

**Louvain School of Management**

# **How can NextGenerationEU stimulate the European Capital Markets Union?**

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## **ABSTRACT**

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In 2020 the world was facing a heavy economic downturn because of the covid-19 pandemic and all its consequences for the people and the businesses. To boost the economic and social recovery the EU commission proposed a very ambitious “NextGenerationEU” (NGEU) recovery plan of 807 billion € with an unprecedented financing based on EU bonds and bills. The purpose of this study is to evaluate how the recovery plan and its innovative financing can stimulate the Capital Markets Union (CMU). The covid crisis pointed out the emergency to progress into this initiative of creating a single EU capital market launched in 2015. We use in this report the new 2020 CMU objectives to develop a composite indicator to visualize the general Capital Markets Union’s progress based on 11 indicators. Our results show that the Capital Market Union progressed by 84% in comparison with 2015. The green and digital finance stimulated by NGEU are the main drivers of this progress. In addition, our study reveals that the EU ambition in “NextGenerationEU” for a “fairer, greener and more digital Europe” stimulates the access to financing, the financial integration within EU and the development of permanent safe assets. These elements contribute to the progress towards the Capital Markets Union. The future composite indicator update will show the CMU future progress and the impact of each of its components. Furthermore, it will allow to evaluate the real future benefit of the “NextGenerationEU” and the “2020 CMU action plan” on the EU Capital Markets Union.

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## LIST OF ABBREVIATIONS

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- **CMU:** Capital Markets Union
- **NGEU:** NextGenerationEU
- **PCA:** Principal Components Analysis
- **FA:** Factor Analysis
- **EC:** European Commission
- **EU:** European Union
- **RRF:** Recovery and Resilience Facility
- **GDP:** Growth Domestic Product
- **EMU:** European Monetary Union
- **PEPP:** Pandemic Emergency Purchase Programme
- **NFC:** Non-Financial Corporation
- **MS:** Member States
- **ECB:** European Central Bank
- **OECD:** Organisation for Economic Co-operation and Development
- **SME:** Small and Medium-sized Enterprises
- **ESMA:** European Securities and Markets Authority
- **AFME:** Association for Financial Markets in Europe

## 1. Introduction

“Coronavirus”, the word everybody knows now, was the most searched word on Google in 2020 according to Google trends. This pandemic is the cause of the world economic crisis we faced. The real GDP per capital dropped in nearly all the regions in the world because of the sudden shut-down of economic activity.

The 27<sup>th</sup> of May 2020 the European Commission proposed an unprecedented recovery plan called “NextGenerationEU”. Its objective is to transform the crisis into an opportunity by building “a fairer, greener and more digital Europe” for the next generation (European Commission, 2020b). This recovery plan of 806,9 billion € (current price) is based on an unusual financing by issuing debt on the capital markets. This report will analyze this new financing.

Various literatures highlight the benefits of NGEU for the European capital markets which until now are less developed compared to other regions such as United States. Due to the covid and the context of the economic recovery a lot of papers highlight the need to progress on the objective of the Capital Markets Union (CMU). This key objective to integrate the national capital markets into one single EU capital market was launched in 2015 but is not yet accomplished (European Commission, 2020b). Some papers are linking the NGEU with the Capital Markets Union. However, none of them studied the effect of the new financing of NGEU on the new objectives contained in the 2020 CMU action plan. European Commission published this new action plan in response to the emergency to progress into this objective for the economic recovery. The purpose of this paper is to complement the literature by creating a composite indicator allowing to monitor the progress of Capital Markets Union as of now and in the future based on the new objectives of the 2020 CMU action plan. This composite indicator will allow to evaluate **how NGEU can stimulate the European Capital Markets Union.**

The paper is divided into two parts: the literature review and the empirical analysis. The literature review will first explain more in details the NextGenerationEU recovery plan and why its financing is so unprecedented. Then it will describe how the capital markets are developed in European Union and why do we need a Capital Markets Union by studying its stakes.

Some implications of NGEU on the objective of CMU reported in the literature will be addressed and the new 2020 CMU action plan will be presented.

The empirical analysis will describe the methodology and data used to develop the composite indicator and then will present the results and learnings. A conclusion and some limitations will end up this paper.

## 2. Literature review

### 2.1. Covid crisis and economical consequences

The 17th of November 2019 the first case of a new infectious disease was reported in Wuhan. It was officially reported the 31st of December 2019. This town became rapidly the epicenter of the epidemic. The 11th of January 2020 the infectious disease was publicly identified as so-called covid-19 and the human transmission was very quickly confirmed. The World Health Organization declared on 11th of March 2020 the covid-19 as a pandemic. More and more governments decided to confine their population and the first lockdown in Belgium began the 17th of March 202 (World Health Organization, 2020). This pandemic implied huge economic and social consequences. The economic activity was at a standstill due to lockdown. Large recessions were observed in 2020 in all regions except China. In comparison with the financial crisis in 2008, the covid shock did not come from the financial system but came from a sanitary shock.

### 2.2. Great recession in 2008 vs covid crisis in 2020: comparative analysis

	Great recession 2007-2008	Covid crisis 2020
<b>Cause</b>	financial shock: subprime crisis 2006-2007 in US	sanitary shock: pandemic Covid-19 = most severe economic crisis in the history of the european union
<b>Starting date</b>	September 2008 in Europe	March 2020 in Europe
<b>Date of approval by European Commission on the economic recovery</b>	26 November 2008	21 july 2020
<b>Name of the european economic recovery plan</b>	European economic recovery plan	NextGenerationEU recovery plan
<b>Recovery plan package</b>	200 billion €	806.9 billion €
<b>EU recovery plan</b>	1.5% of european GDP	5% of European GDP
<b>Financing</b>	170 billion € brought by the member states themselves (1.2% of GDP) + 30 billion € coming from budgetary reserves and EIB (0.3% of GDP)	debt mutualization: EU borrows on the markets by issuing EU bonds/bills
<b>GDP per capita caused by the crisis</b>	-4.6%	-6%

Table 1: 2008 crisis vs 2020 crisis (European Commission, 2008 & 2020b)

### 2.3. EU long-term budget and NextGenerationEU recovery plan

“Next Generation EU” (NGEU), the European economic recovery plan to mitigate the economic and social consequences of the covid crisis, is the biggest plan ever issued by the European Union. Indeed, this plan represents an amount of **806.9 billion €** (in current prices). Moreover, to power the EU’s recovery the Council of European Union and the European Parliament voted a EU’s long-term budget (the multiannual financial framework) for 2021-2027 of 1210.9 billion €. Therefore, European Union will have at its disposal 2 018 billion € to contribute to the recovery and drive long-term priorities. It represents 1800 billion € in 2018 prices. This is " the largest stimulus package ever financed in Europe" (European Commission, 2020c). 50% of the EU long-term budget and Next Generation EU will be allocated to new priorities and 30% will be allocated to the objective of fighting against climate change. European Union has never spent such large budget dedicated to the green objective (European Commission, 2021f).

The objective of Next Generation EU is to build a “FAIRER, GREENER and more DIGITAL Europe” (European Commission, 2020b, p.6). The package of Next Generation EU is divided in two. First, the centrepiece of this package is the Recovery and Resilience Facility (RRF) which represents **723,8 billion €** (in current prices). This temporary recovery instrument started the 19th of February 2021 and will last until the 31st of December 2026. It relies on 6 pillars: “the green transition; the digital transformation; the smart, sustainable and inclusive growth; the social and territorial cohesion; the health, economic, social and institutional resilience; and the policies for next generation” (European Commission, n.d.-d). The amount of RRF plan is divided into loans (385.8 billion €) and grants (338 billion €) allocated to member states in order to help them to recover.

The second part with **83,1 billion €** will contribute to other programs. (European Commission, n.d.-d).

The Next Generation EU breakdown is summarized in Table 2.

Recovery and Resilience Facility (RRF)	723.8 billion €
of which, LOANS	385.8 billion €
of which, GRANTS	338.0 billion €
ReactEU	50.6 billion €
Horizon Europe	5.4 billion €
InvestEU	6.1 billion €
Rural Development	8.1 billion €
Just Transition Funds (JTF)	10.9 billion €
RescEU	2 billion €
<b>TOTAL</b>	<b>806.9 billion €</b>

*Table 2: Next Generation EU breakdown (European Commission, 2020c)*

For example, the European programme “**ReactEU**” is the Recovery Assistance for Cohesion and the Territories of Europe. “**Just Transition Fund**” aims to "guarantee that the transition to climate neutrality works for all". “**InvestEU**” aims at supporting the innovation and funding of companies through investments (European Commission, 2021f).

The 806.9 billion € will be raised through the capital market thanks to the issuance of EU bonds (maturity >1 year) and EU bills (maturity < 1 year) and 30% of the NGEU plan will be raised thanks to green bonds. European Commission uses also the capital market by issuing social bonds to raise 100 billion € for the SURE instrument, the temporary “Support to mitigate the Unemployment Risks in an Emergency” (European Commission, 2020e).

At this stage it is important to explain some definitions:

A **bond** is a fixed-income debt instrument. An investor buys a bond issued by a borrower (often government or firms) and receives in return a fixed interest rate called “coupon” until the maturity of the bond (date of repayment of the bond to the investor). It allows the borrower to raise funds.

A **green bond** is a “fixed income security which finance investments with environmental or climate-related benefits” (Ehlers, & Packer, 2017). It works the same way as traditional bonds. ICMA group defines **social bonds** as “use of proceeds bonds that raise funds for new and existing projects with positive social outcomes” (International Capital Market Association, n.d.)

However, to benefit from the “Recovery and Resilience Facility” (RRF), the member states have to present to the European Commission a RRF plan with some milestones and targets and it has to be approved in two months following their presentation. Afterwards the Council has 4 weeks to adopt it. The RRF plan details the initiatives, the investments and the reforms they will put in place until 2026 thanks to the allocated funds. The member states have to respect the following conditions: a minimum of 37% of expenditures dedicated to climate investments and reforms and a minimum of 20% of expenditures to foster the digital transition (European Commission, n.d.-c). The European Commission provides an online dashboard to track the investments made thanks to the money raised through NGEU green bonds (European Commission, n.d.-b). The transparency is guaranteed.

As soon as the plan is agreed, the member state receives 13% of the total allocation as an upfront payment a few days after the signature of the financing agreement. They will receive the remainder if they fulfill the milestones and targets as proposed in their plan (European Commission, 2022c).

If we take the example of Belgium, their “Recovery and Resilience Facility” (RRF) plan has been approved the 23d of June 2021. They will receive grants for an amount of 5.9 billion € which represent 1,24% of their GDP. The above conditions are respected because 50% of the Belgian RRF plan is dedicated to reforms and investments towards the green transition and 30% is allocated to the digital transition.

The following figure (Figure 1) describes the expected positive impacts of the Next Generation EU plan on the Belgian GDP. Moreover, Belgium will benefit in terms of GDP from the recovery plan of other member states. This is called the spillover effect (European Commission, n.d.-a).



Figure 1: Impacts of the NextGenerationEU plan on Belgian economy (European Commission, n.d.-a)

To investigate deeply on the impact of NGEU on economy and the spillover effect, Picek (2020) studied the economic effects of Next Generation EU. He investigated the increase in member states' GDP thanks to the plan as well as the spillover effect between member states. He used a static multi-regional input-output model to make predictions.

He found that in the best case Greece would increase his GDP 2020 (baseline) by 3,2% per year over the period 2021-2027 thanks to the NGEU grants. This would be the highest growth among EU member states. According to him the maximum effects of the NGEU plan are expected to be in 2023/2024 because 70% of the RRF grants will be paid (Picek, 2020).

Moreover, Picek (2020) reported that the economic effects are larger due to the spillover effects of the member state's expansion. The following graph (Figure 2) is interesting because it shows in green the effects on the GDP growth if each country runs its own expenditure program but no other member state runs their program at the same time. A simultaneous and cooperated response allows to increase the GDP growth thanks to the spillover effect which is clearly expected in Next Generation EU. We can see that the portion between domestic and spillover effect can vary a lot among EU countries. Some countries have a big portion of their GDP growth attributed to the domestic effects (Picek, 2020).

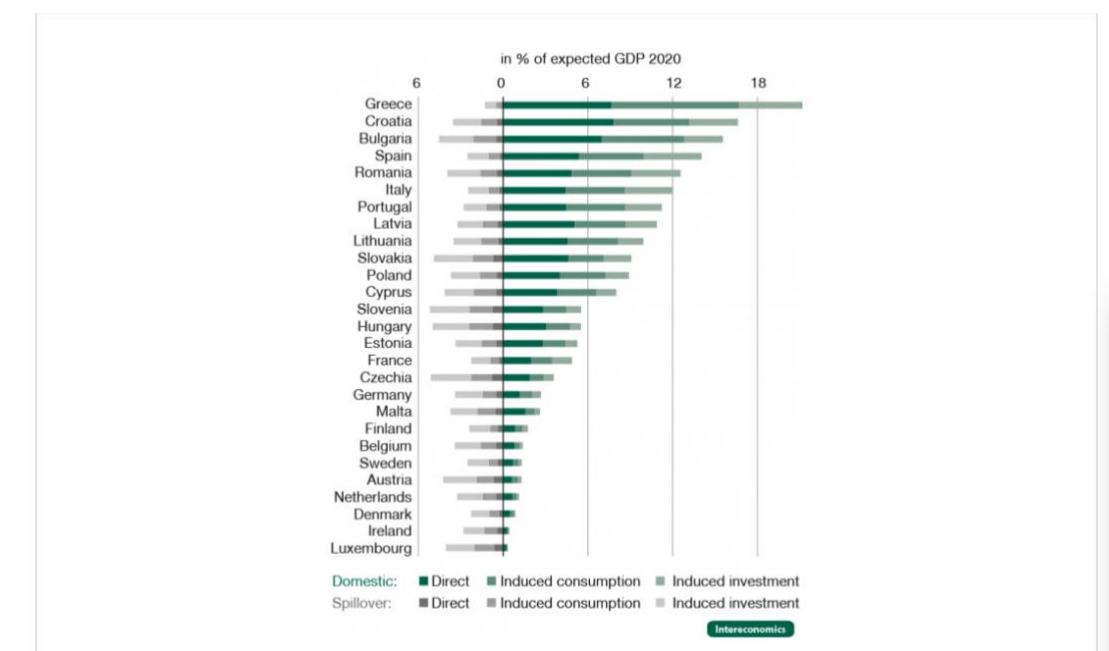


Figure 2: Decomposition of the cumulative GDP increases into a domestic (green) and spillover (grey) effect (Picek, 2020)

The European Commission carried out a similar study by quantifying the spillover effect. They simulated the level of real GDP growth with and without the spillover effects of NGEU. They found that in the case the NGEU program takes more time than scheduled the GDP would be 30% larger with spillover effects and the highest effect would be observed in 2026. In case NGEU would progress quicker than the plan the GDP would be 40% larger with spillover effects and the highest effect would happen in 2024 (Pfeiffer, Varga & Veld, 2021).

#### 2.4. Focus on the unprecedented financing of the Next Generation EU recovery plan

The financing of the EU's long-term budget has not changed and continues to be based on the following revenues as customs duties, the contributions from the Member States based on value added tax (VAT) and the contributions based on gross national income (GNI). However, in this master thesis we do not focus on the EU budget but rather on the unprecedented financing of the Next Generation EU plan. Indeed, to finance its plan the European Commission, on behalf of European Union, borrows large amounts on the markets on advantageous conditions thanks to the high credit rating of European Union (European Commission, 2020c). By issuing bonds and bills for an amount of around 150 billion € per year from 2021 until 2026, the European Union will be one of the biggest issuers in euros. This is a positive advantage for the attractiveness of the euro currency. The amounts raised will be redistributed among member states either under the form of grants or loans with low interests upon requests by member states and later reimbursed by them. But to deal with such large amount of borrowing the European Union had to adopt a diversified funding strategy with different instruments and funding techniques. It will allow to decrease the costs and risks thanks to the diversification and to attract a bigger panel of investors (European Commission, 2021d).

#### **Funding instruments:**

- *EU- bonds*: are bonds with variable maturities above 1 year (from 3 to 30 years). European commission chose to raise the amount through these newly issued bonds but also to be present on the secondary market, where existing bonds or stocks are traded, by increasing the amount of bonds already issued. Moreover, 30% of the bonds issued are green bonds (European Commission, 2021d).
- *EU- bills*: are also called "European union short-term debt securities " with a maturity lower than 1 year. A lower maturity allows the Commission to manage temporary

liquidity shocks by rapidly raising funds. The advantage for the investor is to invest in risk free and highly liquid assets issued by a well rated sovereign issuer (EU) (Christie, Claeys & Weil, 2021).

Therefore, EU-bills and EU-bonds are both debt securities but are differentiated by their maturity.

In the context of Next Generation EU borrowing, the Commission chose two different funding techniques to sell EU-bonds and EU-bills to investors: the syndication and auction which will be both developed further below. It is important to mention the use of a primary dealer network at the heart of the transactions. This is a group of credit institutions selected by the European Commission and rewarded by fees function of the volume securities sold. They have a role of managing the syndications and they take part to auctions. Commission cares to keep transparent relationships with the primary dealers. EU has the biggest Primary Dealer Network compared to major sovereign issuers with 41 institutions versus 24 in the United States (Christie, Claeys & Weil, 2021).

### **Funding techniques:**

- *Syndications*: This is the traditional technique for issuing debt. A group of banks from the primary dealer network proposes the debt securities to investors and creates an "order book of investor interest". This is the only way the Commission can have an eye on investors' interests and the bond price before the issuance. A second advantage of this technique for the EU Commission is that in case of no demand for the bonds the primary dealers sometimes guarantee the issuance, i.e. buy the securities (Christie, Claeys & Weil, 2021; European Commission, 2021d).
- *Auctions*: This technique is only used by governments. The commission itself proposes its debt to a group of banks via an efficient and safe electronic platform. Primary dealers have a role of advising the EU Commission regarding the terms and volumes of bonds. Investors have to make offers in a limited time. The highest bidder wins and the remaining offering goes to the next highest bidders in a descending order. This is the technique mostly used by big borrowers such as Germany and France and this is cheaper than syndications. Moreover, this is the only available technique to issue short-term debt securities and the cheapest technique because they have no fees to pay to primary dealers. However, it can be risky because Commission doesn't have an eye on the price traded or investor's interest. Only big borrowers can afford using this technique in

addition of syndication. So far only United States can afford to use **exclusively** this technique thanks to their excellent reputation. If the auction technique is chosen for **EU-bonds** there will be monthly transactions to increase existing bonds (tap) or issue new bonds (new). Concerning EU-bills the transactions will be executed twice a month (Christie, Claeys & Weil, 2021; European Commission, 2021d).

The following table (Table 3) summarizes the funding instruments and techniques.

Instruments	EU-bonds	EU-bills
	= bonds with variable maturities	= short-term debt instruments
	30% are Green bonds	
Maturity	>1 year : 3, 5, 7, 10, 15, 20, 25 and 30 years	< 1 year
Funding techniques	syndications or auctions	ONLY auctions
Transactions	monthly	twice a month

*Table 3: Summary of funding instruments and techniques*

The European Union has a high credit rating but it is important to protect the rating to keep EU debt attractive. The rating agencies Fitch and Moody's rated EU debt AAA while S&P computed an average of EU countries' rankings and obtained an AA rating (European Commission, 2022a). The European debt is safe because it has the advantage to be backed by the EU budget.

In the past, European Union already issued euro bonds on the international capital market with successful results but never for such amount issued in the context of Next Generation EU stimulus package. NGEU borrowing is used for loans but for the first time for grants too. NGEU debt is guaranteed by EU countries. Issuance began in June 2021 and the reimbursements will be executed between 2028 and 2058 (Christie, Claeys & Weil, 2021). The European Commission wants to foster transparency and that's why it will publish its semi-annual financing plans as well as the annual borrowing decisions (European Commission, 2021d). The Appendix 1 contains an extract from an example of semi-annual financing plans between January and June 2022 (European Commission, 2021c).

## 2.5. Analysis of the first EU-bonds issuance

The first Next Generation EU bonds were issued the 15th of June 2021 for an amount of 20 billion € raised. This represented "the largest amount ever borrowed in the history of the EU" according to the European Commission (European Commission, 2022b, p.2).

The Figure 3 coming from European Commission summarizes the key information from this first issuance. Seven banks from the Primary Dealer Network were involved such as BNP Paribas. The order book represented 142 billion €, it means the bonds were 7 times oversubscribed but oversubscription alone is not a mark of success according to Christie et al. (2021). When looking to the type of investors, fund managers represent the biggest share with 37% followed by central banks with 23%. The investors were also relatively well balanced in term of geographical zone.

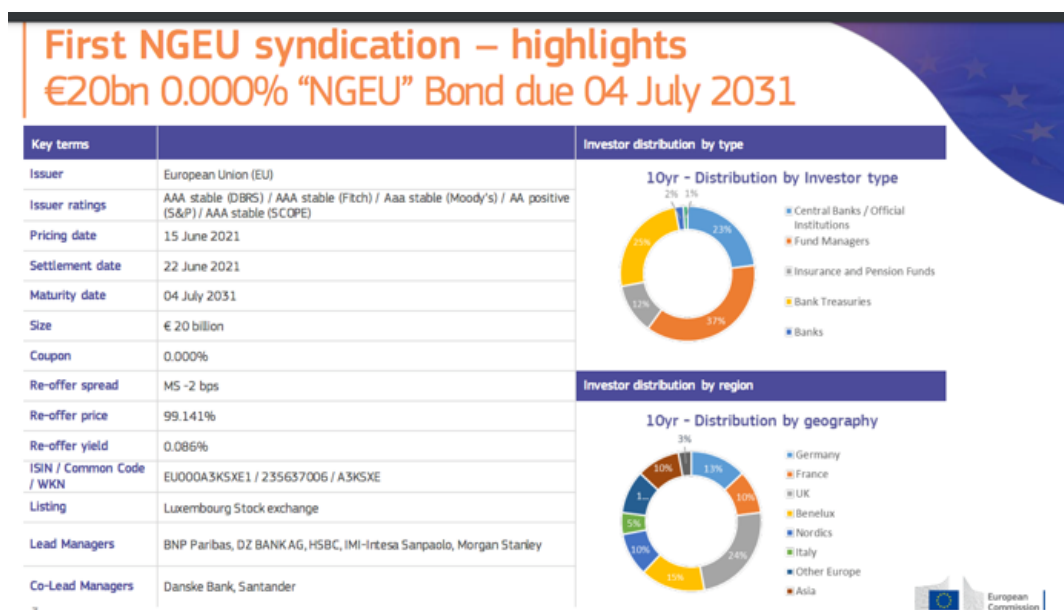


Figure 3: Summary of the first NGEU syndication (15<sup>th</sup> of June 2021) (European Commission, 2022b)

## 2.6. Capital market in European Union

The European Union is a group of 27 member states gathered for economic and political purposes created in 1993. The European economic and monetary union (EMU) was created in 1992 around a common currency, the euro, and gathering 19 member states. European Central bank is in charge of the monetary policy for these 19 member states (European Central Bank, 2020). Following the 2008 crisis, the banking union was created to ensure stability in banking sector in euro zone but this is not yet completed. However, The EMU needs not only a banking union but also a fiscal union.

Indeed, introducing a European fiscal union under the management of a European central government would solve many fiscal challenges that EU and EMU are facing. A Union would allow to be more resilient to some shocks as well as facilitating a policy mix (the combination of fiscal and monetary policy) (Barbier-Gauchard, Sidiropoulos, Varoudakis, & Grauwe, 2018).

The European Union is the only example of monetary union which did not lead to a fiscal union. Micossi (2020) argued that it was an artefact to believe that the monetary union can survive without some dimensions of a fiscal union. We need to implement some joint sovereign risk sharing for example in case of sovereign debt default in the presence of a common currency (Micossi, 2020).

The covid crisis brings back the debate on fiscal union as well as on the emergency to continue the objective of capital markets union for the European Union.

### 2.6.1. What is the capital markets union?

Getting a more integrated financial system involves the completion of the banking union and the construction of a capital markets union. Before explaining what the capital markets union is, it is important to understand what is the capital market and the financial integration.

First, the financial market is composed of four markets which include the monetary market, the derivatives market, foreign exchange market and capital market. Federation of European Securities Exchanges gives a clear definition of capital markets which are “the venues where savings and investments are channeled between the suppliers who have capital and those who are in need of it” (FESE, 2019).

The capital market includes **equity** and **debt** market, each of them separated in public and private market as the following table (Table 4) on the typology of capital market shows.

	<b>Public markets</b>	<b>Private markets</b>
<b>Debt markets</b>	Bond markets	Private placement
<b>Equity markets</b>	Stock markets	Private equity

Table 4: Typology of the capital markets (European Commission, 2015)

**Private placement** is the sale of securities to pre-selected investors and involves few regulatory requirements (Ganti, 2022). **Private equity** is the capital investment in private companies not listed on a public stock exchange (Wood, & Wright, 2009). **Stock market** is the sale or purchase of shares of publicly held companies. **Bond market** is the market where we sell and buy bonds (Morvan, 2017). The equity and debt can be traded either on the *primary market* where new bonds or stocks are sold or bought or *secondary market* where existing bonds or stocks are sold or bought. The main roles of the capital market are to raise capital and invest. It allows to diversify the investments’ portfolio in order to decrease the risk. The principal investors in the capital market are the retail investors (households) and the institutional investors who invest money on behalf of people (European Commission, 2015).

The following figure (Figure 4) describes the functioning of the capital market.

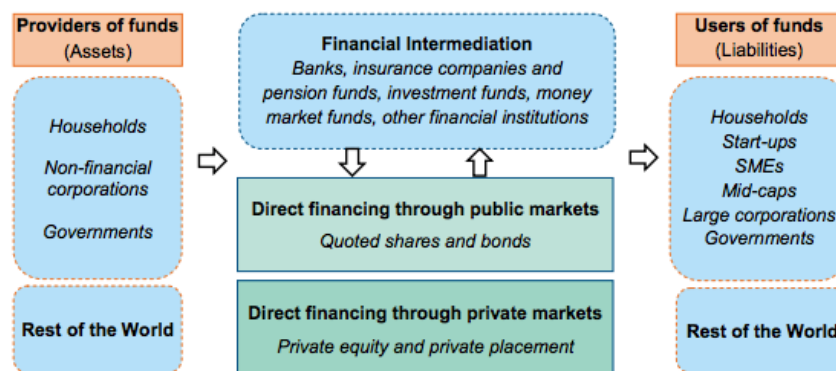


Figure 4: Stylised view of capital markets in the broader financial system

(European Commission, 2015)

**Financial integration** is another important term to define because a more integrated financial system contributes to the progress towards a capital markets union. The European Central bank gives a summarized definition: the financial integration is “the extent to which financial services are available under the same rules and conditions in all countries that use the euro. In a well-integrated financial system, assets with the same risk-return characteristics cost the same, irrespective of the country in which they are traded” (European Central Bank, 2022).

Regarding the **capital markets union**, it is an initiative launched in 2014 by Jean-Claude Juncker, the president of the European Commission at that time, to create a single market for capital. His idea was based on the observation that companies are financing themselves through debt funding, essentially through banking loans. Indeed, they have no other option because there is a strong lack of capital market integration which reduces the choice of financing (Boldeanu, & Tache, 2016).

According to the definition of the Council of European Union, an integrated capital market “offers new funding sources for companies and especially SME, reduces cost of capital, attracts foreign investors, expands investment possibilities, supports long term investment projects and strengthens the stability, resilience and competitiveness of the financial system” (Council Of The European Union, 2022). However, a capital markets union requires harmonization through a centralized power body in order to be effective (Guindos, Panetta, & Schnabel, 2020). A capital markets union would represent a more stable funding structure.

## 2.6.2. How did the financial integration and capital market develop in European Union until now?

The Euro area capital market is interesting to analyze in comparison with the well-developed capital market in the United States.

The European Central Bank (2022) observed that the Euro area is mainly financed through loans and unlisted shares. The United States are on their side mainly financed through capital market.

The left graph of the Figure 5 here below shows that equity financing of the euro area is mainly composed of unlisted shares, i.e. not listed on stock market contrary to US mainly composed of listed shares. Listed shares have the advantage to benefit from a well-regulated and transparent environment.

Regarding the private equity, venture capital and business angels the gap is huge between Euro area and United States on the right graph (Figure 5). The **venture capital** is a subset of private equity and represents the investment in the risky capital of innovative young and growing companies. **Business angels** is the investment by a professional and private investor into the high risky capital of an early stage and innovative company. Moreover, its role is to support the company in its development. These types of financing need to be improved because they are essential to support the growth of young and innovative companies. (European Central Bank, 2022). In comparison to Euro area, the United States make intensive use of the capital markets.

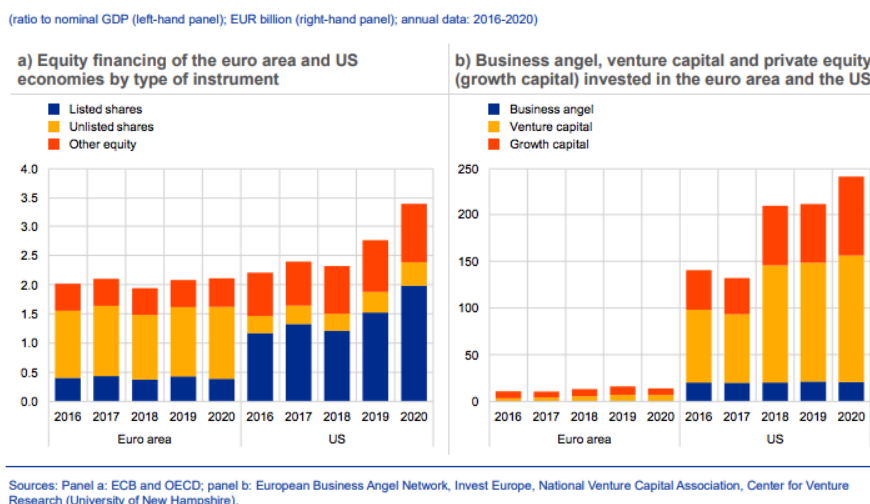


Figure 5: Comparison of the equity financing by Euro area and the US (European Central Bank, 2022)

As reported by Demertzis, Domínguez-Jiménez & Guetta-Jeanrenaud (2021), Venture capital in US (0,633% of GDP) is 10 times higher than in EU (0,044 % of GDP). Moreover, the authors studied that the high acquisition rate of European high-tech companies by US is due to the lack of venture capital. And high-tech companies contribute to the dynamism of the market.

Regarding the market capitalization (total market value of shares of stock) it represented only 9 trillion € in European Union against 37 trillion € in the United States. This is four times more (Camilli, & Thomadakis, n.d.).

Therefore, figures show that the European capital market needs to be developed and this requires a change in investor habits. Indeed, they are not used to take risks and they are large savers. (European Central Bank, 2022).

It is now interesting to analyze how European financial integration reacted to the covid crisis. To measure it we use the composite indicator of financial integration from ECB. It is composed of the price-based and the quantity-based indicator (Figure 6). The price-based indicator “requires that assets with identical risk and cash-flows should have the same price, regardless of the country where they are issued or traded” (Hoffmann, Kremer, & Zaharia, 2019, p.10). It is constructed on a selection of 10 raw indicators that cover four markets (bond, equity, money, banking markets). A higher dispersion of prices represents a weaker financial integration. The quantity-based indicator is calculated using intra euro area cross border security holding as share of euro area total holdings. It is constructed based on 5 raw indicators from 3 markets (bond, equity and interbank markets) (Hoffmann et al., 2019). We focus here on the price-based indicator because price data are more available and can be obtained at a higher frequency of observations than quantity data. The composite indicator is constructed so as to have an index from 0 to 1.

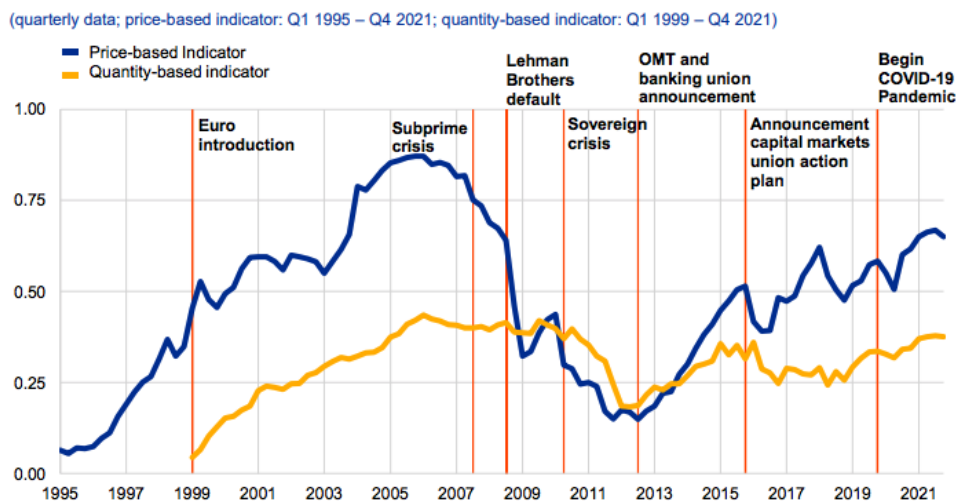


Figure 6: Price-based and quantity-based financial integration composite indicators  
 (European Central Bank, 2022)

The following graph (Figure 7) represents the previous price-based indicator on the period January 2004 – January 2022 with a visualization of the indicators composing this price-based composite indicator. It allows to directly identify the banking market as the most integrated during the 2008 crisis. Regarding the covid crisis bond and banking markets are the most integrated markets. The bond market seems to have increased as a consequence of the covid crisis.

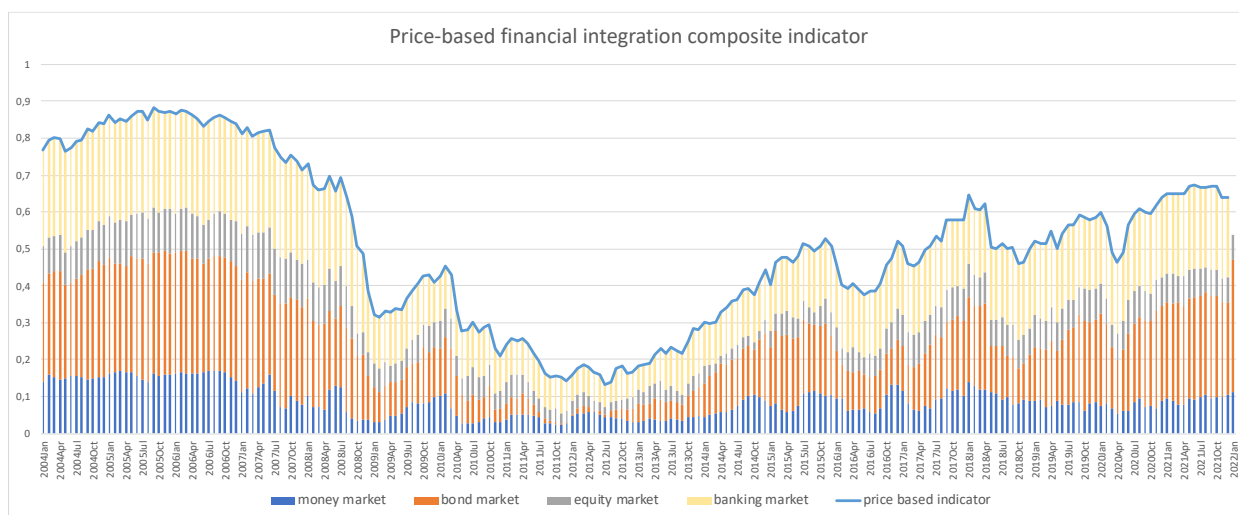


Figure 7: Decomposition of the price-based composite indicator based on ECB data  
 (European Central Bank, 1995-2022)

The following graph (Figure 8) is a high frequency price-based indicator during the covid period.

(daily data, 3 February 2020 – 23 February 2022)

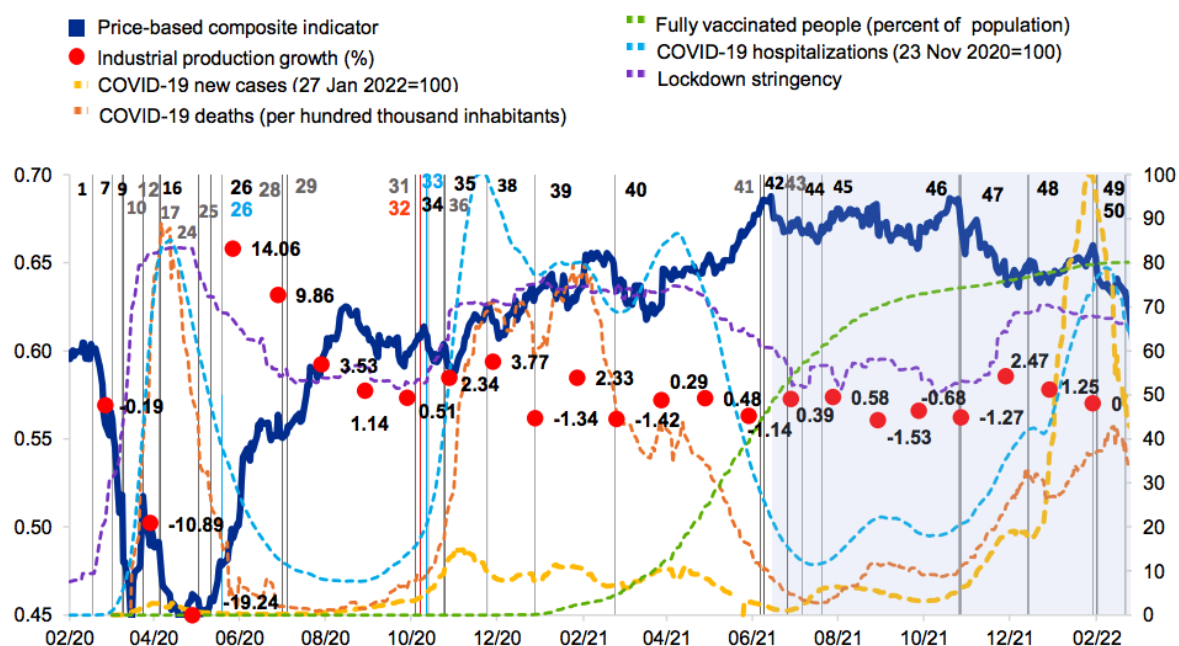


Figure 8: Euro area price-based financial integration composite indicator on the covid-19 period (European Central Bank, 2022)

In the ECB economic Bulletin of 2020, Borgioli, Horn, Kochanska, Molitor & Mangelli analyzed the financial integration on four phases of the covid-19 crisis in 2020. The first phase is between January 30 and March 25, the second phase is between March 26 and May 7, the third phase is between May 8 and July 21 and the last phase is from July 22 to September 15. At the beginning of covid crisis (1<sup>st</sup> and 2<sup>nd</sup> phase) the authors observed a sharp fragmentation of the financial integration, especially in the bond market. The 3<sup>rd</sup> phase represents the relaxation of lockdown measures, the increase of the size of the Pandemic Emergency Purchase Program (event 26: ECB PEPP expansion on the Figure 8) and the agreement on Next Generation EU recovery plan (event 25: 27 May 2020). During this third phase the price-based financial integration composite indicator increased suddenly strongly. The four markets representing this composite indicator are the equity, bond, money and banking markets. Authors reported a general increase of the financial integration of these four markets but the highest positive effect was observed in the bond market (Borgioli et al., 2020).

On the Figure 8, after the sharp decrease, the re-integration of the price-based indicator returned to the pre-crisis level and even more to the 2008 level. Borgioli et al. (2020) reported it was due to “the unprecedented amount of monetary and fiscal stimulus” put in place. For the authors, “the European joint fiscal response (through the debt mutualization) is a milestone which reinforces financial integration” (Borgioli et al., 2020). Moreover, the general director of market operations of ECB, Imène Rahmouni-Rousseau, highlights during a debate organized by the think tank Bruegel on the 29<sup>th</sup> of June 2021 “the strong impact of just the announcement of the ECB PEPP expansion as well as agreement on Next Generation EU had on the stabilization of the market” (Bruegel, 2021).

These events show also that aligning the monetary and fiscal policies is very powerful in time of crisis (European Central Bank, 2022).

### 2.6.3. Why do we need a capital markets union?

First, the recourse to the banking system is not enough to finance the recovery after the covid crisis. It should be supplemented by a more integrated capital markets involving the progress towards the capital markets union (CMU) in order to reach a **long-term strong recovery and growth after the covid crisis**. Indeed, in a working paper on financial integration in Europe, Hoffmann et al. tested a OLS regression between financial integration and economic growth (the dependent variable) and they found a positive relation (Hoffmann et al., 2019).

By developing the CMU, EU has also to complete the banking union at the same time. A more integrated capital markets could support a more integrated banking system and vice versa according to Constâncio (2017). Moreover, a CMU could make the **economy less reliant on the banking system** and therefore less vulnerable to lending tightening, especially in times of shocks such as covid crisis (European Commission, 2015).

Secondly, the progress towards a CMU allows **supporting the transition towards a sustainable and digital economy**. Indeed, only capital markets can gather the huge investment needed to achieve this transition (European Commission, 2020f).

A digital economy allows the companies to **remain competitive** in an era of technological growth. European Central Bank (2022) and Demertzis et al. (2021) argue that private and public equity markets are more suitable to finance high growth/innovative sectors (such as high-tech

companies) compared to the financing through bank loans. These types of companies often hold more intangible capital which can only be funded by capital markets (Demertzis et al., 2021). Indeed, this is due to the fact that the young companies imply some risks. Capital market is more suited here because the investors are compensated for the risk with higher expected yields. On their side, banks are more reluctant to fund these projects because of a low creditworthiness. Moreover, as reported by de Haas R. and Popov A., (2019) a financial system based more on equity funding involves also positive impact on the environment by reducing the carbon emission. Stock markets are more suited to lead investments towards less polluting activities compared with banks (de Haas, & Popov, 2019).

Moreover, the **opportunity for a company to be funded through the capital market increases the number of young companies with high growth potential.**

By the same time, developing the young and innovating firms can bring a number of benefits to the economy such as increasing the employment rate (Alonso-Borrego, & Collado, 2002).

However, the country risk premium limits the development of the equity market. A country risk premium is the additional return given to investors facing higher risk. This is the difference between the return on equities and the risk-free rate. Demertzis et al. (2021) reported the risk to invest in the European equity market compared with US considering a higher European risk market premium. Therefore, European companies have to guarantee higher returns to investors in order to get it financed. It limits the supply of equity (Demertzis et al., 2021).

Consequently, it is essential to guarantee to companies a wide, diversified and affordable access to funding because it is at the heart of their development, their capacity to innovate and to create new jobs (European Commission, 2020f). CMU could allow an easier access to funding for all types of companies (Demertzis et al., 2021).

Thirdly, an integrated capital market allows the economy to be **more resilient to shocks** and could protect the European economy in future crisis. Milano (2017) found that well developed capital markets better absorb the shocks as proven in US during the Great Financial Crisis where capital markets absorbed 22% of the shock. It would also increase the private risk sharing between the countries and limits the asymmetries during the recovery in the context of covid crisis (Guindos et al., 2020). Indeed, a single market for capital offers same conditions and same access to all countries.

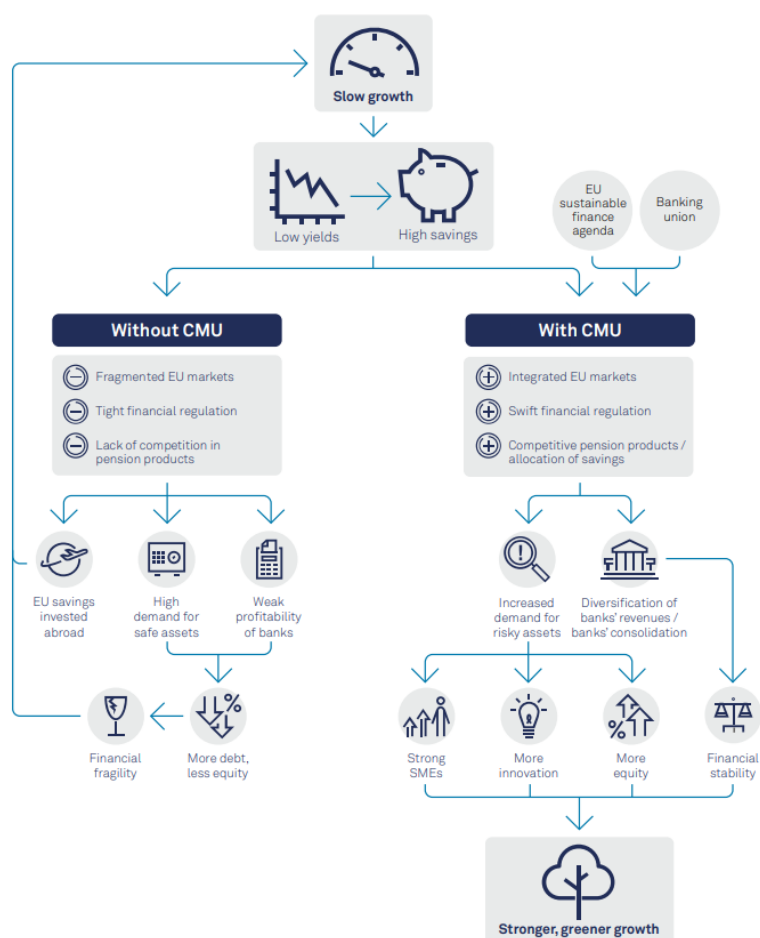
In addition, a capital markets union would allow the economy to be **more competitive and attracting foreign investors** (European Commission, 2020f). It would **strengthen the international role** of euro. For now, the euro lags behind dollar in terms of international role. Indeed, Claeys & Wolff (2020) reported that one of the determinants of global currency status is the existence of a developed, liquid and deep financial market. But compared to US the euro area's capital market is less developed and highly fragmented between countries (Claeys & Wolff, 2020). The intense development of securities issuances denominated in euro thanks to the creation of a CMU could improve the euro's international role and maybe have the opportunity to surpass the dollar (Micossi, 2020).

Another reason why we need a capital markets union is the withdrawal of United Kingdom from European Union. This country was the financial center for the capital market transactions in EU (Micossi, 2020).

Finally, we need a capital markets union in order to allow people to **save and invest at long-term**. For example, it could be the possibility for households to build up a better pension compensation (European Commission, 2020f).

To summarize, the capital markets union will benefit to all Europeans with access to more diversified options in terms of investment and savings. The Figure 9 below represents the EU economy situation with and without CMU.

The covid crisis emphasized the urgency to make progress towards the objective of capital markets union. Indeed, the public measures as well as the banking loans helped to face the urgent needs but in order to face the long-term societal and environmental challenges, people and enterprises have to rely on a stable and available funding (European Commission, 2020f). In the next section we describe and discuss the influence of NGEU recovery plan on the objective of capital markets union.



Source: S&P Global Ratings.

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Figure 9: EU economy after the covid crisis with and without a CMU (Broyer, & Doyle, 2020)

#### 2.6.4. Influence of the NGEU recovery plan on the objective of Capital Markets Union

The NGEU financing uses EU bonds and EU bills listed on the Luxembourg Stock exchange market in order to raise the funds. First, The NGEU bonds are rated AAA by Fitch with a return a little higher than German Bunds (European Commission, 2022a). Secondly, EU bills are highly demanded thanks to their short maturity. This new financing of the recovery plan is not only a way to recover from crisis but is also an opportunity for the development of European capital market and CMU.

First, in order to reach the Capital Markets Union the European Union needs **a safe asset**. They are particularly highly demanded in times of shocks because they keep their nominal value, are liquid and the credit risk is low compared with other assets (Habib, Stracca, & Venditti, 2020). However, there is a shortage of safe assets in EU.

The American capital market is well functioning because they have a safe asset, the “Treasury Bonds” which allow to fix the base rate. European union doesn’t benefit from a European safe asset due to a highly fragmented market between countries. The financial fragmentation means that same financial instruments are priced differently in the member states. The interest rate gap between member states’ sovereign debts is large. The financial fragmentation represents a huge barrier to the implementation of a European safe asset and therefore limits the progress towards CMU and the internationalization of euro (Micossi, 2020). A permanent European safe asset would allow to have a benchmark index for the European bond market in order to price those bonds in euro currency and fix the interest rates. This is the solution to harmonize the funding conditions for companies across EU (Christie et al., 2021). Moreover, it can improve the financial integration. According to Gossé and Anass (2021), safe assets in EU represent only 37% of the GDP contrary to 89% in US. Until now the safe assets in EU for investors were the German bunds and French OAT (French government bonds).

EU safe assets represent a step towards the CMU objective according to the High Level Forum on the Capital Markets Union (2020). The NGEU bonds represent 5,4% of EU GDP in 2019 (Amiot, 2020) and are issued by European Union, one of the safest issuer. However, the European debt has to grow even more to reach a sufficient amount able to offer sufficient liquidity on secondary market (Le Quéau, Madeline, & Sabalot, 2022). This is not sufficient to solve the issue of scarcity of EU safe assets according to Global Capital (2021). It has also a long way to go before reaching the efficiency of German Bunds or French OAT.

Indeed, NGEU bonds have a higher bid ask spread and more volatile prices compared to German bunds and French OAT. The Bid is the highest price investor is willing to pay (the demand) and the Ask is the lowest price seller is willing to sell (supply). Higher spread means larger differences between supply and demand. A liquid market is a market where a lot of securities are traded without causing large movements in prices which involves lower bid ask spread. Therefore, high spread for NGEU indicates lower liquidity. Increasing the volume of NGEU securities traded would increase the liquidity and decrease the spread. Bonds will be more liquid with prices being less volatile.

Moreover, the issuance of EU debt in the context of NGEU recovery plan is a first step to **strengthen the international role of euro**. An important requirement mentioned by Micossi (2020) for the internationalization of the euro is the existence of liquid safe government bond market. This is linked with the previous paragraph which identifies NGEU bonds as a first step

towards a massive and permanent euro-denominated safe assets issuance from the monetary union. It would allow to attract foreign investors and to strengthen the international role of the euro in the face of the dollar. Micossi (2020) adds the importance of getting a more developed capital market by completing the banking union as well as the capital markets union in order to strengthen the euro as an international reference currency. Some further changes to the institutional framework of the monetary union will also be needed in order to place the euro as a major international currency (Claeys, & Wolff, 2020).

Another important positive influence of NGEU concerns the green transition. In the context of the recovery plan, European Union plans to raise 30% (250 billion) of the funds through the issuance of **NGEU green bonds. It represents the biggest green bond issuance in the world.** Therefore, EU could become the first issuer of green bonds (European Commission, 2021g). The first issuance of NGEU green bonds on the 12<sup>th</sup> of October 2021 was a success. They were 11 times oversubscribed (Christie et al., 2021). Moreover, Europe benefits from already being the headquarter of the green capital markets. Indeed, Pailler (2022) reported that 51% of green bonds in 2020 were issued by Europe. Christie et al. (2021) highlighted the role of euro as global currency for green finance. This is a developing and high potential market because people are more and more committed to fight the climate change. In 2020, green bonds represented 3 times the green loans.

According to Christine Lagarde, *“the green transition offers us a unique opportunity to build a truly European capital market that transcends national borders – or what I would call green capital markets union (CMU)”* (Lagarde, 2021). Therefore, these NGEU green bonds being part of the green transition are steps towards the CMU.

However, when we deal with green finance there is always a risk of greenwashing. But the new green regulation implemented by European Union reduces this risk by creating a new label “European Union green bonds” (EUGB) and implementing rules in order to monitor green investments. The green bonds will be standardized around the new European taxonomy. This new European regulation has the ambition to expand around the world (Pailler, 2022).

However, if EU becomes a large issuer of safe assets, we can wonder what the impact will be on the national debt. The debt issued by European Union musn’t represent a barrier to the issuance of sovereign debt. As reported by the general director of the Spanish treasury during a Bruegel (belgian economic think tank) debate on the 29<sup>th</sup> of June 2021, the size of European investors’ portfolio is limited by availability of safe assets such as German Bunds.

But if we add EU debt, people can increase the size of their portfolio. Moreover, the introduction of EU debt can attract large investors such as Asian investors (Bruegel, 2021).

He used an example to prove the high demand for EU debt as well as sovereign debt from investors. Indeed, “the EU raised 20 billion € through bonds the 22nd of June 2021 for a demand of 142 billion € and it was one week after Italy issued bonds for 10 billion € and a demand of 65 billion € and one week before Spain issued bonds for 8 billion € and a demand of 74 billion €. Therefore, the market absorbed 38 billion € with same maturity within 2 weeks and with stable prices” (Bruegel, 2021).

To summarize the literature identified some links between the NGEU recovery plan and the Capital Markets Union objective. NGEU recovery plan and the CMU strategy go both in the right direction.

## 2.7. New capital markets union action plan 2020

The 2007-2009 financial crisis as well as the sovereign debt crisis already warned on the need to improve the financial stability and decrease the banking dependency. But despite the CMU initiative, the progress is too slow and the covid crisis highlighted once again the urgent need to accelerate the transition towards a capital markets union because we remain still too dependent on bank financing (Sapir, Véron, & Wolff, 2018). Moreover, we still see some major obstacles to the CMU such as the monitoring, the taxation and the insolvency law (European Commission, 2020f).

In 2019 Commission created a High-Level Forum, an expert group, in order to progress towards the objective of CMU and finalize it. In June 2020 they published a final report on the capital markets union with 17 mutually reinforcing recommendations on what should be urgently done (High Level Forum, 2020).

Indeed, CMU is needed by the economy to recover and grow at long term. A first action plan for CMU was issued in 2015 and some progress have been made since. But some challenges remain and new challenges appeared due to the covid crisis.

Therefore, European Commission submitted a new action plan on the 24<sup>th</sup> of September 2020 based on 16 actions aiming 3 big objectives following the recommendations of High-Level Forum (European Commission, 2020a):

- Objective 1: “Support a green, digital and inclusive and resilient economic recovery by making financing more accessible to European companies” (European Commission, 2020a, p.6)
- Objective 2: “Make the EU an even safer place for individuals to save and invest long-term” (European Commission, 2020a, p.6)
- Objective 3: “Integrate national capital markets into a genuine single market” (European Commission, 2020a, p.7)

Objective 1	Objective 2	Objective 3
<b>Action 1:</b> making companies more visible to cross-border investors	<b>Action 7:</b> empowering citizens through financial literacy	<b>Action 10:</b> alleviating the tax associated burden in cross-border investment
<b>Action 2:</b> supporting access to public markets	<b>Action 8:</b> building retail investors' trust in capital markets	<b>Action 11:</b> making the outcome of cross-border investment more predicatable as regards insolvency proceedings
<b>Action 3:</b> supporting vehicles for LT investments	<b>Action 9:</b> supporting people in their retirement	<b>Action 12:</b> facilitating shareholder engagement
<b>Action 4:</b> encouraging more LT and equity financing from institutional investors		<b>Action 13:</b> developing cross-border settlement services
<b>Action 5:</b> directing SMEs to alternative providers of funding		<b>Action 14:</b> consolidated tape
<b>Action 6:</b> helping banks to lend more to the real economy		<b>Action 15:</b> investment protection and facilitation
		<b>Action 16:</b> supervision

*Table 5 : Table summarizing the actions planned per objective (European Commission, 2020a)*

The aim of the NGEU recovery plan “creating a green, digital, inclusive and resilient economic recovery” is at the heart of the objective 1 of the new CMU action plan.

This action plan aims at reducing some barriers to financial integration. Following this action plan the European Commission’s staff published a working document called “Monitoring progress towards a Capital Markets Union: a toolkit of indicators” (European Commission, 2021a). This document lists indicators based on the 3 objectives mentioned above in order to track the progress towards the CMU objective.

A positive influence of the financing of NGEU on the progress towards a CMU has already been identified in the literature review. We also observed the strong and positive impact the agreement on NGEU recovery plan had on the financial integration. But the impact of NGEU financing on the CMU objective as well as the CMU measures taken in the 2020 action plan will take time to materialize. So far only 20 out of 33 measures of the 2015 action plan have been implemented (Broyer, & Doyle, 2020).

Therefore, in the next section we develop a composite indicator of progress towards the CMU objective based on the new 2020 objectives of the CMU. It will track the progress of the CMU as of now and in the future and will also be used to monitor the future CMU progress resulting from this EU unprecedented recovery plan. The idea to create this composite indicator is also based on the observation that no graph is currently available to visually summarize the progress of the CMU over the time.

### 3. Empirical Analysis

#### 3.1. Methodology

A composite indicator is the compilation of several indicators into a single indicator. This is useful to aggregate several dimensions. This is a strong policy analysis tool. In order to construct the composite indicator we use the “handbook on constructing composite indicators” (OECD, 2008) proposed by OECD and the “Tools for composite indicators building” (Nardo, Saisana, Saltelli, & Tarantola, 2005). The composite indicator will have the possibility to be updated each year to observe the progress.

The construction of the composite indicator requires to respect the following steps:

##### 3.1.1. Theoretical framework

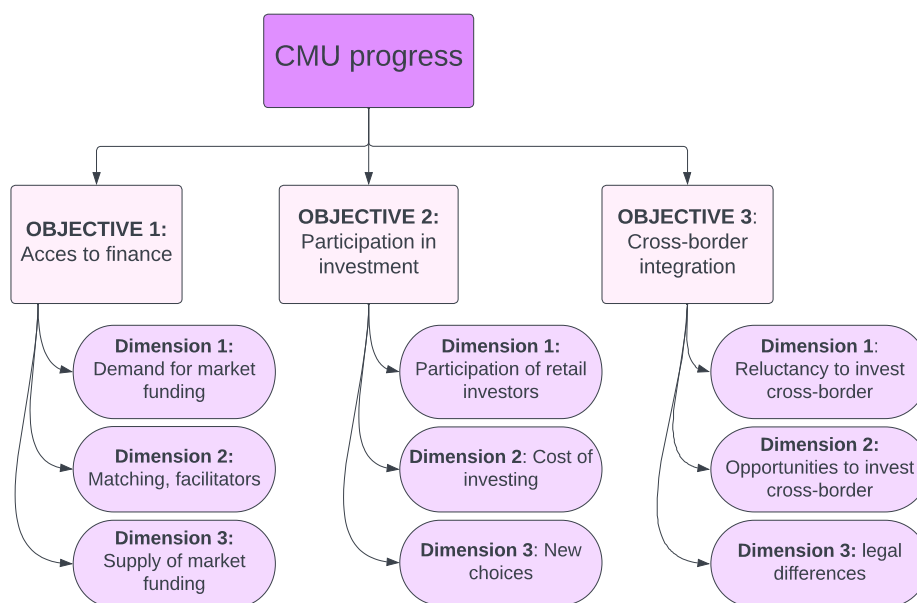
###### Concept:

In the context of the progress towards CMU the use of a composite indicator to measure this progress is appropriate. The progress combines very different dimensions. A composite indicator will allow to summarize the dimensions and easily interpret the progress. In the literature different papers studied the CMU progress through several indicators interpreted separately. But no single composite indicator summarizing the different dimensions of the CMU progress has been created until now. The developed composite indicator will enable to

visually observe where the European Union stands in term of capital market integration and will help to set priorities. The 2020 CMU action plan summarizes three new objectives. On the basis of these new objectives we select the indicators constituting the composite indicator.

Sub-groups:

The EU Commission staff describes in its working document the dimensions covered by the indicators for each objective. The figure (Figure 10) below summarizes the objectives and dimensions.



*Figure 10: Objectives and dimensions covered by the indicators*

The EU commission chose its indicators based on another document from the European Commission “study for the creation of a CMU indicators dashboard” which screened 150 possible indicators (European Commission, 2020d). They came out with 34 indicators to monitor the progress related to the 3 objectives.

We select the indicators in order to cover each dimension by at least one indicator. Data availability and relevance will be the other criteria of selection. The selection of the indicators is based on some subjectivity but will remain in link with the indicators proposed by the Commission staff working document.

### 3.1.2. Selecting variables

In this step we select the indicators and check their relevance in the composite indicator.

The European Commission provides the data related to its list of indicators monitoring progress towards the CMU (European Commission, 2021b). Therefore, we take some of these data and complete them with other sources of data. The data are coming from International Monetary Fund, ECB, Refinitiv, Eurostat, Invest Europe, FESE, ESMA, Bloomberg. Sometimes we take proxies of the indicators provided by European Commission's staff when some data were not yet published.

For example, in the objective 1 the 2020 data for the market funding ratio was missing. Therefore, we compute a proxy indicator with data available for each year.

In the future, the selection of the indicators used to construct the composite indicator will evolve because some indicators will be replaced, improved or added in function of the new priorities. Moreover, some data not yet published will be available later.

Regarding the sample we have selected annual data from 2015 until 2020. This is the time range chosen in the Commission staff working document because the first CMU action plan was published in 2015 (European Commission, 2021a). It is interesting to analyze the progress since its launch. The 2020 year represents the covid crisis and the publication of its recovery plan as well as the publication of the new CMU action plan. Because of some data not yet published for 2021 we will only highlight in the section 3.2.2. the main trends for the year 2021 for the indicators with available data and we will make predictions.

#### 3.1.2.1. Data description

*Objective 1: “making financing more accessible to European companies”* (European Commission, 2020 a, p.6)

The 2020 CMU action plan focus its attention on improving the access to **small and medium sized enterprises** (SMEs). Companies can obtain funding through bank lending but also through the market by issuing equity or debt on the capital market. This latter market is not yet well developed in European Union.

The Commission staff working document selected indicators covering the Non-financial corporations (NFC), the SMEs and the banks for each dimension. We try to cover each dimension for each actor. The table below (Table 6) summarizes the indicators we use as representatives of the objective 1 and are classified according to the different dimensions:

	Demand for market funding	Matching, facilitators	Supply of market funding
Non-financial corporations' bonds and shares	Market funding ratio	private equity investment	lack of data
Financing of SME	Use of equity	bid ask spread SME equity + venture capital	breadth of venture capital investor base
Banks' lending capacity		securitisation	

Table 6: Summary of the indicators for the objective 1

The only dimension we couldn't cover was the supply of market funding for non-financial corporations' bonds and shares because of a lack of data.

The “**market funding ratio**” (in %) measures the share of listed shares (equity funding) and corporate bonds relative to bank loans in the funding structure of **NFC** (non-financial corporations) (European Commission, 2021a). This indicator allows to monitor the use of market funding. It does not include the other funding instruments (financial liabilities) of NFC such as unlisted shares, trade credits, etc.

$$\frac{\text{listed shares} + \text{corporate bonds (LT debt securities) issued by NFC}}{\text{listed shares} + \text{corporate bonds} + \text{bank loans to NFC}}$$

NFC =Non-financial corporations

The data are coming from Eurostat (“financial balance sheets - annual data” (Eurostat, 2012–2021). The data are consolidated in order to avoid including inter-sectoral holdings. It is important to select in the database of Eurostat the financial position “LIABILITIES” because the funding of NFC is accounted in the liability side of their balance sheet. The 2021 data is not yet released. The listed shares, corporate bonds and banking loans are expressed in outstanding amount in Million €. Outside the eurozone area the national currencies are converted in € using historic exchange rates.

The “**private equity investment**” indicator is represented by the annual private equity investment by NFC relative to nominal GDP (in %). It includes venture capital. Investing in private equity means an equity investment in the private companies' capital. Here we focus only on the investment by NFC (European Commission, 2021a). Private equity data are coming from a report called “**Investing in Europe: private equity activity 2021**” released the 3<sup>rd</sup> of May 2022 by “Invest Europe” (InvestEurope, 2022). The report is an annual survey.

In the objective 1 of the composite indicator we choose to include more indicators related to SMEs because they are at the heart of the objective 1 of the new action plan.

The SME's are very important in the competitiveness of the European Union. In 2019, they represented 99,8% of the NFC (Eurostat, 2011–2020). However, they lack of access to funding compared to large enterprises. SMEs are mostly financing themselves on banking market. However, Kraemer-Eis et al. (2017) mention two reasons for credit rationing in bank loans to SMEs. First, the SMEs are less able to provide a collateral (a financial guarantee and signal of credit worthiness) for bank's loans. Secondly, the credit market information asymmetries are higher for SMEs and it requires high costs to monitor them.

The Capital markets union target aims to improve the SMEs financing by offering a wider set of funding options as well as strengthening the bank lending, the most important funding of SMEs (Floyd & McManus, 2005). Diversifying the financing options is represented by the action 5 “directing SMEs to alternative providers of funding” (Table 5) of the objective 1. Strengthening the bank lending is represented in the action 6 of “helping banks to lend more to the real economy” (Table 5) through the securitization.

As reported by Floyd and McManus (2005), the SMEs are younger and more prone to improve their innovation compared to large firms. They play a huge role in the EU competitiveness vs United States for example.

The indicators to track the progress of the SME funding are the following:

The “**SME use of equity**” indicator represents the percentage of firms claiming “equity is relevant for them, they used it in the past or consider using it in the future” (in % of total SME) (European Commission, 2021a, p.27). The indicator covers the public and private issuance of equity. We take the data provided by European Commission in the “[Overview of CMU indicators](#)” working document (European Commission, 2021b). Data are based on a yearly survey conducted by ECB and European Commission. This survey called SAFE aims to improve data on SMEs following the observation of a lack of information on SMEs (European Commission & European Central Bank, n.d.). As reported by European Commission, the covid crisis should have an effect on this indicator because the companies will face higher indebtedness which can be reduced thanks to issuing of equity (European Commission, 2021a). Moreover, the action 2 in the new action plan (Table 5) aims at creating a regulatory framework supporting access to public funding for SME (European Commission, 2020a).

The **bid ask spread on SME equity markets** indicator is a measure of the liquidity of listed SMEs equity market (European Commission, 2021a). The data are directly taken in the European Commission's document "[Overview of CMU indicators](#)" and are based on a panel of 7500 EU firms with quoted share price (European Commission, 2021b). European Commission used data coming from "Refinitiv". Each member state is equally represented in the sample of firms. The indicator is calculated as the relative price difference between the bid and ask price for each company of the panel (European Commission, 2021a). The EU-27 data represents the median of all companies. A lower bid ask spread represents a higher liquidity of the SME equity market. If the gap is lower, the demand is higher and the market is more liquid. A liquid market is characterized by the ease and speed of transactions as well as low transaction costs (La finance pour tous, 2022).

The **venture capital investment** indicator measures the annual investment relative to GDP (in %) (European Commission, 2021a). Venture capital is "a form of private equity and a type of financing that investors provide to startup companies and small businesses that are believed to have long-term growth potential" (Hayes, 2022). This type of funding is very important and has to be developed because as we have seen in the literature review there is a huge gap between venture capital investment in US and EU. An increase of venture capital investment will increase the number of high potential growth companies. This will have a positive impact on the technological development of European Union. We use data provided by European Commission in the document "[Overview of CMU indicators](#)". The data for this indicator are coming from "InvestEurope" (InvestEurope, 2022).

The **breadth of venture capital investor base** indicator measures the size of the investors base. It is expressed as an Herfindahl index going from 0 to 1. A lower index closer to zero means an investor base more dispersed, so there are more different types of investors who hold all together larger market shares. "The more dispersed the investor base, the less concentrated and the more dynamic venture capital markets are expected to be" (European Commission, 2021a, p.31). Data are coming from the Commission staff document "[Overview of CMU indicators](#)" which used "Invest Europe" as source of data (European Commission, 2021b).

The **securitization** indicator is represented by this ratio (in %):

$$\frac{\textit{outstanding amount of securitization instruments}}{\textit{bank loans to non – banks (excluding governments)}}$$

This indicator allows to track the action 6 of the new action plan which is “helping banks to lend more to the real economy” (European Commission, 2020a). Securitization represents the transformation of loans by banks or credit institutions into securities. It allows banks to transfer the risk by selling the securities to investors (European Commission, 2016). Securitization is important to develop in the context of capital market and compared to other large competing countries such as US. This indicator and the data are entirely taken from the Commission staff document “[Overview of CMU indicators](#)”. They used the AFME source (European Commission, 2021b).

*Objective 2: “Making the EU an even safer place for individuals to save and invest long-term”* (European Commission, 2020 a, p.6)

This objective is monitored in the European Commission (2021a) working document of the European Commission by 8 indicators.

The dimensions covered are the following (Figure 11):



*Figure 11: Dimensions covered by the objective 2 (European Commission, 2021a, p.37)*

The first dimension is about the retail investors’ investment in marketable financial assets. The action 9 in the objective 2 of the new action plan aims at “supporting people in their retirement” (European Commission, 2020a) (Table 5).

Long-term savings or investments through the capital market are ways for households to increase their public pension.

This would increase the progress towards a CMU. In order to track that dimension we choose one indicator from the EC document:

The **direct and intermediated retail investment by households** indicator is represented by the following ratio (in %):

$$\frac{\text{listed shares} + \text{bonds (LT debt securities)} + \text{claims against non – bank intermediaries (CNBI)}}{\text{listed shares} + \text{bonds} + \text{CNBI} + \text{currency and deposits}}$$

The claims against non-bank intermediaries are composed of the investment fund shares/units, the life insurance and annuity entitlements and the pension entitlements, claims of pension funds on pension managers and entitlements to non-pension benefits.

The data are coming from [Eurostat](#) (“financial balance sheets – annual data”) (Eurostat, 2012–2021).

The second dimension “costs of investing” is represented in the EC document by a total expense ratio of equity UCITS funds computed based on a ESMA report. However, due to a lack of data for 2015 and 2016 as well as some limitations reported by the European Commission concerning the data collection of the ESMA report I decided not to include it in the composite indicator.

The last dimension of “new choices of investments” is very important in the context of the recovery of covid crisis. As we have reported before in the literature review one of the aim of the NGEU recovery plan is to make European Union greener and more digitalized. Therefore, the capital markets union has a role to play in this transformation by making new choices in the finance. We represent this dimension by two indicators:

The **issuance of green bonds** indicator represents (in%):

$$\frac{\text{european green bond issuance}}{\text{total european bond issuance}}$$

Data are coming from “[AFME](#)” (Association for Financial Markets in Europe (AFME), 2022).

The European Commission proposed an indicator representing the use of new technologies for investing which is the capital allocated via crowdfunding. Some data were not yet published. Therefore, we create a proxy indicator:

The **fintech equity funding** indicator represents the amount of equity funding (in \$) raised through the fintech. Fintech is the acronym for financial technology. Fintech are technological start-ups which offer digital financial services such as crowdfunding, online portfolio management, etc. They are in full expansion in recent years and take part to the digital transformation of European Union. The data are coming from the “[Bank for International Settlements](#)” (Cornelli, Doerr, Franco, & Frost, 2021). They used PitchBook data Inc as source of their data on fintech funding.

### *Objective 3: “integrating national capital markets into a genuine single market”*

The last objective is monitored in the EC working document by 7 indicators covering the following dimensions (Figure 12):



*Figure 12: Dimensions covered by the objective 3 (European Commission, 2021a, p.48)*

The first dimension of the composite indicator will not be the reluctance to invest cross-border but rather the “cross-border investments” represented by the two following indicators:

The **cross border holding of equity and investment fund shares** indicator represents (in%):

$$\frac{\text{cross border holdings of equity and investment fund shares in EU}}{\text{total equity and investment fund shares issued in EU}}$$

It represents the share of equity and investment shares that intra-European investors hold cross-border. To compute the numerator of the ratio we take the database called “Coordinated portfolio investment survey” (CPIS) coming from IMF and we choose the indicator called “[Geographic breakdown of total portfolio investment assets](#)” (International Monetary Fund (IMF), 2001–2021). For the denominator we select the total equity and investment fund shares

issued by the European Union in the financial balance sheet provided by Eurostat (Eurostat, 2012–2021). The data are consolidated.

The **cross border holding of debt securities** indicator represents (in%):

$$\frac{\text{cross border holdings of debt securities in EU}}{\text{total debt securities issued in EU}}$$

The sources and computations are the same as the previous indicator except that I selected “debt securities” in the databases.

The second dimension of “opportunities to invest cross-border” is represented by one indicator: The **cross-border UCITS** indicator measures the number of UCITS funds available for sale to retail investors in at least two member states (including their residence) (European Commission, 2021a). UCITS means Undertaking for Collective Investments in Transferable Securities. These cross-Europe mutual funds are very safe and benefit from a well-regulated and harmonized framework regarding their management and sale (Chen, 2021). We use data provided by the EU Commission document “[Overview of CMU indicators](#)” taken from the European Securities and Markets Authority (ESMA). We complete the data sample with the 2020-year data coming from the “Performance and costs of EU retail investment products” report from ESMA (2022). This is an annual statistical report (European Securities and Markets Authority (ESMA), 2022).

The final dimension of “legal differences” won’t be represented in the composite indicator for two reasons. First, the indicators used in the EC staff working documents are indicators on legal and business conditions coming from “World Bank doing Business reports”. And some issues have been encountered in these reports, that’s why the authors decided to stop the publication of these reports. Therefore, we decided not to include these indicators into the composite indicator because the update of the data in the coming years won’t be possible. Secondly, this last dimension of the objective 3 covers legal conditions but data sources on legal conditions are difficult to find and monitor.

### 3.1.3. Imputation of missing data

This step consists of estimating the data missing in the sample of indicators (OECD, 2008). But no data are missing in the sample, no imputation will be required.

We targeted monthly or quarterly data in order to track the impact of the Next Generation EU debt on the CMU progress. However, a lot of data to construct the indicators were not monthly or quarterly reported but only yearly reported. The imputation of missing data would have been detrimental for the robustness of the indicator. Therefore, we decided to focus on a yearly reporting which could be improved by quarterly data in the future.

### 3.1.4. Multivariate analysis

In order to choose the correct indicators it is important to look at interrelationships between them. The nature of the data needs to be monitored. Principal component analysis, Cronbach coefficient alpha or cluster analysis can be used to monitor if all dimensions of the indicator are represented equally and allows to identify if there are correlations between some variables (OECD, 2008). However, as reported in the OECD handbook (2008), the multivariate analysis is not appropriate when the sample is smaller than the number of indicators. Indeed, our sample is composed of 6 years going from 2015 until 2020 but we have 15 indicators. Therefore, no multivariate analysis will be carried out.

### 3.1.5. Normalisation of data

This stage is essential because the indicators have different measurement units. In order to aggregate them this is important to normalize them. Among the different techniques of normalization, the most appropriate one for the composite indicator is the **distance to a reference**. It measures “the relative position of a given indicator with respect to a reference point” (OECD, 2008, p.28). The reference can be a country, a year, an external benchmark, etc. We choose the **year 2015 as the benchmark** because it represents the first CMU action plan published, so the starting point for the CMU objective. The normalization will be centered on the base 100 for the year 2015.

The formula for the computation of the indicator normalized is the following:

$$I_q^t = \frac{X_q^t}{X_q^{t_0}} \times 100$$

Note:  $I_q^t$  is the new value normalized for the indicator q at time t,  $X_q^t$  is the value of the indicator q at time t,  $X_q^{t_0}$  is the value of the indicator q at time  $t_0$  = benchmark year (2015).

The multiplication by 100 is required to center the indicator on 100.

### 3.1.6. Weighting

Before being aggregated the indicators need to be weighted. This stage is very important because weights represent the importance of the indicators in the composite indicator. Several techniques to weight the indicators are proposed by OECD (2008). There is no standard weighting method.

Here are the 3 methods for weighting: the “equal weights” used in the construction of many composite indicators, the “weights based on statistical methods” and the “weights based on expert opinions” (OECD, 2008). It is important to note that each method has pros and cons and that weighting implies some subjectivity.

We test here one statistical method, “the Principal Components Analysis (PCA)/ Factor Analysis (FA)” and the “equal weights” method.

#### *Principal components analysis/ Factor analysis*

The PCA/FA method uses only the statistical dimensions of the data to allocate weights. It does not reflect the importance of each indicator in the composite indicator (OECD, 2008). The aim of this method is to represent a large set of indicators using a small number of uncorrelated variables (Cadima, & Jolliffe, 2016). These uncorrelated variables are called factors. Indicators are grouped based on their common information.

**The first step** is to check the correlations between indicators (OECD, 2008). The Figure 13 below summarizes the correlations computed on “R studio” (R code in Appendix 2) between the 13 indicators.



Figure 13: Correlations between indicators

Legend: **X1** = market funding ratio by NFC, **X2** = SME use of equity, **X3** = value of annual private equity investment relative to nominal GDP, **X4** = value of securitization instrument relative to bank loans, **X5** = breadth of venture capital investor base, **X6** = direct and intermediated retail investment, **X7**= green bond issuance, **X8** = Fintech equity funding, **X9** = cross-border holding of debt securities, **X10** = cross-border holding of equity, **X11** = cross-border UCITS, **X12** = median bid ask spread SME equity, **X13** = value of annual venture capital investments

High correlations between indicators are observed. Without any correlations between the indicators meaning there are no common information, the method couldn't be conducted.

**The second step** is related to the identification through a PCA of  $n$  latent factors smaller than the number of indicators (OECD, 2008). The PCA is used to extract the factors. We execute the PCA (Figure 14 and 15) on the program “R studio” (R code in Appendix 3).

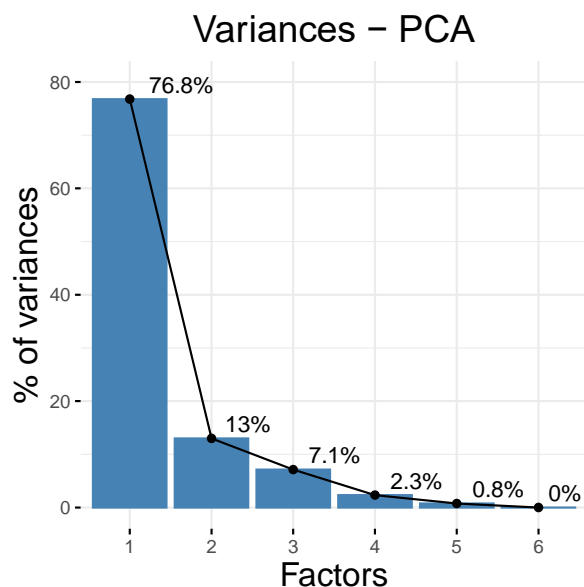


Figure 14: PCA (% variances)

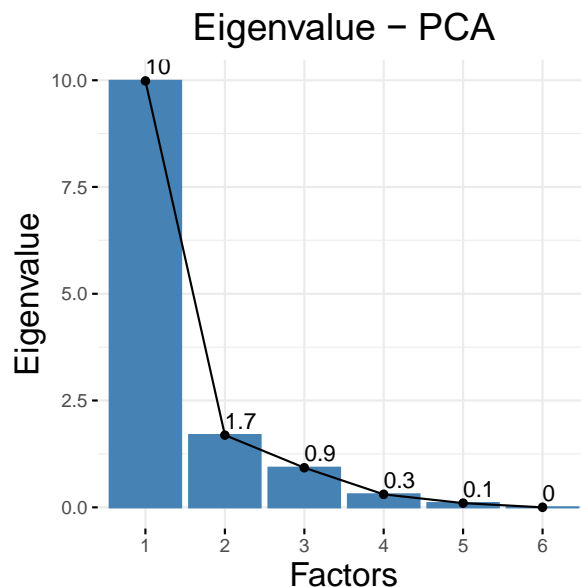
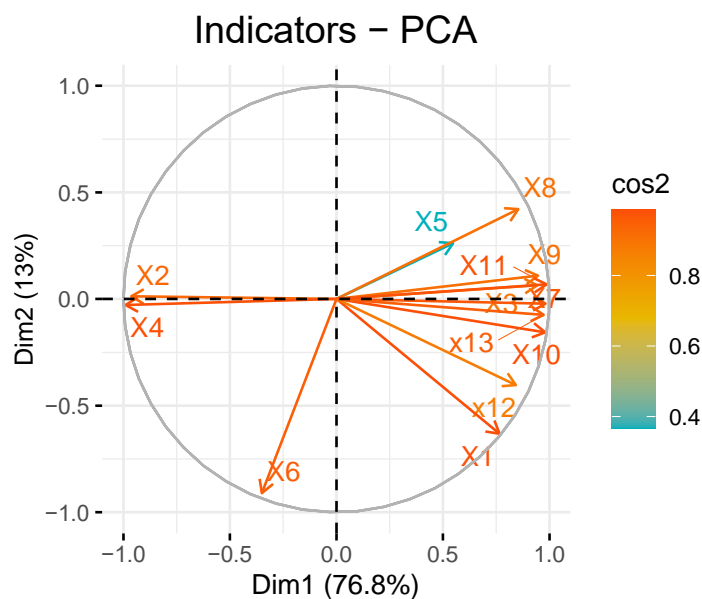


Figure 15 : PCA (Eigenvalue)

The PCA extracts 6 factors. The FA will only retain a number of factors which contain the largest part of the variance. We keep the first two factors which have an eigenvalue higher than one (Figure 15) and an individual variance of more than 10% (Figure 14) with a cumulative variance of 89,8%. The correlations between the indicators and the two factors retained can be represented on the following circle (Figure 16) created on “R studio” (R code in Appendix 3). The axis x is the factor 1 and the axis y is the factor 2. On the right side of the graph the indicators are positively correlated to factor 1 and on the left side of the graph they are negatively correlated. Above the x-axis the indicators are positively correlated with factor 2 and below the x-axis they are negatively correlated. The projection of the indicators on the axes shows to what extent they are correlated with the factors. Here for example the indicator X4 is strongly negatively correlated with the factor 1 and X6 is strongly negatively correlated with the factor 2.



*Figure 16 : Correlation circle*

**The third step** is the rotation of factors retained using the varimax function on “R studio” (OECD, 2008) (R code in Appendix 3).

Each factor is represented by a set of coefficients (=loadings) measuring the correlation between the indicators and the factor (Appendix 4). But each indicator will only be loaded under one factor. In order to directly identify to which factors each indicator belongs we use the rotation. This method extracts a simpler structure (“factor loadings” on the table below (Table 7)) on R. The loadings are squared and “scaled to unity sum” (OECD, 2008). The number in bold represents under which factor the indicators are loaded. For example, X2 is directly loaded under Factor 1. For the indicators such as X1 they are loaded under the factor with the strongest correlation.

**The last step** is the allocation of the weights based on the loadings after rotation (OECD, 2008).

	Factor loadings		Squared factor loading (scaled to unity sum)		PC weights	weights per objective
	Factor 1	Factor 2	Factor 1	Factor 2		
X1	0,25	-0,48	0,06	<b>0,24</b>	0,14	0,432
X2	-0,31		<b>0,09</b>	0,00	0,05	
x3	0,30		<b>0,09</b>	0,00	0,05	
X4	-0,31		<b>0,10</b>	0,00	0,06	
X5	0,17	0,20	0,03	<b>0,04</b>	0,02	
X6	-0,10	-0,70	0,01	<b>0,50</b>	0,29	0,404
X7	0,31		<b>0,10</b>	0,00	0,06	
X8	0,27	0,33	0,07	<b>0,11</b>	0,06	
X9	0,30		<b>0,09</b>	0,00	0,05	0,164
X10	0,31	-0,12	<b>0,10</b>	0,01	0,06	
X11	0,31		<b>0,10</b>	0,00	0,06	
X12	0,27	-0,31	0,07	<b>0,10</b>	0,05	
X13	0,31		<b>0,10</b>	0,00	0,06	
expl.Var	1,00	0,98			<b>1,00</b>	1,00
expl./Tot	0,50	0,50				

*Table 7: Factor loadings and PC weights*

*Legend:* orange = objective 1, green = objective 2, blue = objective 3

Based on the factor loadings squared and “scaled to unity sum” we get that the indicators X2, X3, X4, X7, X9, X10, X11, X13 are grouped under the Factor 1 and the indicators X1, X5, X6, X8, X12 under the Factor 2. The weights resulting from the principal components analysis are expressed under “PC weights”. The three colors represent the three objectives. Under “weights per objective” the weights are summed up by objective and it shows 0,43 for the objective 1; 0,40 for the objective 2 and 0,16 for the objective 3.

### *Equal weighting*

The second method is the “equal weighting”. The same weight is allocated to each objective (0,333 per objective) considering there is no information given by the CMU action plan regarding the relative importance of each objective.

**The first step** is to check the correlations between indicators under the same objective in order to eventually remove some highly correlated indicators. The correlation per objective is executed on R (results below).

The correlation matrix for the objective 1 is the following (Figure 17):

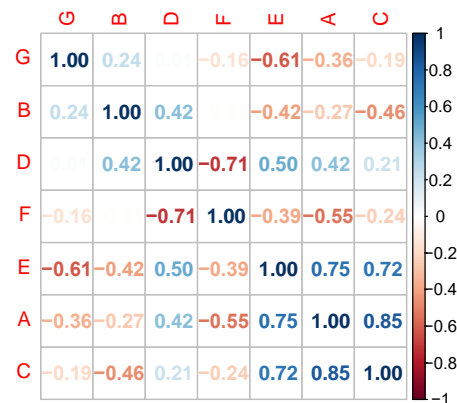


Figure 17 : Correlations between indicators of the objective 1

*Legend:* **A** = market funding ratio by NFC, **B** = SME use of equity, **C** = median bid ask spread SME equity, **D** = value of annual private equity investment relative to nominal GDP, **E** = value of annual venture capital investments relative to GDP, **F** = value of securitization instrument relative to bank loans, **G** = breadth of venture capital investor base

We can observe a high correlation between three indicators (A, C, E). Because the objective 1 contains a higher number of indicators compared with the two other objectives two indicators are removed to achieve a well-balanced set of indicators. The highest correlation (0,85) is between the “market funding ratio by NFC” (A) and the “median bid ask spread SME equity” (C). Therefore, the objective C is removed because it is less relevant in the composite indicator compared with the market funding ratio. Regarding the correlation between A and E (0,75) the indicator of “annual venture capital investment” (E) is removed for two reasons. First, the venture capital investment is already represented under the indicator D of “private equity” (venture capital is a part of private equity). Secondly, we will get more balanced dimensions covered by the indicators by having two indicators for dimension 1, two for dimension 2 and one for dimension 3.

The correlation matrix for the objective 2 is the following (Figure 18):

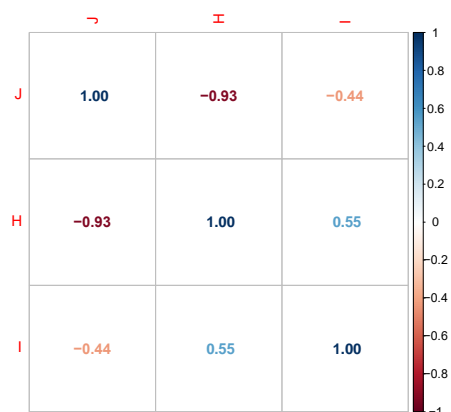


Figure 18: Correlations between indicators of the objective 2

Legend: **H** = direct and intermediated retail investment, **I** = green bond issuance, **J** = Fintech equity funding

The only high correlation is between indicators H and J. But they cover very different dimensions, so I won't remove any of them.

The correlation matrix for the objective 3 is the following (Figure 19):

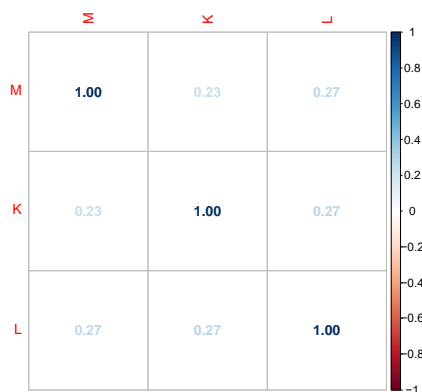


Figure 19 : Correlations between indicators of the objective 3

Legend: **K** = cross-border holding of debt securities, **L** = cross-border holding of equity, **M** = cross-border UCITS

Indicators are very low correlated, so they don't require to remove an indicator.

Consequently, the weight per objective (1/3) is splitted between the number of indicators contained in each objective.

The following table (Table 8) summarizes the composite indicator made of 11 indicators representing the three objectives and their dimensions, the data source as well as the weights allocated to each indicator.

	Objectives	Dimensions	indicators	Data source	Weight
CMU progress composite indicator	objective 1: Access to finance	Demand for market funding	Market funding ratio indicator (X1) (+)	Eurostat	0,067
			SME use of equity indicator (X2) (+)	ECB (SAFE survey)	0,067
		Matching, facilitators	private equity investment indicator (X3) (+)	Invest Europe	0,067
			securitization instrument indicator (X4) (+)	AFME	0,067
		Supply of market funding	breadth of venture K investor base indicator (X5) (-)	Invest Europe	0,067
	objective 2: Participation in investment	Participation of retail investors	direct and intermediated retail investment indicator (X6) (+)	Eurostat	0,111
		New choices	green bond issuance indicator (X7) (+)	AFME	0,111
			fintech equity funding indicator (X8) (+)	BIS	0,111
	objective 3: Cross-border integration	Cross-border investment	cross-border holding of equity indicator (X9) (+)	IMF + Eurostat	0,111
			cross-border holding of debt securities indicator (X10) (+)	IMF + Eurostat	0,111
		Opportunities to invest cross-border	cross-border UCITS indicator (X11) (+)	ESMA	0,111

*Table 8: Summary of the objectives, dimensions, indicators, data sources and weights*

All the data used for the composite indicator are detailed in the Appendix 5

The method chosen is the “**equal weighting**” which is the most appropriate method for the composite indicator. Indeed, the PCA/FA method allocates more weight to the objective 1 and 2 but a much lower weight to the objective 3 only based on statistical dimensions. No economic reasoning is involved in this method. Moreover, because no information is given about the relative importance of each objective an equal weighting is the most cautious method.

The composite indicator using the “PCA” is compared with the result obtained from the “equal weighting” method on the graph below (Figure 20). The PCA method gives a result 17% lower than the “equal weighting” method in 2020. There is almost no difference between the curve for the PCA 11 indicators and 13 indicators. The removal of the 2 indicators was relevant.

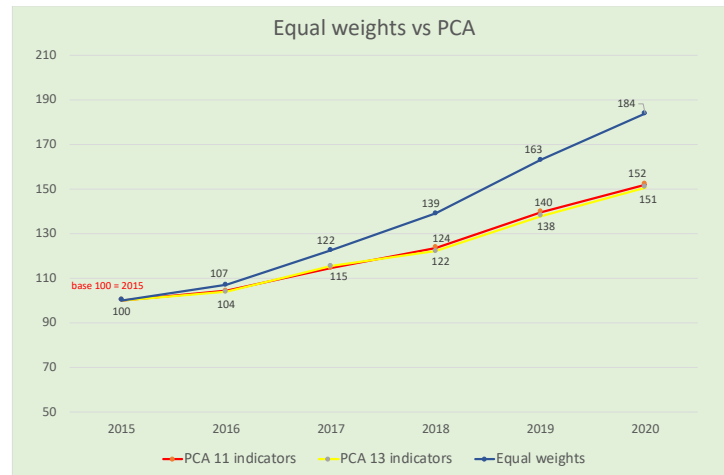


Figure 20 : Comparison equal weighting method to PCA

### 3.1.7. Aggregation

OECD reports three aggregation methods: linear, geometric and multicriteria. The most appropriate technique for the composite indicator is the linear aggregation. The normalized weighted Indicators are simply summed up (JRC European Commission, 2005).

$$CI_c = \sum_{q=1}^Q w_q I_{qc}$$

with  $\sum_q w_q = 1$  and  $0 \leq w_q \leq 1$ , for all  $q = 1, \dots, Q$  and  $c = 1, \dots, M$  (Nardo et al., 2005)

An important criterion to respect is the compatibility between the weighting and aggregating methods. OECD handbook (2008) reported equal weighting and linear aggregation as compatible methods.

By following all the steps reported by OECD Handbook we get the following equation of the composite indicator:

$$CMU \text{ progress composite indicator} = 0,067*X1 + 0,067*X2 + 0,067*X3 + 0,067*X4 + \\ 0,067*X5 + 0,111*X6 + 0,111*X7 + 0,111*X8 + 0,111*X9 + 0,111*X10 + 0,111*X11$$

3.1.8. Visualization of the composite indicator

The CMU progress composite indicator (Figure 21) is represented by a graph. The aim of this composite indicator is to aggregate several important dimensions of the three new objectives set out by the new CMU 2020 action plan into one single visual tool. The dimensions are covered by indicators which track the progress of CMU since 2015 and monitor the future implementation of the new measures from the 2020 action plan.

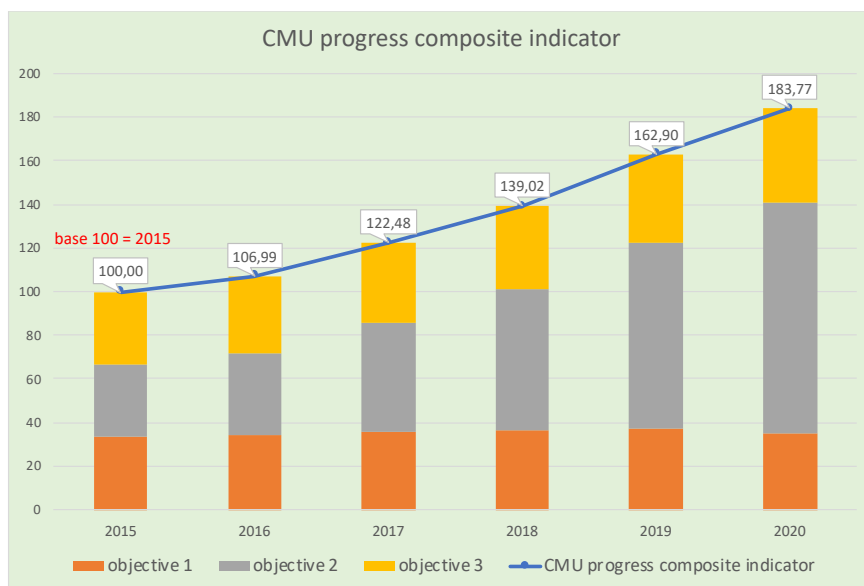


Figure 21 : CMU progress composite indicator

We also decided to represent each objective with a single composite indicator in order to analyze them separately.



Figure 22 : Objective 1 composite indicator

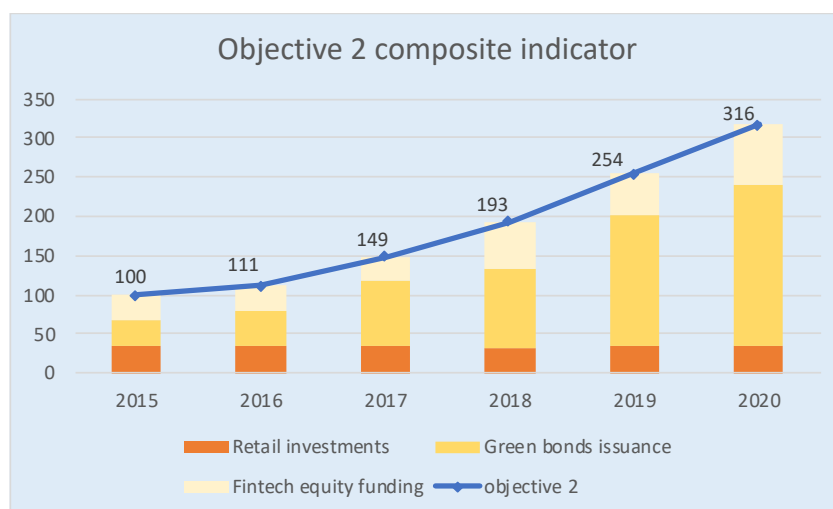


Figure 23 : Objective 2 composite indicator

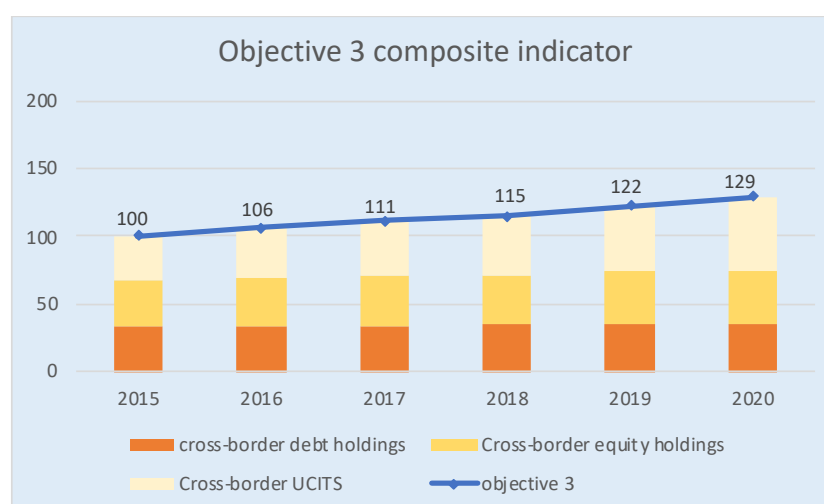


Figure 24 : Objective 3 composite indicator

## 3.2. Results

### 3.2.1. Interpretation of the CMU progress composite indicator

The curve of the CMU progress composite indicator shows a progress of 84% since 2015. The highest growth happened during the year 2019 with an increase of 16% compared with 2018. The objective 1 contributes to 2,3% of the growth of the composite indicator, the objective 2 contributes to 85,3% of the growth and the objective 3 contributes to 11,4%.

**The objective 1** “Support a green, digital, inclusive and resilient economic recovery by making financing more accessible to European companies” (European Commission, 2020a, p.6) shows a low growth of 6% in 2020 compared to 2015. The highest growth was observed in 2019 with 12%. The information given by the raw indicators indicate a “market funding ratio” in 2020 9% (highest growth since 2015) higher than in 2015. Regarding the “use of equity by private and

public SME”, it encountered an annual decrease of around 2 to 5 % each year. The highest decrease happened in 2020 because of the covid crisis. The use of equity in % of the total funding for SME’s represented 10% that year. It is 26% lower than in 2015. The decrease of this indicator since 2015 is not surprising. Indeed, the results are in line with the findings of Demertzis et al. (2021). They reported that the risk to invest in EU equity is high compared to Unites States for example. Therefore, even if equity is the most suitable funding for growing or young companies the risk to invest limits strongly the supply of equity. Regarding the share of the “private equity investments relative to nominal GDP” it has constantly increased to reach in 2019 an amount of 0,58%, an increase of 60% since 2015. It decreased slightly to 0,54% of the nominal GDP in 2020. We observed that the private equity investment in 2020 is composed of 11% of venture capital investment, investment in the capital of high growth potential young companies. These numbers remain low but are positive and predict a future growth. Another important dimension of the objective 1 is the value of “securitization instrument in % of bank loans to domestic non-banks”. In 2015 the securitization represented 9,2% of the bank loans and since 2015 it decreased constantly to reach an amount of 7,2% in 2020. But securitization is essential. As reported by Loutskina (2011) securitization allows banks to increase their lending ability as well as liquidity and decrease their risk exposure by transforming “illiquid loans into liquid securities” (Loutskina, 2011, p.1). This represents an additional source of funding for banks. Securitization allows to rely less on bank credit in order to progress towards CMU. This indicator is very important to monitor in the future. The last indicator is about the “breadth of venture capital investor base”. This index has improved by 20% since 2015 to reach an Herfindahl index of 0,3 in 2020. It means that the share of venture capital is more dispersed in the hands of a larger investor base compared to 2015 (0,4). A higher dispersion is a sign of market dynamism (European Commission, 2021a).

The **objective 2** “Make the EU an even safer place for individuals to save and invest long-term” (European Commission, 2020a, p.6) is the main driver of the increase of the composite indicator as observed in the above graph (Figure 21). Over the time, the objective 2 portion (grey) in the composite indicator grew.

This increase in objective 2 is driven by the combination of green and digital finance but mainly by the green finance. Indeed, the *green bond issuance indicator* increased strongly each year to reach in 2020 4,81% of the total bond issuance. This is an increase of 517% since 2015. Highest growth (88%) is observed between the year 2016 and 2017.

In 2007 the European Investment Bank issued the first green bonds. This green bond market experienced very strong growth after the Paris Agreement adopted during COP 21 in December 2015 aiming at limiting global warming. The national actions plans following this Paris Agreement accelerated the green bond issuances by corporates and mainly governments (public sector) (United Nations Climate Change, 2016). Then in March 2018 the European Union published an action plan on sustainable finance which pushed the green bond market up again. As we have seen in the literature review European Union is the global leader in terms of green bond issuance in the world (51% of the total green bonds issuance) (Pailler, 2022).

Regarding the digital finance, the indicator of *fintech equity funding* decreases slightly in 2016 and 2017 before surging in 2018 to reach 14,3 billion \$ (an increase of 83% since 2015). In 2019 the investments reduced slightly but in 2020 the fintech equity investment are on the rise again reaching the highest level since 2015 (18,3 billion \$ for an increase of 134% compared with 2015). Covid crisis had a positive impact on the digitalization. The staggering increase during the year 2018 in European Union is consistent with a world fintech growth trend. That year the total global investment in fintech through M&A, Private equity and Venture Capital tripled going from 12,2 billion \$ in 2017 to 34,2 billion \$ in 2018 despite a decreasing trend in the number of deals. The reason behind this trend was the very large deals concluded in 2018 across the world such as the acquisition of Worldpay (M&A) by Vantiv for 12,86 billion \$ in Europe (Pollari, & Ruddenklau, 2019). In European Union the increase of investments in fintech was mainly driven by M&A activities which tripled and especially by United Kingdom, the leader in fintech investments.

Therefore, the digital and mainly green finance drove the CMU progress.

The last indicator in the objective 2 is about the *retail investment*. This indicator has stabilized since 2015. The ratio is mainly composed of intermediated retail investment (claims against non-bank intermediaries) which are largely higher than the investments in listed shares and bonds (direct investments). The latter have decreased by 15% since 2015. During covid crisis the share of currency and deposits hold by households increased at the expense of holdings of financial securities (European Commission, 2021a). Monitoring this indicator in the future is very important. Developing the retail investor's participation is essential in the progress towards CMU.

The **objective 3** of “integrating the national capital markets into a genuine single market” (European Commission, 2020a, p.7) improved by 30% since 2015. The main driver is the cross-border UCITS indicator with an increase of 64% since 2015. UCITS are investment funds complying with the EU regulation. In general, the investment funds can’t be sold in a country without receiving the approval of this country. UCITS is a label of quality and it allows them to be sold in the whole European Union without the need of an approval in each EU member state. The aim of UCITS was to create a European single market for investment funds. People are free to invest where they want and the funds can sell their shares in all EU member states (Chen, 2021). This type of funds improves strongly the intra-EU financial integration. As reported in the European Commission document (2021a) institutional investors and investment funds contribute to the financial integration because they hold a large part of their portfolio abroad. Authors found that institutional investors allow to decrease the home bias. Indeed, households hold indirectly more cross-border assets when they use intermediaries such as institutional investors or mutual funds than they would hold by investing directly (European Commission, 2021a). Therefore, this is important to increase the opportunities for retail investors to invest cross-border by offering them more cross-border investment funds, represented by UCITS in this indicator.

Regarding the “cross-border holding of equity indicator” it has constantly improved to reach a ratio of 16,7% in 2020 (an increase of 18% since 2015). This means that a larger share of European equity and investment fund shares issued was held cross-border. The “cross-border holding of debt securities indicator” also increased but at a lower extent (increase of 5% from 2015 to 2019 with a slight decrease in 2020 due to the high increase of debt securities issuance). However, the debt securities are in general more cross-border traded with a mean of 44% compared to equity and investment fund shares with a mean of 15%.

A possible improvement of the composite indicator in the future would be to include an indicator monitoring the issuance of these European safe assets in the objective 3 of “integrating national capital markets”. The literature review showed their direct impact on the financial integration. Moreover, the High-Level Forum on Capital Markets Union (2020) reported the safe assets as one of the tools boosting the most the CMU. Until the covid crisis only 800 billion € were raised through safe assets (issued by ESM, EIB). The NGEU recovery plan will double this amount with an issuance of 750 billion € EU safe assets until 2026. It would boost the progress towards CMU and represents “the biggest game changer for CMU” as reported by

Janse & Strauch (2020). This is a relevant and highly important indicator to add in the next few years.

In a nutshell, the development of the CMU progress composite indicator showed a significant progress of the green and digital finance indicators and a higher financial integration (objective 3). This is encouraging because they are important determinants of the progress towards an EU single capital market and represent all together more than 50% of the weight in the CMU progress composite indicator. The indicators of the objective 1 as well as the retail investment in the objective 2 have not evolved so much. We expect that the new measures of the CMU action plan will develop these indicators. The NextGenerationEU recovery plan didn't impact our composite indicator until 2020. This plan was proposed in May 2020 but the measures were fully negotiated and approved in December. The impacts should be observed in 2021.

The following graph (Figure 25) represents the prediction realized on “R studio” (graph in Appendix 6, R code in Appendix 7) of our CMU progress composite indicator for the next 2 years (2021 and 2022). Because “R studio” is a statistical tool, the results don't take into account the future effects of governmental measures such as the NGEU plan. The “R studio” program predicts in 2021 a growth of 11% compared to 2020 and then a growth of 10% for 2022. This is now interesting to compare in the next section these results with the trends for 2021.

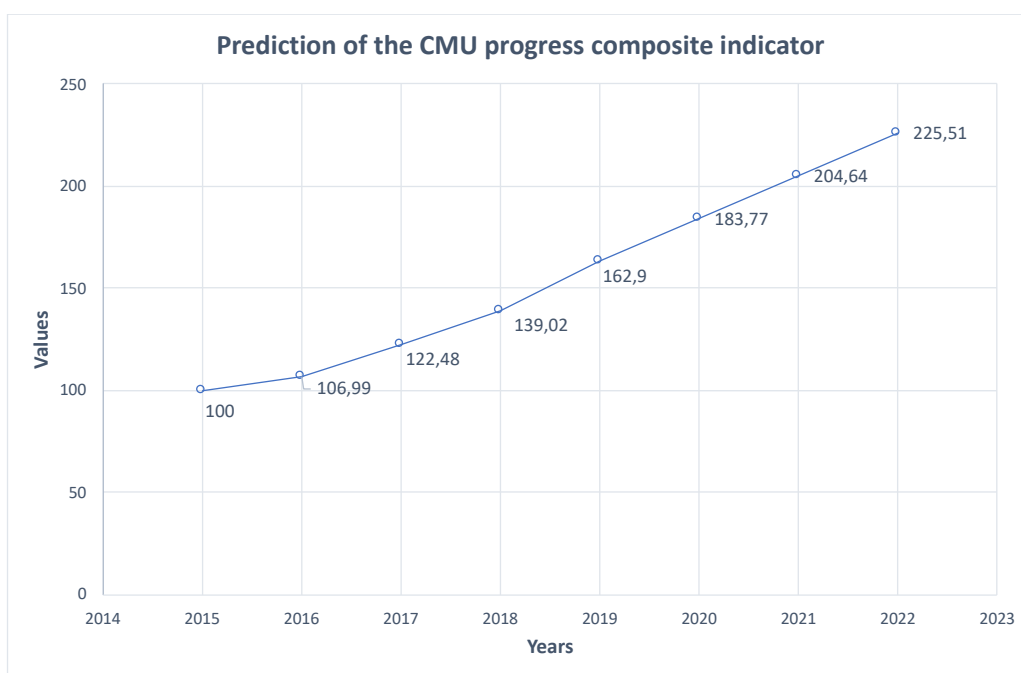


Figure 25 : Prediction of the CMU progress composite indicator

### 3.2.2. Trends for 2021

In this section we will highlight the main trends for the indicators in 2021 based on data available. In theory, the impacts of the covid should begin to be observed in 2021 because the economic activity resumed that year. The results for the year 2020 reflected the sudden cessation of economic activity.

For the **objective 1**, the “SME use of equity” increased by 10% in 2021. This confirms the European Commission’s prediction whereby covid crisis would positively impact this indicator (European Commission, 2021a). Indeed, crisis resulted in a high level of indebtedness for SMEs. The use of equity is a way to tackle the indebtedness by raising money on capital market. This result is encouraging for the future. This is a step towards a more efficient use of the multiple sources of funding offered by capital market. Regarding the “market funding ratio by NFC” the Association for Financial Markets in Europe (2021) observed in H1 2021 an increase for this indicator. There are two reasons. First, the bank loans decreased in 2021 (AFME, 2021). During 2020, the need for cash was very high for companies and banks granted a lot of loans. But in 2021 European companies required to recapitalize because the economic activity recovered. Banks were more reluctant to grant loans because of the non-stable situation of many companies. Secondly, AFME (2021) found an increase of equity issuance by 131% (increase of debt issuance was only 3%). This increase in equity issuances is due to the lower cost of equity, a lower market volatility and a strong increase of the IPO issuances by 430% according to the Association for Financial Markets in Europe (2021). IPO issuances will boost the listed shares being part of the numerator of market funding ratio.

Therefore, the need to recapitalize pushed European companies to use more intensively the capital market and especially the equity in 2021. The use of equity funding could avoid some business defaults (AFME, 2021). This is positive for the progress towards a CMU. However, EU and national governments have a role to play in this recapitalization by providing expertise and advices. The collaboration between the private and public sectors is crucial.

“Private equity in % of nominal GDP” increased also by 41% in 2021, driven by increasing venture capital investment (increase of 218% compared to 2020). In 2021, the risk capital being part of the private equity represented 2,9 times the amount in 2020 (AFME, 2021). This is expected to boost the creation of companies. Indeed, risk capital is an important financing for

SME's and companies with high growth potential. The possibility to be funded by risk capital will drive the creation of these types of companies.

Moreover, the venture capital in 2021 is held in the hands of a more diversified investors base which dynamizes this market ("*breadth of venture capital investor base*"). Regarding the "securitization market" AFME (2021) reported a slight increase for the first semester of 2021. This is a positive signal because this tool is an essential instrument especially in times of crisis. It allows banks to lend more. The securitization was intensively used in US for the covid crisis recovery. Moreover, it is possible to combine the green investments with the securitization. During a conference on "Capital Markets Union: investing for a stronger, prosperous and sustainable European Union" in 2022 the development of green securitization was reported as a great opportunity to transform a non-green portfolio into a green portfolio (European Commission, 2022d).

As reported in the literature review by De Haas and Popov (2019) the equity market (stock and private equity market) is more efficient to target green investments. Therefore, the indicators of the objective 1 which are all related to equity market are relevant to support a green recovery.

The increasing trend of all the indicators for the objective 1 during 2021 is contributing to the economic recovery.

The reduction in capital markets costs has been one driver of the increase of all these indicators. The government and monetary measures to face the covid crisis contributed to reduce the cost of capital market (Figure 26) and facilitate the access (AFME, 2021). On the graph below (Figure 26) the cost of equity and market-based debt increased when covid crisis started and for May 2020 a decrease occurred. During the period May-June 2020 the NGEU recovery plan proposal and the relaxation of the lockdown measures took place. By implication NGEU recovery plan had a positive impact on the reduction of capital market's costs. This result is consistent with the results from Borgioli et al. (2020). They found that the announcement of the NGEU recovery plan had a positive impact on the financial integration. The same phenomenon was observed on the decrease of the cost of capital. Indeed, the agreement for an unprecedented recovery plan brings trust in the population and decreases the uncertainties. People are more confident about the future of the economy. It has been reflected through an EU decreasing market risk premium. The risk for compensation is lower.

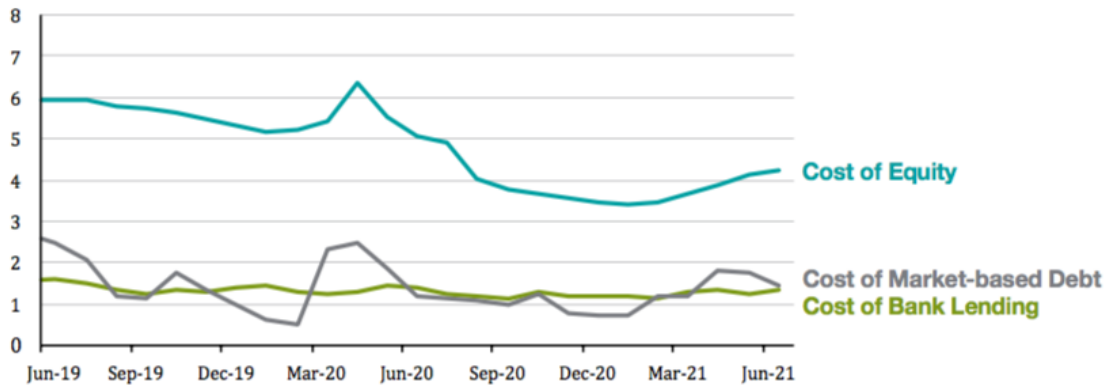


Figure 26: Cost of equity, bank lending and market-based in EU (AFME 2021)

Regarding the **objective 2** the indicators related to green and digital investments surged in 2021. The “green bond issuance” reached 10,9% of the total European bond issuance for an amount of 252 billion € (Association for Financial Markets in Europe (AFME), 2022). This represents an increase by 90% compared with 2020.

Until end of 2021 European Commission only raised 12 billion € through the green bond market in Q4 of 2021. Therefore, we can imagine that the 248 billion € the European Commission plans to raise through green bonds issuance in the next few years will soar the growth of this indicator.

The “use of fintech for equity funding” is also well resilient to the covid shock with a growth of 160% in 2021 reaching an amount of 47,5 billion \$. The covid crisis effects has a positive impact on the digitalization. The improvement of the European regulatory fintech ecosystem expects to increase the use of Fintech (AFME, 2021).

The composite indicator showed the strong impact of digital and mainly green finance have had on the CMU progress. The high expansion of European green bond market is an opportunity to reach a green capital markets union which will boost the progress towards a Capital Markets Union. The European Commission green bonds issuance being included in the indicator “European green bonds issuance” will positively and strongly impact the CMU progress in the coming years.

The last indicator related to the “retail investors participation” can’t be analyzed in 2021 because data are not yet published. However, AFME report on CMU KPI (2021) reported a very high increase of the capital market savings by households for the first semester of 2021. Covid crisis effects and the reduction of costs of capital contributed to this growth. The insurance and pensions, the listed shares and funds shares contributed to the increase in 2021

(AFME, 2021). This will boost the numerator of our retail investment ratio. However, the level of capital markets investments by households relative to the deposits remains below the pre-crisis level (AFME, 2021). During a conference organized by European Commission about CMU in June 2022 retail investors were at the heart of the debate and strategy. The financial literacy has to be improved. People are not informed enough about the possible capital markets investments for efficient financial decisions. (European Commission, 2022d).

Regarding the **objective 3** data on “cross-border investments” are not yet published. The Association for Markets In Europe (AFME, 2021) reported a slight decrease of the capital markets integration within Europe for the first semester of 2021 and an increase of integration with the rest of the world. This was observed in the equity holding market. Private equity and M&A activities increased strongly with companies outside Europe at the expense of intra-European market (AFME, 2021) These disruptions caused by the covid crisis will be mitigated by the EU bonds issued in the context of NGEU which will increase the intra-European financial integration as discussed in the literature review.

The 2021 data for “cross-border UCITS” are not yet published.

To summarize, as reported by AFME (2021) the capital market issuances reached a record in 2021. The sudden economic recovery, the NGEU recovery plan agreement, national measures as well as the implementation of a new CMU action plan contributed to accelerate the progress towards CMU in 2021. The partial available figures in 2021 show a much higher CMU progress compared to the statistical prediction (Figure 25) showing an increase of only 11%.

The measures to support the economic recovery seem to have contributed to progress towards the objective of CMU.

However, the year 2021 is a special year. During covid crisis the economies were at a standstill, the offer suddenly dropped and created an offer crisis, a high level of bankruptcies and layoffs were reported. Companies had to adapt their capacity and workforce. Consequently, when the lockdown measures were lifted and all the business activities reopened the economy experienced a sudden sharp growth. Everything started again at the same time with a very high demand.

But economy need time to readapt and find an equilibrium. The sudden growth in the economy in 2021 involved multiple consequences such as sea freight congestion and rising prices, supply chain issues, raw materials disruptions, strong increase in hiring, highly rising energy costs and

even worse because of the Russia-Ukraine crisis in early 2022. All those elements led to an extremely high inflation in 2022 not experienced since more than 40 years.

The economic recovery and the progress towards CMU could be slowed down by this too sharp restart of the economy and all the direct and indirect consequences. The market risk premium reflects this phenomenon. The premium had strongly decreased end 2020 to reach end 2021 a level never reached in the previous years. Since end 2021 the markets risk premium increased strongly to reach in Q2 2022 the pre-covid level (KPMG, 2022). It will be interesting to monitor it in the next few years.

### 3.2.3. Effects of the NGEU on CMU progress composite indicator.

**Objective 1:** *“Support a green, digital and inclusive and resilient economic recovery by making financing more accessible to European companies”* (European Commission, 2020a, p.6)

The announcement of the NGEU recovery plan has contributed to decrease the cost to access capital market and indirectly positively impact the objective 1.

However, four out of the five indicators representing the objective 1 are related to equity market. NGEU debt issuances don't directly stimulate the equity market. But as the NGEU bonds issuances only began in June 2021 it will be interesting in the future to analyze if debt issuance could stimulate the equity issuances.

The measures taken by the CMU action plan will allow to stimulate the equity funding and support the green and digital transition targeted by NGEU. The equity funding proved to be the funding with the highest impact on the reduction of carbon emissions (de Haas, & Popov, 2019).

**Objective 2:** *“Make the EU an even safer place for individuals to save and invest long-term”* (European Commission, 2020a, p.6)

For the objective 2 the direct positive effects of NGEU bonds/bills will be mainly observed in the next few years. EU green bonds issuances started end of 2021 but the biggest part will be issued between 2022 and 2026. The strong positive effect will only be observed in the next few years. In 2021, green bonds issuance reached an amount of 252 billion € including 11,2 billion € coming from NGEU. European commission planned to issue 250 billion € green bonds from 2021 to 2026. It means that for the next 5 years 47,6 billion € will be issued each year. The other NGEU bonds will positively and indirectly impact the fintech equity funding. Indeed, the funding of RRF, the highest part of NGEU's investments, are allocated to member states which

have to respect a minimum of 20% of the expenses dedicated to foster the digital transition. Therefore, NGEU bonds contributed indirectly to the increase of fintech equity funding in 2021 but stronger positive effects are expected. Regarding the retail investment indicator the NGEU contributed to reduce the cost of capital and by implication to increase in 2021 the households capital markets savings. However, the direct impact of EU bonds is more difficult to identify. To remember the “retail investment ratio is composed” of direct (listed shares and bonds) and intermediated (claims against non-bank intermediaries) investments. The only identifiable impact could be on the intermediated investments. Indeed, European Commission (2021a) reported that households have a lower home bias when they invest through intermediaries such as investments/mutual funds. And the data on the NGEU transactions showed until now that the investments funds and pensions funds have hold a large part of investments in NGEU bonds (European Commission, 2022b). Therefore, the NGEU bonds issuances could indirectly stimulate the retail intermediated investments (investments funds, etc.).

**Objective 3:** *“Integrate national capital markets into a genuine single market”* (European Commission, 2020a, p.7)

The EU temporary safe assets (NGEU debt issuances) represent a step towards the creation of permanent EU safe assets. And as reported by Alogoskoufis et al. (2020) a common safe asset could boost the financial integration. Therefore, even if the NGEU issuances are not included in the cross-border holdings of debt and equity indicators they will stimulate the financial integration.

Regarding UCITS (mutual funds) it will have a direct impact because mutual funds/investment funds invested largely in the first NGEU issuances. During the six NGEU syndications from June 2021 to February 2022 36% in average was invested by fund managers for an amount of 25,9 billion €. We can expect that a large part of these fund managers are fund managers of UCITS because UCITS are easily sold in all EU member states. NGEU financing will stimulate the cross-border UCITS indicator for retail investors.

To conclude we can highlight the main findings regarding the effects of NGEU on the objective of CMU. First, the financing of NGEU has and will have a strong impact on digital finance (the fintech equity funding indicator) and mainly on the green finance (green bonds issuances indicator). The green and digital transition are the main pillars of Recovery and Resilience Facility, the biggest instrument of NGEU recovery plan. Our results confirm the literature:

NGEU, by targeting a green transition, represents an opportunity to create a green CMU. We found also that NGEU plan contributed to the reduction of the costs of capital which boosted the use of capital markets by households and companies in 2021. However, companies use mainly equity to recapitalize after the covid crisis and NGEU financing is only based on debt market. We cannot confirm yet if the NGEU bonds/bills issuances could stimulate the equity financing and therefore progress towards the objective 1. In addition, the NGEU bonds and bills could stimulate the retail investments through the intermediaries such as investments funds. Regarding the objective 3 we found that EU debt demonstrated a direct effect on financial integration. We can expect that UCITS, mutual funds regulated in EU, will be stimulated by the EU bonds and bills issuances.

Secondly, the NGEU recovery plan is another proof that solidarity between EU member states is crucial and works well. This is a good signal for the objective of Capital Markets Union. Moreover, the issuance of the first NGEU bonds and bills was a success and highlighted the very high demand for EU safe assets. But the recovery plan is temporary. The issuance of EU debt has to become permanent in order to play the role of safe asset and solving the long-term challenges and progress towards the CMU.

Finally, **our results showed that the NextGenerationEU recovery plan stimulated the progress towards the Capital Markets Union** and we expect higher effects in the future that will be monitored thanks to our CMU progress composite indicator. As reported by Picked (2020) the highest effect of NGEU recovery plan should be observed in 2023/2024 when 70% of the RRF grants will be paid.

But as found by Lannoo & Thomadakis (2022) the full benefits of NGEU would only last if the private investments are stimulated even after 2026 (end of NGEU investments). European Commission (2021e) added that EU will need to add private and public investments of around 520 billion € per year until 2030 for green transition and 125 billion € per year for digital transition.

NGEU is a unique opportunity for the creation of a Capital Markets Union but the biggest challenge is to come. The capital markets will have to take advantage of this opportunity.

## 4. Conclusion

“NextGenerationEU” is the European Union recovery plan because of the covid crisis proposed by the European Commission on the 27<sup>th</sup> of May 2020. The stakes of this recovery plan are the green and the digital transition. Its unprecedented financing relying on a debt mutualization by issuing EU bonds and bills on the capital market represents an opportunity for the progress towards a Capital Markets Union.

This paper aimed at answering the following research question: **“How can NextGenerationEU stimulate the European Capital Markets Union?”**.

The literature highlighted that the context of covid crisis brings back the emergency to implement a Capital Markets Union for the acceleration of the economic recovery.

The European Commission (2020a) published in September 2020 a new Capital Markets Union (CMU) action plan with three objectives and 16 actions as well as a list of indicators to monitor the progress towards a CMU (2021a). On this basis we create a composite indicator measuring the progress towards the CMU as of now and in the future. This composite indicator is based on 11 indicators and the method described in the OECD “Handbook on Constructing Composite Indicators” was applied. As a result the Capital Markets Union progressed by 84% since 2015. The progress was mainly driven by the green bonds issuances and fintech equity funding indicators. Some of these indicators have been and will be further stimulated by NGEU. As a confirmation the NGEU green bonds issuances represent the opportunity to unify the capital markets. In addition, NGEU contributed to the decrease of the cost of capital in 2021 and therefore improved the access to financial system for companies and households. The temporary debt issued by European Commission under NGEU could represent an opportunity to develop permanent European safe assets issuances, the booster of CMU. The empirical analysis demonstrated that NGEU stimulated the progress towards the creation of a Capital Markets Union. Now the challenge will be for the financial system to get the full benefit from this opportunity.

The development of a composite indicator measuring the general CMU progress completes the literature on that matter but with some limitations. First, the model is based on a database from 2015 to 2020 with annual data due to a limited data availability. Quarterly or monthly data would be ideal for a more accurate analysis. Secondly, the composite indicator is represented by 11 indicators and can't cover all dimensions. But the indicators could be integrated or replaced in the future depending on the data available and the new priorities of the CMU.

Thirdly, the construction of composite indicators entails some subjectivity. Lastly, the topic of this master thesis is recent and we are only experiencing the very first effects of the implementation of NGEU as well as the 2020 CMU action plan. Indeed, NGEU financing just started in 2021 and will last until 2026 and the effects of the new 2020 CMU action plan will take time to provide all the benefits as experienced during the 2015 action plan. Consequently, the CMU progress composite indicator developed in this paper could be the basis for future analysis and monitoring. It allows to directly visualize the progress of the European Capital Markets Union and can be used to adapt some economic policies and priorities.

## Appendix

### **Appendix 1:**



#### Detailed issuance calendar\*

##### ISSUANCE WEEKS FOR THE NEXTGENERATIONEU SYNDICATED TRANSACTIONS:

<b>Week 06</b>	Monday 7 – Friday 11 February
<b>Week 12</b>	Monday 21 – Friday 25 March
<b>Week 14</b>	Monday 4 – Friday 8 April
<b>Week 19</b>	Monday 9 – Friday 13 May
<b>Week 25</b>	Monday 20 – Friday 24 June

##### EU-BILLS AUCTION DATES:

Wednesday, 05 January	(tap 3m, new 6m)
Wednesday, 19 January	(tap 3m, tap 6m)
Wednesday, 02 February	(tap 3m, new 6m)
Wednesday, 16 February	(tap 3m, tap 6m)
Wednesday, 02 March	(tap 3m, new 6m)
Wednesday, 16 March	(tap 3m, tap 6m)
Wednesday, 06 April	(tap 3m, new 6m)
Wednesday, 20 April	(tap 3m, tap 6m)
Wednesday, 04 May	(tap 3m, new 6m)
Wednesday, 18 May	(tap 3m, tap 6m)
Wednesday, 01 June	(tap 3m, new 6m)
Wednesday, 15 June	(tap 3m, tap 6m)

##### EU-BONDS AUCTION DATES:

Monday, 24 January
Monday, 28 February
Monday, 28 March
Monday, 25 April
Monday, 23 May
Monday, 27 June

The next funding plan, to cover the period from July to December 2022, will be published in June 2022.

\*The calendar information is indicative and transactions might be cancelled or additional transactions may be executed. Additional transaction for programmes other than NGEU might be conducted which are not part of these calendars.

(European Commission, 2021c)

### **Appendix 2: R code correlations**

```
# correlations
```

```
library(readxl)
```

```
Indicator <- read_excel("~/Downloads/Indicator.xlsx",  
                        sheet = "13 indicators", range = "A1:M7")
```

```
View(Indicator)
```

```
library("corrplot")
```

```
corrplot(corr = cor(Indicator), order = "hclust", method = "number")
```

### Appendix 3: PCA

```
library(readxl)
Indicator <- read_excel("~/Downloads/Indicator.xlsx",
  sheet = "13 indicators", range = "A1:M7")
View(Indicator)
```

#### # PCA + eigenvalues

```
library("factoextra")
res.pca <- prcomp(Indicator, scale = TRUE)
get_eig(res.pca)
fviz_eig(res.pca)
fviz_eig(res.pca, addlabels=TRUE, hjust = -0.3, cex.lab=2)
fviz_eig(res.pca, addlabels=TRUE, hjust = -0.3)
p <-fviz_eig(res.pca, addlabels=TRUE, hjust = -0.3) +
  ylim(0, 80)
p + labs(title = "Variances - PCA",
  x = "Factors", y = "% of variances") + theme(plot.title = element_text(hjust = 0.5, size =
  18),axis.title.x = element_text(size = 16),axis.title.y = element_text(size = 16))
fviz_eig(res.pca, choice = "eigenvalue",
  addlabels=TRUE)
s <-fviz_eig(res.pca, choice = "eigenvalue",
  addlabels=TRUE)
s + labs(title = "Eigenvalue - PCA",
  x = "Factors", y = "Eigenvalue") + theme(plot.title = element_text(hjust = 0.5, size =
  18),axis.title.x = element_text(size = 16),axis.title.y = element_text(size = 16))
```

#### # Correlation circle

```
fviz_pca_var(res.pca, col.var = "red")
fviz_pca_var(res.pca, col.var = "cos2",
  gradient.cols = c("#00AFBB", "#E7B800", "#FC4E07"),
  repel = TRUE)
t <-fviz_pca_var(res.pca, col.var = "cos2",
  gradient.cols = c("#00AFBB", "#E7B800", "#FC4E07"),
  repel = TRUE)
t + labs(title = "Indicators - PCA") + theme(plot.title = element_text(hjust = 0.5, size =
  15),axis.title.x = element_text(size = 11),axis.title.y = element_text(size = 10))
```

#### # varimax rotation with the factors retained

```
varimax5 <- varimax(res.pca$rotation[,1:2], normalize = TRUE)
```

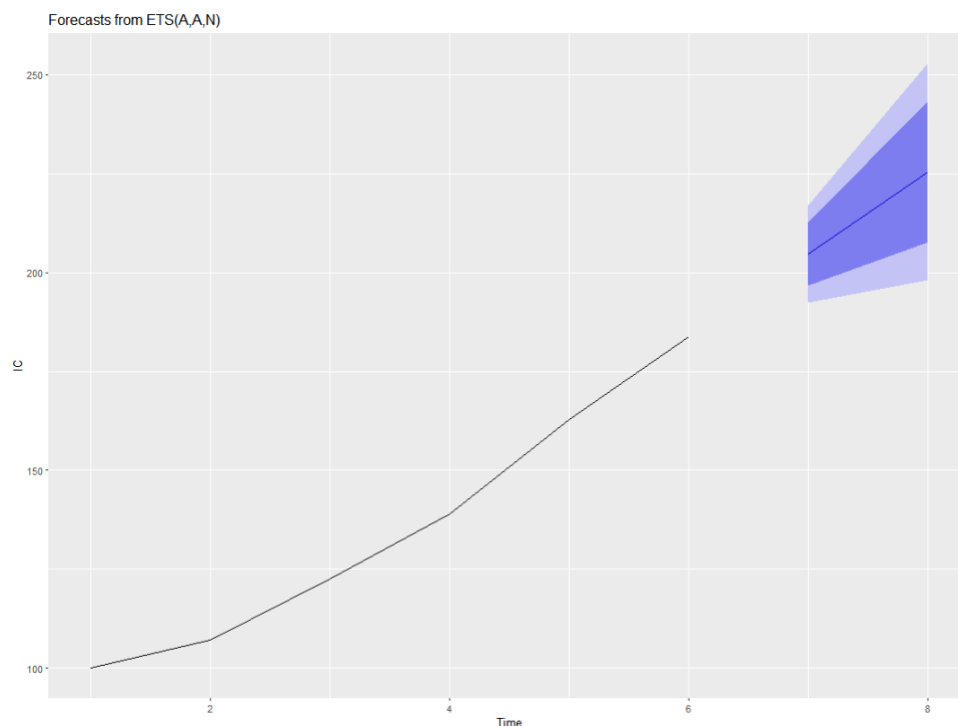
**Appendix 4: Loadings (correlations) between the factors and indicators**

	PC1	PC2	PC3	PC4	PC5	PC6
X1	0.2422720	-0.486453573	-0.12354471	-0.01106420	-0.02662789	0.35382101
X2	-0.3050036	0.009593968	0.17297315	-0.33359819	0.31328698	0.36390937
X3	0.2982953	0.049695088	0.15943328	-0.48097858	0.37439549	0.21929988
X4	-0.3134485	-0.021698587	-0.07231469	0.18616807	0.17307794	-0.24160255
X5	0.1733556	0.201197865	0.81033332	0.22637392	-0.29258714	0.14371291
X6	-0.1108250	-0.700223206	0.14371444	-0.21612354	-0.40152369	-0.24194223
X7	0.3107479	-0.016870414	-0.17423044	-0.13941850	-0.12147461	0.17679133
X8	0.2701863	0.324446775	-0.30427855	0.12114924	-0.18112070	-0.14287507
X9	0.2995366	0.084556893	0.17360578	-0.45803135	0.07693246	-0.66094074
X10	0.3100642	-0.120258018	0.09510518	0.11912291	0.17638519	-0.07469363
X11	0.3122694	0.052935250	-0.09583471	0.02381841	-0.36507921	0.21415844
x12	0.2665490	-0.310328947	0.15763293	0.51540316	0.49872237	-0.12863937
x13	0.3077747	-0.057174757	-0.22520346	0.01819244	0.13261896	0.01499359

### Appendix 5: Data used in the composite indicator

Objectives	OBJECTIVE 1					OBJECTIVE 2			OBJECTIVE 3		
Dimensions	Demand for market funding		matching, facilitators		Supply of market funding	retail investors' participation	New choices of investments		cross-border investments		Availability of vehicles for retail investment in other Member States
Indicators	Market funding ratio by NFC (X1)	SME use of equity (X2)	value of annual private equity investment relative to nominal GDP (X3)	value securitization instrument relative to bank loans (X4)	breadth of venture K investor base (X5)	direct + intermediated retail investment (X6)	green bond issuance (X7)	fintech equity funding (X8)	cross border holding of equity and investment fund shares (X9)	cross border holding of debt securities (X10)	cross-border UCITS (X11)
Unit of measure	in %	in % of tot funding	in % of nominal GDP	in % of bank loans to domestic non-banks	HHI index from 0-1	in %	in %	in \$	in %	in %	ucits available for sale to retail investors in at least 2 MS
<b>2015</b>	43,3	13,5	0,36	9,2	0,405	59,82	0,78	7 808 650 000	14,12	43,13	6403
<b>2016</b>	43,75	12,8	0,38	8,7	0,276	60,03	1,04	7 805 380 048	14,75	43,52	7256
<b>2017</b>	45,99	12,3	0,46	8,3	0,277	60,30	1,95	7 490 419 920	15,75	44,03	7677
<b>2018</b>	42,78	12,1	0,5	8	0,23	58,56	2,34	14 266 089 872	15,43	44,57	8436
<b>2019</b>	46,48	11,5	0,58	7,3	0,259	59,87	3,9	12 808 909 952	16,25	45,31	9434
<b>2020</b>	47,17	10	0,54	7,2	0,296	59,24	4,81	18 273 539 824	16,69	44,95	10505
<b>2021</b>		11	0,76		0,1142	58,8	10,9	47 534 778 976			

## Appendix 6: Graph of the Prediction on R



## Appendix 7: R code Prediction

```
library(readxl)
ind_comp <- read_excel("~/Downloads/ind-comp.xlsx")
View(ind_comp)
```

```
library(tseries)
library(quantmod)
library(forecast)
library(ggplot2)
library(forecast)
```

### #Dataset

```
ind_comp <- read_excel("~/Downloads/ind-comp.xlsx", col_types = c("date", "numeric",
"numeric", "numeric", "numeric", "numeric", "numeric", "numeric", "numeric",
"numeric", "numeric", "numeric"))
ind_comp
```

### #Variable

```
IC = ind_comp[,c("indicateur composite")]
IC = ts(IC,frequency=1)
```

### #Plot

```
plot(IC)
```

```
F_IC= forecast(IC, h=2)
```

```
F_IC
```

```
autoplot(F_IC)
```

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