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GREEN AND SUSTAINABLE FINANCE: EVIDENCE FROM EUROPEAN BANKS

GABRIELE MAGGIO

42593

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Work project carried out under the supervision of:

João Pedro dos Santos Sousa Pereira

Abstract

The aim of this thesis is to analyze the impact of Green and Sustainable practices on banks' profitability in Europe. In the first part of the work are discussed definitions and principles of the main green financial products. Then the paper analyzes the European institutional background underpinning the Green Finance market. In the final section a Fixed Effects panel model is used to detect the impact of Green practices on European banks' performances. Two different samples are considered in the empirical analysis: one composed by 40 significant banks and a reduced one that considers 30 banks that joined the Equator Principles Framework, both covering the period 2010-2020. Among other bank specific and macroeconomic explanatory variables, ESG score and Green and Sustainable Lending activity are used as measure of sustainability for each institution. Green and Sustainable Lending activity assumes two different forms: a dummy variable for the first sample and a growth rate for the second one. The estimation results show no significance of these green variables in the broad sample and a positive significant impact of the Green and Sustainable Lending activity growth rate on ROE in the reduced green sample, showing that Green and Sustainable practices positively affect European green banks' profitability.

Keywords

Green Finance; Sustainable Finance; ESG; Profitability; Banking

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INTRODUCTION

Sustainability and environmental impact became two of the most discussed and relevant topics in today's society. Even from an economic point of view, the sustainability of investment is becoming, day after day, more important as a consequence of specific international regulation and policies that are requiring a growing and concrete attention to Environmental Social and Governance (ESG) thematic. With the adoption of the United Nations 2030 Agenda for Sustainable Development and the Paris Agreement, both signed in 2015, the international community committed itself to fight climate changes. However, in order to achieve the objectives targeted by the Paris Agreement, it is necessary a radical transformation of the old "Brown Economy" into a new green and sustainable low-carbon economy.

To successfully complete the transition toward this low-carbon and green economy it is now clear that an immense amount of public and above all private investments is needed. Experts estimate that an annual capital investment from 5 to 7 USD trillion is required to achieve the international community environmental goals by 2030. Up to date, unfortunately. The annual investment gap is still huge (around 2.5 USD trillion) and this may suggest that the sustainable revolution has not convinced all investors yet.

Going into details to have more color, under current market conditions, the biggest investor disappointment arises from low interest rate levels. After the 2008 financial crisis, the world's major central banks tried to revive consumption and reduce unemployment by cutting interest rates. Undoubtedly this strategy has had positive effects on the real economy but with obvious limitation. By flooding capital markets with liquidity and keeping interest low, policy makers have encouraged investors to generate financial wealth throughout capital gains. With rates at zero or in negative territory, the investment quality has decreased while leverage surged.

Even if monetary policy has been pushed to its limits, there has been no significant increase in long-term investments and in infrastructure financing, especially for green and sustainable projects. Two of the main reason why the private sector does not seem to be sufficiently interest yet in long-term financing of this kind of projects is the low interest rates level and the operational risks that are often difficult to assess. At the same time, the public sector of most

countries worldwide, especially in developing countries, is unable to address this burdensome investment gap.

The role of central banks and regulatory authorities is crucial in order to fill the green and sustainable financing gap. These, aiming to ensure the macroeconomic and financial stability, have the duty to consider environmental and climate risk in the systemic risk computation. Moreover, central banks and other institution such the European Bank Authority (EBA) or more broadly the Basel Committee, throughout their regulatory control over the financial system and the credit market, are in strategic and strong position to support the development of Green and Sustainable Finance models.

Although the landscape is still not well defined and the discussion about the financial soundness of ESG investments is heated, banks appear to be among those that pay attention the most to this topic. The constant volumes growth of green financial instruments, especially Green Loans and Sustainability Linked Loans in 2019 and 2020, the growing attention to environmental impact and the increasing capital placement into eco-friendly sectors, show how banking institutions want their industry to play a cornerstone role in the sustainable development run.

In light of these considerations, the purpose of this thesis is to evaluate and assess the existence and the extent of the impact that ESG policies and green and sustainable lending activities have on European banking sector's profitability.

In order for this work to be as much complete as possible and properly discuss the above-mentioned topics, it will be divided as follows.

The first chapter will analyze in detail what is meant by Green Finance and what are the most relevant financial instruments in the market, with a focus on Green Loans and Sustainability Linked Loans. Then it will be explored the taxonomy and the reporting standards thematic and what are the procedure in order for an instrument to get the green label.

In the second chapter it will be outlined the current regulatory framework and how the European union is using its regulatory tools to facilitate and encourage the transition toward the green economy. Moreover, it will be discussed the role of macroprudential policies.

In the third chapter, after a careful literature review regarding the determinants of European banking sector profitability, aiming to fill the research gap regarding the impact of green and sustainability lending activity on banks' profits, two model will be used in order to define the impact of two Green variable like banks' ESG score and Green Lending activity.

In the end, the results of the two models will be commented and future prospective and potential recommendation for the green and sustainable green lending market will be discussed.

Chapter 1. GREEN FINANCE: PRINCIPLES AND DEFINITIONS

1.1 GREEN FINANCE DEFINITION

To date, a unique and universal definition of Green and Sustainable finance does not exist. Guidelines have emerged only for specific products within the industry, for example Green Bonds and Green Loans. These two definitions are widely shared among financial industry players but they do not define a categorical reference in the market. In fat, in the market, a Green Bond keeps being a bond and Green Loan keeps being a simple loan with certain characteristics that make them green.

Generally speaking, two different aspects must be considered to understand the difficulty behind the generation of a unique definition of Green and Sustainable Finance. The first regards the sectors and activities that can be financed using green funds. The second concerns the operational standards that have to be followed to label a specific financial instrument as a sustainable instrument.

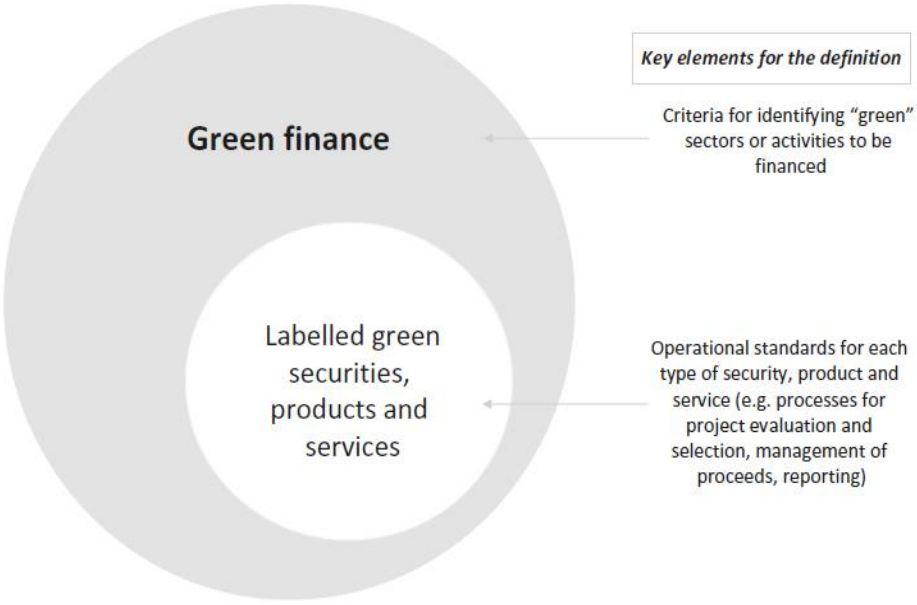
The first aspect involves the analysis of the environmental impact of sectors and activities that are financed with green funds. In light of this, if same sectors and activities are easily eligible to have access to green financing, for example projects related to renewable energy, for many others this evaluation in not always easy, for example projects concerning hybrid vehicles that in any case imply negative externalities on the environment. Currently, there are different taxonomies in the industry, each identifying the sectors and activities that can be considered fully eligible for green financing.

For what concerns the second point, therefore the specific operational aspects to be considered in order to define a security, a product or a service green, different methodologies have been propose in the industry with the main objective of stimulating investors' interest. Specifically, for securities, these standards refer to the processes adopted for the evaluation and the projects to be financed, the way in which the funds are used and the reporting characteristics.

Indeed, are the financial instruments labeled as green, whether products or services, that are the base of green finance definition.

Despite this, there is a broader interpretation of Green Finance that can go far beyond a simple label ensured by compliance with reporting standards.

Image 1: "Green Finance Definition"



[Source: Defining Green Finance: Existing Standards and Main Challenges, *Romain Berrou, Nicola Ciampoli, and Vladimiro Marini*]

The problem of clearly defining what is meant by Green and Sustainable Finance is by no means a minor issue. Indeed, it is at the heart of discussion about the future of this market. This simple definition plays a crucial role for this newborn market for at least three different reasons.

First, defining what is green and sustainable implies deciding which sectors and activities contribute to the achievement of environmental and sustainability goals set by the international community. In this regard, only eco-friendly activities and sectors would benefit from the resources mobilized and channeled by green Finance, while all other activities would remain excluded. Secondly, based on a specific and detailed definition of what is green and what is not in financial markets, specific policies could be adopted to facilitate and encourage green investments, such as reducing capital requirements for financial intermediaries holding and issuing green securities or ad hoc tax incentives. Again, only the most virtuous activity and sectors would benefit in terms of greater availability of resources and lower financing costs.

Third, uncertainty about what green and sustainable means in finance can damage the credibility of this nascent market and, in the medium term, could prove to be one of the biggest obstacles to its development. In fact, it must be kept in mind that, on the financial market, investors who care the most about sustainability are willing to enter the Green Finance market only if their investment decisions are aligned with the scrupulous use of their invested money.

The objective of this first chapter is to offer an overview if what are the essential elements that accompany the definition of Green and Sustainable Finance. It will also delve into the definitions of the main green financial instruments, it will be discussed the issue of reporting standards and finally it will be addressed the Greenwashing problem, one of the main fraudulent pitfalls hiding behind this market.

Given the absence of a common standard, the few financial institutions, Governments and international organizations that are willing to provide a real definition of Green Finance and more generally Sustainable Finance, propose different ones.

- OECD – Organization for Economic Co-operation and Development: Green Finance aims to develop and at the same time reduce pollution and greenhouse gas emissions by minimizing waste and improving efficiency in the use of natural resources.
- German Government: Green Finance is a strategic approach used to include the financial sector in the transformation process towards a low-carbon and resource-efficient economy and fight the climate change.
- PBoC – People Bank of China: Green finance refers to a set of policies and institutional arrangements designed to attract private capital investment in green industries dedicated to environmental protection, energy conservation and clean energy production through financial instruments that include loans, private equity funds, bonds and equity
- European Commission: Sustainable Finance refers to the process of giving the due consideration to social and environmental aspect in investment decision in order to drive the fostering of long-term investment in sustainable assets. Specifically, environment assessment refers to climate change mitigation and more generally to the

environmental risk associate with investments. The social assessment, on the other hand, refers to issues of equality, inclusivity, and investment in human capital and the community.

- FOEN – Swiss Federal Ministry of Environment: sustainable finance is defined as the set of financial services and products that consider all environmental, social and governance aspect in risk management and decision-making processes, aimed at promoting responsible investments that create positive environmental, social and governance impact
- Indonesian Financial Services Authority: Sustainable Finance is defined as the overall support by the financial services industry for sustainable development resulting from a harmonious relationship between economic, environmental and social interest

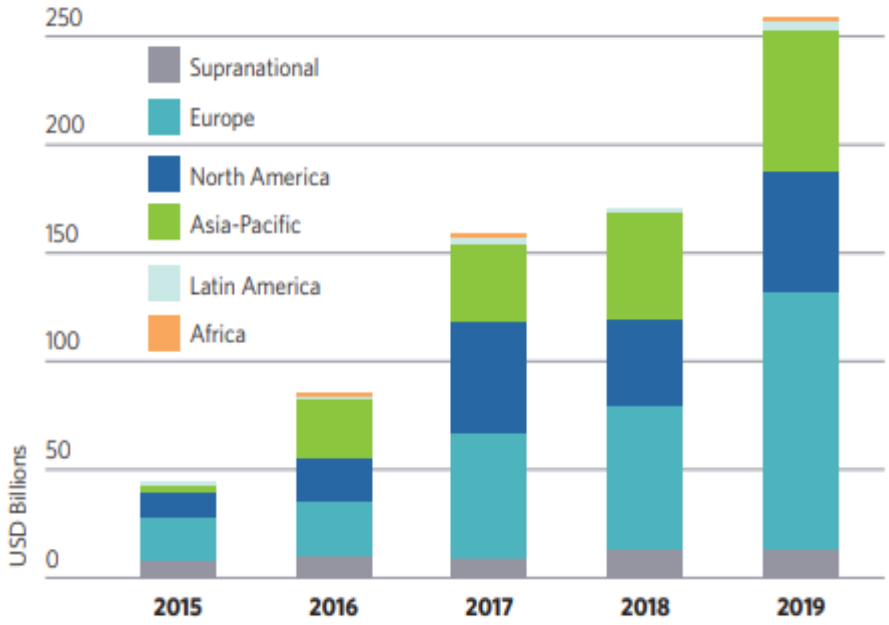
1.2 GREEN FINANCIAL PRODUCTS AND SERVICES

1.2.1 GREEN & CLIMATE BONDS

Green Bonds can be considered the forefathers of the green financial products generation. Since the first issue in 2007 by the European Investment Bank (EIB), the popularity of green bonds has steadily grown and they are now issued daily by international financial organizations, companies and even governments and municipalities. The Italian Government, for instance, is preparing the issue of the first green BTP in 2021.

New green bond issues in 2019 reached USD 258.9 billion compared to the USD 171.2 billion in 2018. Instead, the cumulative volume since 2007 reached USD 754 billion. Below the bar chart showing the volumes divided by world regions over the last five years.

Chart 1: “Green Bond Volume”



[Source: Green Bonds Global State of the Market 2019 Climate Bonds Initiative]

Data shows that the larger amount is issued in Europe, followed by North America and Asia-Pacific. Instead, negligible is the share from less developed regions like Africa and Latin America. Steady by yet important through the years is the volume issued by supernational entities like the European Investment Bank (EIB) and World Bank.

Green bonds are used by issuers to finance specific projects that aim to generate a positive effect on the environment. At the same time, buyers of these bonds have the guaranteed that the proceeds of these bonds will be used for green and sustainable purpose. The projects financed by green bonds mainly involve renewable energy, sustainable management of natural resources, energy efficiency, pollution control and prevention. To date, who purchase the largest amount of green bonds on the (primary) market are institutional investors.

In 2014 has been published for the first time specific principles on Green Bonds (GBP). These have been then updated in 2018 and still constitute the main framework for defining a green bond. These principles represent the guidelines, to be adopted on a voluntary basis, that recommend transparency and promote integrity in the development of the green bond market. These principles are then completed by certification produced by specific agencies that assure investors about the compliance of each issuance with such principles. In this case, we could

define the work of these agencies as “Second Opinions” that have the purpose to assign a green or sustainability label to products. Many are the organizations offering such services, to name a few: Vigeo, Cicero, Sustainalytics, KPMG, EY, Deloitte, etc.

Climate Bonds focus in particular on projects related to climate change mitigation. Differently from green bonds, there is no shared label that could define them. According to that, these kind of products are very often included in the green labelled pool but a substantial difference from Green Bonds: unlike the latter, which are issued by well diversified companies also significant in term of size, Climate Bonds are issued by much smaller entities that often have never used bonds as debt instrument (CBI 2017).

The most innovative trend involves Blue Bonds, the proceeds of which are used to fund projects that aim to safeguard the oceans. The first blue bond was issued in late 2018.

1.2.2 GREEN ASSET BACKED SECURITIES

Following the success of green bonds, more complex structured instruments have begun to emerge in the market. These types of financial instruments, which are constructed following classic securitization schemes are called Green Asset Backed Securities (Green ABS). These products, like common ABS, are generally considered debt and often counted within the Green Bonds universe.

Throughout the securitization, asset that are illiquid are pooled and transferred to an SPV that issues marketable instruments that have the illiquid assets as underlying. The interest and the notional value of these instruments are then repaid from the cashflow generated by the underlying assets.

ABS can be considered green when the underlying assets, which usually do not have a green label, finance projects related to the environment and sustainability and the issuance of these securities structured by the SPV is in line with the criteria defined for Green Bond issues. Given the different kind of assets that could be securitized, Green ABS have a very high degree of heterogeneity. Among these, there are ABS with mortgages for solar energy structures as

underlying, ABS on leases for electric cars, ABS on mortgages for certified low environmental impact residential properties, etc.. Nowadays, Green ABS constitute a substantial portion of the Green Debt market, about 17% according to Moody's estimates.

1.2.3 GREEN FUNDS

The asset management industry has also embraced Green Finance. In doing so, fund managers are progressively developing a range of valuation methodologies in order to integrate the environmental aspect into their investment decisions. These strategies define whether a fund is green or not and are different:

- Best-in-class strategies: they consist in adopting specific criteria to identify the companies that gave the best performance in terms of environmental impact within different sectors and industry
- Thematic strategies: these involve the investment in sectors that are strategic in the battle against the climate change.
- Norm-based strategies: these consist in slavishly following and applying national and international standards in order to build a green and sustainable portfolio.
- Participation strategies: these consist in investing in companies, actively participate in the decision-making processes trough voting rights and encourage eco-friendly activities
- Negative screening strategies: these involve the exclusion from portfolios of those companies that during their activities produces a negative externality that is too costly for the environment.

These funds invest both in equity and debt and therefore provide clients with the opportunity to support virtuous business and organizations in terms of sustainability over the medium-long term. The popularity of this security is growing strongly among retail investors.

1.2.4 GREEN LOANS & SUSTAINABILITY LINKED LOANS

Green Loans are the complementary tool to Green Bonds in the Green Finance Universe. Both have the same purpose but, like common loans, the former benefit forms a certain flexibility and the ability to customize terms and size based on borrowers' needs. In fact, while the size of each green bond issue is necessarily very large, a large portion of environmental and sustainable projects require a fairly small amount of investment. Similar to GBPs, Green Loans follow the Green Loan Principles (GLP), which were developed but the Loan market Association (LMA) in 2018. According to these principles, a Green Loan is defined as "Any type of loan made available exclusively to finance or refinance, in whole or in part, a new or existing green project". In this regard the criteria similar to GBP regarding the use of proceeds, project evaluation and selection, and reporting requirements are considered in order to the loan's compliance with the principles. Like Green Bonds, agencies give a second opinion on whether the product meets LMA standards and they give their own green and sustainable label.

However, if compared to bonds, the green loan market is still in its "early stage" of development and its future success remains unknown. The issuance of green loans compared to a common one, requires additional screening and greater control over the asset financed which inevitably turns into higher operating costs for the banking institution. This is why the wide use of such instruments remains uncertain for the future and could be restricted to very large sizes, reserved for very large companies in order to exploit economies of scale, making them less flexible and much more similar to Green Bonds.

When Green Loans are issued in favor of large companies, at least three technical forms can be identified:

- Bilateral Green Loans: these are bilateral contracts between companies and banks, aimed at financing Green projects
- Syndicated Green Loans: a group of banks finance a company for a specific sustainable project.
- Green Credit Lines: banks make funds available to finance future project and activities in line with the GLP but that have not been defined yet in advance.

However, there are different retail instruments that fall withing the definition of Green Loans. For example:

- Green Mortgages: these mortgages offer retail customers an interest rates lower than the market ones in order to purchase or build a new energy-efficient homes. Banks may also provide funding to convert a conventional home into an eco-friendly one.
- Green Commercial Buildings Loans: these can finance the construction of new buildings in line with stringent environmental standards or to improve existing buildings in terms of energy efficiency and emissions.

Sustainability Linked Loans are slightly different from Green Loans since in not important the existence of a sustainable project underpinning the funding, instead they focus on whether the borrower has begun the transition toward a low carbon business or is willing to improve and addressing other environmental and social issues. The borrower and the lender define the strategic priorities underlying the "improvement plan" and then performance indicators are chosen based on those priorities. These priorities can be measured internally by the borrower or externally throughout a third-party monitoring. In return the lender offers a discount on the loan in term of cost tied to the sustainability and the success of the strategy.

Many examples of performance indicators have been seen in the market. A certainly non-exhaustive list contains:

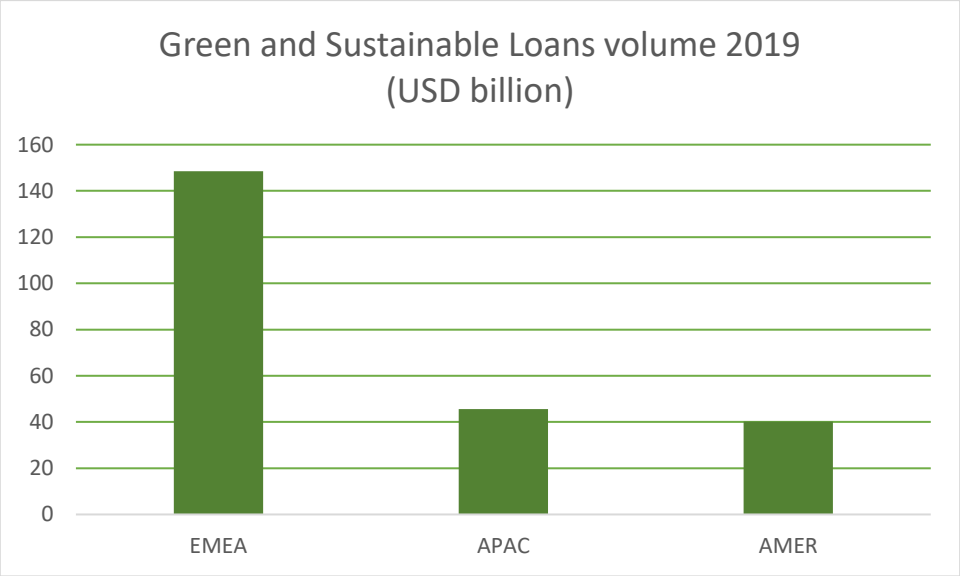
- CO2 reduction and greenhouse gas emissions
- Installation of new renewable energy sources
- Energy saving
- Increase in use of electric vehicles
- Reduction of waste production and plastic use
- Green investments

In the last two years, Sustainability Linked Loans, much more than Green Loans, are a key evolution in the lending market since for the first time ESG strategies are incorporated into the

borrower/creditor relationship and they are no just project based. As happened for Green Loans, the LMA developed the "Sustainability Linked Loans Principles" (SLLP) in March 2019.

In 2019 the Green Loans and Sustainability Linked Loans market counted an issuance volume of over USD 234 billion, two and a half higher level compared with 2018, 70% of which issued in Europe. Also, in 2019, it has been structed the largest Sustainability Linked Loan ever seen in the market: a credit line of USD 10 billion for the energy company Royal Dutch Shell.

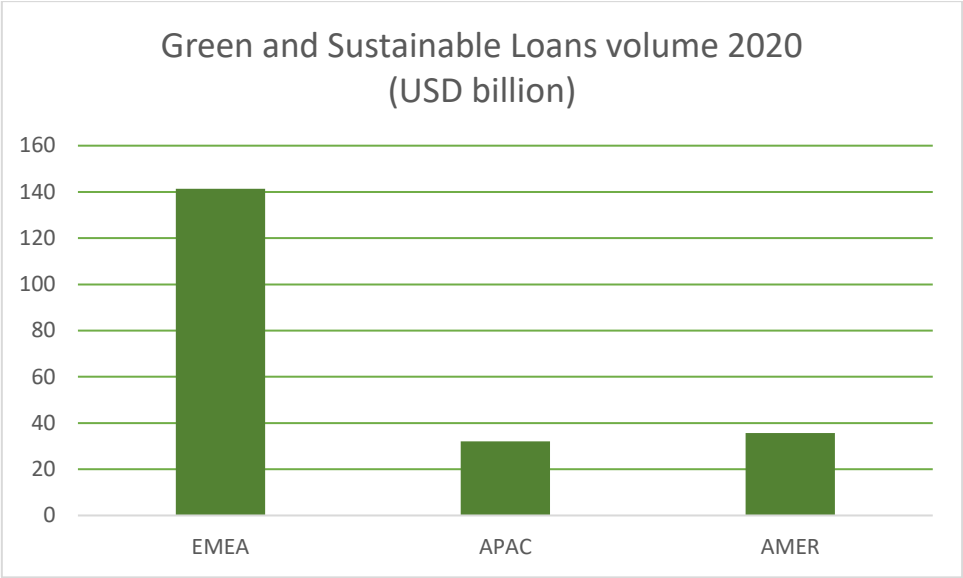
Chart 2: "Green and Sustainable Loans volume 2019"



[source: own elaboration on Bloomberg NEF data]

Instead, volume slightly shrank in 2020 due to the economic situation related to the COVID-19 pandemic which led companies to focus on more short-term form of debt to face the shortage of liquidity. The total amount issued in 2020 has been USD 209 billion and again EMEA has been the most successful market but American countries overtook the APAC region.

Chart 3: "Green and Sustainable Loans volume 2020"



[source: own elaboration on Bloomberg NEF data]

1.3 STANDARDS AND REPORTING

1.3.1 GREEN BONDS PRINCIPLES

Green Bonds Principles (GBPs) have been defined by the international Capital Market Association (ICMA) for the first time in 2014 and then update in 2018. The GBPs are guidelines that are adopted on a voluntary basis and describe the process and the steps to be followed when issuing a Green Bond. The GBPs specifically emphasize the requirement for transparency, care and integrity of the information that is disclosed by the issuer to stakeholders. In addition, the GBPs recommend that at least on third-party agency should confirm the bond alignment with the four core components involved according to the guideline. Those components are:

- Use of proceeds: these should be described in a legally binding document that accompanies the security. In addition, the financed green project must produce tangible and quantifiable environmental benefits. The GBPs define a wide range of projects that are eligible for this purpose, for example those concerning renewable energies, conservation of terrestrial and marine biodiversity, eco-sustainable construction, etc.
- Project Evaluation and Selection Process: in this regard the bond issuer has to clearly communicate to investors the environmental or sustainability objectives, the process

and parameters according to which the process falls within the universe of eligible projects defined by the principles, the process applied to identify and manage potential environmental and social risk associated with the project itself.

- Management of proceeds: these proceeds should be deposited into an account or portfolio separated from other funds of the firm and the issuer should disclose to investors all project development, proceeds placement and the net balance not yet allocated until the bond is fully repaid
- Reporting: issuers should make readily available all information on the use of proceeds until funds are fully allocated at list annually and inform investors in a timely manner if there are any material development in project execution. The annual report should include a list of projects to which the Green Bond proceeds have been allocated, as well as a brief description of the project, expenses and their expected impact

Although the adoption of these principles is not mandatory, they have played a cornerstone role in the structuring of the green market as they have offered to investors a reliable tool to distinguish Green Bonds from other types of debt.

However, it must be pointed out that green debt market can hardly be limited only to products in line with the GBPs and in the same way can not be limited those products that have a green label assigned by a third-party agency. Climate bonds are an example of this.

1.3.2 GREEN AND SUSTAINABILITY LINKED LOANS PRINCIPLES

Following the introduction of GBPs, a very similar framework has been developed by the Loan Market Association (LMA) and the Asian Pacific Loan Market Association (ALMA), which published the Green Loans Principles (GLPs) in 2018 and Sustainability Linked Loans Principles (SLLPs) in 2019. These collections of principles, even if very different, have a common goal: to develop and preserve the integrity of green and sustainable loans by providing guidelines that capture the key characteristics of these type of products.

Both these principles collections are adopted on a voluntary basis and are applied and considered by counterparties based on the characteristics of each underlying loan transaction.

Both GLPs and SLLPs enumerate four key components that defines a Green Loans and a Sustainability Linked Loans.

For GLPs the core requirements are the same of the ones stated in GBPs, with appropriate adjustments given the different nature of the debt instrument.

- Use of proceeds: as with GBPs, the financed project has to produce tangible and quantifiable environmental and social benefits. It should be explicit the portion of financing and refinancing of the project and if the loan is issued in tranches. In this case the specific use of each tranche should be disclosed. GLPs also include a list of projects that can be considered as green.
- Project Evaluation and Selection Process: this point follows exactly what have been said regarding Green Bonds. Therefore, the objectives, parameters and risks of the project must be disclosed to investors.
- Management of proceeds: funds should be deposited in a separate account or tracked appropriately by the borrower to ensure transparency and integrity of their use. If the loan is divided into multiple tranches, depositing each tranche in a separate account is considered the best practice.
- Reporting: again, no differences from GBPs. Reporting at least annually on the use of the proceeds and describing projects in term of expenses and impacts to which funds are allocated.

Despite the strong similarity between GBPs and GLPs, there are at least two key elements that distinguish them. First, the entity to which the principles are dedicated: the issuer in case of GBPs, while the borrower in case of GLPs. This approach limits the role of the organization that operationally issues the debt instrument in the Green Loans determination process. This could imply less engagement of financial institutions in this market. The second aspect is linked to the requirements of external review by third-party agencies, which occurs for Green Loans

just if “appropriate” and is commonly replaced by a simple self-certification by the borrower, thus denoting a greater degree of freedom.

For what concern Sustainability Linked Loans, the approach adopted in SLLPs is very different from GBPs and GLPs. In particular, the key components listed in the guidelines are different from the ones seen before.

- Corporate Social Responsibility Strategy: the borrower must clearly communicate to their lenders their sustainability objectives and their strategies to achieve them. They are also encouraged to disclose what certification or social/environmental standards they are seeking to become compliant with.
- Target Setting and Sustainability Measurement: appropriate sustainable performance targets should be set between the borrower and the lender. These targets need to be compared to a benchmark that usually coincides with company’s most recent performance level (6-12 months). The terms of loans are therefore linked to the sustainable performance of the company. If the firm is able to meet the sustainability target, loan’s terms may become more advantageous (implying for example the reduction in collateral) and, on the other hand, more onerous if the target are not met. Targets can be validated by a third-party entity that confirms their appropriateness and the feasibility. In absence of such opinion, the firm needs to demonstrate its internal expertise that would allow the achievement of the target and disclose how objectives have been defined.
- Reporting: when possible, borrowers should make readily available all information regarding the achievement of sustainability goals at least annually. Companies may choose to share this information only with the lenders, therefore there is not the requirement to disclose information to the public as long as the principles of adequacy and transparency are respected.
- Review: the need for an external performance review is negotiated between borrower and lender in the contract. Therefore, a Sustainability Linked Loans does not need to be labeled as “sustainable”, even if such label exists and could be assigned from a third

agency. The entities that are authorized to carry these reviews are rating agencies, environmental consultant and auditors.

1.3.3 REVIEW AND REPORTING

In order to provide transparency on the use of proceeds from green securities, many organizations have developed specific methodologies to verify the effectiveness of projects with positive social and environmental impacts. These reviews refer to pre and post issuance services and can have the specific form of third-party assurance reports or green ratings. Example of green ratings are S&P's Global Ratings Green Evaluation and Moody's Green Bonds Assessment. In most cases, regardless of who the auditor is, what is assessed is the alignment of the securities to the various GBPs, GLPs and SLLPs.

As environmental and social responsibility grows among all companies, reporting on ESG performance to various stakeholder has begun to play a key role in business. In this regard there are different recognized reporting standards - one of the most important used is the Global Reporting Initiative (GRI), Sustainability Reporting- and many are also the organizations that help companies in disclosing their sustainability information and meet the requirements imposed by the standards. In addition, these organizations provide assurance on the veracity of companies' reports on the impact and sustainability of their activities.

Indeed, reporting on the impact and sustainability of their activities is crucial for the success and growth of the Green Finance market.

1.3.5 THE GREENWASHING RISK

Hand in hand with the development of standards and the growth of certifications and reviews of green financial instruments, there is an emerging discussion about how both companies and financial institutions can use misleading advertising to promote themselves and their products building a false eco-friendly image. This phenomenon is known as "Greenwashing" and is not exclusively specific for the Green Finance market, in fact it was observed for the first time in the consumer goods industry.

Greenwashing can take many forms ranging from changing the name of a product to induce the perception that it is natural or environmentally sustainable, when it is not, to the launch of advertising campaigns conducted to promote a false green image. The literature has noted how increased awareness within society about the potential environmental impact of products has become a key driver for product demand. As a result, it has been observed that many products have benefited from green advertising even though these products did not demonstrate the vaunted environmental attributes (Baum 2012; Delmas and Burbano 2011).

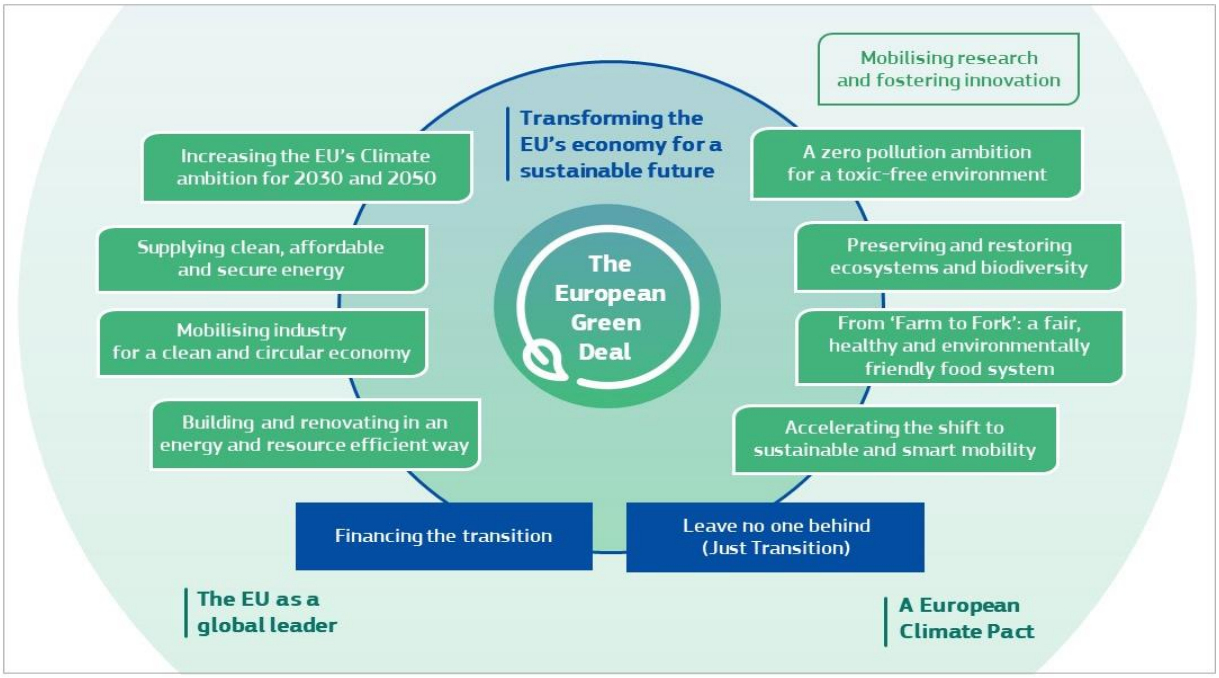
As with any industry and according to the same dynamics, the risk of Greenwashing has progressively penetrated as well in the green and sustainable finance market. Indeed, the lack of universal definitions and standards amplifies this risk because it opens the way to different possible interpretations of what sustainable means in financial markets. For this reason, as certifications and reviews continue to grow and are proving critical for this market, we should expect regulations on disclosures regarding the environmental impact of financial products and services labeled as green and sustainable to become more stringent.

Chapter 2. INSTITUTIONAL BACKGROUND

The objective of this chapter is to review the main milestones in the still going on regulation process regarding the integration of ESG factors in the European financial markets.

Following the subscription of the "2030 Agenda" from the United Nations in 2015, the European Union started its own inclusion process of sustainable and green thematic in the financial system, signing the Paris Agreement in December 2015. From here the UE commits itself in the transition toward growth models that include environmental and sustainable topics. An important year in this process has been the 2018 with the launch of the Action Plan Financing sustainable Growth in which European Countries set the goal of improving investments in the sustainable projects and promote the introduction of environment, social and governance criteria (ESG) in risk management of financial institution. Since then all European Institution constantly work in order to harmonize all definitions regarding green and sustainable finance with the objective of reducing all asymmetry that could arise in this young yet fast pacing market. In the end, the last step that has been taken is the Green Deal, presented from the European Commission in December 2019, that consist in a roadmap to make the Europe the first climate-neutral continent by 2050, turning into opportunities all the environmental and social challenges the whole world is today facing.

Figure 2: “EU Green Deal Summary”



[Source: The European Green Deal – European Commission]

2.1 THE PARIS AGREEMENT AND THE EUROPEAN ACTION PLAN

Climate and social changes are redesigning our world. This is the main reason why, in December 2015, 195 countries joined in Paris the XXI United Nations Climate Change conference, signing a deal stating the commitment of each participating country in taking care of environmental issues affecting the society.

The main objective set by the parts is to keep the average worldwide temperature increase belove 2 C° in the long term, compared to the pre-industrial age average. In this way, United Nations, aims to reduce impact and risks related to climate changes.

The European Union role has been determinant for the success of the agreement. In fact, Europe has always had a strong and consistent track records compared to all other countries in the world regarding the fight in greenhouses emissions. Moreover, among other major economies, it has been the first to present a proposal regarding its contribution to the new agreement. This proposal enumerates three main goals to be achieved by 2030:

1. Reducing the greenhouses emissions by the 40% compared to 1990 levels (today this reduction is around the 25%)
2. Enhance the renewable energy consumption reaching at least the 27% of total energy consumption
3. Improve the energy efficiency and saving at least by 30%

To obtain these results the European Commission estimated an average annual investment of EUR 180 billion in addition to those already allocated to achieve the energy and climate objectives. Moreover, the European Investment Bank raised these estimates to EUR 270 billion investments per year for transport, energy and resource management infrastructure sectors.

In December 2016 European Institutions started a financial market reform program and the European Commission formed the "High Level Expert Group on Sustainable Finance" – HLEG, a group of experts that is in charge of elaborate recommendations useful for the growth and the enhancement of sustainable finance and that should drive the capital markets in the financing of specific economic activities that allow to meet environmental goals.

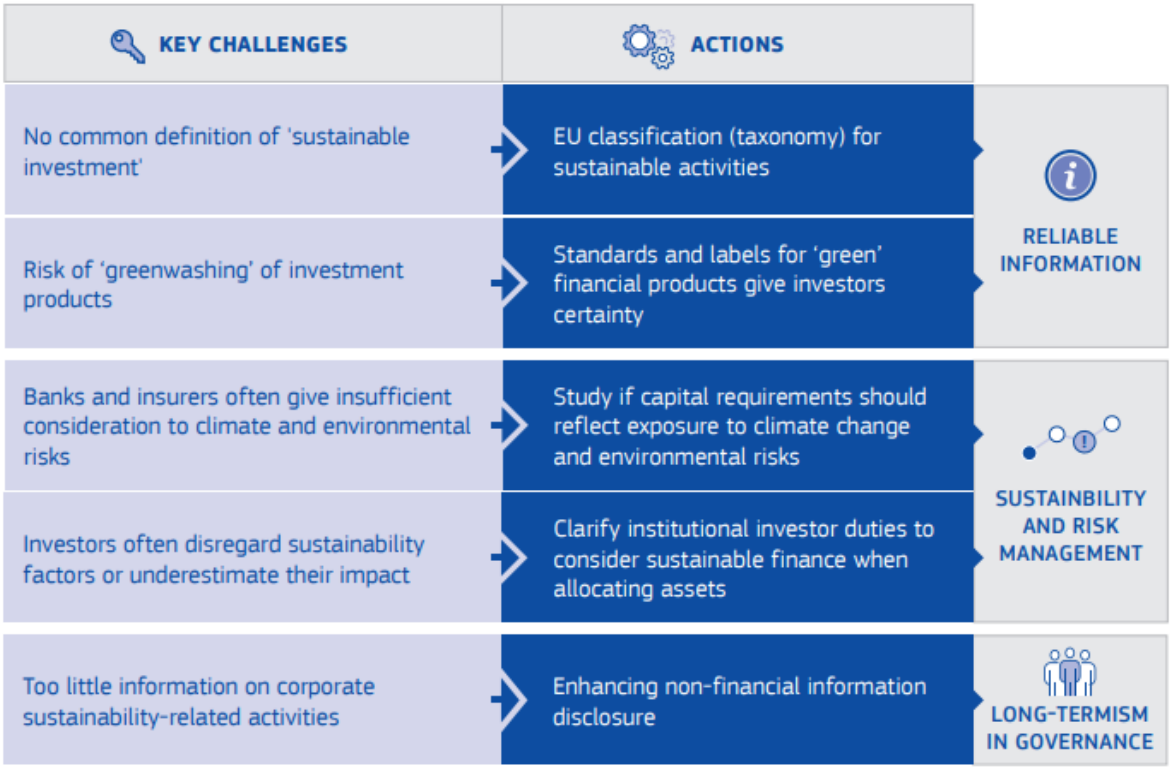
In January 2018 the HLEG published the report "Financing a sustainable European Economy" in which clearly states that the European financial system must:

- Improve the contribution of finance to inclusive and sustainable growth
- Consolidate the financial stability through the integration of ESG factors in investment decisions.

Based on this report the European Commission approved the "Action Plan Financing Sustainable Growth", a strategy that set goals and activities to implement, involving all financial player: Investors, Asset Managers and Banks.

The below table summarise what are the main challenges that the action plan address and the way in which these challenges should be faced.

Figure 3: "EU Action Plan Financing Sustainable Growth challenges"



[Source: Financing Sustainable Growth – European Commission]

More in details, the plan could be divided in three main objectives and it defines ten specific actions that should be undertaken.

1ST OBJECTIVE: "Reorienting Capital Flows toward a more sustainable Economy".

Since actual investment levels are not enough to support a sustainable economic system, increase the investment volume in environmental and social impact project is needed. The roadmap defines five ways to achieve this goal.

1. "Establish an EU classification system for sustainable activities": in order to have the desired capital flow movement toward the most sustainable sectors, is mandatory to define clearly and uniquely which are sustainable activities and which are not, reducing the green washing phenomena. Therefore, Europe sets the goal of defining a green and sustainable taxonomy with the purpose to define guidelines for investors who are interested in activities that mitigate and tackle environmental and social issues. The secondary, yet important, purpose is to include this taxonomy in EU law, using this on

different areas such as branding, standardizations, environmental factors for prudential requirements and sustainability indexing.

2. “Creating standards and labels for green finance products”: in order to improve the trust of all players (companies, banks, investors, governments, other financial institution) in the Green and Sustainable Finance market and facilitate the access to green and sustainability products, it is necessary to define a common standard for such products. This will help the growth of the green financial sector easing the identification of the products and consequently boosting the capital flows from investors and lenders into sustainable projects. About that the European Commission is exploring the use of the EU ecolabel framework for the main green financial products.
3. “Fostering investment in sustainable projects”: Even if the European Institutions commitment is injecting capital in sustainable project, mobilising private capital keeps being the main requirement for green economy success or, at least, for a more sustainable economic system.
4. “Incorporating sustainability when providing financial advice”: financial institutions that provide financial advisory services have a cornerstone role in the transition toward a more sustainable economy. In details, thanks to the Action Plan, the Markets in Financial Instruments Directive (MIFID II) and the Insurance Distribution Directive (IDD) have been amended in 2018. With the latest updates financial intermediaries have to take into account the ESG investment objectives of the client and their environmental risk preferences in advising the right financial instrument. Based on the European Commission invitation, the European Securities and Market Authority (ESMA) included provisions on investors sustainability preferences on its guidelines regarding the assessment of the adequacy of financial instruments.
5. “Developing sustainability benchmarks”: traditionally used equity and debt benchmarks, which play a primary role in the pricing of financial instruments, do not reflects sustainability objectives or, at least, only to a limited extent. Therefore, these indexes are not adequate for measuring the performance of sustainable investments. According to this in the last two years many ESG benchmarks have been developed. In

order to minimize the "Greenwashing risk" and make an index reliable, the pick-up methodology has to be as transparent as possible and compatible with the objectives outlined by the international community.

2nd OBJECTIVE: "Mainstreaming sustainability into risk management".

In order to integrate ESG criteria in the risk assessment in financial markets, the European Commission planned three well defined actions.

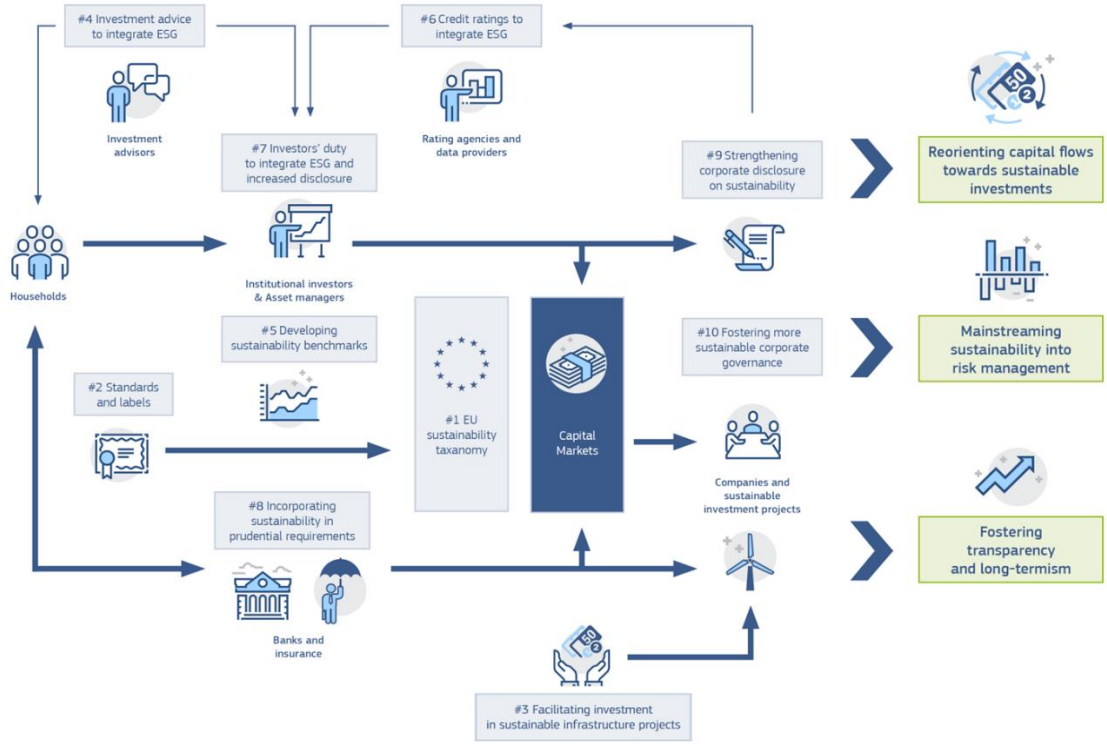
1. "Better integrating sustainability in ratings and market research": Credit rating is a crucial element for a healthy financial market since it allows investors to have information about the creditworthiness of companies and institutions. The European Commission, aware of such importance, in the Action Plan asked ESMA to promote the integration of sustainability and long-term environmental risk in rating agencies assessments. According to that, in recent years, market research providers and rating agencies intensified their efforts to evaluate companies ESG performances and their ability to face environmental risks. Unfortunately, the absence of a well-defined sustainability standard makes the evaluation still very hard.
2. "Clarifying institutional investors' and asset managers' duties": different European directives (UCITS, AIFMIF and MIFID II) requires institutional investors and asset managers to act in the best interest of their final investors and beneficiaries. Before the 2018 these rules were not sufficiently uniformed regarding ESG risk assessment. Moreover, financial institutions and wealth managers did not adequately communicate to their clients how they considered ESG factors in their investment decision process.
3. "Introducing a green supporting factor in the EU macroprudential rules for banks and insurance companies": the European financial market is bank-based, therefore protect banks from risk linked to non-sustainable growth must be a priority. According to that the European Commission instructed the European Bank Authority to "Identify the principles and methodologies for the inclusion of ESG risks in the review and evaluation performed by supervisors" and "Explore the prudential soundness of introducing a more risk sensitive treatment of "green asset".

3rd OBJECTIVE: “Fostering transparency and long-termism”

In order to boost the transparency of the green financial market and ensure its success and wellness over the long term, the EU Commission defined two actions to undertake.

1. “Strengthening sustainability disclosure and accounting rule-making”: in June 2019 the EU Commissions amended the disclosure of non-financial reporting Directive allowing all corporates to flexibly disclose relevant information on key environmental, social and governance aspect and all the risk related to these aspects. In order to have a wealthy investment process toward green and sustainable business the Commission advices to find a fair compromise between flexibility and standardization of information on which investment decisions are made.
2. “Fostering sustainable corporate governance and attenuating short-termism in capital markets”: this specific action is based on the assumption that managers are commonly too focused on short term financial goals, mainly due to capital markets pressure, with the consequence of disregarding opportunities and risk related to environmental and sustainability factors that, by definition, require a long term commitment. That is why the EU Commission, on February 2019, requested ESMA, EBA and EIOPA to produce advices in order to reduce the short-term pressure on Corporates due to financial performance goals achievement. At the same time the Commission, alongside other authorities, started to consider the possibility to require boards of directors to mandatory develop and disclose a sustainability strategy and define measurable sustainability targets according to the long-term interest of the company.

Figure 4: “EU Action Plan Financing Sustainable Growth Actions”



[Source: Action Plan: Financing Sustainable Growth – EU Commission]

2.1.1 EU PARLIAMENT AND EU COUNCIL REGULATION 2018

In the spring of 2018, the action plan started to become alive through different European Parliament and Council Proposals.

- Regulatory Proposal 2018/0178 on the instruction of the "Sustainable Investment Framework".

  This proposal defines common criteria to establish when an economic activity should be defined environmental friendly and sustainable and outlines a process that allows the introduction of a multilateral platform for an European Union classification system based on specific green criteria with the purpose to clearly define which activities are sustainable and which are not. It has been decided that such activities should be identified progressively taking into account market practices and initiatives in order to extend the taxonomy to environmental issues not yet analyzed. The ultimate goal of this

proposal is to make aware investors and all financial market operator of which could be considered sustainable in their investment decision.

Specifically, the art. 3 of the legislative proposal defines the "Do not significantly harm" principle, according to which an activity is considered sustainable in compliance with the taxonomy only if it contributes substantially to the achievement of one or more environmental objectives without causing damage to the achievement of others.

- Regulatory Proposal 2018/0179 on sustainable investment and environmental risk information.

  The objective of this proposal, that modifies the EU Directive 2016/2341, is to introduce new disclosure requirements for institutional investors, therefore asset managers, pension funds, insurance companies, etc., regarding the method used to integrate environmental, social and governance factors into their investment process decision when delegated by their customers. This proposal becomes necessary also to overcome the confusion in European financial market due to different laws among member states. In fact, differences in trade priorities among states led to different information standards and practices. Therefore, a uniform framework regarding this subject was needed to avoid confusion and difficulties in comparing financial instruments and services across euro states and enhance the market.

  As stated in the art. 3 of the proposal, Intermediaries are now required to publish on their website the ESG integration policies and the environmental risk related to their investment decisions. Moreover, art. 4 requires who provides financial services to describe the procedures and the conditions on which the sustainability risk is integrated in the decisions, how it may affect the investment return and how financial instrument are consistent with environmental and sustainability objectives. For example, whenever a green index has been defined as a benchmark in a sustainable investment, intermediaries must specify the reason of any misalignment from the index weightings and the reason of such change in term of risk and sustainability.

  Finally, intermediaries must publish periodic reports on the impact of an ESG investment, describing the overall impact of the product in environmental or social

terms, using specified sustainability indicators (an example could be the percentage greenhouse emission reduction). If a green index is used as benchmark the impact of the investment should be compared with the impact of the green index and with the impact of the broad market index.

- Regulatory Proposal 2018/0180 regarding low carbon benchmarks and positive carbon impact benchmarks.

  The "High Level Expert Group on Sustainable Finance" reported that benchmarks have an indirect but important impact on investments. Despite index providers have developed a wide range of indicators and criteria that considers climate and sustainability related topics, their weight in the overall portfolio allocation remains limited. The aim of this proposal is to improve ESG transparency in benchmark creation methodologies and enumerate well defined standards for low-carbon indexes. This makes indexes more comparable among themselves and therefore makes easier and clearer portfolio managers' investment decisions.

  The regulatory proposal introduces two categories of benchmarks: low carbon emission indexes and positive carbon impact indexes. The former involves the selection of underlying assets that produce lower CO2 emission compared to a broad standard benchmark. The latter identifies those kinds of activities that contribute to reduce the average CO2 emissions. The effect desired is to concentrate and identify issuers and asset with a strong positive impact on environment. In few words, the low carbon indexes reduce stocks of companies that have negative impact on climate change, instead positive carbon impact indexes increase the percentage of issuers and assets that have a positive impact.

  The European Parliament, based on Technical Expert Group advice, in 2019, gave a name to the above discussed low carbon benchmarks:

  1. EU Climate Transition Benchmarks: aimed at reducing the carbon footprint of a standard portfolio. In details these indexes consider companies that follow a

well-defined, scientific and measurable “decarbonization path” in line with the long-term global worming goal set by the Paris Agreement.

2. EU Benchmarks aligned with the Paris Agreement: in this case more ambitiously, indexes are composed by companies with characteristics that clearly contribute to 2 C° objective set by the Paris Agreement.

2.2 THE TECHNICAL EXPERT GROUP ON SUSTAINABLE FINANCE AND THE GREEN TAXONOMY

The Technical Expert Group on Sustainable Finance is a multi-stakeholder task force formed by 35 experts from financial, academic, entrepreneurial and civil society sectors. It has been appointed by the European Commission in June 2018 to provide advice on four priority topics related to environmental regulation proposed by the Commission:

1. European Classification System and Taxonomy: it is necessary to define standards and labels for sustainable financial products that channel private capital to the green economy
2. European Green Bonds Standards: the group defines objectives and characteristics of green bonds and evaluates incentives for issuers
3. New benchmarks for low carbon investments
4. Guidelines to improve transparency on climate-related information: the purpose is to update the Non-Financial Disclosure Directive, working on the possibility of improving reporting requirements with risks associated with climate change.

Between 2018 and 2019, the TEG drew four different reports, each one focused on one of the above thematic.

The one related to the first topic, the “Taxonomy Technical Report”, defines the classification of eco- friendly and sustainable activities with the goal of driving investors and companies in the transition to a low carbon economy. This taxonomy includes a list of economic activities alongside technical criteria that computes their environmental impact. Those activities have

been chosen based on the possibility to contribute to six environmental goals set by the European Commission:

1. Climate change mitigation
2. Adaption to climate change
3. Sustainable use of water and protection of marine resources
4. Transition to the circular economy, reduction and recycling of waste
5. Prevention and control of pollution
6. Protection of biodiversity and health of eco-system

In order to become green labeled, an activity must satisfy three well-defined criteria:

1. Positively contribute to at least one of the six environmental objectives ("Substantial Contribution")
2. Do not produce any negative impact on the pursuit of other goals ("Do Not Significantly Harm")
3. Be carried out in compliance with minimum social guarantees

In this taxonomy, the TEG defined qualitative and quantitative requirements that assess if an economic activity contribute or not to the achievement of one of the six goals. The multi-stakeholder nature of the group became relevant in defining these principles since it summarizes technical know-how and competences from different sectors, being able to state well suited requirements for a broad range of economic activities. It is important to highlight that the classification is based on the type of economic activity and not the type of companies or sector. In this way each company, even if belonging to a carbon intensive sector, would be able to disclose which activities in their business contribute to environmental objectives.

The importance of the taxonomy for green finance industry is relevant, in fact many are the areas in which the TEG classification system applies, for example:

- The definition of activities eligible for green financing
- The measurement of capital flow toward green and sustainable economy

- The design of green investment policies aligned with customers' sustainability preferences
- The creation of clear and transparent market information

Financial markets participants benefit from this taxonomy because they are facilitated in identifying green and sustainable activities and consequently integrate ESG factors in their investment decision. Not less important, the vividness on the sustainable activities' definition would limit the Greenwashing risk. Higher transparency and lower risk would result in higher interest in green products from investors and this interest would encourage companies to incorporate sustainability goals in their business strategies.

The Taxonomy Regulation was published in the Official Journal of the European Union on 22 June 2020 and entered into force on 12 July 2020.

2.3 ESMA TECHNICAL ADVICE ON CREDITWORTHNESS VALUATION

The 18 July of 2019 the European Security Market Authority published its technical advice on the sustainability factors consideration in the credit rating markets and its guidelines related to disclosure requirements applicable to credit rating as asked by the EU Commission in the Action Plan.

ESMA assessed the level of ESG factors consideration both in specific credit ratings actions and in credit ratings market in general. Form this assessment emerged that Credit Rating Agencies are already taking in consideration ESG factors for their ratings, however, given the different methodology used by each institution, the effectiveness of their valuations varies significantly. Nonetheless these kinds of differences, given the specific role that credit rating plays in the European regulatory framework for the purpose of the credit risk assessment, ESMA explicitly advised against the amendment of the Credit Ratings Agencies regulation regarding the inclusion of sustainability considerations in all ratings assessments. In particular ESMA, asked the European Commission to ensure that there are sufficient regulatory

guarantees for other rating products, different from credit, to meet the demand for pure sustainability assessments.

The ESMA president Steven Maijoor said that financial market regulation must reflect the climate change that is taking place, moreover, given the increasing demand in sustainability assessments in credit ratings, supervision for investor protection should be intensified.

Even if no amendments to the Agencies regulation have been made, guidelines have been created to allow greater transparency and homogeneity on how ESG factors are included in credit rating assessments.

ESMA also analyzed the current ESG integration practices in credit rating market. The premise behind this kind of assessment are mainly two:

1. Credit ratings are reflection of the creditworthiness of an issuer or an entity and not a sustainability assessment, therefore it is not possible to evaluate sustainability practices in a market that does not consider this aspect.
2. ESG factors can be considered part of the credit rating, but the credit rating cannot be interpreted as an opinion on the sustainability of an issuer.

From the assessment, the conclusions enumerated by ESMA are three

- The consideration of ESG factors as key factors in determining the rating varies according to their relevance to the creditworthiness of the issuer, therefore this relevance is given by the underlying methodology used in the assessment. At the same time these methodologies take into account ESG factors only when considered relevant. For example, when an agency evaluates the creditworthiness of an insurance company, it takes better account of environmental events and natural disaster, therefore ESG implication, due to the immediate relevance in insurance company business model.
- Credit ratings should not be considered as opinions over the sustainability of an issuer or an institution. This is not the purpose of the credit rating and it would not be consistent with the role and the definition of rating stated in the Credit Ratings Agencies Regulation. Given the important role that credit ratings play in the financial system it is

not appropriate to amend the regulation in order to impose an explicit analysis of ESG factors within creditworthiness assessment.

- In order to increase transparency and help investors perform their own green due diligence, it is necessary to update the disclosure requirements on how ESG factors are considered in the credit evaluation process aiming to ensure that Ratings Agencies regulatory framework is up to date with ESG developments in the financial market. ESMA has already taken a first step with the formulation of guidelines on ESG disclosure procedure of which is currently monitoring the proper application. Considering the growing demand for sustainability assessments in the financial markets a regulatory tightening regarding this specific rating product is to be considered the most probable next step for the industry. In fact ESMA is aware that the introduction of regulatory requirements for green financial products based on such sustainability rating that have no guaranties for their own integrity and reliability, since there are based just on guidelines and not proper rules, generates a certain degree of risk. Given previous negative experiences of over-reliance on ratings before the financial crisis a brand new ESG rating regulatory framework, separated from the credit one, is required to mitigate any risk for investors and financial stability.

2.3.1 GUIDELINES ON SUSTAINABILITY INFORMATION DISCLOSURE IN CREDIT RATINGS

These guidelines aim to increase the overall quality, consistency and transparency of Rating Agencies credit assessments. These are a detailed list of sustainability information regarding an issuer or an institution that should be disclosed after a credit review, allowing financial players to better assess how much ESG factors affect a rating.

Where sustainability factors have been a key element behind a change in a credit rating or a previously attributed credit outlook, ESMA requires agencies to report:

- If one of the key drivers behind the change in rating matches the categorization of ESG factor as defined by the agency.

- Identify such ESG factors.
- Explain why these ESG factors were relevant for the credit rating or outlook.
- Explain of these factors are computed and included in the credit assessment in terms of methodologies and models used.

2.4 EBA CONSULTATION OVER ESG RISK ASSESSMENT IN LOANS MONITORING

The European Bank Authority (EBA) developed guidelines for the creation and the monitoring of loans. In the last version of such guidelines, defined in September 2020 and not yet in force, EBA includes the ESG risk among the elements to be assessed when a loan is issued.

EBA defines ESG risk as: "the risk of any negative financial impact to the institution, from the current or prospective impacts of ESG factors on its counterparties".

The guidelines define the supervisory expectations for institutions when their lending activities include technological innovations, environmental factors and green lending. In these guidelines, EBA introduces the "green loan dimension": it defines requirements for the consideration of environmental factors and associated risk in banks' credit policies and procedures. Specifically, here the most important regulations introduced:

- Institutions should include ESG factors and related risks and opportunities in their credit risk management practices, polices and procedures. When a green loan is issued, these policies and procedures should be specific to the green product, in order to cover both the granting and the monitoring phase in the proper way, differently from a common loan. In particular, such policies and procedures should:
    1. Provide a list of projects and sustainable criteria that the institution considers eligible to give a green label to the loan.
    2. Specify the process through which the institution is assessing if the proceeds from the green credit line issued are used correctly. Such process should include:

gathering information about borrowers' sustainability and environmental objectives; evaluate the compliance of borrowers' financing projects with the requirements established for green projects; ensure that borrowers have the willingness and the ability to monitor and report the allocations of the proceeds for the green projects; monitor on a regular basis that the green proceeds are allocated correctly (which may consist, for example, in asking borrowers to provide updated information about the use of proceeds on a regular basis until the end of the related credit line).

- Banks should integrate their green loans policies and procedures in their general sustainable finance objectives and strategy. In particular, institutions should clearly set qualitative and quantitative goals to support the development of their green lending business and assess how much this development is in line with or it is contributing to their overall environmental and sustainability goals.
- Institutions must consider environmental and climate change related risk in their credit risk policies and procedures. Borrowers' financial performances could be affected by climate change.

  EBA defines two types of risk: transactional risk and material risks.

  Transactional risks arise from the transition to a low-carbon and environmental resilient economy and include: political risks (for example mechanisms that increase fossil fuel prices or policies that increase the economic costs of carbon emission); legal risks (for example risks of lawsuits that could arise from not having avoided or minimized the negative impact on the environment or the failure to adapt to climate change policies); market risks (for example if customers preferences move toward more sustainable and environmental friendly products); reputational risks (for example the difficulty in attracting and retaining customers, employees and investors due to an environmentt injurer image).

  On the other hand, material risks are basically two: acute material risks that arise from weather conditions and natural disaster; chronical material risks that come from long term climate changes.

Initially the publication of the guidelines final version was scheduled for December 2019 and to entry in force by June 2020. It has been moved to May 2020 and they will be in force from 2021 as required from European banks in order to be able to prepare themselves to put in place one in the best and proper way this that seems to be one of the most important milestones for green finance industry.

2.5 ESA CONSULTATION OVER ESG FACTORS DISCLOSURE RULES

The European System of Financial Supervisors (ESA) that is composed by EBA, ESMA and EIOPA, in April 2020 published a consultation document aimed to propose disclosure standards on ESG factors for markets participants and products. These rules have been developed under the EU regulation on sustainable disclosure requirement in the financial services sector published by the European Council in 2019, with the aim of strengthening the protection of end investors with the improvement of the information quality regarding financial products provided to clients.

ESA developed regulatory technical standards over the content, the methodology and the presentation of ESG information both at an entity and a product level. These proposals are in line with the establishment of a framework that incentivize sustainable investments as mentioned in the Action Plan and advised by the TEG, the already said “green taxonomy”.

Here the key consideration raised from the consultation:

- The main negative impacts that investment decisions have on sustainability factors should be clearly disclosed on the entity’s website. Specifically, the proposals set out how such public disclosure should be made. The disclosure should take the form of a due diligence policy statement, showing how investments negatively impact indicators related to sustainability and environment, social and employee issues, respect for human rights, corruption issues, etc. ESA also included a draft list of indicators measuring negative impacts, in collaboration with the Research Centre of the European Commission and the European Environment Agency.

- Financial products' sustainability characteristics and objectives should be disclosed in the precontractual documentation and on intermediaries' web site. Proposals that are included in these regulatory technical standards indicate rules for implementation of this kind of communication, guaranteeing transparency on how the products meet their sustainability characteristics and objectives. Moreover, they define the additional information that should be provided for products which are compared to a green benchmark.
- In the end, at the product level these proposals give disposition on which kind of information should be disclosed in order to have a product compliant with the "Do Not Significantly Harm" principle.

2.6 THE MACROPRUDENTIAL ROLE: BASEL POTENTIAL GREEN TOOLS

After the financial crisis, regulators decided to improve the existing financial regulatory framework in order to enhance the resilience of the financial system. This framework, still in force, is the Basel III agreement that has the objective of tackle the systemic risk of the financial sectors and mitigate consequences of financial disruption on to the real economy has happened back in 2008.

However, in the current Basel III framework the environmental and climate related risks are barely named and they are not considered in the prevention tools put in place. In fact, Pillar 1 that define capital and liquidity requirement for banks, do not require to assess explicitly the impact of "climate-related risks" (CRRs) on financial institutions exposures. Moreover, many economists highlighted how the regulatory framework stimulate short term practices in financial markets, clearly creating an impediment to the capital mobilization toward green and sustainable projects that require a "patient" capital and are long term investments by definition. Basel III applies a lower risk weighting to short term securities in balance sheet. This results in higher capital requirements for institution that are prone to longer term lending.

Table 1: "Basel III's Pillars"

Basel III's 3 Pillar Framework

Pillar 1	Pillar 2	Pillar 3
Minimum Capital Requirements	Supervisory Review Process	Market Discipline
Additional/Refined Capital basis	**Supervisory Review Process**	**Market Discipline**
-Liquidity Coverage Ratio (LCR) -Net Stable Funding Ratio (NSFR) -OTC Derivatives charge -Quality and Level of Capital -Leverage Ratio -Capital Conservation Buffers -Countercyclical Buffers -Enhanced Loss Absorption Clause (Write-off or Debt Conversion	-Firm-wide Corporate Governance -Managing Risk Concentration -Alignment of LT incentives -Sound Compensation Practices -Capital (ICAAP) -Firm-wide risk management -Valuation Practice, Stress Tests -Supervisory Review Evaluation Process (SREP)	-Risk Management - Market - Credit - Operational -Regulatory Capital components -Detailed Reconciliation of Capital -Regulatory Capital Ratios -Securitisation Exposure

[Source: Own Elabotation]

The above table shows an overview of the 3 pillars framework of Basel II.

Even if no international standards are yet emerged to support the inclusion of ESG topics in banks' risk management system, Banks are becoming aware of the importance and the impact of green and sustainability factors in their business.

At the moment the implementation of environmental issues in credit decision and risk management just depend on national regulation but is clear that central banks and regulators should play a cornerstone role in the run to the green economy.

Many are the tools enumerated in the Basel agreement and, even if the agreement does not give specific rules about environmental topics, those tools could be used to foster green investments in further regulation updates.

- Capital Requirements. A new green implementation of this tool gained huge support from Europe and specifically from European Commission (Dombrovsky Speech 2017), the High-Level Expert Group on Sustainable Finance (HLEG 2018) and EBA (2018). This update concerns the so called "Green Supporting Factor" (GSF). This factor emphasises the need to include green finance goals in banks' requirements, with the final objective of incentivize and easy the capital flow from banks to green and sustainable projects.

  This mechanism should work as a similar one already used in the framework to incentivize the landing activity toward small and medium enterprises. It implies the adjustment of minimum capital requirement (CAR) by taking into account a lower risk weight for loans financing the transition to a low carbon economy, offsetting the long-term negative nature of the capital investment. In this way, financing practices to low carbon activity would have lower pressure on banks' balance sheets. Lowering the risk of green loans and generally green assets is one of the most prominent objective to ensure green loans market success since, using the current weighted mechanism of credit risk measurement, an higher risk is assigned to environment friendly projects funding due to their long payback periods.

  A simplified equation that includes the GSF should be the following:

$$Bank's\ CAR = \frac{Bank's\ total\ capital}{\alpha * Brown\ Loans + (\alpha - GSF) * Green\ Loans} \geq \beta$$

Where α is the risk weight applied on assets and β is the capital requirement set by regulators.

Even if the direction is right many are reluctant to this kind of change in capital requirement. In fact, the implementation of the GSF factor would consist in a decrease in bank's regulatory capital vis-à-vis the current standard. Moreover, since the volume of green lending is still low compared to other loans, there are no empirical evidence about the risk level of green credit and no evidence regarding the possible green and sustainable lending increase. In the end a scenario that must be taken in consideration with such capital incentive is the possible development of a green bubble.

In light of the above considerations, many authors are in favour of a "Brow Penalizing Factor" (BPF), better than the GSF. In this way it would be required to banks to hold more capital if they finance carbon intensive activities:

$$Bank's\ CAR = \frac{Bank's\ total\ capital}{(\alpha + BPF)\ * Brown\ Loans + \alpha * Green\ Loans} \geq \beta$$

- Differentiated Reserve Requirements. Even if reserve requirements might seem a monetary policy tool to regulate market liquidity, these have to be considered a macroprudential tool when used to correct the business cycle. Reserves consist in a minimum amount of funds that banks have to hold in the Central Bank to avoid any liquidity shortage as a counterpart of people deposits. Since the level of reserves is set based on banks' portfolio composition and risk, the amount could be reduced looking at the portion of loans used in green and sustainable sectors and projects.

  It is not a new practice to differentiate the reserve requirement looking at banks size, type, maturity of liabilities and sector profile of lending portfolio in order to steer capital to specific areas of the economy. Therefore, use a green factor to compute the level of reserve required from banks might be a strong weapon to bust the green finance market.
- Countercyclical Capital Buffer. This is an important macroprudential tool that works as a cushion for banks against systemic vulnerabilities and the contraction phase of the

credit cycle. The capital buffer might be an important tool to ensure the financial stability during the transition to the low carbon economy. Build an high capital buffer requirement when the brown credit is growing would have two significant effects: first it would act as a speed limit for carbon intensive lending due to its cost in terms of capital, second it would allow a soft and smooth transaction to the green economy absorbing the shock of the reduction of high level of carbon lending. The main difficulties related to this implementation consist in the early activation of such buffer, therefore activate it before the credit cycle change, and the right calibration, in other words, compute the brown percentage of banks total exposure.

Another way to look at this macroprudential tool is to have a negative capital buffer for green investment that would result in a compensation in terms of lower capital requirements for more virtuous banks.

- Sectoral leverage ratio. Pillar 1 of Basel III agreement defined a non-risk based ratio to avoid an excessive leverage. This ratio consists in a capital boundary calculated as bank's equity on total exposure. One way to incentivize the green lending activities could be to modify this ratio easing the leverage constraints related to sustainable sectors, considering mainly exposure to carbon intensive sectors in the computation. In this way bank's brown assets exposure would be limited

$$LR = \frac{Tier\ 1\ Capital}{Exposure\ to\ carbon\ intensive\ sectors} \geq \gamma$$

Where γ is the leverage ratio constraint set by regulators.

- Liquidity Constraints. Basel III imposed specific liquidity regulation throughout two different ratio: the Liquidity Coverage Ratio (LCR), which have the purpose of protecting banks against shot term liquidity shortage, and the Net Stable Funding Ratio (NSFR) that requires banks to finance long term assets with stable funding. Both ratios work together in order to smooth the maturity mismatch between assets and liabilities.

Looking closer, many argue that the way how SFR is built has an important effect on banks green and sustainable exposure. In fact, this ratio basically requires banks to

finance long term assets with long term liabilities to avoid mismatch in maturities. However, long term funding is more expensive than shorter one with the result that banks may be more unwilling to have long term assets in their portfolio.

In 2018 the EBF (European Banking Federation) proposed to modify one of the two above mentioned liquidity ratios to link liquidity constraints set by Basel macroprudential setup to environmental and sustainability targets.

A hypothetical Green Net Stable Funding Ratio could be represented as follow:

$$NSFR_t = \frac{ASF_t}{RSF_t} = \frac{\sum \theta_E E_t + \sum \theta_{Liab} Liab_t}{\sum \theta_B B_t + \sum \theta_G G_t} \geq \pi$$

Where ASF stands for "Available Stable Funding" which is composed by Equity (E_t) and Liabilities ($Liab_t$), and RSF stands for "Required Stable Funding" which contains Brown (B_t) and Green (G_t) portfolio exposure. In the end θ is the weighting factor used by rule and π the minimum level imposed by the regulator. Looking at how this formula is set up, it is clear that using a lower θ_G, therefore giving less weight to green exposure, would reduce the Required Stable Funding, increase the Stable Funding Ratio and, in the end, relax the liquidity constraints. This would allow banks to undergo trough a higher volume of green and sustainable long-term investments with a lower cost impact on the funding side.

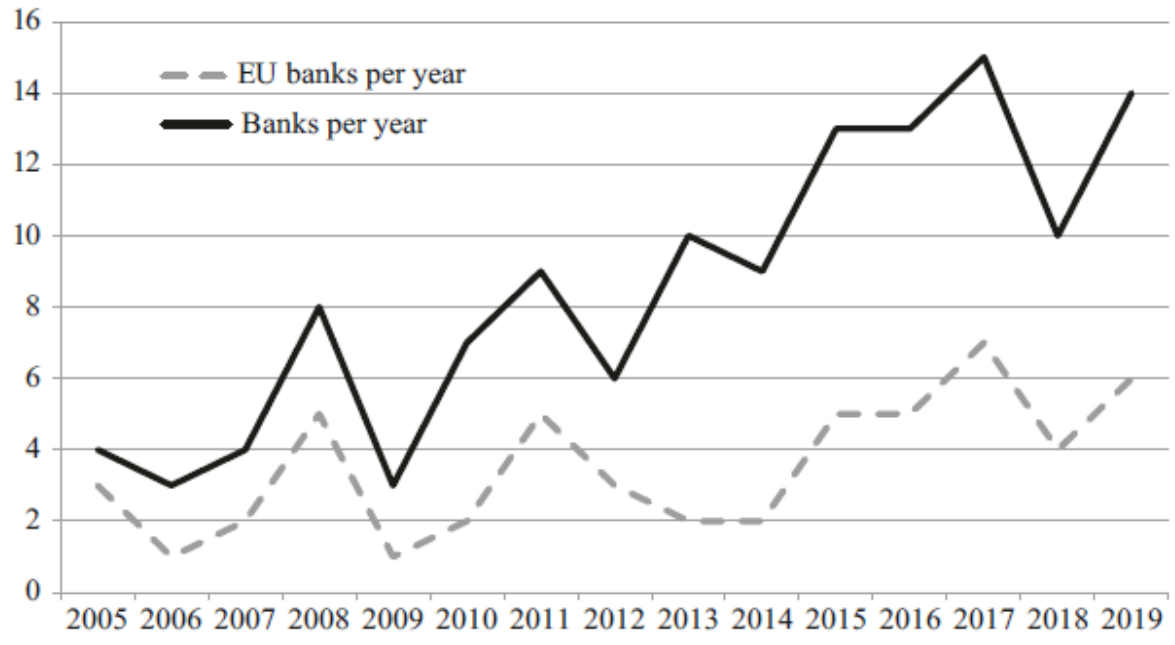
Chapter 3. DOES BEING GREEN IMPACT BANKS' PROFITABILITY?

Nowadays, Banks that aim to tackle environmental issues and address sustainability must build both a green strategy and a green business framework. For banks that decided to play a cornerstone role in the transition toward the low carbon economy using sustainable models and acting green inside and outside, many challenges and opportunities arise in term of risk and profitability.

Being sustainable for a financial institution does not imply just the provision of green labeled products but it is the consequence of a larger strategy. The transition toward a sustainable business might have different results, for example: enhance the reputation of the bank; spread the sustainability way of thinking among banks' stakeholder; being able to involve governments in supporting sustainable projects etc. All these factors might have a positive impact on banks business.

A study which tried to detect the sustainability efforts of banks (Carè 2018) showed banks' penetration among the most green and sustainable companies in the world, analyzing the top 100 Global Sustainability Index between 2005 and 2019.

Chart 5: "Banks' penetration in 100 Global Sustainability Index"



[Source: Sustainable banking: Issues and Challenges – Carè 2018]

As the above chart shows, the green activity of banks increased in the recent years becoming steadily more than the 10% of the whole index since 2013. In this percentage, following the same path, European banks presence was important through the years. For example, BNP Paribas and Intesa are the only two banks worldwide that have always been in the index since its creation.

Without any doubt the sustainable finance market is still in its early stage but given the catalyst nature of banks for the financial sector and the power that they have to easy and speed up the filling of the green financial gap, consideration about the profitability of sustainability procedures for banks is mandatory in order to forecast the future of this newborn market.

In this chapter using two different models, it will be detected the impact of ESG factors and the provision of green financial products, specifically Green and Sustainability linked loans, on banks returns.

3.1 LITERATURE REVIEW

As already discussed, the aim of this paper is to detect the impact of green practices on European banks' profitability. This topic has not been yet faced and analyzed in the existing literature and the final purpose of this work is to fill this research gap.

Although the impact of sustainability thematic has not been studied yet, many are the researches regarding the key determinants affecting banks' profitability in different region of the world. The following literature analysis aims to identify which are the most used econometric model and which are the control variables that should be used in this paper analysis in order to have objective results about the impact of green and sustainable practices on European banks.

To measure banks' profitability the Return on Asset (ROA) and Return on Equity (ROE) are traditionally used. Historically profitability analysis has been conducted dividing variable in two macro groups: bank specific variables and macroeconomics variables.

Among bank specific characteristics Asset Size is one of the most used. Manicucci and Paolucci (2016) study showed a positive and significant impact of the variable on European Bank's ROE. The two Italian researchers used the natural logarithm of the asset size as reported in institutions' financial reports, but it is not the only way used to compute this characteristic. Neves, Gouveia and Proenca (2020) used instead the natural logarithm of the number of employees as a proxy of the bank dimension, showing this time a negative relation with the dependent variable. The nature of the relation between Size and profits keeps being uncertain among researches, in fact the relationship is found to be negative by Pasiouras and Kosmidou (2007) and Coffinet and Lin (2010).

Is widely agreed that credit risk underpinning banks' loans portfolios has a negative impact on profitability. Most used variable in literature that capture the credit risk and the asset quality for a bank are commonly variables related to the size of non-performing or impaired loan in bank's balance sheet like NPL to total asset or Impaired Loans to total Loans. Petria, Capraru and Ihnatov (2015) considering the EU 27 banking sector between 2004 and 2011 showed a significative and negative impact of impaired loans ratio on institutions' ROA. Trujillo-Ponce (2013), using the non-performing loans to gross loans ratio demonstrates the negative impact that this asset quality ratio has on profitability. The same output came out from two different analysis on Greek Banks performed by Athanasoglou et all (2008) and Alexiou and Sofoklis (2009).

Capital adequacy is another variable considered to concretely affect Banks' profits. This variable has been measured in different ways, using both the bank's total capital and the Tier 1 ratio in most recent studies. One of the first studies demonstrating the positive impact of this explanatory variable was the one performed by Molyneux and Thornton (1992) based on an incremental sample of banks of 18 European countries between 1986 and 1989 (671 for '86, 1063 for '87, 1371 for '88, 1108 for '89). In the same way Goddard, Molyneux and Wilson (2004) showed the significative and positive impact of capital ratio on 665 banks from six European countries (Denmark, France, Germany, Italy, Spain and UK). Also Abreu and Mendes (2001) showed the positive impact of the equity to total asset ratio on bank's ROE.

Literature showed how liquidity is an important driver for bank's profits. The most common way to define this characteristic is to consider the level of loans and deposits in bank's balance sheet or compare them using a ratio. Demirgüç-Kunt and Huizinga (1998) were among the first researchers to consider this aspect and they found out that a higher level of loans level compared to deposits have a negative impact on profits. Staikouras and Wood (2004) with their study confirmed the negative impact of low liquidity ratio for the European Banking Sector over the period 1994-1998. Davydenko (2011) showed instead the positive relationship between deposits volume and profits.

One way to see if a banking institution is operating profitably is to compare its interest income with its interest expenses. Thus, literature looked at the impact of the net interest margin on banks' profitability. Demirgüç-Kunt and Huizinga (1998) in Determinants of commercial bank interest margins and profitability: some international evidence" showed the positive nature of the relationship between profits and interest margin.

Banks' ability to generate profits is related to the capability of being efficient in term of costs. This is what literature suggests in different papers. Neves, Gouveia and Proenca (2020), analyzing 94 listed European Commercial Banks in the period between 2011 and 2016, found out that the Cost to Income Ratio, therefore the bank efficiency has a significant and negative impact on profitability. Also, Petria, Capraru and Ihnatov (2015) analyzing a sample between 2004 and 2011 documented the negative impact of the efficiency ratio on both ROA and ROE. The same significant relation has been detected by Pasiours and Kosmidou (2007), Alexiou and Sofoklis (2009) and Trujillo-Ponce (2013).

Beside Corporate specific factors, Literature deeply analysed the role of macroeconomics condition in explaining banks' performances. The most used and studied indicator has been the economic growth rate or GDP growth rate. Albertazzi and Gambacorta (2009) investigated the relation between business cycle and profitability in the banking sector of different European countries during the period 1981-2003 discovering that real GDP growth and profitability are positively related. In the paper "An enquire into the determinants of the profitability of Italian

banks" Albertazzi, Notarpietro and Siviero (2016) concluded that the main driver of profitability levels was the economic growth rate.

Another widely discussed variable in literature is Inflation rate. Researchers are divided on the effective impact that this explanatory variable have on banks' profits. Abreu and Mendes (2001) suggest that inflation is significantly and negatively related to bank profitability, instead Demirgüç-Kunt and Huizinga (1998) and Alexiou and Sofoklis (2009) found out that inflation have a positive impact on both ROA and ROE.

Studies often considered the Unemployment rate as explanatory variable. It is agreed that this macroeconomic characteristic has a negative impact on profitability as showed by Liu et all. (2013).

Different are the econometric specification used in the above-mentioned studies to define the relation between profits and both bank specific and macroeconomics variables. A model that could fit the panel data set of this thesis' empirical study is the Pooled OLS panel model. Molyneux and Thornton (1992), Alexiou and Sofoklis (2009) and Goddard, Molyneux and Wilson (2004) used this estimation process in their studies.

Another widespread estimation methodology uses the Fixed Effect panel model. Among the researches that used this econometric approach there are Demirgüç-Kunt and Huizinga (1998), Anber and Alper (2011), Pasiouras and Kosmidou (2007), Davidenk (2011), Anber and Alper (2011), Petria, Capraru and Ihnatov (2015), Manicucci and Paolucci (2016).

Given the advantages related to common endogeneity problem of panel data set, the Generalized Method of Moments (GMM) estimation is often used. Goddard, Molyneux and Wilson (2004), Trujilo-Ponce (2013), Athanasoglou et all (2008), Albertazzi and Gambacorta (2009), Davydenko (2011) Neves, Gouveia and Proenca (2020) used the GMM in their empirical studies.

Less used is the Random Effect panel model, tested by Davydenko (2011) who analyzed his data set also with a Fixed Effect and a GMM model.

3.2 SAMPLE

The starting sample has been constructed considering 40 significant European banks. In order to have a broader view of how green and sustainable practices are impacting the banking sector in Europe, the sample considers institution from countries different from the ones under the European Central Banks supervision. For example, Swedish Norwegian, Danish, Swiss and UK banks are also considered for this study.

The following table summarize the banking sample, considering country of jurisdiction and ranking institutions by asset size, as reported in 2019 balance sheet.

Table 2: "European Banks Sample"

N	BANK NAME	COUNTRY	ASSETS (bn EUR)
1	HSBC	UK	2422,08
2	BNP Paribas	FRA	2164,71
3	Credit Agricole	FRA	1767,64
4	Banco Santander	SPA	1522,70
5	Société Generale	FRA	1356,30
6	Barclays	UK	1348,65
7	Deutsche Bank	GER	1297,67
8	Lloyds Banking Group	UK	986,32
9	ING Bank	NL	891,74
10	Unicredit	ITA	855,65
11	Natwest (RBS)	UK	855,20
12	Intesa Sanpaolo	ITA	816,10
13	Credit Suisse	SWI	725,68
14	BBVA	SPA	698,69
15	Standard Chartered Bank	UK	642,64
16	Rabobank	NL	590,60
17	DZ Bank	GER	559,38
18	Nordea Bank	DAN	554,85
19	Natixis	FRA	513,17
20	Danske Bank	DAN	503,61
21	Commerzbank	GER	463,53
22	CaixaBank	SPA	391,41
23	ABN Amro	NL	375,05
24	Credit Industiel et Commercial	FRA	313,83
25	Svenska Handelsbanken AB	SWE	292,37
26	SEB	SWE	272,20
27	La Banque Postal	FRA	271,68

28	DNB	NOR	251,07
29	Swedbank AB	SWE	229,47
30	Bayerische Landesbank	GER	225,97
31	Banco Sabadel	SPA	223,75
32	Nykredit Bank A/S	DAN	215,51
33	Bankia	SPA	208,47
34	Banco BPM	ITA	167,04
35	BNG Bank N.V.	NL	149,69
36	Banca Monte Dei Paschi Di Siena	ITA	132,20
37	Mediobanca	ITA	78,95
38	De Volksbank	NL	63,13
39	RCI Banque SA	FRA	58,08
40	Aareal Bank AG	GER	41,14

[Source: Own elaboration on Refinitiv data]

Institutions from ten European countries have been considered and specifically the sample comprises 5 banks from UK, 5 from France, 7 from Spain, 5 from Germany, 5 from the Netherlands, 5 from Italy, 1 Swiss bank, 3 Danish ones, 3 from Sweden and 1 from Norway.

In order for a bank to be considered significative and therefore subjected to the centralized supervision of the European Central Bank, its asset size must be larger than 30 billion EUR. The analyzed sample considered banks with assets in a range between around 41 billion EUR, the smallest, and around 2422 billion EUR, the largest. No consideration of any type has been made in the construction of the sample apart from using the 30 billion asset size threshold. Even if the observed Banks are from different monetary jurisdictions, all data has been collected in Euro.

3.3 VARIABLES DESCRIPTION

Many are the variables that could have been considered in order to assess banks' profitability. After a careful review of the literature, for the model that will be used to detect whether green and sustainable polices have any effect on European banking sector, variables have been selected as follow.

For what concern the dependent variable, in the baseline specification, the research considers as explicit measure of profitability the ROE.

- ROE – Return on Equity: it is the ratio of bank's profits to equity and indicates the return for shareholders

This dependent variable has been measured as running year averages that means that asset and equity are computed as the average of two contiguous years since profits are a flow variable generated during the year.

Concerning the independent variables, literature divides factors into two different group: banks specific variables and macroeconomic variables. The following models will use these two groups as control variables, recalling the known significance in past research. Alongside these groups a new one will be added for the purpose of the study: the Green Variables group. Given the research gap related to the topic, the considered variables have not been yet used in literature and therefore have been chosen and constructed in a discretionary way.

Regarding banks specific variables, those used in the model are:

- Asset Size (Log): this is one of the most used variables in literature. Commonly it is computed as the natural logarithm of bank's total asset. Even if used a lot to improve the computational power of econometrics models the effect on profitability of this characteristic used to be ambiguous. For the studies that detected a positive impact of bank's size variable on profitability could be explained by the larger volume of loans and a higher product diversification. On the other hand, when size negatively affect profitability, it could be explained with higher operational costs. Many authors tried to explain these discrepancies in result with the nonlinear nature of the factor.
- NPA to Assets – Nonperforming asset ratio: this variable is a good proxy of the asset quality of a bank and therefore a good measure of credit risk. It is computed as the sum of non-accrual loans, renegotiated or restructured loans and foreclosed real estate over total asset. Even if it is not the most used ratio, Literature agrees on the overall negative effect of these kinds of variables (very similar to the NPL ratio) on banks' profitability.

- Tier 1 ratio: it is a measure that captures the capital adequacy of a bank. Tier 1 is a portion of banks' capital that includes not distributed profits, common and preferred equity. Literature finds a positive relation between this ratio and profitability. The reason of such positive impact is that the higher is the Tier 1, the lower is the expected need of funding and the less expensive is the debt for banks, therefore profitability should increase.
- Loans to Assets: this ratio is a measure of liquidity and income for the institution. Even if often used in related studies, the impact of this variable on the dependent one is uncertain. If from one point of view many think that the higher the quantity of loans in portfolio, the higher the income from interest and therefore the higher is the profit, from another hand it must be considered that to issue and monitor a loan have a cost often higher than other assets. Moreover, the higher is the volume issued, the higher are the risk of having low quality asset in portfolio that could become nonperforming. For these reasons, literature is divided in considering the loan to asset ratio a positive or a negative determinant for banks' profitability.
- Loans to Deposits: this one is an explicit indicator of liquidity. Specifically, it is an indicator of business self-financing capability and shows how fewer liquid assets in balance sheet (loans) are financed with stable funding (customers' deposits). The relation that authors found between profitability and this liquidity variable is negative. Deposits are one of the main sources of funding for a bank and by far the less expensive. A bank that have a high level of deposit have a lower cost of funding compared to another one that finances its activity with money market funds or any other kind of liability. In the end the higher are the deposits compared to loans, the higher the profit.
- Net Interest Margin: it is a ratio calculated as the difference between interest income and expenses over average earning assets. The positive nature of the relation with profitability in the banking and broadly in the financial sector is acknowledged by all authors in literature. Since this measure compares the net interest income coming from products like loans, with the outgoing interest payment for saving account and certificates of deposit, it represents the ability of the institution to operate in the

medium-long term. In other words, the bank's ability of operate profitably. The statistical significance of this variable across the whole literature is extremely consistent.

- Cost to Income ratio – Efficiency ratio: this variable measure the operational efficiency of the bank and it is defined as non-interest expenses over gross revenues. In literature there is a wide consensus regarding the positive impact of this characteristic on profitability. In fact, the more efficient an institution is in reducing its expenses the higher is the profit. Like for the previous one, efficiency ratio is one of the variables with the most evident significance track record in related studies.

The Macroeconomics variables considered are 3, as computed by the World Bank:

- GDP Growth rate: It is the annual percentage change in gross domestic product at market value in constant local currency. GDP has several definitions. It might be seen as the sum of the added value generated by each producer residing in the economy, plus any taxes on the product, minus any subsidies not included in the value of the product. The added value is computed as gross value of production minus the value of intermediate goods and services used in production. Another definition considers GDP as the sum of incomes in the economy, therefore, the sum of wages and profits of workers and business. Since the GDP growth explain general market and economic conditions, it has an important impact on the demand and supply of loans and deposit. Regarding this variable, literature commonly agrees on its positive impact on profitability of the banking sector.
- Inflation Rate: it is measured by the consumer price index (CIP) and reflects the percentage change in the cost of purchasing a basket of certain goods and services (that is changed at certain intervals, for example annually) for an average consumer in the economy. If the inflation rate is forecasted and expected, banks could adjust interest rates and increase revenues. On the contrary if inflation is not anticipated it could result in lower profitability. Literature reveals conflict opinions about the nature of the relationship between this independent variable and profitability. Therefore, there is not a clear expectation for the sign and the statistical significance of the coefficient.

- Unemployment rate: it is defined as the ratio of unemployed workers over the total labor force in a country. An unemployed worker is who currently is not working but is able to work and is actively looking for a job. The total labor force is defined as the sum of all employed and unemployed people in the economy. Since it is a crucial indicator regarding the wealth of the economy, banks' profitability is commonly affected by unemployment. For instance, a higher rate would imply a lower quality of the loans portfolio. Many studies in literature provides evidences regarding the negative impact of this explanatory variable on banks' profits.

Since the purpose of the model is to identify any possible impact of Green Finance practices, it has been decided to insert in the model two different measure of green and sustainability: one that should represent how green a banks appear "inside" and another that should show how green and sustainable a bank acts "outside". The two Green Variables used are:

- ESG Score: this is a measure of Environmental Social and Governance data disclosure computed by Bloomberg. This is an important measure of how much an institution is green since it allows to know how much a company is in line with the guidelines and goals imposed by the international community agreement. The score is the result of the completeness of the disclosure and the efficiency of the effort toward sustainability thematic at an individual level. Many are the characteristics taken into account. Regarding the Environmental topic, for example, Bloomberg considers institutions' total greenhouse gas emissions, total CO2 emissions, CO2 intensity per energy, total energy consumption, total waste. Other metrics like percentage of minorities in workforce, percentage of women in workforce, percentage of women in institutions' management are considered regarding the "Social" aspect of the score. The score goes from 0 to 100 based on the information disclosed. Each data point is weighted based on its importance. For example, characteristics like total greenhouse gas emission are considered more important than other metrics and thus it carries more weight than other disclosures. The score is also tailored to different industries and sectors. In this way each institution is evaluated just on factors that are relevant for the sector to which it belongs. In the considered sample, some institution in different years of observation

scored 0. Since the database offers ESG data with plus of 10 year of history for more than 11700 companies in 102 countries with a coverage rate of around 90% of companies in Europe, for the purpose of this study 0 is not considered a missing value but just the absence of any ESG related disclosure from the bank, since it is not mandatory to report its own ESG activities.

- Green and Sustainable Lending Dummy: this variable has been created specifically for the purpose of the study and therefore finalized after a deep study of the European Loan market. Before ending up with the final result, a multi-layer analysis has been done, in particular, the analysis has been divided in two steps, considering and using data before and after 2016. The 2016 was a watershed for the market because it was the year in which the first Green labeled loans started to be issued. The purpose of the dummy is to show if an institution in a specific year undertook green financing activities, financing at least one green project throughout a Green and Sustainable form of lending. Thanks to the Refinitiv and Bloomberg NEF Database, data about this kind of lending has been collected. From a sample of more than three thousand green deals data has been filtered by issuer and year, computing also aggregate amount, more useful for a descriptive purpose than for the model itself. Different descriptive charts regarding Green and Sustainable lending can be found in the paragraph 3.8 Appendix. Before 2016, since no label existed yet, in order to distinguish a green loan from a brown loan, a lending deal selection process has been developed. For this purpose, a sample of more than twelve thousand deals have been analyzed and filtered firstly by issuer and year and secondly by sector. Once again Refinitiv dataset has been used. In order to have a good proxy of what was green and what was not, and being in line in most efficient way possible with Green and Sustainability Linked loans standards, it has been used the same sector selection process used in the realization of the MSCI Global Transformation Index. Differently from other ESG index, for example its cousin MSCI ESG Leader Index that consider all sectors of the MSCI World Index, picking from each sectors the winners in terms of ESG scores, the Global Transformation considers just thematic that are driving the world toward a sustainable and social equal economy, using as a rule for sector

picking the sustainable development goals set by the international community: no poverty; good health and well-being; quality education; affordable and clean energy; clean water and sanitation; reduce inequality; responsible consumption; climate action; life below water; life on land; etc..

Using this methodology, the sectors considered eligible for the purpose of the study, as named in Refinitiv database, are the summarized in the below table.

Table 3: "Green and Sustainable Sectors"

ELIGIBLE SECTORS
Wind Electric Utilities
Biotechnology & Medical Research
Renewable IPPs
Alternative Electric Utilities
Employment Services
Waste Management, Disposal & Recycling Services
Water & Sewage Construction
Water & Related Utilities
Electric Power Plant Construction
Solar Electric Utilities
Primary Care Services
Professional Education
Water Supply & Irrigation Systems
Wind Systems & Equipment
Renewable Energy Equipment & Services
Healthcare Facilities & Services
Photovoltaic Solar Systems & Equipment
Educational Service Providers
Renewable Energy Services
Environmental Services & Equipment
Batteries & Uninterruptable Power Supplies
Biopharmaceuticals
Sewage Treatment Facilities
Biomass & Waste to Energy Electric Utilities
Environmental Consultancy Services

[Source: Own elaboration on Refinitiv data]

The main issues related to the creation of this variable is that was impossible to know if proceeds from loans have been used to finance green and sustainable project but we considered the sector as a good proxy of the sustainable use of funding. Once computed

the total amount of green and sustainability loans issued from 2010 and 2019, since for different banks no deal was counted in certain years (therefore considering the total amounts would result in an unreliable variable) and also because many loans were structured as syndicated loans and therefore it was almost impossible to identify the share of the loans in their own balance sheet, the model uses a dummy variable that shows the presence of green financing activity in the given year or not. There is no evidence regarding the use of this variable in literature.

The bellow table summarize all variables used in the study.

Table 4: "Variables Summary"

	Variable	Measure	Notation
Dependent Variables	Return on equity	Net profit / Equity	ROE
Bank-Specific Explanatory Variables	Asset size	Natural logarithm of Total assets	SIZE
	Non-Performing assets ratio	NPA / Total Assets	NPA
	Tier 1 ratio	Tier 1 %	TIER1
	Loans to Assets ratio	Total Loans / Total Assets	LA
	Loans to Deposits	Total Loans / Deposits	LD
	Net Interest Margin	Net Interest Income / Total Assets	NIM

	Cost to Income Ratio	Non-Interest Expenses / Gross Revenues	CI
Macroeconomics Explanatory Variables	GDP Growth Rate	Annual GDP Growth rate	GDP
	Inflation Rate	Annual Inflation Rate (Consumer Price Index, CPI)	INF
	Unemployment Rate	Annual Unemployment rate	UN
Green Explanatory Variables	ESG Score	ESG score computed by Bloomberg	ESG
	Green Lending Activity	Dummy variable based on the presence of at least one green deal during the year	GreenD

[Source: own elaboration]

3.4 BASELINE SPECIFICATION: MODEL SELECTION

Many models for the baseline dependent variable ROE have been tested in order to assess and choose the one that fit in best way the panel data.

The first step has been testing the presence of unit roots in the time series of the panel. A unit root implies the non-stationarity of the series. A time series is a stationary process when the

joint probability distribution of the process does not change over time. Consequently, parameters like sample mean and variance does not change over time. Stationarity is a crucial assumption for time series analysis and use a non-stationary series would lead to a spurious regression with misleading results with unjustified high R squared values. In order to avoid this problem each time series of the panel has been tested using the Levin-Lin-Chu test, consisting in an augmented Dicky Fuller (ADF) test for panel data, testing the null hypothesis H_0: *a unit root is present in the time series sample*. Results showed the presence of a unit root with a 5% confidence level for the following explanatory variables: Non-Performing Asset ratio; Tier 1 ratio. In order to remove the unit root and make the process stationary, log differences of the above stated variables have been computed. The new differentiated variables took the place of the original ones in the panel. The cost of making stationary all processes that the model has to pay is the loss of one observation each time the difference is taken. Therefore, observation decreased from 400 (ten years of observations for 40 banks) to 360.

The first model tested was Pooled OLS (Ordinary Least Square) model. In this case the Goodness of fit was low with and R squared of less than 35% and the model presented different very debilitating issues. The first one was heteroskedasticity. Heteroskedasticity is the condition in which the size of error terms differs across the independent variables. If homoskedasticity (the contrary of heteroskedasticity) is absents, one of OLS hypothesis is not satisfied. The problem that this issue implies in a model could be easily explained in this way. OLS seeks to minimize residuals in order to produce the smallest standard errors possible. OLS models give the same weight to all observations but, if heteroskedasticity is present, the variables with higher disturbance have more influence than other observations and biased error would conduce to incorrect conclusion regarding the significance of regression's coefficient. White test for errors heteroskedasticity did not reject the null hypothesis "Heteroskedasticity absent" with a 99% confidence level.

Another important issue to deal with is the autocorrelation between error terms that occurs when in a regression error terms are serially correlated. The consequences of serial correlation between error terms are that the estimators remain linear and correct but not efficient, thus they do not have minimum variance. Furthermore, estimators' variances and error terms variances

would be biased, implying non-reliable confidence intervals and R squared. The Durbin-Watson test showed autocorrelation between errors terms with a 99% confidence level. Another important test for the "Poolability" of the model is the Chow Test to see if regressor's slope is the same for all regressors regardless of individual. Chow Test rejected the null hypothesis $H_0: \beta_{ik} = \beta_k$ with a p-value close to 0, therefore the sample is not "poolable" under basic condition. The robust error version (Arellano) has been tested in order to remove heteroskedasticity but the autocorrelation was persistent and the chow test still rejected the null hypothesis.

Since the panel was not fitting the Pooled OLS model, the second and the third model tested was respectively a Fixed Effect panel model and a Random Effect panel model. In both these models the problem of regressors slope was solved, since it remains constant and only intercepts and error variances matter. The two models need to be tested together in order to have a clear result about the presence of fixed effects or random effects in the panel.

The first step of testing a Fixed Effect model is to run the F test that allow to detect if fixed effects could improve the goodness of fit compared with an OLS model. This test verifies if regressors have different intercepts. Since the null hypothesis is rejected the fixed effects in the model are not null. It has been concluded that the fixed effect model is a better model compared to OLS.

It is also necessary to test the Random Effect model that is complementary to the fixed one. In this case error are tested to assess if it should be a better fit for data than the OLS model. The test we run is the Brush Pagan's Lagrange Multiplier test that examines if individual or specific variance components are zero, specifically testing $H_0: \sigma_u = 0$. Being rejected the null hypothesis could be concluded that there is a significant random effect in the panel data. Thus, the random model is preferred to the pooled OLS since it is able to deal with heterogeneity in a better way.

The last test used in order to choose between random and fixed effect is the Hausman test on the random effects one, that helps to understand which effect (fixed or random) is more relevant and significant for the dataset, testing the null hypothesis that individual effects are not

correlated with any regressor in the model. Since the null hypothesis has been rejected, GLS estimation results inconsistent and biased, concluding that the Random Effect model is not helpful for the given data panel.

Cross-sectional errors dependence has been tested using the Pesaran CD test. It is a very important test to undertake to verify if the data fit the model or not. When errors dependence within cross-section is present fixed effects estimators are not consistent and not efficient, resulting in biased standard errors estimate. In this case Pesaran CD test the null hypothesis H_0: $cross-sectional\ independece$ has not been reject with a 95% confidence level and a p-value of 0.09. The absence of endogeneity in the model has been tested running different regressions with instrumental variables and using for each variable the Hausman test for endogeneity which did not reject the null hypothesis of exogeneity (the contrary of endogeneity) for all variables.

Given the consistency of the fixed effect estimators, the fixed effect model is the one chosen for the analysis of ROE. In order to avoid the heteroskedasticity problem, Arellano robust errors are used.

GMM has been also used but Sargan test showed the presence of over identification problem that arise when there are more reduced form coefficients than structural parameters, in few words there is not a perfect fit between model and data. Furthermore, the Autocorrelation test spotted the presence of second order correlation, a problem for this model since it use lagged values of variables.

The baseline specification model tested that are perfectly in line with the most used procedures in literature is a Fixed Effect model:

$$\begin{aligned} ROE_{it} \;=\; & \beta_0 + \beta_1 NPA_{it} + \beta_2 SIZE_{it} + \beta_3 TIER1_{it} + \beta_4 LA_{it} + \beta_5 LD_{it} \\ & + \beta_6 NIM_{it} + \beta_7 CI_{it} + \beta_8 GDP_{it} + \beta_9 INF_{it} + \beta_{10} UN_{it} + \beta_{11} ESG_{it} \\ & + \beta_{12} GreenD_{it} + \varepsilon_{it} \end{aligned}$$

Where: β_0 is the constant, other β_i are the parameters to be estimated and ε_{it} is the random error term.

3.5 RESULTS

All tables with the main descriptive statistics and the sample and econometrics models' outputs are located in the paragraph 3.9 Appendix 2 at the end of the chapter.

The Table 3: "Baseline Model 1" in the appendix 2 shows the output of the Fixed Effect model that takes ROE as dependent variable. Three are the independent variables that resulted significantly impacting the return of equity of European banks in the past decade. Without any surprise, results are in line with literature's studies. Non-performing asset ratio has a negative impact on the dependent variable. Specifically, a 1% increase in the above-named ratio would result in a 0.021% institutions' ROE decrease. NPA ratio resulted significant with a 90% confidence level. This is coherent with the fact that a higher asset quality implies lower losses from loans portfolio with lower credit risk and therefore higher profitability. Another variable that has a negative impact on the dependent one is the Loan to Deposit ratio (LD) with a confidence level of 95%. This output is in line with what has been already seen in literature. In fact, a high level of this ratio means that a bank is financing its lending activities with debt other than deposits that are the cheapest funding that a financial institution could use. Thus, the higher is the ratio the most expensive is for a bank finance loans issues. Results show that a percentage increase in this explanatory variable would result in a 0.086% decrease in institution's ROE. The last statistically significant variable at 1% significance level is the Cost to Income ratio, or efficiency ratio. A unit percentage increase in this ratio would result in a 0.36% reduction on bank's ROE. Since this variable shows how much an institution is efficient in term of operating costs, less efficiency, therefore higher ratio, would imply lower profitability.

Given the output, the two Green explanatory variables ESG score and Green Lending activity dummy resulted not significantly impacting ROE at all confidence level.

In conclusion, for the considered sample, green practices do not affect European banks' profitability.

3.6 MODEL 2: THE EQUATOR PRINCIPLES SAMPLE

Given the result of the first model, the second step of this empirical analysis aimed to discover the impact of green practices on banks' profitability, is to use a reduced sample based on a specific green criterion.

Among the 40 banks of the first sample, those that explicitly declared their green and sustainable lending and financing activity by joining the "Equator Principles" (EPs) have been selected. EPs are one of the most important green lending frameworks, joined by 116 financial institution in 37 countries worldwide. The official definition of EPs is: "a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence and monitoring to support responsible risk decision-making". Therefore, the construction of the new sample has the purpose to discover, among declared green institutions, which are the main driver of profitability and if green factors can define if the greenest institutions perform better within their peers.

The institutions considered in the new green sample, sorted in alphabetic order, are the following:

Table 5: "Equator Principles Sample"

EPs Sample
ABN Amro
Banco BPM
Banco Sabadel
Banco Santander
Bankia
Barclays
BBVA
BNP Paribas
Commerzbank
Credit Agricole
Credit Industiel et Commercial
Credit Suisse
Danske Banks
Deutsche Bank
DNB

DZ Bank
HSBC
ING Bank
Intesa Sanpaolo
Lloyds Banking group
Mediobanca
Natixis
Natwest
Nordea Bank
Rabobank
SEB
Societè Generale
Standard Chartered Bank
Swedbank AB
Unicredit

[Source: Own elaboration on EPs data]

After checking the goodness of fit with the same procedures showed in paragraph 4.4, the model used for this new sample is the same Fixed Effects used for the previous one. There were no changes in dependent and explanatory variable apart from the Green Dummy variable that has been replaced by the Green and Sustainable Loans growth rate, computed for all institutions (with notation GL Growth in models' output). The growth rate reflects the growth in the number of green deals closed year on year and not the increase in the absolute amount of lending. This choice is due to the fact that most of the green deals are structured as syndicated loans. With the impossibility of defining the exact impact of those deals on institutions' balance sheet, using loans size as explanatory variable could generate misleading estimations. In this context, the number of deals is considered a good proxy for the intensity and quality of green lending activity of European banks.

Like for the first sample, the presence of unit roots in panel's the time series have been tested. The Levin-Lin-Chu test showed that the just Non-Performing asset ratio series was a non-stationary process at 95% confidence level, therefore, once again, in order to overcome this problem, the time series has been differentiated. This time the observation lost in the process were 30.

The main descriptive statistics of this new sample are summarized in the appendix 2 table “EPs Sample Descriptive Statistics”.

The output in the Table 4: “Baseline Model 2” in the appendix 2 shows that once again, NPA ratio, Loans to Deposits ratio and Cost to Income ratio resulted statistically significant. As in the first model, the asset quality variable (NPA ratio) has a negative impact on banks’ profitability and approximately an increase of 1% in the ratio results in a 0.012% decrease in return on equity. The expected negative impact of the Loans to Deposits ratio is confirmed also in this model, reducing the ROE by 0.0122% for each unit percentage increase. In the end, the efficiency ratio (Cost to Income ratio), has a negative impact on the dependent variable, reducing the ROE by 0.295% for each unit percentage increase and confirming that more efficient banks perform better.

The last and most important output of this model is the significance of the Green Landing Growth variable with a 5% significance level. This result shows that the new green practices have an effective impact on profit. Even if the volume is still not comparable with the common debt volume, banks that in the last ten year undertook with constancy and consistency green lending policies, committing themselves in the financing of sustainable projects, given the model result, they recorded an higher ROE compared to their green peer. The reason behind this better performance could be many and not just related to the convenience of the green and sustainable financial products for banks’ balance sheet. The first non-financial related implication could be the better image arising from being among the greenest institutions in the industry, that would imply higher customers and investor satisfaction that would be more willing to do business with the bank or invest in it. Another reason could be related to the risk mitigation mechanism that in many European country have been constructed in order to foster investment in green and sustainable projects. In green project financing, for instance, often governments participate in the lending deals guaranteeing financial institution a minimum cash flow from the project and thus a minimum return on the loans, partly offsetting the underpinning credit risk. Moreover, specifically for clean energy sector, which constitutes the most important share of the sustainable debt market, the interest on Power purchase Agreement (PPA) is growing. This practice consists in long term supply energy contract between borrowers and

third companies that allow to forecast cashflows for specific clean energy project and easily compute the risk and the profitability of the operation. Thus, banks that in the last decade intensified their green and sustainability lending activities experimented a positive impact on profit.

Instead, no statistically significant impact of the ESG score on ROE have been detected.

3.7 ROBUSTNESS ANALYSIS

In order to assess the robustness of the baseline analysis another indicator of profitability has been used to verify the consistency of the result regarding the significance of green explanatory variables. The new dependent variable used is the Return on Asset (ROA). It is the ratio of bank's profits to asset and reflect the management ability to generate profits from bank's assets even if it might be biased due to off-balance-sheet activities.

Unfortunately, another better fitting model than the Fixed Effects one was needed for ROA because of the presence of cross-sectional dependence using the Fixed Effect model given the fail in not rejecting the null hypothesis of the Pesaran CD test.

Two other possible ways to avoid cross-sectional dependence and at the same time to deal with the heteroskedasticity of the panel data are the WLS model (Weighted Least Square) and the GMM moment (Generalized Method of Moments).

WLS model is a specialization of GLS in which cases are weighted by error terms in two different ways: observations with larger variance count less, instead those with small variance count more in estimating coefficients. In this way the heteroskedasticity problem is avoided. Autocorrelation has been tested with the Pesaran CD Test for cross-sectional dependence and the null hypothesis of no relation has been rejected. Given the non-efficiency of the regression results, WLS has been discarded.

The last model tested was the GMM that is often used in literature and applies for dynamic panel model. This model is used to eliminate fixed effect in case those can't be observed transforming the model in first order differences. The most important advantage of this model is that it resolves endogeneity problem between the dependent variable and others explanatory variables using lagged values of the dependent variable. Thus, using this methodology, correlation between independent variables and error terms is avoided, obtaining consistent estimates. The model seemed to fit in the proper way the panel data when the considered dependent variable is ROA. The Wald test indicating the goodness of fit rejected the null hypothesis of joint insignificance of variables. Moreover, the Sargan test did not reject the null hypothesis H_0: $instruments\ as\ a\ group\ are\ exogenous$, showing the absence of endogeneity and over identification among variables, therefore instrument used in the regression are correct. Two other important tests to run when using the GMM model are the autocorrelation (AR) test. AR 1 (first order) and AR 2 (second order). Even if the equation shows the presence of negative and significant first order autocorrelation at 5% significance level, recalling Arellano and Bond 1991, this do not imply the inconsistency of the estimates. In fact, inconsistency would arise if second order autocorrelation was present. Second order autocorrelation test showed no presence of autocorrelation for all significance level. In conclusion GMM model has been chosen as best fit for explaining ROA determinants.

The robustness check model has the following form:

$$\begin{aligned} ROA_{it} \;=\; & \beta_0 + \beta_1 ROA_{it-1} + \beta_2 NPA_{it} + \beta_3 SIZE_{it} + \beta_4 TIER1_{it} + \beta_5 LA_{it} \\ & + \beta_6 LD_{it} + \beta_7 NIM_{it} + \beta_8 CI_{it} + \beta_9 GDP_{it} + \beta_{10} INF_{it} + \beta_{11} UN_{it} \\ & + \beta_{12} ESG_{it} + \beta_{13} GreenD_{it} + \varepsilon_{it} \end{aligned}$$

The main difference in the structure compared with the Fixed Effect model used for ROE, apart from the estimation process of the two model, is that GMM considers as instrument the lagged value of the dependent variable (ROA_{it-1}), instead the fixed effect model does not.

The Table 5: “Robustness Check Model 1” shows the results of the GMM regression of ROA over all explanatory variables. A variable that already was significant in the ROE model and resulted significant also in GMM model for ROA is the Cost to Income ratio with a 99% confidence level. The impact that this explanatory variable has on ROA is exactly the same already seen for ROE, showing the consistency of the two models that have congruent results. In fact, the efficiency ratio has a negative impact on return on asset for the same reason explained above in paragraph 3.5. A 1% increase in the independent variable would result in a 0.04% reduction in ROA. In this GMM, another variable resulted significant in explaining the dependent variable. This is the Net Interest Margin with a significance level of 5%. This variable resulted to have an important impact on bank’s profitability with a $\beta_7 = 0.288$. This strong positive effect on profitability is because this ratio is a direct indicator of the ability to generate profit and continue to operate in the medium long term for a bank. The higher the interest on lending activity, the lower the interest paid on debt, the higher are the revenues, thus profitability increase.

All other variables resulted not statistically significant, including green ones. Thus, for the considered sample, the presence green and sustainable lending activities and the ESG score have no impact on banks’ return on asset as the baseline specification model already highlighted, confirming the overall goodness of the analysis.

The last model of this empirical chapter is the GMM using the ROA from the reduced Equator Principles sample as dependent variable. Results are summarized in the Table 6: “Robustness Check Model 2”. Like for the larger sample with 40 banks, Net Interest Margin and Cost to Income ratio are statistically significant respectively at 95% and 99% confidence level. Again, the relation with profitability resulted positive for Net Interest Margin and negative for the efficiency ratio. Also, coefficients are relatively close to the ones computed in the other model, respectively $\beta_7 = 0.288$ and $\beta_8 = -0.042$.

The most important output of this model is the statistically significance of the ESG score at 10% significance level. ESG score resulted to have a positive impact on ROA. Even if there are no studies regarding green practices in banking industry, many are the researches regarding

ESG criteria in asset management. In particular, these studies are about the returns of portfolios tilting toward stocks with high scores in ESG characteristics. Three hypotheses have been made relatively to return of "ESG stocks" versus conventional companies:

1. "No effects": the expected return of green and sustainable stocks is equal to conventional stocks
2. "Doing good while doing well": the expected return of ESG stocks are higher than conventional stocks
3. "Doing good but not well": the return of ESG stocks are lower compared to traditional stock

The model output seems to be in line with the second hypothesis. An important study endorsing this theory is the one of Statman and Glushkov (2006). In their study they used a measure very similar to the score considered for this paper analysis. Specifically, they used the KLD score that rates companies on strengths and concerns regarding corporate governance, community (e.g. charity, support for hosing), diversity, environment (e.g. pollution prevention, recycling), human rights etc. They constructed long short portfolio sorting companies by this score, going long with the portfolio with top-overall companies' stock and shorting bottom-overall companies. Using the four factor Carhart's model they discovered that the long short portfolio generated a consistent annual excess return, showing that best ESG performers, on average, generate positive abnormal return compared to less green corporate and. In conclusion, ESG is a good investment idea. Even if the methodology of this study is very different from the one used in this thesis, the GMM model showed in a similar way that institutions with higher ESG score perform better among their peers in terms of profitability. Outcome indicates that an increase of 1% in ESG score would result in a 0.01% increase in ROA.

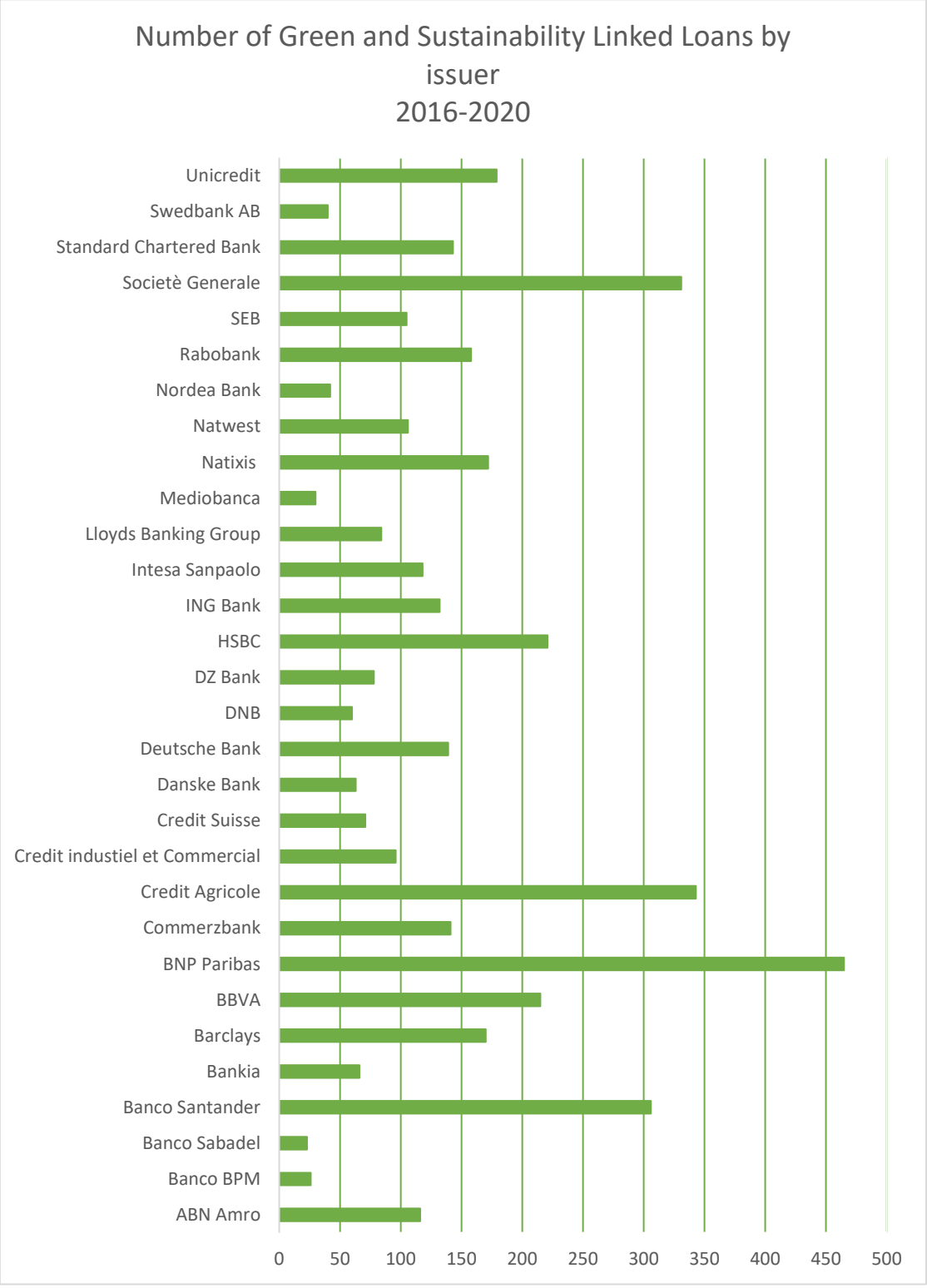
In the end the second green variable, capturing the Green and Sustainability lending activity growth resulted not significant. This does not reflect properly what have been seen in the baseline model using the green sample. This could be related to the different nature of the dependent variable. Even if ROA and ROE are both measures of profitability, the impact of the

different leverage on the two dependent variables could imply different result in detecting the main drivers of the explanatory variable.

The Robustness analysis shows how, like in the baseline specification, Green factors become significant just considering a declared green sample highlighting that once again who do better in term of sustainability perform better compared to their peers.

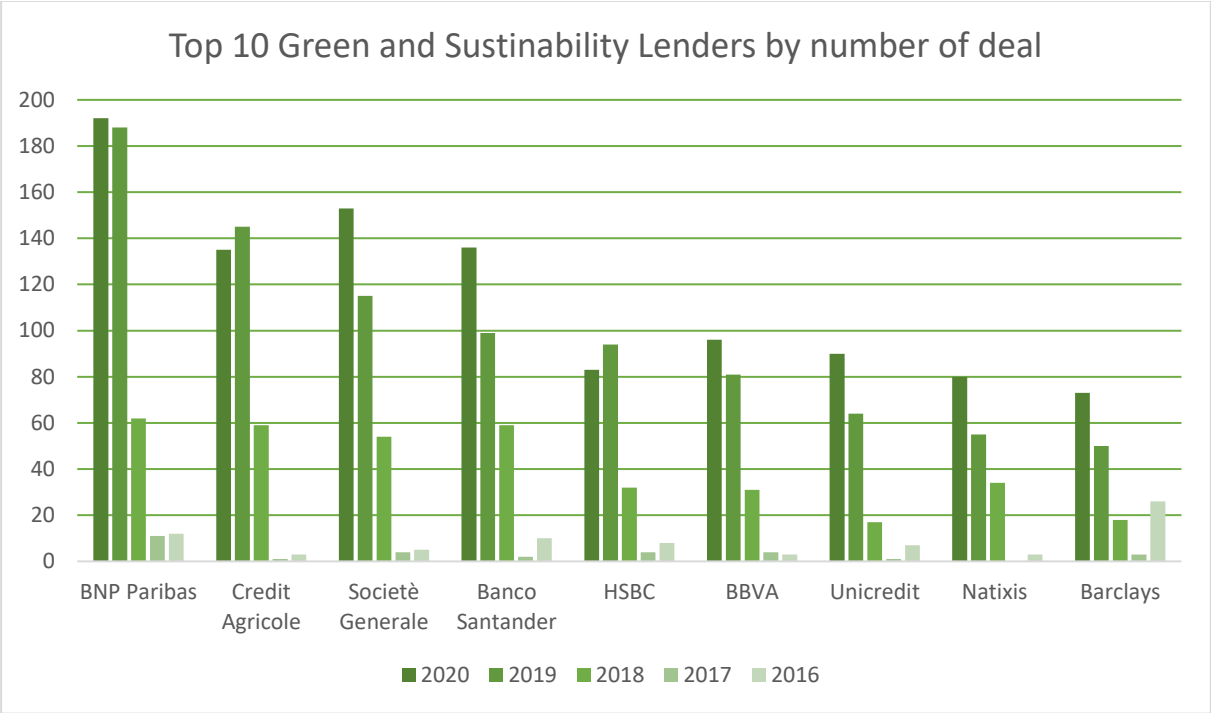
3.8 APPENDIX 1 – Green and Sustainable Lending

3.8.1 Chart 1: "Number of Green and Sustainability Linked Loans by issuer"



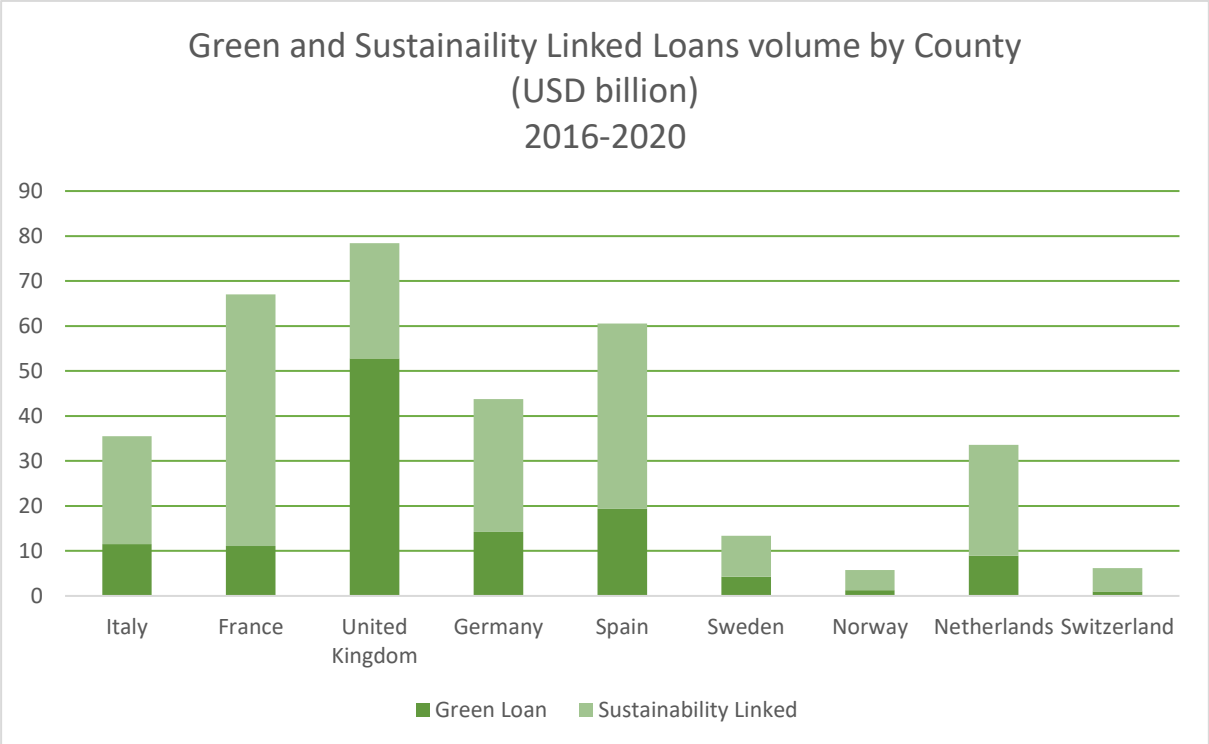
[Source: Own Elaboration on Refinitiv Data]

3.8.2 Chart 3: "Top 10 Green and Sustainability Lenders"



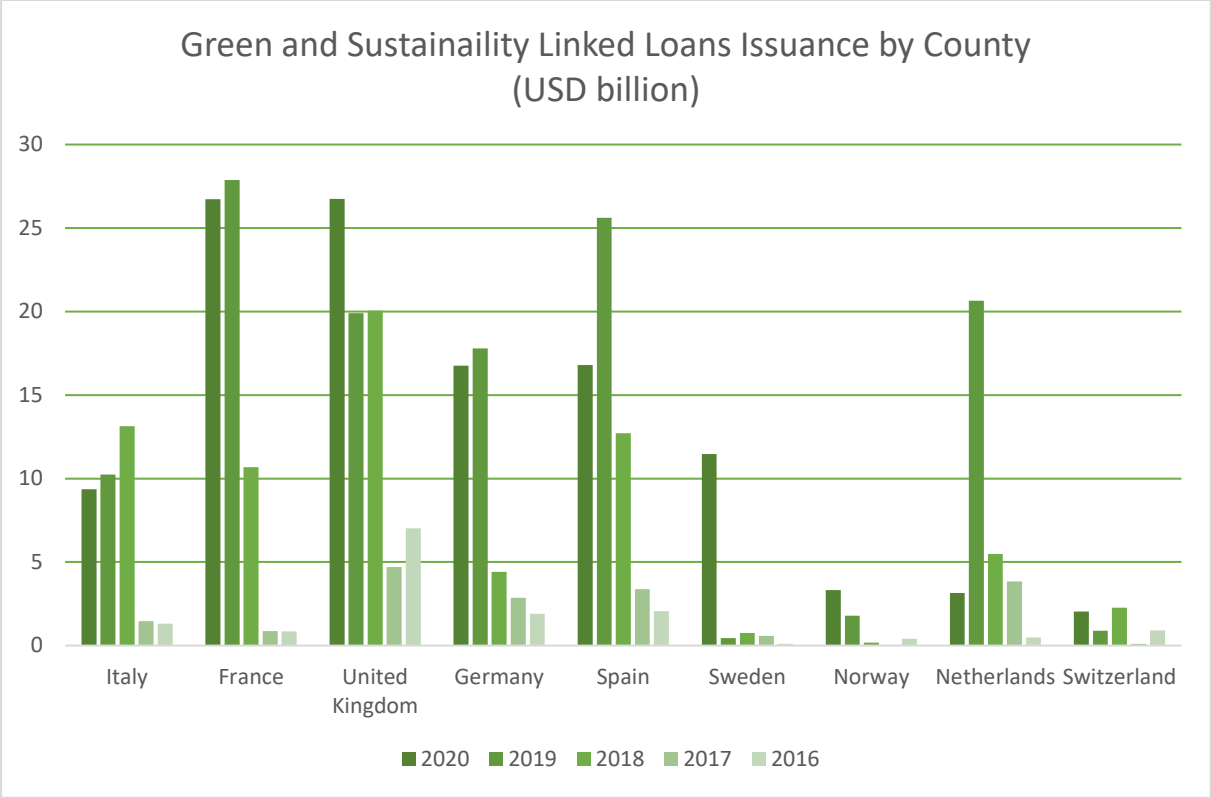
[Source: Own Elaboration on Refinitiv Data]

3.8.3 Chart 3: "Green and Sustainability Linked Loans breakdown"



[Source: Own Elaboration on Bloomberg NEF Data]

3.8.4 Chart 4: "Green and Sustainability Linked Loans by Country"



[Source: Own Elaboration on Bloomberg NEF Data]

3.9 APPENDIX 2 – Econometric models

3.9.1 Table 1: "Sample Descriptive Statistics"

Summary Statistics, using the observations 1:01 - 40:10

Variable	*Mean*	*Median*	*S.D.*	*Min*	*Max*
ROE	0.0513	0.0646	0.101	-0.903	0.575
ROA	0.00297	0.00324	0.00661	-0.0656	0.0316
NPA	0.0333	0.0150	0.101	0.000400	1.88
SIZE	11.4	11.7	0.791	9.38	12.4
TIER1	0.149	0.137	0.0461	0.0500	0.380
LA	0.533	0.567	0.166	0.200	0.981
LD	1.19	1.11	0.405	0.264	2.69
NIM	0.0149	0.0138	0.00909	-0.0150	0.143
CI	0.641	0.637	0.177	0.148	1.27
GDP	0.0147	0.0155	0.0139	-0.0298	0.0595
INF	0.0134	0.0128	0.00954	-0.0114	0.0386
UN	0.0883	0.0768	0.0517	0.0297	0.261
ESG	0.405	0.474	0.200	0.00	0.767
GreenD	0.557	1.00	0.497	0.00	1.00

[Source: Own Elaboration]

3.9.2 Table 2: "EPs Sample Descriptive Statistics"

Summary Statistics, using the observations 1:01 - 30:10

Variable	*Mean*	*Median*	*S.D.*	*Min*	*Max*
ROE	0.0534	0.0607	0.0740	-0.295	0.575
ROA	0.00297	0.00330	0.00600	-0.0656	0.0316
NPA	0.0332	0.0150	0.111	0.00160	1.88
SIZE	11.8	11.8	0.367	10.8	12.4
TIER1	0.139	0.133	0.0370	0.12	0.287
LA	0.510	0.539	0.158	0.200	0.981
LD	1.13	1.06	0.325	0.670	2.63
NIM	0.0146	0.0130	0.00973	-0.0150	0.143
CI	0.673	0.660	0.151	0.368	1.27
GDP	0.0146	0.0155	0.0138	-0.0298	0.0595
INF	0.0137	0.0141	0.00985	-0.0114	0.0386
UN	0.0896	0.0780	0.0530	0.0297	0.261
ESG	0.476	0.500	0.124	0.0518	0.767
GL Growth	1.31	0.00	4.89	-1.00	58.0

[Source: Own Elaboration]

3.9.3 Table 3: "Baseline Model 1"

Baseline Specification: Fixed-effects, using 360 observations
Included 40 cross-sectional units
Time-series length = 9
Dependent variable: ROE
Robust (HAC) standard errors

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	0.304581	1.13909	0.2674	0.7906	
ld_NPA [1]	−0.0210758	0.0105198	−2.003	0.0521	*
SIZE	0.00220298	0.0922056	0.02389	0.9811	
ld_TIER1 [2]	0.0220364	0.0439561	0.5013	0.6190	
LA	0.0633908	0.0749111	0.8462	0.4026	
LD	−0.0862635	0.0386607	−2.231	0.0315	**
NIM	4.34418	3.06273	1.418	0.1640	
CI	−0.361187	0.102785	−3.514	0.0011	***
GDP	0.0692860	0.246748	0.2808	0.7804	
INF	−0.0393126	0.343371	−0.1145	0.9094	
UN	−0.131036	0.200118	−0.6548	0.5164	
ESG	−0.0844720	0.0559168	−1.511	0.1389	
GreenD	0.00223844	0.0111289	0.2011	0.8416	

Mean dependent var	0.048896	S.D. dependent var	0.103294
Sum squared resid	1.183703	S.E. of regression	0.061993
LSDV R-squared	0.690974	Within R-squared	0.300718
Log-likelihood	518.3243	Akaike criterion	−932.6486
Schwarz criterion	−730.5712	Hannan-Quinn	−852.2988
rho	−0.183335	Durbin-Watson	2.127245

Pesaran CD test for cross-sectional dependence: z = -0.110936 [0.911667] [3]
Robust test for differing group intercepts: F(39, 112.0) = 19.6077 [1.1221e-034] [4]

*, ** and *** indicates significance level at 10%, 5% and 1%
1. Logarithm difference of the variable Non-performing asset ratio
2. Logarithm difference of the variable Tier 1 ratio
3. Test for cross-sectional dependence of residuals (H0: No cross-sectional relation)
4. F test for regressors intercept (H0: The groups have a common intercept)

[Source: Own Elaboration]

3.9.4 Table 4: "Baseline Model 2"

Baseline Specification: Fixed-effects, using 270 observations
Included 30 cross-sectional units
Time-series length = 9
Dependent variable: ROE
Robust (HAC) standard errors

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−1.05804	1.37775	−0.7679	0.4487	
ld_NPA [1]	−0.0128866	0.00622613	−2.070	0.0475	**
SIZE	0.114327	0.118229	0.9670	0.3415	
TIER1	0.189231	0.169997	1.113	0.2748	
LA	0.0157118	0.0485221	0.3238	0.7484	
LD	−0.122771	0.0564501	−2.175	0.0379	**
NIM	5.33665	3.45327	1.545	0.1331	
CI	−0.295225	0.0747656	−3.949	0.0005	***
GDP	0.0809663	0.291481	0.2778	0.7832	
INF	0.186361	0.469266	0.3971	0.6942	
UN	0.188247	0.208725	0.9019	0.3745	
ESG	−0.0665316	0.0581930	−1.143	0.2623	
GL Growth	0.000738691	0.000358861	2.058	0.0486	**

Mean dependent var	0.051093	S.D. dependent var	0.075975
Sum squared resid	0.526643	S.E. of regression	0.048061
LSDV R-squared	0.660829	Within R-squared	0.376512
Log-likelihood	459.2399	Akaike criterion	−834.4799
Schwarz criterion	−683.3462	Hannan-Quinn	−773.7912
rho	−0.068745	Durbin-Watson	1.752650

Pesaran CD test for cross-sectional dependence: z = -0.355762 [0.722019] [2]
Robust test for differing group intercepts: F(29, 85.3) = 8.09066 [1.93638e-014] [3]

*, ** and *** indicates significance level at 10%, 5% and 1%
1. Logarithm difference of the variable Non-performing asset ratio
2. Test for cross-sectional dependence of residuals (H0: No cross-sectional relation)
3. F test for regressors intercept (H0: The groups have a common intercept)

[Source: Own Elaboration]

3.9.5 Table 5: "Robustness Check Model 1"

Robustness Check: GMM 1-step dynamic panel, using 320 observations
Included 40 cross-sectional units
H-matrix as per Ox/DPD
Dependent variable: ROA

	Coefficient	*Std. Error*	*z*	*p-value*	
ROA(-1)	0.0237556	0.0563794	0.4214	0.6735	
const	0.000173599	0.000234584	0.7400	0.4593	
ld_NPA [1]	−0.00071427	0.000593692	−1.203	0.2289	
SIZE	0.00514167	0.00733597	0.7009	0.4834	
ld_TIER1 [2]	0.00691767	0.00440398	1.571	0.1162	
LA	0.0149241	0.0103282	1.445	0.1485	
LD	−0.00338020	0.00280815	−1.204	0.2287	
NIM	0.288334	0.121271	2.378	0.0174	**
CI	−0.0407612	0.0105786	−3.853	0.0001	***
GDP	0.00834298	0.0239033	0.3490	0.7271	
INF	−0.0128368	0.0314031	−0.4088	0.6827	
UN	−0.0305614	0.0341259	−0.8955	0.3705	
ESG	0.00358252	0.00372959	0.9606	0.3368	
GreenD	0.000510070	0.000691275	0.7379	0.4606	

Sum squared resid	0.009198	S.E. of regression	0.005483

Test for AR(1) errors: z = -2.97577 [0.0029] [3]
Test for AR(2) errors: z = -0.35338 [0.7238] [4]
Sargan over-identification test: Chi-square(35) = 36.3122 [0.4073] [5]
Wald (joint) test: Chi-square(13) = 38.9568 [0.0002] [6]
Pesaran CD test for cross-sectional dependence: z = -1.44911 [0.147307] [7]

*, ** and *** indicates significance level at 10%, 5% and 1%
1. Logarithm difference of the variable Non-performing asset ratio
2. Logarithm difference of the variable Tier 1 ratio
3. Arellano-Bond test for autocorrelation of 1st order in residuals
4. Arellano-Bond test for autocorrelation of 2nd order in residuals
5. Test for over-identification restriction in GMM
6. Test for joint insignificance of variable
7. Test for cross-sectional dependence of residuals

[Source: Own Elaboration]

3.9.6 Table 6: "Robustness Check Model 2"

Robustness Check: GMM 1-step dynamic panel, using 240 observations
Included 30 cross-sectional units
H-matrix as per Ox/DPD
Dependent variable: ROA

	Coefficient	*Std. Error*	*z*	*p-value*	
ROA(-1)	−0.0487624	0.0638442	−0.7638	0.4450	
const	−0.00016057	0.000419424	−0.3828	0.7018	
ld_NPA [1]	−0.00051261	0.000629266	−0.8146	0.4153	
SIZE	0.0120323	0.00842017	1.429	0.1530	
TIER1	0.0401082	0.0264693	1.515	0.1297	
LA	0.00564738	0.00621381	0.9088	0.3634	
LD	−0.00238609	0.00185687	−1.285	0.1988	
NIM	0.287126	0.129683	2.214	0.0268	**
CI	−0.0423600	0.0134786	−3.143	0.0017	***
GDP	0.0273267	0.0251752	1.085	0.2777	
INF	−0.0495393	0.0464521	−1.066	0.2862	
UN	−0.0353394	0.0485505	−0.7279	0.4667	
ESG	0.0106908	0.00593649	1.801	0.0717	*
GL Growth	2.59633e-05	1.73523e-05	1.496	0.1346	

Sum squared resid	0.006224	S.E. of regression	0.005248

Test for AR(1) errors: z = -2.90337 [0.0037] [2]
Test for AR(2) errors: z = 0.523133 [0.6009] [3]
Sargan over-identification test: Chi-square(35) = 41.5176 [0.2078] [4]
Wald (joint) test: Chi-square(13) = 76.9267 [0.0000] [5]
Pesaran CD test for cross-sectional dependence: z = -1.33812 [0.180857] [6]

*, ** and *** indicates significance level at 10%, 5% and 1%
1. Logarithm difference of the variable Non-performing asset ratio
2. Arellano-Bond test for autocorrelation of 1st order in residuals
3. Arellano-Bond test for autocorrelation of 2nd order in residuals
4. Test for over-identification restriction in GMM
5. Test for joint insignificance of variable
6. Test for cross-sectional dependence of residuals

[Source: Own Elaboration]

CONCLUSIONS

In this last chapter the results of the empirical models will be summarized and it will be discussed the future of the Green lending market. The purpose of this thesis was to define the institutional framework in which the Green and Sustainable Finance markets is locate and how banks, that can be considered the most important players in the finance industry in term of possibility and capability of fostering the transition from a carbon intensive economy toward a low-carbon economy, are affected by these new green practices. In order to fill the research gap related to the impact of green practices in the European banking sector, two hypotheses have been tested.

H1: European Banks' profitability is affected by green and sustainability behaviors and activities.

Empirical results showed no evidence regarding the correlation between European Banks profits and sustainable corporate policies and activities. These have been measured respectively with the ESG score and a dummy variable capturing the presence of green and sustainability credit activity during the last ten years for each institution. This result could be explained by the still small size of the green finance market. Even if the commitment of some institutions is huge, the niche nature of the market does not show evident results in term of profit and competitiveness in the considered sample. Being green does not differentiate banking institution in terms of profitability.

H2: Declared Green European Banks' performances are explained by the level of their commitment toward green and sustainability topic among their green peers.

Empirical outputs showed a positive and significant impact of green and sustainable practices on banks profitability, indicating that being "greener" generate advantages in terms of profit compared to other "green" competitors. In particular, among the two green variables used in the models, Green Lending Growth rate and ESG score, the former resulted positively significant in the Baseline specification of profitability, using the Return on Equity as dependent variable, instead, the latter had a statistically significance in explaining the Return on Asset in

the robustness check analysis. Given the youth of the market it is still difficult to clearly understand the economic rational underpinning the impact of these variables on profitability. For sure, even if sustainable lending may appear more costly compared to the classic one due to the higher monitoring efforts and the possibly higher risk related to the success of innovative projects concerning the transition toward the low carbon economy, regulation and incentives are evolving in order to embrace this transition with financial institution. As already highlighted, different risk mitigation mechanism has been put in place in order to incentivize banks' sustainable financing activities. In fact, one of the core objectives of the European green deal is to stimulate green investments with the support of the EIB group canalizing capital from the EU and form member countries' budgets generating attractive investment conditions. With the Green Deal, EU commission planned EUR 1 trillion to be invested over the next decade that will be even increased thanks to the economics support initiatives put in place as response to the COVID-19 crisis. The way in which this amount of money allows banks to foster their profitability is through guarantees on their green investments. For example, in green project finance a minimum cash flow level from the project is guaranteed to financial institutions by EU or national funds for the repayment of the debt.

Another accredited reason explaining the positive effect of green practices is the return in terms of image and accountability that would result in a higher loyalty and satisfaction from clients and investors that become more willing to do business or invest in the institutions. This will be reflected in higher profits compared to competitors.

PROSPECTIVES

In 2019 Green and Sustainability linked loans have seen a huge increase in volume, reaching a record issuance of USD 234.3 billion, more than doubling the levels of 2018. On the other hand, in 2020 the number of ESG loans issued worldwide slightly decreased even if the overall amount of sustainable debt gained around USD 200 billion in volume due to the surge of Social Bonds, another sustainable form of debt with huge potential. This decrease in loans amount was due to the general economic condition related to the pandemic situation. In fact, companies in these tough times turned their focus to short-term liquidity lines implying the generalized

restriction of loans markets. An important data that needs to be highlighted is that European investment grade companies enlarged their share of sustainable loans as source of funding, from the 32% of the total loan volume in 2019 to the 38% in 2020, although the overall amount of loans decreased.

Until the recent slowdown, the history of the asset class was explosive. Based on that and given the fact that during 2021 less companies will need short-term funding lines as the stress of the pandemic will decrease, green debt market is expected to register again record volume in the current year. The 18th of February 2021 in fact, the largest sustainability linked loan deal ever has been completed. AB InBev, maker of beer brands Budweiser and Stella Artois, signed a green revolving credit facility of USD 10.1 billion, setting sustainability targets to be met by 2025. Even before the closing of this deal the issuance of Green and Sustainability loans was 71% higher compared to 2020 in the first six weeks of the year. Considering instead the AB InBev credit line, volume is now more than doubled.

While addressing the potential of the market, another important factor to take into account is the renewed commitment of government and institution toward the green economy as the best way to exit the pandemic crisis. Without any doubt, the COVID-19 situation opened huge possibilities for the growth of the European Green Finance Market. On July 2020 the 27 European member states government with the European Council President Charles Michel and the President of the European Commission Ursula Von der Leyen reached the agreement for the constitution of the EUR 750 billion Covid-19 recovery fund and approved the EUR 1.074 trillion long-term EU budget. Of this total EUR 1.824 trillion the 30% has been allocated for the achievement of the Paris Agreement objectives and fulfill the European Green Deal. Thanks to that a new season of incentives and fiscal relief has been triggered, opening the door to the most important climate initiatives ever.

Although such incentives and guarantees are non-yet defined since each country will submit their proposal regarding the use of this fund by the end of April 2021 and they will be approved by the European Commission just in summer 2021, the future of the European green debt market seems brighter than ever. Banks keep playing a cornerstone role in the development of

the green economy, since they can canalize resources in a sustainable way. Given the result of the empirical analysis that shows the goodness of green practices in terms of profitability for banks and the convinced intent of governments and supernational organization to move toward a low carbon economy, green finance seems to be a win-win game that could drive the world in a new sustainable era with clear growth opportunities for the whole economy.

RECOMMENDATIONS

In order to forecast the success of the green and sustainable loan market It is also needed to address the main challenges that the market is still facing and define possible solutions. In light of the discussed thematic, the following policy recommendations are outlined.

- Increase the ESG data penetration intensifying disclosure requirements: this aspect is crucial for banks in order to clearly define the risk related to their green lending activities. From a survey of 30 well know green lenders completed by Bloomberg News, emerged that this topic is considered the most relevant concern related to the expansion of the green financing market. Few and not structured green data imply difficulties in setting sustainability targets during the pricing. This would result in less advantageous terms for borrowers compared to conventional debt and the reduction of the economic advantage deriving from green structures undermines the success of this market. To deal with this issue would be needed a double layer regulation intervention. Firstly, consolidate the unified European Green Taxonomy that is still a work in process. Secondly it should be intensified the disclosure requirement regarding ESG practices at the company level at least for larger companies which are more likely to finance their activities with green funds.
- Harmonize Credit rating: from the same above-mentioned Bloomberg survey emerged that banks are worried about the poor quality of ESG ratings. Since the scoring system varies a lot among different agencies the difficulties in comparing and understanding ratings would result in a more difficult and expensive monitoring activity for banks. Again, this is a burdensome obstacle for the development of the green and sustainable lending market. If banks cannot rely on the quality of these ratings, they have to compute

their own due diligence that would inevitably imply a higher cost of financing. Even if ESG factors cannot be inserted in the credit rating regulation, as discussed in the Chapter 2 – Institutional Background, a possible solution would consist in creating a specific ESG rating regulation that would allow to define standards of valuation and harmonize evaluation score among different agencies.

- Adjust macroprudential tool in order to consider the benefits arising from these new green products: one of the most important limits this market is facing regards macroprudential regulation that does not promote green financing activities. As discussed in Chapter 2, many researchers highlighted how the regulatory framework stimulate short term practices in financial markets, clearly creating an impediment to the capital mobilization toward green and sustainable projects that require a "patient" capital and are long term investments by definition. The usable tools to make less onerous sustainable lending for banks balance sheet are different. Some idea would consist in implementing weighting factors that favor green asset or penalize carbon intensive ones in the computation of capital requirements, or in using less onerous weights for green loans in computing liquidity constrains.

REFERENCES

Abreu, M., Mendes, V. (2001). Commercial bank interest margins and profitability: evidence from some EU countries. Paper presented at the Pan-European Conference Jointly organized by the IEFS-UK and University of Macedonia Economic and Social Sciences, Thessaloniki, 17-20, May.

Albertazzi, U., Gambacorta, L. (2009). Bank profitability and the business cycle. Journal of financial stability.

Albertazzi, Notarpietro and Siviero (2016). An inquiry into the determinants of the profitability of Italian banks. Questioni di Economia e Finanza, Banca D'Italia.

Alexiou, C., Sofoklis, V. (2009). Determinants of bank profitability: evidence from the Greek banking sector. Economic Annals

Anber, A., Alper, D. (2011). Bank specific and macroeconomic determinants of commercial bank profitability: Empirical evidence from Turkey. Business and Economics Research Journal.

Athanasoglou, P.P., Brissimis, S. N., Delis, M. (2008). Bank specific, industry specific and macroeconomic determinants of bank profitability. Journal of international financial markets, institutions and money.

Climate Bonds Initiative (CBI). (2017, September). Bonds and climate change. The state of the market. London.

Climate Bonds Initiative (CBI). (2018, January). Green Bonds Highlights 2017. London.

Climate Bonds Initiative (CBI). (2018, September). Climate bonds taxonomy. London.

Climate Bonds Initiative (CBI). (2018, September). Bonds and climate change. The state of the market 2018. London.

Delmas, M. A., and Burbano, V. C. (2011). The drivers of greenwashing. California Management Review.

D'Orazio P. and Popoyan L. (2018). Fostering green investments and tackling climate-related financial risks: which role for macroprudential policies?

Davydenko, A. (2011). Determinants of bank profitability in Ukraine. Undergraduate Economic Review

Demirguc-Kunt, A., Huizinga, H. (1998). Financial structure and bank profitability. World Bank

European Commission (EC). (2018). Action plan: Financing sustainable growth. Brussels.

European Commission (EC). (2018). A clean planet for all. A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy. Brussels.

European Commission (EC). (2018). Proposal for a regulation on the establishment of a framework to facilitate sustainable investment. Brussels.

European Commission (EC). (2018). Proposal for a regulation on disclosures relating to sustainable investments and sustainability risks and amending directive (EU) 2016/2341. Brussels.

European Commission (EC). (2018). Proposal for a regulation amending regulation (EU) 2016/1011 on low carbon benchmarks and positive carbon impact benchmarks. Brussels.

European Commission (EC) (2020). Investing in a Climate-Neutral and Circular Economy – The European Green Deal. Brussels.

European Investment Bank and Green Finance Committee of China Society for Finance and Banking (EIB and GFC). (2017, November). The need for a common language in green finance.

European Sustainable Investment Forum (Eurosif). (2018). European SRI study 2018. Brussels.

ESMA (2019). Final Report Guidelines on Disclosure Requirements Applicable to Credit Ratings.

ESMA (2019) Final Report on Integrating sustainability risks and factors in the MiFID II.

ESMA (2019). Final Report on Integrating sustainability risks and factors in the UCITIS directive and the AIFMD.

EBA (2019). Draft Guidelines on loan origination and monitoring.

ESA (2020). Joint Consultation Paper ESG disclosures rules.

Goddard, J., Molyneux, P., and Wilson, J. O. S. (2004). The profitability of European banks: a cross-sectional and dynamic panel analysis. The Manchester School

High-Level Expert Group on Sustainable Finance (HLEG). (2017). Financing a sustainable European economy. Interim Report by the High-Level Expert Group on Sustainable Finance – Secretariat provided by the European Commission.

Höhne, N., Khosla, S., Fekete, H., & Gilbert, A. (2012). Mapping of green finance delivered by IDFC members in 2011. Cologne: Ecofys. Global Reporting Initiative (GRI). (2016). Introducing the GRI standards.

International Capital Market Association (ICMA). (2018, June). Green bond principles. Voluntary process guidelines for issuing Green Bonds.

Liu, H., Molyneux, P. and Wilson, J.O.S. (2013), "Competition and stability in European Banking: A regional Analysis", Manchester School.

Loan Market Association (LMA). (2018). Green loan principles. London.

Lona Market Association (LMA) (2019). Sustainability Linked Loan Principles. London.

Manicucci and Paolucci (2016). Factors affecting bank profitability in Europe: An empirical investigation. African Journal of Business Management.

Migliorelli, M. and Dessertine, P. (2019). The rise of green finance in Europe. Palgrave Macmillan.

Molyneux, P., Thornton, J. (1992). Determinants of European bank profitability: a note. Journal of Banking and Finance.

Neves, Gouveia and Proenca (2020). European Bank's Performance and Efficiency. Journal of Risk and Financial Management.

Novethic. (2018, April). The European green funds market 2018. Paris.

Parguel, B., Benoit-Moreau, F., & Russell, C. A. (2015). Can evoking nature in advertising mislead consumers? The power of executional greenwashing.

Pasiouras, F., and Kosmidou, K. (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union. Research in International Business and Finance.

Petria, Capraru and Ihnatov (2015). Determinants of banks' profitability: evidence from EU 27 banking systems. 7th International Conference on Globalization and Higher Education in Economics and Business Administration, GEBA 2013.

Schmuck, D., Matthes, J., & Naderer, B. (2018). Misleading consumers with green advertising? An affect–reason–involvement account of greenwashing effects in environmental advertising. Journal of Advertising.

Statman M. and Glushkov D. (2006). The wages of social responsibility.

Technical Expert Group on Sustainable Finance (TEG). (2019, June). Taxonomy. Technical report. Brussels.

Trujillo-Ponce, A. (2012). What determines the profitability of banks? Evidence from Spain.