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Course of The Economics of Europe

The Impact of Next Generation EU on Productivity:

The Case of the Italian National Recovery and Resilience Plan

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Introduction

In recent years, the world and Europe confronted unprecedented challenges posed by the COVID-19 pandemic. It not only posed a significant public health crisis, causing more than two million deaths in the European continent but also led to severe economic and social disruptions. In response to this crisis, the European Union has taken decisive actions, such as the introduction of the Next Generation EU (NGEU) programme. This initiative represents a paradigm shift in the history of the EU, being a massive policy programme aiming not only to support the immediate recovery from the pandemic, but also to address long-standing structural issues and promote a more resilient, sustainable, and inclusive future for the EU.

As the thesis will demonstrate, the NGEU is a comprehensive plan, encompassing a range of reforms and investments aimed at revitalising the European economy. It seeks to transform and modernise key sectors, focusing on digitalisation, the green transition, and social and territorial cohesion. At the heart of this programme is the Recovery and Resilience Facility (RRF), which provides member states with the necessary financial resources to reach the goals of the programme. A key new feature of the RRF is its performance-based model, which links the funding to the achievement of concrete milestones and targets, introducing a new mechanism into EU public policy.

A central objective of the NGEU is to enhance productivity, a fundamental driver of economic growth and competitiveness. Productivity improvements are crucial for long-term economic prosperity, as they facilitate higher living standards, greater economic resilience, and enhanced global competitiveness. However, the concept of productivity is multifaceted, involving a complex interplay of factors including technological innovation, human capital development, efficiency, and infrastructure. The NGEU aims to influence these drivers through targeted investments and reforms, with the goal of not just restoring pre-pandemic levels of economic activity but also setting the foundations for a more dynamic and competitive European economy.

Italy, with its distinctive economic structure and regional disparities, offers a compelling case for examining the impact of the NGEU on productivity. The Italian economy has historically been characterised by a high prevalence of small and medium-sized enterprises (SMEs), a significant north-south divide in terms of economic development, and persistent challenges in areas such as innovation, education, and public administration efficiency. These

structural issues have contributed to a prolonged period of sluggish productivity growth, making Italy particularly vulnerable to external shocks such as the COVID-19 pandemic. The Italian National Recovery and Resilience Plan (NRRP) is therefore of particular importance and will serve as a key example for the thesis to explain how and to what extent the programme can be beneficial for productivity.

To address all these topics, the thesis is structured as follows:

It begins with an exploration of productivity, dissecting its definitions, measurements, and the key factors that drive it. This includes an examination of different metrics and methodologies used to understand it and an analysis of its importance in the context of economic growth. Subsequently, the thesis provides a global and European perspective on productivity trends, highlighting disparities and identifying the underlying reasons for variations across different regions and economies, and also includes a detailed analysis of the Italian situation.

The discussion then transitions to an in-depth analysis of the NGEU in the second chapter. Here, the focus is on its origins, structure, and objectives, particularly in relation to enhancing productivity. The chapter also examines the structure and functioning of the Recovery and Resilience Facility and assesses its overall economic impact.

In the third chapter, the Italian National Recovery and Resilience Plan is studied in detail, offering insights into how Italy intends to use NGEU funds to tackle its specific economic challenges. This section scrutinises the NRRP's strategic focus areas, such as digital transformation and support for SMEs, and evaluates how these initiatives could potentially influence productivity within the country. Lastly, an analysis of a flagship measure of the NRRP, Transition 5.0, will be conducted, also benefitting from the contributions of the Head of the administration responsible for its implementation, Dr Raffaele Spallone.

1 Productivity: metrics, drivers, and comparative analysis

Productivity is a fundamental driver of economic growth and development. It is a complex economic measure that comprehends a vast array of concepts and phenomena. Albeit difficult to measure and concretely understand, it is a crucial element to consider when one wants to fully grasp the nature of an economy and a society. Indeed, productivity was a key concern of the fathers of modern economics, such as Adam Smith and David Ricardo (Kim, Loayza and Meza Cuadra Balcazar, 2016), and it is considered by some as one of the basic variables governing economic production activities, if not the most important one (Alby, 1994).

The International Monetary Fund (IMF) recently projected global growth to slow to 3% by 2029, and a significant portion of this growth decline is attributed to a slowdown in productivity (Li and Noureldin, 2024). Indeed, as this chapter will try to demonstrate, productivity concerns many economies, particularly Western and European countries. As far as this thesis is concerned, a general analysis of this key variable will serve to correctly understand whether and how the Next Generation EU programme influences it.

Therefore, the primary objective of this chapter is to provide a comprehensive analysis of productivity, focusing on its definition, measurement, and relevance in the global, European, and Italian contexts. To achieve this, this chapter will first provide a definition of productivity in economic terms and explain its significance. After that, an attempt will be made to describe the indicators and metrics most commonly used to measure productivity, such as total factor productivity and labour productivity, and the methodologies that are usually employed will be explained. Moreover, the factors that the literature considers to be beneficial for increasing productivity in an economy will be explained. Finally, an overview of productivity globally, in the European and in the Italian context will be presented through a data analysis covering both historical trends and the current situation.

1.1 Definition and key metrics

1.1.1 Defining productivity

Productivity refers to the efficiency with which an economy converts inputs, such as labour, capital, and materials, into outputs, including goods and services. It is a key measure of economic performance, indicating how effectively resources are utilised to generate value. This depends essentially on two elements: the factors of production and the production function (Mankiw, 2010). While the factors of production are the inputs used to produce goods and services, namely capital (K) and labour (L)[1]; the production function expresses how much output is generated from given amounts of these two elements. Hence, the production function can be represented as follows (where Y stands for the amount of output).

$$Y = F(K, L).$$

Given K and L, the available technology determines how much output is produced.

Measuring the concept of productivity serves a wide range of important purposes. The Organisation for Economic Cooperation and Development (OECD) (2001) identified five key purposes for which productivity measurement is crucial:

1. Technology: measuring productivity ultimately allows for tracing technical change.
2. Efficiency: noticing a change in productivity serves as a way to understand a change in efficiency. This is meant by movements to a best practice or solving organisation inefficiencies.
3. Real cost savings: productivity measurements aim to identify real cost savings by determining how efficiently resources are used to produce goods and services, highlighting opportunities to produce more with the same or fewer resources.
4. Benchmarking production processes: it also facilitates the assessment of production processes, allowing for detailed comparisons between companies and identification of inefficiencies.

[1] In simpler terms capital is constituted by factories, machinery, or offices, and labour by workers. Other types of inputs are materials, services, and energy.

5. Living standards: measuring productivity is a critical element in assessing living standards. Per capita income, the most common measure of living standards, varies directly with labour productivity.

1.1.2 Main indicators and methodologies

Productivity is a useful indicator in a vast variety of studies. This large variety encompasses different lenses of analysis, which can be categorised into two classic groups: macro and micro studies. With regards to productivity, macro studies focus on aggregate productivity, while micro studies measure individual productivity (Del Gatto, Di Liberto and Petraglia, 2011). The first ones study the indicator at a country, regional or industry level, making comparisons. The latter aims at focusing on a firm level.

Selecting one particular productivity measure strictly depends on the purpose of the measurement and the availability of data. Another key distinction, in addition to the macro/micro analyses, is between single factor productivity (SFP) measures and multifactor productivity (MFP) measures (OECD, 2001). SFP relates a measure of output to a single measure of input, while MFP relates a measure of output to a bundle of inputs (Istat, 2018). In other terms, SFP measures represent labour or capital productivity. The former is the most commonly expressed one (McKinsey, 2024). It is typically defined as GDP per hour worked and is considered a key indicator, strictly linked to wage growth. It is one of the most available productivity measures, and it is therefore widely used for international comparisons (OECD, 2023). Indeed, higher labour productivity leads to better wages, improved living standards, and greater purchasing power for consumers. The latter, capital productivity, indicates how well capital is employed to generate output. It encompasses any resource that continues to contribute to production output without being consumed during the production process (Office for National Statistics, 2018). Both labour and capital productivity, when combined, form MFP measures (sometimes referred to as total factor productivity TFP). MFP compares the output to the amount of combined inputs used to generate the output. Hence, it reflects the change in the output that cannot be explained by changes in capital and labour inputs. It reflects the economy's ability to produce more with the same resources through technological and organisational advancements (Diewert and Nakamura, 2007).

1.1.3 Productivity drivers

Productivity is typically considered to be driven by four components: innovation, education, efficiency, and infrastructure (Kim, Loayza and Meza Cuadra Balcazar, 2016).

Innovation consists of the creation of new technologies, products and processes, which have the potential to lead to the development of high-value-added activities. Innovative environments thrive on substantial and ongoing investments in research and development from both public and private sectors. They require a robust supply of skilled scientists and engineers, top-notch research institutions, and companies capable of fostering and supporting innovation. These environments also benefit from strong collaboration between academia and industry, and effective protection of intellectual property rights.

Education enhances human potential by imparting the knowledge and skills needed for economic activities, disseminating and advancing existing technologies and processes that increase industrial productivity, and creating an environment in which new ideas are conceived and developed into innovative technologies. To increase productivity, a country must have a robust education system that ensures universal primary and secondary education, promotes higher education and supports continuing education within universities and industries. This comprehensive approach is crucial to fostering a skilled and qualified workforce that can drive economic growth.

Efficiency refers to the effective and timely allocation of capital and labour through the continuous renewal of enterprises across sectors. Key aspects include sectoral and business renewal and the flexible use of resources. Developed countries have shifted from agriculture to high-value-added industries and services, a process that is ongoing in developing countries. Corporate renewal involves the closure of inefficient companies, the growth of productive ones and the emergence of new ones. Flexibility in the allocation of resources is essential, but regulatory rigidity in many developing countries hinders technology adoption, the formation of new firms and their formalisation.

Infrastructure, encompassing both physical and intangible elements, is crucial for boosting productivity. Physical infrastructure includes transportation, telecommunications, and energy systems, while intangible infrastructure involves robust public institutions and a stable macroeconomic environment. Effective public institutions safeguard intellectual property, ensure transparent policymaking, responsibly manage budgets, provide reliable security, and maintain economic stability.

1.2 Data Overview

1.2.1 A Global and European Perspective

According to McKinsey (2024) over the past 25 years, global productivity has experienced significant growth, with China and India being the primary contributors. Between 1997 and 2022, China increased its output from $6,000 to $40,000 per worker and the median economy productivity has seen a sixfold increase. Thirty emerging economies, representing 3.6 billion people, are rapidly improving; and if this trend continues, they are projected to reach advanced-economy productivity levels within the next 25 years. However, despite notable progress in some regions, overall productivity growth has decelerated since the global financial crisis of 2008. Labour productivity growth has particularly declined in the United States and Western Europe, following a boom in the 1960s. This slowdown in productivity in Japan, the United States, Western Europe, and other advanced economies can be attributed to two main factors. First, the productivity advancements in the manufacturing sector, especially in electronics, leading up to the 2008 crisis, have gradually diminished. Second, there has been a general decline in capital investment across various sectors since the 2008 crisis, likely due to decreased demand and ongoing macroeconomic uncertainties.

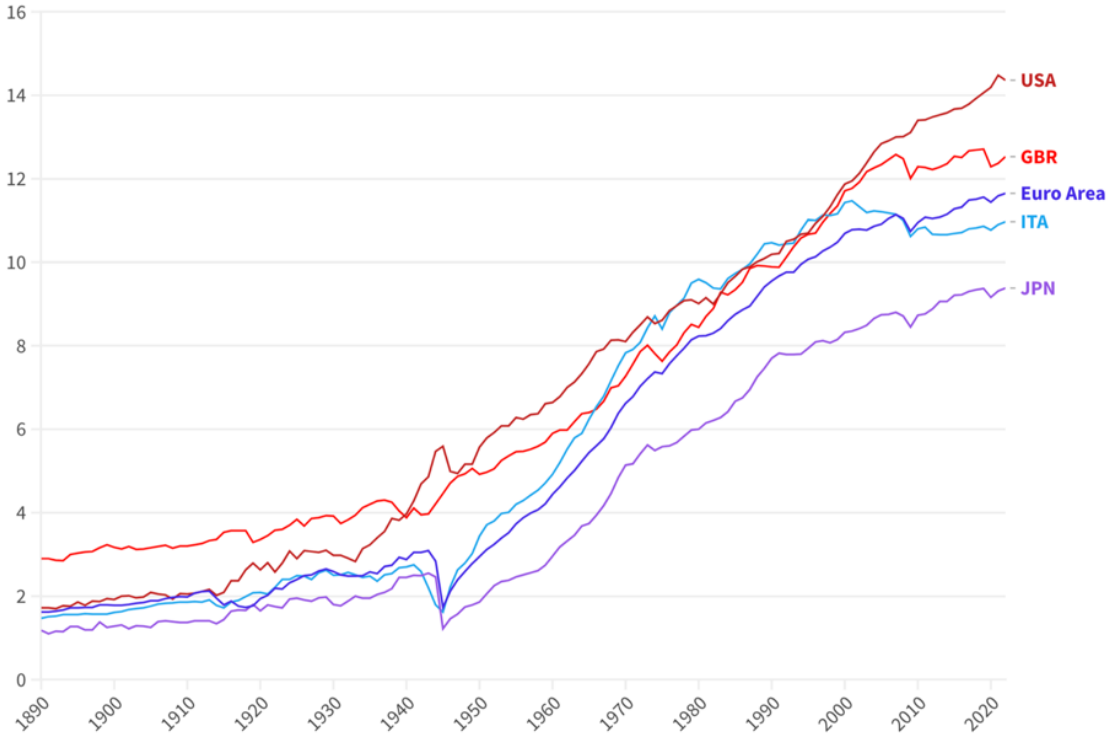
Figure 1 displays the long-term trends in Total Factor Productivity for five major economies: the United States, the United Kingdom, the Euro Area, Italy, and Japan. The USA shows the highest overall growth in TFP over the entire period. Post-World War II, there is a notable acceleration in productivity, particularly during the technology boom starting in the 1980s and continuing through the early 2000s. The UK's TFP growth mirrors that of the USA but at a slightly lower level. The UK experienced steady growth throughout the 20th century with significant increases during the post-war period and the late 20th century economic reforms. The Euro Area, represented collectively, shows robust growth in TFP, particularly during the post-war economic boom. However, growth rates appear to plateau and fluctuate more in the latter half of the 20th century and into the 21st century. Italy's TFP growth is notable but lower compared to the USA and UK. Italy experienced strong growth post-World War II but has shown stagnation and slower growth rates since the 1990s, reflecting economic challenges and structural issues. Japan displays a unique trajectory with rapid TFP growth post-World War II, peaking during its economic miracle in the 1960s and 1970s. However, since the 1990s, Japan's TFP growth has slowed significantly, coinciding with its prolonged economic stagnation. Overall, all regions show a significant increase in productivity following

World War II, reflecting reconstruction efforts, technological advancements, and economic expansion.

Figure 2 depicts the changes in TFP at constant national prices from 1980, indexed to a base of 100. 1980 is taken here as a reference, as it marked the end of the post-World War II economic boom, and the beginning of a period characterised by significant economic restructuring and policy shifts in many countries. Moreover, the early 1980s marked the beginning of the Information Age, with the advent of personal computers and the early stages of globalisation. These factors have had profound effects on productivity growth, and setting 1980 as the baseline allows for the analysis of how these technological and economic changes have played out over time. Key trends that can be deduced from the graph include the rapid increase in TFP for China, reflecting its significant economic reforms and industrialisation efforts. In contrast, advanced economies like the United States and countries in Western Europe show a deceleration in productivity, especially noticeable after the 2008 global financial crisis. The graph underscores the diminishing returns from manufacturing advancements and reduced capital investment in these developed regions. Japan, similarly, shows a stagnation in TFP, aligning with its prolonged economic stagnation post-1990s. The comparative perspective provided by this graph illustrates the divergence between emerging economies, which are catching up quickly, and advanced economies, which are struggling to maintain previous growth rates.

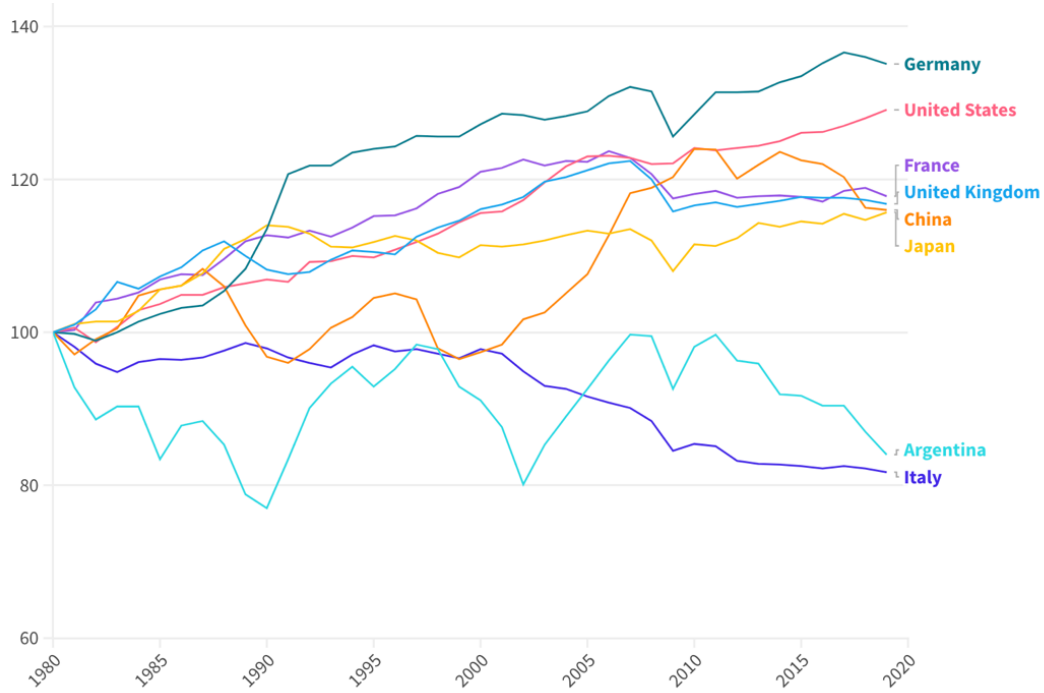
Figure 3 presents data on GDP per hour worked, adjusted for current prices and purchasing power parities (PPPs), for various countries. The graph reveals significant disparities in labour productivity across the OECD countries and selected non-OECD countries. The top performers like Ireland, Norway, and Luxembourg benefit from high-value industries, effective labour policies, and advanced technological integration. Their economic structures and business environments likely contribute to such high productivity. Conversely, countries at the lower end of the spectrum face various challenges. These can include less developed industrial sectors, lower levels of technological advancement, and potentially less effective labour policies and economic strategies. For instance, the lowest performers, such as Colombia and Mexico, struggle with infrastructural issues, lower levels of education and skills among the workforce, and less favourable business environments.

Figure 1: Total Factor Productivity, $US 2010 ppp based, 1890-2022



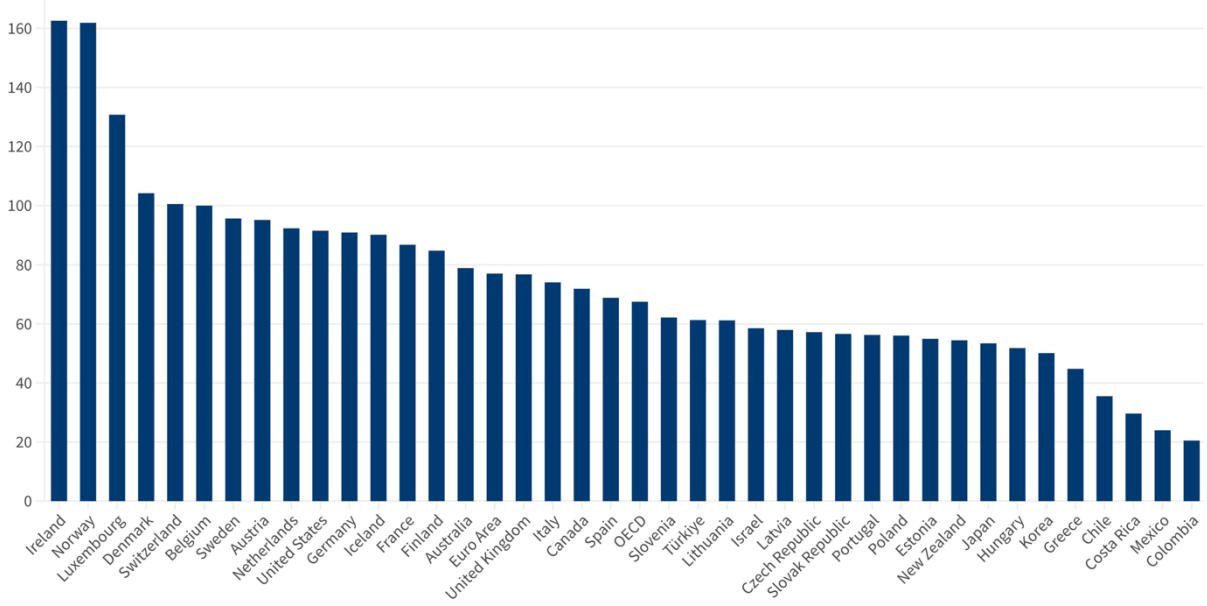
Source: (Bergeaud, Cette and Lecat, 2016), Long-Term Productivity Database. Author's own elaboration.

Figure 2: Total Factor Productivity at Constant National Prices, 1980=100



Source: University of Groningen and University of California, Davis, retrieved from FRED, Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/graph/?g=1qf4X. Author's own elaboration.

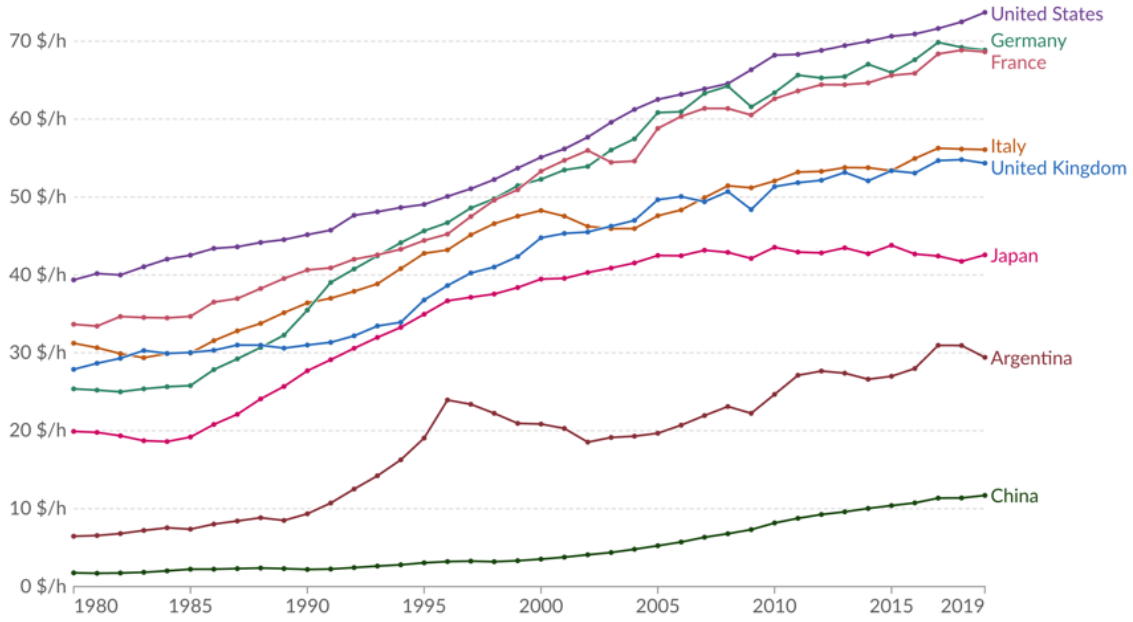
Figure 3: Labour productivity (GDP per hour worked), current prices and current PPPs, 2022



Source: (OECD, 2024). Author's own elaboration.

The following graph (Figure 4) offers a comparative view of several countries from 1980 to 2019 in terms of labour productivity changes. It reveals that the United States, among the selected countries, consistently leads in productivity, reflecting its strong economic performance and technological advancements, with productivity rising steadily from about $39.4 to $73.7 per hour. Germany and France show similar trajectories, starting at around $30 per hour and increasing to $68.9 and $68.6 per hour respectively, indicating robust industrial bases and effective economic policies. In contrast, the United Kingdom and Italy display more varied growth patterns. The UK shows consistent productivity increases while Italy's growth is more volatile, reflecting economic challenges and structural inefficiencies. Japan's productivity trend is unique, with rapid growth until 1990, followed by stagnation and a slight decline, stabilising around $42.6 per hour by 2019, mirroring its economic boom and subsequent stagnation. Argentina and China present contrasting narratives among emerging economies. Argentina's productivity is erratic, starting at $6.5 per hour and peaking at $31 before a slight decline, highlighting economic instability. Meanwhile, China's productivity soars from about $1.8 to $11.7 per hour, underscoring its industrialisation and significant economic reforms.

Figure 4: Labour productivity (GDP per hour worked), international-$ at 2017 prices per hour, 1980-2019



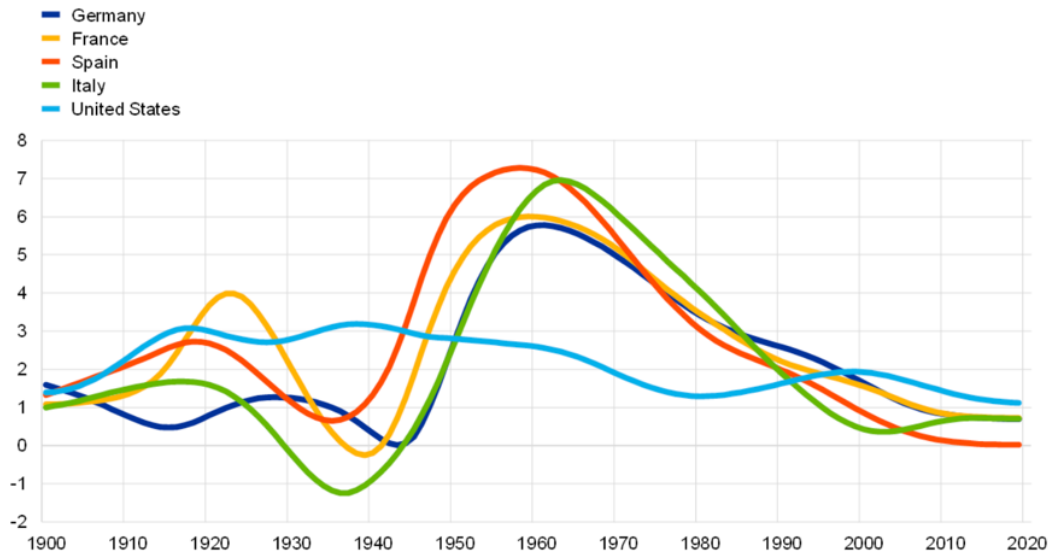
Source: (Feenstra, Inklaar and Timmer, 2015), Our World in Data.

For the countries for which data are available, it is possible to notice a great decline in labour productivity growth starting from the 1960s (Lopez-Garcia and Szörfi, 2021). As Figure 5 shows, GDP per hour worked declined from 7% in 1960 to just 1% in the early 2000s in the European countries analysed. The graph also highlights the difference between these countries with the US, which shows significant volatility in productivity growth, with peaks around the 1940s and 1960s. Germany and France exhibit similar trends, with peaks around the post-World War II period and the 1960s, reflecting their rapid industrial recovery and growth. Their productivity growth rates decline steadily after the 1970s, aligning closely with each other. Spain and Italy also show high growth rates post-World War II, with Spain experiencing a more pronounced peak in the late 1950s. Both countries see a decline in growth rates from the late 1960s onwards. The decline started in the 1960s is caused by "a variety of interacting factors, including global, country-specific, sector-specific, structural and temporary factors, as well as events with potential scarring effects on productivity and potential output growth, such as the global financial crisis" (Lopez-Garcia and Szörfi, 2021, p. 1).

Another detailed analysis by Erixon, Guinea and du Roy (2024) provides a comprehensive examination of the factors contributing to Europe's lag behind the United States in productivity. For the authors, this divergence stems from deep-rooted structural challenges within the European economy that have consistently hindered its ability to keep pace with its American counterpart. A fundamental reason for Europe's productivity shortfall is its comparatively

lower investment in research and development (R&D). R&D drives innovation and technological advancement, which in turn boosts productivity. However, the EU has consistently invested less in this critical area than the US, leading to fewer patents and a slower rate of technological adoption. While the US has steadily increased its R&D expenditure, the EU's growth has been sluggish, widening the gap in innovation capacity. Insufficient investment in intangible capital is another key factor. In today's knowledge-driven economy, intangible assets like software, databases, and human capital are crucial for productivity growth. However, Europe has been slower to invest in these compared to the US, resulting in weaker technological diffusion and overall productivity. Market dynamism is also an issue. A dynamic market environment, characterised by high rates of business creation and destruction, fosters competition and innovation. The US market is marked by such dynamism, ensuring resources are reallocated to the most productive uses, driving economic productivity. In contrast, the EU's markets are more rigid, with slower business creation and lower exit rates, leading to less competitive environments that stifle innovation. Additionally, while the EU is often praised for its trade openness, it has been less successful in attracting foreign direct investment (FDI) compared to the US. FDI is crucial for bringing new technologies and expertise into an economy. The US consistently outperforms the EU in attracting FDI, allowing American firms to access cutting-edge technologies and international expertise that fuel productivity gains. The EU's relative decline in FDI limits its ability to integrate global advancements, exacerbating its productivity challenges.

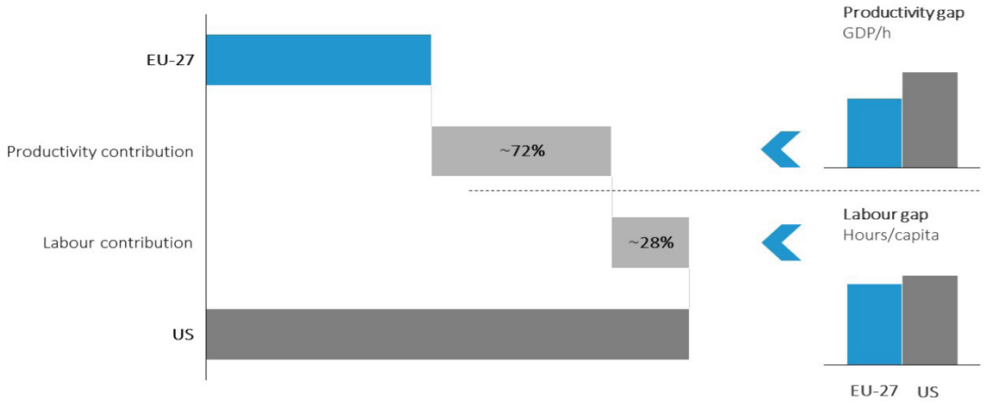
Figure 5: Labour productivity growth (GDP per hour worked) (smoothed annual percentage change), selected euro area countries and the US, 1900-2020



Source: (Bergeaud, Cette and Lecat, 2016; Lopez-Garcia and Szörfi, 2021).

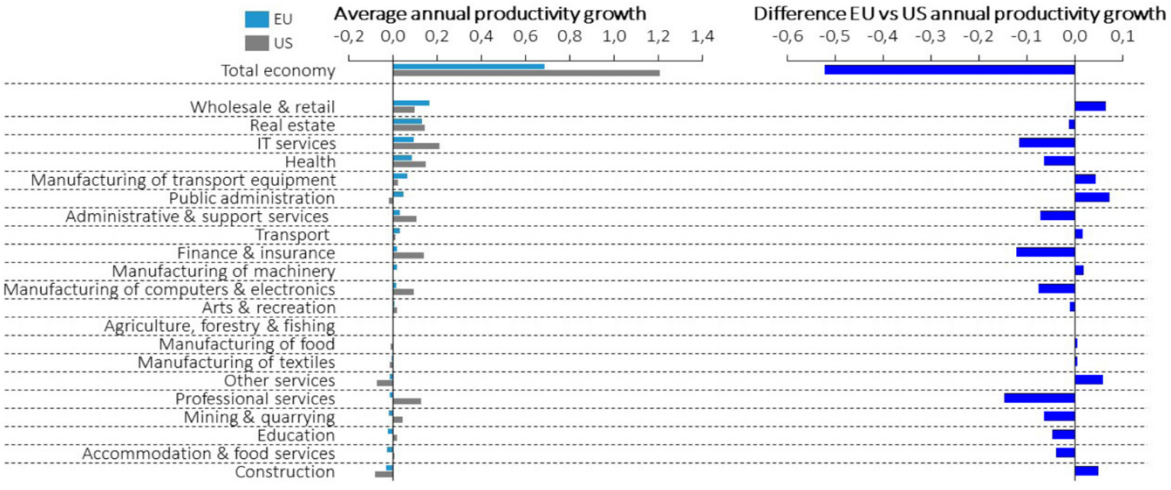
The comparison of EU productivity with the US has been vastly investigated in the recently published Report on the future of European competitiveness by former ECB President Mario Draghi (2024). The report highlights that the gap in per capita GDP between the US and the EU, of about 34%, can be mainly explained by the diverging developments in productivity. Indeed, 72% of this gap with the US is explained by lower EU productivity, as figure 6 shows. This diverging productivity, as shown in part before, is almost entirely attributable to the tech sector. In this regard, Draghi emphasised that Europe failed to capitalise on the first digital revolution led by the internet and is struggling to keep pace with the development of technologies that will drive future economic growth, such as artificial intelligence and quantum computing. Considering these factors, it can be observed that, excluding the tech sector, European productivity would not be so far behind that of the United States, as demonstrated by the breakdown of the gap by sectors in Figure 7.

Figure 6: GDP per capita gap between the EU and the US (2023, constant PPP prices, EUR)



Source: (Draghi, 2024).

Figure 7: Decomposition of average annual labour productivity growth. Selected sectors, US and EU



Source: (Draghi, 2024).
Note: EU is the GDP-weighted average of AT, BE, DE, DK, ES, FI, FR, IT, NL, SE. The values are the average annual labour productivity (GVA per hour worked) growth contributions over the period 2000-2019.

1.2.2 The Italian case

This paragraph delves into the productivity trends of Italy, a country with a rich industrial history yet marked by unique economic challenges, especially concerning productivity. This overview will serve as a basis for understanding the peculiarity of this country and better interpreting the following sections of the thesis.

A study with a wide historical perspective analysed the main economic trends for Italy starting from its year of national unification, 1861 (Giordano, Toniolo and Zollino, 2017). In terms of economic development, Italy significantly trailed the other major industrial nations until the Second World War. However, between 1951 and 1973, Italy quickly narrowed this gap (Figure 8). This was largely driven by an increase in capital intensity and, more importantly, by rapid growth in TFP. By the end of this period, Italy's labour productivity had reached the level of the United Kingdom, although it remained notably behind that of the United States. This gap started to widen again in the 1990s (Bank of Italy, 2017). More precisely, between 1995 and 2007 Italian TFP grew only by 0.2% per year, whilst for instance, it increased by an average of 0.8% in France and 1.5% in the UK and USA. In 2008, the cyclical downturn interrupted TFP growth in all the main industrial countries, but Italy faced an even sharper decrease.

Figure 8: Total Factor Productivity (average percentage changes), selected European countries, 1861-2016

A. Italy	GDP	TFP
1861-1896	1.3	0.3
1896-1913	2.3	0.6
1919-1928	2.7	1.7
1929-1938	1.5	-0.4
1950-1973	6.0	3.5
1973-1993	2.6	1.2
1994-2007	1.7	0.7
2007-2013	-1.6	-0.6
2013-2016	0.6	0.3

B. United Kingdom	GDP	TFP
1871-1891	1.8	0.6
1891-1911	1.7	0.3
1912-1950	1.3	0.6
1929-1937	*2.3*	*1.1*
1950-1973	2.7	1.2
1973-1990	1.1	0.3
1990-2007	2.6	0.9
2007-2013	0.3	-0.5
2013-2016	2.4	1.6

C. United States	GDP	TFP
1869-1889	4.3	0.0
1889-1909	4.2	0.8
1909-1950	3.0	1.3
1929-1937	*0.6*	*0.3*
1950-1973	3.6	1.4
1973-1990	1.5	0.0
1990-2007	3.1	0.9
2007-2013	0.8	2.2
2013-2016	0.6	0.4

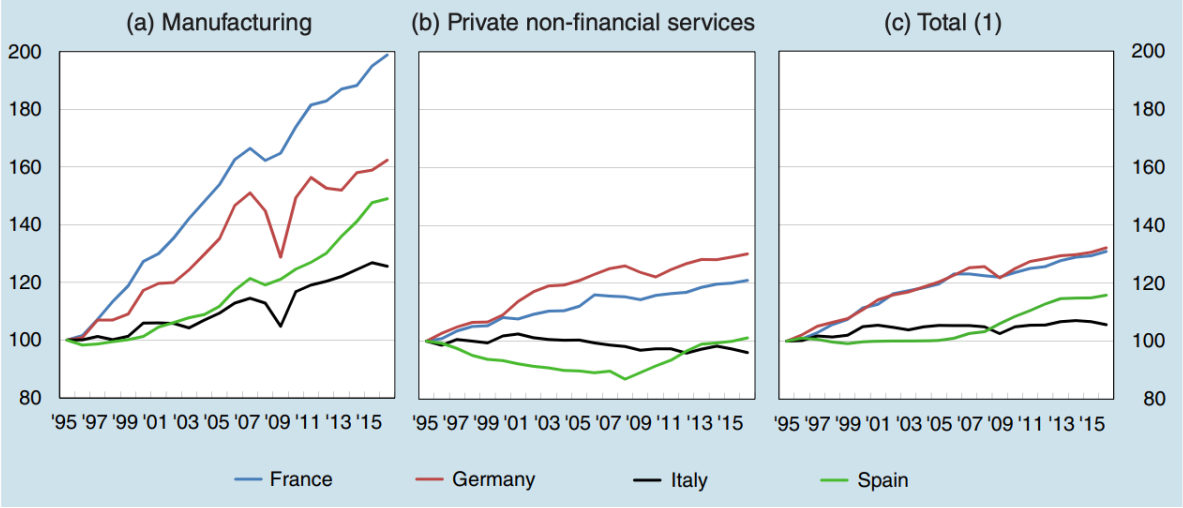
D. Germany	GDP	TFP
1871-1891	2.4	0.7
1891-1911	2.1	0.8
1911-1950	-0.3	0.6
1929-1935	*0.1*	*0.7*
1950-1973	5.4	7.0
1973-1990	4.6	2.3
1990-2007	0.6	1.2
2007-2013	0.7	1.7
2013-2016	0.3	0.6

Source: (Giordano, Toniolo and Zollino, 2017).

Taking into account the differences by sector, it is possible to notice that manufacturing was characterised by an hourly labour productivity growth of 1.6% per year between 2002 and

2007 and accelerated to 1.9% after 2009. On the other hand, private non-financial services declined by 0.4 % per year over the same period, as the following charts show (Figure 9).

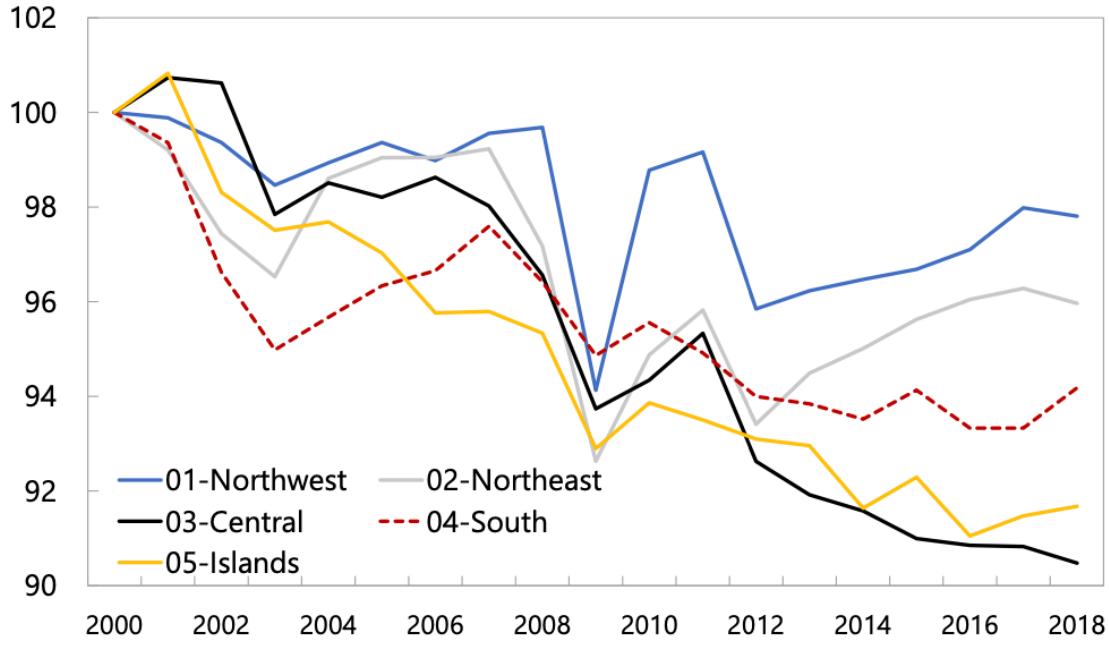
Figure 9: Hourly labour productivity (value added per hour worked at 2010 prices), 1995=100, selected EU countries, 1995-2015



Source: (Bank of Italy, 2017), Eurostat, national accounts. (1) Manufacturing and private non-financial services.

Regional disparities in terms of productivity also characterise Italy. Northern regions are indeed more productive than the rest, but the negative trend includes the entire country (International Monetary Fund, 2022). However, central, southern and island regions have experienced the largest productivity decline over the past two decades (Figure 10).

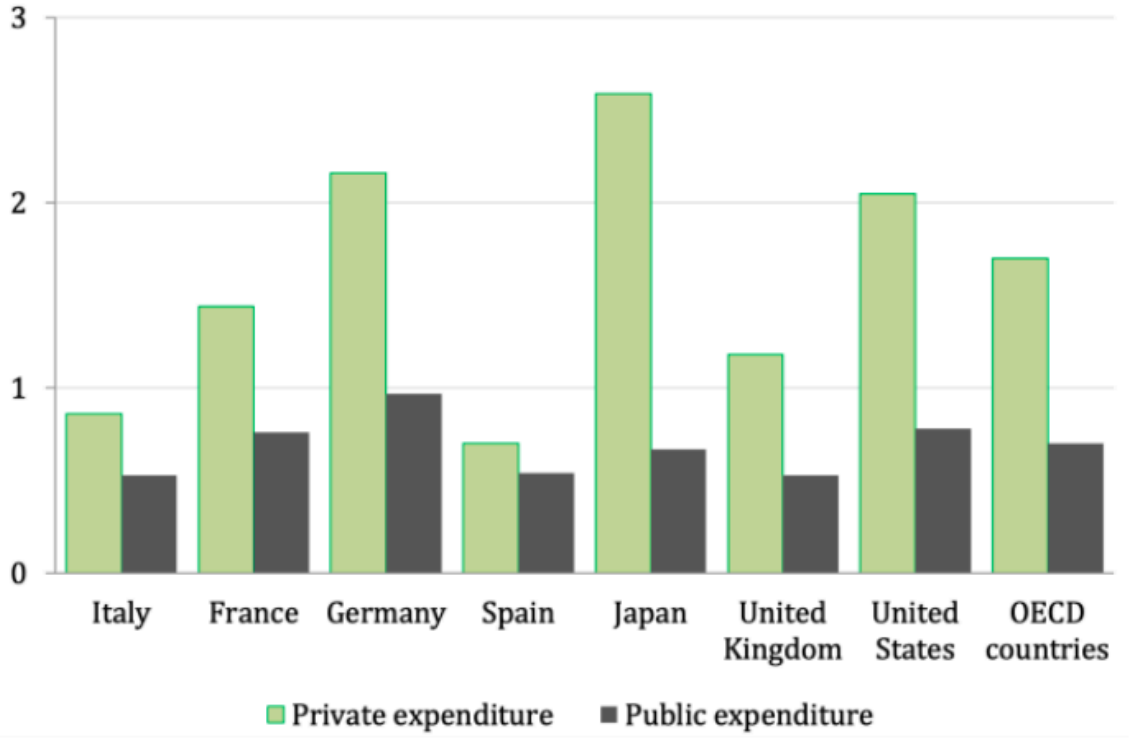
Figure 10: Labour Productivity (Real GVA per employment), Italian macro-areas, 2000=100, 2000-2018



Source: (International Monetary Fund, 2022), Istat.

Visco (2020) identifies the key causes for the Italian low productivity. The first one is innovation. Indeed, the Italian economy in the last decades has been characterised by a very low level of spending on research and development (R&D), with a share of only 1.4% as a share of GDP, against an OECD average of 2.4% in 2018 (Figure 11). This low expenditure can be better understood by looking at the small number of researchers compared to other advanced economies – 5.5 per thousand workers in Italy against slightly less than 9 in the OECD.

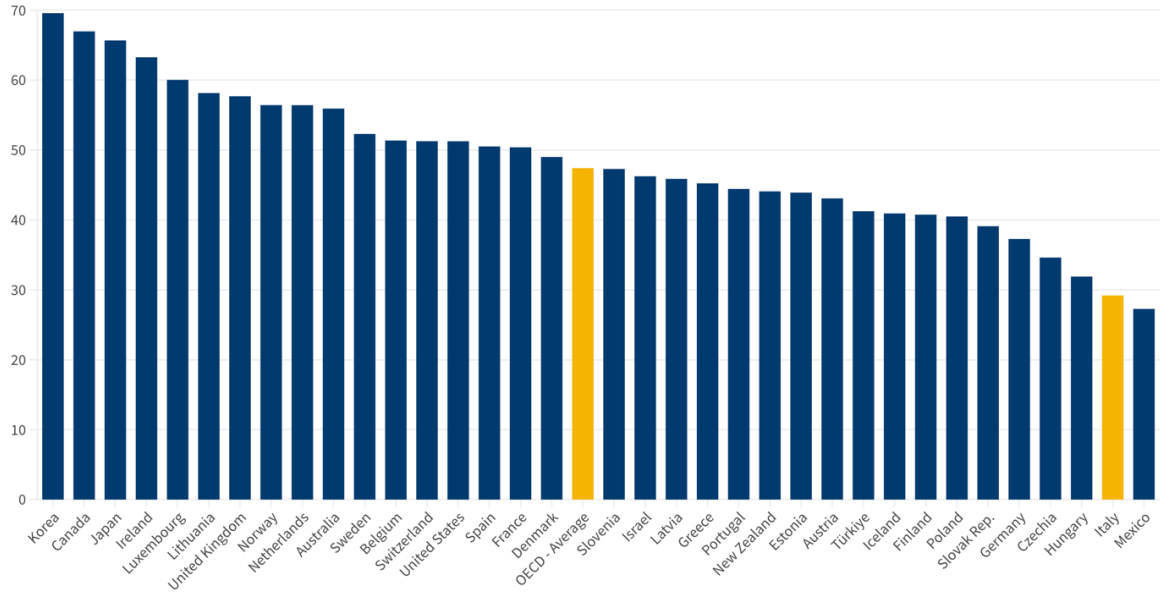
Figure 11: Spending on research and development as a share of GDP, selected OECD countries, 2018



Source: (OECD, 2020; Visco, 2020).

The second cause is human capital. Education is indeed a crucial issue when dealing with Italian productivity, as it affects the levels of skills and knowledge of the labour force. A key indicator to properly understand the issue is the percentage of the population with a tertiary education. As Figure 12 clearly shows, Italy lags far behind the other countries in this indicator. It has a percentage of people with a tertiary level of education of 29.2%, which is incredibly lower than the OECD average of 47.4%, making it the penultimate OECD country in 2022. Moreover, Italian professional tertiary programmes are underdeveloped compared to other countries and valid vocational content inside programmes is still insufficient.

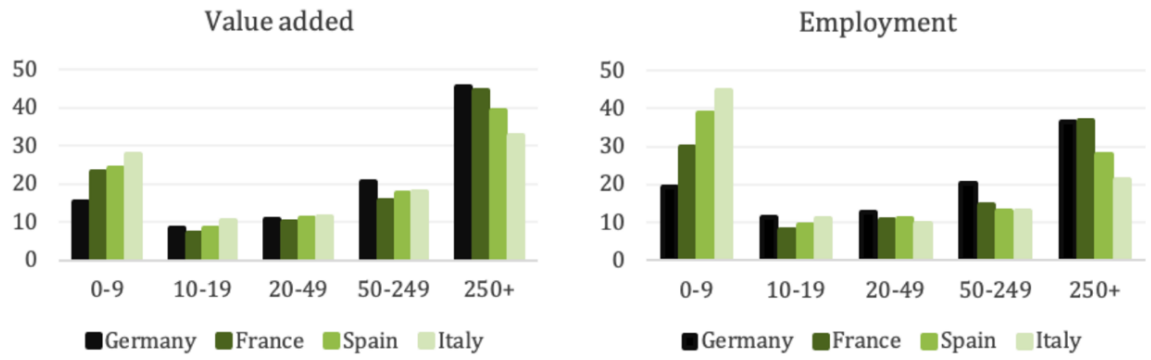
Figure 12: Population with tertiary education, 25-34 year-olds (% in same age group), OECD, 2022



Source: OECD.

The third is the structure of the productive system, and in particular its fragmentation in the country. Italy has very peculiar and problematic features in this regard. 25,000 medium-large firms produce half of the value added of the industrial and non-financial service sector with 6 million employees, while the other half is produced by 4.3 million small firms, involving 6 million employees and 4.8 million self-employed (Figure 13). These data are completely different for countries such as France, Germany and Spain, where the value added produced by large companies is considerably higher and small businesses have a significantly smaller share of the productive system. Despite Italian large firms are often more productive than other countries, a large number of smaller firms – much less productive than the bigger competitors – lowers the average productivity.

Figure 13: Value added shares and employment shares by firm size, selected EU countries, 2016



Source: Eurostat, Structural Business Statistics.

The Bank of Italy (2017) affirmed that the productivity lag with the other advanced economies "can be traced entirely to the country's numerous small and micro firms" (p. 178). Moreover, the productivity levels of these firms are not only lower than those of the larger firms within the country but also with French and German ones of the same size. In this regard, the following charts (Figure 14) extremely well describe the situation in comparison with France, Germany, and Spain. Considering this data, productivity in Italy is markedly affected by the number of micro and small firms.

Figure 14: Labour productivity by size class (1) (value added per worker at 2005 prices, thousands of euros), selected EU countries, 2005-2014

Source: (Bank of Italy, 2017), Eurostat, Structural Business Statistics. (1) Manufacturing and private non-financial services.

2 Next Generation EU and Productivity

The Next Generation EU represents a landmark policy initiative crafted by the European Union. Its significance extends beyond mere financial support, as it embodies a vision of solidarity characterised by coordinated actions and shared objectives. Announced in May 2020, NGEU is a recovery instrument designed to address the economic and social impacts of the COVID-19 pandemic.

This chapter will delve into the various facets of NGEU, examining its origins, structure, and implementation strategies. It will analyse the economic challenges it addresses and the opportunities it creates, with a particular focus on its potential impacts on productivity at the European level. Additionally, it will explore the governance mechanisms underlying NGEU, highlighting the interplay between intergovernmental and supranational approaches, and review complementary initiatives such as REPowerEU that extend and support the original plan.

2.1 Overview of Next Generation EU

2.1.1 Genesis

The genesis of the NGEU can be traced back to the unprecedented economic and social upheaval caused by the COVID-19 pandemic. The first signs that the pandemic could pose a serious threat became evident in March 2020 when Italy, one of the first European countries with cases of infection, had to establish lockdown zones. Gradually, other European countries experienced the spread of the virus, and progressively imposed travel restrictions. This situation destabilised European, as well as global, economies, leading to a profound economic crisis. For this reason, from mid-March 2020, member states had to increase their public spending, heavily burdening their national debts, primarily to cover healthcare expenses and to mitigate adverse economic effects, particularly through financial aid packages for businesses.

Initially, some economic measures were adopted. For instance, the ECB adopted the Pandemic Emergency Purchase Program[2] (PEPP), and on 19 March 2020 the European Commission allowed more flexibility to member states to support their economies, and the Stability and Growth Pact was temporarily suspended. Besides these instruments, in May 2020 France and Germany came up with a proposal for an aid package worth €500 billion to give liquidity to member states. On 27 May 2020, the Commission officially presented the Next Generation EU plan worth €750 billion "to power a fair socio-economic recovery, repair and revitalise the Single Market, to guarantee a level playing field, and support the urgent investments, in particular in the green and digital transitions, which hold the key to Europe's future prosperity and resilience" (European Commission, 2020). In this first proposal, the Commission made it clear that the aim was not to return to the pre-crisis status quo but to create development and redesign the European economy by putting it on new tracks. This proposal was a bold move, advocating for a huge amount of financial resources (around 7% of the EU's GDP) financed through the issuance of European Union bonds, a historic step towards deeper financial integration. The plan aimed to support member states in their recovery efforts by providing grants and loans, focusing on key areas such as digital and green transition.

The adoption process of the NGEU involved intense negotiations among member states, culminating in an agreement at the European Council meeting held from July 17 to 21, 2020 (European Council, 2020). The European Council's conclusions highlighted the consensus on the necessity of the NGEU and the commitment to a collaborative recovery effort. The final adoption of the plan on 14 December 2020 marked a significant milestone in the EU's response to the pandemic, paving the way for its implementation and the subsequent economic revitalisation of the Union. A deadline of 30 April 2021 was set for the submission of the national plans so that the Commission could assess the orientation of the member states.

An interesting analysis by Bressanelli and Quaglia (2021) put the genesis process of the NGEU under the lenses of intergovernmentalism and supranationalism. The authors identify an 'intergovernmental phase' of the genesis process (from February to July 2020) which was dominated by hard negotiations among EU member states. Indeed, the key EU intergovernmental institutions were involved, as discussions took place within the European

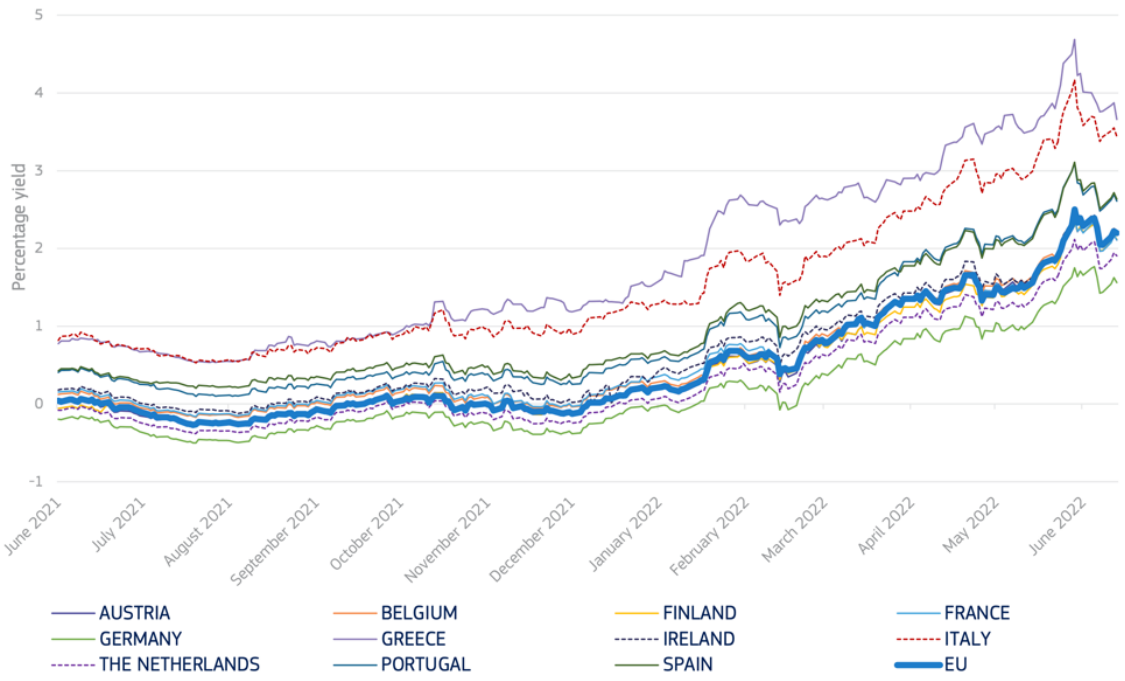
[2] The PEPP was a temporary non-standard monetary policy aimed at countering the economic impact of the COVID-19 pandemic. It involved purchasing up to €1.85 trillion in public and private sector assets to ensure financial stability and maintain favourable financing conditions across the euro area.

Council and the Council of the European Union. These were characterised by tensions between the 'frugal' countries (Netherlands, Austria, Denmark, and Sweden), which favoured loans with stringent conditions, and Southern European countries (Italy, Spain, Portugal, Greece), which advocated for grants and mutualised debt. In July 2020 started the 'supranational phase' which lasted until February 2021, where supranational actors, particularly the European Commission and the European Parliament, played a more significant role. In this period there was the finalisation of the Multiannual Financial Framework (MFF) for 2021-2027 and the presentation of the already mentioned Commission proposal for the NGEU of €750 billion in grants and loans. The authors' analysis also looks at the role of a specific country in the genesis process, Italy. Being one of the hardest-hit countries by the COVID-19 pandemic, Italy played a crucial role in advocating for substantial EU support. Along with other Southern European countries, it pushed for the creation of mechanisms like coronabonds and grants instead of loans, arguing that the traditional loan-based support mechanisms, such as the European Stability Mechanism (ESM), were inadequate due to the high levels of existing public debt. Italy's coalition, which included countries like Spain, Portugal, and Greece, sought more robust support to prevent severe economic downturns. A notable moment was the joint letter signed by nine EU leaders, including Italy's, advocating for the issuance of coronabonds. Italy's internal politics also influenced its stance, with significant debates over the use of ESM funds. Populist and nationalist parties in the country were particularly opposed to taking on additional loans, associating them with external conditionalities and interventions. This internal political landscape shaped Italy's strong push for non-repayable grants and significant financial support from the EU.

2.1.2 Funding and available resources

To finance this huge aid package, the Commission borrows money from the financial markets, leveraging very favourable interest rates, lower than those of many member states (European Commission, no date e) (Figure 15).

Figure 15: Yelds of 10-year EU-Bonds and selected euro area issuers, June 2021 - June 2022

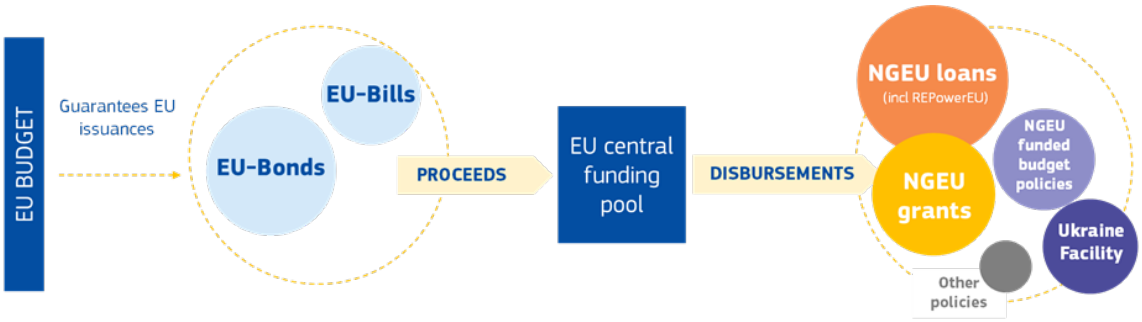


Source: (Freier et al., 2022), Bloomberg data.

Under the unified funding approach, the Commission issues EU-Bonds, pooling the resulting funds into a central reserve. This reserve distributes financial resources to support various EU policy programs, as described in Figure 16 (European Commission, no date b). The EU-Bonds are placed with varying maturities (3, 5, 7, 10, 15, 20, 25, 30 years) and short-term debt instruments, the EU-Bills, which are securities with a shorter maturity of below one year. The Commission is also involved in the green bond market with the NextGenerationEU Green Bonds; in this regard, the Commission is seeking to raise up to 30% of the NGEU funds with these bonds and use them to finance the multitude of green policies of the programme (European Commission, no date a). Moreover, between 2020 and 2022, the EU also issued social bonds to finance SURE, the EU instrument to help secure jobs threatened by the coronavirus pandemic. The financing of SURE represented the first time the EU started borrowing in large volumes to finance one of its instruments from the financial markets (European Commission, 2021c). In general, the EU's high credit rating has helped incredibly obtain favourable borrowing conditions, and, to secure this credibility, the EU will use its budget headroom as a guarantee.

To date, the NGEU funding programme has been demonstrated to be a success, and the reason for this is the credit strength of the EU debt and the general interest in social and green investments (European Commission, 2022a).

Figure 16: The EU's unified funding approach

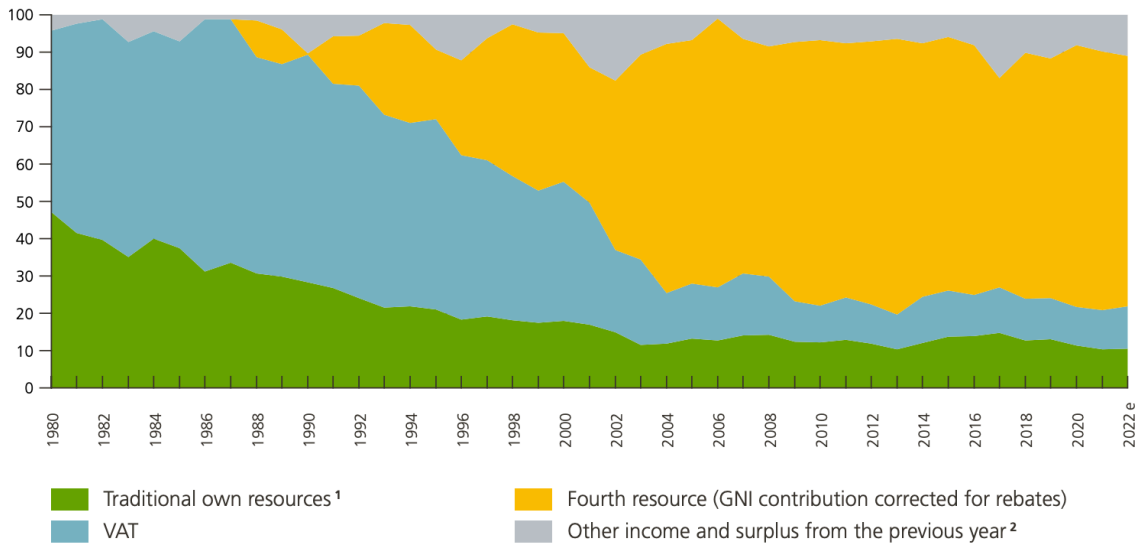


Source: (European Commission, no date b).

The NGEU is intrinsically linked to the Multiannual Financial Framework (MFF), which sets the European Union's budget over seven years. Incorporated into the 2021-2027 MFF as an extraordinary funding plan to address the COVID-19 crisis, the NGEU operates within the overarching budgetary framework provided by the MFF. This integration is crucial for understanding the allocation and distribution of NGEU funds among member states and the priority sectors they target. The NGEU introduces new and temporary financing instruments, such as the Recovery and Resilience Facility, which complement the existing mechanisms within the MFF. The MFF reflects the EU's long-term political priorities, including the green and digital transitions, and NGEU aligns its objectives with these priorities.

The MFF benefits from other sources of revenue: custom duties (25% of the amount coming from the import collected by member states), contributions based on the value-added tax (VAT) collected by member states (0.3% of the VAT bases of member states), direct payments from national budgets states (the amount of the contribution is based on the size of the country's economy), and a new resource based on volume of non-recycled plastic (€0.80 per kilogram) (European Commission, 2021c). This results in the following structure of the EU's revenue (Figure 17).

Figure 17: Structure of the EU's revenue (percentage of the total)



Source: (Bisciari et al., 2021). (1): Customs duties, agricultural levies and sugar levies (minus the compensation which member states receive for collecting costs). (2): Includes the new national contributions on non-recycled plastic packaging waste from 2021.

The multiannual financial framework 2021-2027 is strongly linked with the huge recovery programme of the NGEU. It is completely different from the previous EU budgets, both in its dimension and priorities. In the past, its bulk was directed to agriculture and cohesion, but gradually spending was increased in sectors such as research or external action (European Commission, 2021c). As of now, taking into account the NGEU resources, areas such as education benefit from a huge share of the budget.

The following table (Figure 18) exemplifies the dimension of the total resources employed by the EU to face the crisis and rebuild a stronger Europe.

Figure 18: Multiannual Financial Framework 2021-2027. Total allocations per heading

	MFF (€bn)	Next Gen EU (€bn)	TOTAL (€bn)
1. Single market, innovation and digital	149.5	11.5	161.0
2. Cohesion, resilience and values	426.7	776.5	1,203.2
3. Natural resources and environment	401.0	18.9	419.9
4. Migration and border management	25.7	–	25.7
5. Security and defence	14.9	–	14.9
6. Neighbourhood and the world	110.6	–	110.6
7. European public administration	82.5	–	82.5
TOTAL MFF	**1,210.9**	**806.9**	**2,017.8**

Source: Deloitte.

By breaking down each of the table's headings, it is possible to understand the rationale for the allocated resources.

The first one, ‘Single market, innovation and digital’, is crucial. Future growth for the Union can be secured if investments are allocated towards research, innovation, digital transformation, and strategic infrastructure. Hence, the funds under this section will help finance these areas and tackle challenges such as decarbonisation and demographic change, while also boosting the competitiveness of European enterprises and SMEs. Key programmes include Horizon Europe, InvestEU, and the European space programme.

The second heading is ‘Cohesion, resilience and values’. The spending under this section aims to strengthen cohesion between member states, reduce disparities in and between EU regions, and promote sustainable territorial development. The RRF is the main part of this section, but key funds such as the European Regional Development Fund, the Cohesion Fund, the European Social Fund+, and Erasmus+ are also part of this heading.

Heading 3, ‘Natural resources and environment’, funds the farming, agricultural, and fisheries sectors, helping them become more competitive. Key programs are the European Agricultural Guarantee Fund and the Just Transition Fund.

The fourth heading is ‘Migration and Border Management’. It helps the EU face the challenges of migration and manage its external borders, safeguarding the asylum system within the Union.

Heading 5 is dedicated to ‘Security and defence’. It aims to improve the security and safety of European citizens by strengthening defence capacities and securing tools to respond to security challenges that cannot be addressed by a member state alone.

The sixth heading, ‘Neighbourhood and the World’ aims at reinforcing the EU’s socio-economic impact outside its borders and assisting countries in the phase of accession to the EU.

The last one, the ‘European Public Administration’, helps the EU deliver its priorities and implement its policies by financing the European Union institutions and its officials. It has been quite stable over the years, accounting for less than 7% of the spending under the budget.

As already mentioned, the financial power of the NGEU is €806.9 billion. its composition reflects a complex and multifaceted structure. It is made up of (prices November 2020):

- the Recovery and Resilience Facility – €723.8 billion in grants and loans available to support reforms and investments undertaken by EU Member States;
- Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU) – €50.6 billion to help tackle the economic consequences of COVID-19 in the first years of the recovery;
- additional funding for several other EU programmes in addition to the funding planned in the EU long-term budget 2021-2027:
    - Horizon Europe (€5.4 bn),
    - InvestEU (€6.1 bn),
    - Rural development (€8.1 bn),
    - Just Transition Fund (€10.9 bn),
    - RescEU (€2.0 bn) (European Commission, 2021c).

Going into more detail about these individual entries, the RRF is the central element of the NGEU. Its funds are given to member states in line with their national Recovery and Resilience plans. Under the RRF, up to €338 billions of grants will be financed through the borrowing operations described in the previous paragraph. Member states will also receive additional RRF grants of €17.3 billion financed under the Emissions Trading System (ETS) and €1.6 billion under the Brexit Adjustment Reserve (BAR). Also, the RRF funds in loans (€ 385 billion) are financed through borrowing operations (European Commission, no date c). Moreover, the RRF requires member states to invest at least 37% of allocated funding in climate investments and reforms, and 20% in digital transition.

2.1.3 The Recovery and Resilience Facility. Structure and rationale

As already mentioned, the RRF is the centrepiece of the NGEU. Its large volume of financial resources is key as it allows for heavy investments and useful reforms for member states participating in the programme. Reforms and investments are defined in the member states National Recovery and Resilience Plans (NRRP) – sort of roadmaps which contain the targets and milestones of investments and reforms until 2026 (European Commission, 2021a).

More recently, the RRF, through the new REPowerEU plan[3], also has served as a way to respond to the socio-economic consequences of the global energy market disruption caused by the war of aggression by Russia in Ukraine.

It entered into force on 19 February 2021 and finances EU member states investments and reforms made from the start of the pandemic in 2020 until the end of 2026. As a rule, to receive the funds, member states National Recovery and Resilience Plans had to allocate 37% of their budget to green measures and 20% to digital measures. Another key characteristic, which represents a novelty for its functioning rationale is a performance-based model. In concrete terms, the Commission only funds the countries that achieved the previously agreed milestones and targets[4] of completion of reforms and investments; only this condition allows countries to request the payments, an operation that can be done up to twice a year. Following the request, the European Commission checks the milestones and targets fulfillment, and, in case of success, proceeds with the payment.

However, member states are allowed to revise their plans, but this should be justified according to particular financial aspects, such as objective circumstances that can make the implementation unfeasible, or the opportunity to add the additional REPowerEU funds to the national plan.

The RRF is composed of a six-pillar structure (European Commission, no date d):

1. *Green transition*

In alignment with the European Green Deal as Europe's sustainable growth strategy and the goal of achieving climate neutrality by 2050, the RRF supports the integration of climate action and environmental sustainability. To achieve this, the measures funded by the RRF

[3] The REPowerEU plan aims at reducing the EU's dependence on Russian fossil fuels in response to the energy crisis exacerbated by the war in Ukraine. The plan focuses on accelerating the transition to renewable energy, improving energy efficiency, and diversifying energy supplies to enhance the EU's energy security and achieve climate goals faster.

[4] Milestones and targets are specific goals set for the implementation of the Recovery and Resilience Plans that member states must achieve to receive disbursements of funds. On the one hand, milestones are qualitative achievements, such as the completion of legislative reforms or the implementation of new policies, on the other hand, targets are quantitative benchmarks, like achieving a certain percentage of renewable energy usage or reducing unemployment rates by a specific amount.

should promote the green transition. Member states have proposed reforms and investments in green technologies and capacities, such as sustainable mobility, energy efficiency, renewable energy, climate change adaptation, circular economy, and biodiversity. Moreover, as already mentioned, each member state must allocate at least 37% of the resources of their plans to measures that contribute to these climate objectives. In total, the pillar includes 3,191 milestones and targets into 1,213 measures.

2. *Digital transformation*

Reforms and investments in digital technologies, infrastructures, and processes aim at enhancing the Union's resilience and innovative potential and play a key role in reducing the EU's external dependencies by diversifying critical supply chains. In this regard, the RRF supports reforms and investments aimed at promoting the deployment of very high-capacity networks, the digitalisation of public services and government processes, the digitalisation of businesses, particularly SMEs, the development of basic and advanced digital skills, and measures supporting digital-related R&D and the implementation of advanced technologies. Member states must allocate at least 20% of their recovery and resilience plan to measures being part of this pillar. The digital transformation pillar includes 2,458 milestones and targets and 926 measures.

3. *Smart, sustainable and inclusive growth*

Within this third pillar, member states will use RRF funds to make their economies more competitive. Indeed, it will fund entrepreneurship, competitiveness, industrialisation and reindustrialisation, but it will also help to renovate buildings, improve the business environment, foster research, development and innovation, and support SMEs. This pillar includes 3,296 milestones and targets and 1,284 measures.

4. *Social & territorial cohesion*

Among the key objectives of the RRF, is the willingness to promote social and territorial cohesion and to mitigate the social impact of the crisis. This means contributing to fighting poverty and tackling unemployment issues the member states are facing. These measures should contribute to improving social and territorial infrastructure and services, helping the inclusion of disadvantaged groups, supporting employment and skills development, and boosting the creation of high-quality and stable jobs. This pillar comprises 2,881 milestones and targets and 1,129 measures.

5. *Health, and economic, social and institutional resilience*

The fifth pillar objective is to increase crisis preparedness capacity, following the awareness created by the pandemic experience regarding the healthcare sector. Member states, thanks to the RRF, will commit to improving long-term care and the whole sector by advancing digitalisation and increasing the effectiveness of the public administration and judicial system. It includes 2,503 milestones and targets and 992 measures.

6. *Policies for next generation*

A key part of the RRF is dedicated to the next generations. Measures concerning children and youth are indeed essential to alleviating the impact of the COVID-19 crisis. RRF measures help in this regard by including support for general, vocational, and higher education, with a focus on digital education, childhood education, and youth employment. The Policies for next generation pillar includes 663 milestones and targets into 276 measures.

In addition to these policy priorities, member states must also use the RRF funds to address the Country Specific Recommendations (CSRs) outlined by the Council of the EU during the European Semester of 2019 and 2020.

As already mentioned, a novelty in the system governing the RRF is that it is 'performance-based', as the disbursement of the funds is contingent on the completion of the milestones and targets previously set. The linkage between the disbursement of funds and the successful completion of reforms and investments allows for stronger incentives for member states to implement them (Freier *et al.*, 2022). Moreover, the ongoing assessment of milestones and targets reinforces national ownership and accountability, also promoting stronger and more effective dialogue between the Commission and the member states.

In March 2023 entered into force a key amendment of the RRF Regulation, which integrated the new provisions related to REPowerEU. Following the energy crisis caused by the war of aggression of Russia in Ukraine, and the resulting high inflation and supply chain disruption, the amendment provides additional support for reforms and investments aimed at diversifying energy supplies, increasing energy savings, and accelerating the clean energy transition (European Commission, 2024a). By February 2024 all member states requested to modify their RRPs and 23 of them submitted a REPowerEU chapter.

The allocation of funds among the member states is defined in the EU Regulation establishing the RRF[5], which establishes that contributions are distributed to member states according to both the severity of the impact of the COVID-19 pandemic and the country's economic dimension. The precise criterion for the allocation of resources is defined in the aforementioned regulation, and it is the following:

> *70 % of that maximum financial contribution should be calculated on the basis of the population, the inverse of the GDP per capita and the relative unemployment rate of each Member State. 30 % of that maximum financial contribution should be calculated on the basis of the population, the inverse of the GDP per capita, and, in equal proportion, the change in real GDP in 2020 and the aggregated change in real GDP during the period 2020-2021.*

This rationale made it possible for central, eastern, and southern member states to receive larger shares of grants in percentage of their GNI, while they are far less substantial in northern and western European countries (Bisciari *et al.*, 2021). Then, it is important to notice that all member states have requested grants under the RRF, but only a part of them have also requested loans.

2.1.4 Governance, implementation, and oversight

According to Article 8 of the aforementioned regulation, the European Commission is entitled to the direct management of the implementation of the RRF but member states retain a key responsibility over it (Lilyanova, 2023). The implementation of the measures is indeed made by the member states, respecting EU budgetary rules and procedures. To facilitate compliance, the regulation also provides that milestones and targets are clear and measurable, with clear and well-defined indicators. Among the other actors involved there are also the EU's control and investigative bodies, the European Anti-Fraud Office (OLAF) and the European Public Prosecutor's Office (EPPO), but also the European Court of Auditors (ECA), which is responsible for examine payments as EU's external auditor. Moreover, the European Parliament plays a pivotal role in scrutinising the implementation by ensuring accountability and transparency. Member states have the responsibility to prevent and detect possible fraud or corruption and avoid double funding. In case of irregularities of such nature, member states must take action by recovering funds, or cancelling contracts, keeping the Commission

[5] Regulation (EU) 2021/241 of 12th February 2021.

informed of all suspected fraud. Member states are also obliged to set up an internal control system and indicate in the NRRPs a body in charge of the audits of the RRF.

The oversight responsibilities in the implementation process are summarised in the following table (Figure 19):

Figure 19: Oversight duties in the RRF implementation stages

Ex-ante	Throughout implementation	Ex-post*
Member States: - describe in the NRRPs the national control systems to prevent, detect and correct corruption, fraud and conflicts of interest, and to avoid double funding from other EU programmes; - define the audit and control bodies and their capacity; - describe relevant measures and arrangements for collecting and making available of data on final recipients. **The Commission:** - assesses the adequacy and robustness of national audit and control systems for the RRF, presented in the NRRPs; - sets relevant milestones and targets to be met before the first payment requests.	**Member States:** - investigate and take corrective measures if irregularities are detected; - submit their payment requests, accompanied by a management declaration and summary of audits to justify the completion of milestones and targets. **The Commission:** - examines payment requests with the evidence presented and external sources, and asks for more detailed information where it deems necessary; - can reduce or recover funds in cases of irregularities if Member States do not act on them; - performs system audits on the milestones and targets system, based on the financing agreement; - performs system audits on serious irregularities or serious breaches of the financing agreement; - performs system audits (at least one per Member State) on measures taken to protect the EU's financial interests; - performs dedicated audits on achieved milestones and targets.	**The Commission:** - performs audits of milestones and targets, reported by the Member States following a risk assessment; - performs system audits of the monitoring data collection systems (before or after payment); - performs system audits of measures to protect the EU's financial interests, and ad hoc audits where serious irregularities are suspected; - proportionately recovers funds in case milestones and targets assessed as fulfilled have been reversed. **Based on the financing agreement, ex-post audits can be carried out up to 5 years from the date after the last payment has been submitted.*

Source: (Lilyanova, 2023).

2.1.5 A permanent instrument?

According to Allemand *et al.* (2023) Transforming the NGEU into a permanent instrument represents a pivotal opportunity to address some of the EU's most pressing structural challenges, including fiscal coordination, democratic legitimacy, and the provision of public goods. The temporary nature of NGEU, while effective in responding to the immediate economic fallout from the pandemic, highlights significant limitations in the EU's existing fiscal framework. Indeed, the authors affirm that to ensure long-term economic stability and resilience, there is a compelling need to establish NGEU as a permanent instrument. This transition would not only support ongoing growth and resilience-oriented reforms but also create a central fiscal capacity capable of macroeconomic stabilisation and financing European public goods.

The establishment of a permanent NGEU involves addressing substantial legal, institutional, and political hurdles. Revising EU treaties could be one avenue to achieve this, providing a solid legal foundation for a central fiscal capacity. Alternatively, new intergovernmental arrangements, modelled on mechanisms like the European Stability Mechanism, could offer a viable path forward without immediate treaty changes. One practical step towards this goal is the proposed creation of a European Public Investment Agency. This agency would be instrumental in planning and implementing investment projects across member states, ensuring that the provision of public goods is both efficient and aligned with European priorities.

A permanent NGEU would fundamentally shift the EU's approach to fiscal policy. By financing public goods through a truly European tax system, rather than relying on national contributions, the EU could enhance its democratic legitimacy and foster deeper integration. This central fiscal capacity would not only support traditional economic objectives but also address broader societal demands for environmental sustainability, digital transformation, and social cohesion. Moreover, the authors believe that aligning a permanent NGEU with the reform of the Stability and Growth Pact is crucial. This alignment would ensure that the necessary fiscal space is available within the EU, balancing fiscal discipline with the need for strategic investments. The move towards a permanent NGEU thus offers a strategic opportunity to rectify the depoliticisation of EU policies. It opens a window for a breakthrough to a more political Europe, where fiscal policies are not only coordinated at a supranational level but are also democratically accountable and responsive to the needs of European citizens.

However, the authors highlight several potential drawbacks to making the NGEU a permanent tool. They express concerns about deepening economic divides between wealthier northern countries and economically weaker southern countries, which could lead to perceptions of perpetual financial transfers without mutual benefits for the formers. There are also risks to national democratic processes, as increasing fiscal authority for EU institutions might limit the fiscal autonomy of national parliaments, potentially fueling Euroscepticism. Legal and institutional challenges are also significant as treaty reforms are politically complex and likely to face strong resistance. The authors also worry about potential inefficiencies in fund allocation, as a centralised fiscal capacity might not align with the specific needs of individual member states, leading to suboptimal investments.

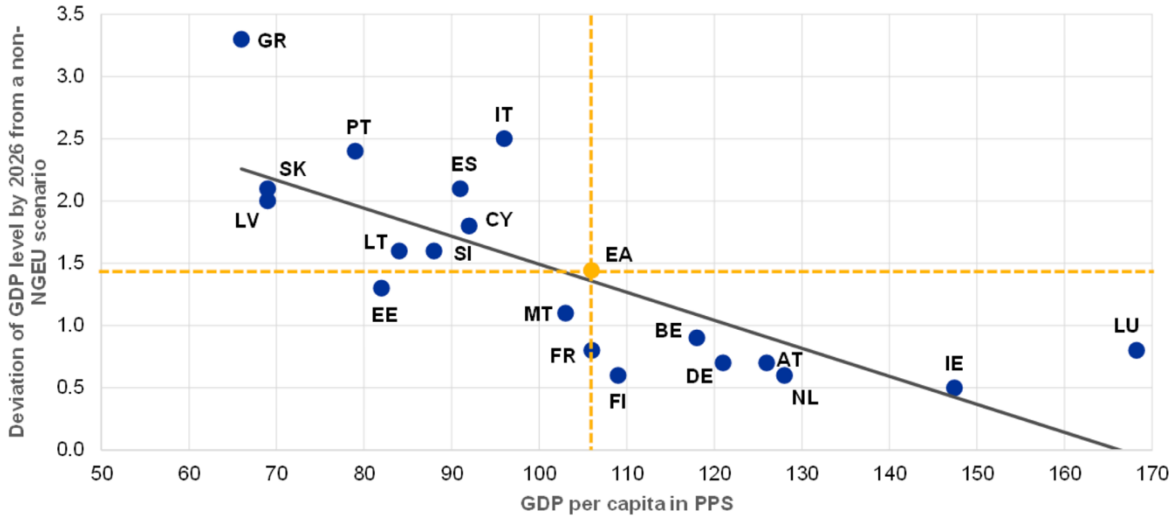
2.2 The NGEU and RRF economic impact

2.2.1 General economic impact

According to Freier *et al.* (2022) almost 80% of the RRF funds are expected to be directed toward investments with high fiscal multipliers in the euro area countries, and only a residual part is dedicated to subsidies and social payments (mostly limited to the early years of the programme), allowing for a stronger impact on macroeconomic variables. Moreover, the investments are expected to be more productive when combined with structural reforms. Investments can directly increase the capital stock, enhancing TFP and generating employment, contributing to output. However, the authors admit the possibility of lower-than-expected absorption rates and even a reduction in non-RRF investments.

In this regard, figure 20 illustrates the projected impact of the NGEU initiative on the GDP levels of various euro area countries by 2026, in relation to their GDP per capita in 2019. It highlights how countries with different economic standings are expected to benefit from this significant EU recovery plan. On the horizontal axis, is represented the GDP per capita for 2019, with the EU average set as a baseline of 100. The vertical axis shows the deviation in GDP by 2026, comparing the expected GDP level with and without the NGEU. Essentially, this axis measures the positive impact of the NGEU on each country's economy. The general trend, depicted by the downward-sloping regression line, suggests that countries with lower GDP per capita in 2019 are likely to experience a more significant boost in their GDP by 2026 due to the NGEU. This is an important observation, as it implies that the NGEU is particularly beneficial for countries that were economically weaker before the pandemic. For example, Greece, which had a lower GDP per capita, is projected to see a substantial increase in GDP, indicating a strong positive impact from the NGEU. In contrast, Luxembourg, with the highest GDP per capita in 2019, is expected to experience a relatively modest increase in GDP.

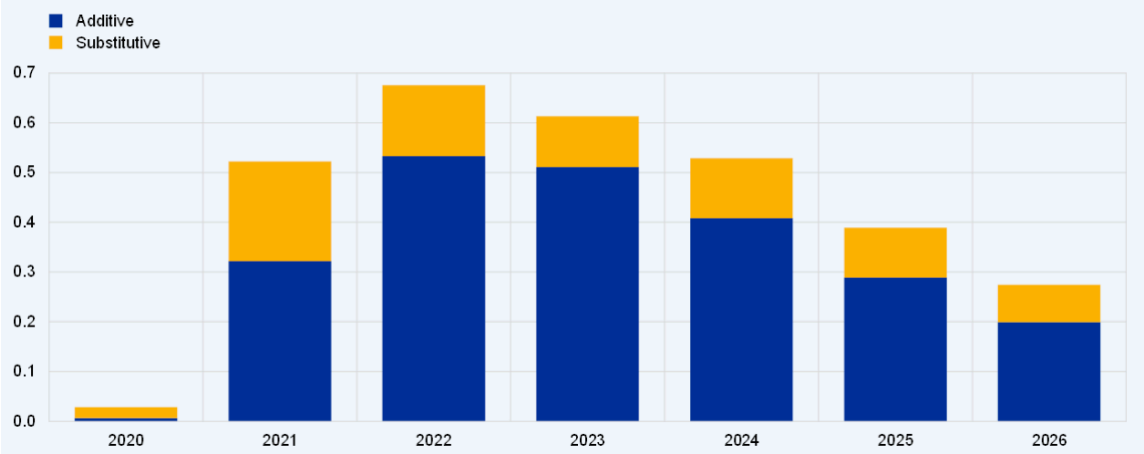
Figure 20: Estimated impact of NGEU on GDP level by 2026 and 2019 GDP per capita, Euro area 19 (x-axis: EU27=100, 2019; y-axis: percentages)



Source: (Pfeiffer, Varga and in 't Veld, 2021; Freier *et al.*, 2022).

To properly assess the economic impact of the NGEU and RRF is crucial to distinguish 'additive' expenditure from 'substitutive expenditure'. According to the calculations reported by Freier *et al.* (2022), 23% of the grants are in fact to be defined as 'substitutive', as they are used to finance fiscal measures that would have been undertaken even in the absence of the NGEU and therefore do not have an additional economic effect. However, as much as 77% of the loans and grants are used to finance 'additive' fiscal measures, with important impacts on GDP, as depicted in figure 21.

Figure 21: Amount of RRF funding used for additive vs. substitutive fiscal measures (percentage of GDP)

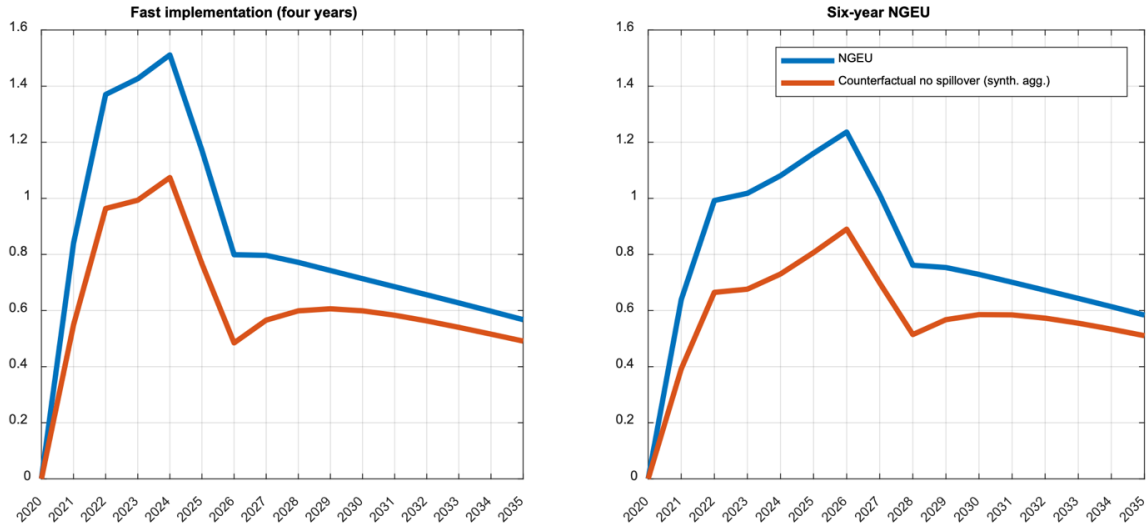


Source: (Freier *et al.*, 2022), Eurosystem and ECB assumptions.

A key analysis conducted by the European Commission (2021a) also considered the spillover effects generated by the NGEU. With a complex and precise methodology, the authors elaborated a model that found that the GDP effects are around one-third larger when accounting

for spillover effects. Moreover, the analysis revealed a huge positive impact of the NGEU on real GDP, which is estimated to be more than 1.2% higher in 2026 compared to a situation of no-policy change (Figure 22). Furthermore, the authors found that a faster implementation would imply a larger peak in the positive effects. By looking at the member states singularly, the authors also found that even countries receiving smaller shares of the funds benefit incredibly from spillovers coming from other countries' RRPs. The GDP growth due to the NGEU of some countries such as Luxembourg or Ireland, which receive very modest allocations, can be indeed explained almost entirely by the positive effect of spillovers.

Figure 22: The role of spillovers for EU GDP growth



Source: (Pfeiffer, Varga and in 't Veld, 2021).
Note: This graph reports the level of real GDP in percent deviation from a no-policy change (no-NGEU) baseline. Blue lines show simulation results from a simultaneous investment stimulus (NGEU). Orange lines display a synthetic EU-wide GDP (weighted average) obtained by aggregating stand-alone 27 simulations with unilateral stimulus in each country. All values are yearly averages of the quarterly series.

A recent study (Creel and Kaiser, 2024) reviewed the literature concerning the multiplier effect of spending since the pandemic crisis. It was found in several studies that the multiplier was close to zero, but in several other studies, it was above one. Furthermore, it was shown that the impact of the NGEU differs significantly depending on the economic circumstances of a given country and the specific timing at which funds were allocated. Even if NGEU loans could be seen as similar to domestic debt-funded public spending, they present higher fiscal multipliers. NGEU grants, not presenting immediate interest costs, are in fact "expected to yield higher fiscal multipliers" (p. 6).

2.2.2 Productivity drivers within the RRF

Even considering the lack of specific literature on the effect of the NGEU and RRF on productivity at the European level, it is still possible to analyse the programme to identify

which of its parts can act most on this front and with what intensity, also considering the elements described in the first chapter of this thesis.

By looking at the pillars of the RRF it is possible to select the most fitting ones helping boost productivity. This section will then look more in detail at some of the specifics of the Facility, to help understand their possible effects on productivity, using case studies and analysing single NRRPs' measures.

Digital transformation

One of the key aims of the digital transformation pillar is to boost digital skills across the Union. As already explained, technology is a key driver for productivity, however, it often, if not always, requires specific and specialised skills and professionals to get the best out of it. In this regard, the RRPs built by the member states are rich in measures able to increase it through investments and reforms. In total, more than 25 billion euros will be spent on this section which aims at increasing digital skills levels for the general population, public sector workers, SMEs, the unemployed, and increasing the number of ICT specialists (European Commission, 2022b). This last measure includes the development of training modules in advanced digital technologies and their inclusion also in higher education courses and vocational training. In terms of reforms, active labour market policy will in some cases include retaining the right to unemployment benefits during the participation in trainings concerning digital skills.

A good practice in this regard is represented by the Latvian plan, which includes a measure to increase the number of specialists with advanced digital skills in the country. Some training modules will be developed and included in bachelor, master, and doctoral courses, as well as in educational programmes for professionals in enterprises concerning topics such as quantum, high-performance computing, and language technologies.

Another example is Spain, which is developing training programmes for digital skill development for managers and experts in SMEs, especially for female professionals in the ICT sectors. The objective is to target groups of workers where digital skills are currently low and raise their efficiency and productivity.

Smart, sustainable and inclusive growth

A key part of the 'Smart, sustainable and inclusive growth' pillar is dedicated to supporting the European SMEs. SMEs are the backbone of the European economy, representing 99% of all businesses, employing two-thirds of the EU workforce, and accounting for more than half of the value added (European Commission, 2024b). However, they face significant challenges,

such as limited access to finance, barriers to market expansion, and difficulties in adapting to new technologies. The RRF addresses these issues through targeted reforms and investments aimed at enhancing the competitiveness, sustainability, and digitalisation of SMEs. One of the primary ways the RRF supports SMEs is by improving their access to finance. This includes the development of financial instruments like guarantees, loans, and equity financing specifically designed to meet the needs of SMEs.

For instance, Croatia's RRP includes a range of financial instruments that offer more favourable financing conditions, including grants and loans aimed at supporting SMEs in their green transition and innovation efforts. Additionally, by improving the overall business environment through the reduction of administrative burdens and regulatory simplification, such as the reforms in Greece and Hungary, SMEs are better positioned to focus on growth and innovation. The RRF also prioritises the digital transformation of SMEs. Many small businesses struggle to adopt new technologies due to financial constraints or lack of expertise. The RRF addresses this by providing direct support for digitalisation initiatives. For example, Portugal has implemented a comprehensive digital transition package for SMEs, including financial incentives and digital commerce accelerators expected to benefit around 25,000 SMEs. These efforts not only help SMEs modernise their operations but also enhance their competitiveness in an increasingly digital market. Furthermore, the RRF supports the green transition of SMEs, which is essential for sustainable growth. Investments in energy efficiency, waste management, and renewable energy technologies enable SMEs to reduce their environmental footprint while also cutting costs and improving long-term viability. Latvia, for instance, has introduced a financial instrument to encourage SMEs to adopt renewable energy technologies and improve energy efficiency, demonstrating the practical impact of the RRF's green policies on SME operations.

Policies for the next generation

The support for education within the 'Policies for the next generation' pillar of the RRF is fundamental not only for enhancing the quality, inclusiveness, and effectiveness of education systems across the European Union but also for boosting productivity in the long term. Education and training systems in the EU face significant challenges, such as educational inequalities, underachievement in basic and digital skills, and the risk of early school leaving, which directly impact the future workforce and, consequently, productivity. By prioritising the digitalisation of education, the RRF equips students with essential digital skills that are increasingly required in the workforce.

For instance, Spain's €1.4 billion investment in the digitisation of schools will not only bridge the digital divide but also ensure that students, especially those from disadvantaged backgrounds, are better prepared for future jobs that demand digital competencies (European Commission, 2021b). This focus on digital skills is critical, as a more digitally literate workforce can improve the efficiency and innovation capabilities of businesses across the EU.

Another critical area of focus is early childhood education and care (ECEC). Investments in ECEC are designed to increase participation rates, particularly among disadvantaged groups, thereby reducing educational inequalities from the earliest stages of learning. For example, Croatia's plan includes both reforms and investments aimed at increasing access to ECEC by creating 22,500 new places and improving the affordability of these services. These measures are complemented by investments in training more teachers and improving the quality of early childhood education. Furthermore, the modernisation of higher education and vocational training through the RRF directly impacts the alignment of educational outcomes with labour market needs. Latvia's comprehensive higher education reform, which includes revising governance and funding models, is designed to produce graduates with skills that are in high demand in the modern economy.

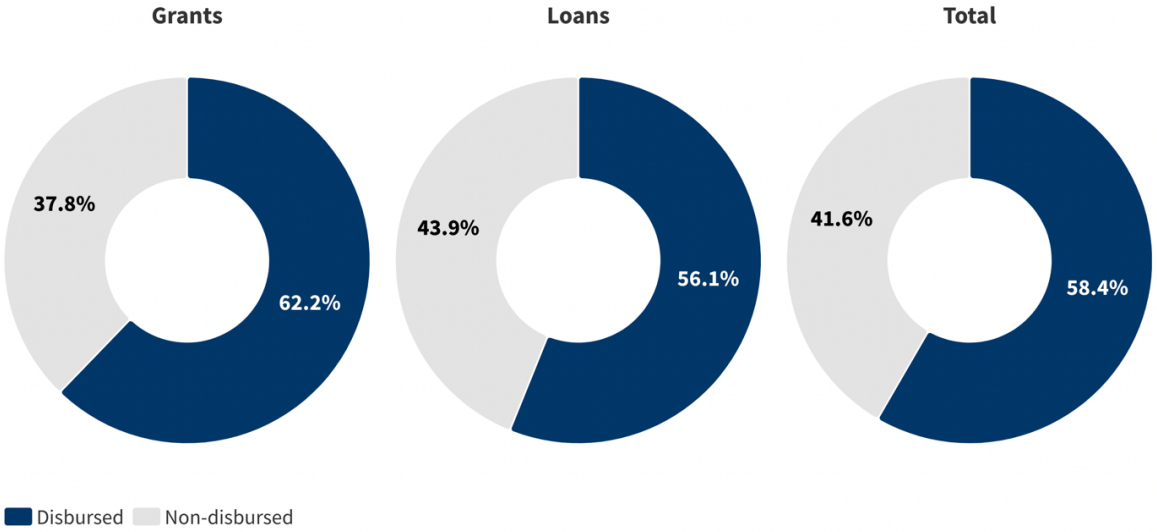
3 The Italian NRRP and productivity

3.1 The Italian NRRP

In the landscape of Next Generation EU RRF national plans, Italy's National Recovery and Resilience Plan stands out with several distinctive features that make it particularly unique. Italy is notably the largest beneficiary of NGEU funds, receiving a significantly higher share than most member states. This allocation reflects not only the magnitude of the economic and social challenges the country faces but also the unique opportunity these funds represent for revitalisation and modernisation. One of the most marked specificities of the Italian NRRP is its focus on the economic and social disparity between the North and the South of the country. The economic dualism between these two macro-regions is a historical and structural phenomenon that has no equivalent in such a pronounced form in other European contexts. Consequently, a substantial portion of the NRRP funds has been allocated to the South, aiming to reduce disparities and promote more equitable and sustainable development across the country. Another distinctive element of the Italian NRRP is the integration of fundamental structural reforms, such as those in the justice system, public administration, and tax system, which are tied to the disbursement of European funds. This approach reflects a more comprehensive and binding strategy compared to other European recovery plans, highlighting the need for profound and long-term renewal to overcome the structural weaknesses that have long plagued the country.

The Italian plan was revised in December 2023 to add €2.9 billion of the energy-focused REPowerEU chapter, and it is now endowed with a total of €194.4 billion (26.1% of the RRF resources and 10.8% of the country’s GDP in 2019) (D’Alfonso, 2024). Figure 23 reports the current situation in terms of spending for Italy.

Figure 23: Percentage of disbursed RRF resources of the total foreseen for Italy (as of August 2024)



Source: (European Commission, no date d). Author's own elaboration.

3.1.1 Challenges to be addressed

Italy's NRRP is designed to address significant challenges, which are identified in the context of the European Semester by the European Council's country-specific recommendations (CSRs) from 2019 to 2020. These challenges are categorised into 12 broad areas, including i) Public finances and taxation; ii) Labour market and social policies; iii) Education and skills; iv) Healthcare; v) Research and innovation; vi) Digital infrastructure; vii) Energy, resources and climate change; viii) Transport; ix) Business environment and competition; x) Public administration; xi) Justice system and anti-corruption framework; and xii) Financial markets and access to finance. The 2020 recommendations particularly emphasised addressing the pandemic's impact, focusing on the green and digital transition, enhancing infrastructure quality, and improving the resilience of the healthcare system.

The report also highlights Italy's long-standing issues, such as inefficiencies in the tax and labour systems, low productivity, and the need for increased participation of women in the labour market. Additionally, the challenges include high youth unemployment in terms of share of young people neither in employment, education and training (NEETs), an inefficient public administration, and a slow justice system, all of which negatively impact the business environment. Recommendations also focus on improving competition, addressing banking sector vulnerabilities, and enhancing SMEs' access to finance.

3.1.2 Goals and structure

Considering the challenges expressed before, the Italian NRRP sets key objectives to address these challenges. These goals are:

1. Support Italy's recovery from the profound socio-economic effects of the COVID-19 pandemic.
2. Address long-standing structural issues within the Italian economy, such as sluggish productivity growth, regional disparities, low female labour market participation, and lags in digitalisation, education, and research.
3. Concentrate efforts on the three key strategic priorities identified as common challenges across the EU: digitalisation and innovation, ecological transition, and social inclusion (D'Alfonso, 2024).

To address the above challenges and pursue these objectives, the Italian NRRP intervenes through 7 different missions and 17 components (Figure 24).

Figure 24: Italian NRRP, Missions and components

Mission	Component	Costs (EUR million)
Mission 1 (digitalisation, innovation, competitiveness, culture and tourism)	M1C1. Digitalisation, innovation and security in the PA	9,741.93
	M1C2. Digitalisation, innovation and competitiveness in the production system	24,989.86
	M1C3. Tourism and culture 4.0	6,605.00
Mission 2 (green revolution and ecological transition)	M2C1. Circular economy and sustainable agriculture	8,115.00
	M2C2. Renewable energy, hydrogen, grid and sustainable mobility	21,971.28
	M2C3. Energy efficiency and renovation of buildings	15,567.74
	M2C4. Protection of land and water resources	9,871.00
Mission 3 (infrastructures for sustainable mobility)	M3C1. Investments in the rail network	22,791.43
	M3C2. Intermodality and integrated logistics	954.00
Mission 4 (education and research)	M4C1. Strengthening the provision of education services: from crèches to universities	19,084.75
	M4C2. From research to business	11,000.87
Mission 5 (inclusion and cohesion)	M5C1. Employment policies	7,714.00
	M5C2. Social infrastructure, households, the community and the third sector	8,322.10
	M5C3. Special interventions for territorial cohesion	883.50
Mission 6 (health)	M6C1. Local networks, facilities and telemedicine for local health care	7,750.00
	M6C2. Innovation, research and digitalisation of the national health service	7,875.54
Mission 7 (REPowerEU chapter)		11,177.95

Source: (European Commission, 2023). Author's own elaboration.

According to the official website dedicated to Italy's NRRP, Italidomani[6], each of the missions has the following objectives and characteristics:

1. Digitalisation, Innovation, Competitiveness, Culture, and Tourism: This mission aims to drive Italy's transition to a more digitally connected and innovative economy. It focuses on enhancing the digital infrastructure necessary for

[6] https://www.italiadomani.gov.it/content/sogei-ng/it/en/home.html

businesses, public administration, and citizens to fully engage in the digital age. The mission also includes efforts to modernise and promote Italy's rich cultural heritage, integrating advanced technologies into the cultural and tourism sectors to boost competitiveness. Investments will be directed towards improving digital skills, fostering innovation in SMEs, and increasing the competitiveness of industries.

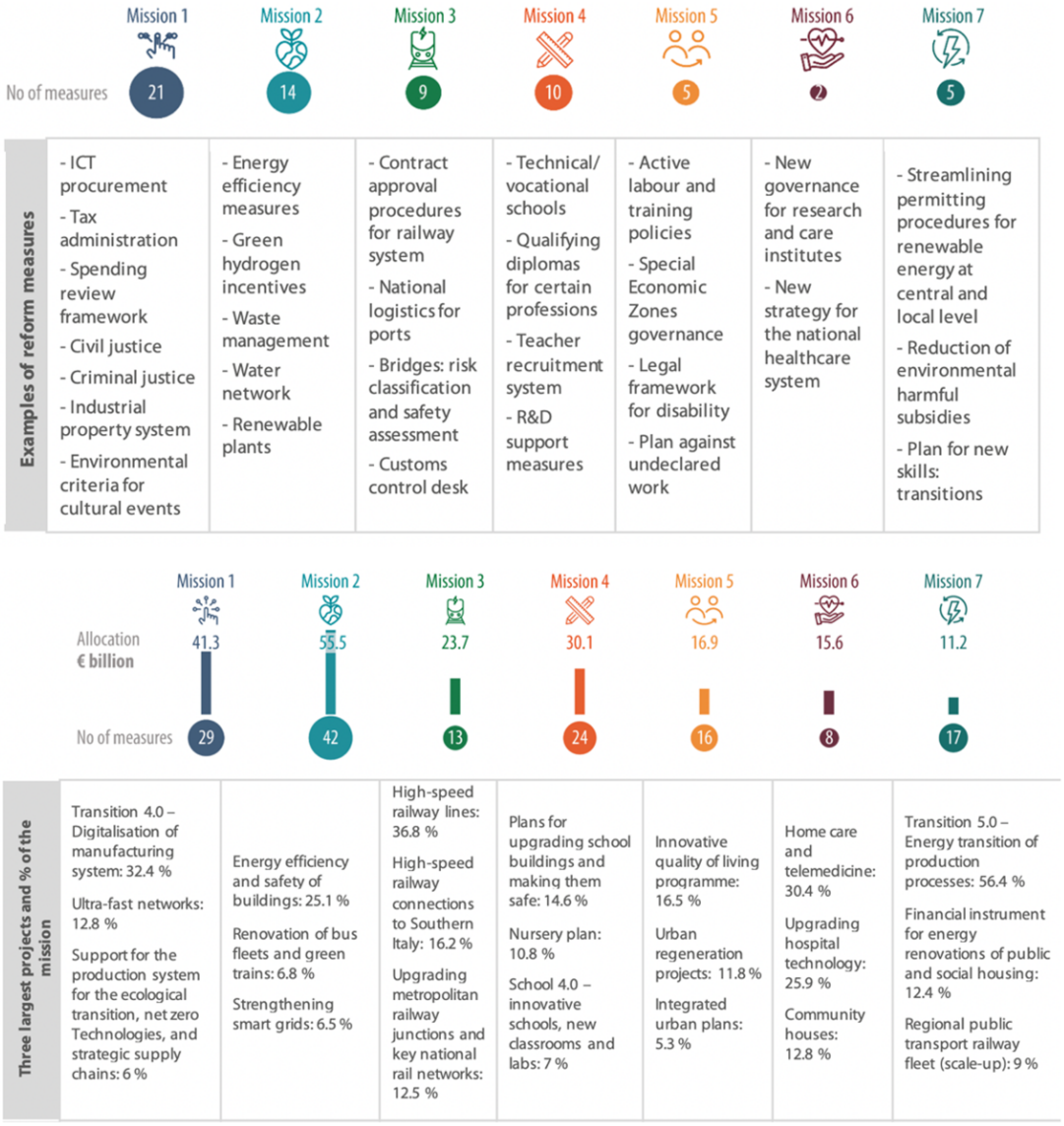
2. Green Revolution and Ecological Transition: This mission is dedicated to addressing climate change and environmental sustainability. It involves extensive investment in renewable energy sources, the circular economy, and sustainable agricultural practices. The mission promotes the transition to a low-carbon economy by improving energy efficiency in buildings, industries, and transport. It also includes projects to protect biodiversity, manage waste and water resources effectively, and mitigate the impact of climate change. The overarching goal is to position Italy as a leader in the ecological transition within the European Union, contributing significantly to EU-wide environmental targets.
3. Infrastructure for Sustainable Mobility: This mission focuses on creating a modern, efficient, and environmentally friendly transport system in Italy. It includes developing high-speed rail networks, improving road safety, and investing in public transport to reduce carbon emissions and improve connectivity. The aim is to create a more resilient infrastructure that supports economic growth while adhering to environmental sustainability goals.
4. Education and Research: This mission aims to overhaul the Italian education system, making it more inclusive, effective, and aligned with the needs of a modern economy. It includes reforms to primary, secondary, and tertiary education, with a particular focus on digital literacy and STEM education. The mission also seeks to strengthen the link between education and the labour market, ensuring that graduates have the skills needed by employers. In addition, significant investments will be made in R&D to foster innovation and technological advancements, particularly in areas critical to Italy's future competitiveness, such as artificial intelligence, biotechnology, and renewable energy.
5. Inclusion and Cohesion: This mission addresses social disparities and aims to promote equality across Italy's diverse regions. It focuses on reducing poverty, improving access to essential services, and enhancing the quality of life for vulnerable groups, including the elderly, children, and people with disabilities. The mission also targets regional disparities by directing investments to the South and

other economically disadvantaged areas, ensuring that all regions benefit from the economic recovery. The goal is to build a more inclusive society where everyone has the opportunity to contribute to and benefit from Italy's growth.

6. Health: This mission is centred on strengthening Italy's healthcare system, ensuring it is resilient, accessible, and capable of responding to future health crises. It includes investments in healthcare infrastructure, such as hospitals and clinics, as well as in healthcare technologies, like telemedicine and digital health records. The mission also aims to improve the quality of care, particularly in underserved areas, by addressing disparities in access to healthcare services. Additionally, it focuses on promoting public health through preventive measures, health education, and the promotion of healthy lifestyles, aiming to reduce the burden of chronic diseases and improve overall public health outcomes.
7. REPowerEU: As part of the broader EU initiative already described in the thesis, this mission seeks to reduce Italy's dependence on fossil fuels by accelerating the transition to renewable energy sources. It includes measures to enhance energy security, promote energy efficiency, and support the development of new energy technologies. The mission aims to diversify Italy's energy supply, reduce greenhouse gas emissions, and contribute to the EU's goal of climate neutrality by 2050. It also includes efforts to ensure that the transition to a green economy is just and inclusive, providing support to workers and communities affected by the shift away from fossil fuels.

To simplify the explanation of the plan's measures, D'Alfonso (2024) highlights the main actions associated with each mission. The following illustration (Figure 25) visually categorises these actions, distinguishing between reforms and investments.

Figure 25: Reforms and investments within the Italian NRRP



Source: (D'Alfonso, 2024).

In addition to the RRF funds, the Italian government integrates and enhances the contents of the NRRP through the Complementary National Plan (CNP)[7]. It serves as an essential extension to Italy's NRRP, worth €30.6 billion, providing additional national funding to ensure the comprehensive implementation of Italy's recovery strategy. While the RRF primarily funds the NRRP, the CNP addresses areas where European funds might not be sufficient, covering crucial projects and reforms that require further investment.

[7] decree-law n.59 of 6 May 2021. https://www.normattiva.it/eli/id/2021/05/07/21G00070/CONSOLIDATED/20210730

3.2 The effect of the NRRP on the Italian economy

3.2.1 General effect on the economy

Various studies have analysed the impact of the NRRP on the Italian economy as a whole. Among them, Di Bartolomeo and D'Imperio (2022) have built a model to understand the effects on various macroeconomic variables using granular information and data from the Italian Ministry of Economy and Finance. Firstly, they calculated an impact on GDP of +3.4% over the period 2021-2026 compared to a no-policy change baseline scenario (Figure 26). This positive impact is concentrated in the first three years, mainly driven by the strong increase in total investment, but it is at the same time softened by the slowdown of consumption and exports. The analysis also finds a negative impact on private consumption, which is explained by the fact that households tend to reduce consumption to save and invest in the first period, expecting higher levels of consumption in the future. As the table shows, there is also a negative dynamic for exports, which is caused by the inflationary pressure on the prices of exported goods. Moreover, the plan causes an increase in the demand for investment goods which has effects on costs for the firms, which are in turn rebated on export prices. In the medium term, the accumulation of public capital improves the economy's supply capacity, reducing inflation. This results in a positive impact in the case under analysis of 2.3% with respect to a no-policy change baseline scenario. It is important to mention that this effect on exports does not take into account the spillover effects from the implementation of RRF plans in other countries, which would have a positive effect on exports also in the short term. Moreover, this specific study employs a simulation that does not consider the impact that structural reforms can generate, but these will be addressed in the following sections of the thesis.

The effect of the NRRP on GDP slightly changes when using a different model. This can be seen in an analysis presented in the official document produced by the Italian Presidency of the Council of Ministers (PCM) (2021). The analysis also shows the detailed effect given by each of the plan's components, allowing for a deeper understanding of the impact on the economy (Figure 27).

Figure 26: Impact of the NRRP on selected macroeconomic variables (annual percent deviations from a no-policy changes baseline scenario)

	2021	2022	2023	2024	2025	2026
GDP	0.5	1.0	1.4	2.1	2.8	3.4
Private consumption	-0.4	-0.7	-0.5	-0.1	0.7	1.6
Total investment	2.9	7.0	8.4	10.9	11.7	11.0
Import	0.2	0.8	1.4	2.2	3.1	3.8
Export	-0.1	-0.4	-0.2	0.4	1.3	2.3

Source: (Di Bartolomeo and D'Imperio, 2022).

Figure 27: Estimated impact on GDP of the NRRP components (annual percent deviations from a no-policy changes baseline scenario)

	2021	2022	2023	2024-2026
M1	0.2	0.5	0.8	0.8
M1C1	0.0	0.1	0.2	0.2
M1C2	0.1	0.2	0.3	0.3
M1C3-Culture	0.0	0.0	0.1	0.1
M1C3-Turism	0.0	0.1	0.2	0.2
M2	0.2	0.6	0.7	0.7
M2C1	0.0	0.1	0.1	0.1
M2C2	0.0	0.1	0.3	0.4
M2C3	0.2	0.4	0.2	0.1
M2C4	0.0	0.0	0.1	0.1
M3	0.0	0.1	0.2	0.3
M3C1	0.0	0.1	0.1	0.2
M3C2	0.0	0.0	0.1	0.1
M4	0.1	0.3	0.5	0.5
M4C1	0.0	0.2	0.3	0.3
M4C2	0.0	0.1	0.2	0.2
M5	0.1	0.3	0.5	0.4
M5C1	0.1	0.2	0.3	0.1
M5C2	0.0	0.1	0.1	0.2
M5C3	0.0	0.0	0.1	0.1
M6	0.1	0.1	0.2	0.3
M6C1	0.0	0.0	0.1	0.2
M6C2	0.1	0.1	0.1	0.1
Total NRRP (1)	0.7	2.0	3.0	3.1

Source: (Italian Presidency of the Council of Ministers, 2021).

Another study conducted by the Centro Studi Confindustria (Capretta *et al.*, 2023) is more cautious about the impact on GDP. The econometric model employed estimates a positive effect of the NRRP of about 2.8% at the end of the implementation of the plan. The increase is mainly concentrated in 2023 (+1.0%), at the maximum level of resources deployed, and remains sustained also in the following two years (+0.8% and +0.5% in 2024 and 2025 respectively), but it turns marginally negative in 2026 (-0.1%), reflecting the decline in the

available resources. Furthermore, the authors estimate an increase in the employment rate of 2.4% at the end of the NRRP in 2026.

A report produced by the Osservatorio sui Conti Pubblici Italiani (OCPI) (Brugnara and Orlando, 2022) offers a critical assessment of the plan's potential impact on the country's long-term economic growth. It highlights that while the NRRP includes a broad range of expenditures aimed at various essential goals, only about half of these expenditures are expected to significantly contribute to enhancing Italy's productive capacity. A key finding of the report is that many of the NRRP's investments, though necessary for immediate recovery or social improvements, do not directly influence the country's potential GDP growth. For example, initiatives such as the 110% Superbonus, which incentivises energy-efficient home renovations, boost aggregate demand and thus have a positive short-term effect on GDP. However, these initiatives do not substantially increase the economy's productive capacity, which is essential for sustained long-term growth. The report categorises the NRRP's investments into four main groups based on their impact on economic growth. The first category includes investments with a medium-term impact, expected to expand public capital and generate growth within six years after completion. These are primarily infrastructure projects, such as enhancements to transportation networks and digital infrastructure, which can quickly bolster productive capacity. The second category consists of long-term investments, particularly in education and research, which are crucial for human capital development. These investments, while slower to impact growth, lay the foundation for sustained economic advancement, with effects anticipated to materialise at least seven years after the projects are completed. The third category includes investments with only a partial impact on growth. This category reflects projects where only a portion of the spending is likely to boost productive capacity, often due to insufficient detail in planning or challenges in predicting outcomes. Examples include some digitalisation efforts within the public administration, where efficiency gains may not fully translate into economic growth. Finally, the fourth category covers investments that do not have a significant impact on productive potential. These are projects that either replace existing public infrastructure without significantly improving efficiency or improve social and environmental conditions without directly enhancing productivity. In total, the report estimates that around 51% of the NRRP's resources are allocated to investments that have a clear positive impact on Italy's productive potential. The remaining 49% consists of expenditures that are likely to have limited or no effect on long-term economic growth.

3.2.2 The effect on productivity

In an article written by the economist Jean Pisani-Ferry (2021), the issue of the effect of the NRRP on Italian productivity has been defined as “the big question”. Indeed, given the situation presented in the first chapter of the thesis, NRRP has raised great optimistic interest in the beneficial impact it could represent. To understand this, different aspects of the plan will be analysed with a specific focus on whether and to what extent can contribute to productivity in the country.

The effect of investments

The already mentioned analysis by the Centro Studi Confindustria (Capretta *et al.*, 2023) tries to quantify the effect of NRRP investments on productivity. The authors find a significant impact, particularly in improving TFP, and this is expected to occur through two main channels. Firstly, a major driver of productivity growth under the NRRP is the accumulation of capital. The investments financed by the plan are designed to strengthen the economy's production capabilities by increasing the stock of capital – this includes physical assets like machinery, infrastructure, and technology. As businesses and industries gain access to more and better capital, they can operate more efficiently, utilising resources in a way that maximises output. Secondly, another contributor to productivity growth, albeit to a lesser extent, is the anticipated increase in the labour force. The NRRP is expected to encourage individuals who have been inactive in the labour market to reenter the workforce. By drawing more people into employment, the economy benefits from a larger pool of workers. This not only helps meet the increased demand spurred by the plan's investments but also enhances the productive capacity of the economy as a whole. When these two factors are combined, they are estimated to lead to a cumulative increase of 0.3% in total factor productivity by 2026. In addition to these direct effects, there is also the potential for further productivity gains stemming from the broader reforms embedded within the NRRP, which will be discussed in more detail later.

As shown in the second chapter, NGEU digital transformation investments are considered overall beneficial for the European economies. However, some key concerns are raised in a study carried out by Meliciani and Pini (2021) regarding the effect these measures may have on Italy. One major concern is the potential for regional inequality, as the benefits of digitalisation might not be evenly distributed across the country. Specifically, northern regions, which are more economically developed, could see greater gains from these investments, while the less developed Southern regions might struggle to keep up. This could widen the existing

economic divide in terms of productivity between the North and South. Another challenge is the disparity between different sizes of businesses. Larger companies are in a better position to take advantage of digitalisation, thanks to their greater resources and capabilities. In contrast, smaller businesses, which, as already seen, make up a large portion of the Italian economy, may find it harder to adopt new technologies and fully benefit from the opportunities the NRRP offers. The paper also points out that Italy faces a significant skills gap when it comes to digital competencies. A large portion of the workforce lacks the necessary digital skills to take full advantage of new technologies, which could severely limit the effectiveness of the NRRP's digital initiatives. Without sufficient digital skills, businesses may struggle to implement and benefit from technological advancements. Finally, the paper raises concerns about the impact of outdated business models, particularly in family-owned and managed companies, which are prevalent in Italy. These businesses may be less inclined to embrace the organisational changes required by digital transformation. As a result, they could fall behind in terms of innovation and competitiveness.

With regards to the north-south gap explained above, Mauro and Pigliaru (2023) looked at the whole effect of the plan on this territorial divide in terms of productivity. The authors approach this issue by developing an endogenous growth model aimed at understanding how the plan might influence this regional disparity over the long term. At the heart of the paper is the authors' assertion that public investment plays a pivotal role in fostering sustained economic growth. However, they emphasise that the effectiveness of these investments is significantly influenced by the quality of local governance and the level of social capital[8] within a given region. In regions where social capital is low, the quality of local governance tends to suffer, leading to inefficiencies in the management of public investments. This inefficiency, in turn, exacerbates economic disparities, particularly in areas like Southern Italy. The authors contrast two scenarios to explore the potential outcomes of the NRRP. In the first scenario, where public investments are managed locally (decentralised management), the paper suggests that the effectiveness of these investments may be undermined by mismanagement and corruption, especially in the South. Conversely, in the second scenario, where the management of public investments is centralised, the paper finds a slight improvement in the South's relative productivity. Centralised management is seen as a way to mitigate the risks associated with

[8] Social capital, as the paper describes, refers to the shared norms, values, and institutions that enable cooperation within or among groups.

local mismanagement, ensuring that investments are more efficiently utilised. However, even in this best-case scenario, the improvement is modest, with the North-South productivity gap narrowing only slightly from 75% to 76.4%. The authors argue that for the NRRP to have a more meaningful impact on reducing the North-South productivity gap, it is crucial for reforms to extend beyond 2026. The temporary nature of the NRRP's centralised management poses a risk that, once the plan concludes, the South could revert to its previous state of underperformance.

The effect of reforms

While the investments under the NRRP are expected to provide a much-needed boost to Italy's productivity, particularly through capital accumulation and increased labour force participation, their effect could appear modest. However, the broader impact of the plan hinges significantly on the structural reforms it includes, as they address the underlying issues that have long plagued Italy's productivity, described in the first chapter. A detailed analysis by the IMF (2022) offers valuable insights into how these reforms could drive productivity improvements. By using Principal Component Analysis[9] (PCA), the IMF identified a set of structural characteristics that are closely linked to productivity outcomes in the country. These characteristics include public sector efficiency, regulatory quality, innovation capacity, and education levels. The analysis found that regions with stronger performance in these areas tend to have higher productivity, suggesting that reforms targeting these structural aspects could have a substantial positive impact. According to the authors, NRRP's structural reforms are specifically aimed at improving these key areas. For example, the plan includes measures to enhance the efficiency of the public sector, which has historically been a significant barrier to economic growth in Italy. By reducing bureaucratic inefficiencies and simplifying regulatory frameworks, the NRRP aims to create a more business-friendly environment, and this, in turn, should enable companies to operate more effectively and innovate more freely, hence contributing to higher productivity levels across the economy. If regions across Italy can

[9] "Principal component analysis is a versatile statistical method for reducing a cases-by-variables data table to its essential features, called principal components. Principal components are a few linear combinations of the original variables that maximally explain the variance of all the variables. In the process, the method provides an approximation of the original data table using only these few major components" (Greenacre *et al.*, 2022).

elevate their performance in these structural areas to match the best-performing regions, the country could see an overall productivity increase of up to 10.75%.

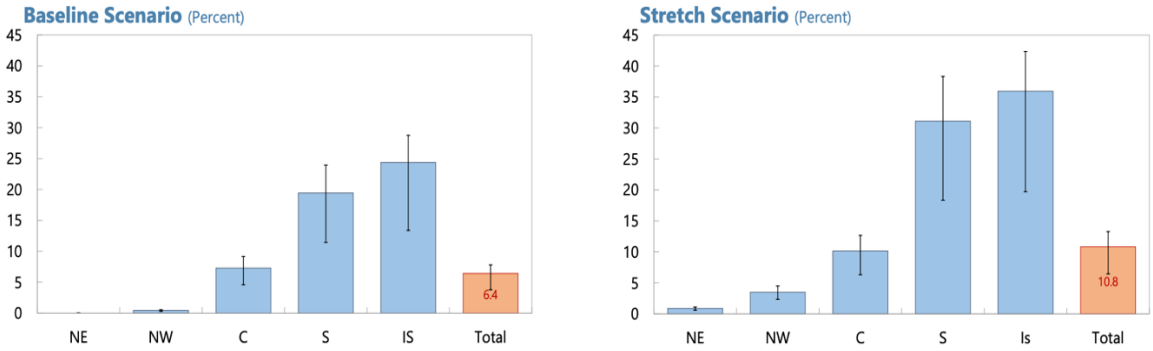
The bar charts in figure 28 quantify these improvements and provide a visual representation of how Italy's regions could experience significant productivity gains through targeted improvements in structural characteristics. The charts illustrate two distinct scenarios.

In the first chart, which depicts the 'Baseline Scenario', it is possible to see the outcomes of a modest yet meaningful enhancement in structural indicators across various regions. If each region were to improve its structural characteristics by just one quintile, the resulting productivity gains during the timeframe of the NRRP could be substantial, particularly in the areas that have traditionally lagged behind. The South (S) and the Islands (IS), for example, show the most potential for improvement, with projected within-sector productivity increases of around 20%. The Central regions (C), too, stand to benefit from such improvements, albeit to a lesser extent, with anticipated gains of nearly 10%. Meanwhile, the Northeast (NE) and Northwest (NW), which already benefit from stronger structural foundations, would see smaller yet still meaningful improvements in productivity, reflecting their already higher starting point. In total, this would lift Italy's labour productivity by 6.4%.

The second chart, illustrating the 'Stretch Scenario', presents a situation where each region was to elevate its structural indicators to the 80th percentile of the national frontier, matching the best-performing regions of the country. The potential gains in this scenario are even more striking, particularly for the South and the Islands, where productivity could surge by as much as 30-35%. The Central regions, under this scenario, could see productivity gains in the range of 10%, while even the Northern regions, despite their current advantages, could still achieve a slight growth. In this case, labour productivity would rise by 10.8%

Overall, the potential impact of these reforms is not automatic, and the success of the NRRP will depend on the consistent and effective implementation of these reforms over time. Indeed, while the plan sets a solid foundation, the real challenge lies in maintaining momentum. However, the IMF (2022) affirms that the Italian NRRP is "well designed to raise labour productivity and potential growth" (p. 8) since the effects of an economy's structural characteristics are complementary rather than additive; hence, the NRRP is considered beneficial in light of the concerted and multi-faceted reform program it envisages.

Figure 28: Productivity gains from improving structural indicators, 'baseline' and 'stretch' scenarios



Source: (International Monetary Fund, 2022).

Specifically, it is possible to observe the most impactful reforms for the Italian economy envisaged by the NRRP. The official plan presented by the PCM (2021) in this regard looks at the reform of public administration (PA) and justice.

The first one aims at improving personnel selection mechanisms, simplifying procedures and processes, investing in human capital, and strengthening digitalisation. A positive effect can be attributed to this reform since there is empirical evidence attesting to the link between PA efficiency and productivity (Fadic, Garda and Pisu, 2019), which can be explained by the fact that the quality of the PA is positively correlated with business performance and, thus, with economic growth. Moreover, another study by the IMF (Giordano *et al.*, 2020), which uses data from more than 400.000 Italian firms, affirms that closing the gap between the current level of effectiveness of administrations and the potentially attainable level would have a positive impact on labour productivity of 2% to 10% and contribute, on average, to an increase in output of 3%.

In the area of justice, the reform aims to make the justice system more efficient and to shorten the duration of legal proceedings. The justice reform focuses on three main initiatives. First, it aims to complete the project of the Office of the Process, a structure designed to assist judges during the early stages of a case. Second, it seeks to strengthen the administrative capabilities of the justice system by investing in human resources. Finally, the reform includes efforts to enhance the digital infrastructure supporting the judicial system. The fundamental idea behind this reform is that by making the justice system more efficient, two significant benefits will be realised for the economy. First, it will make markets more competitive, allowing new companies to enter more easily. Second, it will reduce uncertainty about future returns on investments, which will improve financing conditions for families and businesses, and encourage more investment, both from within the country and from abroad (Italian

Presidency of the Council of Ministers, 2021). In this regard, a study by the Bank of Italy (Mocetti, Ciapanna and Notarpietro, 2020), which used microeconomic data at the business level, affirms that the overall effects of a justice reform can be analysed by looking at the relationship between the length of legal proceedings and the productivity of the economy. The study reveals that a reduction in the duration of legal proceedings by about 15% between 2008 and 2016 due to a series of legislative innovations led to an improvement in TFP by 0.5%. Given this result, it is suggested that the new judicial reform initiatives, such as the one envisaged by the NRRP, could have additional effects of a similar magnitude.

Another key reform is analysed by the Ministry of Economy and Finance - Department of the Treasury (D'Andrea *et al.*, 2023), namely the Education and research reform. This is a comprehensive initiative that aims to improve the entire education system, from early childhood through to higher education and research. The reform includes several key projects and measures designed to address regional disparities, improve the quality of education, and enhance the country's research and technological capabilities. For early and primary education, the plan focuses on bridging the regional gaps, particularly in primary schools and kindergartens. This includes renovating school buildings, implementing educational programs that emphasise sustainability and accessibility, and taking targeted actions to reduce disparities. One of the main strategies here is mentoring programs and initiatives aimed at young people who are at risk of dropping out of school or who have already left the education system. In secondary education, the reform seeks to enhance the quality of education by providing better guidance for students transitioning from school to university, with a particular emphasis on technical education. It also includes efforts to improve teachers' skills, especially in ICT. For higher education, the plan proposes revising curricula to better align with professional services and increasing public funding for scholarships and social housing for students, making higher education more accessible. Additionally, the reform aims to build a knowledge-intensive, competitive, and resilient economy by strengthening the training system, promoting digital and STEM skills, and supporting research activities and technology transfers. Improvements in this regard can be tracked thanks to data such as the assessment tests produced by the OECD, such as the PISA. For the purpose of the thesis, an interesting study by Égert, Maisonneuve and Turner (2022) estimates the correlation between PISA scores and TFP. The authors found that a 5.1% improvement in the PISA scores results in an increase in TFP of 3.4-4.1% in the long run via an increase in human capital by 1.4%.

3.3 The case of Transition 5.0

Among the many measures of the NRRP, Investment 15 of the new Mission 7 of the program, Transition 5.0, is a pivotal one that aims to have a significant impact on the country's industrial landscape. Transition 5.0 builds upon the foundations laid by the previous Transition 4.0 program, expanding its horizons beyond digitalisation to encompass a more holistic transformation. The essence of this measure lies in harmoniously blending technological innovation with environmental sustainability, as it recognises that the future of the industry is not solely about automation and efficiency but also about creating systems that are resilient and ecologically responsible.

More in detail, this €6.3 billion measure aims to help production processes shift towards a more energy-efficient, sustainable, and renewable-based model. It is expected to result in a reduction of energy consumption by 0.4 million tonnes of oil equivalent (Mtoe)[10] between 2024 and 2026 (Council of the European Union, 2023). The benefits will be granted in the form of a tax credit, and the projects must involve investments in one or more new tangible or intangible assets essential to business operations, as specified in Annexes A and B of Law No. 232 of December 11, 2016, and under the conditions set forth in Article 6. As a result of these investments, it must be achieved either an overall reduction in energy consumption of the production facility of at least 3 per cent or, alternatively, a reduction in energy consumption of the processes involved in the investment by at least 5 per cent. The major novelty is however represented by the opportunity to obtain incentives for:

- Investments in new tangible assets essential to the business operations aimed at self-producing energy from renewable sources for self-consumption, with the exception of biomass. This includes facilities for storing the energy produced, under the conditions set out in Article 7;
- Expenses for training activities aimed at acquiring or consolidating skills in technologies relevant to the digital and energy transition of production processes, under the conditions set out in Article 8.

[10] Tonne(s) of oil equivalent, is a normalized unit of energy. By convention, it is equivalent to the approximate amount of energy that can be extracted from one tonne of crude oil. It is a standardized unit, assigned a net calorific value of 41 868 kilojoules/kg and may be used to compare the energy from different sources. (Source: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Tonnes_of_oil_equivalent_(toe)).

The tax benefit will be commensurate (based on three incremental thresholds) with the reduction in final energy consumption (equal to at least 3%) or the energy savings achieved in the target processes (of at least 5% compared to previous consumption for those processes) related to the investments made in the assets. To be eligible, the project must be certified by an independent evaluator who attests that, ex-ante, the innovation project meets the eligibility criteria related to the reduction of total energy consumption. Additionally, an ex-post certification must confirm the actual implementation of the investments in accordance with the ex-ante certifications.

The measure consists of one milestone and two targets:

- M7-40 (Milestone): Legal act making Transition 5.0 tax credits available to potential recipients, determining the eligibility criteria, also in terms of minimum energy savings, and the maximum expenditure cap for the measure. Timeline for completion: Q1 2024;
- M7-41 (Target): Notification of the granting of all RRF resources earmarked for this investment. The satisfactory fulfilment of the target also depends on the publication of the report evaluating the RRF investments under the responsibility of the Ministry of Enterprises and Made in Italy. Timeline for completion: Q2 2026;
- M7-42 (Target): The investment shall generate 0.4 Mtoe of energy savings in final energy consumptions in the period 2024-2026. Timeline for completion: Q2 2026.

As emphasised in many parts of the thesis, investments in digital transformation are a quintessential element in boosting productivity. Transition 5.0 is therefore considered a key tool for companies to undertake a more modern and efficient production system through the use of these technologies. More precisely, technology investments, as mentioned above, fall into two categories[11]. The first is '4.0 tangible capital goods'. They include advanced machinery and equipment that are interconnected with factory IT systems, allowing for remote loading of instructions or programmes. Examples encompass machine tools, robotic systems, and mechatronic devices that enhance production efficiency and flexibility. Moreover, the category covers systems designed for quality assurance and sustainability. This includes equipment for continuous monitoring of machine conditions and systems that improve

[11] Annexes A and B, Law No. 232 December 11, 2016.

workplace ergonomics and safety through advanced human-machine interaction. Technologies such as collaborative robots, automated handling systems, and devices utilising augmented and virtual reality also fall under this category. The second category is ‘4.0 intangible capital goods’. This includes software for design, modelling, and simulation, as well as systems for managing and monitoring production processes like MES (Manufacturing Execution Systems) and SCADA (Supervisory Control and Data Acquisition). Cloud computing solutions and platforms that integrate business processes are also included. Additionally, the category encompasses software and digital services for remote monitoring and maintenance, e-commerce platforms, and customer relationship management systems. Cybersecurity solutions aimed at protecting networks, data, and industrial processes are also considered among these intangible assets. Software utilising augmented and virtual reality applied to production processes is also part of this group.

In order to further deepen the description of the measure, will now be reported an interview with Dr Raffaele Spallone, Head of the Division II Policy for enterprises digitalisation, innovation, and analysis of productive sectors of the Directorate-General for industrial policy, industrial crises and reconversion, innovation, SMEs, and Made in Italy of the Ministry of Enterprises and Made in Italy. Dr Spallone's Division is indeed responsible for this NRRP measure and has actively participated in the negotiations with the European Commission that led to its inception. Therefore, his contribution is valuable for better understanding the reasons that prompted Italy to include this measure in the Plan, the challenges that have arisen, and the expected effects on productivity. The interview touched on the following themes:

Continuity with Transition 4.0

Dr Spallone indicated that Transition 5.0 was partly a result of the success of the measure Transition 4.0. He noted that tax credit measures have a strong absorption capacity, which aligns well with the need to quickly utilise the resources provided by the National Recovery and Resilience Plan. However, he also mentioned that tax credit measures are not ideal under the NRRP’s reporting rules due to their complexity. Furthermore, according to Dr Spallone it was necessary to enhance Transition 4.0's impact. While it functioned effectively as an incentive for the replacement of machinery, it was less successful in achieving the initial aim of increasing companies' productivity through the transformation of production processes – making them more digital. However, in many cases, this transformation did not occur, and companies merely replaced machines. Although this had a positive effect on productivity,

especially for SMEs additional effort was required. As a result, Transition 5.0 calls on companies to make a greater effort – not only to introduce digital technologies but also to use them to make production processes more efficient. The link between digitalisation and environmental sustainability presented an opportunity shaped by the new REPowerEU plan, which finances interventions that can contribute to greater energy efficiency across the continent, specifically in Italy's case.

Were similar investments conducted in other countries considered as references during the design phase of this measure?

Dr Spallone indicated that Transition 5.0 was not inspired by similar policies in other countries. Although they had attempted to identify comparable projects, this measure is unprecedented within the European incentive landscape. It is the only tax credit that applies to companies that combine digitalisation with environmental sustainability. He explained that while Transition 4.0 was influenced by an European trend, in this instance, Italy was the first to implement such a measure. The European Union acknowledged its innovation by designating it a flagship initiative of the REPowerEU plan and increasing the available funding from 4 billion to 6.3 billion euros, because the measure was well-received for being particularly challenging. Dr Spallone noted that it is a challenge in the sense that it is highly complex; and companies are required to make an engineering effort, including both ex-ante and ex-post certifications. There is a similar incentive in the Netherlands, but it differs significantly. In the Dutch scheme, the focus is not on digital goods but on items purchased from a predefined list – similar to Transition 4.0 – where a tax credit is applied to these goods linked to energy efficiency.

Negotiations

Dr Spallone explained that the greatest challenge was constructing an entirely new incentive measure, which was also the result of complex negotiations with the European Commission. Initially, they aimed to extend both the scope and the eligible investments, hoping to include research and development to make the investment even more productive; however, this was not possible. The energy-saving thresholds linked to the incentives were decided through hard negotiations with the Commission, making the process highly intricate. He noted that although the Council Implementing Decision came into effect in November, paradoxically, negotiations are still ongoing on certain aspects, such as the 'Do No Significant Harm' (DNSH) principle. This measure is highly efficient for energy-intensive companies, but the DNSH criteria are not

very lenient towards them. Based on the initial estimates requested by the Commission, and after consultations with industry associations, they realised those thresholds were out of scope. Therefore, they sought to reduce them and introduced the concept of the production process. Previously, the Commission had requested much higher savings, so the dual possibility of considering both the production structure and the production process was established.

The impact on productivity of the measure

Dr Spallone acknowledged that it is difficult to predict definitively the expected impact on productivity compared to Transition 4.0, as numerous exogenous factors naturally influence productivity. He explained that Transition 5.0 differs from its predecessor by encompassing three components: goods listed in Annexes A and B, self-production and self-consumption of energy, and training. He pointed out that self-production and self-consumption might be excluded when considering productivity in the strict economic sense, specifically labour productivity, as they affect the competitiveness of enterprises rather than productivity directly. However, digital tangible and intangible goods are expected to enhance productivity. Moreover, mandatory training modules are planned, which are clearly linked to aligning the workforce with major technological trends. In this context, they anticipate an impact on productivity that they hope will be significant, aiming for a direct correlation between investment and productivity increases. Dr Spallone also mentioned that the training in Transition 4.0 was different; in this case, it is more specialised, which further influences the outcome. He noted that the funding for Transition 5.0 amounts to 6.3 billion euros, whereas Transition 4.0 had significantly more resources and a longer history of investment. Therefore, it is necessary to consider these factors when evaluating what the impacts will ultimately be.

Impact evaluation of the measure

Dr Spallone explained that a study report is planned to be conducted. However, since the timeline extends to 2026, it cannot serve as an ex-post evaluation at this stage; however, they will probably carry out such an evaluation and intend to do so. They have equipped themselves – and are continuing to do so – with a Technical Support Instrument (TSI) in collaboration with the OECD for the evaluation of the measure, utilising counterfactual methods.

Barriers to accessing the incentive for SMEs

Dr Spallone explained that, in general, the obstacles faced by SMEs are always the same with any incentive instrument, particularly the more complex ones and especially when

innovation is involved. Innovation measures can be discriminatory because some companies have difficulty identifying and expressing their innovation needs, an issue that arises even before they access the incentives. This leads to a natural self-selection process, and with more complex incentive instruments, this self-selection is even higher. He pointed out that the discrimination is not so much between small and large companies but between different industrial segments. Hence, the issue is less about company size – which certainly plays a role in any incentive instrument – and more about the ability to innovate their production processes. However, he also noted that self-production and self-consumption paradoxically encourage companies to make a greater effort because the need to reduce energy costs is felt by everyone. Since the condition for accessing incentives for self-production and self-consumption, as well as investing in assets listed in Annexes A and B, results in savings, this factor can reduce the self-selection effect by attracting more companies.

Conclusion

The Next Generation EU represents a monumental shift in the European Union's approach to economic governance and integration. As outlined in this thesis, the NGEU is not merely a temporary financial support mechanism, but a strategic tool designed to reshape Europe's economic structure by enhancing productivity, fostering digitalisation, and accelerating the green transition. These are not just urgent responses to the pandemic but are central to addressing the EU's long-standing structural weaknesses, which have resulted in significant productivity disparities both across and within member states.

The thesis examined the potential of the RRF to generate widespread productivity improvements across the EU by incentivising investments in key sectors such as digital infrastructure, research and development, and renewable energy. By tying funding to performance-based targets, the RRF introduces a novel accountability mechanism that aims to ensure that funds lead to tangible outcomes, thus pushing member states to achieve structural reforms and investments that have long been postponed.

From a European perspective, the NGEU is a response to the growing recognition of the EU's productivity gap, particularly in comparison to global competitors such as the United States and China. As highlighted in the first chapter, European productivity growth has lagged behind for decades, largely due to underinvestment in innovation and digital infrastructure, as well as insufficient integration of advanced technologies across industries. The NGEU seeks to address this by directing a substantial portion of its funding to digital transformation. These investments are designed not only to support the post-pandemic recovery but to position Europe as a global leader in the industries of the future.

Turning specifically to Italy as a case study, the country's NRRP exemplifies both the potential and the challenges of the NGEU. As discussed in Chapter 3, Italy's productivity has been stagnant for decades, largely due to structural inefficiencies, regional economic imbalances, and the dominance of SMEs, which have traditionally lagged in adopting new technologies and thus in productivity. The NRRP, if implemented effectively, could mark a turning point for Italy by addressing these systemic issues with a combined approach, thanks to coordinated interventions in digital investments, green projects, and, most importantly, structural reforms.

A critical aspect of the NRRP is its focus on digital transformation, a theme that resonates across Europe but is particularly pressing in Italy, where digitalisation has been slow. As detailed in the last part of the thesis, the NRRP's Transition 5.0 measure aims to bridge this gap by accelerating the adoption of digital technologies across Italian enterprises, modernising their production systems, and enhancing digital skills within the workforce. This initiative is crucial, as it targets one of the most significant barriers to Italy's productivity: the technological lag that has prevented its businesses from competing effectively on the global stage. The Transition 5.0 case study illustrates how targeted investments if properly managed, could lead to substantial productivity gains in sectors that have historically been resistant to change.

Yet, the success of these reforms and investments cannot be taken for granted. Italy's history of underperformance in utilising EU funds, coupled with its bureaucratic inefficiencies, poses a real risk to the effective implementation of the plan. The performance-based nature of the RRF, while designed to encourage reform, could result in delays or reduced funding if Italy fails to meet its milestones and targets on time. Moreover, the thesis pointed out that Italy's regional disparities – with the more industrialised North significantly outperforming the South – remain a major obstacle to nationwide productivity improvements. The NRRP's focus on regional cohesion is therefore crucial, but whether it will be sufficient to bridge the North-South divide remains an open question.

At the European level, the spillover effects of the NGEU, as highlighted in the second chapter, are expected to play a critical role in amplifying productivity gains across the EU. Countries with well-implemented recovery plans will not only boost their own economies but also generate positive externalities for their neighbours. For Italy, this means that its success or failure in executing the NRRP will have ramifications beyond its borders, influencing the overall effectiveness of the NGEU in narrowing the EU's productivity gap, given the magnitude of the resources received under the plan and the dimension of its economy.

In conclusion, the NGEU represents a landmark opportunity for the European Union to reshape its economic landscape, addressing productivity challenges that have hindered its global competitiveness. Italy, as a case study, exemplifies both the promise and the complexities of this initiative. The NRRP provides a roadmap for addressing Italy's structural weaknesses, particularly through digitalisation and the focus on reforms. However, the real test lies in the country's ability to implement these reforms effectively and in a timely manner. The success of the NGEU will ultimately depend on whether the EU and its member states,

including Italy, can turn short-term recovery measures into long-lasting productivity improvements that drive sustainable growth and economic resilience across the continent.

Future studies should focus on investigating the real and long-term effects of the NGEU across Europe following the completion of the national plans. Ex-post evaluations should assess the overall effectiveness of this innovative programme and systematically analyse whether its initial objectives have been achieved.

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