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The impact of banking legislation on project finance and innovation in the non – bank instruments for infrastructure

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INTRODUCTION

Imagine being back in 2007, when everyone was making money consciously on the USA's homebuyer's head. Imagine being a home buyer and not have the opportunity to pay back your loan, which caused investment banks not to honour their commitments.

The backbone of this disastrous failure is called securitisation. Securitisation was the key spreading driver of the global financial crisis that hit the USA and Europe then. However, can the securitisation be considered the only *"scapegoat"* of this global financial crisis? As we know, during the so-called bull market, the trust of investors is strong and positive, and they attempt to make as much profit as they can. Nonetheless, what drives them to act in that way was the lack of supervision and regulation, subsequently to the banking system's deregulation.

Therefore, another factor that played an essential role in the financial crisis was the "deregulation" of the banking sector began at the end of the 70s to allow banks to face new challenges. However, a minimum body of regulation is required in every industry, but in the financial sector, it is even more critical as it must guarantee the deposits of every one of us, and since the financial system depends on trust, the role of regulation is crucial for shaping that trust.

In 1999, the Clinton administration passed the Financial Services Modernization Act, granting to commercial bank and investment bank enter into each' other industry, it was the deregulation milestone, while was barred from the previous Glass-Steagall Act of 1933. The Glass-Steagall act's repeal was accompanied by a merger and acquisition wave that established a giant corporation operating in the financial system. Too giant to be considered *"too big to fail"* that even nowadays represent a real systematic risk. Moreover, before the crisis, credit rating agencies used to rank almost all the bonds deriving from the securitisation as investment grade, considering that as secure, but they were not. This bubble collapsed and reached its peak in September 2008 when Lehman Brothers filed a Chapter 11 petition. It was just the beginning of a new era.

Going back to the initial question, securitisation was not the only factor leading to the global crisis. Instead, regulation, in this case, deregulation, and more generally the lack of supervision of the financial sector, played the most critical role in the crack of the financial market, as investors have been able to assume increasing risks without anyone to supervise them. The globalisation and the interconnection of the financial market was just the icing on the cake.

This short overview about the events that led to the crisis allows us to get some perspective on how banking legislation is fundamental to ensure a more secure and resilient financial market, which influences every part of the financial system, as discussed in this thesis.

First, the thesis's objective is to comprehend all the actions taken after the global crisis during the G20 reunions in Seoul (2010) and Cannes (2011) to meet the growing need to develop a standard international competition framework. In this context, it will be analysed the Basel committee's role and how the Basel III accord has redesigned the banking system's role in the capital market. Heavy dependence on bank intermediation, combined with bank deleveraging and reduced investor confidence, subsequently to the credit crunch has reduced the financing to all sectors of the economy. Particularly, Basel III's implementation has stem banks from long-term investments, paving the way to institutional investors' rise in the credit market. As banks reduce their capacity to finance long–term projects, especially in infrastructure, institutional investors seek a new way to deploy their resources in long-term projects that are completely detached from the economic cycle.

Moreover, as highlighted by the UN sustainable goals and by the European Commission, high-quality

infrastructures are needed to improve the economy's productivity, enables growth, and facilitates the internal market's interconnection. From this perspective, it will be analysed how financial innovation is widening the possibility to non – bank intermediaries deploying innovative solutions and resources into infrastructure investment. The long – term lending landscape has changed open to new opportunities for non-bank lenders to invest in such projects.

The final points to address are how to enhance, on the one hand, that the flow of resources goes into worthwhile projects, hence making sure that they are deployed efficiently. On the other hand, to support reluctant investors who are not willing to bear certain risks. This is made possible thanks to enhancements credit techniques, namely instruments used to guarantee investors in case certain risks arise. These instruments are provided by several entities, including the export credit agency, and their role in the credit marketplace is becoming increasingly central.

CHAPTER ONE

1. THE IMPACT OF BANKING LEGISLATION ON INVESTMENT

This chapter has the object to investigate the aftermath of the financial crisis and provide an extensive insight into the capital market, the predominant role of banks in the financial system, and the consequences of the crisis in the real economy. Additionally, all the actions taken at a legislative level to guarantee a more resilient financial market. Finally, explain clearly how this event and actions have influenced investment in project financing.
In conclusion, it will be possible to comprehend the regulatory body implemented to guarantee banks' financial stability and how it affects the market even nowadays and how impacted, mainly about taking financial risk.

1.1. A *glimpse into capital markets*

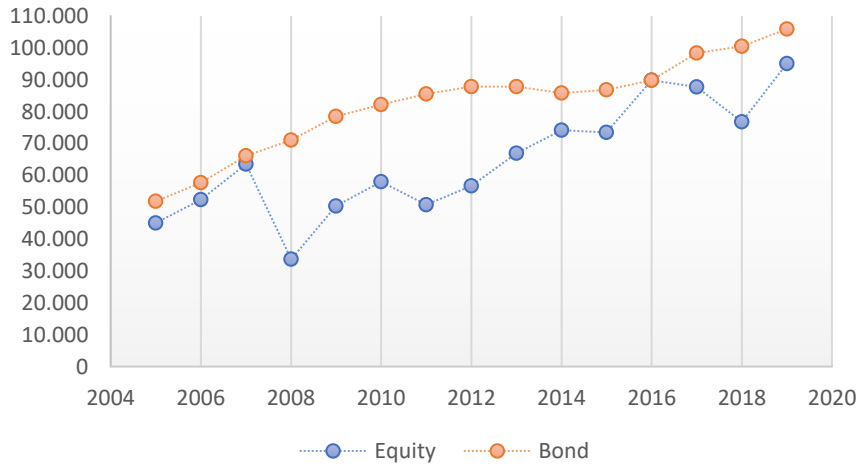
This paragraph focuses on the capital market, particularly on the bond market, also known as the debt market. This market is characterised by the dominant role played by banks, based on trust and risk. Nowadays, the risk has shifted towards other financial institutions that lately have substituted banks, but it will emphasise the next chapter. The focus here is on banks' risk aspects and all the actions taken after the crisis to mitigate that risk and assure that banks have a more significant capital strength and strengthen banks' prudential requirements by affecting liquidity and financial leverage.
The capital market is a part of the financial market where long-term debt and equity-backed securities are traded.[1] It is essential for channelling the resources where most needed, usually towards governments, families, and businesses. It is composed of the primary market where securities are issued for the first time and the secondary market used for traded already issued securities. One of the bond market hallmarks is that transactions are conducted by a financial institution, rather than households, and any time a trader wants to make a transaction, they must raise money first, either through a sale of an existing asset or borrowing money from another financial institution.
On the bond market, debt instruments can be divided into loans and securities, where the purpose represent the main difference. In fact, the former is an investment that a financial institution has made and holds to maturity. Simultaneously, the latter is an asset-backed by a set of loans issued by some financial institutions that are subsequently held by another entity, a financial institution or an individual.

[1] Krishnamurthy A., (2010). "How debt markets have malfunctioned in the crisis", *Journal of economic perspective*, Vol.24 No. 1, pp. 3-28.

Until 2008 the main feature that characterises this market was the logic of *laissez-faire,* in a more extensive views the logic of the invisible hand, conceived by Adam Smith [2] in his book *An Inquiry into the Nature and Causes of the Wealth of Nations* published in 1776. In his view, unobservable forces are enough to allocate resources between consumers and firms efficiently.

Unobservable forces can be summarised as the self-interest pursued by consumers and businesses, and while they persevere their self-interest, the whole of society will be in a better situation. However, until when this is true? If we consider the crisis of 2008, the lack of legislation did not prevent investors from acting in their interest; they continued to take risks for their self-interest to make money. Therefore, the unobservable forces intertwined with the lack of legislation have given rise to the worst financial crisis. As shown by the graph below, this selfish behaviour can be observed. Between 2007 and 2008, the whole equity capitalisation around the globe halved. After 2008 a series of actions were taken at the international level to *reset* the system and assure a more reliable and resilient financial system capable of supporting losses and all the consequences deriving from future economic downturns.

Figure 1 - Global Equity Market Capitalisation and Bond Market Value (B$)



Source: Bank for International Settlements (BIS)

Following this summary of capital markets and their functioning, we need to focus our attention on market actors, emphasising the role of banks as intermediaries. Historically, banks have played an essential role in the real economy, channelling resources where they

[2] Fleischacker S., (2020). "Adam Smith's Moral and Political Philosophy", *The Stanford Encyclopedia of Philosophy.*

are most needed to boost investment and consumption. However, in times of economic downturn, the ability to finance the private sector could be compromised, negatively impacting the real economy. The drying up of bank liquidity will affect the access for businesses and families to investment and consumption of funds which, as a result, affect all aspects of the real economy.

Furthermore, the dry-up in bank liquidity can be more vulnerable for Small and mid-size enterprises[3] (from now SMEs) with respect to large companies because of their limited access to other financing sources, even though SMEs are crucial for economic growth, innovation, and employment.

1.2. Project financing and corporate financing

Project financing is a structured funding approach used for funding projects with high complexity and capital requirements. A key element is that it must guarantee its bond and equity holders solely through the project's cash flows.

Investment in project finance is essential, mainly to finance single-purpose and capital-intensive projects that can be public or private, such as plants, toll roads, pipelines, industrial plants, and telecommunications facilities. On average, the size of a project finance deal is worth $450 million[4].

Investment in project finance has grown exponentially between 1991 and 2012, reaching its peak in 2006 with 328 billion dollars invested in PF and raised over 2.5 trillion dollars in the same period.[5]

In the developed world, particularly in Western Countries, government spending is constrained by austerity. As a result, it is difficult to make investments even when countries face ageing infrastructure, stricter environmental regulations, and globalisation. The infrastructure deficit is estimated at roughly $3.7 trillion a year.[6] In this situation, project funding could help revitalise ageing infrastructure while trying to stimulate the economy.

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[3] OECD, (2014). "SMEs and the credit crunch: Current financing difficulties, policy measures and a review of literature", *OECD Publishing*, Paris.

[4] Pinto J., Alves P., (2016). "The Choice between Project Financing and Corporate Financing: Evidence from the Corporate Syndicated Loan Market", Available at SSRN: https://ssrn.com/abstract=2876524.

[5] Krishnamurthy S. and Tung F., (2016). "Law and Project Finance", *Journal of Financial Intermediation*, Vol. 25, pp.154-157.

[6] De Moor L., Thiere W., (2019). "Determinants of bank loan spread in project finance", *International Journal of Managing Projects in Business*, Vol. 12 No. 1, pp. 161-186.

Therefore, to fill the gap, governments progressively look at the private sector for financing infrastructures, using project finance in public-private partnership (PPP) due to budgetary constraint. Conversely, the private sector is increasingly examining PPP has given certain elements that make investing in such transactions noteworthy. Specific characteristics of project finance deals make the private sector more amenable to invest in these projects. These features include his insensitivity to the economic cycle, stable cash flow, and extended asset life cycle. Consequently, a larger number of financial institutions, such as pension funds or hedge funds, are interested in investing in project finance deals.

However, what is project finance? Project finance is an investment technique aimed at financing projects, which requires a high intensity of capital, equity or mezzanine debt, and is useful in managing complexity. A legally independent project company called special purpose vehicle or SPV is established to perform its construction and operation.[7]

One of the key features of project financing versus other financing methods is that such projects are undertaken with high leverage. This means that up to 70-80 percent of the financing project is debt and, in some cases, such as infrastructure, this percentage can reach even 90 % of the total value.

Another difference from corporate financing is the limited recourse available to lenders. Nevertheless, the SPV's cash flows are given priority to finance operating expenses and debt servicing, while the remaining cash flow will pay dividends.

The lion's share of the debt comes from banks, and one advantage is based on banks' monitoring role regarding other types of financing where the control is less verifiable. Furthermore, as specified before, the project's debt is no recourse, which means that lenders have little or no claim on the asset of the sponsors' balance sheet in the event of default. Every loan granted will be fully repaid only with the cash flow generated by the project.

Although high leverage companies can finance projects consistently at low cost with respect to using equity, a high leverage is a vulnerable point since it exposes projects to default during hard times, possibly terminating it. As mentioned above, bank loans represent the first part of the debt in a project financing operation, although bond financing is gaining popularity thanks to this feature.

[7] Gatti S., (2018). "*Project Finance in Theory and Practice: Designing, Structuring, and Financing Private and Public Projects",* Elsevier.

To further the analysis, it is essential to understand the difference between corporate financing and project financing, as some particularities are useful in understanding price differences.

According to *Caselli* and *Gatti*[8], the use of project finance is justified by two economic motivations. First, project financing facilitates financing a particular asset class where other external funding practices are not available for a specific financial requirement. Second, project finance creates value and reduces financing costs by addressing agency issues, asymmetric information costs and improving risk management. Focusing on risk management, the non-recourse nature of projects, protects the sponsoring debt's firm from risk contamination, allowing an efficient allocation of risk to the project to reduce costs and ensure proper benefits. The first economic benefit will lead to a reduction in under-investment due to information asymmetry. The second economic benefit, the reduction in funding cost, is enabled because using an explicitly structured transaction thru an SPV and secured with ring-fencing assets produces cash flow available only to support the transaction and subsequently reduce the cost of funding. Since project financing reduces financing costs relative to other financing methods, the rate charge on project financing loans is expected to be lower than the rates charged on non-project financing loans.

Sponsors prefer to invest in the form of project financing when seeking long-term investment while maintaining financial flexibility and protecting their credit rating. Indeed, thanks to the peculiar structure of project finance, sponsors can maintain their creditworthiness and not impact their ability to access additional financing in the future. Companies that use project financing rather than corporate financing are larger and more financially limited, and they usually operate in countries with lower sovereign debt ratings[9].

Despite the benefits of implementing a project-based agreement, there are notable drawbacks in using a project financing transaction.

First, the complexity of project finance operations is time-consuming to implement and execute, and when operations are in place is very restrictive. Furthermore, the design and drafting of the required documents, linkages to the negotiation of the funding and operating agreement takes time. Finally, it is more expensive than the corporate funding option, it is costly to implement, and the cost of borrowing is higher compliance with corporate

[8] Caselli S., Gatti S., (2005). *"Structured Finance: Techniques, Products and Markets"*, Springer: Berlin

[9] Pinto J., Alves P., (2016). "The Choice between Project Financing and Corporate Financing: Evidence from the Corporate Syndicated Loan Market", Available at SSRN: https://ssrn.com/abstract=2876524.

obligations. Although there are essential drawbacks that could prevent from investing in project finance deals, they are compensated by the beneficial effect arise from the reduction in the net financial cost associated with the large capital investment, off-balance-sheet financing, and appropriate risk allocation. Another point to consider in using project finance with respect to corporate finance is the inefficiencies created by the weak legal protection of outside investors for large investment projects[10].

Project financing provides a contractual and organisational alternative to the investor protection law by making cash flows verifiable for lenders through two mechanisms. This is because cash flows are the only means of repayment used by lenders. Verifiable on the cash flows, it is made possible by the contractual arrangements on which it is based the unique structuring of the project funding company, a legally independent entity separate from the sponsors. On the other hand, sponsors must deposit cash flow into a special fund that can be readily controlled by lenders and in the case of concern, they can enforce these contracts.

As a result, project finance is more likely to occur in countries with weaker laws against insider stealing and weaker creditor rights in bankruptcy since it gives more protection for investors.

Furthermore, contractual constraints are feasible on cash flows because the project company owns only the single project for which it is created and is separated from the sponsor's other cash flow.

In contrast, in the corporate finance sector, the blending of the cash flows coming from several projects make it difficult to separate those cash flows, and therefore lenders' monitoring is problematic. Additionally, several cash flow constraints, such as the one of project financing, would interfere with management's discretion in their use, affecting the corporate entity's internal capital markets.

To conclude, there is a trade-off between project finance and corporate financing since what can be implemented in project finance cannot be implemented in corporate debt finance. Corporate financing offers more management flexibility regarding the allocation of cash flows, but in contrast, they are less verifiable. Conversely, project finance offers cash flows verifiability, limiting the possibility of allocating these cash flows as managers prefer. However, the attendant cash flow controls preclude managers from funding project-related

[10] Krishnamurthy S. and Tung F., (2016). "Law and Project Finance", *Journal of Financial Intermediation*, Vol. 25, pp.154-157.

growth opportunities from internal cash flow or impede them from reallocating cash flows across multiple projects, as it is possible for corporate finance debt.

Project finance might be more useful in countries where corporate and bankruptcy laws provide weak investor protection as corporate debt finance can lead to outside investors' expropriation by corporate insiders.

1.3. Pricing the deal

Project financing is a highly leveraged operation, meaning that on average, between 70% and 80% of the project is composed of debt, while the remaining part is equity.

Of this proportion, most of the debt is represented by bank loans. Given this structure, the project financing margin is the main driving force behind the cost of funds, as is infrastructure projects' feasibility.

The cost of debt is based on two main components: the fixed component and the floating component. The floating component is generally based on the interbank lending rates[11], while the fixed component is expressed with basis points asked by banks over interbank lending rates. Since the interbank credit rate is considered a risk-free rate, the debt cost is mainly based on basis points, known as a spread or margin, charged by the banks.

According to *Thiere* and *De Moor*[12], four groups of drivers affect banks spread for infrastructure projects. These drivers are grouped into loan characteristics, project characteristics, banking characteristics and macro-economic variables.

The *first bundle* includes all the factors related to the loan, the term structure, the loan's size, the type of loan and the credit subsidy. In general, credit risk is higher at the initial stage of the project and tends to decrease over the project's life.

The maturity in the case of a project finance deal is not an issue because the maturity risk can be eliminated due to credit enhancement, while it cannot eliminate that risk in corporate debt. In some cases, long-term projects may have a smaller gap than other projects due to other factors such as country risk or political risk. Conversely, long-maturity exposes the project to political risk, but this risk can be covered by export credit agencies or multilateral development banks. Lenders must protect themselves against the risk of default, particularly

[11] The interbank lending rate to consider for the EURO market is the EURIBOR rate, while the interbank lending rate for the UK and the US market is the LIBOR, respectively in their currency.

[12] De Moor L., Thiere W., (2019) "Determinants of bank loan spread in project finance. "*International Journal of Managing Projects in Business"*, Vol. 12 No. 1, pp. 161-186.

when funding investments in emerging economies. Therefore, the spread reflecting the risk applied to the project will be lower.

Another factor that falls under the first category is the size of the loan. There is a negative relationship between the transaction size and the spread, and two factors must be considered under this relationship. The first is based on borrowers' creditworthiness, given that creditworthy borrowers are granted larger loans. The economies of scale resulting from the granting of a large quantity of money for banks to arrange larger syndicated loans will be beneficial for the borrower, and consequently, a lower spread will be applied. The second is based, as previously, on country and political risk, as banks are more willing to provide loans when they invest in low-risk countries. Finally, the credit enhancement has a downward effect on the spread, while the type of loan has a differential effect depending on each instrument's specific risk profile. For example, mezzanine and subordinated debt required a greater spread for short-term or revolving temporary financing for major projects.

The *second bundle* refers to project characteristics and specifically to capital structure, industry, and different project risks. Given the structure of the project financing, the higher is the leverage, the higher will be the risk of default, and consequently, the overall cost of financing the project will increase. However, after a specific leverage point, in any case, lenders will be not willing to grant loans anymore. Regarding the industry, literature shows how, in some industries, such as road transportation projects or power projects, banks impose a higher spread.

To conclude, some risk factors are related, such as construction, country, currency, and credit risk, that influence risk premia. In an efficient capital market, these risks may be diversified or transferred to an insurance company through the project financing transaction structure. Relating to the construction phase, the impact on the spread is not clear-cut, and it does not result in incrementing the cost of debt, even if during this first phase the probability of default is too high. However, greenfield projects respect brownfield projects yield a higher spread, given that greenfield projects have to be constructed. After the construction risk, it is essential to analyse the country or political risk, defining it as the likelihood that changes in political, economic, financial, or social rules in the host country might cause the borrower's inability to meet its obligation. Clearly, banks will charge higher risk premia in countries with higher political risk as opposed to those with low political risk[13]. Another key

[13] Political risk can be assessed based on different indexes such as, the corruption index provided by Transparency International, JP Morgan Emerging Market Sovereign Bond Index used as a proxy for emerging economies, International Country Risk Guide.

risk that can have a sturdy impact on basis point is currency risk, and in fact, banks are willing to lower the spread to international borrowers who are willing to borrow in US dollars or another hard currency.

The feature of banks and sponsors forms the resultant set of factors. The impact on spread, in this case, depends on the size of the banking syndicate, the prestige of the arranging bank and the bank origin, but fundamentally depends on the market power's role. In the latter case, banks will ask for a higher spread and higher capital contributions where the sponsoring companies are also a vital SPV counterpart. Some studies done by *Corielli* and *Gatti*[14] showed how the prestige of a bank influences the global loan spread downward, allowing projects to be highly leveraged. Finally, the last bundle of drivers concerns the macroeconomic variable that influences banks' risk premium on project finance deals. Nowadays, this influence is more remarkable than it was in the past. Inflation, the debt-to-GDP ratio, and the real GDP growth are the main driver in this bundle affecting the spread.

First, inflation plays an essential role in an economy; a high inflation link to public dissatisfaction could lead to political instability. Political instability that, in turn, increased spreads charged and, accordingly, the project's overall cost. Therefore, the inflation factor is significant when investors decide where to invest, how but essentially when. Inflation and spread have a negative correlation. Most of the time, as inflation increases, banks charge fewer basis points. Undoubtedly, this is correlated with other macro variables because when inflation goes up, the economy usually does well.

Instead, research done by *Altunbas* and *Gadenecz*[15] showed how the debt-to-GDP ratio, real GDP growth and sovereign ratings impact reasonably on the spread. Considering the first ratio, debt-to-GDP, higher is that ratio and more likely will be the probability of a country's default, which will affect banks' propensity to grant loans. Conversely, real GDP lowers the pricing of credits since it is considered an indication of a nation's wealth. The sovereign rating is not less important since projects implemented in a poor sovereign rating country are priced four times more than the projects implemented in countries with the best sovereign

[14] Corielli F., Gatti S., Steffanoni A., (2010). "Risk shifting through nonfinancial contracts: effects on loan spreads and capital structure of project finance deals", *Journal of Money, Credit, and Banking,* Vol. 42 No. 7, pp.1295-1320.

[15] Altumbas Y., Gadanecz B., (2004). "Developing country economic structure and the pricing of syndicated credits", *Journal of Development Studies,* Vol. 40 No.5, pp.143-173.

rating. Although infrastructure investment lasts for a decade and goes through different economic cycles, a short economic outlook and projections define the lending cost.

In conclusion, literature undervalued macroeconomic variables' role in affecting the cost of debt, focusing mainly on project, loan, and bank characteristics. Instead, according to *Thiere and De Moor*, the cost of debt is mainly driven by market, business cycle and more generally by the macroeconomic environment in place at the time of closing the deal, rather than the project's structuring. The impact is even more significant for PPP projects, and public involvement is a crucial driver for lessening the cost of projects, given the fact that they can borrow at a risk-free rate and therefore the overall cost of a project PPP will be considerably smaller than in other projects.

1.3.1. The bearing of the monetary policy on project finance deal

Project financing have been affected during the economic downturn and the consequently European sovereign crisis, which affected the project financing overall cost[16].

As mentioned in the paragraph above, one key parameter in highly leveraged projects is the cost of debt, which is composed of a fixed component and a floating component. The inflation rate influences the floating component. The inflation rate is kept under control by central banks who attempt to manage the inflation rate through conventional or unconventional instruments. Low-interest rates are made necessary to enhance banks' willingness to concede loans if they shorten a credit. However, liquidity trap interacts with recessionary trends that may lead to a deflation or stagflation situation. Therefore, in such situations, because inflation is highly sensitive to economic growth or (un)growth, a low inflation rate, or even a negative inflation rate, it is not welcome. If debt is expressed in real terms, debt becomes more expensive under such a scenario, impacting investments in highly leveraged infrastructure such as PPP or project finance projects. Additionally, in the case of recession, as was the case during 2007-2009 and the crisis of sovereign debt in 2011, the spending ability, especially for indebted countries, has been reduced and impacted infrastructure investment.

According to the European Central Bank, unconventional measures, as the Quantitative Easing introduced by Mario Draghi in 2015, can boost economic growth, impacting the rate

[16] Visconti R., (2016). "The impact of quantitative easing (QE) on the cost of debt in project finance investment", *Public money and management,* Vol.36 No. 2, pp. 129 - 135.

of inflation. An increase in the inflation rate improves the sustainability of debt, and consequently, it impacts the overall cost of debt.

However, the cost of debt in project financing is divided into two main components, which are senior and subordinated debt. The latter's maturity is slightly higher than the senior debt, and therefore, its duration makes this kind of debt more sensitive to interest rates.

To conclude, QE impacts the composition of debt qualitatively and quantitatively, but borrowers can underestimate the risk behind leverage. It may also represent an antidote to the Basel III rules' downsides, which steer European commercial banks away from long-term loans and require higher regulatory capital and liquidity standards. However, if the private sector gains from QE, they subsequently can offer better conditions to the public sector having a win-win strategy.

1.4. Credit Crunch: Repercussion on the capital market

Shortening the willingness to concede loans due to a decline in banks' value due to conditions imposed by regulators, bank supervisors, or banks themselves that require a bank to hold more capital than they previously have held is called *credit crunch*.

The credit crunch of 2007-2008 has been complicated with respect to those that happened before. The new packaging and reselling asset techniques, intertwined with the subprime mortgage growth and the speculative real estate bubble, was an explosive mix that cause the worst financial crisis since the Great Depression[17].

The main channel through which a banking crisis can affect the real economy relates to the private sector's ability to access the credit needed to fund investment and consumption[18]. This section will explore how the dry-up in bank liquidity affects interbank lending and consequently affected the real economy by shortening loans' granting. Shortening the supply of credit has impacted especially on small and medium enterprises that have not had the opportunity to switch lenders, and therefore, could not substitute with other finance sources. To comprehend how and where the credit crunch has begun, three considerations have to be made about the bond market: risk capital, haircuts in repo, and counterparty risk.

[17] Mizen P., (2008). "The credit crunch of 2007-2008: A discussion of the Background, Market Reactions, and Policy Responses", *Federal Reserve Bank of St. Louis Review,* Vol.90 No. 5, pp.531-567.

[18] Iyer R., Peydro J.L., da-Rocha-Lopes S., Schoar A., (2014). "Interbank Liquidity Crunch and the Firm Credit Crunch: Evidence from 2007-2009 Crisis", *The Review of Financial Studies,* Vol.27 No. 1, pp. 347-372.

Risk capital, or equity, is the most significant part of the analysis. It is the most significant as each investment choice, in a specific instrument, has to be made based on the risk capital at the time since it will affect the financial institution's overall risk, and if something happens will affect the overall market.

Considering the hypothetical balance sheet as depicted below, financial institutions can raise capital in two ways, equity or debt. In this case, this financial institution raises $10 of equity and $90 of debt; conversely, it holds $50 in treasury bonds and the other half in risky assets such as mortgage-backed securities.

Table 1 - Hypothetical Balance Sheet of a Financial Institution

ASSET		LIABILITIES	
Treasury securities and cash	$50	Debt	$90
Risky loans and debt instruments	$50	Equity	$10

Source: How debt markets have malfunctioned in the crisis

During the crisis[19], what has happened, that financial institutions started to sell low risky-asset for riskier assets that were more profitable such as the mortgage-backed securities, which made financial institutions more vulnerable. Institutional investors bought risky assets, and the portfolio resulted in unbalanced towards risky securities. A higher proportion of debt or a lower level of risk capital, equity, tends to make a financial institution more risk-averse in its portfolio choice. Therefore, banking legislation and, more generally, legislation on financial institutions can reduce the risk taken by those financial institutions with beneficial effects for the whole market.

The legislation aims precisely at this; banks must have equity capital proportionate to the risk they have taken to keep the probability of financial distress at the minimum level, as the Basel Committee did with Basel I, Basel II, and Basel III. Considering our hypothetical balance sheet again, if we suppose that a loan's value, due to a write-down in the asset side, falls to $45, then the financial institution has a remaining capital equal to $5 and is closer to financial distress. In this case, unless the lost risk capital is not replaced, it will affect the investor's trading decision, and they will be willing to buy less mortgage-backed securities.

[19] Krishnamurthy A., (2010). "How Debt Markets Have Malfunctioned in the Crisis", *Journal of Economic Perspective*, Vol.24 No. 1, pp. 3-28.

On the other hand, another investor is selling the same securities, but the financial institutions will bid a lower price for purchasing that asset with fewer buyers.

During the crisis, financial institutions have taken enormous losses in their risk capital. According to the Lipper TASS Hedge Fund Asset Flow Report, banks, insurers, government-sponsored enterprises from the second quarter of 2007 to the second quarter of 2009 lost something like $971 billion[20]. The systematic risk was unavoidable since the losses were not sustained only by one financial institution, but at the time, investment banks, hedge funds, and pension funds were full of those securities. Therefore, the losses were across all financial institutions.

When the debt market liquidity starts to be short, two concerns need to be considered.

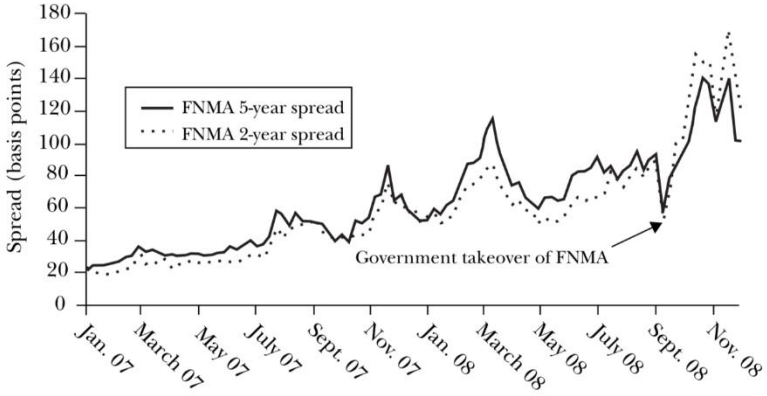
First, financial institutions operating in the secondary credit market reduce their purchases. Second, many investors become more reluctant to invest in illiquid assets during a financial crisis, preferring to keep their investment in liquid assets.

It is possible to observe this preference for liquidity through the Federal National Mortgage Association. The association issues bonds to finance its activity. It is like the US treasury bond, but with the difference that these bonds are not guaranteed by the US government and their secondary market is less liquid than the treasury bonds.

In fact, as can be seen easily from the graph, the spread during the turmoil increased, and this can be intended as a preference for investors to liquidity, creating a stress on treasury bonds relative to less liquid FNMA bonds, which consequently led to an increase in the spread.

[20] Mizen P., (2008). "The credit crunch of 2007-2008: A discussion of the Background, Market Reactions, and Policy Responses", *Federal Reserve Bank of St. Louis Review,* Vol.90 No. 5, pp.531-567.

Figure 2 - The Spread Different of the FNMA

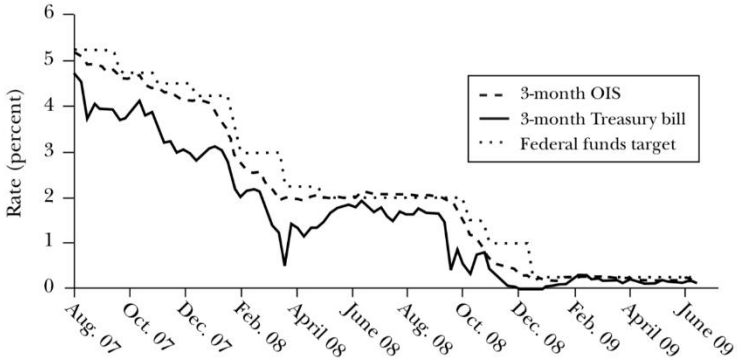


Source: How debt markets have malfunctioned during the crisis

Another point of view that it is useful to focus on that depicts this liquidity preference is between the yields on the three-month Treasury bills and the three-month overnight index swap rate.

As before, the graph below shows how stress on the short-term increases the valuation for the most liquid Treasury securities relative to other securities.

Figure 3 - Spreads Difference between the Treasury bill and the Overnight Index



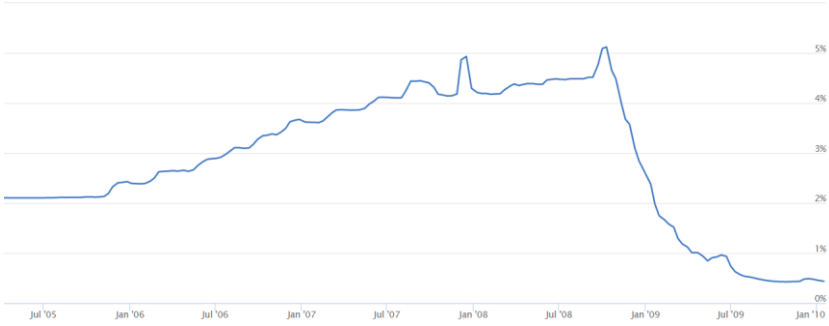
Source: How debt markets have malfunctioned during the crisis

Similar conclusions are reached in a study conducted by *Hempell and Sorensen*[21] that shows that strains on banks' liquidity positions and their access to market financing contributed significantly to the slowdown in corporate lending in the euro area during the financial crisis

[21] Hempell H.S., Sørensen C., (2010). "The Impact of Supply Constraints on Bank Lending in The Euro Area Crisis Induced Crunching?", *European Central Bank*, Working Paper No. 1262.

2007-2009. The contraction on credit started in 2007 when the interbank spread increased as banks were reluctant to lend money given the credit risk.

Figure 4 - Interbank Market Credit



Source: European Central Bank

During this turmoil period, they noticed how bank willingness to concede loans reduced and impacted banks' overall core business. As sovereign bond yields rise and ratings deteriorate, the source of financing becomes scarcer and costlier. These factors contributed to transmitting tensions from the sovereign bond markets to bank' ability to supply credit. Hence, a credit crunch can occur when governments may tighten fiscal policy to combat sovereign tensions.

The critical financial issue, at the time, was to set a fair price for the real value of assets that were no longer traded. This left space to uncertainty and gave rise to a call for liquidity to cover up losses in case of write-down. The banking system would have been capable of supporting the losses in their balance sheet if the demand for liquidity had not impacted the operation on capital markets.

Credit markets intertwined with the real estate market helped fuel the developing crisis, worsening their position by leveraging borrowed funds, sometimes even up to 20:1, which means that considering an investor, even with a 5% realised loss, they lost all the capital invested. However, given the high returns of securities, international investors were willing to buy those securities. The spread of the crisis was given by those international investors attracted by the securities' high returns of the subprime mortgage, which influenced many other markets.

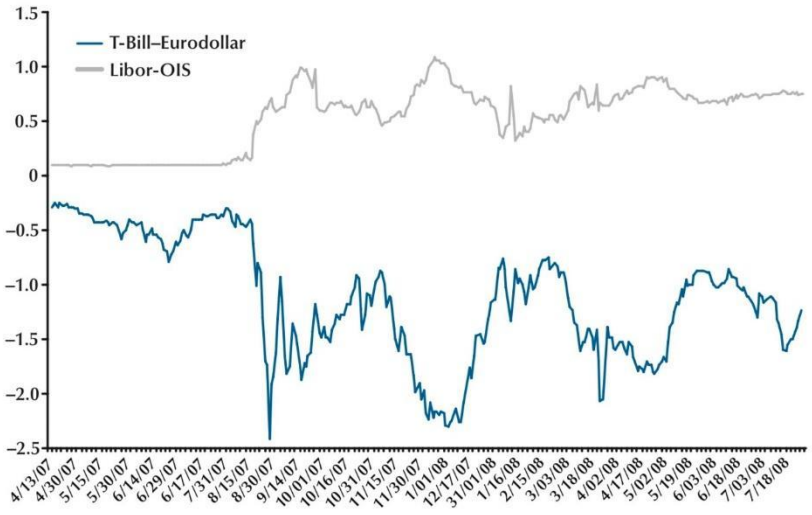
Essentially, sellers of mortgage mispriced risks devoid of assuming house prices would continue to rise while interest remains low. The lack of risk assessment due to the complexity of the structured product and the difficulty that banks faced in evaluating the extent of losses created uncertainty in the interbank market as they became reluctant to lend to each other

unless there was a risk premium used for compensating a riskier loan. The uncertainty, as specified before, created a misallocation in the interbank markets.

The counterparty risk constituted the main fear. If borrowing banks had hidden losses, then they would not be able to repay their loans. It is possible to show this hunger for liquidity graphically by two interest rate spreads represented below: the LIBOR-OIS[22], which correspond to the spread difference between the rate at which banks lend to each other (1-3- months) compared to the overnight indexed swap rate, which soared 100 basis points and did not return to normal.

On the other hand, the Treasury-Eurodollar spread (TED) is the difference between the U.S. Treasury bill rate and the Eurodollar rate[23]. Given that the Eurodollar is a time deposit, and the interest asked for maintaining liquidity in dollar rapidly increased, it reflected the desire to shift into safe U.S. Treasuries[24].

Figure 5 - Interest Rate Spread (%)



Source: *Federal Reserve Board*, Financial Times

The need for liquidity was in part compensated by central banks, who, for distressing the financial system, supplied money to the most troublesome part of the financial system

[22] Central banks often use this spread to describe the cost of interbank lending, reflecting credit and liquidity risk.

[23] Eurodollar is a time deposit held in U.S. dollars but outside the U.S. borders and therefore not subject to the Federal Reserve jurisdiction. Eurodollar because most of the deposit is held in Europe. A time deposit is an interest yielding deposit with a specified date of maturity.

[24] Mizen P., (2008). "The credit crunch of 2007-2008: A discussion of the Background, Market Reactions, and Policy Responses", *Federal Reserve Bank of St. Louis Review,* Vol.90 No. 5, pp.531-567.

directly but acting differently. The Federal Reserve cut the interest rate offered to banks by 50bp, while the ECB injected money by auctions for more than €100 billion, and however, it unchanged its interest rate. Although there was plenty of liquidity in the overnight market, the real issue was a shortage of funds in the 1- 3- and 6-month maturities where banks needed. This shortage of supply caused the rise of cost for these maturities. The ECB was the first to lend at longer maturity.

On average, the reduction in the supply of credit, according to *Iyer, Pedro et al.*[25], had different impacts based on company size, age, risks and weaknesses, and the banking relationship.

They found that the credit contraction's impact was economically and statically more impactful for small, younger firms and firms with a lower relationship for banks.

Instead, large firms were not given the opportunity to switch with another method of financing rather than rely on a bank's loan that did not impact them but were more the relationship that banks have with large firms, and they consider this relationship valuable.

Another important effect of the credit crunch was the impact on syndicated lending. The new syndicated loans fell dramatically by 47% during the peak of the financial crisis[26].

In conclusion, the global financial crisis has brought out some weaknesses of the financial market. Counterparty risk and liquidity risk were essential drivers behind the credit crunch, and the interbank liquidity shock induced a credit supply contraction, which affected the capability of a bank to ensure its activities. The central banks' intervention was considered essential to lift the situation and give breath to the interbank lending essential to carry out the banks' core activities.

[25] Iyer R., Peydro J.L., da-Rocha-Lopes S., Schoar A., (2014). "Interbank Liquidity Crunch and the Firm Credit Crunch: Evidence from 2007-2009 Crisis", *The Review of Financial Studies,* Vol.27 No. 1, pp. 347-372.

[26] Wehinger G., (2014). "SMEs and the credit crunch: Current financing difficulties, policy measures and a review of literature", *OECD Journal: Financial Market Trends,* Vol. 2013 No. 2.

1.5. Banking legislation

The crisis of 2007-2008 has been the worst crisis since the great depression. It was essential to intervene directly on the financial market, particularly concerning banking legislation, to reinforce prudential capital requirements, leverage effect and implement a new risk-weighting system. These actions have become necessary since the financial system undervalued the risk taken and incorrectly assessed the guaranteed debt obligation arising from risky loans' securitisation.

Therefore, after discussing the capital market, the different key features between project and corporate financing, and understanding the impact of the credit crisis on the real economy, our focus in this paragraph is on the legislation implemented and strengthened due to the market collapse.

1.5.1. About the Basel Committee

The Basel Committee was designed to establish a global standard for banks' prudential regulation and promote supervisory cooperation and a level playing field internationally. Forty-five members compose it, and it involves central banks and bank supervisors from 28 jurisdictions. The aim is to enhance financial stability. It can strengthen the regulation on the bank's supervision. Since its inception, it has released standards on many aspects of banks' prudential supervision, and these standards establish minimum prudential requirements for internationally active banks[27].

The Basel Framework is a tool used to reduce opportunistic behaviour and regulatory arbitrage, and it is composed of standards that members must follow to be eligible to satisfy the Basel requirements. The standards provide a risk-based capital requirement, calculation of the risk-weighted asset for credit, market, and operational risk[28], specified a leverage ratio and a liquidity cover ratio. Moreover, it regulates large exposure in the event of a loss sustained by a bank, limiting the maximum loss in the event of counterparty failure.

An important point to stress out is that the Committee does not have any formal supranational authority to force its implementation. The Committee members committed to implement and apply the Basel standards in their national jurisdiction within the time limits set by the

[27] www.bis.org

[28] Risk-Weighted Assets is used to determine the minimum level of capital that banks must hold to reduce the risk of insolvency with respect to the characteristic to analyse.

Committee. Therefore, the Basel Framework requirements will apply to banks once they have been transposed into national laws by authorities in each jurisdiction.
Finally, the World Bank and the International Monetary Fund apply the framework's rules to assess countries' banking supervisory system and practices' effectiveness.

1.5.2. The First Basel Accord: Basel I

The first Basel Accord dated back to 1988 and posed the prudential system's fundamentals that it still forms the financial system's basis. The first Basel Framework, which was the first initiative for the creation of common international rules on bank's supervision, was promoted by the G10 countries plus Luxemburg (Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the UK, the US) that created a committee at the Bank of International Setting (BIS) in Basel (Switzerland). The first paper was released in 1988 by the Committee, and it was called the 1988 The Basel Accord, known as Basel I. It came into effect in 1992 since the Accord is not legally binding, but countries have to transpose the Accord by a national law[29].
Now, focusing on banks' nature, given their business, they undertake several types of risks. Those risks can be divided into three pillars.

Table 2 - Bank's Risks under Basel II

FIRST PILLAR	*SECOND PILLAR*	*THIRD PILLAR*
Credit	Country	Publicly disclose information
Market	Interest	
Operational	Liquidity	
	Currency	
	Strategic	
	Securitisation	
	Concentration	
	Reputation	

Source: From Basel 1 to Basel III

The Basel I accord focus primarily on credit risk, the central bank's risk, by defining capital requirements considering the on- and off-balance sheet position.
The main goals of this first international legislation were to:

[29] Balthazar L., (2006). "From Basel I to Basel III: The integration of State-of-the-Art risk modelling in banking regulation", *Palgrave Macmillan,* pp. 5-16.

- Strengthen the soundness of the international financial system;
- Reduce existing sources of competitive inequality among international banks.

The Accord set the minimum capital level equal to 8%, but national supervisory can implement rigorous requirements. However, as a first element, it is crucial to define what does mean for capital.

The Basel committee divided the capital into two classes by function of its quality:

Table 3 - Classifying Capital under Basel I

TIER 1	TIER 2[30]
Paid-up Capital	Undisclosed reserves
Disclose Reserve: 1. Retained Profits 2. Legal Reserve	Asset revaluation reserves
	General Provision
	Hybrid instrument (must be unsecured)
	Subordinated debt (max 50% or tier 1)

Source: From Basel 1 to Basel III

Moreover, the goodwill and the investments in subsidiaries has to be deducted from capital. The former from the TIER 1 capital since it is subject to subjective valuation and fluctuation. Instead, the latter has to be deducted from the total capital base to avoid that several subsidiaries use the same capital.

The core point was to assign both on-balance and off-balance sheet items a weight based on their risk level and require a minimum level of capital equivalent to 8 percent of those weighted assets. Therefore, the main novelty introduced a system that differentiated the assets based on their assumed risk and requirements for off-balance sheet items since they grew significantly in the 80s.

Finally, the focus is on the weight-related to assets that the Basel Committee have decided are as follow:

[30] TIER 2 was limited to 100% of TIER 1.

Table 4 - Risk Weighted Assets

0 %	20 %	50 %	100 %
Cash	Claims on OECD banks and multilateral development banks	Mortgage loans	Claims on corporate, claims on banks outside OECD with a maturity >1-year, fixed assets, all other assets
Claims on OECD central governments	Claims on banks outside OECD with residual maturity		
Claims on other central governments if they are denominated and funded in the national currency (avoid currency risk)	Claims on public sector entities of OECD countries		

Source: From Basel 1 to Basel III

If we want to know the minimum level of capital, for example, when a bank granted a $500 mortgage loan, the capital requirement will be equal to $500 X 50% (weight based on the table above) X 8% = $20.

Furthermore, if any personal guarantees are linked to the risky asset, it will apply the weighting factor envisaged for the guarantor if more favourable.

Until now, the focus was on on-balance sheet items. The off-balance items are classified into two categories:

- The so-called “on-balance sheet equivalents”, that are similar to unfunded credits, which can be transformed into assets if an event will occur (undrawn part of a credit line);
- Derivatives instruments whose value is based on the evolution of the underlying market parameters.

There is a Credit Conversion Factors (CCF) for the first type of instruments that convert these off-balance sheet items in on-balance sheet equivalents. The weights of this group of items should reflect the underlying risk of these operations.

For the second type of operation, or derivatives, the risk is split into two parts. The first part is the *current replacement cost*, which represents the current market value of the position, and it is taken into consideration only if it is a positive value. Otherwise, it means that there is no credit risk. The second part is the *potential future exposure* (PFE), representing the variation of the current value as a function of the value of several market parameters. The

sum of the two components is the equivalent credit amount of the derivatives. This system for the second type of operation is still in place, amended by Basel II.

Table 5 - PFE (in %)

Residual Maturity	Interest Rate	Exchange Rate & Gold	Equity	Precious Metal	Other Commodities
≤ 1 year	0.0	1.0	6.0	7.0	10.0
1 – 5 years	0.5	5.0	8.0	7.0	12.0
≥ 5 years	1.5	7.5	10.0	8.0	15.0

Source: From Basel 1 to Basel III

For example, if a bank has undertaken a 3-year interest rate swap with another OECD bank, with a notional of $1000 whose market value is $10, the credit-equivalent would be:

$10 + $1000 * 0,5% (Based on the table above) = $15

The required regulatory capital would be:

$15 * 20% (based on table 4) * 8% (minimum required) = $0.24

This first international regulation had led the way to other regulation, given some drawbacks that came out when Basel I was implemented.

The main drawbacks are that Basel I considered only the credit risk without considering the market risk, particularly the interest rate risk and the exchange risk.

Another issue was the lack of risk sensitivity. A corporate loan granted to a small company with high leverage had the same regulatory capital as a loan granted to a AAA-rated large company.

Furthermore, a limited recognition of collateral and an incomplete coverage of risk sources are other drawbacks that Basel II tried to compensate.

Aside from the problems just cited, there is an incontestable achievement to create a worldwide benchmark for banking regulations. The critical point to stress out is that banks face the same set of rules nowadays, which avoids discussing with each national regulator about capital requirements when operating in several countries. Furthermore, banks of different countries competing in the same markets have similar regulations.

The amendment to Basel I in 1996 responded to different issues arising from the implementation of Basel I. The first issue that Basel I lacked was the consideration of the credit risk. The modification of the initial Accord considered even the interest rate risk and

the foreign exchange risk. All positions had to be evaluated at the market price, and then the bank would be able to calculate the capital requirements for credit risk under the Basel I framework. To support market risk, they introduced a new class of capital, Tier 3, which includes subordinated issues, so the quality of credit of this class was lower than Tier 1 and Tier 2. However, Tier 3 was eliminated by the Basel III regulation.

1.5.3. The Second Basel Accord: Basel II

The Basel II accord is based on three pillars, and the main objective were to:

- Increase the quality and the stability of the international banking system;
- To create and maintain a level playing field for internationally active banks;
- Promote the adoption of more rigorous practices in risk management.

The first two pillars were at Basel I's heart, while the last one is Basel II's core and represents a shift toward a system that relies more on internal data, practices, and models.

The Basel II framework is based on three pillars.

The *first pillar* takes into consideration the solvency ratio. The RWA (risk-weighted asset) is still the most relevant control ratio, and it is still set up at 8%, with respect to Basel I has been redesign the way assets are weighted. There are three approaches, which respect Basel I, consider computing the RWA other elements and risks. The table below can easily explain the differences.

Table 6 - How to Assess the RWA with Different Approaches

− Capital consumption +	**Credit Risk – unstructured exposures**	**Credit Risk – securitization**	**Operational risk**	− Complexity +
	Standardized Approach	Standardized Approach	BIA (Basic Indicator Approach)	
	IRBF (Internal Rating-Based Foundation) Approach	– RBA (Rating-Based Approach)	SA (Standardized Approach)	
	IRBA (Internal Rating Based-Advanced) Approach	– IAA (Internal Assessment Approach) – SF (Supervisory Formula)	AMA (Advanced Measurement Approach)	

Source: From Basel 1 to Basel III

The standardised approach is similar to the one of the Basel I framework. The difference is that the risk-weight is a function of the counterparties' risk, but it is also based on estimation done by external rating agencies recognised internationally. These agencies are called External Credit Assessment Institutions (ECAI), which provide public risk assessment of borrowers through ratings. Consequently, ratings are converted into risk-weights.

Moreover, what is considered in Basel II is a clear path of guarantees that affect the calculation of the RWA and a precise risk weighting for securitisation operations.
Regarding the IRB approach, banks must have the authorisation by the regulatory authority to use this approach. This approach considers not the global risk-weight based on external ratings but uses models based on risk parameters estimated by banks for estimated capital requirements.

Table 7 - Different Key Inputs

PD	Probability of default	Probability that the counterparty will not meet its obligation
LGD	Loss given default	Expected amount of loss on the exposure if the counterparty fails
EAD	Exposure of default	The expected amount of exposure at the time when the counterparty default
M	Maturity	

This approach considers credit companies' experience in estimating and assessing the counterparty's risk and, consequently, the regulatory capital. The IRB approach can be divided into:

- IRB foundation: in this case, only the first element of the table above is calculated internally, while the others are given;
- IRB Advance: in this case, all the elements are estimated by banks.

Finally, if a financial institution uses one method for the unstructured exposure must use the same method for the other categories.
The *second pillar* is about the Supervisory Review Process. The core of this process is to ensure that a bank has enough capital to cover its risk and have better risk management. A bank's management is required to develop an Internal Capital Adequacy Assessment Process for defining a bank risk profile. In case the supervisor is not satisfied with the capital level, it can require a bank to increase its capital or mitigate some risks.
The supervisory Review process is built around four principles. Firstly, banks must have a process allowing them to adequate the capital concerning their risk profile and a strategy for maintaining the capital, and it must be forward-looking. The second principle is related to the supervisor, who should control the assessment process's adequacy and strategies and monitor and ensure their compliance with regulatory ratio. In case there are some

mismatches, the supervisory must intervene to restore the situation. The third principle is that banks should maintain the regulatory capital above 8 percent, given that pillar one does not cover every risk. Finally, the fourth principle is about supervisors and their ability to intervene at an early stage to prevent capital diminishment below the minimum, and they should require actions to restore the capital.

In conclusion, the *third pillar* is about actors operating in the market and their role to monitor the banks in which they have a stake. The third pillar is a set of disclosure requirements that help the equity or debt holders assess critical information about risk exposure, risk assessment process, and capital.

The financial crisis of 2007 has brought out weaknesses of Basel II, such as quality and level of capital, too many hybrid capitals instruments, even with an adequate level of capital, were not useful for absorbing the banks' losses, uncontrolled increase in financial leverage, there were insufficient illiquid buffer, and the interconnections of the industry exacerbated the spread of the crisis.

Given these difficulties, the Basel Committee released a new version of the Basel framework in 2009 known as Basel III.

1.5.4. The background leading up to Basel III

The financial crisis had requested an urgent need to overhaul the international prudential standard on the financial market. Even if it has responded to regulatory weaknesses, the Basel framework reforms focused on large and international financial institutions. However, these institutions' centrality for the entire financial system's stability and the need to resolve specific issues led to the technical and political debate to disclose new standards.

Even if they proved complicated to implement in less complex and smaller financial markets like in underdeveloped markets, the new standards offer a solid base for strengthening the financial system even in those underdeveloped countries.

The high cost of the financial crisis obliged the international community to review the regulatory framework needed to reinforce the resilience of the global financial system.

Several issues, considered as the cause of the international crisis, which the international community has attempted to change are[31]:

[31] Ferreira C., Jenkinson N., Wilson C., (2019). "From Basel I to Basel III: Sequencing Implementation in Developing Economies", *International Monetary Fund*, Working Paper No. 127.

- Building resilient of the financial institution: before the crisis, inadequacies in the supervision standards led institutions to be weakly capitalised, poorly protected against liquidity shocks and to focus on short term profits against long term business sustainability;
- Ending *too-big-too-fail*: given the interconnections among the largest financial institutions worldwide, the results have been devastating for the real economy. As a result, a new framework was needed to comprise higher loss absorbency requirements in order to avoid that future losses can be absorbed without impacting the taxpayers or impact the market;
- Making derivatives market safer: they were traded before the crisis bilaterally, which created an opaque market increasing the systematic risk due to interconnectedness;
- Transforming shadow banking into a resilient market-based finance: they were not considered in the previous version of the framework as considered not risky for financial stability; the new framework considered them an important part of the financial system.

1.5.5. The Third Basel Accord: Basel III

Given the urgency of the situation, the Basel Committee had to review the international standard as the crisis highlighted certain weaknesses of the Basel II framework. To ensure greater future resilience of the financial system in times of economic turbulence, Basel III made important changes to the previous regime.

Firstly, the common theme underlying the legislation in all the Basel framework has been the credit risk and the capability of a financial institution to have enough capital in their balance sheet for responding efficiently in case of financial turbulence. Besides, emphasis should not be placed solely on the amount of capital required to be available in the event of a crisis, but rather on the quality of capital, and in this, Basel III intervened.

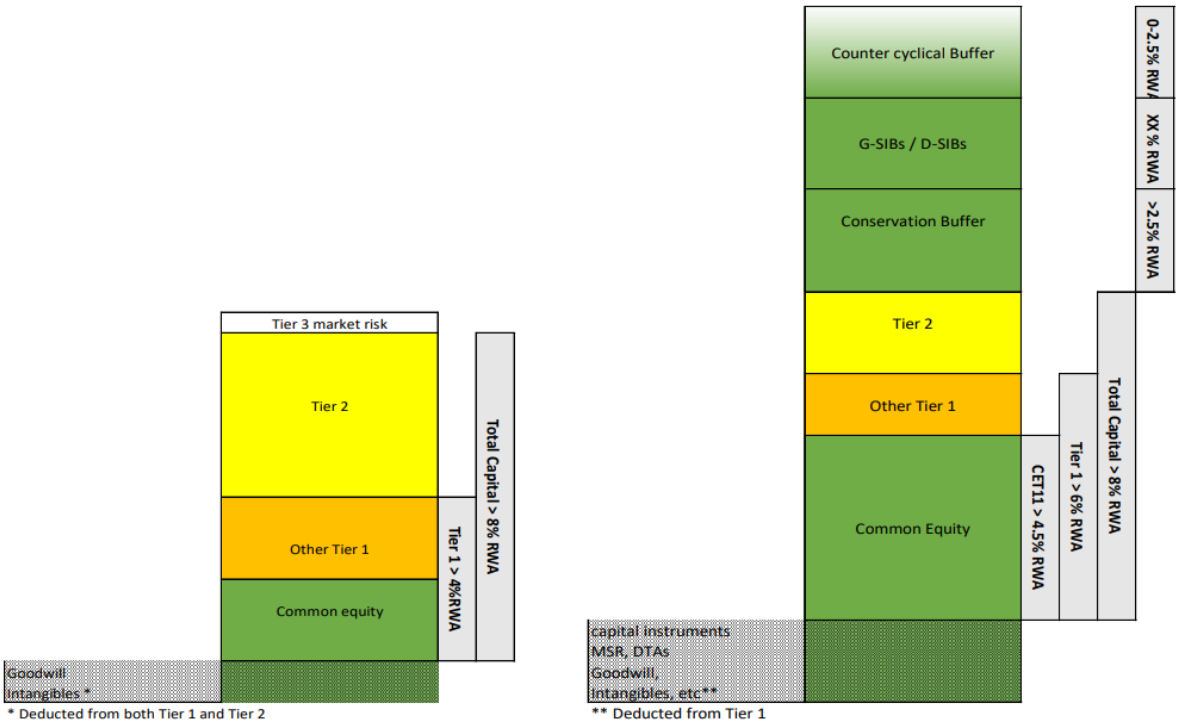
In order to tackle these problems, as the first element Basel III focuses on the definition of common equity, which represents the highest quality component of a bank's capital.

Therefore, it has not changed the 8 per cent capital ratio that must always be maintained, but more importantly, it has changed the capital's composition qualitatively.

Indeed, as can be seen from the figure below, 6% must be from Tier 1 and must be composed of 4.5% common equity, and the remaining part made up of additional going concern capital. The remaining 2% must be from Tier 2, which have the characteristic to be subordinated debt. An additional capital requirement of 2.5%, known as the capital conservation buffer,

has been imposed. It was created as an additional cushion to absorb economic losses in a period of high financial turmoil. In case this buffer is drawn upon, banks must rebuild it, or otherwise, they could be constrained from paying dividends or bonuses.

Figure 6 - The Comparison Between the Capital's Composition of Basel II and Basel III



Source: BCBS and IMF

There are two more ratios required by law that, in addition to the capital conservation buffer ratio, a bank must be maintained. The second ratio is the Domestic Systemically Important Banks (D-SIBs). Given that some large banks can have a disproportionate impact on the domestic financial system, in case of economic turmoil, greater than other smaller banks. Basel III required an additional percentage above the others to absorb the economic losses to mitigate the negative externalities. The Basel Committee did not decide an amount; however, it has released guidelines to identify those institutions and the freedom to establish higher loss absorbance standards for them.

Instead, the countercyclical capital buffer is designed to protect the financial system from periods of excessive credit growth. Periods of high credit growth have often been associated with the build-up of systemic risks. The aim is to ensure that the banking sector, in aggregate, has enough capital to maintain the flow of credit after a systemic shock. The buffer may also help to lean against the build-up phase of the cycle. The tool requires national authorities to

monitor the build-up of systemic risk and apply judgement to determine the capital buffer's appropriate level.

One crucial issue of the economic crisis was the banks' excessive indebtedness, and therefore, the Basel Committee introduced a new leverage ratio requirement that has become mandatory in 2018. The new requirement has been made necessary by the fact that banks before the crisis had built-up excessive on- and off-balance sheet leverage, and at the same time, have a strong capital ratio. Due to a lack of legislation that allowed banks to use internal approaches utilised to calculate the credit risk. Furthermore, off-balance sheet operations were not captured by the risk-based framework. According to the new framework, the new leverage ratio is a bank's capital to be at least equal to 3% of its total unweighted assets, meaning that the maximum leverage will be 33 times its capital. In this case, off-balance sheets and derivatives must be included in the computation. The objective of the leverage ratio can be found in two key points. The first is that Basel III tried to mitigate the systematic risk, damaging the financial system. Secondly, supplementing the risk-based with an independent measure of risk safeguards against error given to arbitrary model risk. Finally, rating agencies may require a leverage ratio lower than required by the regulator to maintain the credit standing and, more importantly, to stop the build-up of excessive leverage.

One of the credit crisis's significant problems was the need for liquidity in the interbank market, which subsequently spilt over into the debt market. Liquidity can be used to assess the soundness in valuing a bank and its ability to withstand an economic downturn. Accordingly, BCBS introduced a new ratio known as the liquidity cover ratio (LCR). This ratio's introduction is intended to promote short-term resilience and help banks have liquid assets of sufficient quality during periods of financial turbulence. It is calculated as the ratio of high-quality liquid assets divided by total net cash outflows for the period. In a stable financial situation, the value of the ratio is to be equal to 100%. The ultimate objective was to provide a forward-looking view and measurement of risk-sensitive liquidity while strengthening the banking system's resilience in the short period.

Together with the LCR, the BCBS has introduced the Net Stable Funding Ratio. Conversely to the LCR, the NSFR is intended *"to promote more medium and long-term funding of the assets and activities of banking organisations",* in order to achieve the objective, the ratio evaluates a bank's availability of stable funding, capital and liabilities with maturity over a year, relative to its required amount of stable funding. In other words, the more illiquid long-term asset a bank has, the more stable funding it will be required to hold. This impacts source cost, especially for project finance players, given the project's nature within ten years.

In conclusion, there is no one-way strategy for implementing the post-crisis Basel Framework. Most of the time depends on each jurisdiction's specific characteristic that has to enhance resilience without conflicting with another market. It is important when implementing the framework to consider the differences in financial developments, the banking sector's risk profile, and to conclude the supervisory capacity. Once further changes to the original framework are decided on, it will be easier to implement.

1.5.6. The impact of the Basel III legislation on infrastructure investment

The most significant sources of financing for international projects came from commercial banks. They were willing to take the construction and operational risk by providing long-term loans. Conversely, project bonds were less used as capital markets, and institutional investors were reluctant to accept construction-related risk. The major impact on project financing after the implementation of Basel III can be summarised as follows[32]:

- Increase in banking funding cost: Given the tighter regulation of capital and, above all, the quality of capital, the introduction of Basel III affected the overall cost of financing projects. The factors that most influenced the increase in cost are the capital conservation buffer and the D-SIB. This ratio was introduced for big financial institutions and reduced the systematic risk. As long-term projects are funded primarily by those institutions, the overall cost increase. According to *Ma*, the implementation of Basel III added up between 60 bps and 110 bps to a bank's funding cost, among other things, even the number of lenders able to lend projects loans over ten years has declined;
- Shorter Tenors for Project Finance Loans: As a consequence of introducing the NSFR, banks increasingly became unwilling to finance projects with long maturity. After implementing Basel III, banks shift from long-term loans towards short-term or mini-perm facilities.[33] The banks attempted to remodulate their long-term investment that required too much liquidity. Therefore, the debt project structure changed consequently. Banks would also persuade project sponsors to accept

[32] Ma T., (2016). "Basel III and the Future of Project Finance Funding", *Michigan Businesses and Entrepreneurial Law Review*, Vol. 6 No. 1, pp.109-126.

[33] Mini perm is short-term financing often used by a developer to pay off construction projects or commercial properties before they become profitable. It is typically payable in three to five years.

refinancing risk by structuring loans that mature between seven and ten years, depending on the project. Proponents should then play a more active role in the project's initial phase by increasing equity and construction completion guarantees;

- Use of letters of credit and revolving credit facilities: It is particularly expensive for banks to finance revolving credit facilities after introducing the regulation. It is costly because working capital facilities require 100% short-term liquidity coverage. This high coverage is because project financing is usually made to an SPV. The impact of letters of credit impacted after Basel III and the introduction of the liquidity cover ratio, national regulators can specify a level of the LCR. Looking instead at the impact of introducing the liquidity cover ratio on letters of credit, we can deduce that even having a 25% ratio would still not be economically feasible for banks to hold this liquidity. However, given the crucial role of the LC in the project finance field, they are not likely to disappear.

In conclusion, the introduction of the Accord disrupted the way in which project finance deals are structured. Banks that traditionally financed such projects now have to deal with stricter regulation, and since the new regulatory framework requires banks to hold much more liquid assets and reduce their dependence on short-term financing, their lending capacity is compromised. Commercial banks' higher costs led some actors out of the markets, while those who remained were unwilling to lend at long maturities and have revised where to invest. On the other hand, however, demand for projects funded by project finance continues to grow, and new ways to finance these projects are needed. Projects bond and institutional debt financing, such as non-bank institutions, have become increasingly critical for financing these projects. These participants include pension funds, insurers, sovereign wealth funds, and export credit agencies, alongside finance companies, private investment funds, business development corporations, asset managers, hedge funds, and sponsored intermediaries such as money-market funds. As opposed to commercial banks, those actors do not face the same regulatory standards depicted in the Basel Accord. Simultaneously, projects bond has emerged with some peculiarities compared to before, thanks to governments' interventions, improved credit ratings, minimum refinancing risk, and competitive pricing. Therefore, institutional investors have gradually become the primary source for funding long-term projects.

1.5.7. The Capital Requirement Directive IV

The primary objective of European legislation, Capital Requirement Directive IV, was to implement rules intended to create a legislative harmonisation of banking supervision rules to create conflicts between member states.

The Directive is divided into two main parts:

- The Capital Requirements Directive: which has to be implemented through a national law:
- The Capital Requirements Regulation: which is directly applicable for firms across the European Union.

As the Basel III agreement is not directly applicable, the European Union has decided to draft such a directive to transpose this regulation and make it mandatory for European countries.

The fundamental objectives are those foreseen by the Basel III agreement, and therefore we can mention:

- *the quality and quantity of capital*
- *a new liquidity and leverage requirements*
- *new rules for counterparty risk*
- *new macroprudential standards, including a countercyclical capital buffer and capital buffers for systemically important institutions.*

This paragraph focuses more on specialised lending and how they are considered in the Capital Requirements Regulation. The Capital Requirements Regulation (CRR) and the Capital Requirements Directive (CRD) establish supervisory requirements for banks and other financial institutions since January 2014. The CRR contains specific mandates for the European Banking Authority to draft technical, regulatory standards to specify how institutions should consider factors when assigning risk weight to specialised lending exposures. Specialised lending are defined in Article 147(8) of the CRR as:[34]

- *the exposure is to an entity that was created specifically to finance or operate physical assets or is an economically comparable exposure;*
- *the contractual arrangements give the lender a substantial degree of control over the assets and the income that they generate;*

[34] EBA, (2016) FINAL draft Regulatory Technical Standards, *European Banking Authority*.

- *the primary source of repayment of the obligation is the income generated by the assets being financed, rather than a broader commercial enterprise's independent capacity.*

The draft used the Basel Framework given that it was being adopted by several EU Member States, although considering the European experiences. The final draft defines four classes of specialised lending: project finance, real estate, object finance, commodities finance.
Inside each class, these final draft RTS specify how factors such as: 'financial strength, political and legal environment, transaction and asset characteristics, strength of the sponsor and developer, including any public-private partnership income stream, and security package' are to be considered for the final calculation of the risk. This common set of guidelines is the basis for assessing the final assignment to a category. Additionally, it is useful to facilitate cooperation among EU authorities when handling cross-border cases and promoting clarity and transparency to all the markets actors and institutions. Although the harmonisation leads to certain benefits, some drawbacks must be considered. The limited supervisory discretion, given that some exposure consideration could not take into account, and the costs for institutions associated with implementing the new regulatory requirements are two of the main drawbacks.
To conclude, the European Union has adopted EU regulation intending to define the categories of specialised lending and what factors should be considered when assessing the associated risks.

1.5.8. The accounting standard: IFRS 9

The implementation of the impairment standard described in the new IFRS 9 is related to integrating the new provisioning process with Basel III's current capital calculation and reporting requirements[35]. This paragraph will aim to briefly analyse the main innovations related to risk management and accounting. The severe economic crisis of 2007 brought to light accounting shortcomings that allowed banks to over-leverage with high credit risk.

[35] Moody's Analytics, (2016). "The IFRS 9 Impairment Model and its Interaction with the Basel Framework", *Moody's analytics risk perspectives: the convergence of risk, finance, and accounting*, Vol. VIII.

One element that came under criticism was the accounting method using for valuing financial instruments, the fair value method[36]. The use of fair value as an assessment tool for securitisations has been widely criticised, as it does not allow the real value of a financial instrument to be objectively measured and assessed in times of economic turbulence. Therefore, it does not represent vital information for decision-makers. Another strongly criticised area was the impairment model provided by IAS 39 for the recognition of credit losses. This provides that credit losses can only be recognised when a specific objective loss event occurs, which have a negative impact on the bank's expected cash flows from that financial asset. Therefore, the presence of a highly backwards-looking impairment model meant that banks recognised low levels of provisions in the run-up to the outbreak of the financial crisis. The main weaknesses of IAS 39 included:

- the difficulty of using the fair value approach for assessing financial instruments;
- the delay in recognising the impairment of credit assets in the income statement;
- the accounting framework's complexity, which included different impairment models depending on the type of financial assets.

The adoption of a forward-looking model has been requested by the G20 group, which has to be capable of capturing deterioration in the quality of financial assets promptly, and the introduction of the expected loss model by the IASB aims to ensure an improvement in the quality of information on the loan portfolio by promoting a timelier and symmetrical recognition of losses.

The IFRS 9 is the accounting standard that responds to this request. One of the major innovations introduced by the new accounting standard in banks is the strong convergence between risk management and finance functions.

The convergence is the result of a vision strongly supported by the Basel Committee. The involvement of risk management functions in assessing and measuring expected accounting losses is essential for estimating adequate value adjustments, impacting the data management process.

The main changes introduced relate to a new classification and measurement of financial instruments, a new impairment model for valuing credits, and revision of hedge accounting.

[36] Ferfoglia M., Soldi G., (2018). "IFRS 9: Come cambia il bilancio delle banche", *Risk and Compliance*. Available at: IFRS9: Come cambia il Bilancio delle Banche (riskcompliance.it).

Concerning the second point, the accounting standard IFRS 9 provides a new system for defining impairment losses on credits, about their progressive deterioration in terms of quality. This is because the system, as mentioned above, based on the loss incurred, has not enabled rapid recognition of the losses. The new impairment model introduced with the IFRS 9 in 2014 envisages three classes of credit. These classes are based on the provisions for expected losses based on the degree of deterioration of the various financial instruments' credit risk.

The so-called *three buckets model*, based on the expected loss approach and not on the incurred loss approach, is forward-looking as the estimation of expected losses, both on a collective and individual basis, must be carried out using verified and available information without excessive burden that includes not only historical and current data, but also prospective data. Subsequently, expected losses must always be set aside and updated so that credit risk is always update.

The three stages of credit as foreseen by the IFRS are:

- Stage 1 – Performing: In this case, financial instruments are considered with low credit risk. The estimation of the expected loss is considered by reference to the relevant collective portfolios for a period of 12 months.
- Stage 2 - Under-Performing: Financial instruments with intermediate credit risk. Instruments for which there is either a default of more than 30 days or a deterioration in the rating level. In this case, expected losses are measured forward-looking over time equal to the remaining contractual duration for identified portfolios for which the risk has increased significantly.
- Stage 3 - Non-Performing: Financial instrument with high credit risk. Financial instruments in this category have a loss that has already occurred. The calculation of loss is carried out analytically in relation to individual impaired positions in proportion to the individual exposure's residual life.

To conclude, under IFRS 9, the expected credit loss must be covered by provisions, while the unexpected credit loss by capital. Consequently, given the increase in the loss provisions, it will reduce the equity and retained earnings available for Tier 1, reducing the Tier 1 capital ratio.

The treatment of allowances for impairment differs according to the credit valuation method used by the institution:

In case an institution uses the standardised approach, the impact on Tier 1 will be equal to 1:1 in case a loss has occurred, since the impact on retained earnings to cover losses influences the availability of Tier 1 capital.

On the other hand, with the IRB approach, banks must compare the total amount of qualifying reserves (defined as the sum of all provisions that are attributed to exposures treated under the IRB approach) with the total expected loss amount as calculated within the IRB approach. There are then the following two scenarios:

- If the expected loss is greater than the total eligible provisions, the surplus of expected loss over provision is reduced from the capital. The reduction will affect 50% Tier 1 and 50% the Tier 2.
- If the expected loss is lower than the total of the qualifying provisions., the difference is recognised in Tier 2 capital up to a maximum of 0.6% (subject to national discretion) of credit risk-weighted assets.

CHAPTER TWO

2. HOW INSTITUTIONAL INVESTORS ARE THRIVING IN THE PROJECT FINANCE FIELD.

Only a decade ago, a series of market failures threatened to overthrow the world's financial system. This chapter will focus on the increasing power of institutional investors in the project finance industry versus banks' role. The introduction of banking regulation was not without consequences. Indeed, global regulators and policymakers took drastic measures after the global financial crisis, which resulted in the rapid growth of projects bond and institutional investors' activity in project finance. It results from rigorous banking regulation that pushed banks out from the long-term financing activities carried out by them and give rise to institutional investors. The strengthened of the banking system has enhanced the so-called parallel banking system, known as shadow banking. However, there is one crucial issue that needs to be addressed. The fact that the risk intended to seize under the new regulations has moved to non-regulated markets has made the financial system more complex and interconnected.

The global economic crisis affects the functioning of the financial system and the role of different market players. Traditionally, banks have played a significant role in the financial system, transforming savings into long-term capital to finance private sector investment and infrastructures. However, the banking model has evolved and continues to evolve. After the global financial crisis, the disintermediation and capital markets' growth led to institutional investors' rise. Nowadays, institutional investors such as pension funds, insurance companies, sovereign wealth funds, hedge funds, and mutual funds are becoming central players in financing long-term capital. The non – bank credit system[37] is becoming more and more central for the development of infrastructure. Infrastructures which fall under the category of long-term investments are necessary for the development, competitiveness, and employability of a country. It is possible to include investment in real estate, R & R&D, and new ventures capital in the long-term investment.

In this section, as far as the thesis' objective, the focus will be on the rise of institutional investors, on the long-term financing proposed by the European Commission and on the instruments of the non – bank credit system.

[37] The non – bank credit system is composed by a various type of investors, instruments, and relationships among the participants of the financial system. They can be regulated as in case of the investment funds or not regulated as the crowdfunding platforms.

2.1. The European Commission on the Long – Term Financing: Green Paper

According to the EU definition, the European Commission's Green Papers are: "*discussion documents on a specific policy issue published by the commission. They are first and foremost documents for all those - both organisations and individuals - who participate in the consultation and debate process*"[38].

After the economic crisis, the collapse of GDPs, industrial production and the sovereign debt crisis, the European Commission released the Green Paper for the European Union's long-term financing released in 2013. According to the European Commission, long-term financing is fundamental as they contribute to the long-term capital formation, including tangible assets, such as infrastructure, and intangible assets, such as education and research and development. These investments promote innovation and competitiveness and have a broader social function as they benefit society by supporting essential services and improving living standards. However, such long-term investments must consider current trends, as climate change, to deplete natural resources. Low-energy, low-carbon, resource-efficient investments underpin the commission's guidelines for keeping global warming within two degrees.

The key objective that the European Commission sought to drive through the Green Paper publication on long-term financing was the urgency of getting the EU growing again in a smart, sustainable, and inclusive way. Alongside the renewal of the job market and the competitiveness in global markets. However, to grow in a smart, sustainable, and inclusive way, the banking system, although more capitalise and resilient, after the global financial crisis, intertwined with the impossibility of the public sector to cope with an unprecedented need for investment, it will not be able to guarantee the rate of growth in line with the needs of economic re-adjustment[39]. Therefore, strong market financing is needed as the banking sector alone; it will not be able to guarantee the resources and instruments needed by the economy for a strong and rapid ricochet. In fact, the main bottleneck that is holding back growth in the EU economy is the current banking-centred financial system connected to fragmented and underdeveloped capital markets, which weaken and slow the recovery, making the capital markets less attractive and competitive. Therefore, an important question

[38] European Commission, (2013). "Green Paper: European Union on long-term financing", *European Union*.

[39] European Union, (2020), "A new Vision for Europe's capital markets: Final Report of the High-Level Forum on the Capital Markets Union", *European Union*;

raised in the Green Paper is whether Europe's dependence on bank intermediation for financing such projects will give way to a more diversified system with a greater share of direct investment via the capital market and greater participation of institutional investors in alternative financial markets.

The economy's ability to finance such projects in the long term depends on the financial system's ability to channel public and private savings efficiently and effectively to the appropriate beneficiaries and purposes through open and competitive markets. However, market-based financing remains limited due to the EU ecosystem's inefficiencies, structural bias towards debt financing, and, given the high costs of legal compliance. So, a substantial investment in technology is required for maintaining competitiveness as the innovation gap between the EU and other global economies widens. A legislative framework that achieves its full potential while maintaining the key principles of financial stability, consumer protection and equal opportunity.

This ability to channel savings into long-term investments failed during and after the economic crisis, creating a climate of uncertainty and risk aversion, which harmed institutional investors' confidence and risk appetite. To support such investments, governments must first seek to create a favourable environment for generating savings and channelling them to where they are needed. Therefore, at the heart of the debate is the need to improve long-term funding and improve infrastructures involving capital markets participants. One of the main points for improving the efficiency and effectiveness of financial markets in channelling resources are the financial instruments made available by the various capital market participants. Nevertheless, a more fluid bond and securitisation market, which are more accessible to all, is one of the main objectives that the European Commission has set to improve the financing of long-term projects. It has also proposed creating trading platforms to improve information transparency and efficiency and create financial packages placed on the market according to various projects' various risk levels. This is because fundamentally, the EU has never had a European market for project bonds before.

Another key point for improving the European capital market's attractiveness is the availability and quality of investment information, as investors required information about securities issuers.

As the availability of such information may be a measure of the transparency of a capital market, which is, therefore, an engine for attracting more investors. Also, the lack of information about the issuers undermines investors' confidence. The inability to compare

public information increases investors' search costs, hence constraining them to invest only in a specific geographical or jurisdictional area, undermining capital markets' integration.

Therefore, public information is critical for developing a national capital market but more important for the integration of capital markets across the EU. One way to overcome the inefficiencies given by the lack of public information is the creation of a single access point, where investors can access data more easily and then compare it. Hence, this would remove one of the obstacles that discourage investors from accessing small capital markets or providing funding for smaller and medium enterprises.

Another instrument developed by the European Commission useful for channelling investment and creating a common framework for professional and institutional investors who want to place their capital into long-term infrastructure companies and projects is creating the ELTIF. ELTIFs stands for E*uropean Long-Term Investment Funds*, and they can play an essential role in kick-starting Europe's flagging economic growth. The ELTIFs has been developed to fill the gap, as Europe suffered from a lack of late-stage venture capital financing. Therefore, such instruments were needed to ensure that private investment, from retail and institutional investors, went into companies at a specific funding and development stage, supporting sustainable investment objective.

Some shortcomings need to be addressed, although they made the capital market more fluid and integrated.

If, on the one hand, they reduce barriers to investment, their structure is rigid as they are closed-end funds, hence are less attractive for long-term investors. Therefore, an amendment should allow investors to enter and withdraw at more regular intervals.

Second, the lack of clarity and practical advice on the eligibility of assets, particularly investment in real assets, may reduce the funding capacity of ELTIFs, in SMEs and infrastructures.

Finally, they need to be incentivised in the capital markets through favourable tax legislation from the various countries.

Besides the ELTIFs, some entities such as the development banks and multilateral banks play a key role at both national and international levels. These entities help to catalyse long-term financing and improve the efficiency and effectiveness of financial markets and instruments. Given market failures that may dissuade investors from taking certain risks or making certain investment decisions, they can help stimulate private finance in line with public policy objectives for economic, social, and environmental value creation.

Their intervention has a counter-cyclical function by reducing the volatility of financing costs and mitigating the short-termism of private operators.

The final focal point of the European Commission is on companies' need to disclose non-financial information, as the market increasingly demands it. This is because it was pointed out that companies that can proactively manage sustainability aspects tend to show a higher long-term return and have a lower cost of capital than their competitors. The committee has proposed a tightening of regulations to reduce reliance on traditional credit ratings favouring ratings that balance a measurement of long-term perspective and short-term responsibility, which would become a useful tool to support long-term investors.

In conclusion, a primary lesson from the crisis is that common rules, regulation, and the financial sector's supervision are needed to underpin market stability and confidence. In this context, both public authorities and the various market participants are responsible for creating an environment of confidence and certainty that will attract capital and enhance the overall attractiveness of the UE as an investment destination.

2.2. Institutional Investors: Intrusive animals or saviors

So far, we have talked about how, in the aftermath of the Basel III rules implementation, there has been a retreat by the banking system from long-term investment. This is because the increasingly stringent rules on capital and the need to hold a liquidity ratio based on the various balance sheet items have eroded the banks' profitability to invest in long-term projects. Subsequently, as part of long-term investment, it was seen that infrastructure is at the heart of sustainable and inclusive growth. Nevertheless, given the inability of banks to mobilise resources for such investments, on the one hand, and the increasingly tight government budgets for new infrastructure or the renewal of old, on the other, left the field to institutional investors, who in the meantime were looking for new ways to invest their resources in the long term, but above all driven by the need to shelter their resources in a world characterised by uncertainty and volatility. Therefore, this paragraph will analyse institutional investors' rise, which are becoming central in the capital markets.

2.2.1. The escalation of institutional investors into the capital markets

Banks tend to outpour in a period of financial stability, while project finance transactions tend to fill the void, particularly in the form of project bonds, when banks are less active. Undeniably, the project bond market developed in the 1990s resulted from banks' inability to meet the global demand for infrastructure privatisation. From that point of view, it is possible to consider two distinctive periods. Before the crisis of 2007, banks used to fund around 90%[40] of the total private infrastructure debt, where infrastructure debt funds typically invest in debt linked directly to projects rather than debt linked to a corporate entity.

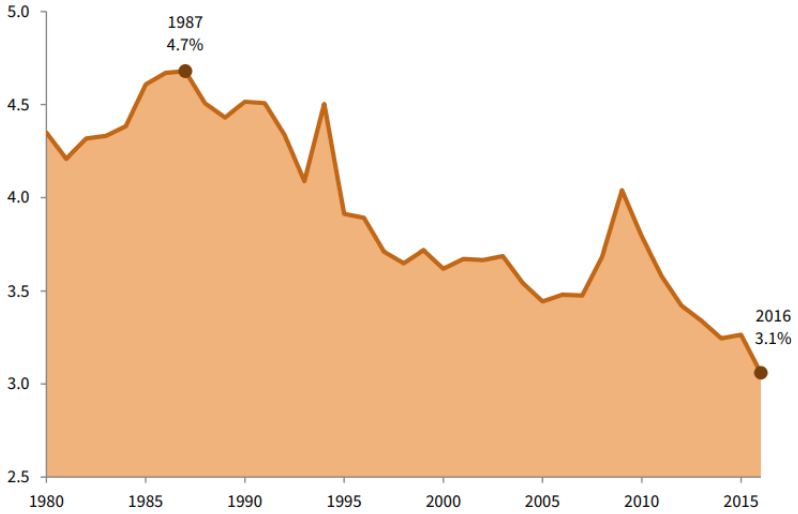
The ability to finance long-term projects by banks disappeared after the turbulence that hit the financial market and the subsequent actions taken after the crisis for making more robust and resilient the system and ensure that markets can withstand future economic downturn impacted in a disruptive way. The new regulations, Basel III, introduced to recalibrate the regulatory framework, since the previous Basel II, it was highly inadequate in preventing risk-taking, linked with a new demanding liquidity ratio and a higher capital requirement stems banks in investing in long-term projects.

Hence, the Basel III regulation shortened project loans term, increased the refinancing operation risk, and reduced banks' willingness to grant project-related letters of credit. All these elements made the financial system more secure, but conversely, banking projects' loans more expensive. Consequently, new sources of alternative financing were required. One point to stress out is that Basel III neither poses the attention on institutional investors nor on the risk shifted towards these entities.

The drop in bank funding has coincided even with the shortfall in government infrastructure spending. Indeed, according to the Organization for Economic Co-operation and Development (OECD), aggregate investment has fallen, as shown from the graph below, from a high of 4.7% of GDP in 1987 to 3.1% in 2016.

[40] Rosenbaum K., Lang R., Day D., (2018). "Infrastructure debt: Understanding the opportunity", *Cambridge Associates.*

Figure 7 - Aggregate OECD Government Fixed-Asset Investment



Source: OECD

If, on the one hand, governments face budgetary constraints. Therefore, the ability to invest in infrastructure has been diminished. On the other hand, there was the awareness that alternative financing sources were needed to support infrastructure development, and more generally, long-term projects have difficulties finding the necessary resources to invest in.

Governments were considered natural investors in infrastructure given the public nature of infrastructure and the positive externalities generated by such facilities. However, spending on infrastructure means increasing government deficits, public debt to GDP ratios, and the inability to deliver an efficient infrastructure on time, led many countries to reduce public funding for infrastructure. Therefore, institutional investors managing assets worth $120 trillion are a valuable alternative to deploy resources where they are needed most, with respect to commercial banks or a syndicate of banks. As a result of the issues mentioned above, the financing of infrastructure has taken the form of project finance. This technique makes it possible to attract private capital involving public entities as a regulator or counterpart.

However, several preconditions are necessary for the investment process to work as intended, as some factors can affect funds' ability to finance long-term investment projects. These factors can be summarised as follow:

- macroeconomic environment
- financial environment
- entrepreneurial and broader business environment
- at the level of individual investors and investment projects – the microeconomic environment

- institutional environment for infrastructure
- capital markets formation for infrastructure finance

Institutional investors are attracted to these types of investments as they seek new sources of long-term investment that guarantee long-term cash flow, a new way to diversify their portfolios, a return adjusted for inflation in a world characterised by low-interest rates and stock market volatility. However, institutional investors' role in long-term investing is limited by the increasingly widespread short-termism in financial markets, lack of adequate financing instruments, limited investment, and risk management expertise.

Institutional investors establish their strong position in the financing of projects, mainly employing project bonds. As mentioned before, in a low-interest environment, project bonds guarantee a higher return than corporate and sovereign debt and, therefore, are attractive, especially for entities such as pension funds and insurance companies. Direct lending is less common than project bonds due to the capability to invest, implement and hedge all the risks. However, recently, the largest corporations increasingly lend directly to projects, even during the construction and operating phases. In addition to direct lending, institutional investors are gradually entering into bank-like activities as they indirectly lend to projects by purchasing project banks loans in the secondary market. This last operation is fundamental even for banks allowing them to keep off-balance sheet project loans and release new loans.

Nonetheless, the institutional investors do not share the same skill sets or investment strategy, which differ significantly across countries. The asset allocation is influenced by several factors such as market trends, investment beliefs, regulation, risk appetite, cultural factors, governance structure, tax issues, and domestically available assets.

Traditionally, institutional investors built their investment portfolio around the two main asset classes, bonds and equities, with a long-term investment horizon. However, during the past decade, there have been significant changes in investment strategies. There has been a remarkable drop in allocation towards listed equities, while investment in bonds and alternative assets classes, such as infrastructure debt, has increased substantially.

Institutional investors have been eager to fill the infrastructure gap left behind by governments since they face budgetary constraints, providing the resources needed to fill the gap.

Since it provides essential services, the new asset class is appealing for institutional investors as they are attracted to risk-adjusted returns, the ability to match long-term liabilities, and the potential to diversify traditional business cycle-sensitive investment holdings.

Similarly, also, managers in infrastructure debt differ in their exposure to development risk. In case funds are looking for stable yields, managers tend to invest in mature and already operating assets, also known as brownfield assets. On the contrary, funds looking for a higher return may invest in assets referred to as greenfield assets, that given the higher exposure in the development phase, offer higher return to investors. However, in the latter case, the construction risk is borne by the project financing framework, allowing participants to address various risks throughout the project life cycle. Most of the infrastructure debt comes in the form of senior debt, which is typically investment grade. Additionally, if sponsors want to lower the total cost of capital, they might issue junior or mezzanine debt with higher returns to compensate for greater risk.

In addition to PPPs, government investments include credit enhancement programs and guarantees for project financing transactions. However, these programs are carried out by independent institution called infrastructure banks[41]. Infrastructure banks can be established with a specific mandate to support a project's roll-out and promote these assets' design and sustainable use. Given their respective governments' unconditional support, it enables infrastructure banks to have a high credit rating, allowing them to borrow cheaply from domestic and international markets. They can implement a wide range of financial instruments to mobilise private capital and even provide preparation assistance, one of the main missing capabilities when institutional investors want to invest in greenfield projects. However, since infrastructure banks have a social mandate, they should invest only in financially viable projects that create value for taxpayers and satisfy stringent environmental standards. One of the most noteworthy examples globally is the *European Investment Bank* (EIB). The EIB, founded in 1958 by the European Union, is one of the most important institutions at the European level for financing projects in several sectors such as food and rural development, agriculture, education, digital economy, energy, health and life science, transport, water management. It funds its projects through the emission of bonds on capital markets. In general, a third link with its long-term financing attracts other investors. Its philosophy and mandate are based on the determination to contribute to growth, employment, regional cohesion, and environmental sustainability. The EIB core activities are lending, including project loans, intermediation loans, equity, and fund investments. Blending activities with the scope to access financing from other sources using guarantees,

[41] Uzsoki D., (2018). "Infrastructure Banks: Solutions and best practices", *International Institute for Sustainable Development.*

structure finance, trust and other strategies to de-risk infrastructure projects. The final core activity is the advising activity. In fact, the EIB provides even the administration and project management services.

To conclude, it is observed that institutional investors' role as an alternative source of finance has not yet fully implemented in many emerging economies. Simultaneously, they are more incisive in developed countries, even though several barriers to investment prevent them from investing in such an industry. This reflects the degree of involvement of the government and the private sector in delivering basic infrastructure service. However, it is worth noting that in non-OECD countries, institutional investors tend to be less developed, with some exceptions, like Brazil and South Africa, which have well-developed pension fund and mutual fund industries.

After examining the increasing role of the institutional investors today in the financial system and, mainly, in infrastructure and more generally in the field of project financing, it is noteworthy to illustrate how the rise of institutional investors has modified and shifted the risk from banks to unregulated markets.

2.2.2. Systematic risk in the wake of the rise of institutional investors

This section analyses the implications of systemic macro-level risk associated with project bonds' proliferation and increased institutional activity in project financing. In part by government credit enhancements, the institutional activity has been addressed, and in part by growing regulatory costs associated with the banking sector, following the new regulatory framework's introduction.

Project finance is an already complicated and interconnected field since it involves numerous participants, including non-financial institutions and global development banks, and coordinating all these participants, each of whom has incentives and rights, is complicated.

In addition, the complexity and the interconnectedness of the financial markets increased after the global financial crisis, although regulators agreed that it was necessary to view financial risk from a new perspective. Then, institutional investors' rise and their increasingly central role in project finance transactions worsened and improved financial markets.

Undoubtedly, they shift financial risk away from the well-regulated banking sector, undermine the existing regulatory framework, and encourage market participants to engage in regulatory avoidance shifting risk to an unregulated market, increasing systematic risk. Investors were trying to sneak out from the highly regulated banking sector to avoid costly

rules and demands. Other institutional investors encourage project participants to engage in regulatory avoidance through risk-pooling and risk-shifting financial instruments called "*synthetic securitisation*". In other words, banks transferred risk exposure to an institutional investor using credit default swap, credit guarantees, or other derivative contracts, allowing banks to improve their capital ratio, free up regulatory capital and use this additional capital for granting new brand loans.

The rise of institutional investors worsens the market's complexity and interconnectedness in at least two ways. Firstly, they render the financial market riskier by resuscitating industry such as the monoline insurance[42] companies, which are considered one of the main problems that have resulted in the global economic crisis. Second, increasing institutional activity through project bonds and other financial instruments can lead to specialisation and decentralisation of the sector. Project bonds allow a wide variety of institutions and investors to take a debt interest in risky projects. This diversification and allocation of risk to a broader base of investors offset the financial losses of many small financial institutions, addressing the problem of the *"too-big-to-fail",* however during the market optimism phase or during an excessive credit growth periods, the risk remains high, worsening the complexity of the global financial system.

To conclude, the rise of institutional investors connected to the migration of lending activity outside the banking sector shifted the financial risk into various institutional investors, which have made the project finance market even more complex and interconnected through specialisation and decentralisation or through the reviving of some industry that were considered disappeared, make the global financial system riskier. On their side, regulators could impose some framework to limit the mechanism for the migration of risk into institutional investors or impose regulatory requirements for certain complex financial instruments used in project finance.

[42] A monoline insurance company is an insurance company that provides guarantees to debt issuers, often in the form of credit wraps that enhance the credit of the issuer. It was used to guarantee householder in USA, and it is considered one of the key factors which triggered the financial crisis.

2.3. Infrastructures investment: a global opportunity

Infrastructure investments are the central element of growth in the European Union and other countries worldwide; as mentioned above, infrastructure is the Green Paper cornerstone.

However, what makes infrastructure so important? They are the backbone of socio-economic growth, sustainable development and, most importantly, are responsible for improving a country's standard of living thanks to access to essential services such as health care, education, and electricity.

According to the *OECD,* infrastructure is intended as *"The system of public works in a country, state or region, including roads, utility lines, and public buildings"*[43].

Investment in infrastructure has always been linked to public measures to promote growth, competitiveness, and employment. The world spends $ 2.5 trillion a year, representing 2.8% of the world's GDP[44] on transportation, power, water, and telecom systems.

A broader definition of infrastructure also includes the real estate industry, social infrastructure, and oil and mining. If considering the broader definition, the world invests 14% of its GDP (2013), with China leading the infrastructure investment in 2015 with 38% of the total spending, followed by North America and Western Europe, respectively investing 21% and 17%. The fastest-growing infrastructure market, growing at double-digit rates, is the India market. From 2016 to 2030, $3.3 trillion a year is required to be invested *only* to maintain the actual rates of growth. Most of these investments must be implemented in emerging economies. However, if the current trend of underinvestment will be kept at that level intertwined with the UN Sustainable Development Goals that require an additional investment of $1trillion annually, the world GDP will increase less than 350 billion yearly.

Nevertheless, many G20 countries faced the consequences of the global financial crisis, even though the global infrastructure gap is estimated at roughly $5.5 trillion annually[45]. The countries' willingness to invest in these projects is diminishing, as many countries cut back their spending on infrastructures. This reduction is mainly due to high debt, low appetite for tax increases, and the desire to keep public spending low. Furthermore, up to 38% of the

[43] OECD, (2015). "Infrastructure Financing: Instruments and Incentives", *OECD.*

[44] Bughin J., Manyika J., Woetzel J., (2016). "Bridging Global Infrastructure Gaps", *Mckinsey's capital projects and infrastructure practice*.

[45] Uzsoki D., (2018). "Infrastructure Banks: Solutions and best practices", *International Institute for Sustainable Development*.

total infrastructure spending is not spent efficiently due to bottlenecks, lack of innovation, and market failures.

Hence, innovative solutions are necessary to take advantage of government resources to attract institutional investors' private capital. They have $120 trillion in assets under management[46], and the debate is how to unlock this source and create a more effective market. The fact is not about finding more money, but it is more about letting flow, more freely, that huge amount of money into infrastructure projects globally. Great emphasis was placed on institutional investors' connection, seeking opportunities for stable, long-term, inflation-protected returns, on the one hand. On the other hand, governments want to circumvent tight budgets and benefit from private sector efficiency, creating a widening role for public-private partnerships. However, PPP works well under precise conditions; otherwise, the failures are behind the corner.

Hence not all projects are suited for PPPs. The conditions, according to McKinsey, are:

- the project makes economic sense;
- there is a clear and efficient process to select a partner;
- there is appropriate risk transfer between the government and the partner;
- there is a revenue stream to provide appropriate risk-adjusted returns.

Owing an infrastructure asset is challenging, given the nature of the asset, some general characteristics are useful to distinguish this asset from other assets[47].

- Capital intensity and longevity: investing in infrastructure requires high up-front costs and requires efficient management of the risks to avoid unnecessary costs. However, the asset's long life ensures a stable cash-flow for the future. This is true especially for the so-called brownfield projects, namely when facilities are already into the operational phase while face more risks of a greenfield project, given the construction phase the riskiest phase. However, if users do not pay for services, projects will not produce cash flow. In this case, government intervention will be the key to creating investment value;
- The economy of scale and externalities: Infrastructure investment generates social benefits, just if we consider a highway or water supply, they can have a positive

[46] Woetzel J., Garemo N., Mischke J., Kamra P., Palter R., (2017). "Bridging Infrastructure Gaps: Has The World Made Progress?", *Discussion paper in collaboration with McKinsey's capital projects and infrastructure practice*;

[47] OECD, (2015). "Infrastructure Financing: Instruments and Incentives", *OECD.*

impact on society. Nevertheless, these positive externalities are difficult to measure and if so, charging for them is undesirable;

- Heterogeneity, complexity, and presence of many parties: This type of investment is less liquid than other assets. This is due to the high involvement of several parties when closing the deal. Complex legal arrangements are required for having a proper distribution of payoff and risks, which is useful for aligning the incentives of all parties;
- Opaqueness: transparency for investors is a crucial concern. However, the information needed to measure an infrastructure's performance is not clear, and many investors see the absence of a benchmark as the main obstacle for investing in infrastructure.

Finally, infrastructures are generally costly and complex to set up, but once in place, they can generate up to 20% return in the long term[48], with clear socio-economic benefits for the entire population.

2.3.1. Limitations to infrastructure investments

Although investing in infrastructure is one of the fundamental tasks of governments, necessary to improve living conditions and ensure future growth, some limits do not allow an efficient allocation of resources and an efficient and effective operationalisation of infrastructures.

As mentioned before, bottlenecks, lack of innovation, and market failures representing the main drawbacks. Further limitations lie in developing an adequate pool of well-prepared and bankable projects that provide investors with the appropriate risk-adjusted returns.

The quality of infrastructure is the primary issue, and the early phase of concept development of each project is the most delicate and risky. This phase is costly in terms of involvement from multiple actors. It is complex, can face legal opposition, and the lengthy review can stop ideas to move forward. Furthermore, some projects lack insufficient skills and resources for developing concepts into well-prepared projects with solid economics.

On the other hand, constraints on the supply side of financing implemented after the global financial crisis, such as the Basel III regulation and Solvency II, stem banks from long-term

[48] Bughin J., Manyika J., Woetzel J., (2016). "Bridging Global Infrastructure Gaps", *McKinsey's capital projects and infrastructure practice.*

financing. However, the European Union has accepted infrastructure as an asset class to lower the risk weighting for institutional investors under Solvency II.

Besides, capital markets for infrastructure are non-standardise, complex, and illiquid, increasing projects' transaction costs.

After considering the downsides at the macro level, it is worth considering the project-related hitches. The main concern in the construction phase is the productivity aspect. However, measuring productivity is not easy, as each project is unique in terms of project-specific characteristics. The overall trend in the OECD countries is that productivity growth in the construction sector has been slow or negative for many of them.

During the construction phase, delays, overruns cost, blown budget and quality issues are shared, meaning that taxpayer money is wasted and when one project exceeds its budget, obtaining further funds for future projects is complicated. In greenfield infrastructure projects, usually, it requires an upfront investment equal to 5% of the total capital investment during the planning phase.

Therefore, for greenfield projects, productivity problems are related to fragmentation, skill level, and project management capabilities, which are also two critical elements for on-site productivity and insufficient planning and design. Having a project manager with a high set of skills and capabilities is the key to delivering an efficient infrastructure. Given that project managers can manage problems and cover risks appropriately. In fact, it has been shown how the top-quartile of managers consistently deliver projects ahead and below cost, as opposed to the low-quartile.

Further on in the analysis, several barriers impede a heavily allocation of resources towards this asset class, infrastructure. The willingness of institutional investors and the private sector to fund a long-term project depends on a country's perceived investment policy, economy, and political processes. This is because infrastructure is vulnerable to high political and regulatory risks. Furthermore, developing countries face additional stronger barriers, coming from heavy bureaucracy and controls, obstructing foreign investors to participate in the investment process. Among the several challenges, the following may be emphasised:

- Investors perceive a lack of suitable infrastructure investment opportunities: One of the biggest barriers preventing institutional investors from investing in infrastructure appears to be the lack of clarity and consistency in government policy commitments over time.

- Lack of appropriate financing vehicles: the capacities to invest directly in a project is constrained to large investors, smaller funds might invest in collective investment vehicles. However, investing in this kind of funds is costly, given the high entering fee and the excessive leverage have made these vehicles less attractive. In some Latino American countries, infrastructure investing vehicles have been developed to assist pension funds, and this relationship has been successful.
- Lack of debt instruments: the most notable asset class are bonds, and on average, in portfolio allocations of insurers and pension funds. The lack of infrastructure bond may be considered as the main limitation in investing by institutional investors.
- Inappropriate risk transfer: institutional investors prefer brownfield investments, as they consider this investment less risky and more in line with a long investment horizon. However, they would access both the equity and debt side of infrastructure with adequate protections against regulatory and commercial risks. In this case, securitisation weakens the incentives for an efficient operationalisation of the infrastructure. So, governments are placing limits on the share of projects that can be sold in this way.
- Lack of objective: confronting the asset class for understanding which is the one that gives a higher return with the lower risk is fundamental for an investor when deciding to invest. The lack of data and a clear benchmark in infrastructure makes it difficult to assess the risk and understand correlations with other assets' return. This lack of information and data make reluctant investors to make such allocations. Some countries collect some data, but only to meet the needs of regulatory authorities, and so, there is not an international and official data set on the asset allocation.
- Regulatory barrier: this kind of barrier is sometimes set up to protect the pension fund, but such heavy regulation might have unintended consequences in terms of investment. Also, international accounting rules may prevent pension funds from investing in illiquid, long term assets.

Besides the *"common"* infrastructures, incredibly challenging are the green infrastructures. The institutional investors' hesitancy to invest directly in green infrastructures lies in regulatory and policy uncertainty, risk-specific, and the new technology-related projects. These elements make it difficult for credit agencies to give sufficient grade ratings. Moreover, the lack of suitable investment vehicles do not provide the liquidity and risk/return profile needed by institutional investors. In addition, those who are not

environmental experts and non-financial specialists remain cautious when increasing their exposure to newer clean technologies.

To conclude, in a world characterised by debt and deleveraging, financing infrastructure can be constrained; however, there are several opportunities to attract private capital and let capital flow converge towards infrastructure investment. Most institutional investors prefer to invest in a monopolistic or quasi-monopolistic, regulated infrastructure whose demand is relatively inelastic. This preference is due since, in case of an economic slowdown, they guarantee a more stable cash-flow, as the short-term economic phase does not influence them.

2.3.2. A depth dives into the risks correlated to an infrastructure investment

As institutional investors become increasingly crucial in financing long-term projects, effective and efficient political interventions are needed. Among international organisations, governments, and investors, it is recognised that risks associated with infrastructure investments must be addressed and understood for improving their performance, efficiency, and effectiveness. Therefore, infrastructure investment implicates complex risk analysis, risk allocation and risk mitigation.

As far as an investor is concerned, it is fundamental to carefully analyse all the projects' risks during its economic life to determine adequate compensation for bearing those risks.

From a government point of view, the decision to provide the infrastructure itself or partnership with the private sector depends on several factors. It is possible to consider the nature of the infrastructure project, the cost of raising private finance, and the type and magnitude of the related risks. Lately, government interventions to mitigate specific risks are required by investors, as this would make it possible to enhance the availability and reduce the cost of private capital. This is true, especially in developed countries, as they face ageing infrastructure that needs an upgrade. Therefore, the allocation and the hedging of a specific risk is fundamental for accomplishing the project. These risks must be allocated or hedged to the party that is best qualified to manage them. In the case of PPPs, several challenges must be addressed considering risk allocation, including the capability and the incentives for the public sector to negotiate and enforce well-design contracts are at the root of the question.

Therefore, private capital is intended to distribute risk between the private and public sectors to provide commercial benefits. This allocation of risk will impact the mix of equity and debt, influencing the cost of capital.

However, what does it mean for risk in infrastructure investment? There is not a standard and consistent definition of risk regarding infrastructure investment. Risk formally is defined as the measurable probability that the actual outcome will deviate from the expected. Another definition of risk defines it as a range of possible outcomes associated with an objectively or subjectively ascribed numerical probability, with the probability quantifying perceived uncertainty.

Risk can be broken into two components, *exposure*, which can be considered a measure of potential future losses resulting from a particular activity or event and *uncertainty*. Uncertainty, namely situations under which either the outcomes or their probabilities of occurrences are unknown to the decision-maker.

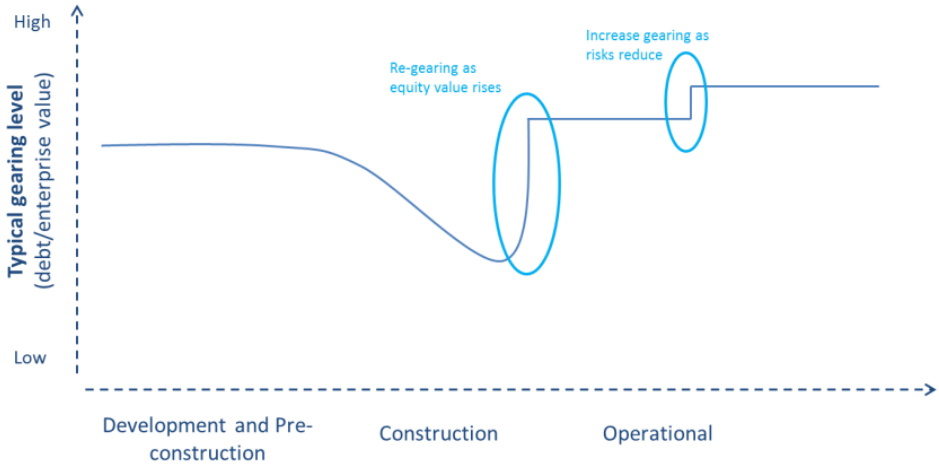
First, as mentioned before, risks vary between greenfield and brownfield; the former are riskier given the construction risk involved. Moreover, the lack of revenues during the construction period, and the uncertainty about the revenue levels once operational, are also two riskiness elements. However, these risks can vary considerably according to the category of infrastructure in question, whether it is social infrastructure or economic infrastructure, and even within these categories, the risks can vary according to the project. Other risks, including financial and regulatory risks, may also differ by category and type of infrastructure.

As a result, the willingness of institutional investors to finance different projects vary.

The project's financial attractiveness of an infrastructure investment depends on the development phase, compared to the type of risk present in that phase. During the planning and construction phase, the revenue level is known but unpredictable, given the risky phase and the probability that uncertain construction cost could emerge. Conversely, at the brownfield phase, cash flow stability is evident, and the project's risk is entirely different.

Hence, infrastructure investment risks vary considerably during its economic life.

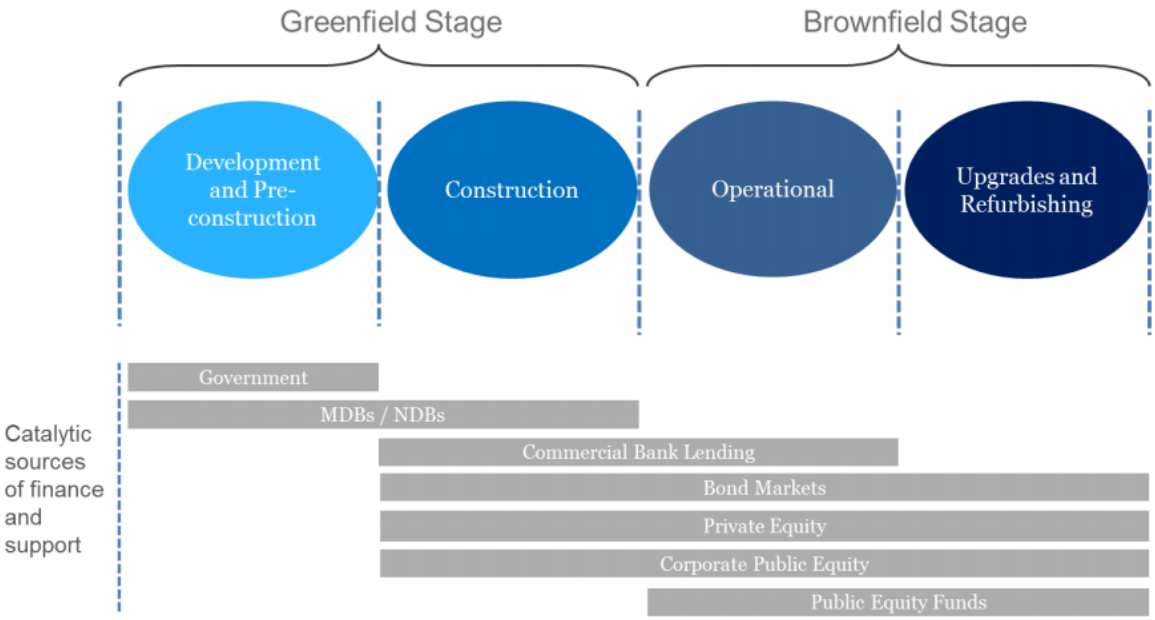
Figure 8 - Infrastructure Project Development Phases



Source: OECD

The development and pre-construction / construction phases are the most delicate to manage, characterised by higher risks and lower gearing. Institutional investors are incredibly reluctant to invest at this phase, underlining the importance of the equity finance, governments, and multilateral development banks approaches. They could adopt innovative approaches to early-stage financing, such as the use of debt and debt securities that might be converted into equities. As the construction phase reaches its conclusion, institutional investors have several opportunities to invest in infrastructure through different instruments. As can be observed from the figure below, governments and multilateral developed banks play a significant role in financing the early stage of an infrastructure at the initial stage. More importantly, they play a key role in attracting future investors for project sponsors partnering to secure long-term investment. Only in a subsequent stage, other financing sources are considered, as the most crucial part for attracting future investors remains the early phase.

Figure 9 - Source of Infrastructure Finance



Source: OECD

According to the working paper developed for the G20 by the OECD, it is possible to classified infrastructure' risks based on the source:

- *Political and regulatory risks*: it is enough considering all the actions taken after the global financial crisis for understanding how governments can change the landscape of the financial system. Some actions can be direct to a specific industry or not, but it will influence in a specific way how investors can invest. However, political risk is difficult to quantify and consequently to price.
- *Macroeconomic and business risks*: in this risk category, we can include all the macroeconomic variables that affect an industry, such as inflation, real interest rate, exchange rate, business cycle, and even the debt maturity is also an essential part of the business risk.
- *Technical risks*: Determined by the skills of operators, managers and in terms of project characteristics, project complexity, construction, and technology.

Considering the risk based on the project life and the risk classified according to the OECD, it is clear all the risks that an infrastructure investment might face during its economic life is shown in the table below. Certain risks may only be present at certain stages of project finance, while others may be present at all stages.

Table 8 - Overall Risks in an Infrastructure Investment

<table>
<tr><th>Risk Categories</th><th>Development Phase</th><th>Construction Phase</th><th>Operation Phase</th><th>Termination Phase</th></tr>
<tr><td rowspan="8">Political and regulatory</td><td>Environmental review</td><td>Cancellation of permits</td><td rowspan="2">Change in tariff regulation</td><td>Contract duration</td></tr>
<tr><td rowspan="2">Rise in pre-construction costs (longer permitting process)</td><td rowspan="2">Contract renegotiation</td><td>Decommission</td></tr>
<tr><td>Asset transfer</td></tr>
<tr><td colspan="3">Currency convertibility</td></tr>
<tr><td colspan="4">Change in taxation</td></tr>
<tr><td colspan="4">Social acceptance</td></tr>
<tr><td colspan="4">Change in regulatory or legal environment</td></tr>
<tr><td colspan="4">Enforceability of contracts, collateral and security</td></tr>
<tr><td rowspan="6">Macroeconomic and business</td><td>Prefunding</td><td colspan="3">Default of counterparty</td></tr>
<tr><td colspan="2" rowspan="3">Financing availability</td><td colspan="2">Refinancing risk</td></tr>
<tr><td colspan="2">Liquidity</td></tr>
<tr><td colspan="2">Volatility of demand/market risk</td></tr>
<tr><td colspan="4">Inflation</td></tr>
<tr><td colspan="4">Real interest rates</td></tr>
<tr><td colspan="4">Exchange rate fluctuation</td></tr>
<tr><td rowspan="6">Technical</td><td colspan="3">Governance and management of the project</td><td rowspan="5">Termination value different from expected</td></tr>
<tr><td colspan="3">Environmental</td></tr>
<tr><td>Project feasibility</td><td rowspan="2">Construction delays and cost overruns</td><td rowspan="2">Qualitative deficit of the physical structure/ service</td></tr>
<tr><td>Archaeological</td></tr>
<tr><td colspan="3">Technology and obsolescence</td></tr>
<tr><td colspan="4">Force majeure</td></tr>
</table>

Source: OECD

An infrastructure operator can incur an economic loss either by reducing the expected cash flows if one of the above-mentioned risks occur or through the default of a project's counterparty. Therefore, the various financial instruments are fundamental when taking a stake in the project since they represent the various risks associated with the project.

To conclude, infrastructure investment involves complex risk analysis, risk allocation and risk mitigation. Investors must carefully analyse all risks that the project will bear during its economic life, determining an acceptable compensation for bearing such risks. From an economic perspective, the key argument for using private funding models is whether they can lead to efficiency exploiting private partners' skills and expertise combined with business incentives. Private financing may represent value for money for the public sector if the incremental funding cost is offset by the benefits of transferring risk to the private sector.

2.4. How to take a stake into an infrastructure asset

Project finance has been an increasingly method to attract private capital, as projects are notably characterised by high specific, low re-deployable value and high capital intensity.

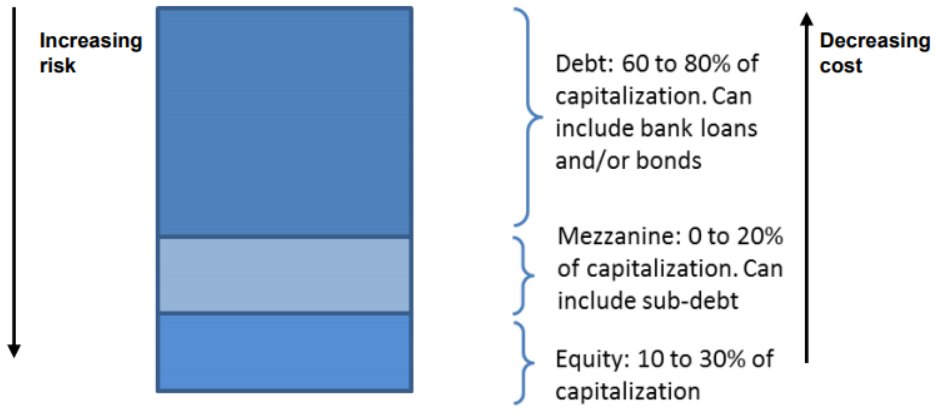
This funding technique started to be used because of budgetary constraints that limit governments' ability to invest in infrastructure and from the desire to introduce a more competitive and efficient market structure. Furthermore, this technique is intended to transfer some risks from the public to the private sector, improve capital allocation, and reduce capital cost.

So, risk allocation is a crucial factor in determining the pool of investors. New financial instruments, available in the non - bank credit system, are necessary for attracting alternative finance sources. This could help overcome the initial phase risks, and make the asset more accessible to a broader group of investors, diversifying the risk.

However, the most important question remains how to attract and channel various institutional investors' resources to finance infrastructure. Not all investors have accessed the same investment route, and not all investors are bigger enough to bear the risk of a greenfield project, as not all investors can invest directly in an infrastructure project, given the limited capabilities or skills. Therefore, there are several instruments used by different institutional investors for investing in this asset class.

Each instrument is based on the ability to carry different risks, based on the expected return and cost, or in the investors' willingness to participate in an infrastructure project's development phase as a sponsor.

Figure 10 - Infrastructure Project Finance Instruments



Source: OECD

Recent market trends have seen co-investment platforms' development to leverage institutional investors' capital in project finance. This necessity has risen from acknowledging that not all investors have the same resources and expertise necessary to invest directly in infrastructure.

Further on into the analysis, this paragraph will deeply analyse all the various financial instruments for infrastructure investment, both direct and market-based available for institutional investors. It will be divided into three main asset categories: equity, debt, and mezzanine, as shown from the graph below. Each asset category contains a bunch of instruments linked with the market vehicles.

Engaging private resources in infrastructure required to structure infrastructure as attractive investment opportunities, providing risk-return profiles that match investors' differing return expectations, liability structures, and preferences. Given the vast infrastructure needs in emerging markets for new projects, greenfield investment is where a significant part of the global infrastructure gap will be closed.

The starting point is the non – bank financial instruments used by institutional investors to deploy resources where most needed.

2.4.1. Equity Instruments

Table 9 - Equity Instruments

Asset Category	Market	Greenfield Projects	Brownfield Projects
Equity	*Listed*	Infrastructure fund Corporate balance sheet	REITs, MLPs, MITS, InvITs, Closed-end funds
	Unlisted	Infrastructure fund Direct/Co-investment	Infrastructure fund Direct/Co-investment

Source: OECD

Equity finance refers to all financial resources provided to a project in return for an ownership interest. In the case of infrastructure project finance, this part contributes 10-30 percent of a project capitalisation. In this case, project sponsors are the initiators of an infrastructure by contributing equity to an SPV or acting as bidders for the project in a PPP case. However, they are responsible for managing the asset. Conversely, financial investors play an important role in providing investment capital. However, they are not involved directly in project operations. Sponsors may sell their participation in the secondary market

if they exist or get a share of proceeds if the asset is sold. However, they are crucial in financing an infrastructure as they provide the initial risky capital necessary to initiate a project. The difference between the listed and unlisted share lies in the fact that the shareholder holds a minority participation with limited ability to influence an infrastructure's management in the former. In the latter, instead, there is a direct ownership, control, and operation of a project asset due to concentrated shareholder's rights.

Equity finance is fundamental, especially for infrastructure assets that have limited capacities for debt finance. In the case of a project with revenues, operating, and construction risks, equity is used as a means of additional financing, increasing the ability to borrow from the financial market. Hence, the major reasons why equity is essential in infrastructure are its perpetual nature, being a stable financing instrument for long-term, high-risk investment, it provides support for the issuance of debt, it helps to align interests between project sponsors, governments, and financial investors, which is the key for the sustainability of the private sector. Finally, equity investment allows for a competitive bidding process, which is especially important for projects delivered through PPP contracts.

To begin with, consider the listed *infrastructure funds*. They raise capital by issuing shares or by gathering investment capital from investors to deploy into infrastructure investment. This fund allows investors to invest directly in infrastructure assets by purchasing units of a fund. These products are like common equity, with a liquid market where shares may be bought, sold and exchanged. According to the fund's strategy, the capital raised by these funds is invested directly in infrastructure assets or to a specific sector. Funds can invest either in listed project companies or unlisted project finance entities. A potential drawback for the listed is the exposure to the market's volatility, as, given the high leverage, the price volatility can be amplified.

As part of the Greenfield project and focusing on unlisted equity instruments, there are also two instruments:

- *Direct equity investment*: Direct equity investment means investing directly in unlisted stand-alone infrastructure assets, bypassing fund managers. The main problem to overcome is the requirement to have in-house by institutional investors the expertise and resources required to invest in the asset and manage it through its life. Therefore, this type of investment is constrained to large, sophisticated investors with the capabilities to perform, select and manage the asset;

- *Co-investment platforms*: have emerged for bypassing the high entering fee offered by fund managers for investing in infrastructure to institutional investors. Therefore, large pension funds and sovereign wealth funds have decided to pool their resources to invest jointly in infrastructure projects. These types of investment also align the interest of the institutional investors with the infrastructure management's interest. There are several benefits: low fee, larger commitment, alignment of interest, better control on the project's characteristics, and a spreading of risk. The main drawback is represented by dissimilarities in strategic orientations, diversification targets, and exposure limits.

The last equity instruments to analyse are the *Closed-end Funds, Real Estate Investment Trusts (REITs) and Master Limited Partnerships (MLPs)*. These instruments are related to the real estate and oil gas sectors. These funds allocate only a small portion in the infrastructure sector, in the narrowest sense. They are trust or partnership, investing in a particular sector, with their fund managers responsible for the asset's operation and management. They both can issue shares that are listed on the stock exchange.

To conclude, equity provides the right support for the issuance of debt, especially for those projects that are innovative or with high technological risk, with an unpredictable or unstable cash flow struggling with debt collection.

2.4.2. Hybrid Instruments

Hybrid instruments non. In cases where capital raising is difficult, due to the high cost and risks, especially in greenfield projects or projects involving new technology, the hybrid instruments are a valuable asset-raising alternative.

This category creates a different risk/return profile for investors, offering a higher yield than government bonds and including equity participation rights. These elements make the hybrid instrument attractive for institutional investors, especially for pension funds that must guarantee a yield to their underwriters.

Subordinated debt and mezzanine absorb credit losses before senior debt, so they have a support function to improve quality and secure the senior debt. The SPV can issue subordinated debt, which can be exchanged on the market.

Similar to debt funds, in this case, general partners raise money from limited partners that will deploy into subordinated or mezzanine debt instruments. Even public entities such as multilateral development banks can step in to reduce the amount of equity to be raised by

more reluctant private investors, providing internal credit support for the whole project structure.

2.4.3. Market Vehicles

The market vehicles enable the pooling of capital for infrastructure finance in a diversified portfolio of securities, loans, or private investments[49]. Public market funds such as mutual funds, index funds, ETFs, and open-ended or closed-end funds have broad appeal to a diverse set of investors.

Financial markets authorities regulate them, and sometimes, in the case of ETFs and listed open-ended funds, they are themselves tradable shares on stock exchanges. Investors and retail institutions can access infrastructure securities like corporate bonds and equities, ensuring a high diversification and transparency level. Most investors exposed to public infrastructure assets such as stocks and bonds invest through funds. The formation of indices for monitoring infrastructure shares facilitates creating products, allowing passive and active management in listed infrastructure companies.

The main asset category, which is the fixed-income investments, takes the form of private debt.

Private debt is generally defined as debt investments that are not financed by banks and usually are not issued or traded in an open market. It comes in many forms, but it is often non-bank institutions that provide loans to private companies or purchase these loans on the secondary market.

A variety of investors, or private debt funds, are involved in the space. They include direct lending, mezzanine, real estate, and infrastructure debt. In addition to repaying the entire loan amount in the future, the corporation is also required to pay interest to the lending institution.

The private debt sub forms can take the form of infrastructure debt fund, direct lending or mezzanine debt.

To begin with, consider the *infrastructure debt funds*. These funds allow insurance and pension funds through units and bonds issued by the IDFs, to invest in infrastructure asset.

Investors have the opportunity to invest directly in infrastructure assets by purchasing units of a fund. These products may be bought, sold, and exchanged in case of a secondary market.

[49] OECD, (2015). "Infrastructure Financing: Instruments and Incentives", *OECD publishing.*

Furthermore, according to the fund's strategy, the capital raised by these funds is invested directly in infrastructure assets into a specific sector. Funds can invest either in listed project companies or unlisted project finance entities. A potential drawback for the listed is the exposure to the market's volatility, and given the high leverage, the price volatility can be amplified.

While the mezzanine and the direct lending and co-investment platforms are cited above, it is worth to cite the private lending funds and the credit funds[50].

Credit funds are investment funds, which tend to be closed-end, i.e., it is not possible to subscribe or withdraw units before the fund's maturity. They are funds mainly dedicated to the underwriting of listed or unlisted bonds in the form of private placements. Investment in such funds allows diversification of the portfolio and counterparty risk, although the structure remains rigid, as it based on the issuance of bonds. On the other hand, private lending funds are funds where the core activity is the financing underwriting activity, and it can be considered bank-like activity. They are managed as a true fund with the functionality to sign a financial arrangement.

2.4.4. The non – bank credit instruments

The infrastructure project is defined as a project financing operation; therefore, debt securities are typically used for 70 to 90 percent of the infrastructure's total capitalisation. The high leverage operation is possible given the less volatile cash flow, low to manage operational risk, and the nature of capital intensity. Given these elements, sponsors are willing to accept a higher level of indebtedness.

Infrastructure debt is classified as a fixed income product, in which loans and bonds belong to the largest categories of infrastructure financing[51]. It is possible to differentiate the debt instrument in a different number of types. Generally, in a greenfield project, there are two types of debt financing, which are project loans and project bonds, with mezzanine debt or subordinated debt. Conversely, for brownfields projects, institutional investors are more likely to deploy financial resources through long-term obligations related to the infrastructure company, given the less risky nature.

[50] Merola F., (2020). "Il mercato del "credito non bancario" in Italia: terza crisi, terza opportunità", *ASTRID*.

[51] OECD, (2016). "G20/OEDCD Supporting Note to the Guidance Note on Diversified Financial Instruments, Infrastructure", *OECD publishing*.

It is important to emphasise that project financing debt is issued in the local currency to minimise currency risk, although strong currency issuance is possible.
This section will explain how investors can gain exposure to infrastructure investment.

Table 10 - Debt Instruments

Asset Category	Instruments	Infrastructure Project
FIXED INCOME	*BONDS*	Projects bonds Municipal / Sub-sovereign bonds Green bonds
	LOANS	Direct / Co-Investment Lending Syndicated Project Loans

Source: OECD

Starting from *project bonds*, after the global financial crisis, banks approached project lending prudently[52]. The need for infrastructure and other special projects remains high. Therefore, regulators and international policymakers have taken extraordinary steps to boost the project finance market while reducing risky financial activities. Consequently, the project bond market became more attractive, even thanks to some forms of policymaking and government interventions underpinning the demand for project bonds. Moreover, some institutions as the European Commission, have introduced, in conjunction with the European Investment Bank, the project bond initiative in 2020 to incentive the investment in the project bond market for large scale infrastructure in several sectors. Project bonds are an emerging component of infrastructure funding and an increasing source of long-term funding for infrastructure projects.

Project bonds are issued by an SPV and sold to other banks or other bonds investors[53]. Project bonds are standardised securities issued for financing a single infrastructure project. In this sense, they are considered riskier than corporate bonds, given credit holders' risk-based only on a specific project versus a diversified portfolio. They can be issued in a public

[52] Park J. D., (2018). "Remembering financial crises: the risk implications of the rise of institutional investors in project finance", *Michigan Law Review,* Vol. 117 No. 2, pp. 383 – 414.

[53] OECD, (2015). "Infrastructure Financing: Instruments and Incentives", *OECD publishing*.

market or placed privately. The benefits to list project bonds are the higher level of transparency, liquidity, and pricing.

Given the riskiness of the project bond, most of the time are issued during the operational phase, otherwise the risk/return profile will not match the expectations of the institutional investors, that will not be willing to bear the construction risk. Bonds become a feasible option when project volume is significant, over $100 million, and longer-term funding is required.

Only in PPPs projects might be issued project bonds given the government's support, allowing the project bond market's issuance.

As a result, project obligations are used during the operational phase, more generally for brownfields projects providing a potential solution to long-term debt financing. Indeed, in this phase, the construction phase is complete, and the infrastructure starts to generate positive cash flows, with the solvency of the project bonds dependent on cash flow performance.

The main difference with a bank loan or other financing forms is based on the instrument's nature, making them attractive. This makes it an alternative investment or a niche category of fixed income by investors. Compared to syndicated loans, project bonds have certain contractual characteristics that make them more attractive to institutional investors than to banks.

First, bonds are standardised instruments, and they show better liquidity if the issue size is large enough to generate floating securities, which in turn can generate a lower cost of funding concerning a bank's loan.

Second, the larger size of issues can become a component of bond indices, increasing the demand for passive benchmarks from bond investors.

Finally, they can be issued with maturities longer than the syndicated loans.

However, some characteristics do not completely make this instrument attractive. According to *Gatti*,[54] the main drawbacks are:

- Investors are only interested in project bonds once the construction phase is completed;
- Bullet repayments cannot be tailored based on the cash flow pattern and triggers a refinancing risk;

[54] Gatti S., (2014). "Private Financing and Government Support to Promote Long-term Investments in Infrastructure", *OECD Publishing*.

- Institutional investors need to rely on rating agencies to assess risk, given the challenges of an independent risk assessment.

To conclude, due to their inherent limitations, project bonds are an instrument mostly suitable for refinancing operations, as opposed to greenfield projects. For this reason, the use of this instrument is limited in project financing to roughly 10%[55].

Green bonds can be included in this category as the financial characteristics are the same as other project bonds or debt instruments. They can be issued by development banks, governments and municipalities, banks or SPV. The difference lies in the fact that green bonds are issued only to finance green infrastructure assets, and the increasing demand for such bonds makes them attractive. Moreover, given standards and a minimum issue size exist a benchmark that helps institutional investors see the lack of benchmark as one of the main issues steaming them from investing in greenfield projects.
Following the pattern of the table above, the consequent instrument is the *municipal / sub-sovereign bonds*. Securities in this category comprises bonds issued by government entities in the capital markets to finance infrastructure construction and operation. Bonds are sponsored by federal governments, local governments, and sub-sovereign entities, such as government agencies and multilateral development banks. Government and municipal bonds are market-based instruments used to finance an infrastructure and are directly sold to investors through the fixed income market. These bonds have long-term maturity, pay fixed or floating coupon rates, and are rated by the main rating agencies. The difference with other types of instruments is the special tax treatment allowing to finance infrastructure at a lower cost. These bonds are the core investments in multiple institutional portfolios of investment-grade bonds, given the high credit quality.

As far as lending instruments are concerned, institutional investors can consider two lending forms into a project: *direct lending and co-investment platforms.* They are not real instruments as they are considered more a way of financing[56].
The common underlying features are the desire to reduce entering fees associated with debt funds and increase infrastructure lending's attractiveness for gaining a higher yield.
However, relatively to the direct lending, only the most sophisticated investors, with high expertise internal skills, and with a dedicate team, can lend directly to infrastructure projects

[55] Merola F., (2020). "Il mercato del "credito non bancario" in Italia: terza crisi, terza opportunità", *ASTRID*.

[56] OECD, (2015). "Infrastructure Financing: Instruments and Incentives", *OECD publishing*.

bypassing the capital markets, granting loans for brownfield or greenfield project's investment, as they can bear all the risks and manage the infrastructure asset. As a result, knowledge of underwriting transactions, project funding and infrastructure is vital.

In the co-investment platform, the lead underwrites the loan, retains the fee plus a part of the loan, and sells the remaining part. This type of financing has emerged for bypassing the high entering fee offered by fund managers for investing in infrastructure to institutional investors. Therefore, large pension funds and sovereign wealth funds have decided to pool their resources to invest jointly in infrastructure projects. These types of investment also align the interest of the institutional investors with the infrastructure management's interest. There are several benefits: low fee, larger commitment, alignment of interest, better control on the project's characteristics, and a spreading of risk. The main drawback is represented by dissimilarities in strategic orientations, diversification targets, and exposure limits.

Continuing with the analysis, the last instrument for financing infrastructure are *the syndicate loans and bank loans*[57]. Syndicated loans are issued by commercial banks or development banks and are either sold directly to investors or large institutional investors, participating in co-investment arrangements. These types of loans are granted to the SPV and have a high degree of customisation. Regarding interest rates, they can be fixed or floating; this latter case is based on a benchmark, with an average maturity range from 10 to 20 years.

In the syndicate of banks, loans originate from an underwriting and a syndicate of financial investors. Subsequently, syndicated loans might be sold in the syndicated bank loan market. Syndicate loans are more flexible regarding project bonds, as the loan repayment term, coupons and the structure can be adjusted to reflect the projects' requirements over its life.

Bank loans have the lowest risk level on the project finance debt risk, as they are senior debt instruments and are usually secured by collateral.

Repayment of the loan is not necessarily tied to the project's success during the operation phase, but lenders drive the restructuring process in the event of a default. However, after the introduction of Basel III, the use of project bonds as a more stable and liquid form of finance versus loans may be considered an attractive alternative since banks are required to hold more capital than previously, they used to.

[57] OECD, (2016). "G20/OEDCD Supporting Note to the Guidance Note on Diversified Financial Instruments, Infrastructure", *OECD publishing*.

CHAPTER THREE

3. LENDING IS NOT BANKING: A NEW CAPITAL MARKET IS EMERGING

The allocation of and access to financial resources, of whatever nature and whatever institution, is fundamental. The financial system must be able to channel these resources through markets and various intermediaries. This introductory statement is as simple as it is difficult to affirm since technological and legislative developments and the various crises of the past years have raised several questions to whom the various legislators have responded by radically changing the system.

As discussed above, it has been seen how, from the global financial crisis, the accumulation of excessive risk-taking by financial market participants had necessitated a redesign of the bank regulation to address the vulnerabilities that culminated in the 2008 economic crisis. These reforms result from a reassessment of banks' role in the post-crisis world, justified by their distress's negative systemic impacts. As banks' role has been somewhat reduced, non-bank financial intermediaries have played an increasing role in the world financial system.

The European commission in 2013, with the cited above Green Paper, has been a pioneer for addressing the challenges resulting from the collapse of investment by governments, and on the other hand, the need to find a new alternative investment solution. Subsequently, the capital market union project identified a series of measures, each of which design to channel investment in the real economy from the capital market, aiming to revitalise and make the European capital market more attractive.

However, the increasing role of non-bank financing poses new challenges for regulators, as non-bank financial intermediaries' activities may have implications for systemic risk.

3.1. The non – bank financial intermediaries

Traditionally, banks have played a major role in the financial system, given the nature of their main funding source, namely deposits. They were considered the natural bridge between the lenders and borrowers, at least until the crisis. At the same time, non-bank lenders' financing has proliferated, and what was once considered a niche market now can be considered a source of funding.

Non – bank credit[58] can be defined as any loans or credit relationships granted by market players instead of the traditional banking sector, government, and foreign entities. According to the Financial Stability Board, three categories of non-bank intermediaries which operate in the non-bank lending system can be considered. However, it is noteworthy to highlight that the expression *"shadow banking"* has been substituted with the locution *"non – bank financial intermediation"* to underline the parallel credit system's positive side in providing new instruments and new way of financing.

Following the FSB patterns, Non-bank Financial Institution (NBFI) includes all financial institutions, not central banks, banks, or public financial institutions. Additionally, it considers other financial intermediaries (OFIs) as a subset of NBFI, including all financial institutions that are not central banks, banks, public financial institutions, insurance corporations, pension funds, or financial auxiliaries. Finally, the narrow measure of non – bank financial intermediation[59] comprises all non – bank financial institutions that are authorised to be involved in the credit intermediation activities. The mix of banks and other intermediaries varies across countries, and over time, it depends on institutions and the financial development stage. However, alternative financing sources promote stability, increase market liquidity, and improve investors' allocation of risk.

Investors in the non – bank credit system, which in 2018 was worth $379 trillion[60], are typically institutional investors, as most of the 70% of all committed capital comes from pension funds, insurers, and sovereign wealth funds. They are attracted to this market, as the uncertainty and volatility prompt investors to find alternative credit allocation that matches the investor's requirement. Moreover, the provision of credit by non-bank lenders to

[58] Signorini L. F., (2019). "Non-Bank Finance: opportunities and risks", *Euromed Workshop*.

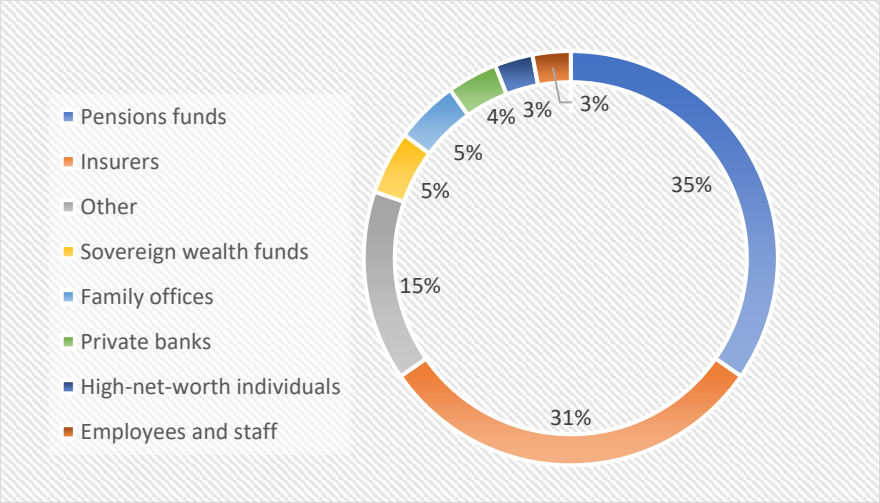
[59] In the narrow measure are included, collective investment vehicle, hedge funds, and securitisation-based credit intermediation.

[60] FSB, (2020). "Global Monitoring Report on Non-bank Financial Intermediation", *Financial Stability Board*;

borrowers depends on investor capital, which is at risk rather than client deposits, creating a tight alignment of interests between investors and fund managers.

The ability of non-bank lenders to deliver a return to their investors rests on their ability to make good lending decisions.

Figure 11 - Breakdown of the participants



Source: Non-bank lending in the EU

The non – bank financial sector creates a diversified financial system, which allows various ways to channel financial resources, including supporting long-term investment and diversifying risks, which positively impact both lenders and borrowers.

The primary beneficiaries of the non - banking credits have been SMEs and mid-market companies, as they are used to rely on bank financing, and it is a valuable source for household and investment in fixed capital.

Furthermore, it creates a resilient economy, provides healthy competition with the banking sector, reduces transaction costs, and improves services quality. Additionally, it stimulates innovation and efficiency, on the one hand, and reduce the impact of economic shock during times when banks are unable or unwilling to lend, given that funding sources are diversified, on the other hand. Indeed, in a credit crunch situation, in countries with well-developed credit markets have been shown how firms can borrow by issuing securities.

However, non-bank funding can become a source of systemic risk[61], directly or through its interconnection with other parts of the financial system, where it engages in activities such as maturity transformation operations or the creation of leverage.

Concerning the first activity, however, as far as this may be an issue in the financial system, it is less important to non-bank lenders where the maturity of the fund's loans is generally aligned with the capital's maturity of the investors. This fear is mitigated by the fact that the capital allocated to non – bank lenders is usually invested by closed-ended fund. So without possibility, the investors can recall their capital before fund maturity, thus having the possibility to count on a stable source of finance. In case investors deploy their resources through an open fund, investors are not allowed to decide when to withdraw their share, but there are windows where that can be done, thus ensuring a flow of resources.

Accordingly, any review of regulatory measures should take into consideration the role that non-bank lenders can and do play to support financial stability and finance the real economy; any attempt to impose bank-like regulatory approaches on non-bank lenders will erode the uniqueness of the industry and limit the benefits of a diversified financial system.

The policymakers, supervisors and market players must act together as it is the most effective way to catalyse non-bank lending growth, aiming at improving access to alternative finance sources worldwide.

Nonetheless, the main lesson from the global financial crisis is that risk can be built up mainly due to lack of legislation if authorities do not have a broader perspective, with consequences beyond the financial markets. Supervision and monitoring of new trends are crucial to prevent any possible build-up of systemic risk and be prepared to anticipate the consequences. Non – bank lenders, during their activities, implement a system of risk management to identify, monitor and manage any possible risk relevant to their lending activity or investment strategy. Diversification is a key tool for managing risks.

It is in the interest of non – bank lenders to lend responsibly and be diligent when assessing a borrower's solvency, assess its creditworthiness and ability to repay loan, analysing key financial information and undertake market research.

In Europe, some of the non – bank intermediaries are already regulated. For this reason, the term "shadow banking", which is considered in its negative side, is inappropriate, given that

[61] Durdu, Bora C., Zhong M., (2019). "Understanding Bank and Nonbank Credit Cycles: A Structural Exploration," *Finance and Economics Discussion Series* 2019-031;

the non-bank credit system is not something to look at with apprehension, but it is a system, undeniably with risks, but conversely, they provide resources that otherwise it would not be deployed, which in turn boost innovation and promote growth.
They are subject to the Alternative Investment Fund Managers Directive (AIFMD)[62], which foresees an authorisation and supervision. The directive provides the national competent authorities (NCAs) tools useful for supervising the non – bank lending sector.

There is a clear framework that ensures that non – bank lenders:

- are authorised and supervised by the NCAs;
- there is no mismatch between the liquidity arrangements of the fund and the liquidity profile of the lending activity;
- undertake rigorous borrower due diligence;
- implement risk management system link with stress test to verify any risks arising from their lending activity;
- are transparent in their use of leverage;
- provide reporting to their investors.

The shortcomings that arise are well addressed by existing regulation and although there has been a significant growth is still relatively small in relation to the traditional forms of lending. However, the new technologies, which are the main alternative in the financial field, can be used to unbundle banks' services. Technology-based financial innovation has the potential to be particularly beneficial to developing countries by making services more affordable and accessible, thanks to acquiring and processing information.
What is the future for banks? The crisis has affected the various OECD countries differently in relation to their different characteristics and structural starting circumstances. It changed how the bank is perceived as a universal global institution, revealing the international credit sector's systemic risks and taking corrective action.
Undeniably, the more bank-centric countries, such as Italy, were more affected by the crisis, as they suffered the severity of the adjustment processes resulting from the new banking regulation, as bank was considered the sole catalyst for resources. All this brought out the fragility of the banking system, with grave repercussions on the granting of bank credit, and drew attention to the lack of development of financial markets, which instead represent a valid alternative to the banking system, which reduces even in times of crisis, as we have

[62] ALLEN&OVERY, (2019). "Non-bank lending in the European Union", *Alternative Credit Council*.

seen above, the repercussions in the event of a credit crunch. Meanwhile, access to credit is diversified.

Therefore, their future is linked to their ability to exploit their core mix activities' unique features. They need to evolve and adapt, as some aspect of the traditional banks, such as physical proximity to clients, costly networks of branches are becoming less important as savers and borrowers can access financial service providers remotely, therefore not further competitive. To take advantage of technology's benefits, they will need to move beyond cost-cutting and adopt far-sighted and perhaps quite profound innovations in their approach to businesses and customers. Banks that demonstrate creativity and efficiency in using technology while preserving their traditional commercial advantages might retain a key role in the future financial system.

To conclude, non-bank financial institutions' lending activities do not present the same potential risk as those that can arise from the traditional lending sector, as non – bank lenders raise capital from predominantly professional investors. They have a greater capacity than bank depositors to understand the risks of their investment, and further, using closed-ended funds, they are unlikely to pose the same risks as credit institutions to the stability of the financial system should they fail. However, certain types of non-bank finance could exacerbate the financial system's tendency to behave procyclical and increase the degree of interconnectedness between intermediaries and markets.

A more diversified financial system, with banks and non-bank financial institutions complementing each other, can improve resource allocation and promote growth while keeping risks under control. Adequate regulation and supervision must ensure that non-bank financial institutions reinforce the financial system by managing risks.

3.2. FinTech companies: the financial innovation enhances market fluidity

A new trend has emerged in the financial market, it is still at its early stage, but its rapid growth cannot be unnoticed. Financial innovation enabled by digital technology known as FinTech has started to play an important role in the financial sector. It has proliferated around the world in recent years but with some differences reflecting the economic development and its financial market structure. Indeed, the higher the country's income is and the less competitive its banking system, the larger the fintech credit activity will be. Other elements that influenced the development of the credit FinTech are its economic growth, the quality of its legal system, and the level of economic and financial development linked to

competitiveness. A less competitive banking system could result in higher margins on bank credit and boost other credit sources such as FinTech credit.

FinTech is changing the financial system's landscape, as new business models are being developed exclusively by firms or by competitive incumbents. If managed well, an alternative funding system can be a viable source for business and consumers and improve credit access for underserved segments. This would enhance the efficiency of the financial intermediation, on the one hand, but give rise to several challenges for regulators, on the other hand.

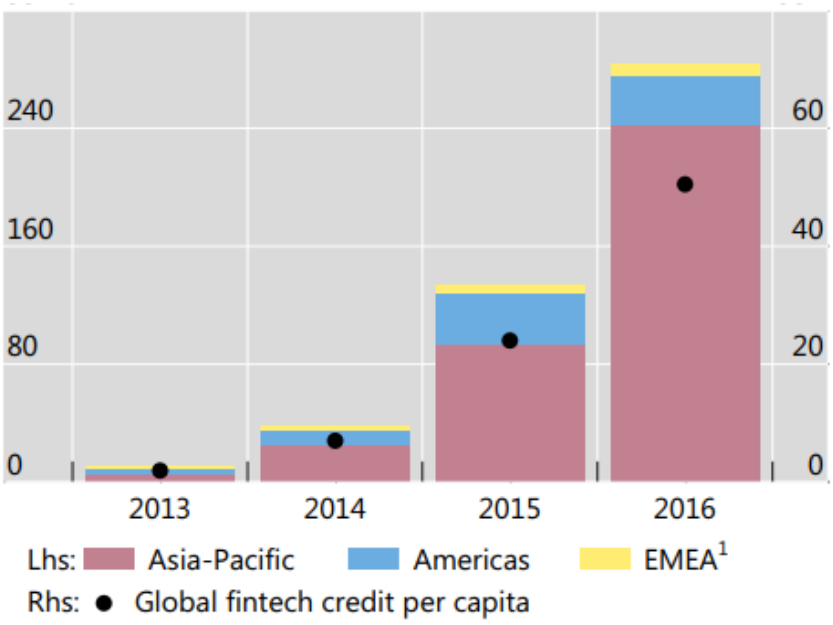
According to the Bank of International Settlement, they define FinTech as the "*credit activity facilitated by electronic platforms that commercial banks do not operate*"[63]. Platforms can vary in design, but they all use digital technologies and innovations to interact fully or mainly with their customers online, which is the unique characteristic that defines FinTech credit entities.

The main differences with a traditional bank rely on the lack of balance sheets for the intermediation of borrowers and lenders and the taking over credit and other risks. However, they provide the monitoring and servicing activities as banks do. Another key distinction between banks and genetic credit platforms in the absence of a branch distribution network and the digitisation of most client origination and loan processes. This includes, among other things, lending decisions, where predictive algorithms and machine learning techniques are common. However, banks can access their exclusive customer data, which intertwined with the new digital technologies, can improve the lending activity or provide new services. On the business side, small and micro companies are the ones that most benefit from this type of credit system as they can find themselves for working capital or investment projects at a lower cost. Further, they can access services more tailored for them, which more closely reflect their preferences in terms of risk and maturity.

As shown in the figure below, FinTech credit activity has expanded rapidly worldwide. According to the bank of international settlement, the FinTech credit market was worth $11 billion at the end of 2013 to get to the value of $284 billion in 2016.

[63] Claessens S., Frost J., Turner G., Zhu F., (2018). "Fintech credit markets around the world: size, drivers and policy issues" *BIS Quarterly Review*.

Figure 12 - FinTech credits growth ($BN)



Source: BIS quarterly review

However, inside the FinTech credit market, it is worth stressing some peculiar businesses that carry out the crowdfunding activities for the thesis's sake. These companies, through crowdfunding activities, collect capital from the public by electronic platforms, which subsequently deploy into projects. The key feature is that any *"investors"* who want to participate in the project via an electronic platform can do so with a minimal entry capital. Most of the time, they deploy the collected resources into the real estate industry. Thus, it could pave the way even for large infrastructure projects, guaranteeing investors who are reluctant to invest in or cannot bear some risks thanks to credit enhancement instruments. This would completely redesign the way investment is made, even with a small amount of money.

Nevertheless, it is possible, perhaps, to have a platform that collects through debt instruments the part of the credit to be deployed into infrastructure investment. It is a whole new field to be discovered, analysed and with a high potential, especially if intertwined with some multi development bank or institutions that offer credit enhancements instruments. Nowadays, one of the most important platforms through crowdfunding invest in infrastructure projects is *InfraShare*. Other companies, most of the time, operates in equity crowdfunding, such as *MamaCrowd* or *Equities*.

The development of fintech credit entities, however, could present risks that need to be addressed[64]. Stricter regulation could foster trust in new forms of financial intermediation. At the same time, this could inhibit innovation and discourage - potential new market entrants. Even sector-specific rules may also play a role, as less intense regulation of fintech activities could aid their growth. Although, enhanced access to credit and competition in credit markets could weaken lending standards, a guiding principle should be *neutrality*, ensuring that regulation does not favour one entity over another entity, who provide the same activities and so interface with the same risks. Therefore, it is essential to establish a level playing field among the various institutions that carry out the same activities, not favour any institutions. However, some countries can apply a stricter regulation for certain activities. Australia and the Netherlands opted for implementing stricter regulations as they, in order to carry out a fintech company, providers must apply for a specific licence.

Finally, the development of fintech credit markets can also impact the supervision of existing financial intermediaries. Banks can interact with FinTech credit platforms and companies providing credit evaluation services or adopt innovations in their lending processes. These activities performed by FinTech often involve outsourcing one or more functions, and these parties could be outside the financial system, introducing new reputational and operational risks, including cyber risks and third parties' risks. Moreover, some of them could be subjected to lighter regulation and supervision, and if these third parties manage confidential data, legal risks may arise. That is why it is fundamental to monitored FinTech innovations to avoid illegal activities that could threaten financial integrity.

3.3. Credit enhancement technique: making infrastructure investment more profitable or less riskier

Infrastructure investments are the backbone of a countries' socio-economic growth. Considerable investments are required for filling the infrastructure gap estimated roughly at $ 5.5 trillion annually, in addition to the investments necessary to meet the UN's Sustainable Development Goals estimated roughly at one trillion per year, bringing the total to almost ten trillion dollars to invest in infrastructure annually worldwide. According to which aim to improve the social and economic well-being of every citizen worldwide. On the other hand, there are $120 trillion under management by banks and institutional investors that are not

[64] Claessens S., Frost J., Turner G., Zhu F., (2018). "Fintech credit markets around the world: size, drivers and policy issues" *BIS Quarterly Review*.

efficiently deployed into the financial market. Therefore, the key issue is how to unlock the potential coming from the financial system?

One of the most important factors that could genuinely improve the flow of that enormous amount toward infrastructure investment can be the *credit enhancement technique*[65]. It became necessary as investors are reluctant to commit their resources through the infrastructure market deriving from some shortcomings. Above all, only a few investors are willing to be involved in transactions that involves construction risk or counterparty risk. Further, institutional investors are reluctant to deploy their resources in countries with high political and country risks, where the country regulation is mild respect to investors protection. Hence, the credit enhancement technique is essential for making infrastructure more financially feasible. The credit enhancement providers' role could become an essential factor for institutional investors, but even for banks, deciding whether to deploy capital—most notably in emerging markets. These third parties include development finance institutions, multilateral development banks, infrastructure banks, commercial banks, insurance companies and export credit agencies, and private guarantors. All players who have the capabilities to bear project risks. Multilateral development banks and development finance institutions support large public projects, while the export credit agencies and private guarantors have a more specific mandate to de-risk smaller projects, including private infrastructure. Credit enhancement techniques can be defined as financial instruments that transfer a specific type of project risk to creditworthy third parties better placed to mitigate them. More generally, credit risk mitigation refers to institutions' collateral agreements used to reduce risk arising from credit position. However, it is a complex structured finance transaction requiring the guaranteeing institution's strong knowledge and financial capacity. One of the main advantages of third parties' involvement, which guarantees, serves to better balance the risk-return profiles requested by investors while keeping them interested in infrastructure. The idea is to reduce the risk, which will be advantageous for investors since they will not require a higher return even because the return rate will still be higher in relation to the debt of investment-grade companies and sovereign bonds. Hence, it encourages the private sector to deploy capital into essential infrastructural projects and a more comprehensive range of project types and, above all, geographies. Moreover, their practical use can lead to project debts receiving a higher rating than a scenario where enhancements

[65] World Bank, (2020). "Credit Enhancement Practices: Supporting Investment in Infrastructure", *The Global Facility for Disaster Reduction and Recovery*.

are absent. Therefore, depending on the instrument used, credit enhancement can reduce the risks associated with certain parts of the project capital structure or shift the project's risks.

Going deeper into the analysis, the various form of credit enhancements can include:

TOOL	DESCRIPTION
Partial credit guarantee	It is an irrevocable promise made by a third-party financial institution to reimburse the creditor/investors in case of technical default up to a certain amount, typically to 30/50 percent of the total obligation.
First – loss provision	Refers to any instrument design to protect the loss of capital exposed first in case of unpredictable cash flow. It could take the forms of debt, equity, or derivatives instruments.
Cash collateral	Cash or cash equivalent held as a guarantee for the benefit of a creditor.
Letter of credit	A financial institution's written commitment to guarantee recovery of a specified cash amount in case of cash shortfalls. It is usually given for a lower percentage, roughly at 10/15 percent.
Political risk insurance	Cover private lenders and investors for certain risks of lending to sovereign or sub-sovereign borrowers. Some risks cover by the PRI are political force majeure or current inconvertibility.
Reinsurance	The practice of insurers transferring portions of risk portfolios to other parties allowing insurers to remain solvent by recovering some or all of the amounts paid to claimants
Viability gap funding	Ex-ante approved bond instrument to support primary debt by providing cash resources to the debtor in severe exogenous shocks. It can be implemented through capital grants, subordinated loans, or even interest subsided.
Performance bond	Specific type of a financial surety instrument issued by a financial institution to guarantee satisfactory completion of a project and ensure that the project has enough liquidity to be completed even in an unfortunate event.

These instruments can reduce the riskiness of the overall projects making them more suitable for the institutional investors. However, the general awareness of the credit enhancement solutions available is low across infrastructure stakeholders. Even public infrastructure planners are often not aware of the variety of instruments offered. Therefore, the first step is to increase the awareness of the value of credit enhancement and the scope of de-risking instruments available to attract new investors even among the new market participants as the FinTech companies previously analysed. The range of these instruments can be used even by banks. However, as they must comply with stringent legislation, asset recycling[66] could be more complicated to administer if credit enhancement is in place.

All of this does not come without cost, which has been quantified from 1% to 3% of the total project cost, depending on the size, region, currency, and project risk[67]. However, the main features to consider when assessing the opportunity to obtain the enhancements are that the cost of credit enhancement should be less than the overall improvement in the cost of financing; otherwise, it would not be feasible. Another important consideration for project sponsors and lenders is the time it takes to receive an activated collateral compensation. If there is a significant delay, it will result in the cost of financing and the project's credit score, which will reduce the positive impact of the guarantee.

One of the aspects that requires an in-depth analysis is the complementary role of the export credit agencies, which also have considerable capacity to provide credit enhancement for infrastructure transactions. While their core activities rely on supporting export investment in their home countries, partial credit guarantees and insurance for multilateral development banks are valuable for de-risking infrastructure projects. For doing so, the subsequent paragraph will analyse the role of the export credit agency operating in Italy known as *Servizi Assicurativi del Commercio Estero* (SACE).

[66] As Basel III poses an unfavourable treatment for illiquid asset held by banks, they tend to not keep loans to infrastructure projects on their balance sheet but instead sell them off as it frees up the bank's balance sheet to lend to other projects. This process is known as *asset recycling.*

[67] IIDS, (2018). "Credit Enhancement for Sustainable Infrastructure", *International Institute for Sustainable Development.*

3.4. SACE: between present and past

One of the most critical areas of public support for the economy since the post-war period has been export support. Over time, needs have varied, as well as how various economic initiatives are supported. In the field of public support, OECD countries have regulated the credit support for the internationalisation of their respective economic systems since 1976. They agreed to compromise for establishing a level playing field for companies competing in international markets to avoid distorting effects on competition. The OECD countries delegated the management of export aid to specific agencies called Export Credit Agencies. These agencies have elaborated a system based on two instruments, the insurance of export credit for goods and services, also known as tied aid credit, and through the interest subsidy on export financing in the operation of supplier and buyer credit.

In Italy, the management of export insurance is delegated to SACE[68]. Established in Rome in 1977 as a special section for export credit insurance of the *Istituto Nazionale delle Assicurazioni*. In 2004 SACE become a public limited company owned by the Ministry of Economy and Finance. At the end of 2012, it was transferred to Cassa Depositi e Prestiti (CDP) till 2020. The absorption of SACE into the CDP group created a single pole for export and internationalisation support, which significantly changed the national system's functioning and was divided into several companies and numerous synergistic instruments. When it became a public limited company, it was set up as a real insurance company and, therefore, fall under private insurance company legislation. Following this path, SACE adopted the Risk Appetite Framework to avoid excessive risk concentration.

The situation has started to change with the so-called Liquidity Decree, which introduced several emergency measures related to the situation arising from the outbreak of the COVID pandemic. It has been granted to SACE the possibility to issue guarantees covered in full by the State budget until 31 December 2020 for bank loans granted to companies that met certain requirements set out in the Liquidity Decree to provide immediate liquidity to healthy companies in the country that had been placed in crisis by the pandemic. However, with the Liquidity Decree, much more has been done. Alongside, not only measures of a temporary nature have been included. Elements have been introduced for an overall strategic vision through which public intervention in the economy is articulated.

[68] Merola F., Onida F., Guzzetti L., (2021). "Export, internazionalizzazione, globalizzazione e apertura dei sistemi economici: le politiche pubbliche di sostegno tra cambiamento e tradizione", *Astrid-Irpa*.

Furthermore, SACE has been transformed into a single agency for the issue of guarantees covered by the Italian State for operations on foreign markets, but the novelty has been introduced with the possibility of issuing guarantees for domestic investment projects. This solution is also consistent with the European Union stimulus programs' approach based on issuing guarantees issued as public support, thus creating a multiplier effect attracting private investment.

Therefore, SACE now can:

- Run its traditional insurance activities as an export support agency, with the transfer of 90% of both new and existing portfolio risks to the Government's budget;
- Has been placed under the direction and control of the MEF, meaning that return to its original shareholders:
- Granted guarantee to national projects and investments, transforming the company into a 'single agency for guarantees to the productive national system'.

Why entrust SACE with this role? Basically, because it has consolidated experience in issuing and managing financial guarantees to banks, it has reliable communication channels that have been operational for decades, specialised in evaluating and granting of guarantees on bank loans and well-integrated with the national and international credit system.

All this is linked to the need to ensure a strong revival of private investment, including infrastructure investment. However, public resources are limited, and investments in welfare infrastructure such as kindergartens, school buildings, hospital, soil conservation, and water pipeline have insufficient resources compared to the real needs. It is necessary to mobilise private capital to have the financial resources necessary to invest in such projects. Nevertheless, problems arise for those social welfare infrastructures that do not offer an adequate return/risk for investors looking for long-term investments unrelated to the economic cycle and consistent with their business model.

Consequently, the most significant bottlenecks are represented by regulatory constraints and the risk-return ratio, which could change if the Italian government grants a public guarantee dedicated to single classes of infrastructure and limited in the PPP formula, which could also attract institutional investors through financial innovation. This guarantee should be granted for 100% of the investment and could be free or onerous. Clearly, it should be granted subject to an assessment of quality and sustainability to avoid moral hazard problems that would affect the public budget. Besides, there is a need to simplify the process planning, design, and decision-making procedures, perhaps by giving these

responsibilities to a single entity, which would validate the projects to be guaranteed. SACE could carry out this ad hoc competence centre to promote joint initiatives to directly support Italian companies' investments through portfolio guarantees, investments in infrastructure, and investments in the sustainable reconversion of the country's productive fabric.

To conclude, SACE guarantees are useful for companies and public works commissioners to contain any credit crunch from an anti-cyclical perspective. The improvement of the economic/equity indicators defined by the Basilea III agreements will enable credit institutions to free up new resources to benefit Italian companies.

CONCLUSION

Barely a decade ago, a string of market failures threatened to overturn the global financial system.

Public reactions to the recent financial crisis have been immediate and draconian to revive the world economy while trying to make markets more secure. Since that time, many financial services sectors have returned to their pre-crisis levels. One of those industries is project finance, which includes a variety of financing arrangements often used to finance long-term infrastructure or industrial projects. The Basel III rules, along with other global credit enhancement initiatives, have been driving institutional project finance activity. Regulators and policymakers should develop robust regulations in order to reduce the impact of financial crises. Public policy should be carefully designed and must consider the possibility of unforeseen consequences.

Commercial banks' higher costs eroded the banks' profitability leading some actors out of the markets, while those who remained were unwilling to lend at long maturities and have revised where to invest. On the other hand, demand for projects funded by project finance transactions continues to grow, and new funding methods are needed. This step back had paved the way for the rise of institutional investors in the project finance activity for the financing of infrastructure. The financing of infrastructure has taken the form of project finance transaction since it makes it possible to attract private capital involving public entities as a regulator or counterpart.

Since investing in infrastructure has been considered vital, according to the European Commission and the OECD, for the development of the long-term capital formation as they are the backbone of socio-economic growth, sustainable development and, most importantly, are responsible for improving a country's

standard of living thanks to access to essential services such as health care, education, and electricity. Institutional investors have been eager to fill the infrastructure gap left behind by governments since they face budgetary constraints and by banks as they face stringent regulation providing the resources needed to fill the gap.

Therefore, we are witnessing a total transformation in the role of banks within the financial system. The banking system has not anymore seen as a global universal entity for funding the real economy, as the non – bank credit system development is becoming more and more central for the granting of credit, even in those sectors that have always belonged to the banking sector.

However, some shortcomings highlighted in the analysis which limit institutional investors' possibility to fully deploy their resources into those infrastructure investments, such as the non-standardised capital market, a more favourable tax legislation, lack of debt instrument and regulatory barrier, and the transparency concerns have been addressed in order to make the capital market more efficient and effective.

It is true that institutional investors play an important role in the financing projects and in the markets as a whole. Therefore, any regulatory effort must necessarily balance the need for systemic and project-level risk mitigation while preserving the effectiveness of institutional investors in funding the project finance.

The strengthening of institutional investors in the field of project financing can be leveraged by multiple entities or instruments, which make those investments more attractive. Given the analysis, it can be stated that the role of development banks and multilateral banks at national and international levels is crucial

for catalyse long-term financing and improve the efficiency and effectiveness of financial markets.

On the one hand, this enhancement credit technique allows governments, since facing budgetary constraint to have the resources they needed for infrastructures with beneficial effect for the entire society. On the other hand, thanks to these enhancements instruments, institutional investors are willing to bear some risks and, therefore, deploy their resources more freely. However, during the analysis, it became apparent that such instruments are not used or are hardly used, since on both sides, sponsors and lenders are unaware of their existence, thus, in order to further enhance the role of the non-bank credit system in this area, there is a need to raise awareness of these instruments.

Hence, enhancement credit technique can be considered the missing bridge between governments, banks, non – bank credit markets and institutional investors, that led to have a win-win-win strategy, where institutional investors deploy their resources, thanks to an efficient capital market into valuable PPPs project beneficial for the entire society.

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EXECUTIVE SUMMARY

The occurrence that the economic crisis of 2007/2008 had a lasting impact on the financial and economic system, and the subsequent corrective measures taken at a global level which completely reshaped the balance within the financial system and the way in which credit is granted, specifically for long-term projects, is the starting point for this thesis. Within this context, the thesis objective is to understand how the capital market has been completely redesigned and how the banking system after Basel III's implementation had to lessen their investment from long-term projects such as infrastructure. This step back had paved the way for the rise of institutional investors in the financial sector, as they, given the volatility and uncertainty of the market, were looking for an alternative method to deploy their resources into long–term projects, which guarantee a more stable return in the long run. Moreover, the understanding of the non – bank lending and their potential role in granting credit to infrastructure investments intertwined with the financial innovation, which widening the instruments for procuring the necessary resources, have been analysed to verify if they represent a valuable alternative to the traditional bank debt, and if the credit enhancements technique granted by public or private institutions can enhance the investment in infrastructure by leveraging private capital, as some shortcomings can be overcome.

The methodology adopted for this thesis project starts with a literature review of the main topic. Trough working paper, international report, interview, and periodical article has been discussed how the new trend emerging thanks to the financial innovation could enhance the investment in the infrastructure projects through new instruments and how the role of the credit enhancements technique is used for leveraging private capital. At the end will be presented SACE, an export credit agency operating in Italy, as its core activities have been amplified lately, as the Italian governments decide to grant to it the possibility of guaranteeing certain investment projects.

Given certain assumptions, such as the bank's investment reduction toward long-term investment, the need to find an alternative solution for infrastructure investment as governments face budgetary constraint, and the fact that

infrastructures have seen as an asset class requested by institutional investors, this dissertation provide a valuable analysis of the current situation in the infrastructure debt market and what are the main drawback brought about by financial innovation. In the first chapter, an investigation has been done into the causes of the credit crunch and its impact on the market following the global economic crisis. Subsequently, has been analysed more in-depth the banking legislation, from Basel I to Basel III, to have a clear understanding of the regulatory framework implemented worldwide for having a level playing field and for making the financial market more robust and resilient so that bank can withstand in case of future economic downturn. Furthermore, it has been examined how the regulatory framework have impacted on long – term investment performed by banks, and specifically on infrastructure investment.

The second chapter's starting point is the Green Paper adopted by the European Commission, which pointed out the importance of the infrastructure investment and the need to attract new capital in this market. Consequently, given the fact that the implementation of Basel III, stem banks from investing in long – term projects, as capital requirements are stricter for illiquid asset, it has paved the way to the rise of institutional investors, since banks had left investment space. Therefore, an analysis of the reasoning for investing in infrastructure has carried out, alongside the investigation of the institutional investors' nature and about the non – bank credit instrument for investing in long – term projects.

To conclude, the third chapter can be divided into two main parts. The first part analyses the shortcomings and the beneficial effect of the non – bank credit system, in other words, where the institutional investors operate. Besides, an overview of the latest financial innovation is provided. Instead, the second part focuses on the credit enhancements instruments, which are considered a valuable factor to use in an infrastructure project, useful even for banks, to enhance the willingness of investors to deploy resources into the capital market, as some risks do not make fully attractive this market niche. Therefore, doing projects with a risk/return that meets the investors' expectations will enhance private capital to converge where most are needed. Finally, it has been presented SACE since it has recently started

to issue guarantees. Therefore, it represents a virtuous example of how an infrastructure investment can be structured with banks, institutional investors, and government, which reflect all the elements of this thesis.

The dissertation started analysing the aftermath of the financial crisis and provided an extensive insight into the capital market, the predominant role of banks in the financial system, and the consequences of the crisis in the real economy. Starting with the capital markets, which is a part of the financial market where long-term debt and equity-backed securities are traded, it is essential for channelling the most needed resources. Until 2008, the main features that characterised this market were the logic of laissez fair, and therefore, The interest of consumers and businesses was seen as sufficient to achieve an equilibrium in the financial system. However, the global financial crisis of 2007/2008 proved the opposite.

This marked the final de-regulation era, as starting from 2008, a series of actions have taken place to ensure a more reliable and resilient financial system.

The dramatic consequences of the crisis resulted in a credit crunch, in the first instance, have been impacted the interbank lending market, which subsequently impacted the real economy, as the hunger for liquidity made unwilling banks to concede loans. Credit crunch means shortening the willingness to concede loans due to a decline in banks' value due to conditions imposed by regulators, bank supervisors, or banks themselves that require a bank to hold more capital than they previously have held. Nevertheless, the banking crisis affected the real economy, as access to credit to fund investment and consumption has been reduced.

The actions taken at a level global legislation aims precisely at this; banks must have equity capital proportionate to the risk they have taken to keep the probability of financial distress at the minimum level. The consequences of an economic downturn can have an impact beyond the financial system. The Basel Committee try to do so with Basel I, Basel II, and Basel III.

Before analysing the regulation framework, it is essential to distinguish between project finance and corporate finance. This distinction will be useful to understand how infrastructure investment are structured. Project finance is an investment

technique aimed at financing projects, which requires a high intensity of capital, equity, or mezzanine debt, and is useful in managing complexity. A legally independent project company, called special purpose vehicle (SPV), is established to perform its construction and operation activities. Moreover, the insensitivity to the economic cycle, stable cash flow, and extended asset life cycle attract institutional investors. Those specific characteristics of project finance deals make the private sector more amenable to invest in these projects, and another key element is that it must guarantee its bond and equity holders solely through the project's cash flows. Most importantly, however, through the PF, it is possible to make an investment in foreign countries with low investor protection.

Corporate financing offers more managerial flexibility regarding the allocation of cash flows, but in contrast, they are less verifiable. Conversely, project finance offers cash flows verifiability, limiting the possibility of allocating these cash flows as managers prefer.

Consequently, it is fundamental to analyse the regulatory framework implemented after the financial crisis. Given that the crisis of 2008 has been the worst crisis since the great depression, it was necessary to intervene directly on the financial market to reinforce prudential capital requirements, leverage effect and implement a new risk-weighting system. The Basel Framework is a tool used to reduce opportunistic behaviour and regulatory arbitrage. However, an important point to stress out is that the Committee does not have any formal supranational authority to force its implementation.

The First Basel Accord dated back to 1988 and posed the prudential system's fundamentals that it still forms the financial system's basis. It was the first initiative for the creation of common international rules on bank's supervision.

The Accord set a minimum capital ratio equal to 8%, calculated using the regulatory capital and the risk-weighted assets. Furthermore, the Basel committee divided the capital into two classes based on its quality, Tier 1, which includes retained profits and legal reserves and Tier 2, including undisclosed reserves, general provision, hybrid instrument, and subordinated debt. The core point was to assign both on-

balance and off-balance sheet items a weight based on their risk level and require a minimum level of capital equivalent to 8% of those weighted assets.

The amendment to Basel I in 1996 responded to different issues arising from the implementation of Basel I. The first issue that Basel I lacked was the consideration of the credit risk.

The Basel II accord introduced respect to the previous version, a new way to calculate the risk-weighted asset, introduce three approaches, the standardised approach, and the IRB approach, which can be divided into IRB foundation and advanced. This necessity comes from the need to calculate the credit risk that was not considered before.

The global financial crisis has brought out Basel II weaknesses. The quality and the level of capital were the main problem that the new regulation has addressed. Also, it has been shown how the hybrid capitals instruments, even with an adequate level of capital, were not useful for absorbing the banks' losses. It was unable to control the increase financial leverage, as there were insufficient illiquid buffer.

However, the main novelty has been introduced by Basel III, which has disrupted the framework thoroughly. The first element focuses on the definition of common equity, representing the highest quality component of a bank's capital. It defined a more stringent ratio without changing the 8% but defining more in-depth by which kind of capital this percentage has to be formed. Furthermore, it introduced the capital conservation buffer for creating an additional cushion to absorb economic losses in case of an economic shortfall.

However, given that one of the credit crisis's significant problems was the need for liquidity in the interbank market, which subsequently spilt over into the debt market. To assure banks with the appropriate liquidity Basel III introduced the liquidity cover ratio and the net stable funding ratio. These two last ratios stem banks from investment in long–term projects, as more capital is required to hold when illiquid assets are in the balance sheet, which negatively impacts infrastructure investment.

The introduction of the Accord disrupted how project finance deals are structured. Banks that traditionally financed such projects must deal with stricter regulation,

and since the new regulatory framework requires banks to hold much more liquid assets and reduce their dependence on short-term financing, their lending capacity is compromised.

On the other hand, however, demand for projects funded by project finance continues to grow, and new ways to finance these projects are needed. As opposed to commercial banks, institutional investors do not face the same regulatory standards depicted in the Basel Accord. Given the benefit of a project finance transaction depicted above, they have gradually become an essential source for funding long-term projects.

Therefore, institutional investors' increasing power in the project finance industry versus banks' role becomes the central point.

After the global financial crisis, the disintermediation and capital markets' growth led to institutional investors' rise as global regulators and policymakers took drastic measures, which resulted in the rapid growth of projects bond and institutional investors' activity in project finance. Institutional investors such as pension funds, insurance companies, sovereign wealth funds, hedge funds, and mutual funds are becoming central players in financing long-term capital. The non – bank credit system is becoming more and more central for the development of infrastructure.

Development of infrastructure that the European Commission has pointed out in its work called Green Paper. According to the European Commission, long-term financing is fundamental as they contribute to long-term capital formation, including tangible and intangible assets. These investments promote innovation and competitiveness and have a broader social function as they benefit society by supporting essential services and improving living standards. However, to grow in a smart, sustainable, and inclusive way, the banking system, although more capitalise and resilient, after the global financial crisis, intertwined with the impossibility of the public sector to cope with an unprecedented need for investment, it will not be able to guarantee the rate of growth in line with the needs of economic re-adjustment. The European Commission aimed at creating a more fluid capital market to support such investments.

The main points for improving the efficiency and effectiveness of financial markets in channelling resources are the financial instruments made available by the various capital market participants, improve information transparency, and made available investment information about issuers, as institutional investors see in the lack of information the main barrier to investment.

Therefore, given the inability of banks to mobilise resources for such investments, on the one hand, and the increasingly tight government budgets for new infrastructure or the renewal of old, on the other, left the field to institutional investors. Institutional investors were looking for alternative ways to invest their resources in the long term and driven by the need to shelter their resources in a world characterised by uncertainty and volatility.

Nevertheless, institutional investors' role as an alternative source of finance has not yet fully implemented in many emerging economies, as some barriers to investment prevent them from investing in such an industry in developed countries. This reflects even the government's degree of involvement and the private sector in delivering basic infrastructure service.

The rise of institutional investors, however, connected to the migration of lending activity outside the banking sector, shifted the financial risk into various institutional investors, which have made the project finance market even more complex and interconnected through specialisation and decentralisation and through the reviving of some industry that were considered disappeared, increased systematic risk. On the other hand, they diversified the source for funding, making the whole system more resilient in case of a credit crunch as the one that happened during the crisis.

However, how can institutional investors help the infrastructure sector? Infrastructures are the backbone of socio-economic growth, sustainable development and, most importantly, are responsible for improving a country's standard of living thanks to access to essential services such as health care, education, and electricity. From 2016 to 2030, $3.3 trillion a year is required to be invested *only* to maintain its actual growth rates. With an estimated infrastructure gap of roughly $5.5 trillion annually, innovative solutions must take advantage of

government resources to attract institutional investors' private capital. It is estimated that they have $120 trillion in assets under management. Therefore, the debate is how to unlock this source and create a more efficient and effective market. Although investing in infrastructure is one of the fundamental tasks of governments, necessary to improve living conditions and ensure future growth, some limits do not allow an efficient allocation of resources and an efficient and effective operationalisation of infrastructures.

Institutional investors can rely on a broader range of instruments to take a stake in an infrastructure investment. Each instrument is based on the ability to carry different risks, based on the expected return and cost, or in the investors' willingness to participate in an infrastructure project's development phase as a sponsor.

- It is possible to consider equity instrument, all financial resources provided to a project in return for an ownership interest. Equity finance is fundamental, especially for infrastructure assets that have limited capacities for debt finance. The equity can be placed through an infrastructure fund or can be placed directly in the project;
- Hybrid instrument, such as mezzanine finance or subordinated debt, are instruments with equity-like participation, forming a bridge between equity and debt;
- Non – bank credit instruments, this category refers to the most critical asset category in which institutional investors deploy their resources, as the construction phase, which is considered the riskiest, is completed. The fixed income comprehends instruments, which can subsequently divide into bonds and loans. The former can include, above all, project bonds. Project bonds are standardised securities issued for financing a single infrastructure project and are attractive for institutional investors, to the extent that even the European Commission incentive the investment in the project bond in 2020. As far as lending instruments are concerned, institutional investors can consider two lending forms into a project, the direct lending and co-investment platforms. The standard underlying features are the desire to

reduce entering fees associated with debt funds and increase infrastructure lending's attractiveness for gaining a higher yield. However, relatively to the direct lending, only the most sophisticated investors, with high expertise, internal skills and a dedicated team, can lend directly to infrastructure projects bypassing the capital markets.

From the global financial crisis, we have seen how the accumulation of excessive risk-taking by financial market participants had necessitated a redesign of the bank regulation to address the vulnerabilities that culminated in the 2008 economic crisis. As banks' role has been somewhat reduced, non-bank financial intermediaries have played an increasing role in the world financial system. However, the increasing role of non-bank financing poses new challenges for regulators, as non-bank financial intermediaries' activities may have implications for systemic risk.

While traditional banks have played a significant role in the financial system and financing infrastructure investment, nowadays, non-bank lenders' financing has proliferated, and what was once considered a niche market now can be considered a source of funding.

The mix of banks and other intermediaries in the credit system varies across countries, depending on institutions and the financial development stage. However, alternative financing sources promote stability, increase market liquidity, and improve investors' allocation of risk. The non – bank credit system, which in 2018 was worth $379 trillion, stimulates innovation and efficiency and reduces economic shock when banks are unable or unwilling to lend, given that funding sources are diversified.

Indeed, in a credit crunch situation, in countries with well-developed credit markets have been shown how firms can borrow by issuing securities at a cost relatively lower than a bank's credit. Therefore, non-bank funding can become a source of systemic risk. However, governments must control the risk-taking from this market players. Any review of regulatory measures should consider the role that non-bank lenders can and do play to support financial stability and finance the real economy; any attempt to impose bank-like regulatory approaches on non-bank lenders will

erode the uniqueness of the industry and limit the benefits of a diversified financial system. However, non-bank financial institutions' lending activities do not present the same potential risk as those that can arise from the traditional lending sector, as non – bank lenders raise capital from predominantly professional investors, which have a greater capacity when making an investment choice. A significant trend to analyse in the financial market is the FinTech companies growing thanks to financial innovation. According to the Bank of International Settlement, they define FinTech as the "*credit activity facilitated by electronic platforms that commercial banks do not operate*". Platforms can vary in design, but they all use digital technologies and innovations to interact fully or mainly with their customers online, which is the unique characteristic that defines FinTech credit entities. They can play an essential role in catalysing private resources to deploy into projects. The key feature is that those who want to participate in the project via an electronic platform can do so with a minimal entry capital. Most of the time, they deploy the collected resources into the real estate industry. However, lately, several platforms are becoming more and more aware of crowdfunding, and some of them started to invest in infrastructure projects.

Finally, one of the most important factors that could improve the flow of resources from institutional investors toward infrastructure investment is the credit enhancement technique. It became necessary as investors are reluctant to commit their resources through the infrastructure market deriving from some shortcomings. The credit enhancement technique is essential for making infrastructure more financially feasible, allowing it to meet the required rate of institutional investors' return. Credit enhancement techniques can be defined as any financial instruments that transfer a specific type of project risk to creditworthy third parties, better placed to mitigate them. Several entities can provide these credit enhancements from developing multilateral banks in the case of the European Investment Bank, commercial banks, but even export credit agencies. In Italy, lately, granting a guarantee for a specific project has been given the possibility to the national export credit agency SACE. Established in Rome in 1977, with the Liquidity Decree, which introduced several emergency measures related to the situation arising from

the outbreak of the COVID pandemic, SACE has been transformed into a single agency for the issue of guarantees covered by the Italian State for operations on foreign markets. However, the novelty has been introduced with the possibility of issuing guarantees for domestic investment projects.

To conclude this analysis, we have seen how the Basel rules' implementation has caused banks to withdraw from the infrastructure credit market. This has left the way open for institutional investors to deploy their resources in this market. Several limitations, however, make such investors reluctant to invest their resources fully, but some credit enhancement techniques are overcoming these shortcomings allowing them to be entirely free to decide where to invest. This enhances even governments to utilise this fund for financing infrastructure investment. The missing bridge makes it possible to have a win-win-win strategy for the project finance field.