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Trends, Challenges and Prospects of Construction in Greece

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EXECUTIVE SUMMARY

The purpose of the study is to analyze the latest data and developments in the construction sector in Greece, as well as to evaluate the prospects of the sector in the coming years, considering the challenges it faces. The study explores the financing needs that may arise for the construction sector in the coming years, in view of the prospect of a significant increase in investments in infrastructure and other construction projects in Greece. Some important challenges for the sector are also highlighted, linked to workforce shortages, weaknesses in the public works procurement system, national strategic infrastructure planning, but also to the needs for financing and rapid adaptation to the new environment of digitalization and sustainable business development through the integration of ESG principles.

SIZES AND TRENDS OF THE CONSTRUCTION SECTOR IN GREECE

Thousands of small and medium-sized enterprises and professionals are active in the construction sector, the number of which has increased in recent years, reversing the downward trend that occurred during the economic crisis. Specifically, in 2022 around 70,000 companies were active in the construction sector, an increase of 7,861 (+13%) compared to 2017. In activities related to Architecture and Engineering approximately 52,000 businesses operated in 2022, almost 4,300 more than in 2017. It is worth noting, however, that most of these enterprises represent self-employed persons.

The production value of Construction, after a decade of low-level activity and divestment, has been significantly enhanced while operating profitability and the contribution of the sector to the Greek economy have also been improved. The total production value of the Construction industry is estimated to have reached 12.8 billion euros in 2023, 84% higher than in 2017. The sector's gross value added (GVA) stood at 3.4 billion euros in 2022 and its contribution to the total GVA of the Greek economy at 1.9%. The operating surplus and gross income of the construction sector has followed a steady recovery path since 2017 and amounted to 1.5 billion euros (14.1% of the total production value) in 2022, which is still significantly below the levels recorded during the 2000s (an average of 25% of the total production value).

Since 2019, the production value in the activities of Architects and Engineers has increased significantly and it is estimated that (in current prices) it reached 4.2 billion euros in 2023. The added value of the Architecture and Engineering sector is approximately 50% of its production value, which in 2022 amounted to 1.7 billion euros, representing 0.9% of the country's GDP.

After 2008, the investments of construction companies in fixed capital (machinery, other equipment, etc.) do not cover the consumption of capital (depreciation), which indicates disinvestment and deterioration of the productive capacities of the sector. Increasing the production capacity and competitiveness of the sector therefore requires a significant reinforcement of modernization investments and related financing.

The low level of investment is one of the factors influencing productivity in the construction industry. Labor productivity in Construction in Greece (in terms of GVA per hour worked) shows a decreasing trend over the period 2010-2022 and is significantly lower than both average labor productivity in the total Greek economy (51% lower) and average labor productivity in Construction in the EU-27 (63% lower). Low productivity also has a significant impact on wages, which are held at a comparatively low level.

The construction sector employed a total of 197 thousand workers in 2022. Employment in the sector has stagnated somewhat, with a trend of moderate growth in recent years. In the activities of Architects and Engineers, 74 thousand people were employed in 2022, a number that has not changed significantly since 2017.

The analysis ascertained that Greece records the lowest share of construction investment as a share of GDP among EU countries, mainly due to the lag in housing investment. Construction investment accounted for 4.8% of GDP in 2022, compared to 14.7% in 2007, while the deviation for 2022 compared to the EU-27 average is more than 6 percentage points. Nevertheless, the sector's overall footprint in the Greek economy, regional development and external balance remains significant.

Short-term indicators reflect the strong recovery of the sector in recent years, with a notable rise in private construction activity, albeit from a very low base, an increase in turnover and a strengthening of positive business expectations. Nevertheless, the significant increase in construction costs and property prices as well as the moderate rise in housing credit, while at the same time raising related borrowing costs, also emerge.

The market for public works is particularly strengthened in the last two years, with an increase in both the number of auctions and the total budget of public works as well as with a decline in the average discount rate, also due to the significant increase in construction costs. According to data collected by the Association of Greek Construction Companies (SATE), in period 2018-2020, an average of 699 projects were auctioned annually, with a budget of more than one million euros. In the following years, the number of auctions increased significantly, reaching 1,218 projects in 2023. The total budget of the projects auctioned was reinforced in 2021/2022 and amounted to 6.9 billion euros in 2023, more than double the average level of 2018-2020 (2.9 billion euros). This trend suggests that a notable increase in construction activity for infrastructure projects is expected in the coming years.

The average discount rate in public works auctions gradually declined in 2021 to around 45%, from 57% in 2018. However, there was a large decrease in 2022 and 2023, when the average discount rate declined further to 30.1% and 22.6% respectively, due to the significant increase in construction costs and the increase in the number of auctioned projects.

The backlog of public and private projects of the country's major construction groups is at a historically high level because of the improved performance and conditions in the Greek economy, the level of EU funding and the large investment gap over the past decade. In particular, the backlog of the largest companies in the sector in 2023 (data up to the nineth month of the year) amounted to 15.35 billion euros, a significant increase of 63% compared to the previous year and about three times compared to the average for the period 2018-2020. The successful implementation of these projects is, however, a challenge for construction companies, as they require, among other things, adequate human resources, strong liquidity, access to funding resources and fast-track procedures on the part of public bodies.

STATE OF PLAY OF NATIONAL INFRASTRUCTURE PLANNING AND FINANCING PROGRAMMES FOR CONSTRUCTION PROJECTS

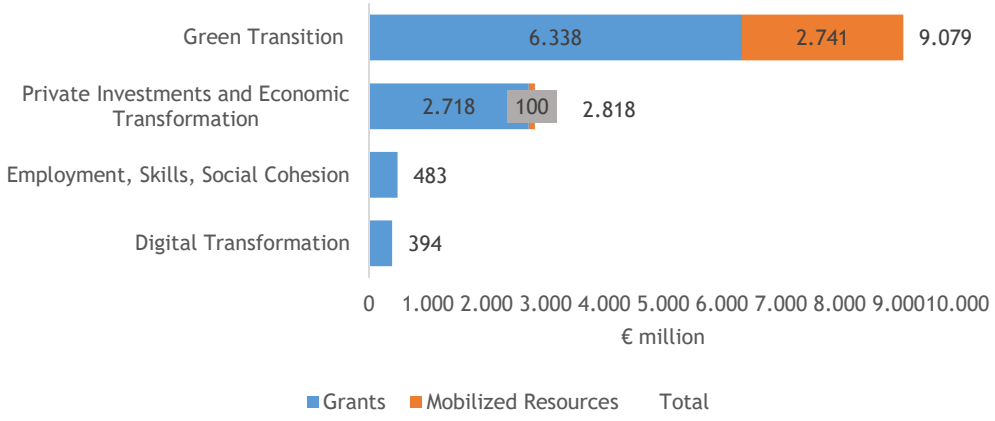
The significant amount of national and European resources, which have been committed for the coming years, coupled with the recovery of private construction activity, create expectations of strong growth for the Construction sector.

The NSRF 2021-2027 funding resources planned to be directed to Environment-Climate Change (greener Europe) and Transport (more interconnected Europe) projects, in which the construction sector is heavily involved in the implementation of the relevant projects, are estimated at 9.14 billion euros. Compared to the previous programming period of the NSRF 2014-2020, the total funding resources in these areas do not lag behind in terms of budget, as the payments (public support) of the previous period reached 9 billion euros (in projects with a total contractual object of 13.8 billion euros). Therefore, the impact on the activity of the construction sector, which is related to the NSRF projects, is not expected to differ significantly compared to the previous programming period.

The Recovery and Resilience Fund (RRF) will finance infrastructure projects that will fuel construction development in the coming years. Based on the analysis of the actions of the National Recovery and

Resilience Plan (NRRP), it is estimated that grants of 9.9 billion euros will be directed to projects directly related to Construction, mobilizing a total of 12.8 billion euros. The construction projects to be supported by grants from the RRF mainly concern the pillars of the Green Transition (6.3 billion euros) and Private Investment (2.7 billion euros) (Figure 1).

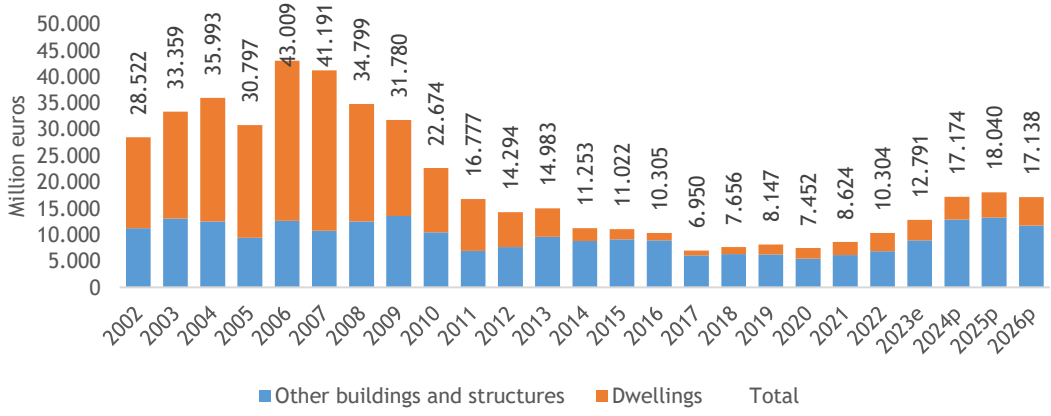
Figure 1: Total investment resources mobilized from grants to Recovery Fund projects directly related to Construction activity, by sector (estimate)



Source: Greece 2.0 National Recovery and Resilience Plan. IOBE estimates.

Along with the resources from the RRF loans (and the funding resources mobilized from the loans) it is estimated that for projects directly related to Construction, a total of 23.9 billion euros (12.8 billion euros from grants and 11.1 billion euros from loans) will be mobilized over the period 2022-2026. Therefore, construction investments are estimated to significantly boost their share in GDP in 2023-2026. In the medium term, additional investment in infrastructure and housing is estimated annually at up to 3.0% of GDP on average (compared to 2022) – with the share of investment in construction projects reaching up to 8.6% of GDP in 2025 from 4.8% in 2022. It is also estimated that the production value of infrastructure and housing construction projects will follow a strong upward trend in 2024-2026, exceeding 18 billion euros in 2025, up from 10.3 billion euros in 2022 (Figure 2). Due to the strong impact of NRRP investments, the overall impetus will be driven to a greater extent by investments in infrastructure and non-residential construction projects, but private construction activity is estimated to strengthen by 56% compared to the level recorded in 2022. Accordingly, the annual production value (turnover) in the activities of Architects and Engineers is estimated to approach 4.5 billion euros by 2025, up from 3.6 billion euros in 2022.

Figure 2: Projection of Construction Production Value, 2023-2026



Source: Eurostat, IOBE Estimation 2023-2026.

EVOLUTION OF FINANCING IN THE CONSTRUCTION SECTOR

The funding received by enterprises in the construction sector is mainly directed to: a) working capital, to cover operational needs and the financing of the transaction circuit (short-term borrowing), b) purchase of fixed capital (mainly long-term borrowing for machinery and other equipment, purchase of real estate for professional use, project development, etc.) and c) issuance of letters of guarantee, such as participation in tenders, project performance, reservations (replacement of tithes), downpayment and payment of obligations.

Domestic monetary-financial institutions (MFIs) financing balances in the construction sector decreased significantly between 2016 and 2021 (3.15 billion euros in 2021 or -67% compared to 2016), with the bulk of the decrease being due to write-offs of (non-performing) loans on credit institutions' balance sheets. In the period after 2021, the outstanding amounts of loans to Construction increased slightly. Overall, Construction raised 5.5% of all remaining financing to non-financial corporations in 2023, with a decreased participation compared to previous years.

In 2023, domestic MFIs' outstanding loans to the professional, scientific and technical sectors (including architectural and engineering activities) amounted to 1.28 billion euros, mainly related to loans with a maturity of more than one year (1.01 billion euros or 86%). The percentage decrease in the sector's financing balances over the period 2019-2023 was significantly higher (-54%) than the decrease in the total financing balances to non-financial corporations (-8%).

Domestic MFI financing of the construction sector did not change significantly in 2020 and 2021, with new loans amounting to 273 million euros and 289 million euros respectively. A large increase occurred in 2022, when new loans amounted to 602 million euros. However, in 2023, despite a further increase in construction activity, new financing for Construction fell to 280 million euros. The significant increase in borrowing costs in 2023 was one of the factors that may have affected funding flows. In the period 2020-2023, small and medium-sized enterprises (SMEs) in the sector received an average of 72% of new loans and large ones the remaining 28%.

The flow of new loans to the professional, scientific and technical sector was particularly high in 2020 (1.37 billion euros), possibly due to the COVID-19 pandemic, but in the following years it was limited to an average of 358 million euros. In 2023, there was also a decrease in funding flows in this sector compared to the previous year.

The lack of access to borrowed capital creates a financing gap, the size of which results from the disparity between the supply and demand of capital by businesses. The financing gap for SMEs in Greece (thus also for companies active in the construction sector) is generally larger than the EU average, increasing in the early years of the economic crisis and gradually de-escalating until 2019. But since 2020, with the health crisis and other disruptions to the economy (e.g. high energy costs), the financing gap for SMEs has widened again.

Finally, the cost of corporate borrowing in Greece is systematically higher than the euro area average, while in the most recent period it increased sharply from 2.72% in October 2022 to 6.16% in November 2023.

ANALYSIS OF FINANCING NEEDS IN THE CONSTRUCTION SECTOR

The development of public and private construction projects, the participation in public projects and the modernization of the productive capacity of the sector will require significantly increased funding resources from the financial system, both in operational capital and in medium- and long-term borrowed capital.

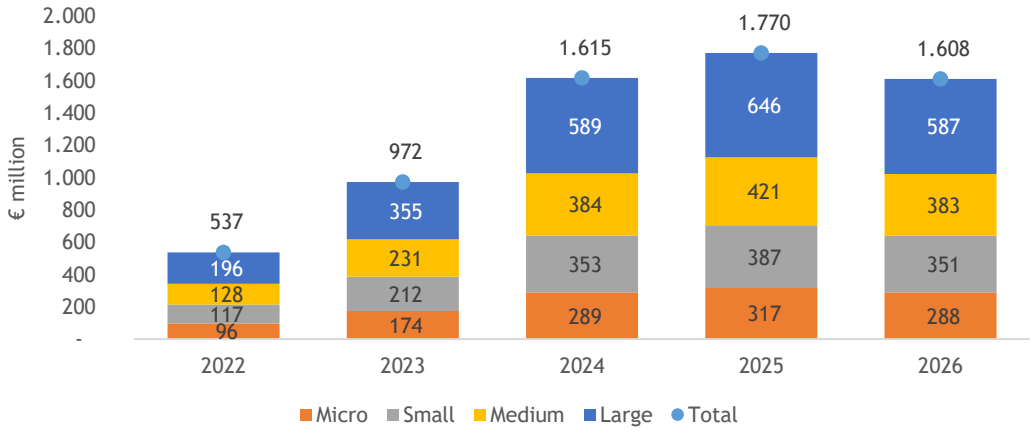
The study investigates the financing needs of the construction sector, considering possible different characteristics of enterprises, using data from accounting statements of technical and design

enterprises covering the period 2010-2022. The ultimate goal is the statistical estimation of the relationship between the amount of short-term and long-term borrowing of enterprises with variables such as profitability and turnover, in order to determine the needs of technical and design enterprises for borrowed capital based on their size.

The prospect of growth for the Construction sector will significantly strengthen the size of enterprises in the sector in the coming years. Based on the distribution of the production value of the Construction sector (Construction sector and Architectural and Engineering Activities) by enterprise size category and the forecast of the production value of the sector in 2023-2026, the amount and the distribution of the turnover of enterprises by size (micro, small, medium and large enterprises) was estimated for the period 2022-2026. Overall, the turnover of the sector is estimated to increase significantly in the period under review, reaching 21.4 billion euros in 2026.

The expected increase in the turnover of technical and design enterprises will also fuel an increase in their bank lending. It is estimated that the total net bank lending of enterprises in the sector over the period 2023-2026 could increase by 972 million euros to 1.77 billion euros (Figure 3). For micro-enterprises, the increase in total net bank lending ranges from 174 to 317 million euros, representing 18% of the total increase. Small businesses account for 22%, medium-sized businesses for 24% and large businesses for 36% of the overall increase in net bank lending.

Figure 3: Estimate of change in total bank loans by corporate category



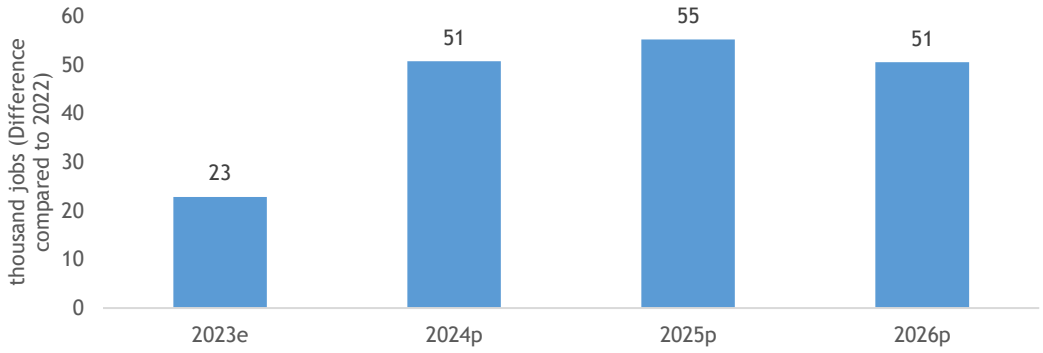
Source: IOBE

CHALLENGES FOR THE CONSTRUCTION SECTOR

Although the prospects for the development of Constructions and the maximization of their contribution to the Greek economy in the coming years are very positive, there are still significant challenges for the sector. These include issues related to human resources and business financing in the sector, the institutional framework of the public works production system and national infrastructure planning, the integration of technology and the digitalization of construction to enhance the productivity of the sector and, finally, the adoption of ESG standards by construction companies.

Workforce shortages are projected as the main bottleneck to growth in 2023, while financing difficulties are also assessed negatively in terms of their impact on construction activity. A shortage of workforce entails delays that may lead to an increase in the budget and non-compliance with project scheduled timeframes.

Figure 4: Assessing Job Needs in Construction



Source: IOBE. e: Estimation. p: Projection.

The prospect of strong growth in domestic construction activity will create additional needs in a workforce of various specialties. According to the estimates of the study, total construction workers should increase in the period 2024-2026 to around 250 thousand workers, a level that is 51 to 55 thousand higher compared to total construction employment in 2022 (197 thousand workers) (Figure 4).

The prospect of a further increase in construction projects in the coming years creates additional financing needs, including guarantees for project participation and fine execution. The need for additional funding and liquidity is compounded by late payments by construction companies, including in the public works sector. Difficulties in financing and the financing gap can be reduced by using various financial tools (e.g. guarantee funds, interest rate subsidy, etc.) so that public and private investments in construction projects can be implemented smoothly in the coming years.

In relation to the institutional framework, and given the large increases in construction costs, the need for a systematic operation of the mechanism for setting the revision coefficients of prices covering the whole range of individual costs was highlighted, to reduce uncertainty for participants in public works tenders and the related problems that may arise during the implementation of projects. The development, operation and management of the Unified System of Technical Specifications and Pricing of Technical Works and Studies and the Electronic System for Determining the Costs of Production Factors of Technical Works, which has not yet been implemented, will contribute to this.

Other interventions to further improve the public works production system include the expansion of the digitalization of public procurement procedures and the enhancement of interoperability between information systems, the introduction of multiple criteria for the selection of the contractor, the widespread use of out-of-court dispute resolution methods, such as mediation and expert panels and arbitration, regulatory interventions to speed up procedures and ensure continuity between contracts and the execution and maintenance of works, ensure reliable and enforceable studies, reform the budgeting mechanism, enhance transparency and ensure conditions of free competition, the implementation of Presidential Decree 71/1019 on the Registers of production factors of public and private works, studies, technical and other related scientific services, and strict control and supervision during the construction of each project.

Low digitalization rates, but also a lack of investment by construction companies, are two major challenges for the resilience and competitiveness of the sector. As the sector is mainly composed of small and medium-sized enterprises, the scope for investment in innovative technologies is generally low and the need for financial support and other financial incentives is high. The recent announcement of the National Strategy and the Roadmap for the implementation of Building Information Modelling (BIM) in Greece is a positive development. The implementation of BIM is expected to be critical in the

production of sustainable and resilient projects, improving the process of designing, constructing and maintaining public works. Integrating the changes required by the National BIM Strategy requires time for the broad development of the necessary skills for companies in the sector to meet the new requirements and procure the necessary equipment.

Environmental, social and corporate governance management (ESG) is particularly important to facilitate access to investment and funding for construction companies. Potential benefits of adopting sustainable practices with ESG criteria also include improving their environmental performance and avoiding any adverse economic impacts, enhancing their reputation, making it easier to adapt to the legislative framework, integrating circular economy principles and strengthening cooperation with all stakeholders (local communities, customers, investors, staff, etc.).

Finally, there is a need to draw up a National Strategic Planning for Infrastructure and Construction, which will set priorities, define planned and foreseen investments in large economic and social infrastructure, specify funding resources for critical infrastructure projects, including their maintenance, and identify workforce and skills needs for their implementation. The national infrastructure plan will provide significant support to the Construction sector by helping it with evidence-based business planning and making the necessary investments in skills and productivity enhancement.

1 INTRODUCTION

Over the past decade, the construction sector in Greece has faced an unprecedentedly adverse domestic economic environment, which has been a serious impediment to its activity. The restoration of stability and the progress made in the Greek economy in recent years, the securing of a significant amount of national and European resources for development projects and the recovery of private construction activity, make the expectations of further development of Construction in the next period particularly positive.

The overall performance and prospects of Construction in Greece were examined in a previous study by IOBE[1], which found that the development of public and private construction projects, the participation in public projects and the modernization of the sector's production potential will require significantly increased financing resources, both in operational capital and in medium- and long-term borrowed capital. The study also pointed out that the smooth implementation of public and private investments in construction projects in the coming years would require the alleviation of financing difficulties and the reduction of the financing gap, using various financing tools, such as guarantee funds, interest rate subsidies, etc.

The period since the completion of the study was characterized by strong inflationary pressures on the Greek economy, which significantly affected the cost of public and private projects and led to a further increase in the cost of financing to the economy, due to the increase in interest rates by the European Central Bank. On the other hand, the activation of the Recovery and Resilience Fund and the provision of liquidity through grants and loan resources on more favorable terms also worked positively for the Construction sector. However, the large number of planned and implemented projects, after a prolonged period of limited construction activity, highlighted inter alia the significant shortages in skilled labor, which limit the capacity utilization of technical enterprises and pose significant challenges, especially in relation to the implementation of projects financed by the Recovery and Resilience Fund, which need to be completed within a certain timeframe.

Current challenges for Construction include increasing awareness of sustainability issues, which requires construction companies to integrate environmental, social and governance principles (ESG principles) and enhance innovation and digitalization, both in the implemented projects and in their operation functions, to improve their access to funds to finance technical projects.

In this environment of significant developments and challenges, it is of particular interest to record the current trends in Construction in Greece, to analyze the factors that affect the sector at the current juncture and to evaluate its prospects in the coming years. In this context, the present study aims to analyze the latest data and developments in the Construction sector in Greece and assess the prospects of the sector in the coming years, considering the significant challenges it faces.

In particular, the structure of the study is as follows. In the next **second chapter,** the demarcation and description of the Construction sector is carried out, its fundamentals and its contribution to investments, value added and employment in the Greek economy are

[1] IOBE (2022). Development prospects and financing needs of the construction sector. July. The study was supported by TMEDE.

examined. The overall contribution of construction activity to the Greek economy, employment and the external balance is also estimated. Finally, current trends in the areas of public and private construction projects are examined.

The **third chapter** presents the planning for the infrastructure and other construction projects to be funded by national and European funds in the coming years. An indicative identification (projection) of the relevant investment costs for the period 2023-2026 is also made based on the available data on their funding.

The **fourth chapter** presents the development of funding in the construction sector and makes comparisons with other sectors of economic activity. Data on the financing gap of small and medium-sized enterprises in Greece are also presented.

In **the fifth chapter,** in order to investigate the needs of technical and consultancy companies in debt capital with a view to a significant increase in their activity in the coming years, an econometric analysis is carried out in which, based on historical data for a large sample of technical and design companies, the relationship between the amount of short-term and long-term borrowed capital with the turnover, profitability and size of the business is estimated. These estimates are then used to project the future debt capital needs of the construction sector by firm size category.

The **sixth chapter** examines several important challenges for the construction industry. These include issues related to the workforce and the needs that are expected to arise in the coming years, the financing of companies in the sector, the institutional framework of the public works production system, national infrastructure planning, the integration of technology and the digitalization of Construction, as well as the adoption of ESG principles by construction companies.

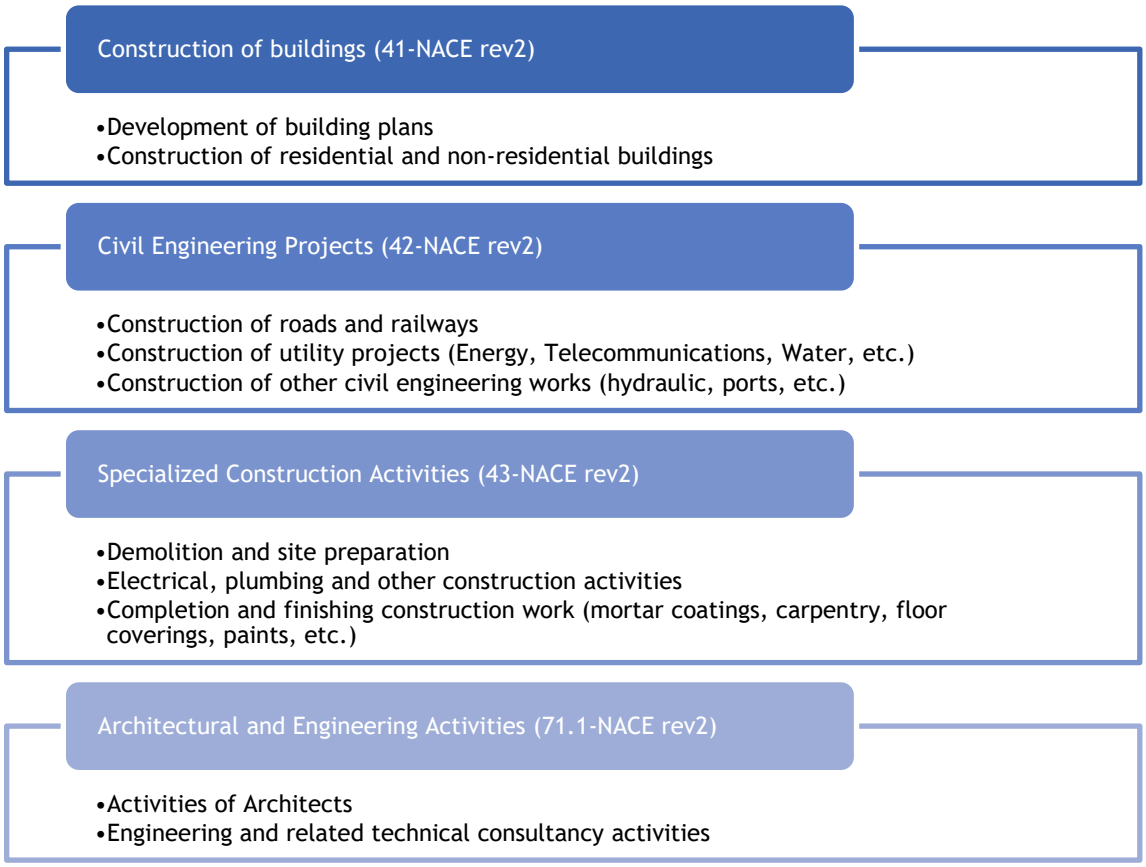
The study concludes with **the seventh chapter**, which summarizes the main findings of the analysis.

2 SIZES AND TRENDS OF THE CONSTRUCTION SECTOR IN GREECE

2.1 Definition and description of the construction sector

Construction involves a wide range of production activities. The main body of Construction includes the economic activities related to the development of construction projects and the construction of buildings, the implementation of civil engineering projects (infrastructure projects), as well as other specialized construction activities, such as demolitions, electrical and plumbing installations and construction works for the completion of projects. The activities of Architects and Engineers are also directly intertwined with Construction[2] (Figure 2.1).

Figure 2.1: Activities included in the construction sector



Source: NACE rev2.

The Construction sector designs and implements several projects that contribute decisively to enhancing the productivity of the economy, sustainable development and the quality of life of citizens. The two main categories of construction projects are **infrastructure** and **buildings projects** (Figure 2.2).

The first category includes road projects, such as urban and interurban motorways and other road projects (e.g. bridges, tunnels), the construction of infrastructure for the operation of track-based modes of transport (Metro, Tram, Railways), projects in the Energy and Telecommunications sectors, such as production stations, pipelines and networks, urban

[2] The broader ecosystem of Construction includes economic activities ranging from the mining of ores and quarry products and the building materials, metals and wood industry to trade and real estate management.

development projects, such as water supply-sewage, regeneration, pedestrianization and environmental projects and, finally, other infrastructure projects such as ports and marinas, airports and hydraulic works. In Greece, these projects are usually co-financed with European Union funds, with a predetermined percentage of national contribution. Public-Private Partnerships (PPPs) and, especially for large contributory projects, Concessions involving private capital also play an important role in financing.

Figure 2.2: Categories of infrastructure and building projects

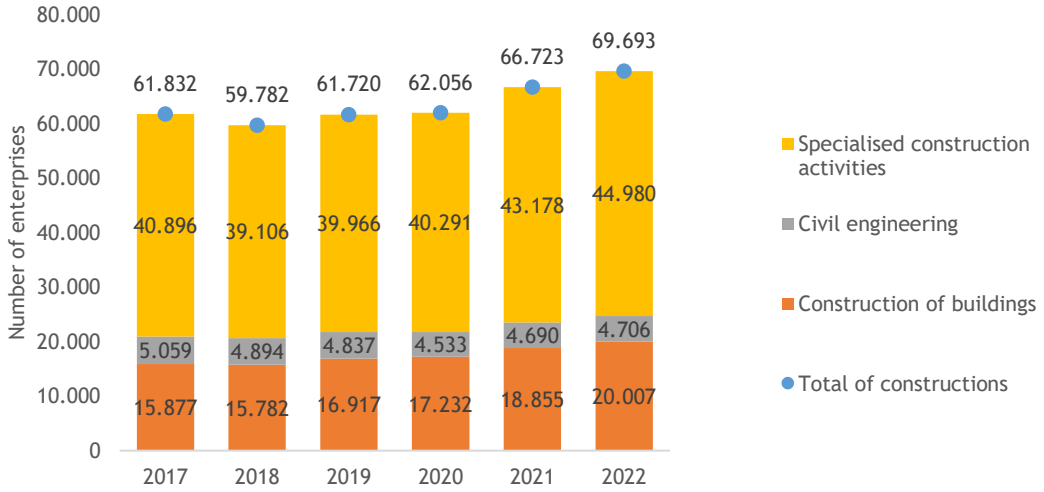
The second category includes projects in the residential sector, which include dwellings and residential complexes, as well as works for the restoration and maintenance of existing buildings (private building activity), i.e. projects that largely determine the quality of life of citizens. Also included are infrastructure construction projects that support economic activities in Commerce, Industry, Services and the Public Sector (shops, shopping malls, industrial facilities, hotels, office buildings, warehouses, parking lots, hospitals, schools, cultural centers, sports facilities, etc.). These projects are mainly financed by the private sector, which uses the projects and assumes the associated risks, while public sector building projects may also use the PPP model or co-financing with European Union funds (e.g. in hospitals, schools and fire stations).

2.2 Number and size of enterprises in the construction sector

In the construction sector in Greece, around 70,000 enterprises were active in 2022 (Figure 2.3). Almost 2 out of 3 of them were active in specialized *construction work.* 28.7% of businesses focused on *building construction.* The number of enterprises performing *civil engineering works is considerably lower (4,706* enterprises or 6.8% of the total). Between 2017 and 2022, the number of enterprises active in the construction sector increased by 7,861 (+13%), reversing the trend of declining number of enterprises that occurred during the

economic crisis[3,4]. The largest increase in the number of enterprises was recorded in building construction (+26%) and specialized construction activities (+10%). By contrast, in civil engineering the number of enterprises decreased by 7%.

Figure 2.3: Number of enterprises in the Construction sector by activity



Source: Eurostat, IOBE analysis.

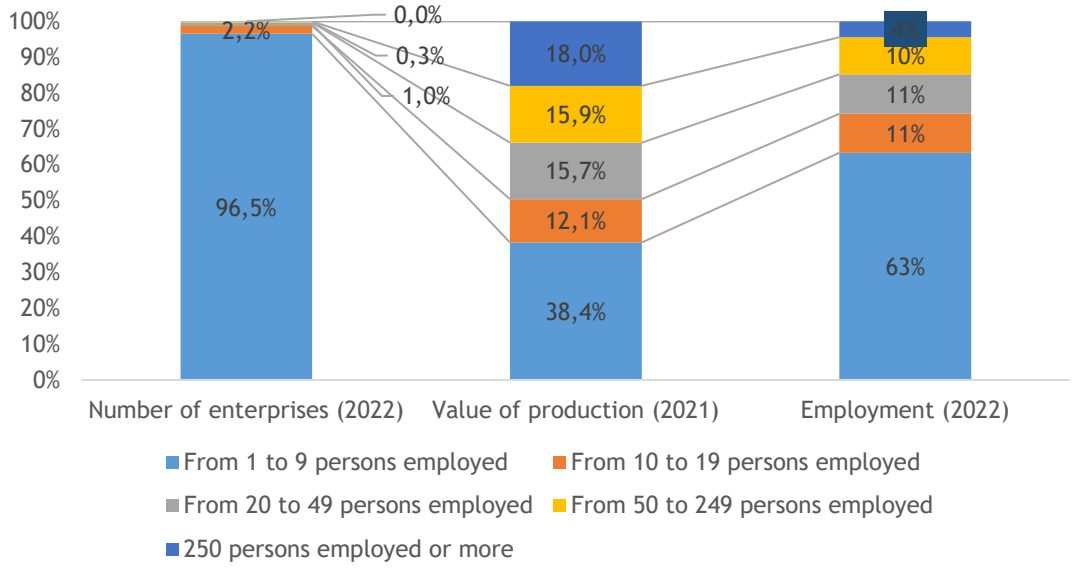
Most enterprises in the construction sector in Greece (96.5% in 2022) are micro-enterprises (sole proprietorships, self-employed persons –enterprises employing up to 9 people). However, these enterprises accounted for 38.4% of the production value of Constructions in 2021. Only 12 companies have more than 250 employees, but they account for 18% of the production value of Construction (Figure 2.4). Small and medium-sized enterprises (employing between 10 and 249 people) make up 3.5% of the total population and account for the remaining 43.7% of the production value of construction. The picture is similar in other countries, at which, though, there seems to be a larger number of firms employing between 10 and 49 people, as well as firms with more than 50 employees (Figure 2.5).

The small size of business units may be linked to less favorable conditions for access to funding. It is, however, an inherent feature of the construction industry, which faces the (often unpredictable) fluctuation in the demand for construction projects of varying degrees of technical requirements, in different regions of the country. In such an environment, business flexibility is particularly important –the main concern of businesses is to minimize fixed costs (e.g. remuneration of permanent staff), which is achieved (also) by subcontracting to small businesses for specific construction works.

[3] Overall, from 2009 to 2017 the number of enterprises in the Construction sector decreased by 45% (or 51,120 enterprises).

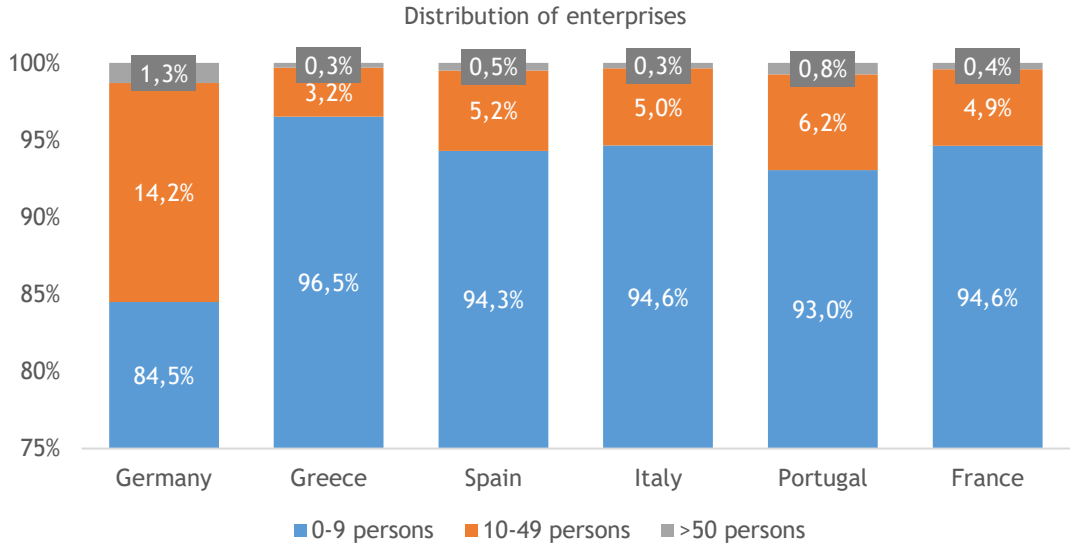
[4] This change is further broken down into an increase in the number of micro-enterprises by 6,862, enterprises employing 10-49 persons by 927 and enterprises employing 50-249 persons by 72 enterprises.

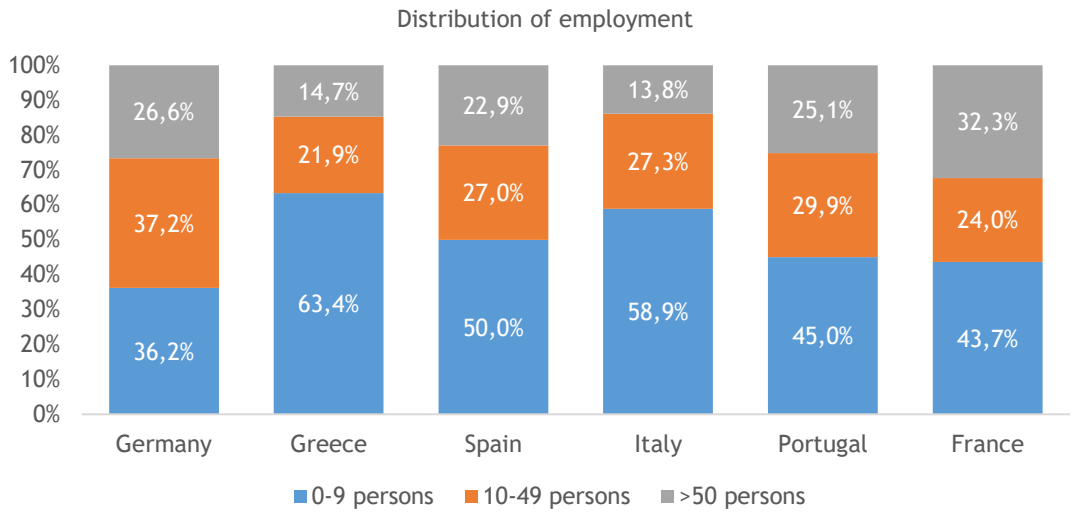
Figure 2.4: Distribution of the number of enterprises and production value in Construction based on employment, 2021



Source: Eurostat, IOBE analysis.

Figure 2.5: Distribution of the number of enterprises based on firm size by employment in various countries, 2022

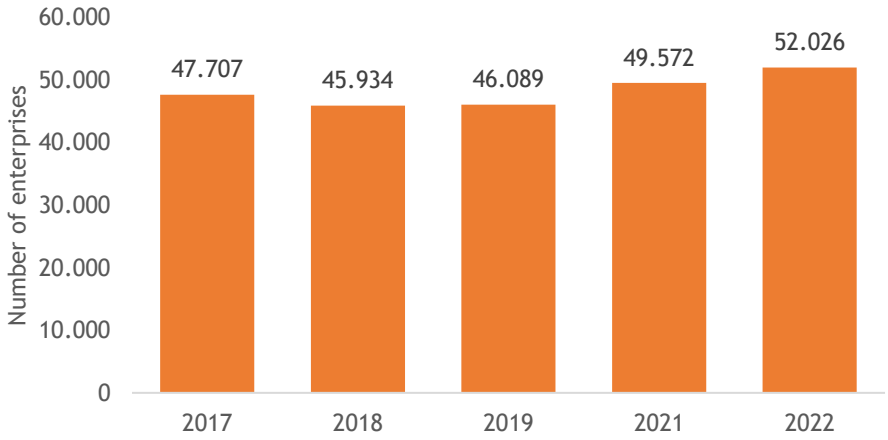




Source: Eurostat, IOBE analysis.

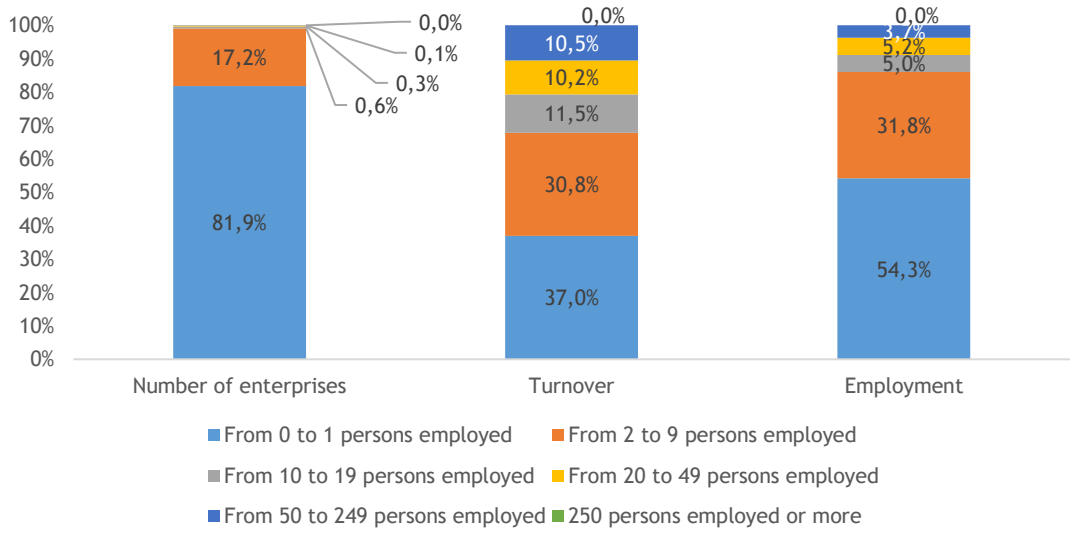
Approximately 52,000 enterprises operated in Architectural and Engineering activities in 2022, an increase of approximately 4,300 enterprises compared to 2017 (Figure 2.6). Almost 8 out of 10 enterprises represent self-employed persons, accounting for 37% of the industry's turnover. Micro-enterprises (2 to 9 persons employed) account for 17% of the total number of enterprises and account for 31% of the total turnover of the activities of Architects and Engineers, while 483 enterprises employing more than 10 persons account for the remaining 32% of the turnover of the sector.

Figure 2.6: Number of enterprises in the Architectural and Engineering activities



Source: Eurostat, IOBE analysis.

Figure 2.7: Distribution of the number of enterprises, turnover, and employment in Architectural and Engineering activities based on firm size by employment, 2022

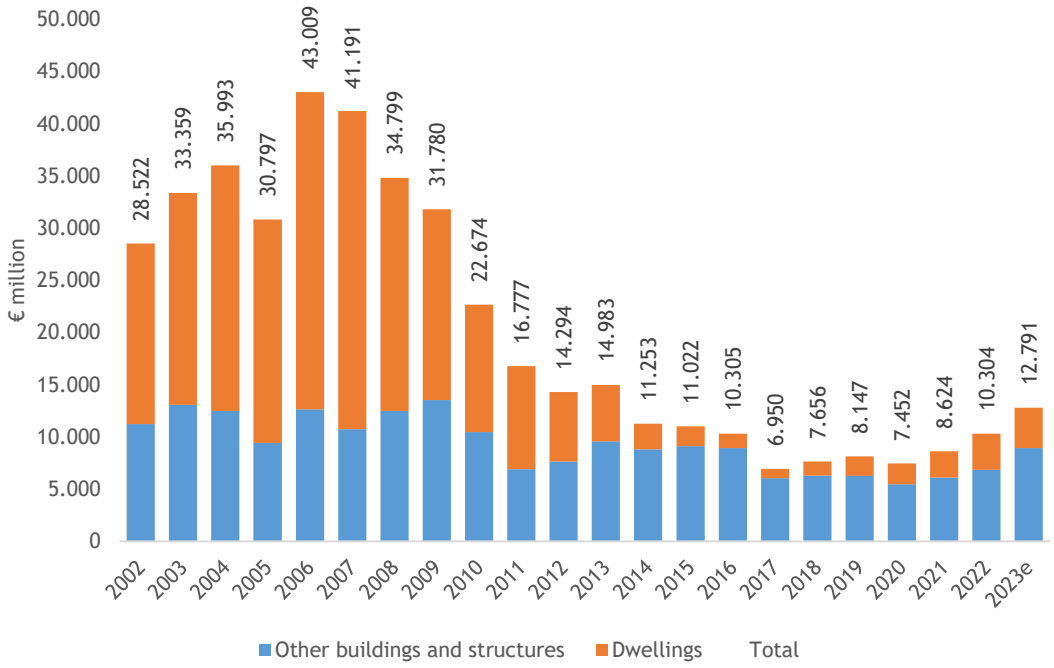


Source: Eurostat, IOBE analysis. *Estimated turnover.

2.3 Output value, operating surplus, value added and investments

The construction sector was adversely affected by the recession of the Greek economy, as the decline in incomes, the limitation of financing, the increase in the tax burden and generalized uncertainty led to a dramatic fall in investment and construction activity. The production value of Construction declined significantly after 2007, causing strong pressures on the profitability of the sector, which is reflected in the decline in value added and the contraction of its operating surplus (gross profitability). However, after 2017 Construction is recovering, as the production value of the industry has strengthened significantly, while improving operating profitability. In particular, the total production value of the construction sector is estimated to have reached 12.8 billion euros in 2023, 84% higher than in 2017, having strengthened particularly after 2020, when it had temporarily fallen due to the health crisis (Figure 2.8). However, it has not yet reached the levels recorded by the industry before 2014 and is far from the historical high recorded in 2006.

Figure 2.8: Production value of the Construction sector

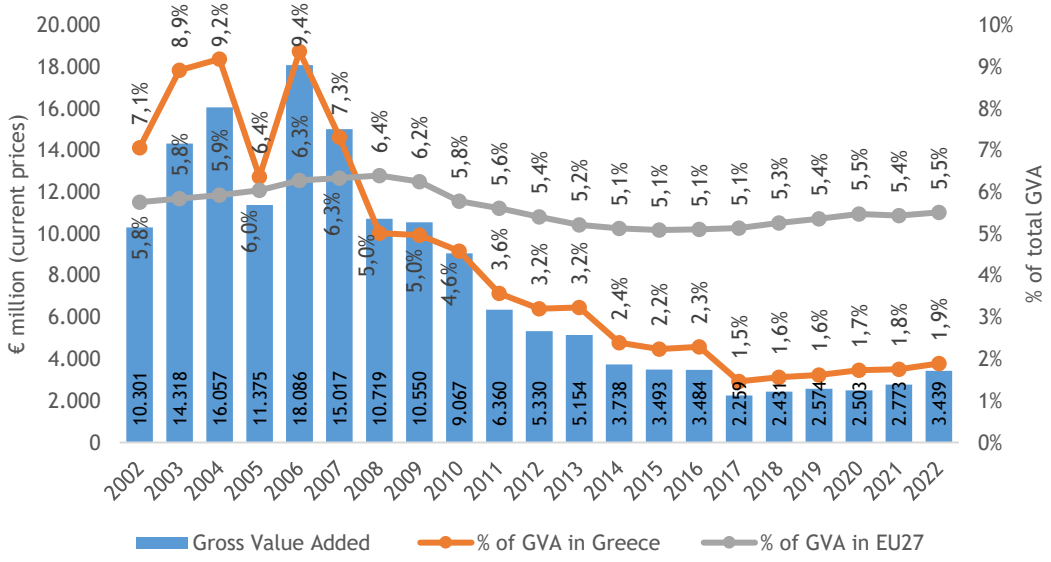


Source: Eurostat, IOBE analysis. Since 2017, there has been a discontinuity in the chronological order compared to previous years. e: Estimation.

The gross value added (GVA)[5] of the construction sector stood at 3.4 billion euros in 2022, compared with 18.1 billion euros in 2006, when it reached its highest point in 20 years (Figure 2.9). As a result, the contribution of the Construction sector to the total gross value added of the Greek economy decreased to 1.9% in 2022 (EU-27: 5.5%) from 9.4% in 2006 (EU-27: 6.3%). It is worth noting that the strengthening of construction activity after 2017 has led to an increase in the GVA of Constructions and a gradual increase of its share in the total GVA of the Greek economy by 0.4 percentage points.

[5] Gross value added (at factor prices) is the gross income from the operating activities of enterprises adjusted for subsidies and indirect taxes. It is calculated by adding turnover, other operating income and changes in inventories and deducting purchases of goods and services and other taxes on products and production. Alternatively, it is calculated as the sum of gross operating surplus and labor costs.

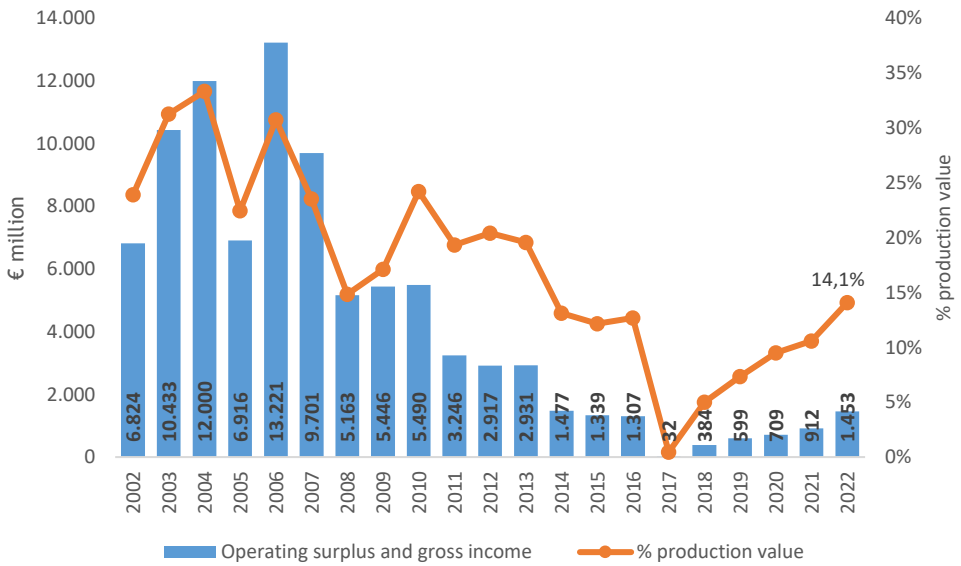
Figure 2.9: Gross Value Added of the Construction sector



Source: Eurostat, IOBE analysis.

The operating surplus and gross income of the construction sector has been at a historically low level in previous years. After 2017, it follows a steady recovery path to reach 1.5 billion euros or 14.1% of the total production value in 2022. However, this is still significantly below the values recorded in the 2000s (an average of 25%) (Figure 2.10).

Figure 2.10: Operating surplus and gross income of the Construction sector

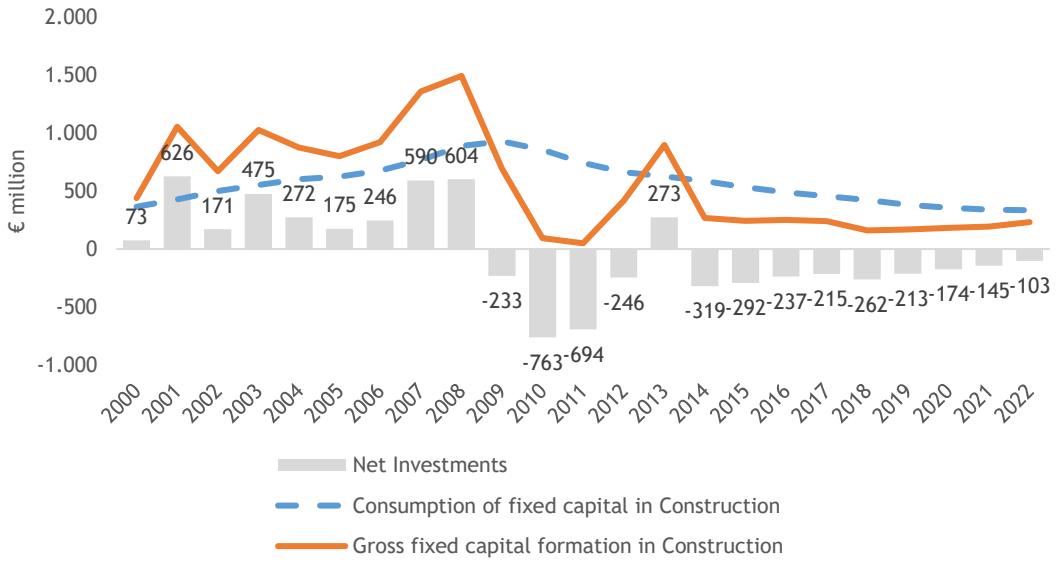


Source: Eurostat, IOBE analysis. Since 2017, there has been a discontinuity in the chronological order compared to previous years.

The decline in overall profitability in Construction also affected the level of the sector's fixed capital investments. After 2008, construction investments in fixed capital (machinery, other equipment, etc.) do not cover capital consumption (depreciation), suggesting disinvestment and deterioration of the sector's production capacities (Figure 2.11). It is also worth noting that the share of investment (gross fixed capital formation) in gross value added of

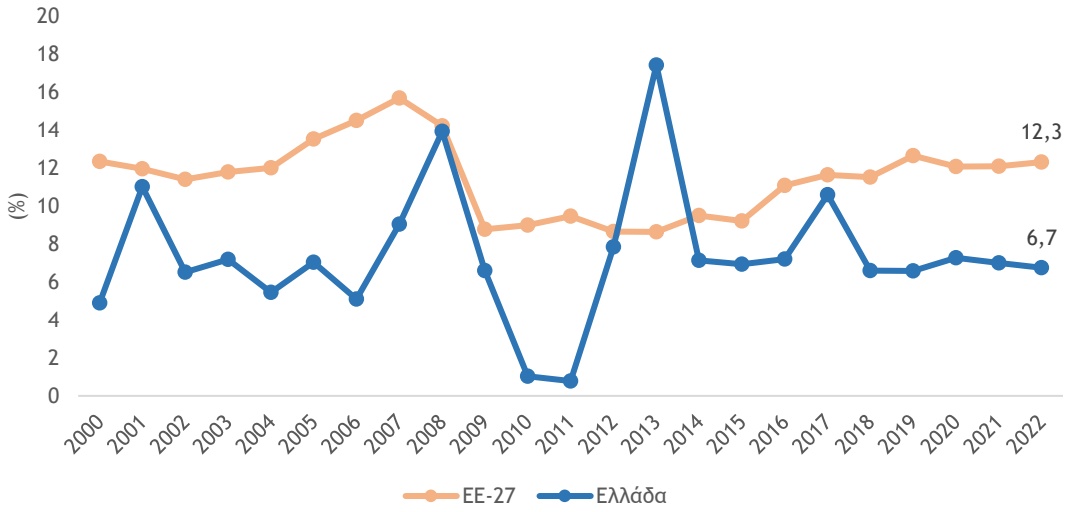
construction is systematically lower in Greece compared to the EU-27 average (6.7% compared to 12.3% respectively in 2022) (Figure 2.12). The improvement in profitability and the prospect of a significant increase in construction activity, as discussed below, will also require a significant strengthening of the sector's modernization investments and related financing, so that the sector's net investments return to positive values and increase the sector's production capacity and competitiveness.

Figure 2.11: Investments in fixed capital in Construction sector



Source: Eurostat, IOBE analysis.

Figure 2.12: Gross fixed capital formation over GVA in Construction sector

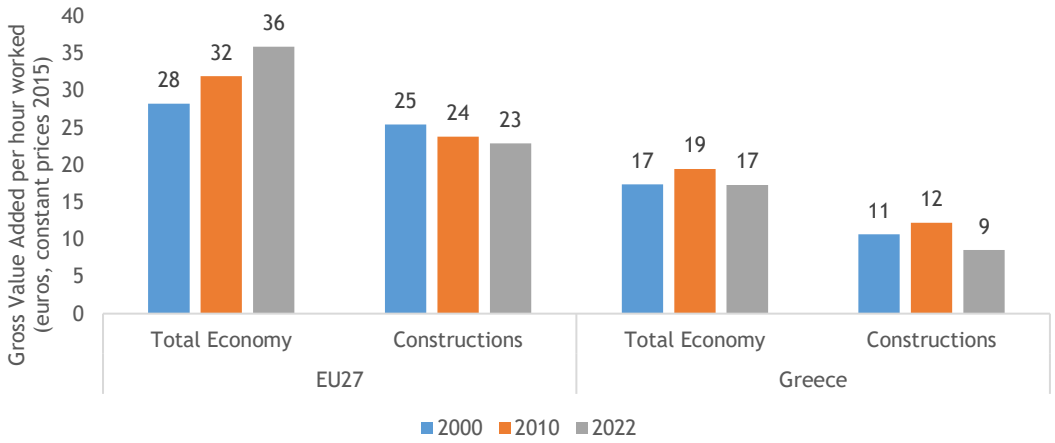


Source: Eurostat, IOBE analysis.

The low level of investment is one of the factors leading to low labor productivity in the construction sector (Figure 2.13). Specifically, labor productivity in Construction in Greece (in terms of GVA per hour worked) shows a decreasing trend over the period 2010-2022 and is significantly lower than both average labor productivity in the total Greek economy (51% lower) and average labor productivity in Construction in the EU-27 (63% lower). It is worth

noting that the same decline in Construction is also observed in the EU-27, in contrast to labor productivity in the total European economy, which is improving. This development suggests the existence of specific structural factors (fragmentation, low rate of adoption of new technologies, etc.), which affect labor productivity in the construction sector.

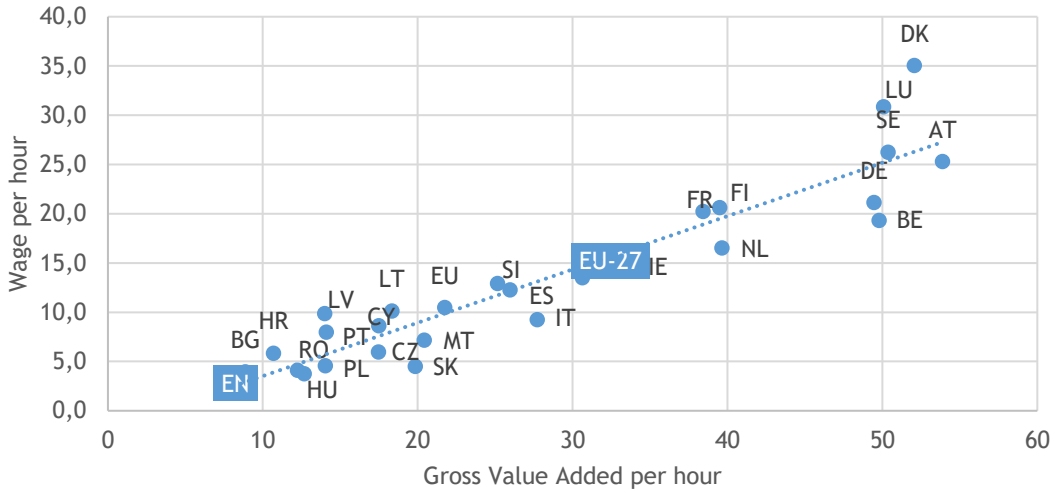
Figure 2.13: Labor productivity in Construction sector in Greece and the EU-27



Source: Eurostat, IOBE analysis.

In addition, labor productivity in Construction in Greece is at a low level compared to the rest of the EU Member States, which also has a significant impact on wage levels, which follow closely the level of productivity (Figure 2.14).

Figure 2.14: Productivity and wages in Construction sector, 2022



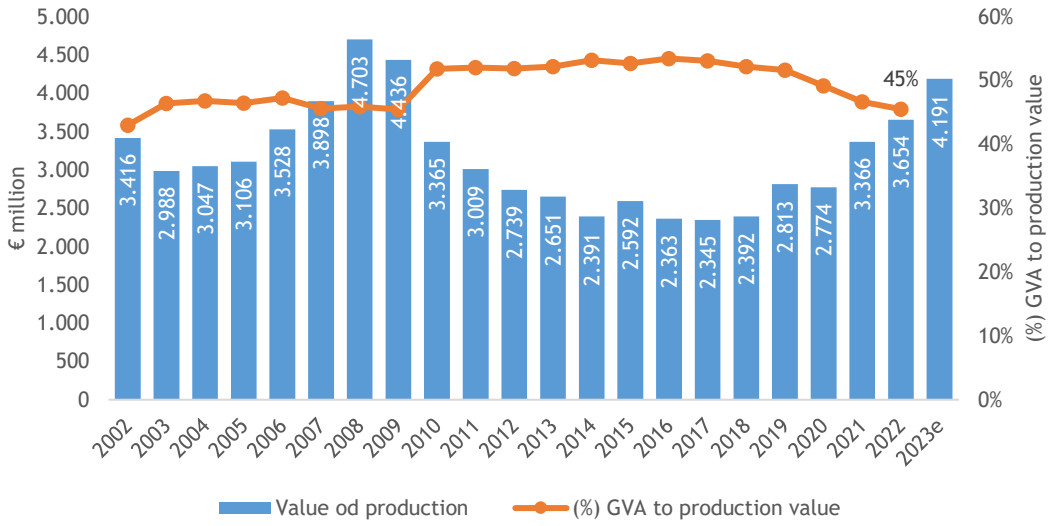
Source: Eurostat.

The economic crisis has also had a significant impact on the activities of Architects and Engineers[6], with the production value of the sector declining by about 50% in the period 2008-2018 (Figure 2.15). However, since 2019 the production value in the activities of Architects and Engineers has significantly strengthened and it is estimated that (in current prices) it

[6] This also includes technical inspection and analysis activities, not all of which are related to the construction sector.

reached 4.2 billion euros in 2023. Approximately 50% of the production value is the added value of the Architecture and Engineering sector, which in 2022 amounted to 1.7 billion euros, representing 0.9% of the country's GDP.

Figure 2.15: Production value of Architectural and Engineering activities

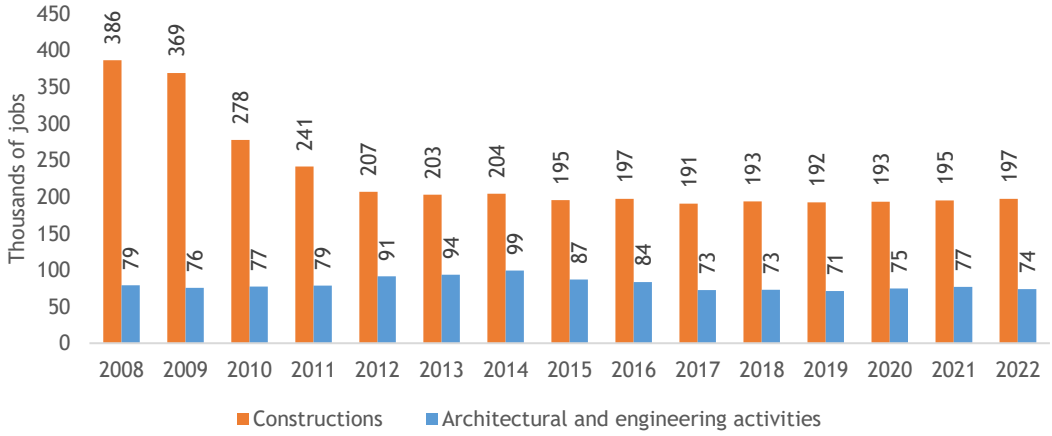


Source: Eurostat, IOBE analysis.

2.4 Employment

The construction sector employed a total of 197 thousand persons in 2022 (Figure 2.16)[7]. A significant decline in employment in Construction occurred in the period 2008-2015, when construction activity declined sharply and total employment in the construction sector fell from 386 thousand persons to 195 thousand persons. Since then, employment in the sector has stagnated somewhat – with a trend of moderate growth in recent years.

Figure 2.16: Employment in the Construction sector and Architects and Engineers activities



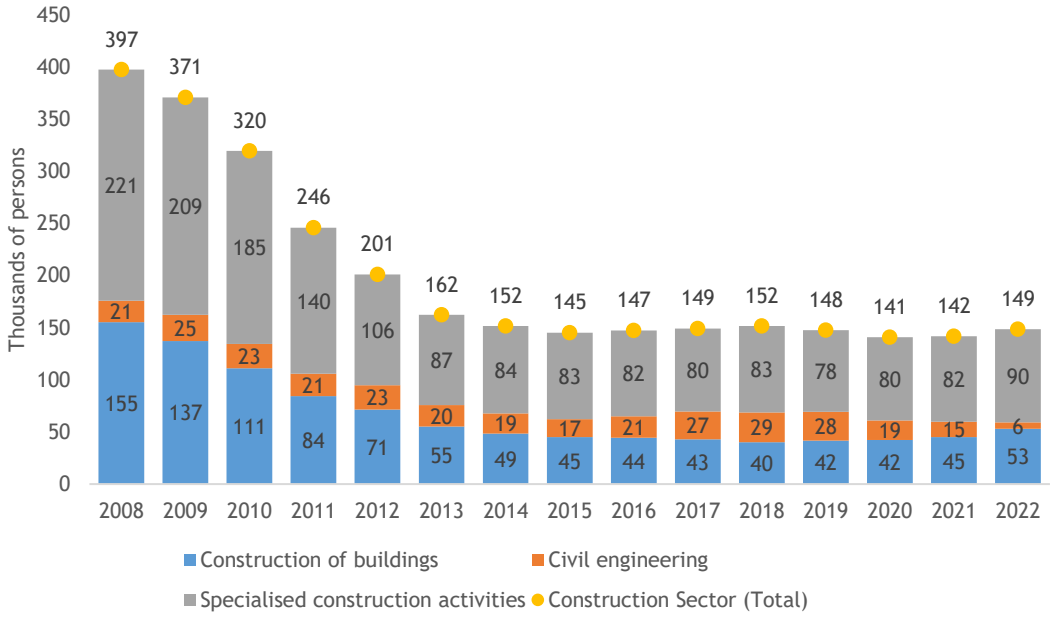
Source: Eurostat, National Accounts.

[7] It should be noted that the sector includes 46 categories of professions based on the 3-digit classification of STEP (Statistical Classification of Occupations), which incorporate hundreds of individual professions.

In activities of Architects and Engineers 74 thousand persons were employed in 2022, a number that has not changed significantly since 2017.

According to the Labor Force Survey[8] of ELSTAT, most employees in the construction sector work in specialized construction activities, with 90 thousand people in 2022, and a decrease of 59.3% compared to 2008. Building construction, which also saw a strong decline in employment over the same period (-65.8%), employed 53 thousand people in 2022. In civil engineering projects, which mainly concern infrastructure investments, employment in 2022 reached just 6 thousand people, while even showing a downward trend from 2018 onwards.

Figure 2.17: Employment in Construction by sub-sector



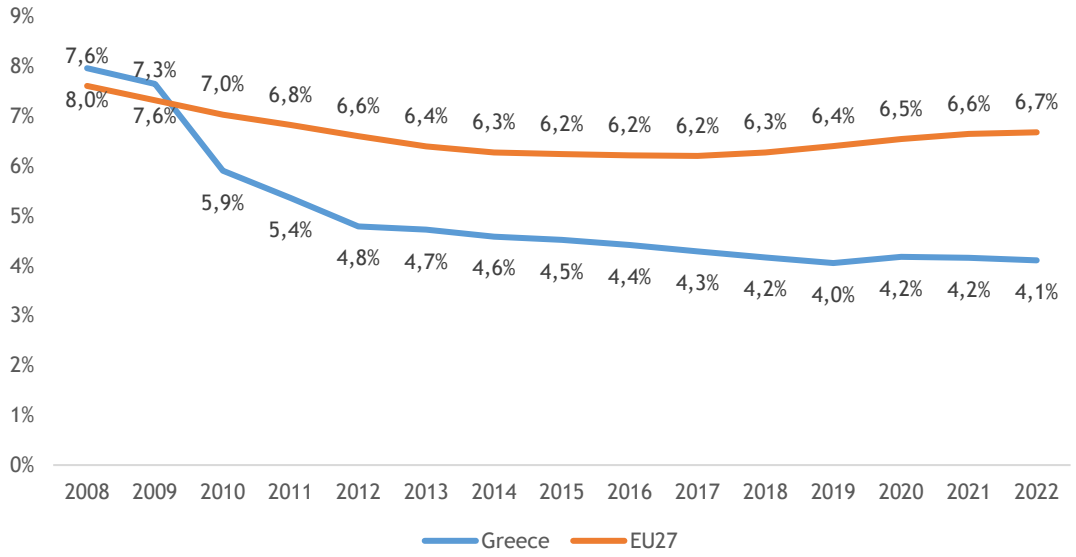
Source: Eurostat, IOBE analysis

However, construction still has a significant presence in the Greek economy. The share of employment in construction in total employment decreased from 8.0% in 2008 to 4.1% in 2022 (Figure 2.18). In 2008, the contribution of the Construction sector to total employment in Greece was above the EU-27 average (partly also due to differences in labor productivity), while in 2022 it was 2.6 percentage points lower, showing the particularly negative impact of the crisis on the sector.

Despite the decline in the sector, in most regions of the country the contribution of Construction to economic activity and employment remains measurable (Figure 2.19). Specifically, in terms of employment in 2021, it ranged from 3.5% (Eastern Macedonia & Thrace) to 6.2% (South Aegean), with the average across the country being 4.2%. In terms of value added, the ranking varies, which is indicative of differences in work volumes and labor productivity across regions.

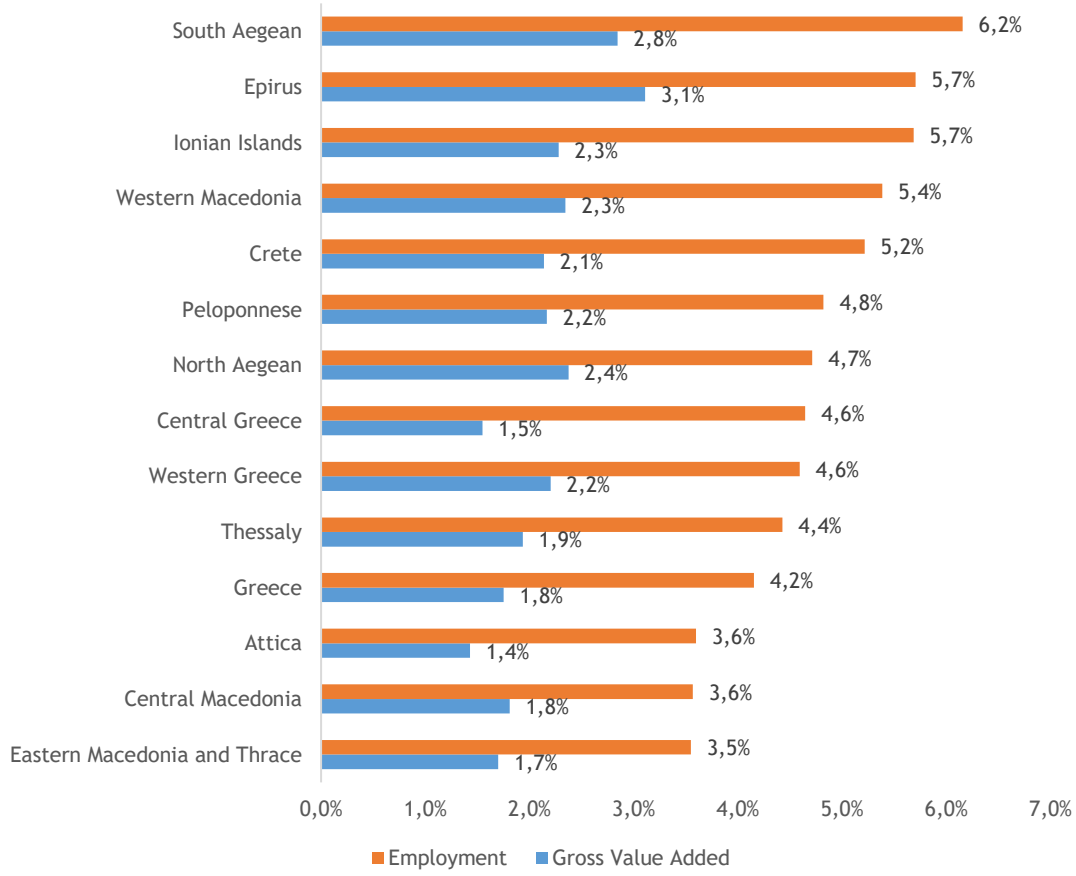
[8] Estimates of employment in the National Accounts differ from the results extracted from the Labor Force Survey (LFS), due to geographical and other differences (population coverage, minimum ages). The LFS covers only resident households and therefore does not include cross-border workers, but they are included in the domestic concept used in national accounts.

Figure 2.18: Employment in Construction sector (% of total employment)



Source: Eurostat, IOBE analysis.

Figure 2.19: Share of Construction in Gross Value Added (GVA) and employment by region, 2021

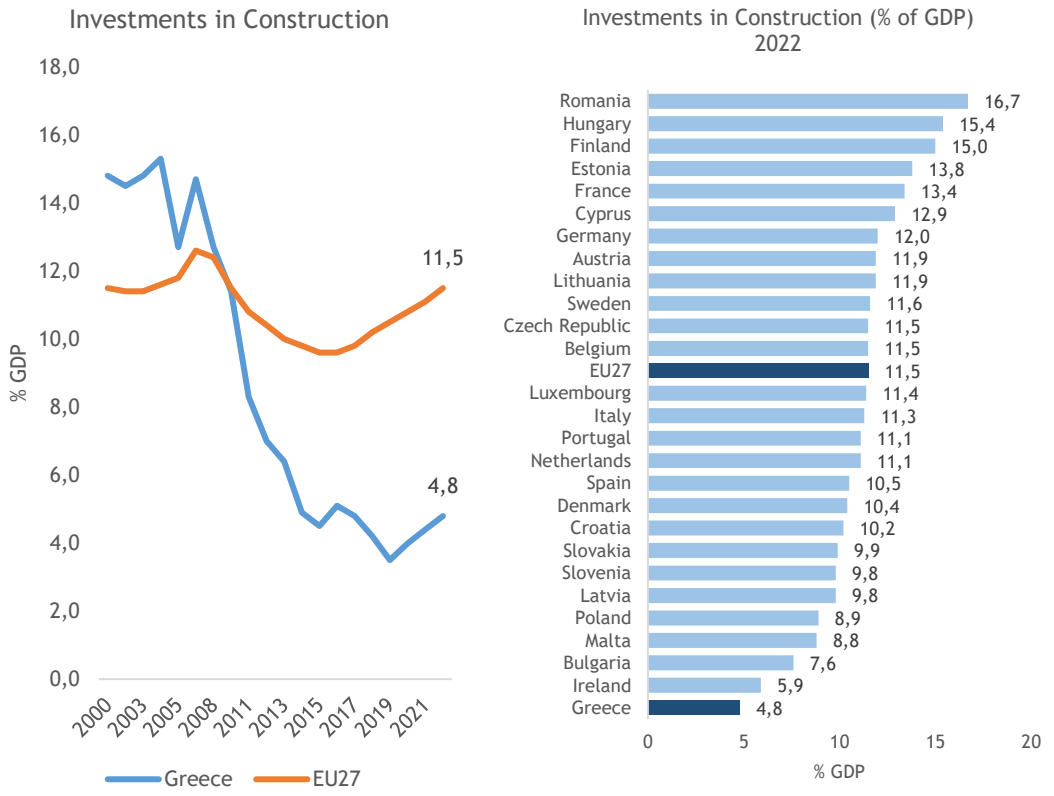


Source: ELSTAT, IOBE analysis.

2.5 Residential and other construction investment

The investment gap in Greece –compared to the EU-27– has been more pronounced due to a drastic decline in investment in housing and other construction projects (Figure 2.20). Construction investment accounted for 4.8% of GDP in 2022, compared to 14.7% in 2007, while the gap compared to the EU-27 average was more than 6 percentage points in 2022. Greece records the lowest rate of construction investment as a percentage of GDP among EU countries.

Figure 2.20: Investments in Construction in Greece and the EU-27 (% of GDP)



Source: Eurostat, IOBE analysis.

Construction investments can be divided into two categories: a) Investments in housing by individuals and b) Investments in other constructions by individuals (e.g. warehouses, industrial buildings, commercial buildings, hotels, etc.) and infrastructure by the State.

Box 2.1: Categories of Construction Investments

1. Investments in dwellings

The category 'dwellings' includes buildings used exclusively or mainly as dwellings, including any associated structures, enclosed parking spaces, and all fixed installations normally installed in dwellings (e.g. warehouses). Costs of construction site clearance and preparation (e.g. earthworks) are also included. Examples include residential buildings, single-family and multi-family buildings and other residential buildings intended for non-transitory stays. Incomplete dwellings are included if the end-user is presumed to already own them, either because the construction is done on his own account or because it is evidenced by the existence of a sale/purchase contract. The value of the investment in dwellings is recorded as net of the value of the land under the dwellings.

2. Investment in other construction (Construction other than residential & rest constructions)

The category 'other buildings and structures' includes buildings and structures other than dwellings as well as land improvements. Incomplete buildings and structures are included if the end-user is deemed to own them, either because the construction is done on his own account or because it is evidenced by the existence of a sales/purchase contract. This includes buildings and structures purchased for military purposes. The value of other buildings and structures is recorded without the value of the land underneath them, which is included in the category 'land' if classified separately.

2A. Non-residential buildings (Professional and public buildings)

Non-residential buildings, public monuments, warehouses and industrial buildings, commercial buildings, buildings for public recreation, hotels, restaurants, educational buildings, sanitary buildings, etc.

2B. Other constructions (Infrastructure)

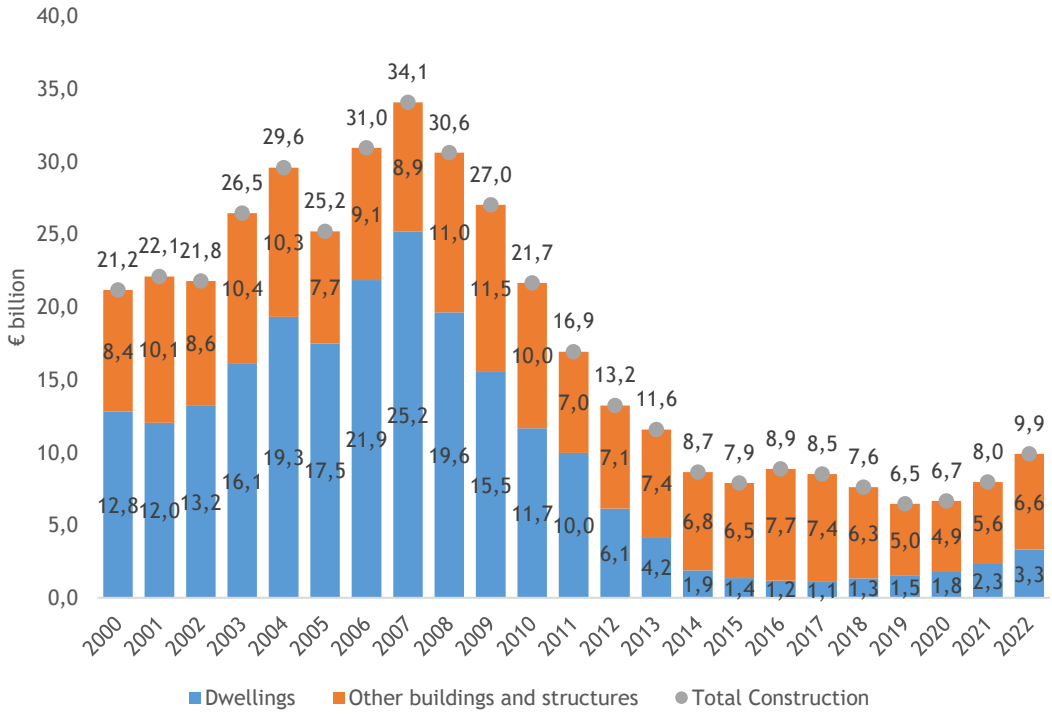
Construction other than dwellings, including the cost of roads, sewers and the clearance and preparation of construction sites. This includes wells, tunnels and structures associated with the extraction of mineral and energy resources, as well as the construction of breakwaters, embankments and flood defenses designed to improve the land in the vicinity. Examples include motorways, roads, railways and airport runways, bridges, elevated motorways, tunnels and underpasses; waterways, ports, dams and other hydraulic works; long-distance pipelines, communication lines and electricity pipelines; local pipelines and cables, ancillary works; construction for mines and industries; and construction for sports and recreation.

Source: European System Accounts 2010.

In absolute terms, total investment expenditure on construction projects decreased from 34.1 billion in 2007 to 9.9 billion euros in 2022 – below 1/3 of the 2007 level (Figure 2.21). During this period, the two categories of investment developed quite differently. Annual residential investment contracted by 87% to 3.3 billion euros in 2022, compared to 25.2 billion euros in 2007, in most recent years, however, have strongly recovered as they more than doubled in 2022 compared to 2019. Other construction investment fell by 42.6% from its peak in 2009. Investments in this category amounted to 6.6 billion euros in 2022, compared to an average of 6.8 billion euros in 2010-2022. Therefore, most of the decline in total construction investment is due to the contraction in residential investment.

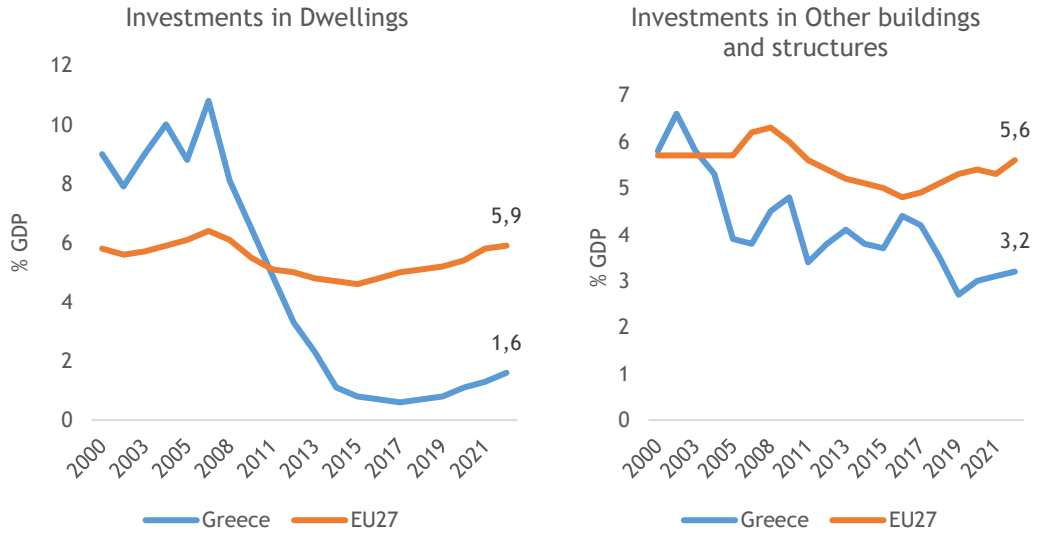
As a result of the above developments, residential investment accounted for 1.6% of GDP in 2022 (EU27 average: 5.9%), compared with 10.8% in 2007. Investment in other construction (private and public) is also lagging, reaching only 3.2% of GDP in 2022 (EU27 average: 5.6%) (Figure 2.22).

Figure 2.21: Investment expenditure for construction projects by category, 2000-2022



Source: Eurostat, National Accounts.

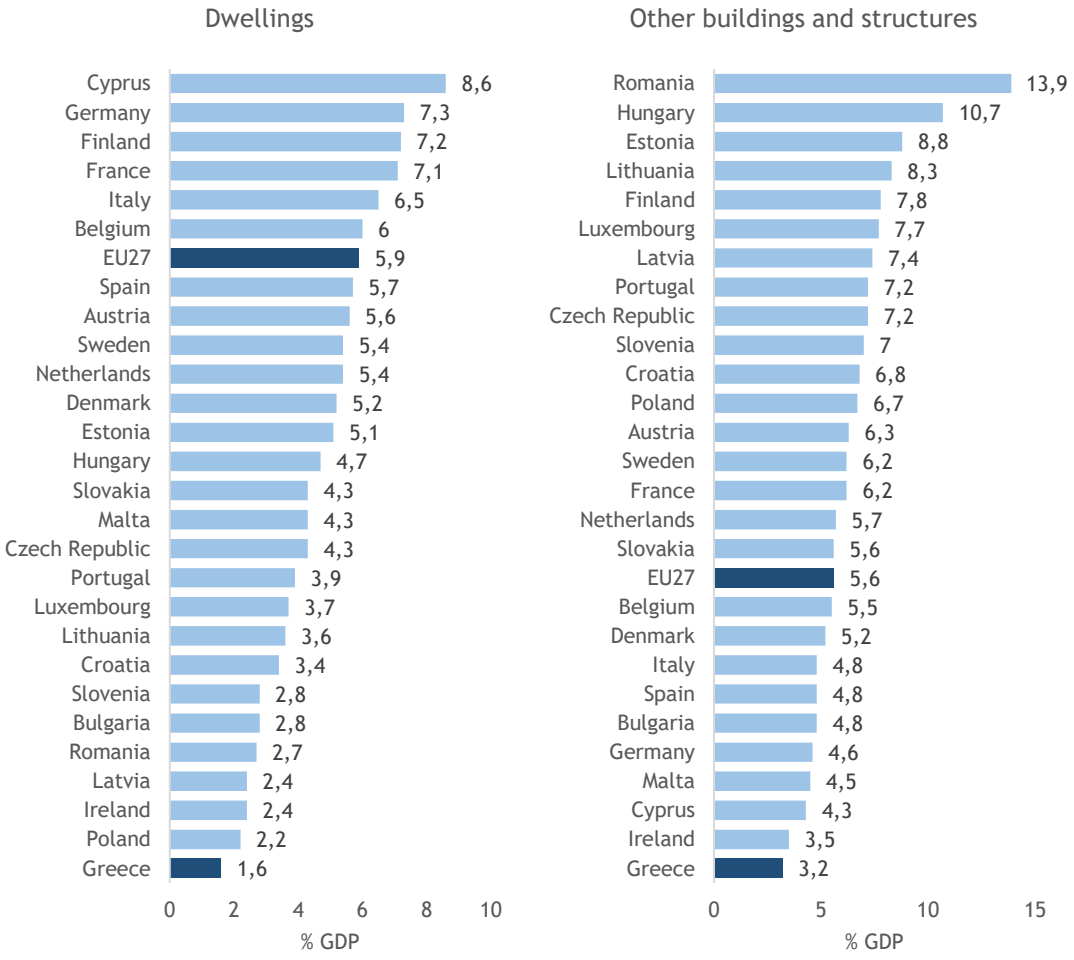
Figure 2.22: Investments in dwellings and other buildings and structures in Greece and the EU27 (% of GDP)



Source: Eurostat, IOBE analysis.

Based on the housing investment ratio over GDP for 2022, Greece ranks last among the EU-27 Member States, while it also ranks last in investment in other construction (Figure 2.23). It is noted that in other constructions the top positions are mainly occupied by the "new" and relatively smaller EU Member States, where there is a greater need for infrastructure investments.

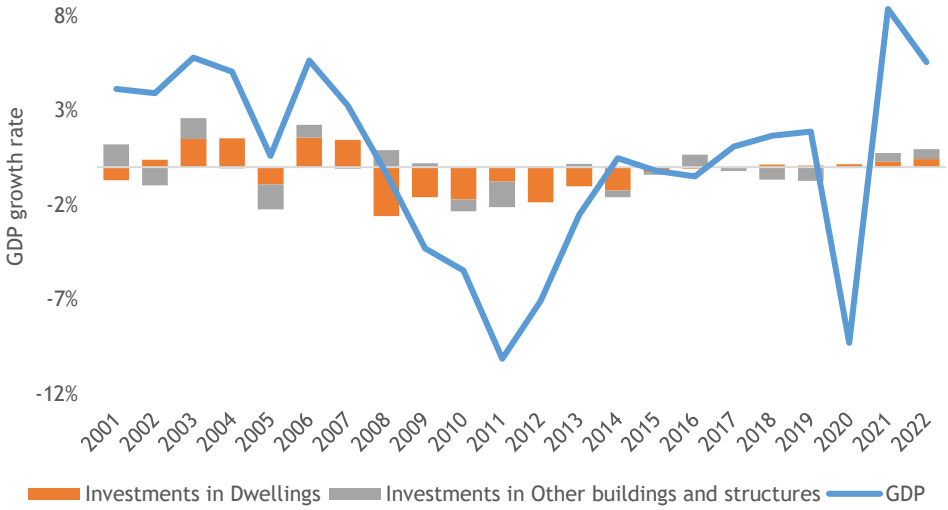
Figure 2.23: Investments in dwellings and other buildings and structures by country (% of GDP), 2022



Source: Eurostat.

Investments in construction constitute a significant part of GDP and therefore affect the fluctuations in income generated by the Greek economy. An analysis of the impact of the GDP components on the growth rate of the Greek economy shows that construction investment has been supporting GDP for most of the years prior to 2007. However, after 2008 and until 2015, their decline negatively affected GDP, accelerating its decline. Thereafter, and until 2020, their contribution to GDP fluctuations was not decisive, which changed in 2021 and 2022 when increased construction investment boosted the growth rate of the Greek economy by around one percentage point (Figure 2.24).

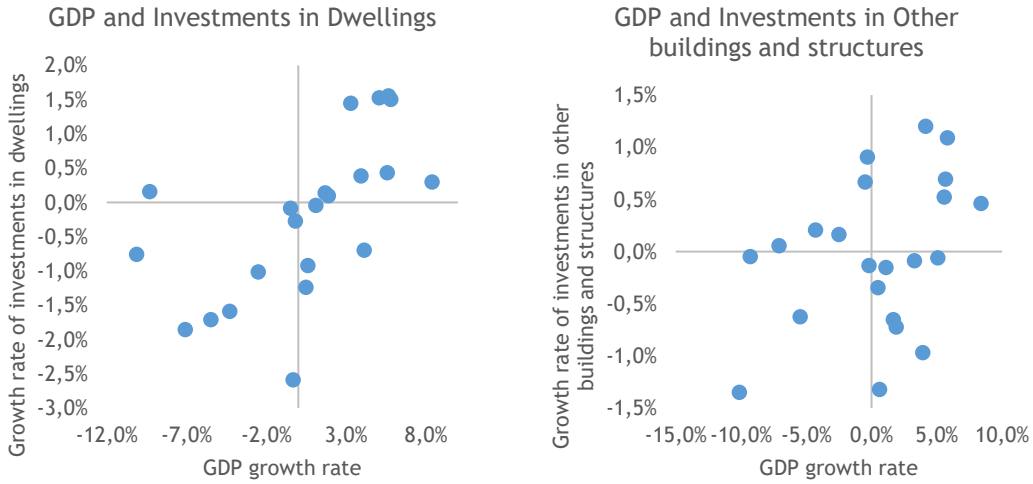
Figure 2.24: Analysis of the contribution of Investments in construction projects to GDP growth in Greece, 2001-2022



Source: Eurostat, IOBE analysis.

From the above it can be argued that construction investments in Greece tend to contribute directly to economic growth. This finding is supported by the data presented in Figure 2.25, according to which higher growth rates of construction investment tend to be associated with higher growth rates of the Greek economy. This correlation is clearly stronger in the case of residential investment.

Figure 2.25: Investments in Construction and GDP growth rate

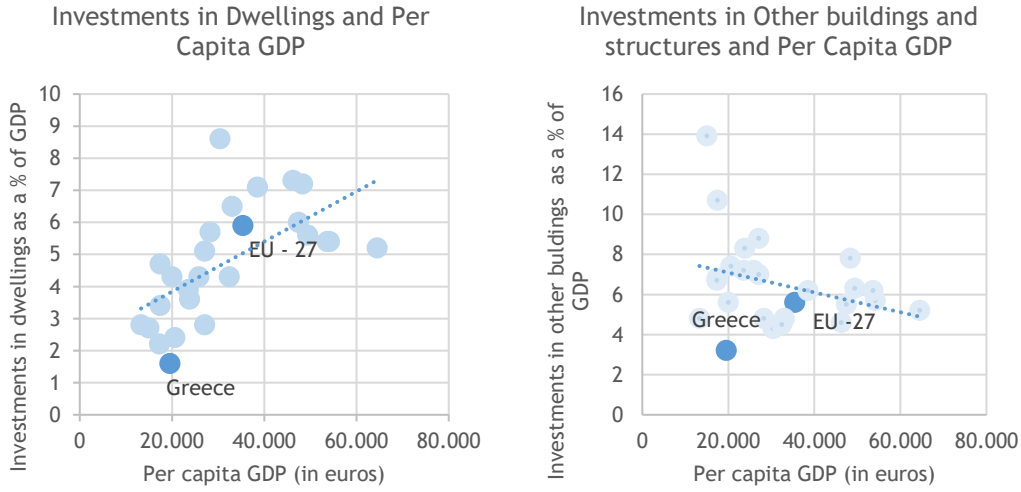


Source: Eurostat, IOBE analysis.

The participation of construction investments in the Greek economy is much lower than in other EU Member States and compared to what is expected based on the country's GDP per capita (Figure 2.26). The difference is more pronounced in the case of residential investment and contributes decisively to Greece's overall divergence from the expected level of investment at a corresponding level of income per capita.

The correlation between GDP per capita and investment in other construction appears negative across EU countries. This may be due to the better level of infrastructure in the more developed countries, while countries with lower GDP per capita are accelerating such investments as part of the convergence effort with the more developed countries. On the other hand, residential investment correlates positively with income – higher income and savings seem to boost the appetite for residential investment.

Figure 2.26: Investments in Construction and GDP per capita in EU Member States, 2022



Source: Eurostat, IOBE analysis. Excluding Luxembourg and Ireland.

2.6 Total contribution of the sectors of Construction and Services of Architects-Engineers to the Greek economy

The added value generated by a sector and the jobs it provides do not reflect its overall contribution to the economy, as its interactions with other sectors of economic activity are not considered. The aim of this module is to quantify the overall contribution of the construction and Architectural and Engineering services sectors to the GDP of the Greek economy, employment and public revenues, considering these interactions.

The overall impact of domestic construction and study activity on the economy is estimated using the input-output model, which considers the interdependencies of the sectors of an economy[9]. It is used to estimate the overall effects on an economy of an exogenous change in economic activity, such as the realization of an investment, as well as to determine the total contribution of a sector to the national economy.

2.6.1 Economic Impact of Construction and Architectural and Engineering Services in 2022

The direct impact of the construction sector in terms of GDP is estimated for 2022 at 3.8 billion euros, while the indirect impact, i.e. the activity of domestic suppliers of the sector resulting from satisfying the demand for inputs in construction activity approached 4.4 billion euros.

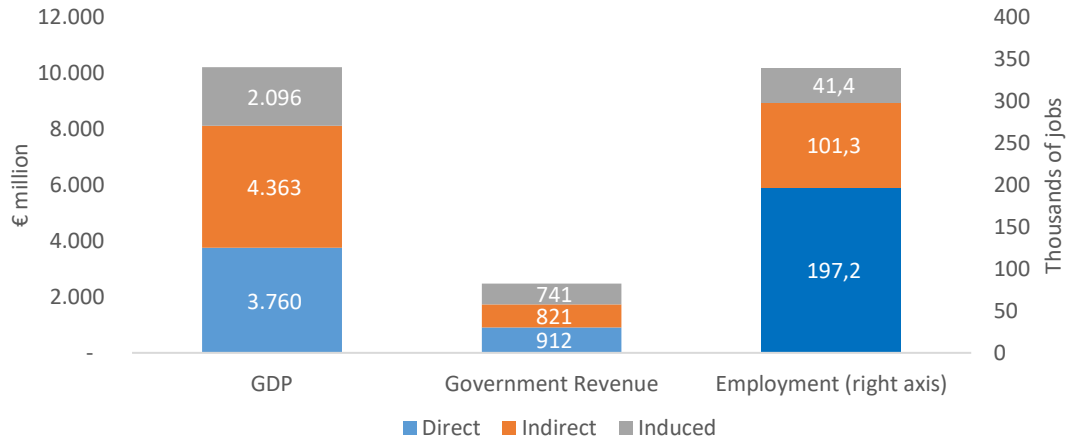
[9] The input-output model was developed in the mid-20th century by the economist Wassily Leontief, who was awarded the Nobel Prize in Economics in 1973 for his development and application to practical issues. More information on the assessment process can be found in the Annex to the study.

The total contribution of the sector, calculated by incorporating the induced effect (activity created by spending the income of workers in the construction value chain to purchase goods and services), is estimated for 2022 at 10.2 billion euros (4.9% of GDP in current prices).

The construction activity contributes significantly to the tax revenues of the State and to the contributions to the social security funds. Specifically, State's revenues from taxes and levies directly arising from construction activities are estimated at 912 million euros, while if indirect and induced effects are included, revenues increase to 2.5 billion euros.

In terms of employment, and considering the multiplier effects, the total contribution of construction activity is estimated at 340 thousand jobs in 2022. The ratio of total to direct employment effect means that for each job created in the construction industry, a total of 1.7 jobs are created or supported across the economy. It follows, therefore, that for every 1.0 euro spent on construction, 1.0 euro is added to the country's GDP. Similarly, for every 1 million euros in value generated by construction, 33 jobs are created in the economy.

Figure 2.27: Direct, indirect and induced impact of Construction on GDP, employment and government revenues, 2022

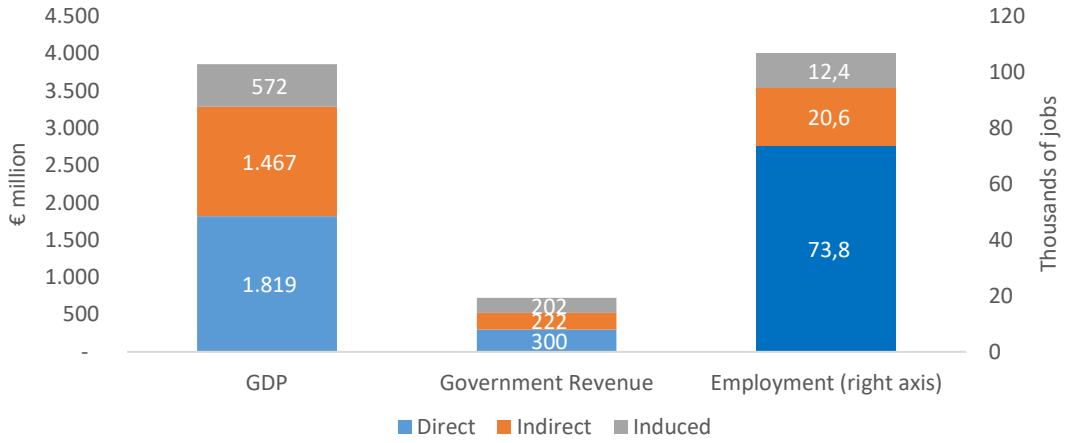


Source: IOBE analysis.

Similarly, the direct impact of the Architectural and Engineering services sector in terms of GDP is estimated for 2022 at 1.8 billion euros, while the indirect impact was close to 1.5 billion euros. The total contribution of the sector for 2022 is estimated at 3.9 billion euros (1.9% of GDP in current prices). The provision of Architects and Engineers services contributes 300 million euros directly to the tax revenues of the State, while if indirect and induced effects are included, the revenues of the State increase to 724 million euros.

In terms of employment, and considering the multiplier effects, the total contribution of the Architectural and Engineering services sector is estimated at 107 thousand jobs in 2022. The ratio of total to direct employment effect means that for each position created in the activities of Architects and Engineers, a total of 1.4 jobs are created or supported across the economy. It follows, therefore, that for every 1.0 euro spent on the provision of architectural and engineering services, 1.1 euro is added to the country's GDP. Similarly, for every 1 million euros worth of architectural and engineering services, 29 jobs are created in the economy.

Figure 2.28: Direct, indirect and induced impact of the Architectural and construction services sector on GDP, employment and government revenues, 2022

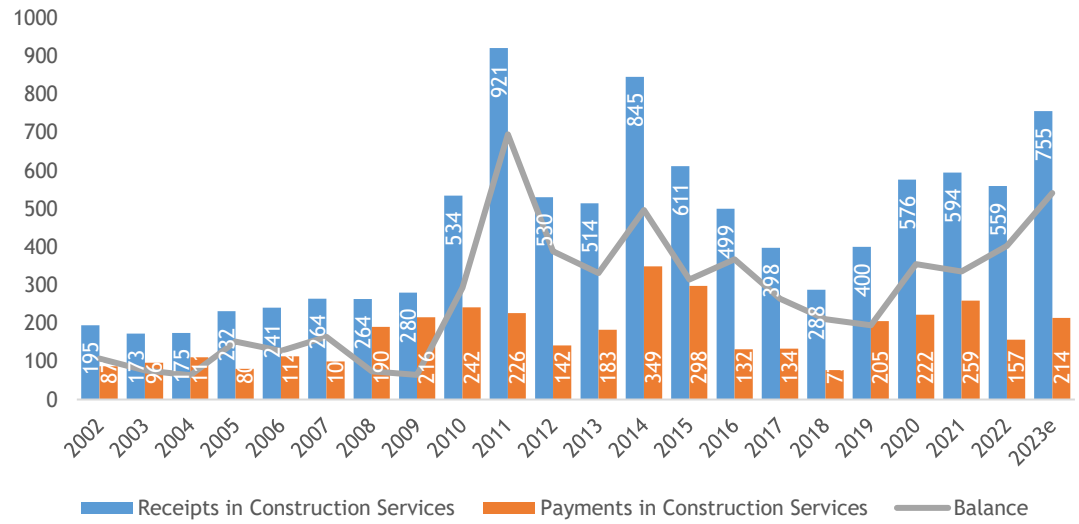


Source: IOBE analysis.

2.6.2 CONTRIBUTION OF THE CONSTRUCTION SECTOR TO THE EXTERNAL BALANCE

An additional aspect of the contribution of Construction to the Greek economy is that of extroversion, which although for various reasons is not developed to the desired degree, has shown positive data since the early 2010s. Specifically, the contribution of Construction to the current account balance increased significantly after 2009, reaching or exceeding 900 million euros in 2011 and 2014 (Figure 2.29). In the following years and until 2018, receipts from construction services abroad declined, but since 2019 they have recovered and are significantly higher than in the period before 2010, reaching an estimated 755 million euros in 2023. Moreover, receipts consistently exceed payments for construction services, resulting in a positive balance over time.

Figure 2.29: Balance of Construction services



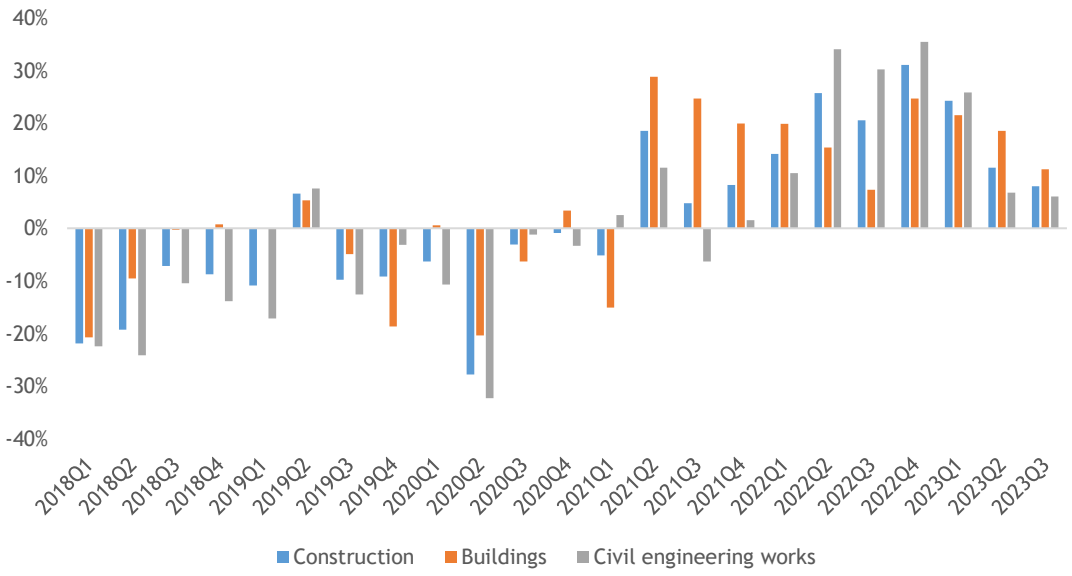
Source: Bank of Greece.

2.7 Current trends in the construction sector in Greece

2.7.1 PRODUCTION INDICES

Short-term indicators, which monitor the development of construction activity more closely, record the recovery of Construction after the 1st quarter of 2021, following a decline in previous years. The recovery in construction activity continued with some fluctuations in the following quarters, but with a decelerating trend in the second and third quarters of 2023, mainly due to the decline (compared to the corresponding quarters of the previous year) in civil engineering works (Figure 2.30). Housing investment has increased even more since 2021, supporting overall construction activity to a significant extent.

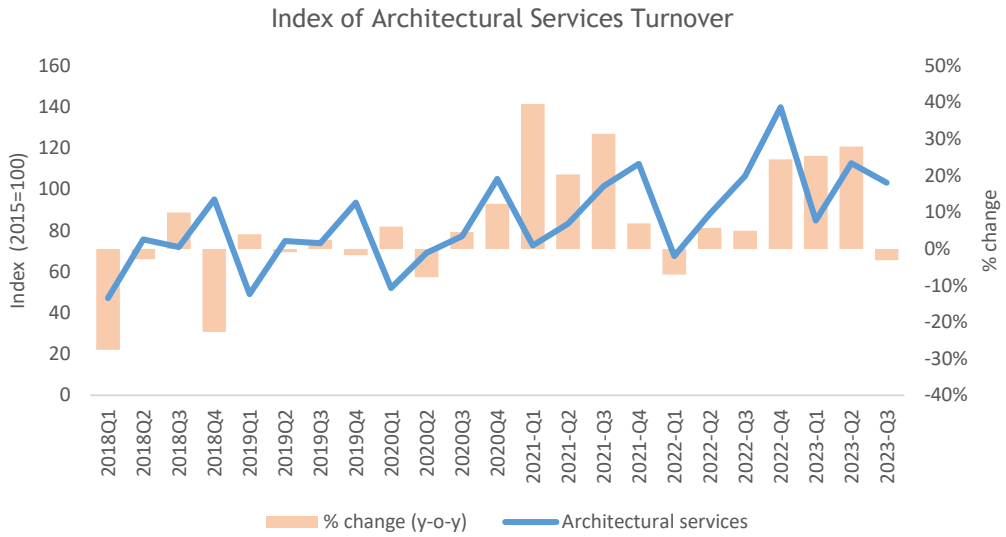
Figure 2.30: Percentage annual changes in the Construction Production Index, Q1 2008 - Q3 2023



Source: Eurostat, IOBE analysis.

The turnover indicator in architectural and other related design services has been strengthening since the second half of 2020, except for the first quarter of 2022. Turnover growth was particularly strong in 2021 and 2023. However, signs of a slowdown in this index occurred in the third quarter of 2023 (Figure 2.31).

Figure 2.31: Turnover Index of Architectural services

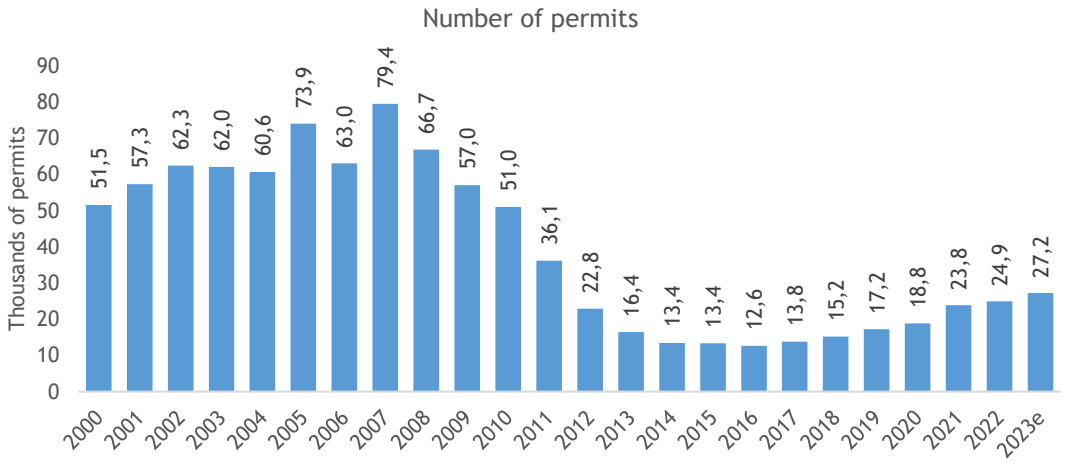


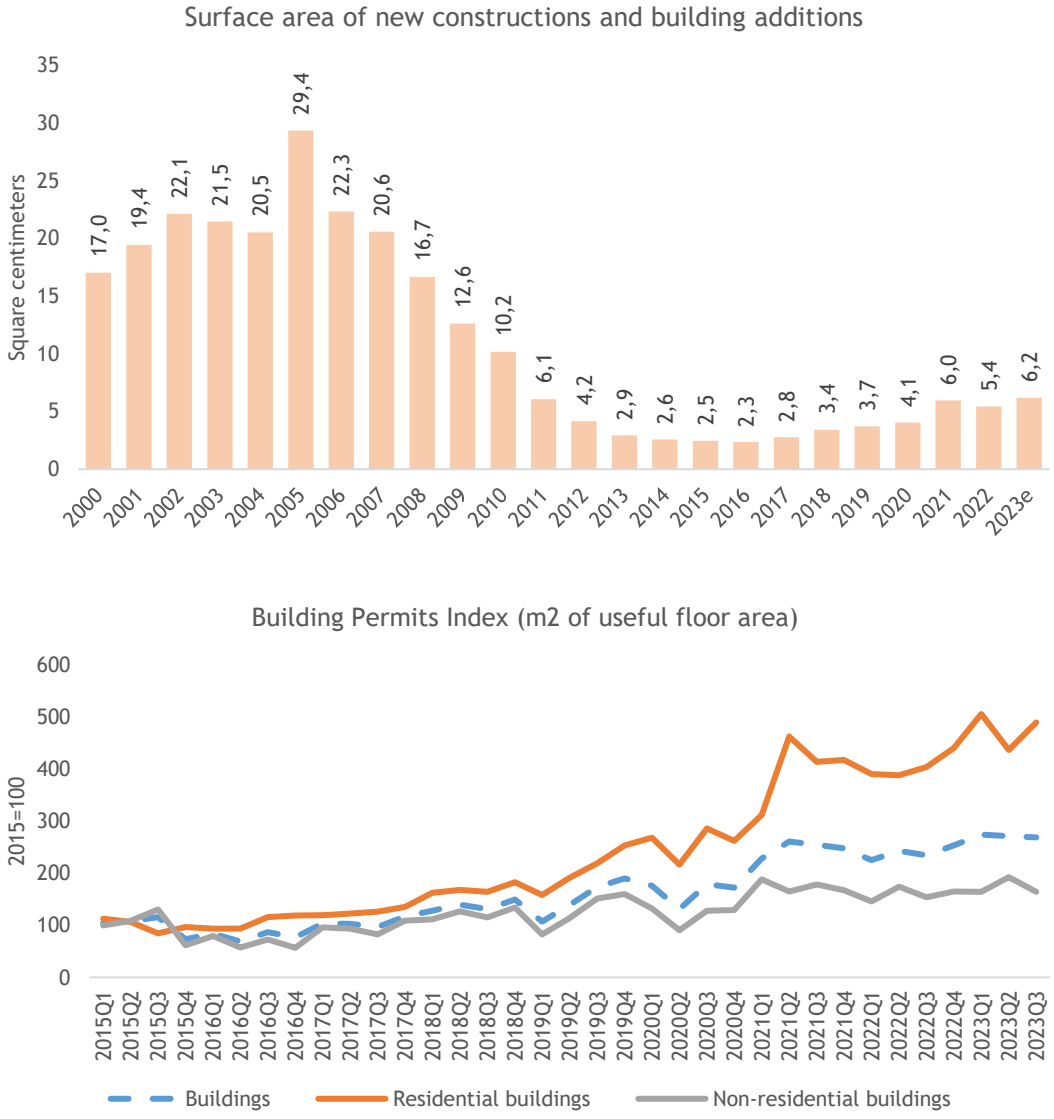
Source: Eurostat, IOBE analysis.

2.7.2 PRIVATE CONSTRUCTION ACTIVITY

Following the slump in private construction activity during the 2010s, the number of permits for new buildings has been steadily recovering in recent years, following the low recorded in 2016 (12.6 thousand permits for new buildings and additions, which accounted for 2.3 million square meters). The number of permits in 2023 is estimated to have amounted to 27.2 thousand permits increased by 9.1% compared to the previous year and by 115% compared to 2016. At the same time, in terms of surface area, which is a more representative measure of the size of building activity, new buildings and additions amounted to 6.2 million square meters in 2023, an increase of 13.9% compared to 2022 and 164% compared to 2016 (Figure 2.32). It is worth noting that the trend of increasing the issuance of new building permits mainly concerns residential buildings and accelerated after 2020, because of, among other things, the suspension of VAT on new buildings and the reduction of ENFIA.

Figure 2.32: Building activity in Greece, 2000-2023 (number of permits and surface area)



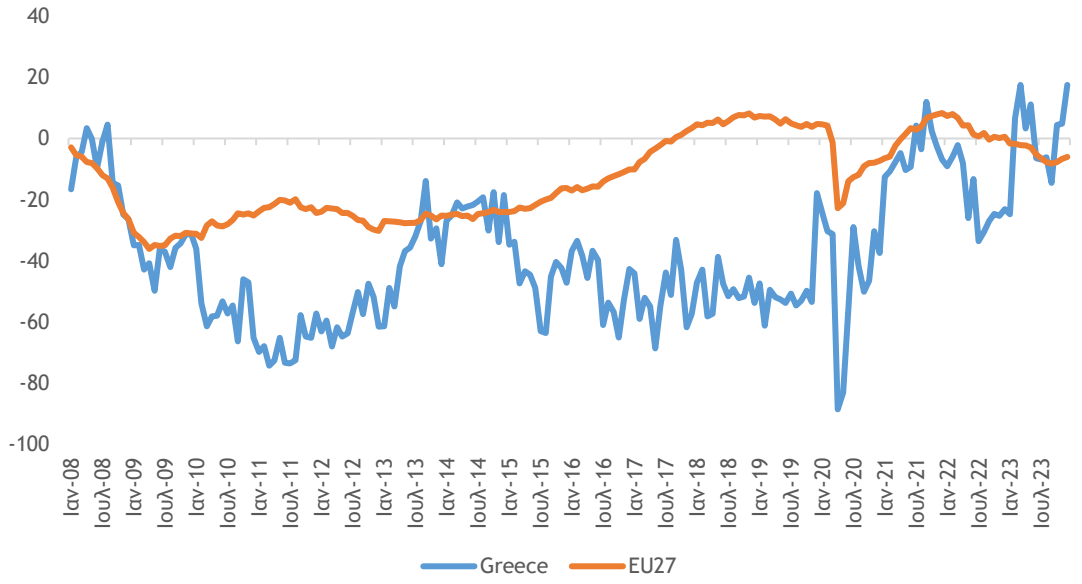


Source: ELSTAT

2.7.3 Business Expectations in Construction

Business expectations in Construction in Greece have been negative for a long period of time (pessimism in the sector prevailed) and at a distance from the EU-27 average. The improvement in expectations since late 2019 came to a halt with the onset of the COVID-19 pandemic, when the construction sector experienced a sharp decline in expectations in April 2020 (Figure 2.33). The forthcoming activation of the Recovery and Resilience Fund has pushed industry expectations into positive territory in April 2021 for the first time since the end of 2008 and brought them in line with average expectations in Construction in the EU-27. During the intensification of the energy crisis in 2022, expectations in Construction fell significantly, but returned to positive territory in 2023 and even to a higher level than the EU-27.

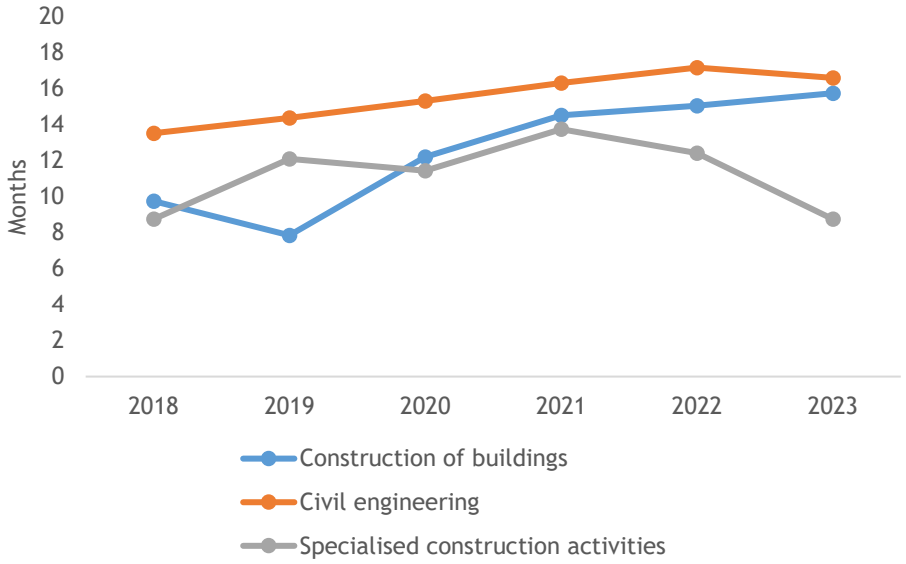
Figure 2.33: Business expectations in the Construction sector, Jan 2008-Dec.2023



Source: IOBE and the European Commission.

Months of guaranteed activity by construction companies have shown an upward trend in recent years in the building and civil engineering sectors, in contrast to specialized construction works where there has been a decline (Figure 2.34). Specifically, the months of guaranteed activity in the construction of buildings, according to the statements of the companies that participated in the relevant survey, increased from 10 in 2018 to 16 in 2023, while in civil engineering from 14 to 17 months respectively. By contrast, specialized construction works in 2023 reported 9 months of guaranteed activity, a duration that has receded after 2021, when an average of 14 months of guaranteed activity was reported.

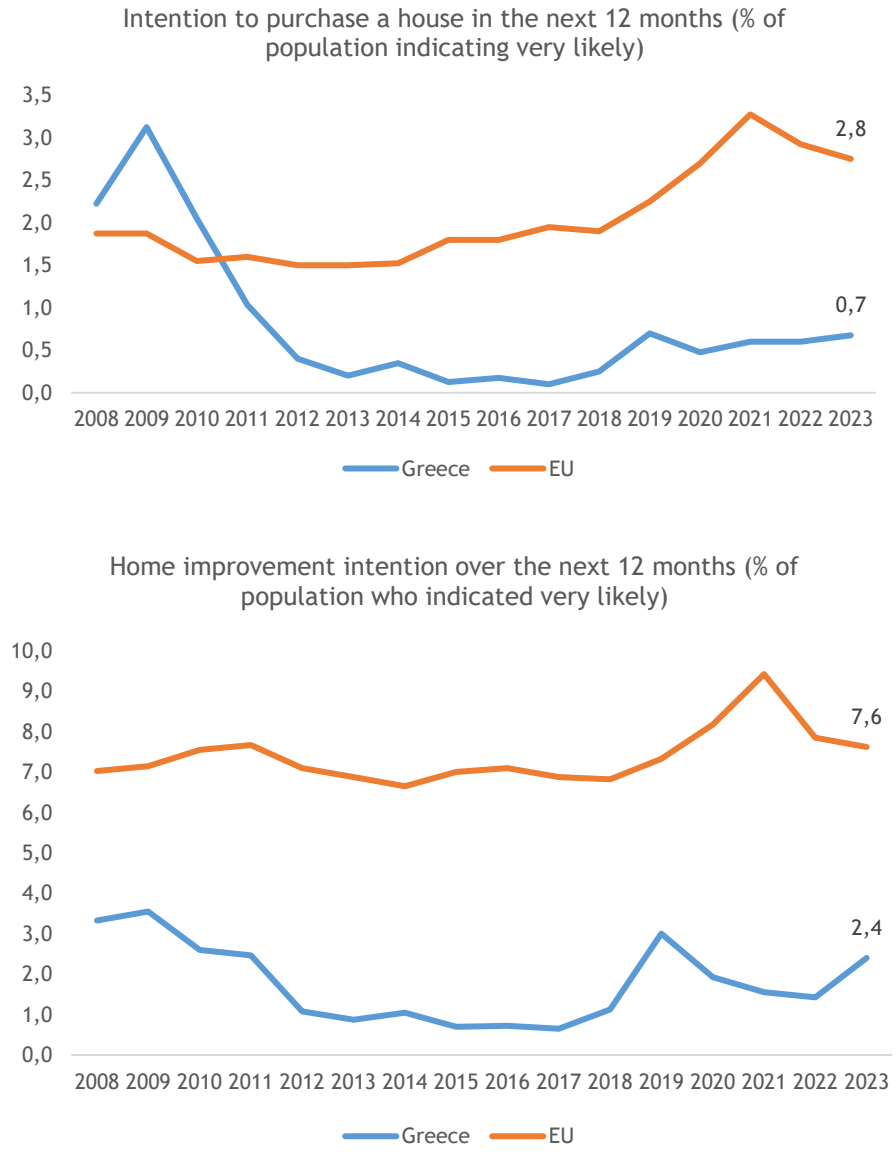
Figure 2.34: Months of guaranteed activity in Construction by sub-sector



Source: IOBE and the European Commission.

According to consumer surveys carried out by IOBE, the percentage of the population that declares that they intend to buy a new house in Greece in the next 12 months consistently shows one of the lowest performances in the EU[10]. Declining disposable income and household credit constraints contributed to a drastic decline in households' intention to buy a new or to repair their existing dwelling. However, from the beginning of 2018, trends of strengthening of the intention to buy and to repair a dwelling started to emerge, which continued in 2023 after a temporary decline the previous year (Figure 2.35).

Figure 2.35: Intention to buy and repair a house within the next 12 months in Greece and the EU



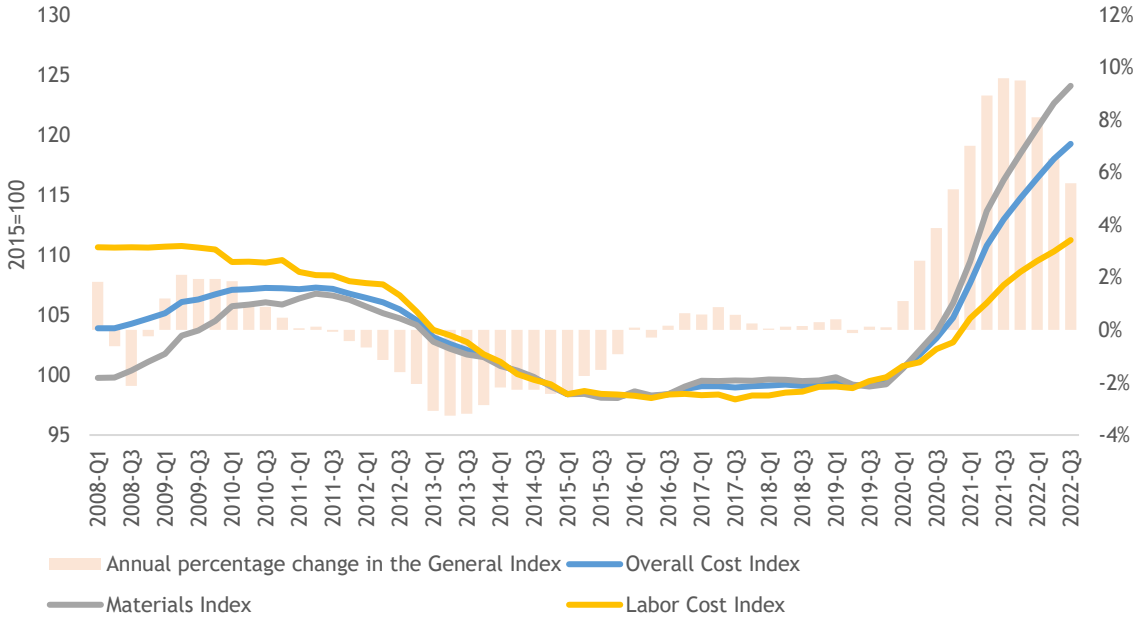
Source: IOBE and the European Commission.

[10] Percentages of the population intending to buy or repair a dwelling close to the EU average were, however, recorded in Greece during the 2000s.

2.7.4 COST OF CONSTRUCTING NEW BUILDINGS

The supply (cost) conditions of construction works and services, as well as the labor productivity of the sector, determine the cost-effectiveness at which the works are carried out and provide a basis for comparison for the competitiveness of the domestic construction industry compared to other countries. Although it is difficult to clearly determine the cost of construction, given the variety and different requirements of the civil works and buildings being constructed, the general cost index for the construction of new residential buildings provides an insight into the evolution of the cost of both materials and labor wages in private building projects (Figure 2.36).

Figure 2.36: Overall Cost Index for the construction of new residential buildings (2015=100)

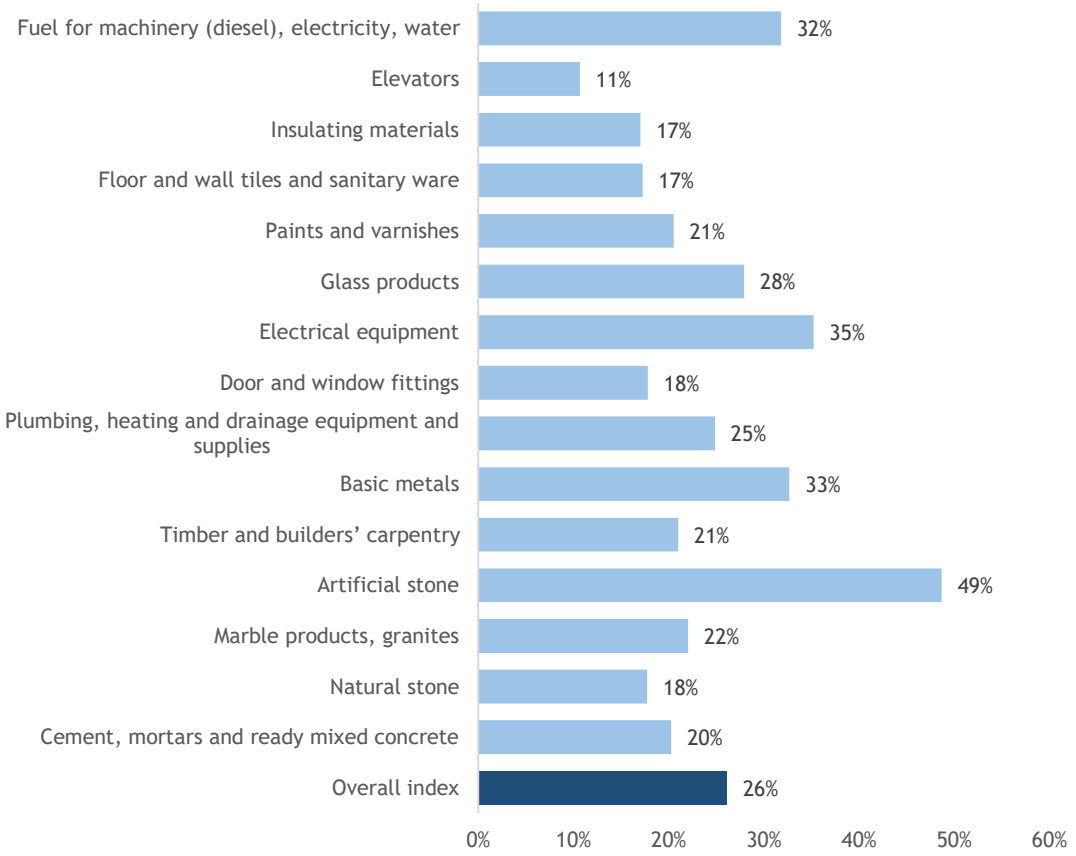


Source: ELSTAT

The contraction in construction activity led to a significant reduction in the cost of constructing new buildings between 2010 and 2014. The decline in costs was greater on the wage side, although material costs declined over the period. Between 2015 and 2019, there were no significant changes in the cost levels for building construction. However, starting in early 2020, construction costs are increasing at an accelerating pace, driven mainly by increases in material costs, first due to problems in international supply chains and second because of the energy crisis, which led to a sharp increase in the prices of several raw materials and construction products.

The largest cost increases between 2020 and 2023 are for artificial rock materials (+49%), electrical materials (+35%), base-processed metallic materials (+33%) and machinery fuels (+32%) (Figure 2.37). Other categories of materials also increased, while in total the overall cost index increased by 26%.

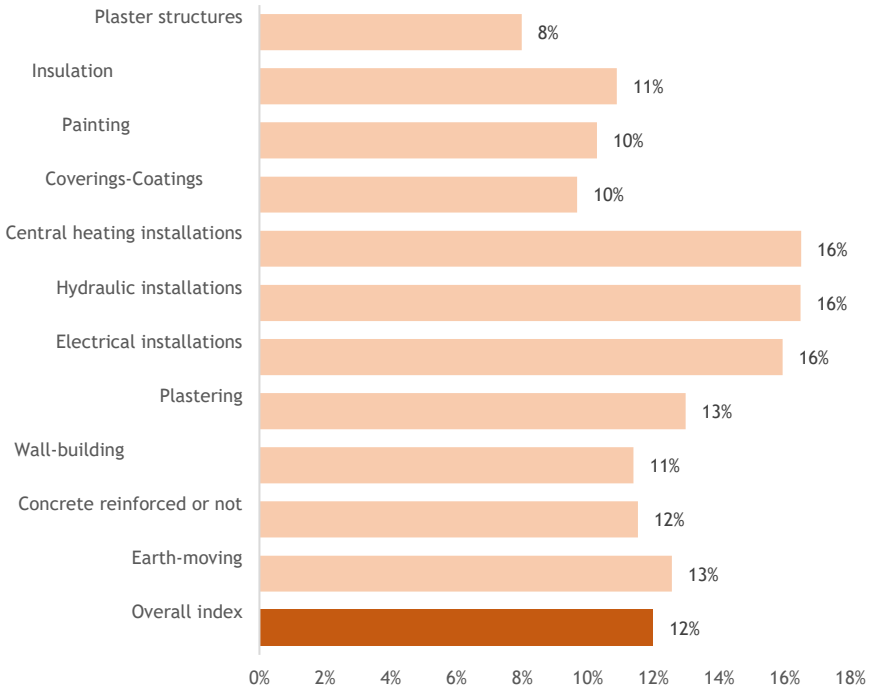
Figure 2.37: Percentage change in materials' prices (November 2023 vs 2020 Average)



Source: ELSTAT

Labor costs increased by 12% between 2020 and 2023, with the largest increase (+16%) been in the cost of work for plumbing, electrical and central heating installations (Figure 2.38).

Figure 2.38: Percentage change in remuneration or labor costs per work stage (Q3 2023 vs 2020 average)

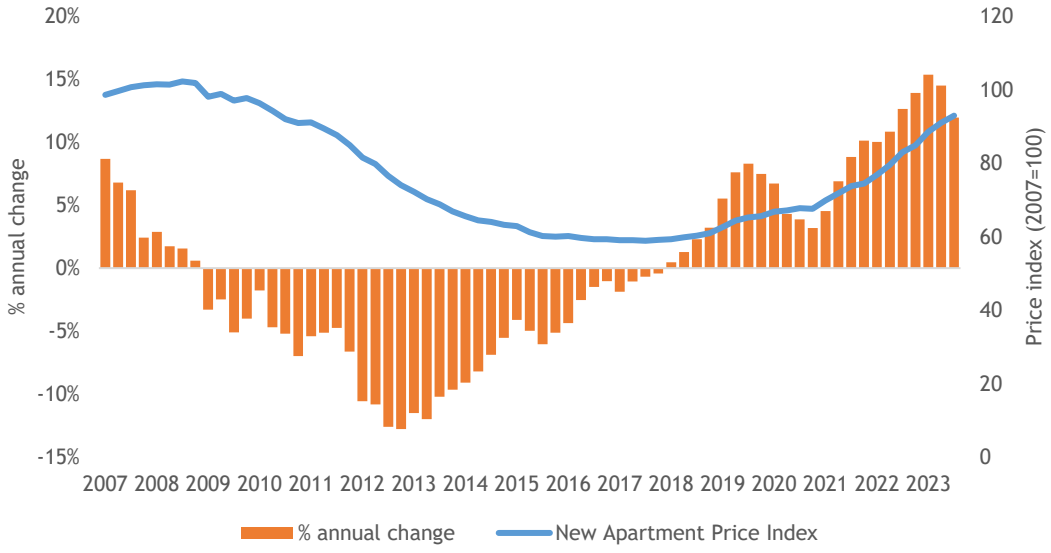


Source: ELSTAT

2.7.5 PRICES OF NEW APARTMENTS AND CONSTRUCTION COSTS

The drastic decline in real disposable income after 2008, combined with other factors such as the increase in property taxation, led to a significant decline in transactions in the domestic real estate market, as demand for real estate fell sharply. As a result, prices of new apartments fell by 40% between 2007 and 2017 (Figure 2.39). Since the beginning of 2018, however, there has been a continuous increase in average prices of new apartments in nominal terms, with an increase of 57% until September 2023. Property prices have not yet shown signs of a significant slowdown, supported by the increasing employment and real disposable income, but also strong foreign demand and short-term rentals. The supply of residential property, as seen by the increase in building permits, is partially responding, but this adjustment takes time to reduce the housing supply deficit.

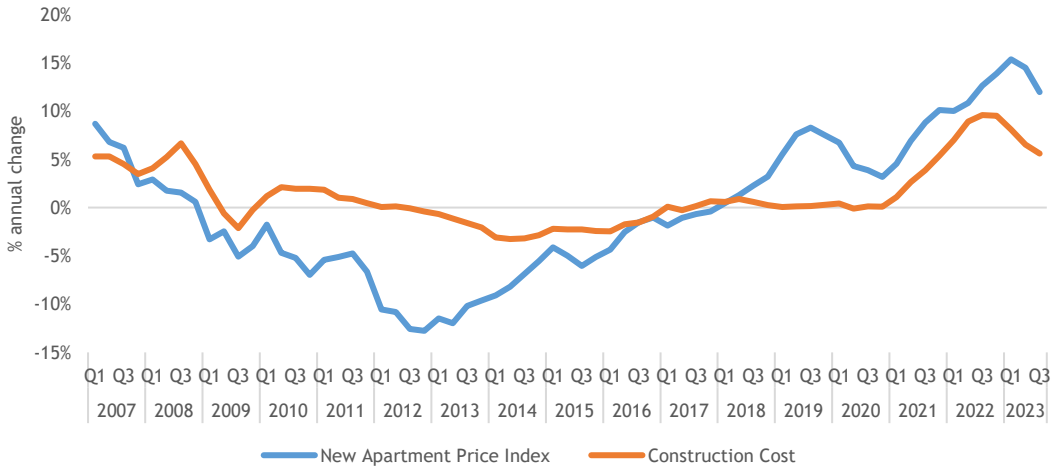
Figure 2.39: Price Index of new apartments, (2007=100)



Source: Bank of Greece.

The relationship between property prices and construction costs is an extremely critical factor, affecting the real estate market and investment in new homes and buildings. A general trend of falling property prices, such as the one recorded in Greece in 2007-2017 – given the construction costs – weakens the incentives to construct new buildings and limits building activity. In Greece prices fell faster than construction costs, making it practically unprofitable to construct buildings (Figure 2.40). The decline in housing construction costs between 2007 and 2017 was limited (0.8%), i.e. costs remained relatively stable, while property prices were declining, squeezing developers' profit margins. Since 2018, property prices have been rising faster than construction costs, improving incentives for building construction. As a result, the price-to-cost ratio has been rising since early 2018, after a 10-year decline. However, the 20% increase in building construction costs between 2018-2023 mitigates the incentives to further expand the supply of new houses.

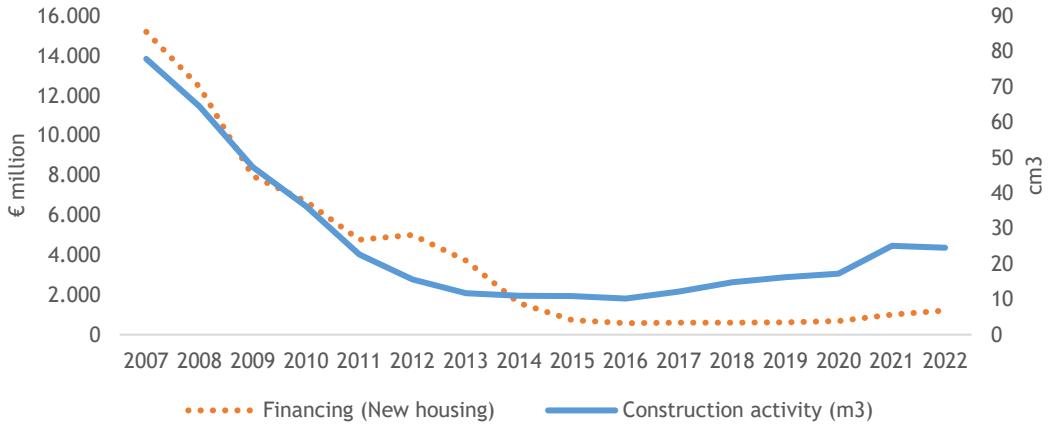
Figure 2.40: Construction costs and house prices (% year-on-year change), 2007-2023



Source: Bank of Greece, ELSTAT, IOBE analysis.

The convenience and level of financing from the banking system also have a significant impact on the real estate market (e.g. prices and number of transactions), due to the high cost of acquiring a home. Thus, it is not surprising that construction activity in Greece is in line with the volume of bank financing flowing through housing and repair loans (Figure 2.41).

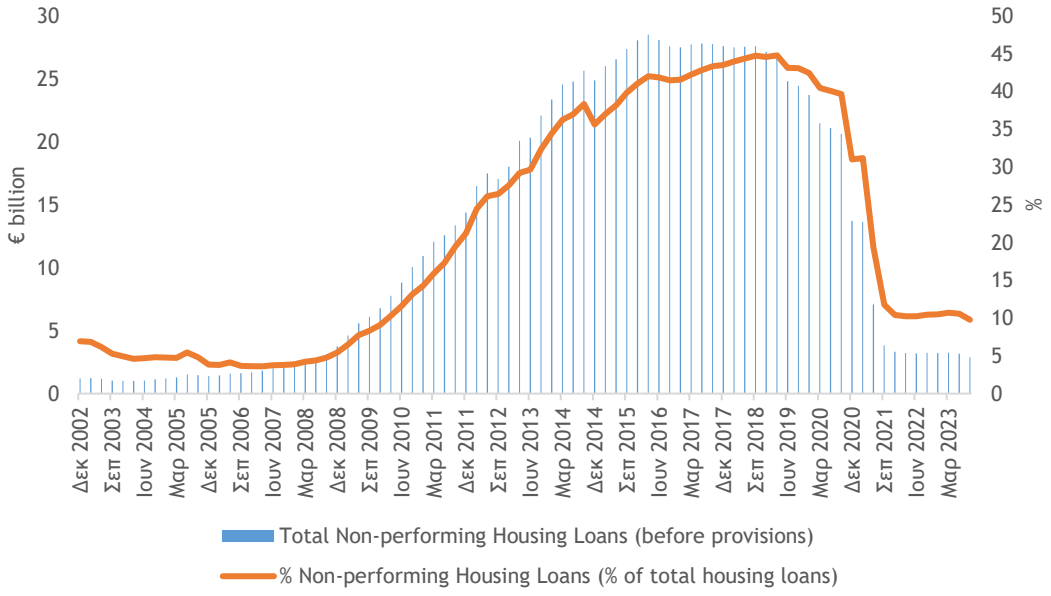
Figure 2.41: Construction activity and bank financing, 2007-2022



Source: Bank of Greece, ELSTAT.

The decrease in incomes had created a significant stock of non-performing mortgages on the balance sheets of banking institutions. These loans, following a significant de-escalation path since the beginning of 2019, accounted for 9.8% of the total outstanding amount of mortgage loans in September 2023 (Figure 2.42). The reduction in the volume of non-performing housing loans has had a positive effect on the development of building activity, as it improves the possibilities for credit expansion.

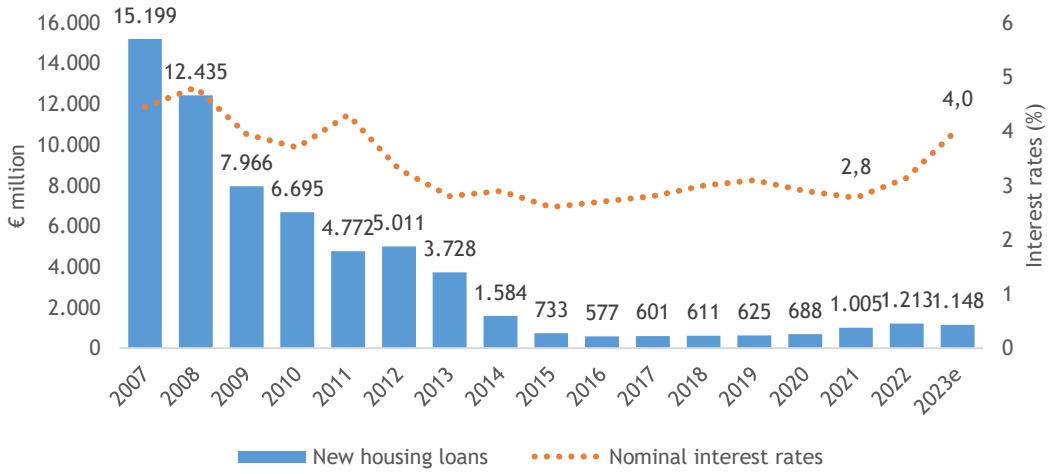
Figure 2.42: Non-performing loans, 2002-2023



Source: Bank of Greece.

The purchase of new housing loans had decreased in the period 2015-2020 to around 650 million euros on average per year, when in the past it was multiple that figure (15.2 billion euros in 2007 and 7.2 billion euros on average per year in 2007-2014) (Figure 2.43). Since 2021, there has been a significant increase in housing loan disbursements, albeit from a very low base, which is also linked to the rise in building activity. Mortgage rates rose from 2.8% in 2021 to 4.0% in 2023, because of the tightening monetary policy, limiting the growth momentum of housing credit.

Figure 2.43: New housing loans and interest rates



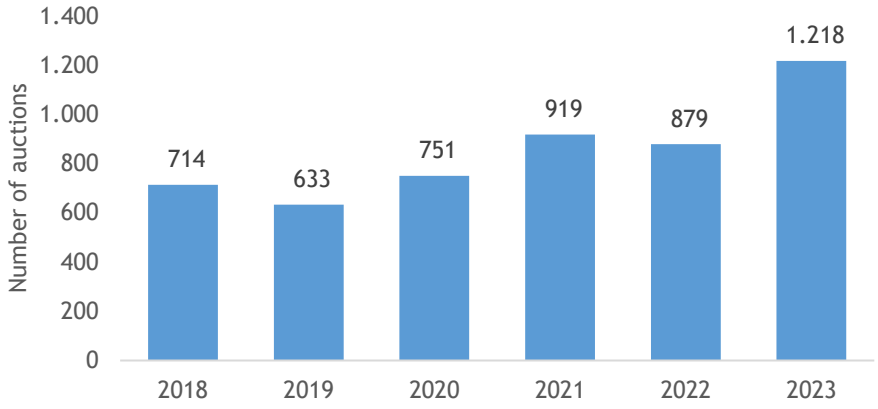
Source: Bank of Greece.

2.8 Public infrastructure and construction works

Public engineering is an important part of the construction market. Therefore, the effectiveness of the public works production system not only shapes the conditions of business activity in the construction sector – and more specifically the part of the sector that deals with infrastructure development – but also the timely, economic and qualitative construction of infrastructure, which is the final goal of the State.

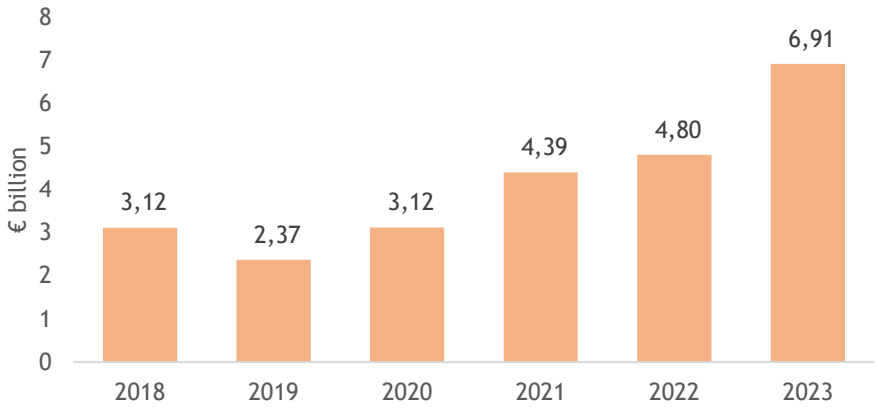
The market for public works in the 2010s went through a period when the number and budget of public works auctions had been significantly reduced (IOBE, 2021). According to data collected by the Association of Greek Contracting Companies (SATE), an average of 699 projects were auctioned annually over the three-year period 2018-2020, with a budget of more than 1 million euros (Figure 2.44). However, in the following years the number of auctions increased significantly, reaching 1,218 projects in 2023. The overall project budget of more than 1 million euros is similar (Figure 2.45). Specifically, the total budget of the projects auctioned was significantly reinforced in 2021/2022 and in 2023 amounted to 6.9 billion euros, more than double the average level of 2018-2020 (2.9 billion euros). This trend suggests that a notable increase in the construction activity of infrastructure projects is expected in the coming years.

Figure 2.44: Number of Public Works with a budget of over 1 million euros



Source: Association of Greek Contracting Companies (SATE).

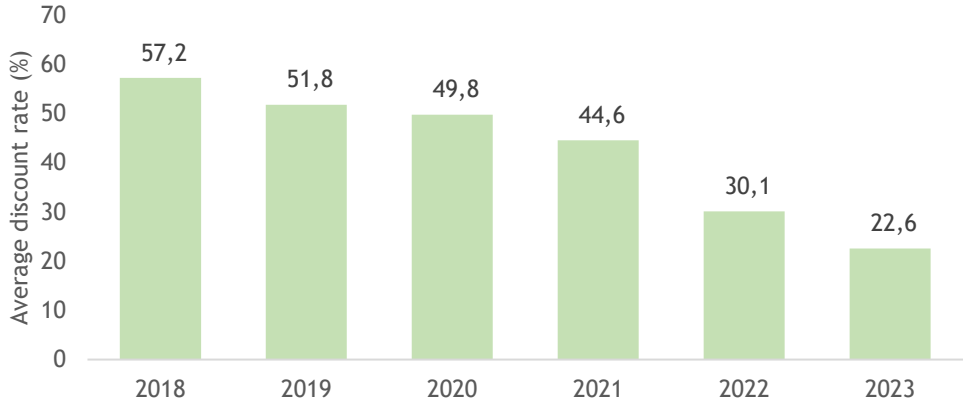
Figure 2.45: Total Public Works budget with a budget of over 1 million euros



Source: Association of Greek Contracting Companies (SATE).

The significant decrease in the number of new projects in the 2010s had led to fierce competition in project auctions, which has led to a significant increase in the percentage of discounts (Figure 2.46). In 2018, the average discount rate of the final contractor of the project approached or exceeded 57% compared to the initial budget, when for example in 2012 the average discount rate was 37%. The average discount rate gradually decreased in the next period 2019-2021 to about 45%, but a large decrease was recorded in 2022 and 2023, when the average discount rate decreased to 30.1% and 22.6% respectively due to the significant increase in construction costs and the increase in the number of auctioned projects.

Figure 2.46: Average discount rate* (%) on Public Works with a budget of over 1 million euros



Source: Association of Greek Contracting Companies (SATE) * Simple arithmetic average.

2.9 Outstanding balance of construction enterprises

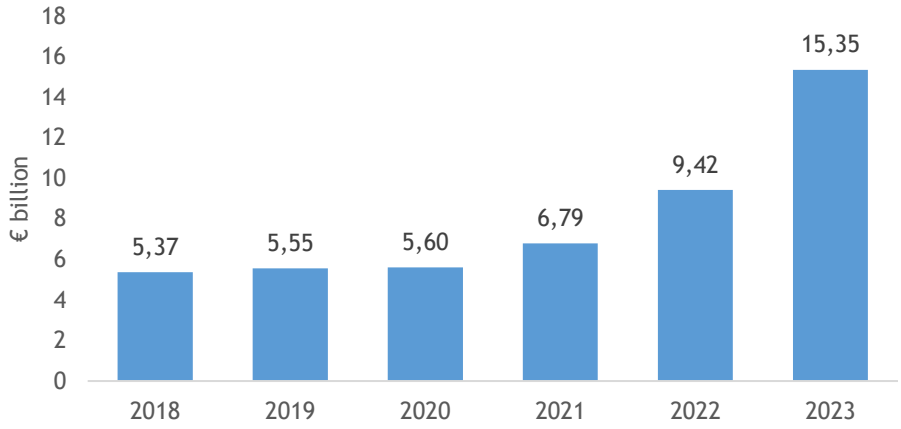
The backlog of construction companies is a reliable indicator of the construction activity that is expected to be implemented in the next period. Relevant data are published in their periodic reports by the large construction groups listed on the stock exchange, which concern the ongoing projects as well as the new public and private works contracts that they have concluded both in Greece and abroad. As can be seen from the data presented in Figure 2.47, the backlog of the largest companies in the sector in 2023 (data up to the nineth month of the year) amounted to 15.35 billion euros, a significant increase of 63% compared to the previous year and approximately three times higher than the average for the period 2018-2020.

The backlog of 15.35 billion euros recorded in 2023 is a historically high level for the industry. Indicatively, and as no official data are available, reports[11] indicate that in 2006 the backlog of the 10 largest construction companies of the 7th construction class had reached 8.5 billion euros, while in 2009 all construction companies had backlog of 11.5 billion euros (of which 90% belonged to the three largest).

These figures reflect the positive outlook for construction activity in the coming years, because of the improved performance and conditions in the Greek economy, the size of financing from European funds, and the large investment shortfall over the past decade. The successful execution of these projects is, however, a challenge for construction companies as they require, among other things, adequate human resources, strong liquidity, access to funding resources and fast-track procedures on the side of public bodies.

[11] https://www.moneyreview.gr/business-and-finance/75790/kataskeyes-anektelesto-11-7-dis-eyro-to-ypsilotero-ton-teleytaion-dekaetion/

Figure 2.47: Outstanding balance of projects of 5 construction groups listed on the Athens Stock Exchange



Source: Financial reports of companies. For 2023, the data cover the first nine months of the year.

3 STATE OF PLAY OF NATIONAL INFRASTRUCTURE PLANNING AND FINANCING PROGRAMMES FOR CONSTRUCTION PROJECTS

3.1 Introduction

The significant amount of national and European financial resources, which have been committed for the coming years to mitigate the effects of the great recession caused by the COVID-19 pandemic and to take further steps forward for the Greek economy, combined with the recovery of private construction activity, create significant growth expectations for the Construction sector in the coming years. This chapter examines the main directions of the national development strategy that are relevant to the construction sector and assesses the national and EU funding resources that are expected to be directed to relevant projects, with an ultimate goal of identifying the potential development and prospects of construction activity in Greece in the coming years.

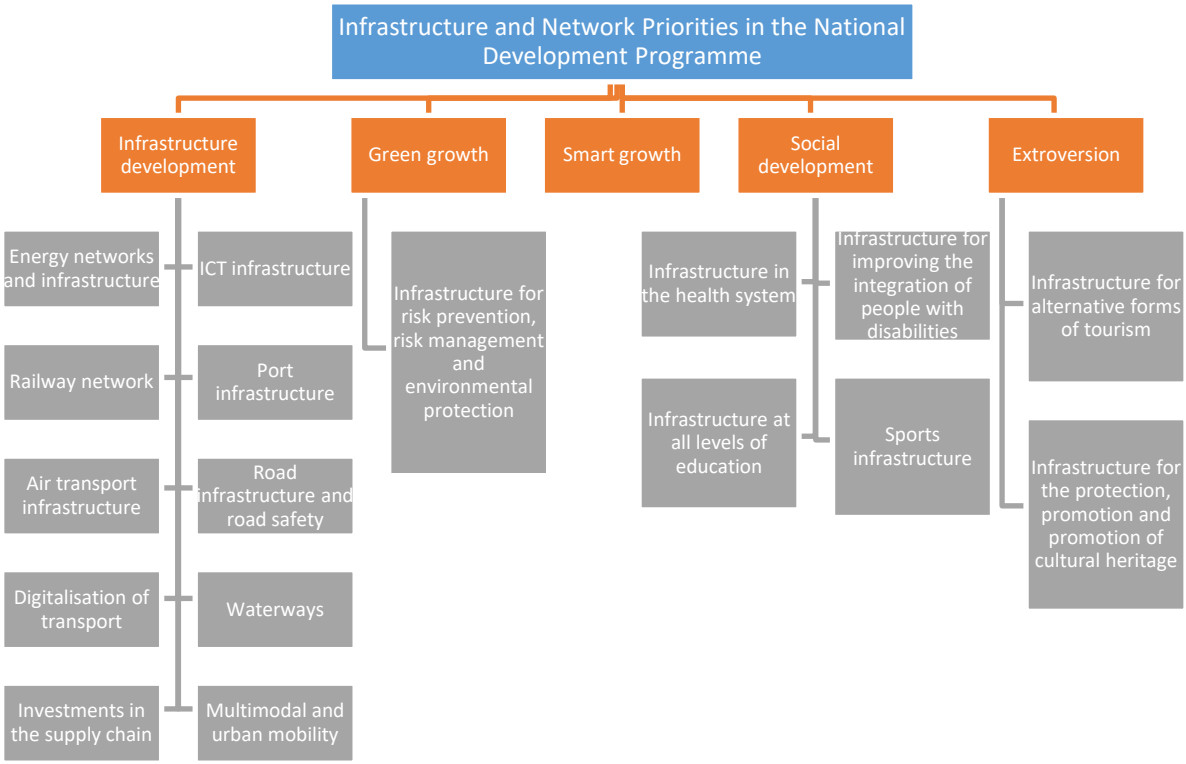
NATIONAL DEVELOPMENT PROGRAMME 2021-2025

The National Development Programme (NDP), which was established by Law 4635/2019, is an integrated system for the planning, management, monitoring and control of interventions financed by the national resources of the Public Investment Programme (PIP). The NRP introduces medium-term objectives and the subordination of PIP interventions to strategic objectives and prioritized development priorities. For the first implementation period of the programme (2021-2025), the total budget is 10 billion euros. The development objectives of the NDP 2021-2025 follow five axes – smart growth, green growth, social development, infrastructure development and extroversion. The funded actions are part of 20 Sectoral Development Programmes (SDPs), 13 Regional Development Programmes (RDPs) and the Special Programme for Natural Disasters.

Infrastructure and network development is an important part of the 2021-2025 NDP[12], which recognizes their critical role for the country's economic development. Specifically, the development of infrastructure and networks is highlighted as one of the five development objectives of the NDP and is specializes in three specific objectives relating to the development, improvement and modernization of networks, transport and the supply chain (Figure 3.1). In this context, eleven investment priorities are set, addressing specific sectors such as transport, logistics, energy and communication infrastructure, road safety and urban mobility. At the same time, however, the other development objectives (e.g. infrastructure for the health system, environmental protection and other social and cultural infrastructure) also include dimensions to which the construction sector is called upon to contribute. The implementation of the NDP started on 1/7/2021, aiming to be frontloaded, allocating 70% of its total budget (10 billion euros) in the first two years. The Ministry of Infrastructure and Transport with a budget of 2.6 billion euros has by far the largest share of them (26%).

[12] Approval and identification of the resources for the implementation of the National Development Programme (NDP) for the programming period 2021-2025, Government Gazette, Series I, No 174, 10 September 2020.

Figure 3.1: Infrastructure and network priorities in the National Development Programme



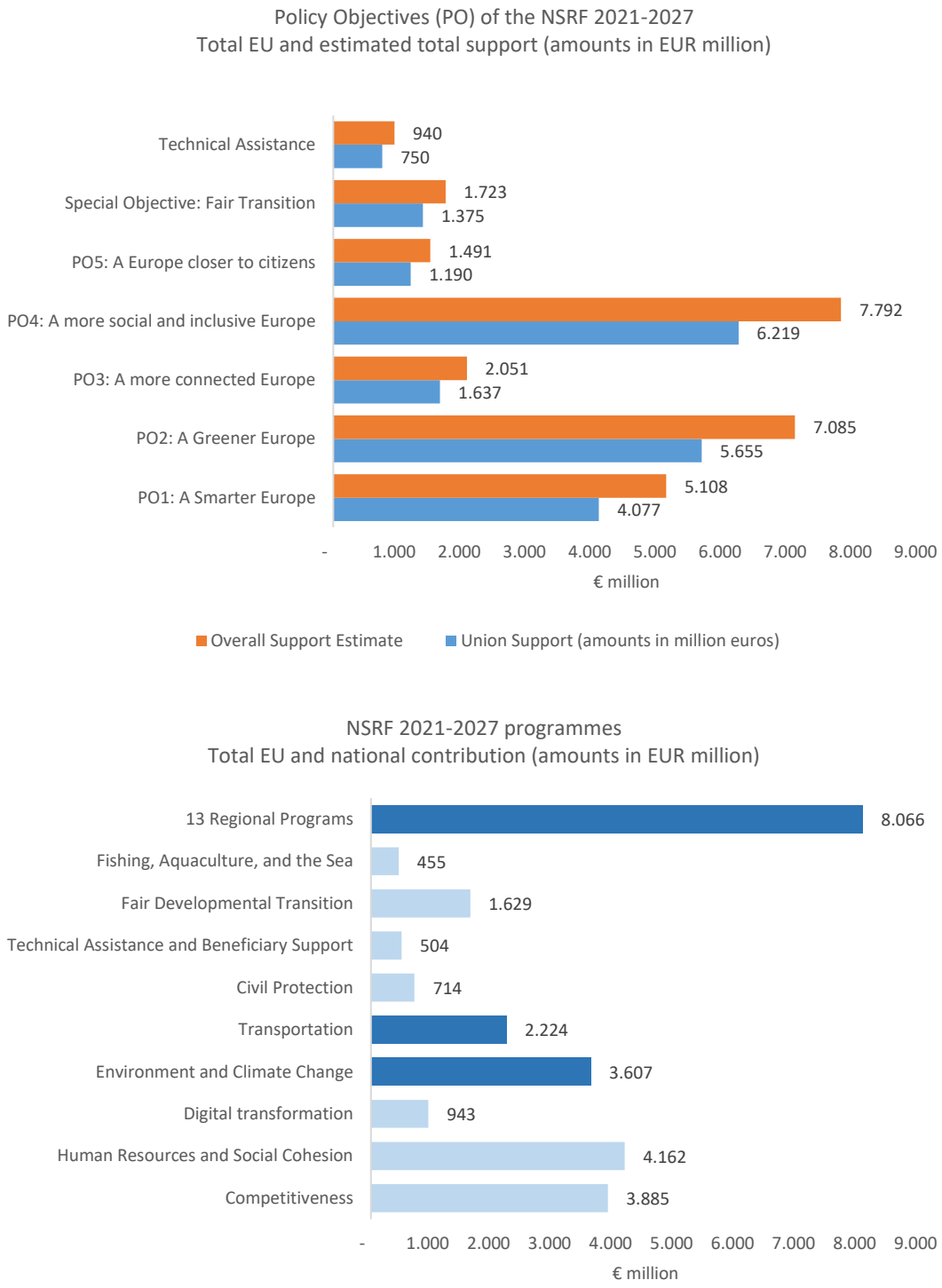
Source: Ministry of Development and Investment - National Development Programme 2021-2025.

3.1.1 NSRF 2021-2027

The " Regional Development Partnership Agreement" (NSRF) is the largest and best-known tool for funding investment projects in Greece. The current NSRF 2021-2027, with a total budget of 26.2 billion euros, was adopted by the European Commission on 29 July 2021. Support from European Structural Funds amounts to 20.9 billion euros and the remaining 5.3 billion euros corresponds to the national contribution to the programme from the national budget of the country.

Priorities for strengthening the new NSRF 2021-2027 include the productive potential of the economy, infrastructure, human skills and social protection. Specifically, 30% of the resources of the NSRF 2021-2027 are earmarked for actions aimed at the transition to a "more social" Europe. The objectives of moving to a ‘greener’ (27%) and ‘smarter’ (20%) Europe also get a high share of resources (Figure 3.2).

Figure 3.2: Policy objectives and programmes of the NSRF 2021-2027



Source: https://www.espa.gr/el/Pages/espa2021-2027.aspx

The programme is implemented through 8 sectoral programmes, 13 regional programmes and the fisheries, aquaculture and maritime programme. The main changes compared to the previous NSRF 2014-2020 include an increase of 2.2 billion euros for the 13 Regional Operational Programmes from the NSRF 2014-2020 (from 5.9 billion euros to 8.1 billion euros), the separate programme for the Environment, Climate Change and Energy with a budget of 3.6 billion euros, the new programme for competitiveness with a budget of 3.9

billion euros and business support actions, as well as the separate programme for digital transformation, with reinforced resources (943 million euros in total budget) and a new managing authority.

Table 3.1 presents an estimate of the funding resources of the NSRF 2021-2027 that are planned to be directed to the fields of Environment-Climate Change (greener Europe) and Transport (more interconnected Europe), in which the construction sector is directly and largely involved in the implementation of the relevant projects. In total, it is estimated that during the programming period of the new NSRF, 9.14 billion euros will be allocated to infrastructure projects, providing significant support to domestic construction activity.

Table 3.1: Estimated funding resources for infrastructure from the NSRF 2021-2027 (million euros)

NSRF Programme 2021-2027 (Projects related to Infrastructure)	Union support (amounts in million euros)	Percentage	Estimate of total support*
SP2: A greener Europe	5.665	27%	7.094
SP3: A more connected Europe	1.637	8%	2.050
SUB-TOTAL (SP2+SP3)	***7.302***	***35%***	***9.144***
GENERAL TOTAL NSRF 2021-2027	**20.913**	**100%**	**26.189**

Source: NSRF 2021-2027 * IOBE estimate.

Compared to the previous programming period of the NSRF 2014-2020, total funding resources in these areas do not lag behind in budgetary terms, as payments (public support) in the previous period approached 9 billion euros (in projects with a total contractual object of 13.8 billion euros) (Table 3.2). Therefore, if the specific funding resources of the NSRF 2021-2027 are absorbed in the new programming period, the impact on the activity of the Construction sector is not expected to vary significantly compared to the previous period.

Table 3.2: Budget and contract size for infrastructure in the NSRF 2014-2020 (million euros)

Thematic objective	Contracts (million euros)	Payments (million euros)
Economy of Low Pollutants	4.160	3.124
Climate change – Prevention	560	377
Protection of the environment	4.738	2.850
Sustainable transport	4.328	2.603
Subtotal	***13.787***	***8.955***
Total NSRF 2014-2020	**39.005**	**27.708**

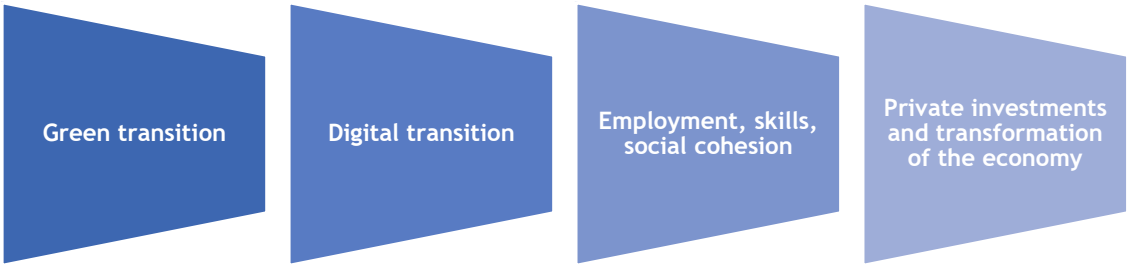
Source: https://anaptyxi.gov.gr/el-gr/

3.1.2 National Recovery and Resilience Plan

The National Recovery and Resilience Plan (NRRP) outlines the national investments and reform programmes for the country to benefit from the Recovery and Resilience Facility (RRF). The NRRP includes a set of reforms and investments aimed at enhancing the competitiveness and extroversion of the Greek economy, while achieving environmental protection, further digitalization of the state, shrinking bureaucracy, drastically reducing the shadow economy, developing an investment-friendly tax system and creating a quality and effective social protection network accessible to all. The NRRP Greece 2.0 was adopted on 13 July 2021 by the Economic and Financial Affairs Council of the European Union (Ecofin), with an initial budget of 30.5 billion euros. On 8 December 2023, its revision was adopted, mainly related to the addition of new investments and reforms in the context of REPowerEU, as well as the

extension of the loan programme. With the adoption of the revised Plan, the total budget of "Greece 2.0" amounts to 36 billion euros. The NRRP includes 103 investments and 76 reforms, broken down into 4 pillars, including the new REPowerEU chapter.

Figure 3.3: Pillars of the National Recovery and Resilience Plan



Source: Greece 2.0 National Recovery and Resilience Plan.

The first pillar of the NRRP concerns the **green transition** and has the following axes:

- The transition to a new energy model that is environmentally friendly.
- The energy upgrading of the country's building stock and the spatial reform.
- The transition to a green and sustainable transport system.
- Sustainable use of resources, climate resilience and biodiversity conservation.

The second pillar concerns the **digital transition** and has following axes:

- Connectivity for citizens, businesses and the state.
- The digital transformation of the state.
- Digital Transformation of Businesses.

The third pillar relates **to employment, skills and social cohesion** and has following axes:

- Increasing jobs and promoting participation in the labor market.
- Strengthening the digital potential of education and modernizing vocational education and training.
- Enhancing the accessibility, effectiveness and quality of the health system.
- Increasing access to effective and inclusive social policies.

The fourth pillar of the NRRP concerns **private investments and the transformation of the economy** and has following axes:

- Developing more growth-friendly tax tools and improving tax administration.
- Modernization of public administration.
- Improving the efficiency of the justice system.
- Strengthening the financial sector and capital markets.
- The promotion of research and innovation.
- Modernize and improve the resilience of the main sectors of the country’s economy.
- Improving competitiveness and promoting private investments and exports.

The total budget of the NRRP is 36.2 billion euros, of which 18.5 billion euros relates to direct grants of the four-pillar actions and the REPowerEU chapter. The remaining 17.7 billion euros concerns loans that will support private investments, giving businesses access to finance through loans and equity support for SMEs, but also through the InvestEU programme, and

will be complemented by reforms to reduce administrative burdens and improve the regulatory framework (Table 3.3).

Table 3.3: Total investment resources mobilized by the Recovery Fund

	Recovery Fund budget (million euros)	Total investment resources mobilized (million euros)
Green transition	6,018	11,283
Digital transformation	1,935	2,070
Employment, Skills, Social Cohesion	5,226	5,307
Private investment and transformation of the economy	5,311	9,614
Sum of subsidies	**18,491**	**28,274***
Loans	**17,728**	**44,320***
Total investment resources	**36,219**	**72,593***

Source: Greece 2.0 National Recovery and Resilience Plan. *IOBE estimates.

Of the 18.5 billion euros, 6.1 billion euros (33%) relates to the first pillar, 2.1 billion euros (10%) to the second pillar, 5.2 billion euros (28%) to the third pillar and 5.3 billion euros (29%) to the last pillar (private investments). In addition to this, 795 million euros came from REPowerEU. At the same time, it is estimated that the total investment resources to be mobilized amount to 72.6 billion euros (using the investment leverage factors from the original NRRP), of which 28.3 billion euros relate to the resources of the four pillars and the remaining 44.3 billion euros to loans. Of the total resources mobilized, it is estimated that 11.3 billion euros (40%) relates to the green transition, 2.1 billion euros (7%) to the digital transformation, 5.3 billion euros (19%) to employment, skills and social cohesion and 9.6 billion euros (34%) to private investments and the transformation of the economy.

Based on the analysis of the NRRP actions, it is estimated that grants of 9.9 billion euros will be directed to projects directly related to Construction, mobilizing a total of 12.8 billion euros (Figure 3.4). The construction projects to be supported by grants from the RRF mainly concern the pillars of the Green Transition (6.3 billion euros) and Private Investment (2.7 billion euros). The main actions considered to be directly related to Construction are presented in Figure 3.5, and detailed in the Annex.

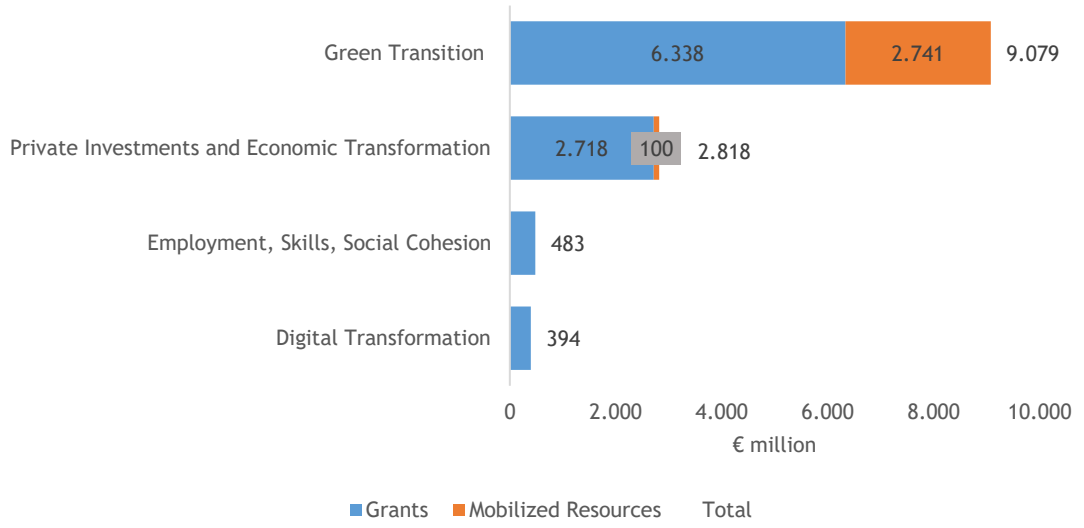
Together with the resources from the RRF loans (and the funding resources mobilized from the loans) it is estimated that for projects directly related to Construction, a total of 23.9 billion euros (12.8 billion euros from grants and 11.1 billion euros from loans) will be mobilized over the period 2022-2026. It should be noted that the estimated time distribution of the resources mobilized in the period 2022-2026 follows the distribution of payment requests, assuming a further five requests (one every six months) up to the first half of 2026 (Table 3.4, Table 8.3 in Annex and Figure 3.6).

Table 3.4: Estimation of the timetable of RRF resources

	Annually			Cumulative		
Timetable of projects	**Grants**	**Loans**	**Total**	**Grants**	**Loans**	**Total**
2021	0.00	0.00	0.00	0	0	0
2022	1.15	1.07	2.22	1.15	1.07	2.22
2023	2.30	2.14	4.44	3.45	3.21	6.65
2024	5.09	5.04	10.13	8.54	8.24	16.78
2025	5.38	5.27	10.65	13.92	13.51	27.43
2026	4.30	4.22	8.52	**18.22**	**17.73**	**35.95**
Total	**18.22**	**17.73**	**35.95**			

Source: IOBE analysis. * The difference with the total amounts in Table 3.3. is due to the estimation of the amounts that will not be directed to projects.

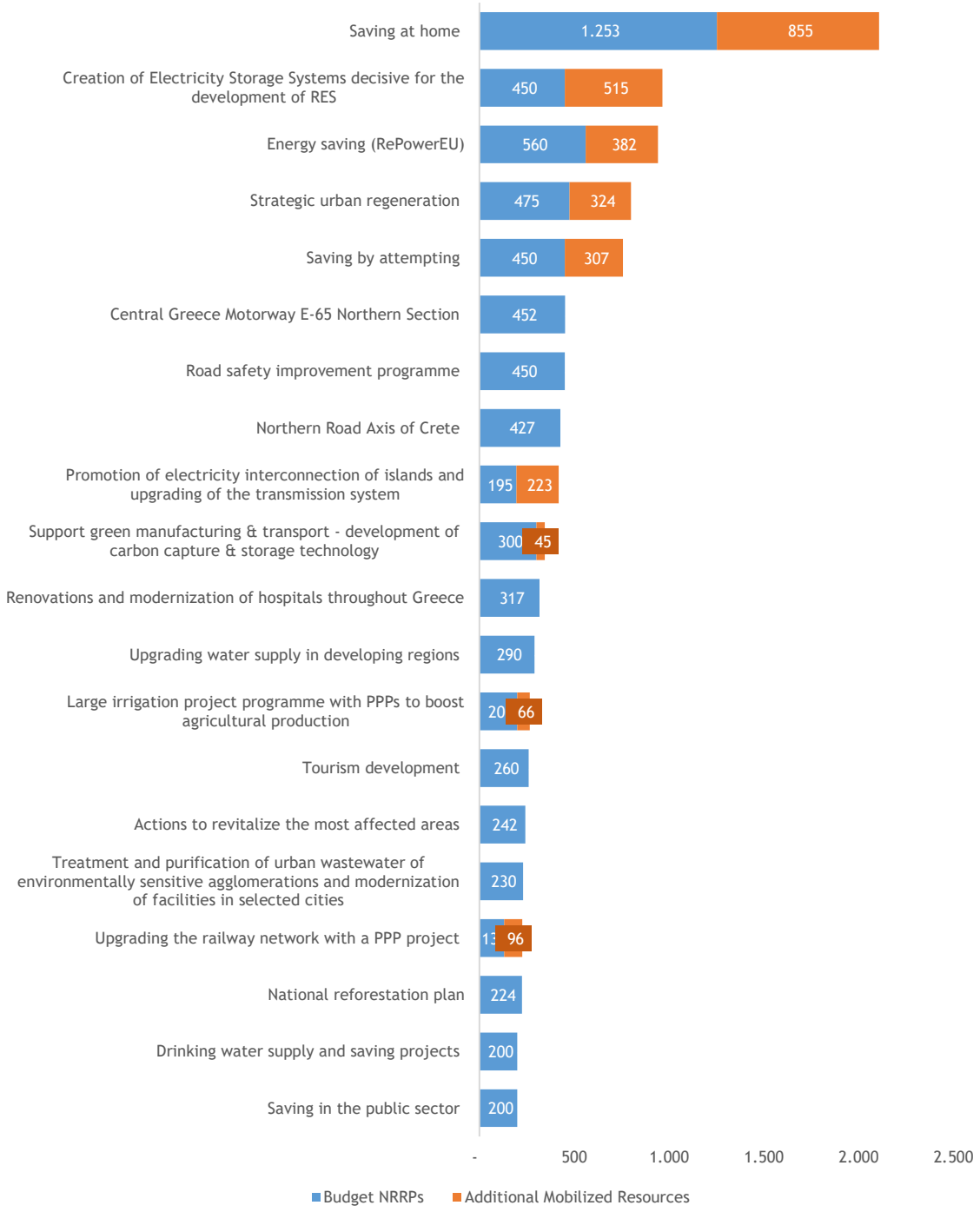
Figure 3.4: Total investment resources mobilized from grants to Recovery Fund projects directly related to Construction activity, by pillar (estimate)



Source: Greece 2.0 National Recovery and Resilience Plan. IOBE estimates.

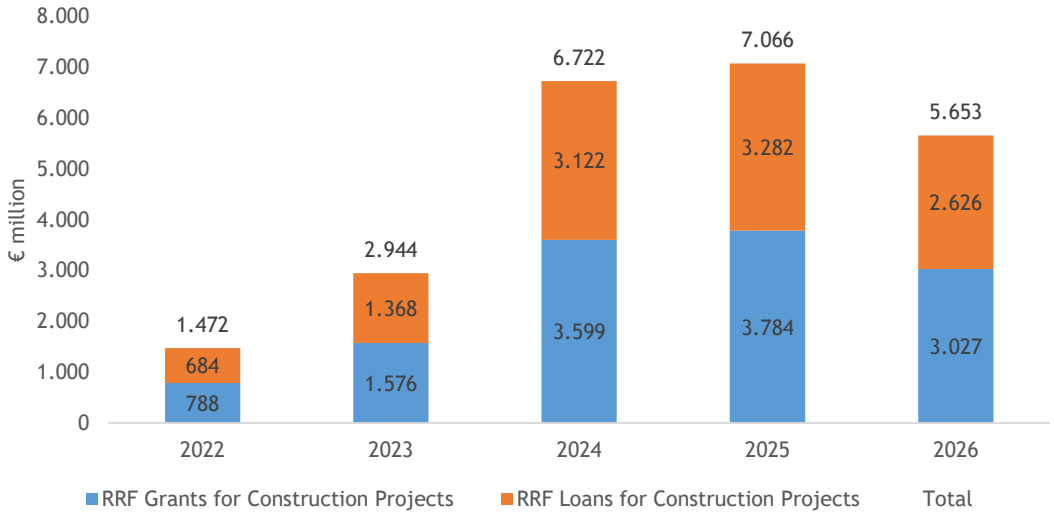
In addition, loans to be directed to construction projects were estimated based on two assumptions: a) 25% participation of Constructions in the total investments to be financed by the RRF loans and b) 40% of RRF loans in the total resources mobilized. It is noted that a different (smaller or larger) absorption of loan resources in projects related to the Construction sector will affect in the same direction the results of the study regarding the prospects for the development of Construction and the loan needs of the sector presented in the next chapter.

Figure 3.5: Grants and resources mobilized for key NRRP actions related to the Construction sector



Source: NRRP, IOBE analysis.

Figure 3.6: Total annual resources mobilized for construction projects from the NRRP (estimate)



Source: Greece 2.0 National Recovery and Resilience Plan. IOBE estimates.

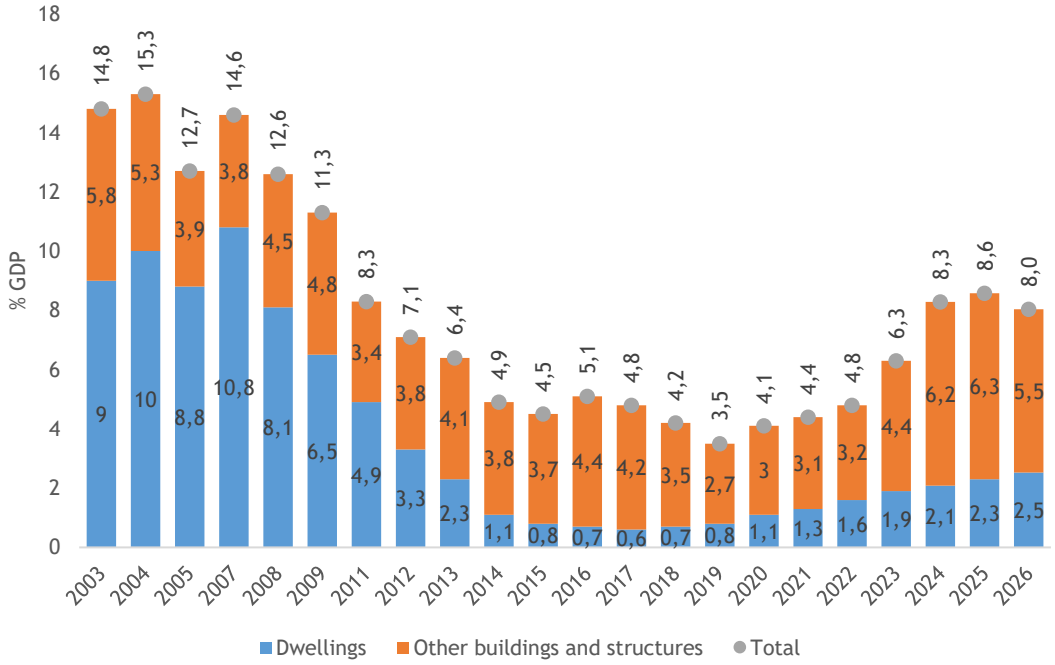
3.1.3 PROJECTION OF CONSTRUCTION ACTIVITY IN 2023-2026

The data presented in the previous sections show that the development of infrastructure and other construction projects is one of the main priorities of the country's development policy for the coming years. The existence of additional funding resources from the EU that will support the development of the Greek economy, combined with the trend of increasing private construction and building activity implies that the role and potential contribution of Construction to the implementation of the required projects is crucial and important.

In order to assess the prospects for the development of domestic construction activity in the period 2023-2026, it was assumed that: a) the resources from the NDP and the NSRF will not provide an additional boost to construction activity, as similar programmes have been implemented in previous years, b) the current upward trend recorded in construction activity (investments in housing and other buildings) will continue in the coming years, however far from the level of the 2000s and c) the boost to construction activity will be given to the largest part of the RRF resources estimated to be directed to construction projects.

Based on these assumptions, construction investments – mainly infrastructure investments – are expected to significantly strengthen its share of GDP in 2023-2026 (Figure 3.7). Specifically, in the medium term, *additional investments in* infrastructure and housing are estimated annually at up to 3.0% of GDP on average (compared to 2022) – with the share of investment in construction projects reaching up to 8.6% of GDP in 2025 from 4.8% in 2022.

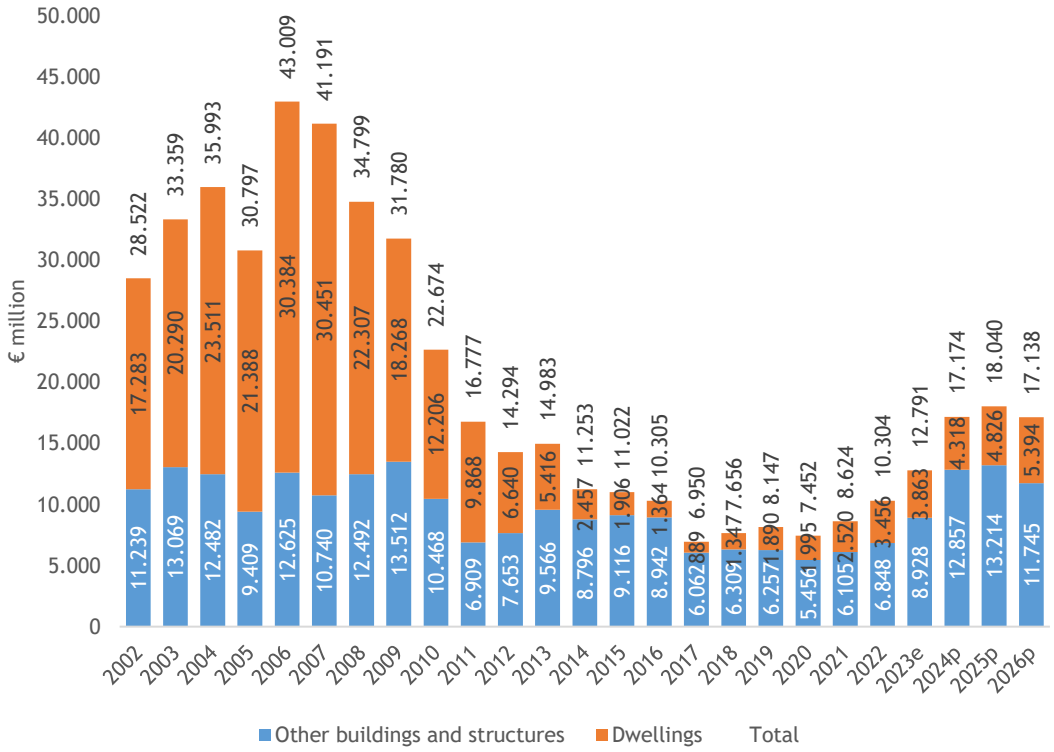
Figure 3.7: Projection of investments in Construction (% of GDP), 2023-2026



Source: Eurostat, IOBE Estimation 2023-2026.

In the medium term, it is estimated that the production value of infrastructure and housing construction projects will more than double compared to its 2020 level (Figure 3.8). Specifically, based on the time distribution that has been considered for the total mobilized investments of the Recovery Fund, the annual production value (turnover) of Construction is estimated to follow a strong upward trend in 2024-2026, exceeding 18 billion euros in 2025 (from 10.3 billion euros in 2022). Due to the strong impact of NRRP investments, the overall impetus will be driven to a greater extent by investments in non-residential infrastructure and construction projects, but private construction activity has been assumed to strengthen by 56% compared to the level recorded in 2022.

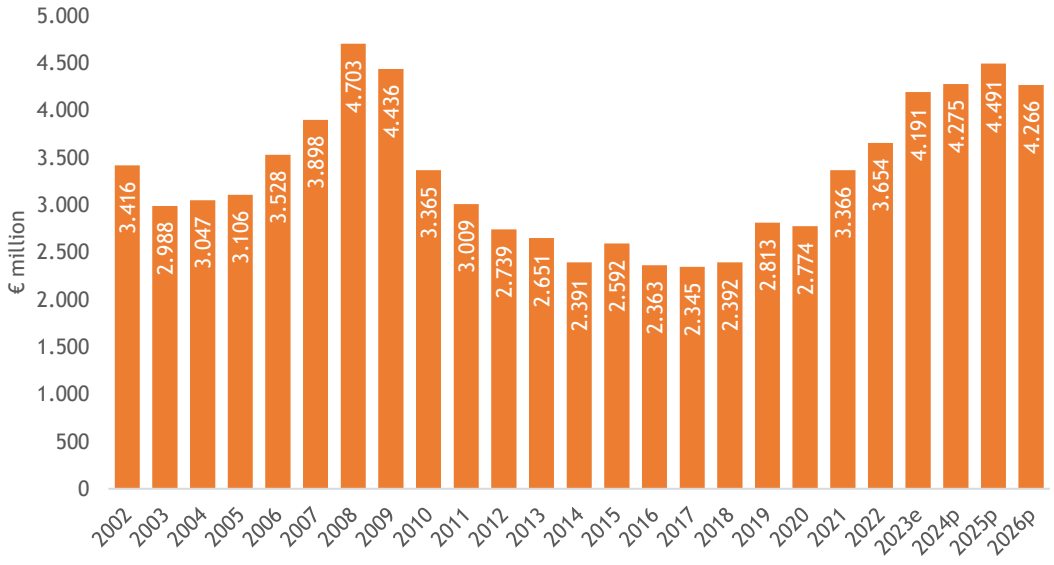
Figure 3.8: Projection of the Production Value of constructions, 2023-2026



Source: Eurostat, IOBE Estimation 2023-2026.

Accordingly, the annual production value (turnover) in the activities of Architects and Engineers is estimated to approach 4.5 billion euros by 2025, up from 3.6 billion euros in 2022. The estimate for the period 2023-2026 is based on a statistical analysis of the relationship between the production value of the construction industry and the activities of Architects and Engineers.

Figure 3.9: Projection of the Production Value of Architectural and Engineering activities, 2023-2026



Source: Eurostat and IOBE Estimates. The projection for the period 2023-2026 is based on a statistical estimate of the relationship between the production value of Constructions and the activities of Architects and Engineers.

4 EVOLUTION OF FINANCING IN THE CONSTRUCTION SECTOR

4.1 Introduction

The funding received by enterprises in the construction and design sector is mainly directed to: a) operational capital, to cover operational needs and the financing of the transaction circuit (short-term borrowing), b) purchase of fixed capital (mainly long-term borrowing for machinery and other equipment, purchase of real estate for professional use, project development, etc.) and c) issuance of letters of guarantee, such as participation in tenders, project performance, reservations (replacement of tithes), downpayment and payment of obligations.

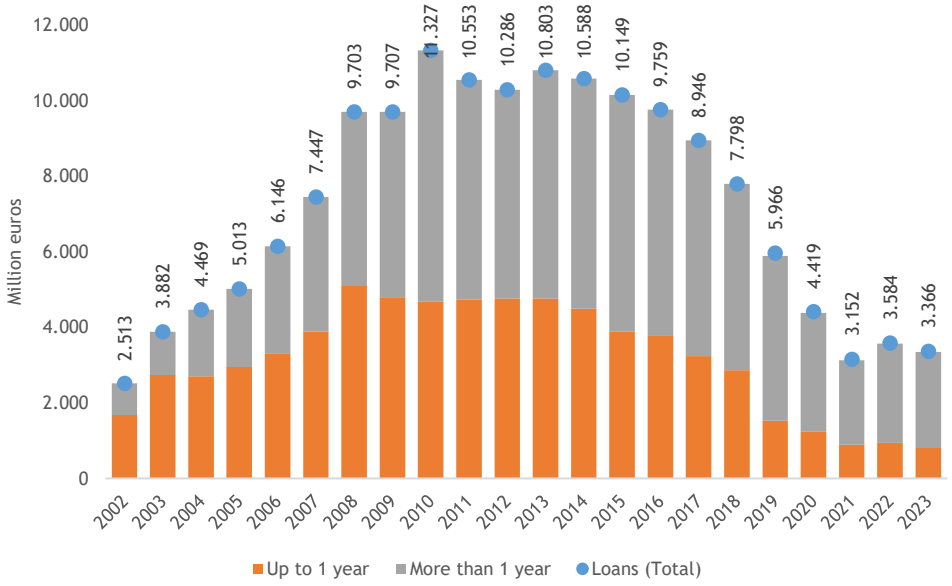
This chapter examines the evolution of the sector's funding, focusing on the period 2019-2023, compared to other sectors of economic activity. As the data examined relate to funding that has already taken place based on banking criteria and the possibilities of granting loans from the financial system (rather than based on total funding needs/demand), data on the financing gap of small and medium-sized enterprises in Greece are also presented. The financing gap arises when demand is greater than the supply of loans and therefore part of the demand for financing remains unsatisfied. The existence of a financing gap has, inter alia, a negative impact on the overall level of investment in the economy. There are, however, several financial tools that can be used to limit this, and consequently to limit the pronounced fluctuations in business activity and the level of investment.

4.2 Loan balances in the construction sector

As regards the financing of the construction sector by domestic monetary-financial institutions (MFIs) over the period 2002-2023[13], four phases can be distinguished (Figure 4.1). The first covers the period 2002-2010, when the stock of domestic MFI loans to the construction sector more than quadrupled, from 2.51 billion euros in 2002 to 11.33 billion euros in 2010, because of the rise in construction activity and rapid credit expansion, due to the liberalization of the banking system in the early 2000s. The second phase covers the period 2011-2015, where although the domestic economic crisis intensified, outstanding loans to the sector remained at an average level of 10.5 billion euros, but partly with a large accumulation of non-performing loans. The third phase, which starts in 2016 and reaches until 2021, is characterized by a significant reduction in financing balances (3.15 billion euros in 2021 or -67% compared to 2016), suggesting that loan repayments exceed new disbursements of loans to Construction. However, the bulk of this decline is due to write-offs of (non-performing) loans from credit institutions' balance sheets and their transfer to debt servicing companies. The fourth phase includes the period after 2021, when the balances of loans to Construction stabilized and presented a small increase.

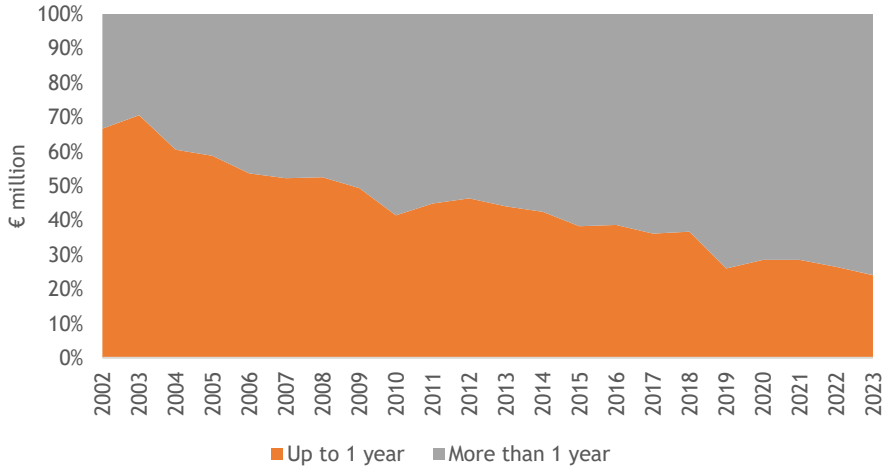
[13] It should be noted that the methodology of the Bank of Greece survey on financing of non-financial institutions changed in 2021 and a discontinuity in the time series was created in 2019 compared to previous years, without however changing the overall trend in the data.

Figure 4.1: Analysis of domestic MFI financing of the Construction sector, 2002-2023 (end-of-period balances)



Source: Bank of Greece. For 2023 data are as of November.

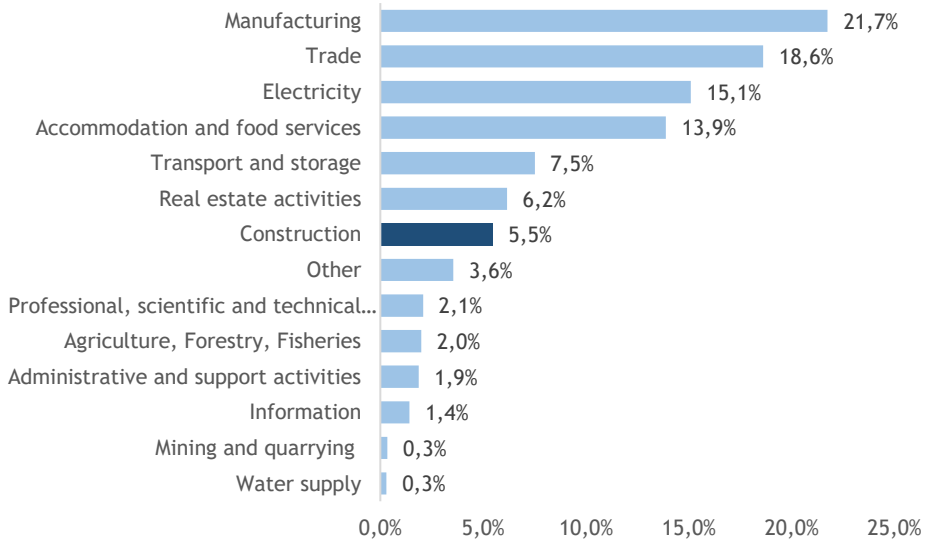
Figure 4.2: Outstanding amount of loans in Construction by maturity (2002-2023)



Source: Bank of Greece, IOBE analysis.

In November 2023, 24% of outstanding loans had a short-term maturity (less than 1 year) (Figure 4.2). This category mainly includes loans used as operational capital, without a specific maturity. Loans with a maturity of more than one year accounted for the largest share of total outstanding loans, at 76%. Overall, Construction (excluding non-performing loans) accounted for 5.5% of all outstanding financing to non-financial corporations in 2023, with a decrease in participation compared to previous years (Figure 4.3). It is therefore one of the sectors with high financing needs in the Greek economy after Manufacturing, Trade, Tourism, Energy, Transport and Real Estate Management.

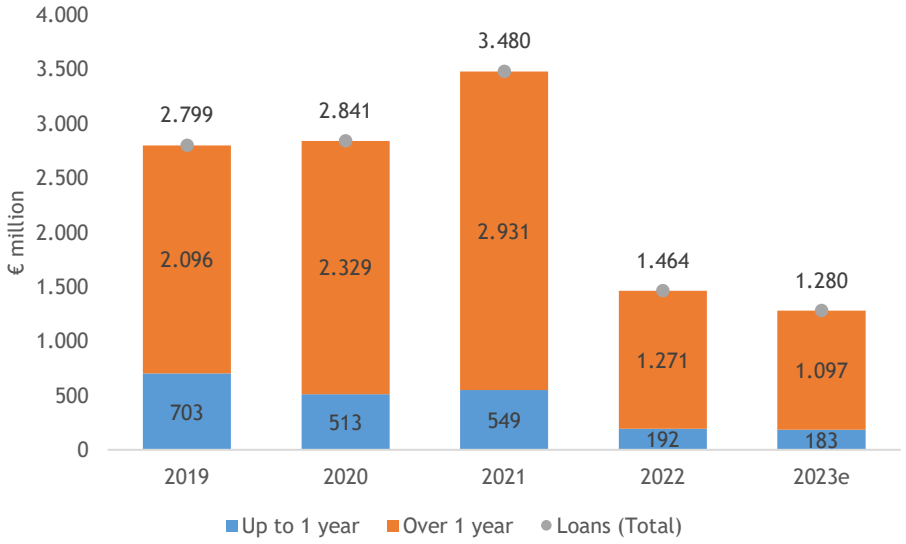
Figure 4.3: Sector shares of total financing to enterprises by domestic MFIs, November 2023



Source: Bank of Greece. IOBE analysis.

Data on total debt obligations in the activities of Architects and Engineers are not available. However, these activities are part of the wider field of professional, scientific and technical activities, for which data are available. In 2023, domestic MFIs' outstanding loans to the professional, scientific and technical activities sector amounted to 1.28 billion euros and mainly concern loans with a maturity of more than one year (1.01 billion euros or 86%). The percentage decrease in the sector's financing balances over the period 2019-2023 was significantly higher (-54%) than the decrease in the total financing balances to non-financial corporations (-8%).

Figure 4.4: Analysis of financing of the professional, scientific and technical activities by domestic MFIs, 2002-2023 (end-of-period balances)

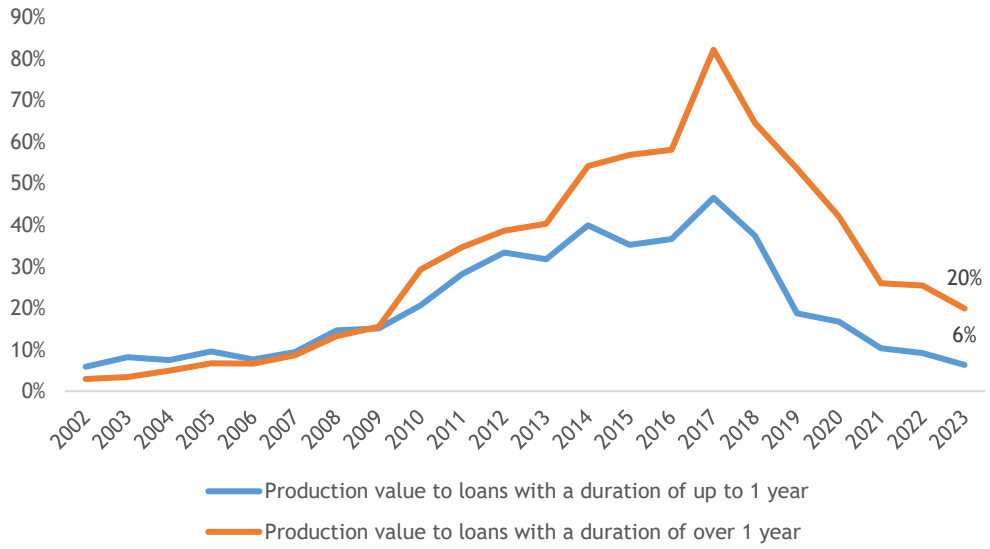


Source: Bank of Greece, AnaCredit.

The accumulation of loans coupled with a sharp decline in construction activity led to a significant increase in the ratio of short-term and long-term loans to the production value of

the construction industry (Figure 4.5). After 2017, however, the stock of loans to Construction as a percentage of production value has been on a declining trend, mainly due to the sale of non-performing loans by domestic MFIs. Overall, the stock of loans from domestic MFIs in Construction is estimated to have accounted for 26% of the industry's production value in 2023, with the significant decline in the ratio after 2017 driven by a decline in the stock of loans mainly due to loan write-offs.

Figure 4.5: Outstanding amount of loans to production value in the Construction sector, 2002-2023

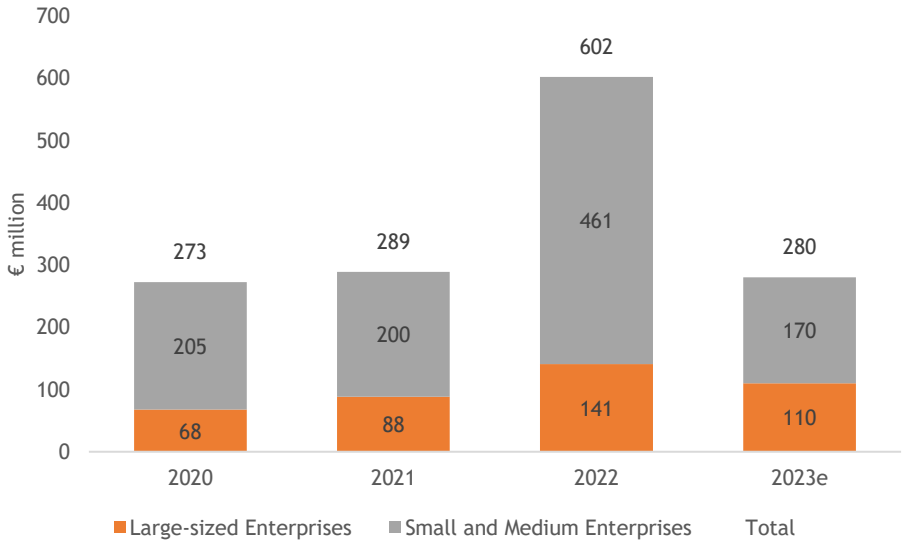


Source: IOBE estimate based on data from the Bank of Greece and Eurostat.

4.3 New loans in the construction sector

Domestic MFI financing of the construction sector did not change significantly in 2020 and 2021, with new loans amounting to 273 million euros and 289 million euros respectively. A large increase occurred in 2022, when new loans amounted to 602 million euros. However, in 2023, despite a further increase in construction activity, construction financing fell to 280 million euros. The significant increase in borrowing costs in 2023 was one of the factors that may have affected funding flows. In the period 2020-2023, SMEs in the sector received an average of 72% of new loans and large ones the remaining 28%. It is worth noting that data on repaid loans is not available, so it is not possible to estimate net loan flows at industry level.

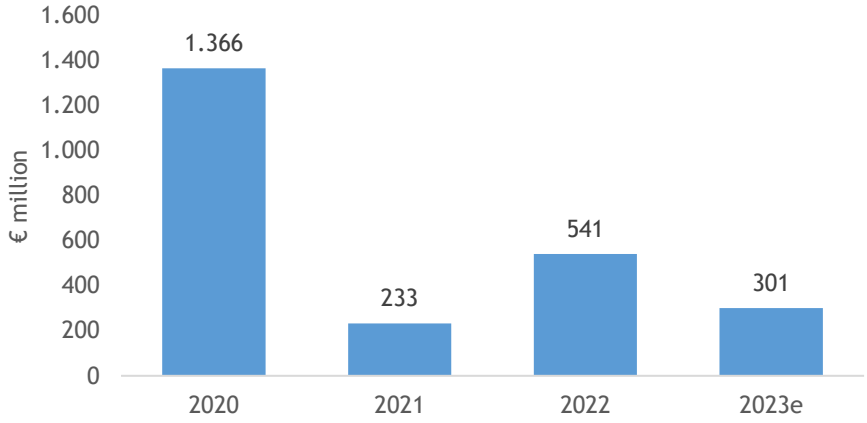
Figure 4.6: Net loan flows in Construction, 2020-2023



Source: Bank of Greece, AnaCredit.

The flow of new loans to the professional, scientific and technical sector was particularly high in 2020 (1.37 billion euros), possibly due to the COVID-19 pandemic, but in the following years it was limited on average to 358 million euros (Figure 4.7). In 2023, there was also a decrease in funding flows in this sector compared to the previous year.

Figure 4.7: New loans for professional, scientific and technical activities, 2020-2023



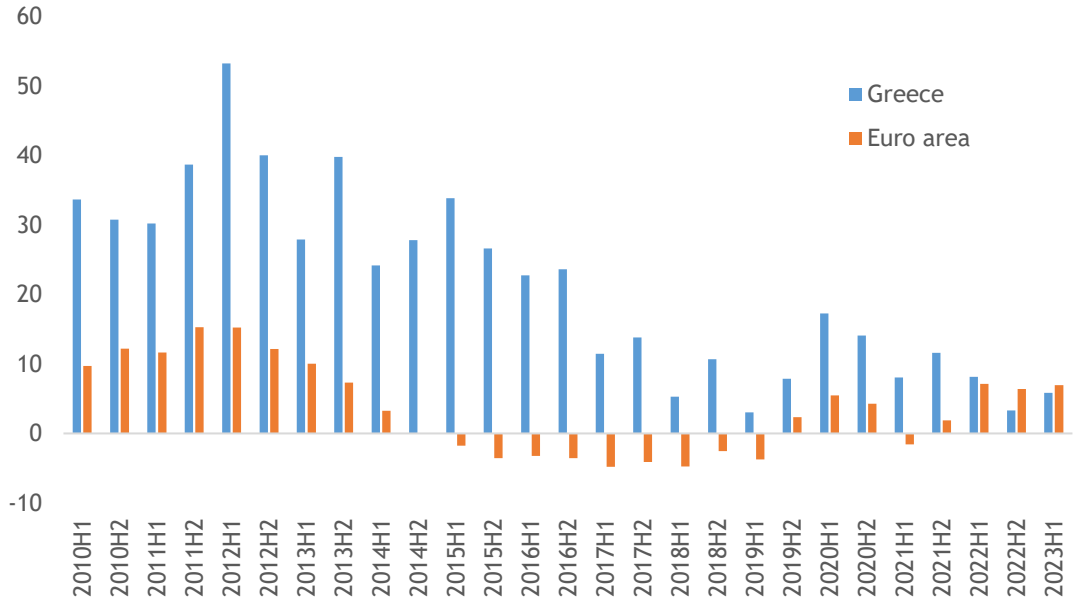
Source: Bank of Greece, AnaCredit.

4.4 Financing gap

Previous data recorded a significant decline in outstanding loans and relatively limited flows of new loans to the construction sector in recent years. The lack of access to borrowed capital creates a financing gap, the size of which results from the disparity between the supply and demand of capital by businesses. In the European Central Bank (ECB) SAFE survey, conducted twice a year, the financing gap of small and medium-sized enterprises (SMEs) is defined as the difference between the change in the financing needs of small and medium-sized enterprises minus the change in the availability of bank lending. A positive value of the indicator points to an increase in the financing gap. Based on the data of this survey, the financing gap of SMEs

in Greece (and therefore of companies operating in the construction sector) is generally larger than the EU average, increased in the first years of the economic crisis and gradually de-escalated until 2019. But since 2020, with the health crisis and other disruptions in the economy (e.g. high energy costs), the financing gap for SMEs in Greece has widened again. It is worth noting that in the second half of 2022 and the first half of 2023 the financing gap of European companies increased, surpassing for the first time Greece's prices.

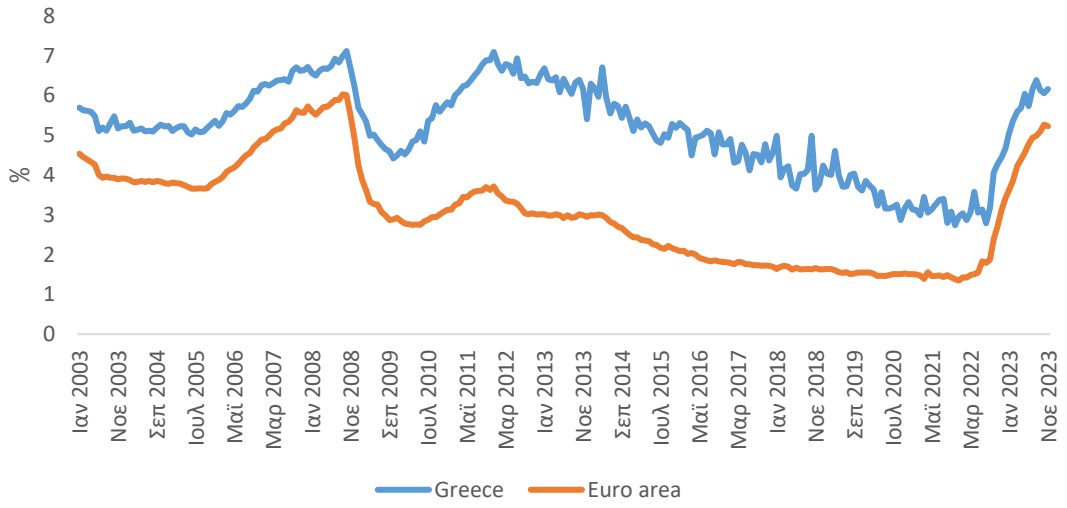
Figure 4.8: Changes in the financing gap, estimated from the perspective of small and medium-sized enterprises (net percentage of respondents) *



Source: ESF, Survey on the Access to Finance of Enterprises (SAFE). * Defined as the difference between the change in the financing needs of small and medium-sized enterprises minus the change in the availability of bank lending. A positive value of the indicator indicates an increase in the funding gap.

Finally, an important factor also linked to the difficulties in financing the domestic construction sector is the borrowing costs of firms, which in Greece are systematically higher than the euro area average, while in the most recent period they have risen sharply from 2.72% in October 2022 to 6.16% in November 2023 (Figure 4.9).

Figure 4.9: Composite index of corporate borrowing costs in Greece and the Eurozone



Source: European Central Bank.

The difference between the cost of borrowing[14] of Greek enterprises and the euro area average has widened significantly since the beginning of 2010, peaking in June 2012, while, despite some improvement since then, the average cost of borrowing in Greece is still higher than in the euro area, reflecting the additional risks and the relative credit squeeze of the Greek economy (6.16% compared to 5.23% respectively in November 2023). The high cost of borrowing degrades the competitiveness of companies in the sector, which are required to direct more resources to cover their operating and investment costs.

[14] Borrowing costs are derived from the average of interest rates on new loans to non-financial corporations. It is calculated by the Eurosystem central banks by weighting the outstanding amounts of loans by category (no fixed maturity, long-term fixed maturity, loans up to €250 thousand, from €250 thousand to €1 million and over €1 million). Weights are calculated on the basis of the average of holdings over the past 12 months rather than the current month to mitigate the impact of sudden changes in holdings.

5 ANALYSIS OF FINANCING NEEDS IN THE CONSTRUCTION SECTOR

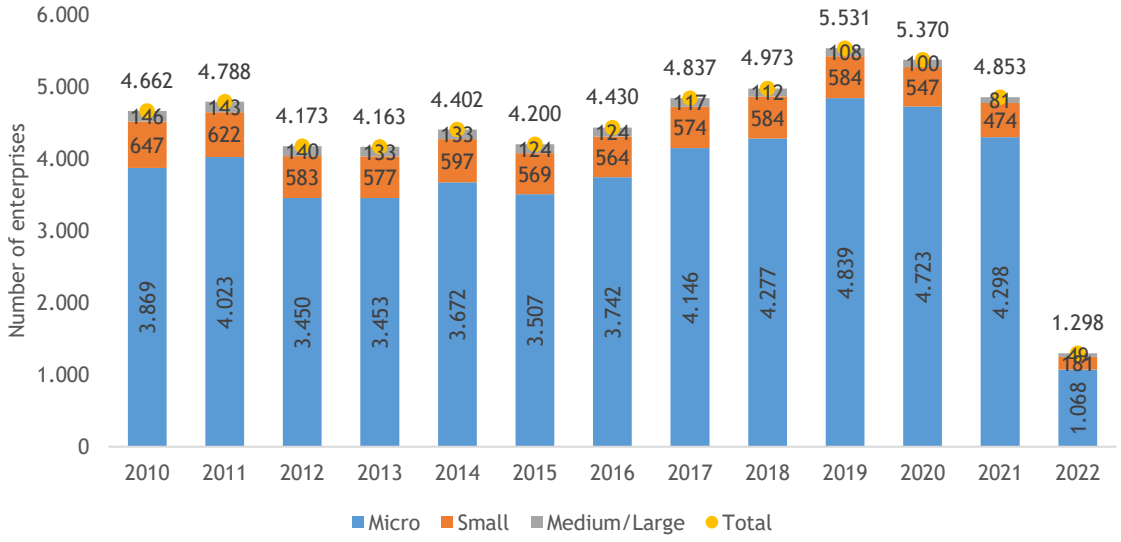
5.1 Data analysis of a sample of companies in Construction

The objective of the analysis of this chapter is: a) to determine econometrically, based on historical data, the relationship between the remaining borrowed capital and the turnover of construction and design enterprises (Architects and Engineers) and b) to use these statistical estimates to determine the needs of enterprises in the sector for of borrowed capital in the coming years, based on the expected level of construction and design activity. In this context, accounting data of technical and design companies, which come from the database "Data Prisma" of ICAP, were used. The analysis data covers the period 2010-2022. The goal is the statistical estimation of the relationship between the amount of short-term and long-term borrowing of enterprises, with variables such as turnover and profitability, in order to determine the needs of technical and design companies for total borrowed funds, but also based on their size. It should be noted that the analysis is carried out using data on bank loan stocks (rather than net loan flows), which include non-performing loans.

Figure 5.1 shows the evolution of the number of enterprises in the sample by size category. It should be noted that the distribution of enterprises into size classes was based on the categorization followed by the European Commission, and is as follows:

- Micro-enterprises: 0 ≤ Turnover ≤ 2,000,000 euros
- Small enterprises: 2,000,000 euros < Turnover ≤ 10,000,000 euros
- Medium and large enterprises: Turnover > 10 000 000 euros

Figure 5.1: Number of Construction and Engineering enterprises sample by size category (2010-2022)



Source: ICAP "Data Prisma", IOBE analysis.

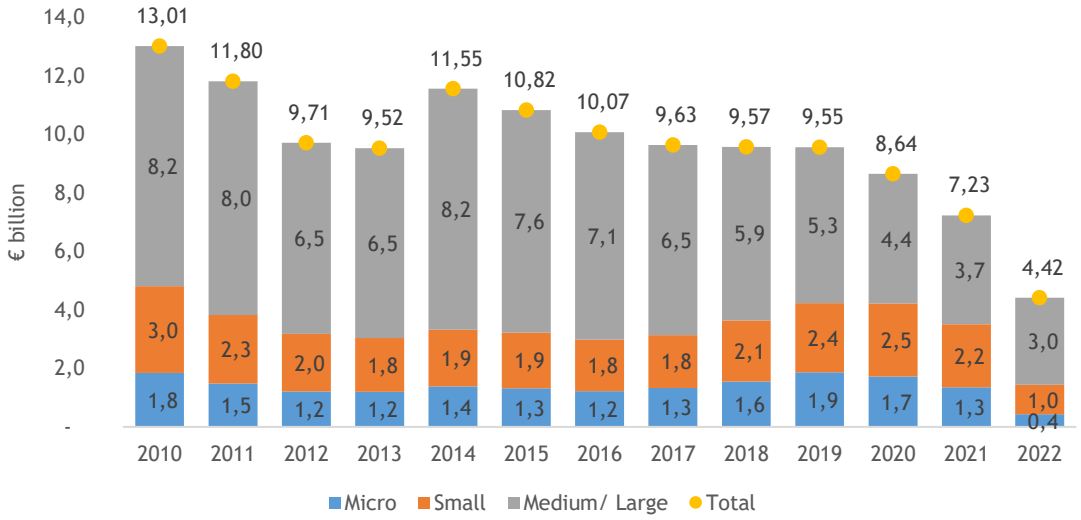
The number of technical and design enterprises in the sample during the period fluctuates. From 4.67 thousand in 2010, it decreased in the period 2012-2016, probably because of the contraction in construction activity that led many companies in the sector to suspend/cease their operation. Since then, the number of enterprises in the sample has increased to 4.85 thousand in 2021. In 2022, their number is significantly limited to 1,30 thousand, due to the

partial availability of published accounting statements, which, however, does not affect econometric estimates.

The vast majority of the sampled companies are of a very small size, as their share in the period considered is on average 84.4%. Next came small businesses, whose share in 2010-2022 was 12.8% on average. Finally, around 3 out of 100 enterprises (2.7%), on average during the period considered, were medium-sized and large enterprises.

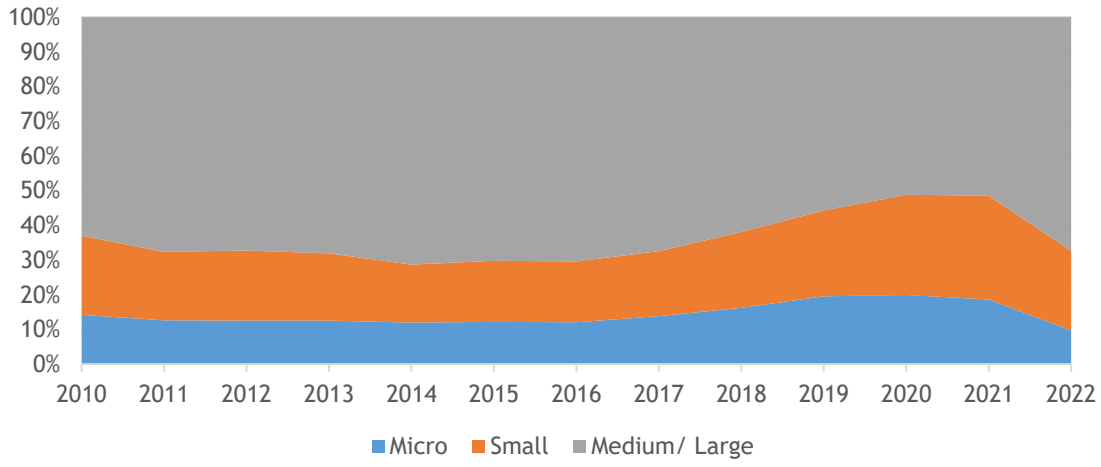
The sampled companies had a turnover ranging from 13 billion euros in 2010 to 7.23 billion euros in 2021 (Figure 5.2). Two-thirds of the industry's total turnover (64.5% on average in 2010-2022) comes from medium-sized and large enterprises (Figure 5.3). Small and micro-enterprises hold on average 21% and 14% of the total turnover respectively. It should be noted that the sample covers on average 70% of the total production value of the construction and Architectural and Engineering services sectors.

Figure 5.2: Turnover of Construction and Engineering enterprises sample by size category (2010-2022)



Source: ICAP "Data Prisma", IOBE analysis.

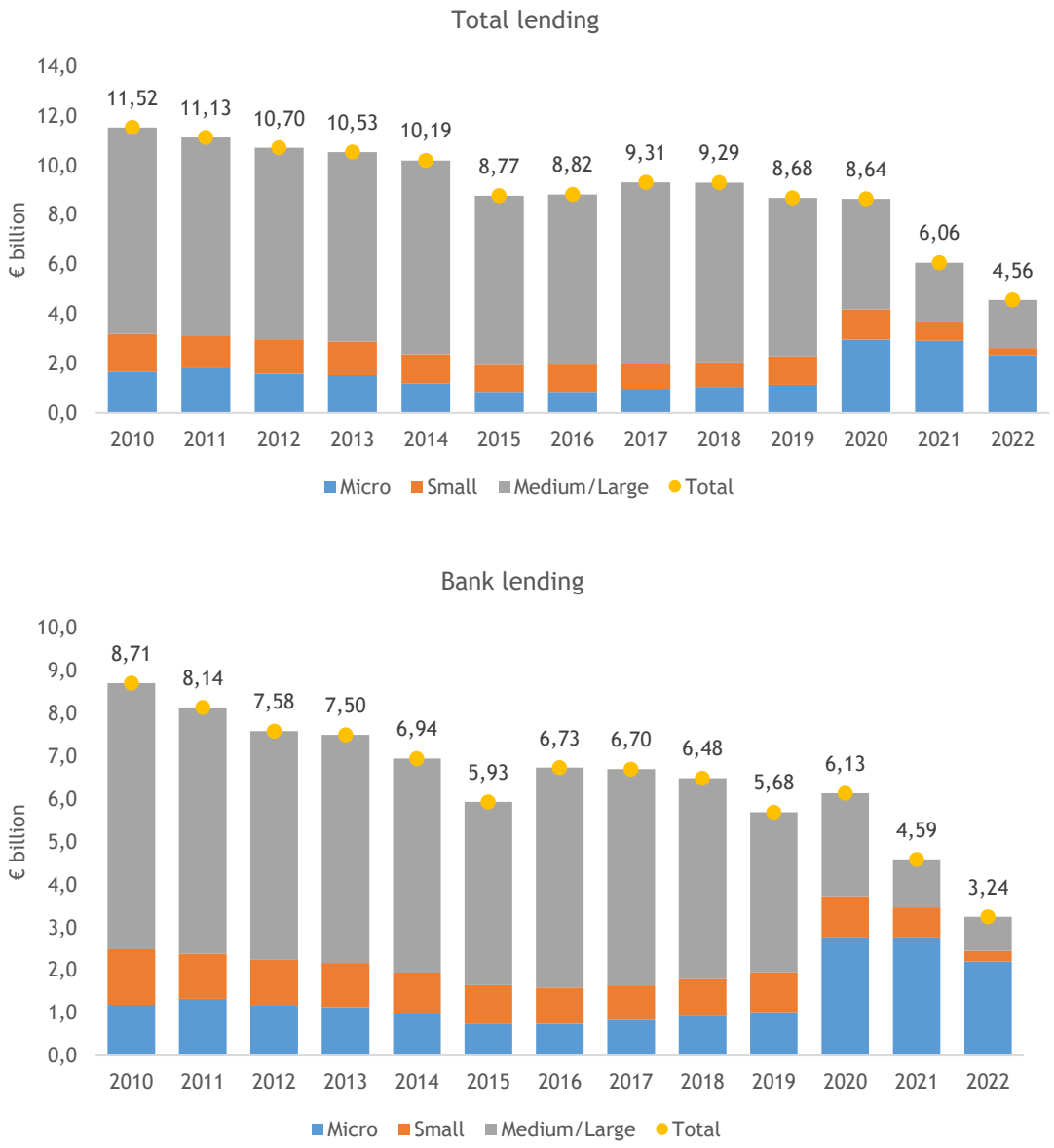
Figure 5.3: Breakdown of turnover of Construction and Engineering enterprises sample by size category (2010-2022)



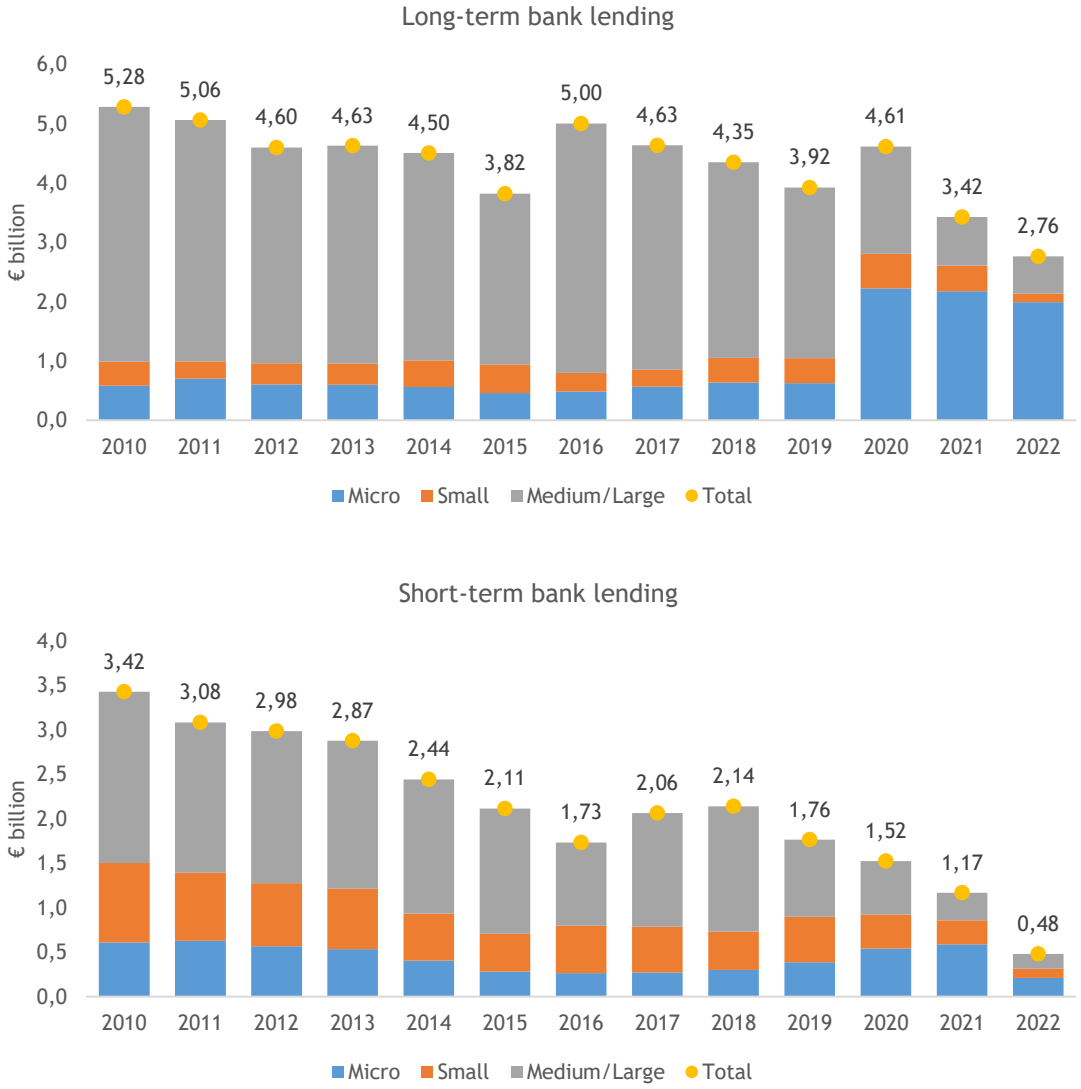
Source: ICAP "Data Prisma", IOBE analysis.

The total borrowing of the sampled companies between 2010 and 2021 shows a downward trend, falling from 11.52 billion euros in 2010 to 6.06 billion euros in 2021 (Figure 5.4). The bulk of total lending results from bank lending[15], which follows a similar trend as total lending. The sector's bank lending mainly concerns long-term loans, while short-term bank loans declined significantly in the period 2010-2021.

Figure 5.4: Development of total and bank lending by category of loans and size of enterprises (2010-2022)



[15] The remaining borrowing relates mainly to other short-term liabilities, or long-term bond loans.

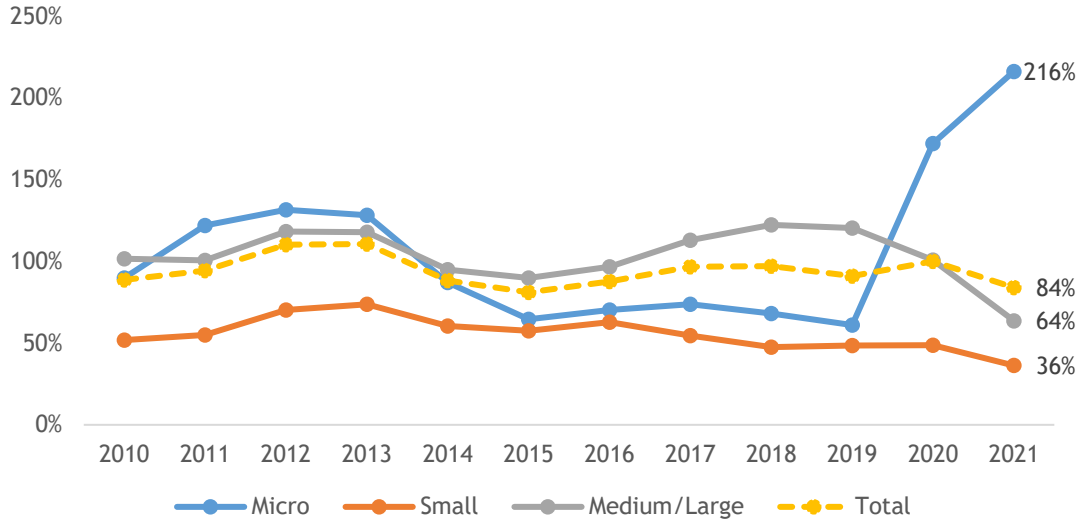


Source: ICAP "Data Prisma", IOBE analysis.

It should be noted that about two-thirds of total bank lending (65.1%), on average over the period 2010-2022, concerns medium-sized and large enterprises. This picture is not particularly different in long-term loans, where again medium and large enterprises account for 69.7%, on average, of the sector's lending. In the case of short-term lending, there is also little differentiation, as the largest share (55.6%, on average) concerns medium-sized and large enterprises, 20.0% micro-enterprises and 24.3% small enterprises.

The ratio of total borrowing to turnover of the sampled enterprises ranged in the period 2010-2022 from 81% to 111% (Figure 5.5). All businesses regardless of size have a debt burden in relation to their turnover of about 1 to 1. Small businesses have the lowest indebtedness rates, while medium-sized and large businesses have higher rates. This indicator for micro-enterprises fluctuates more strongly, rising sharply in 2020 and 2021.

Figure 5.5: Evolution of total bank lending to construction sales by enterprise size category (2010-2022)

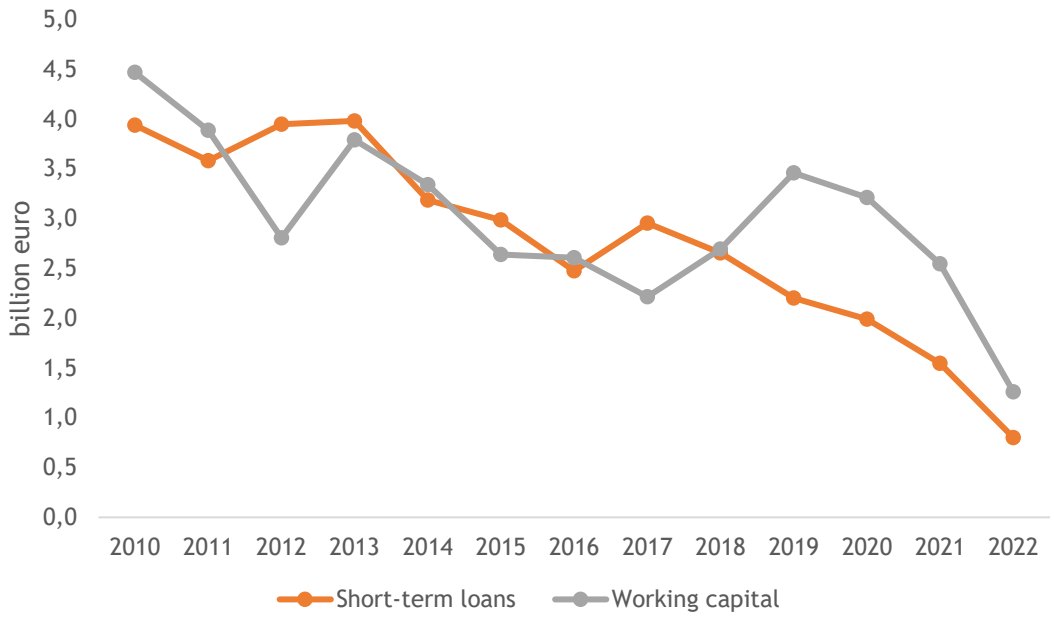


Source: ICAP "Data Prisma", IOBE analysis.

As regards the relationship between short-term bank lending and operational capital, Figure 5.6 follows that the operational capital of the sampled companies since 2019 is higher than their short-term lending, which shows that the companies in the sector now retain sufficient liquidity to repay their short-term loans.

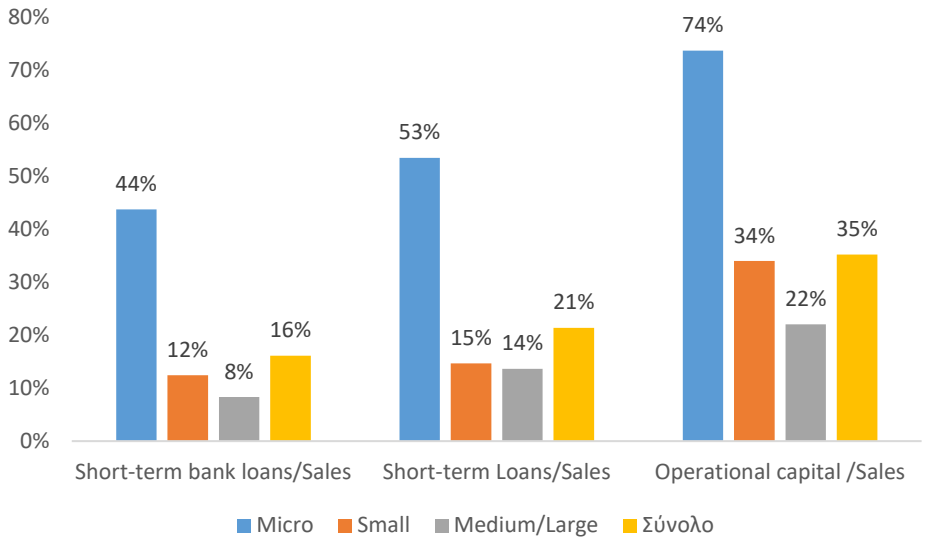
Finally, it should be noted that in 2021 the ratio of short-term bank loans to turnover (Figure 5.7) is higher in micro-enterprises (44%), followed by small (12%) and medium-sized/large-sized enterprises (8%), while in the total sample this ratio stands at 16%. Regarding total lending, as a broader size of bank lending, there is no particular differentiation by size of enterprises. Of course, the percentages of total borrowing to sales are higher. In micro-enterprises, total lending to sales is 53%, while for small and medium/large businesses it is 15% and 14% respectively. For all enterprises, the average of total loans to sales is 21%. The breakdown by size of enterprises is similar in the case of the operational capital to turnover ratio, where in 2020 it is highest in micro-enterprises (74.0%), followed by small (34%) and medium/large enterprises (22%), while in the total sample it amounts to 35%.

Figure 5.6: Development of operational capital and short-term bank lending in the Construction sector (2010-2022)



Source: ICAP "Data Prisma", IOBE analysis. **Note:** Working Capital = Current Assets – Short-term Liabilities.

Figure 5.7: Short-term bank loans and operational capital (% of turnover), 2021



Source: ICAP "Data Prisma", IOBE analysis. **Note:** Working Capital = Current Assets – Short-term Liabilities.

5.2 *Econometric investigation of the factors influencing the level of bank lending of enterprises*

This section presents the econometric model used to estimate the factors influencing the amount of bank lending (short and long-term) of the sample of engineering and design firms. Specifically, a within transformation (fixed and random effects) regression model was used for panel data of the format:

$$y_{it} = \alpha_i + \beta x_{it} + v_i + t_t + u_{it}$$

where:

y_{it}: the dependent variable, in this case the short-term and alternatively the long-term bank lending, in euro, of the firm i at year t

α_i: the fixed term,

β: the vector of the parameters to be estimated of the independent variables x_{it},

x_{it}: the firm-level independent variables, in this case the firm i's sales at time t and the firm i's EBITDA at time t, the annual GDP at time t, both denominated in euro, as well as a series of STAKOD codes in dummy variable form,

u_{it}: the standard error, which changes over time from one production unit to another, with $E\{u_{it}\} = 0$,

v_i: an unobserved variable that differs between firms (firm specific) but remains constant over time for each firm.

t_t: binary variable for each year, which acts as a control variable for unobserved time trends.

For the estimation of the above model, the literature has developed the fixed effects approach and the random effects approach.

The *fixed effects model assumes* that any parameter related to the specific characteristics of an enterprise that does not change over time (e.g. management structure, culture) can influence estimates and must somehow be controlled so that it does not affect estimates of the impact of other factors. Therefore, this approach aims to remove the effects of all those characteristics that do not change over time, to ascertain the actual effect of the independent variables on the dependent variable. So, in this case the hypothesis of the correlation between the standard error and the coefficients of the independent variables is made.

The *random effects model assumes that the variables relating to the* specific characteristics of an enterprise, which affect the dependent variable by causing heterogeneity, are selected from a random sample and are not correlated with the other explanatory variables of the model. So, in this case it is assumed that the standard error is not correlated with the coefficients of the independent variables.

In the context of the study, the models to be assessed were the following:

$$Shortbankloans_{it}=c+\beta_1 Sales_{it} + \beta_2 EBITDA_{it} + \beta_3\, GDP + \sum_{i=1}^{I} \gamma_i\, NACE + \sum_{t=1}^{T} YD_t + \varepsilon_{it} \quad (1)$$

$$Longbankloans_{it}=c+\beta_1 Sales_{it} + \beta_2 EBITDA_{it} + \beta_3\, GDP + \sum_{i=1}^{I} \gamma_i\, NACE + \sum_{t=1}^{T} YD_t + \varepsilon_{it} \quad (2)$$

Where *shortbankloans,* the stock of short-term bank loans, *longbankloans,* the stock of long-term bank loans, *sales,* turnover, EBITDA, *profit before tax,* and *GDP* the annual GDP. The NACE and YD control variables indicate the unobserved effects of the enterprise typology and time trends from 2010 to 2022 respectively.

In the assessments made, the appropriateness of the two approaches to the available data was identified using the Hausman test[16]. Overall, the random estimation model was preferable to fixed effects. At the same time, a multicollinearity test was performed using the Variance Inflation Factor test[17].

The results of the estimates show that sales have a positive effect on the increase in both short-term and long-term bank lending, for all categories of enterprises examined (micro, small, medium-sized and large enterprises) and the result in all but short-term lending of small enterprises cases is statistically significant at the level of at least 5% (Table 5.1 and Table 5.2).

The estimated coefficients show that an increase in sales of 1.0 million euros causes on average:

- Increase of short-term loans by 17 thousand euros for micro enterprises, by 14 thousand euros for small enterprises and by 66 thousand euros for medium and large enterprises
- Long-term loans increased by 52 thousand euros for micro enterprises, by 111 thousand euros for small enterprises and by 161 thousand euros for medium and large enterprises.

At the same time, estimates showed a negative relationship between EBITDA and short-term and long-term bank lending across almost all business categories, with the statistical significance of the result varying between different estimates.

Table 5.1: Results of econometric estimates, short-term bank lending

Dependent	Short-term bank lending		
Independent	***Micro-enterprises***	***Small businesses***	***Medium and large enterprises***
Sales	0.0172**	0.0141	0.0668***
	(0.0070)	(0.0126)	(0.0093)
EBITDA	-0.1018***	0.2016***	-0.0476
	(0.0085)	(0.0379)	(0.0377)
GDP	12.4890**	20.5944	1.295.1055
	(5.8029)	(55.5099)	(987.4802)
Fixed	-473725.75	8816560.0***	-6.0380e+06
	(364551.1875)	(3373826.25)	(5,5723e+07)
Comments	48,080	7,023	1,494
Number of enterprises	8,779	1,049	204
STAKOD controls	Yes	Yes	Yes

***: 1% level of statistical significance, **: 5% level of statistical significance, *: 10% level of statistical significance in parentheses, standard errors

Source: IOBE estimates.

[16] The Hausman test tests the hypothesis that there are no statistically significant differences between the estimated coefficients of the random and constant effect models. If the null hypothesis H_0 is rejected: the constant-effect βmodel factor is consistent but ineffective, while βthe random-effect model factor is consistent and effective, then the constant-effect model is more appropriate.

[17] The VIF test is a measure of the degree of multilinearity in a regression model. The VIF measure shall be equal to the ratio of the total variance of the model using a set of independent variables to the variance of the model comprising only one independent variable out of the set of independent variables of the model to be estimated. This ratio shall be calculated separately for each independent variable in the model. A high VIF score (usually above 10) indicates that this independent variable is highly collinear with the other independent variables in the model.

Table 5.2: Results of econometric estimates, long-term bank lending

Dependent	Long-term bank lending		
Independent	***Micro-enterprises***	***Small businesses***	***Medium and large enterprises***
Sales	0.0527***	0.1112***	0.1609***
	(0.0145)	(0.0145)	(0.0282)
EBITDA	0.0860***	-0.3321***	-0.2482***
	(0.0175)	(0.0436)	(0.0852)
GDP	-41.3899***	-140.1145**	-3,244.9663
	(12.0295)	(65.0105)	(2,397.9109)
Fixed	2698956.25***	2.9069e+07***	2.9373e+08*
	(839,331.8125)	(5926683.5000)	(1.6047e+08)
Comments	48,080	7,023	1,494
Number of enterprises	8,779	1,049	204
STAKOD controls	Yes	Yes	Yes

***: 1% level of statistical significance, **: 5% level of statistical significance, *: 10% level of statistical significance in parentheses, standard errors

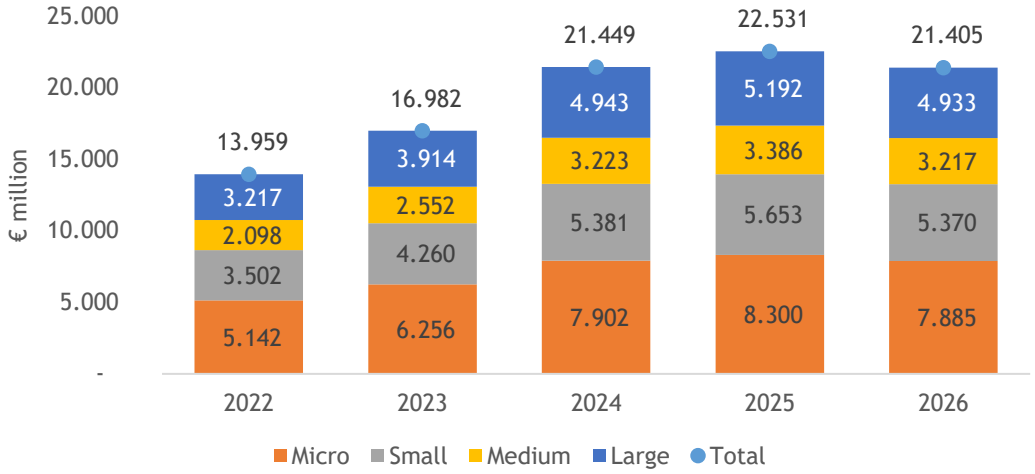
Source: IOBE estimates.

5.3 Projection of bank lending of technical and design enterprises by size category

The prospect for growth of the Construction sector will significantly strengthen the size of enterprises in the sector in the coming years. Based on the distribution of the production value of the Construction sector (Construction sector and Architectural and Engineering activities) by enterprise size category for the year 2020[18], and the forecasts for the production value of the sector for the period 2023-2026, the amount and the distribution of the turnover of enterprises by size (micro, small, medium and large enterprises) for the period 2022-2026 was estimated. Overall, the turnover of the sector is estimated to double over the period considered, reaching 21.4 billion euros in 2026, if all the resources of the Recovery and Resilience Fund (grants and loans) that have been assumed to be directed to construction projects are absorbed (Figure 5.8).

[18] According to the relevant Eurostat data for 2020, micro-enterprises account for 37% of the production value of the sector, small enterprises for 25%, medium-sized enterprises for 15% and large enterprises for 23%.

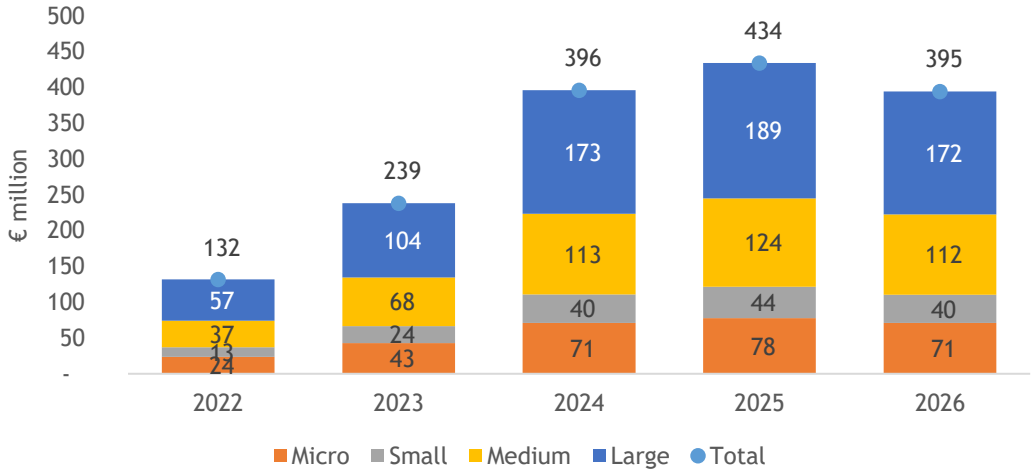
Figure 5.8: Estimate of turnover by firm size, 2022-2026



Source: IOBE

The expected increase in the turnover of technical and design enterprises will also fuel the increase in their bank lending, in accordance with the econometric results of this chapter. Specifically, it is estimated that the sector's total net short-term borrowing in 2023-2026 could increase by 239 million to 434 million euros[19] (Figure 5.9). For micro-enterprises, the increase in short-term bank loans ranges from 43 million to 78 million euros, representing 18% of the total annual increase. Furthermore, small businesses account for 10%, medium-sized businesses for 18% and large businesses for 44% of the overall increase in short-term bank lending.

Figure 5.9: Estimate of change in short-term bank loans by firm size



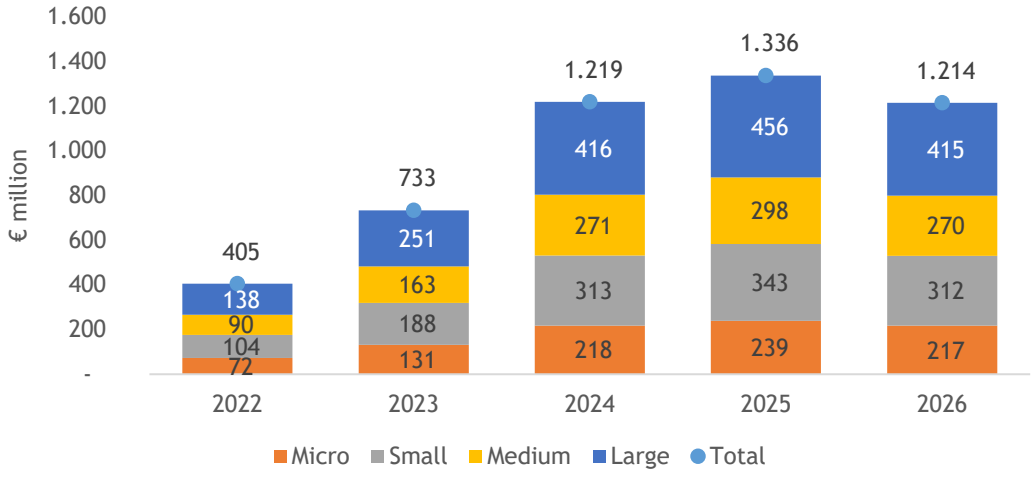
Source: IOBE

Correspondingly, it is estimated that the sector's overall net long-term borrowing in 2023-2026 could increase by 733 million to 1.34 billion euros (Figure 5.10). For micro-enterprises, the increase in long-term bank loans ranges from 131 million to 239 million euros, representing 18% of the total increase. Small businesses account for 26%, medium-sized

[19] Additional financing needs have been identified compared to the level of activity in the Construction sector in 2020, i.e. before the recovery in the following years.

businesses for 22% and large businesses for 34% of the total estimated growth in long-term bank lending.

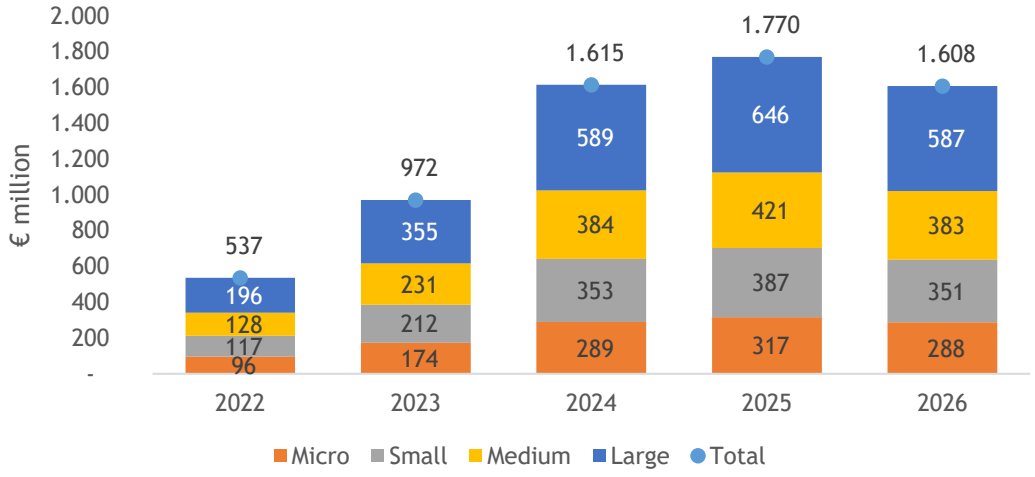
Figure 5.10: Estimate of change in long-term bank loans by firm size



Source: IOBE

In conclusion, based on the above estimates, the total net bank lending of companies in the sector over the period 2023-2026 could increase by between 972 million euros and 1.77 billion euros (Figure 5.11). For micro-enterprises, the increase in total net bank lending ranges from 174 million to 317 million euros, representing 18% of the total increase. Small businesses account for 22%, medium-sized businesses for 24% and large businesses for 36% of the overall increase in net bank lending.

Figure 5.11: Estimate of change in total bank loans by firm size



Source: IOBE

6 CHALLENGES FOR THE CONSTRUCTION SECTOR

6.1 Introduction

From what has been analyzed in the previous chapters, it appears that the prospects for the development of Constructions and the maximization of their contribution to the Greek economy in the coming years are very positive. However, significant challenges remain for the industry. These include issues related to human resources and business financing in the sector, the institutional framework of the public works production system and national planning for infrastructure, technology integration and digitization of construction to enhance the productivity of the sector and finally the adoption of ESG standards by construction companies.

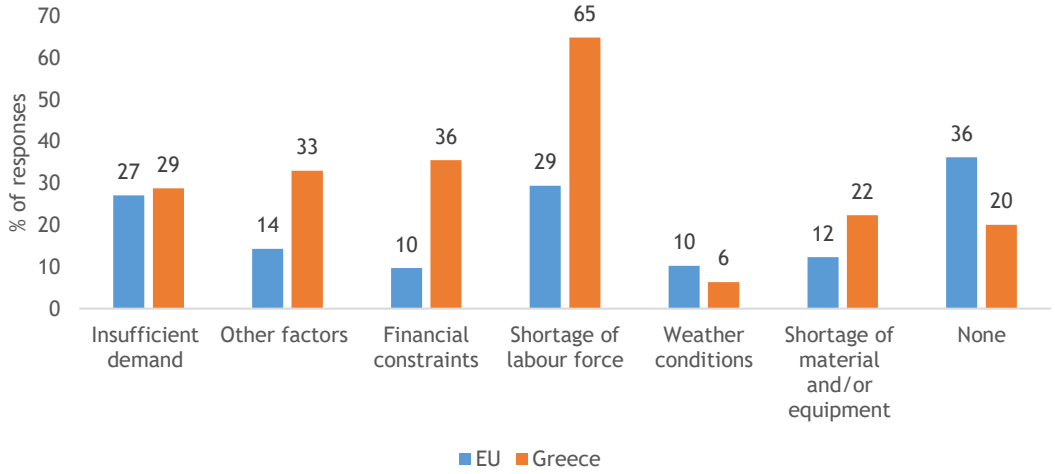
Figure 6.1: Challenges for the construction industry

6.2 Human resources

The construction sector faces a variety of barriers and distortions stemming from the economic and regulatory environment affecting construction activities. Based on the responses of construction companies to the Business and Consumer Surveys carried out monthly by the IOBE on behalf of the European Commission, labor shortages are highlighted as the main obstacle to growth in 2023, while financing difficulties and the category 'other factors'[20] are also assessed negatively in terms of their impact on construction activity in Greece (Figure 6.2). The importance of insufficient demand as a factor hindering business activity in Construction has receded after 2021, in contrast to the lack of materials and machinery, which have increased their weight. Finally, climatic conditions do not create serious obstacles to domestic construction activity.

[20] Factors not defined in advance in the IOBE economic survey (e.g. pandemic, energy crisis, material costs).

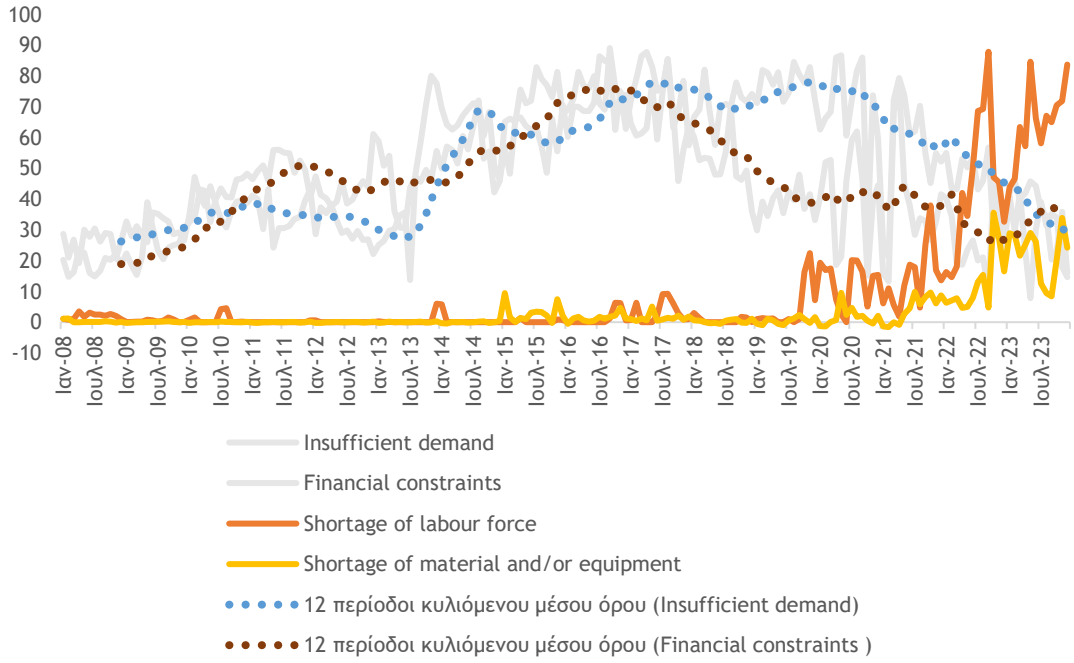
Figure 6.2: Factors limiting business activity in Construction sector, 2023



Source: DG ECFIN, *Factors not defined in advance in the economic survey (e.g. pandemic, material costs).

Labor shortages are therefore the main concern for domestic construction companies in the current period, having even risen sharply since 2022. At EU level, the proportion of enterprises that consider that there is a shortage of staff is lower, but not negligible. The same picture regarding the different significance of the factors in Greece and the EU is also recorded for financial constraints and other factors. On the contrary, the effect of insufficient demand is similarly assessed. Also, much higher than in Greece is the proportion of construction companies in the EU that state that their business activity is not hampered (Figure 6.2). It is worth noting that in Greece, insufficient demand and financing constraints have been the main obstacles for businesses in the sector in recent years, but since 2021 their impact has been limited (Figure 6.3).

Figure 6.3: Factors limiting building activity in Construction sector in Greece (Jan 2008 – Dec 2023)

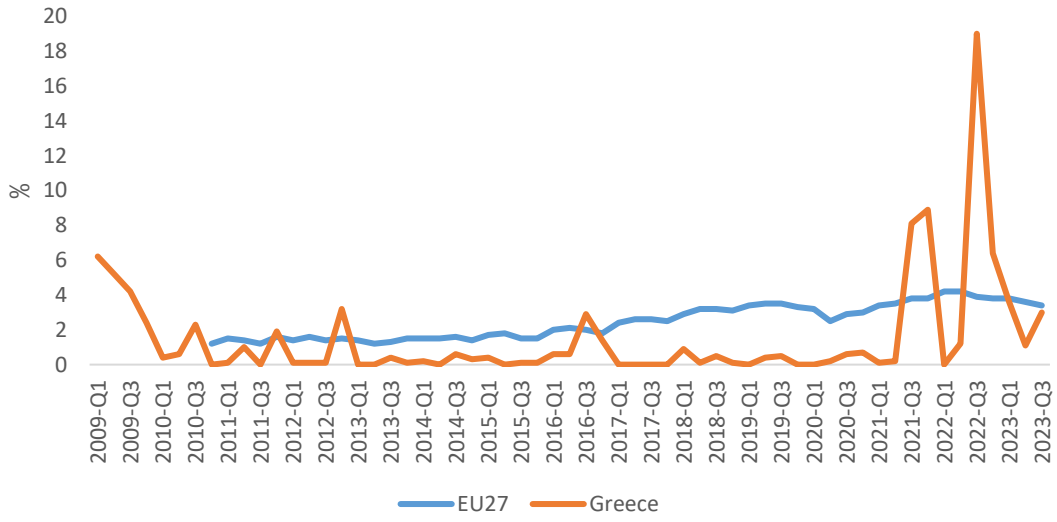


Source: DG ECFIN, *Factors not defined in advance in the economic survey (e.g. pandemic, material costs).

Job vacancies, as a percentage of total jobs in Construction, were minimal during the 2010s, as the sector did not create many new jobs. Between the third quarter of 2021 and the third quarter of 2023, vacancies in Construction have increased significantly (on average to 5.7% of total jobs in the sector), approaching the levels recorded before the Greek economic crisis. In the EU, it appears that after 2021 there is on average a slight upward trend in vacancies in construction, amounting to about 3.7% of total jobs in the sector. The shortage of workforce entails delays that may lead to an increase in the project budget, particularly in an environment of rising costs of materials and other supplies, alongside the necessary overtime and other labor costs required to meet project schedules.

It is worth noting that the decline in domestic construction activity had aggravated the phenomenon of "brain drain", i.e. the movement of highly qualified people abroad for work or education purposes, which at the current juncture contributes to the shortage of staff in Greece. In addition, as there is a shortage of skilled human resources (craftsmen and engineers) in Construction in other countries, strong competition is created to attract employees, offering significantly higher wages that are more difficult to provide in Greece.

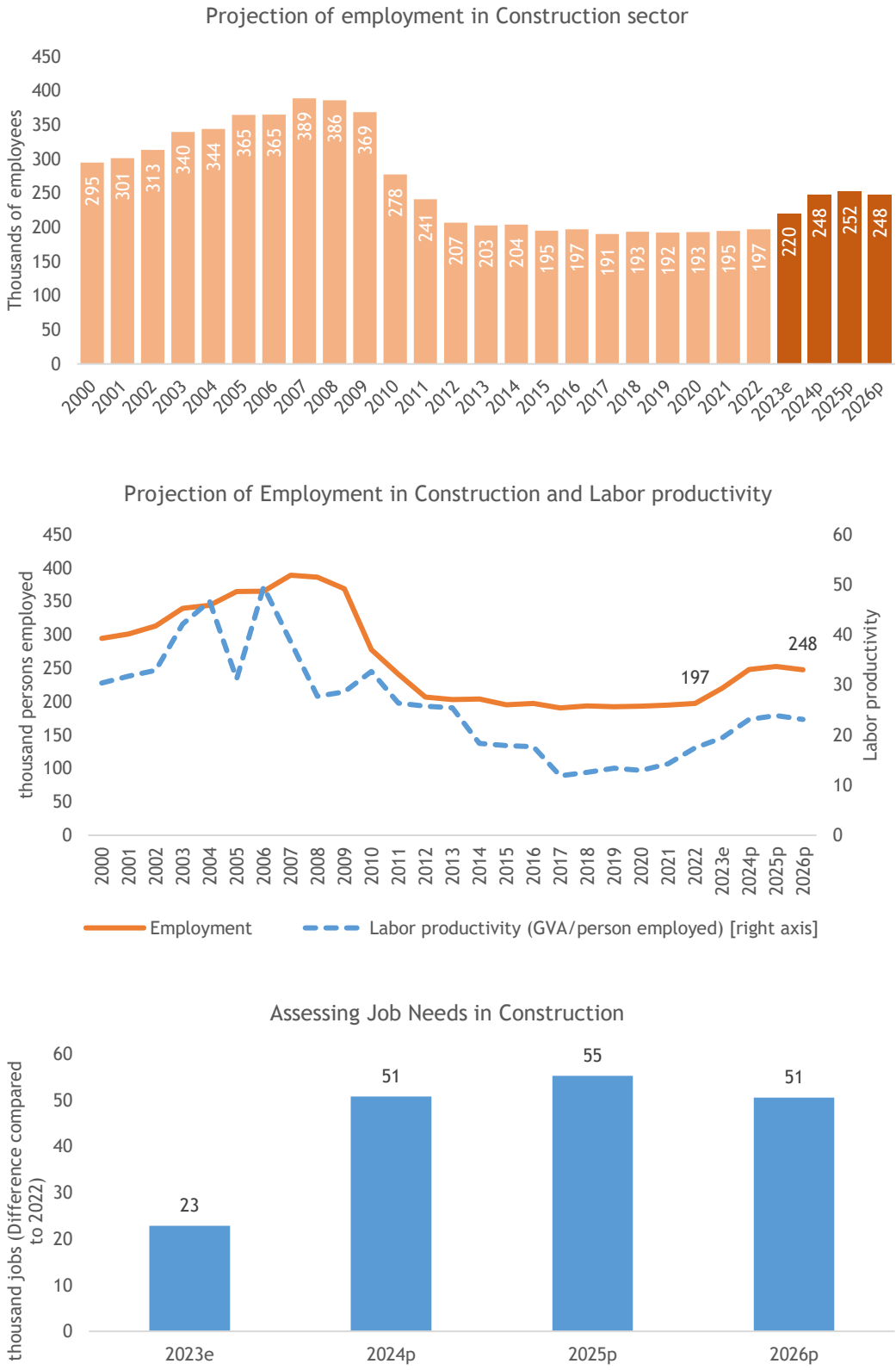
Figure 6.4: Job vacancy rate in the Construction sector (% of total jobs)



Source: Eurostat.

The prospect of strong growth in domestic construction activity in the coming years, as identified in a previous chapter of the study, will create additional needs in the workforce of various specialties. According to our estimates, if this scenario for the development of Construction is verified, the total number of construction workers should increase in the period 2024-2026 to around 250 thousand employees, which is 51 to 55 thousand employees higher compared to the total employment in Construction in 2022 (197 thousand employees) (Figure 6.5). Employment projections up to 2026 assume a level of output value per employee as in 2022, but with an improvement in labor productivity of 32%, based on statistical estimates, to account for the possibility of underemployment that may have led to lower labor productivity in previous years.

Figure 6.5: Projection of employment in Construction sector, labor productivity and estimation of job vacancy

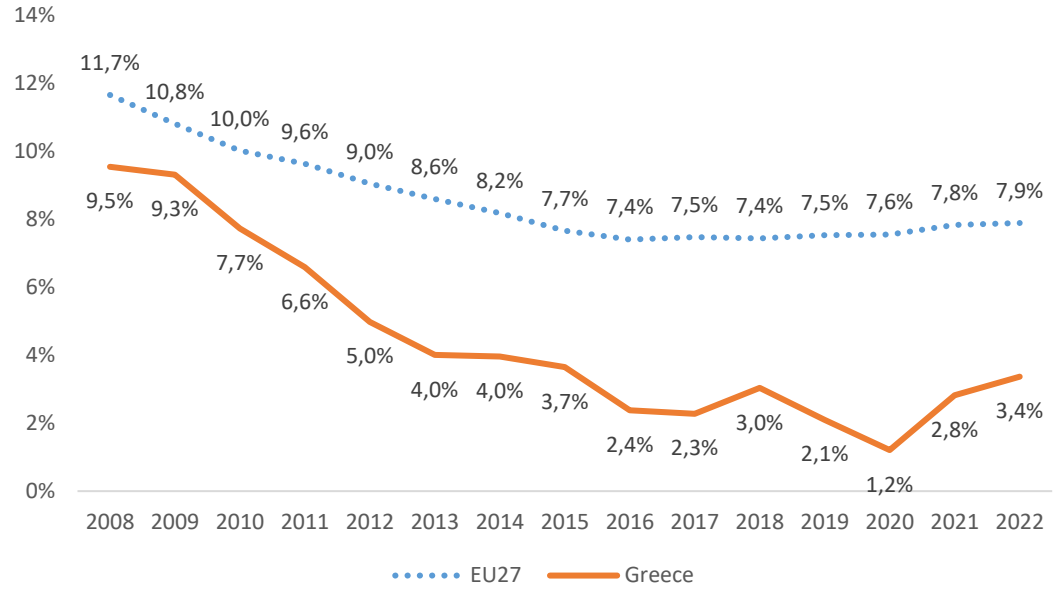


Source: Eurostat. Analysis and estimates IOBE. e: Estimation, p: Projection

However, amid labor shortages, the trend of decreasing participation of young people in the construction workforce in Greece over the last decade is particularly worrying (Figure 6.6). In

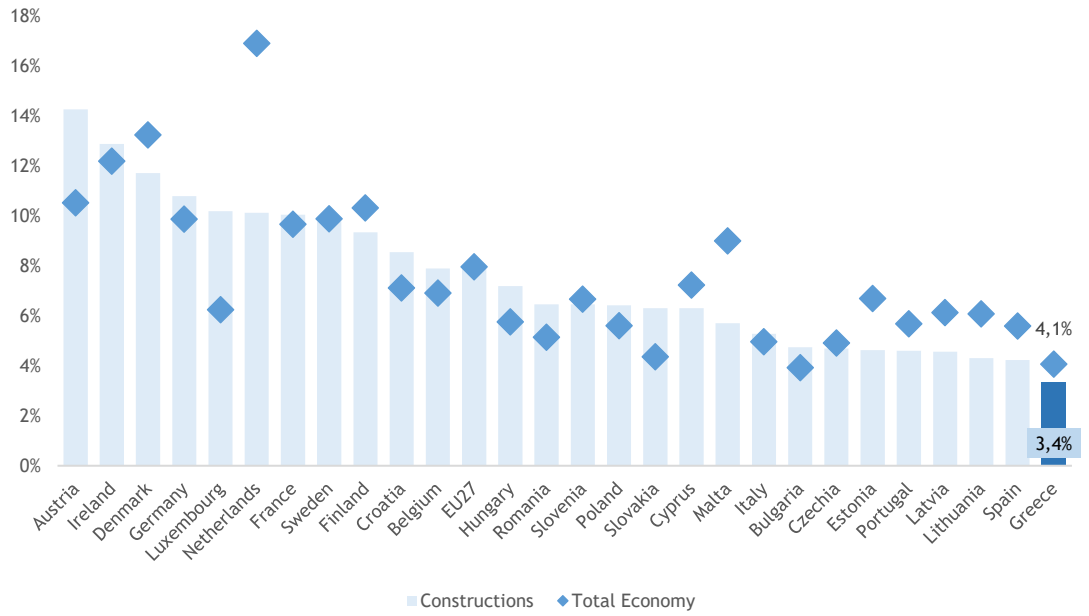
2022, young people aged 15-24 made up only 3.4% of the sector's workforce (down from 9.5% in 2008), while in the EU-27, which also shows a milder downward trend, the figure was on average 7.9%. In fact, this percentage is lower than the participation of young people aged 15-24 in all sectors of the Greek economy (4.1% in 2022). Thus, Greece ranks last among the EU-27 Member States in terms of youth participation in the construction workforce (Figure 6.7). This trend of decreasing young workers, which is also linked to the relative delay in the entry of young people into the labor market (due, for example, to studies), affects the transfer of existing knowledge and skills and undermines the current and future competitiveness of the construction sector.

Figure 6.6: Percentage of persons aged 15-24 employed in the Construction sector in Greece and in the EU-27



Source: Eurostat, IOBE analysis.

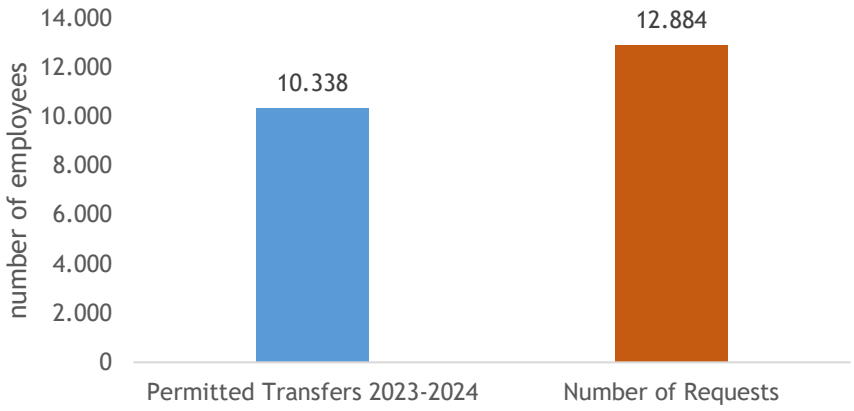
Figure 6.7: Percentage of persons aged 15-24 employed in the Construction sector and in the total economy in the Member States of the European Union, 2022



Source: Eurostat, IOBE analysis.

To fill vacancies in various sectors of the economy, a maximum number of residence permits for third-country nationals for work was set for the years 2023 and 2024 (Government Gazette, Series II, No 2189/3.4.2023). Transfers of workers from third countries are allocated to sectors where there is no labor supply from Greek workers. In the construction sector, out of a total of requests for 12,884 jobs, the ceiling was set at 10,338 posts and mainly concerns skilled builders for whom, based on data from the Public Employment Service (DYPA), large shortages of human resources were identified. Please note that in the previous period 2021-2022 there were no requests from companies in the construction sector. For workers from third countries, the same institutional framework applies that governs the employment relations of Greek/European workers (pay, minimum wage, working hours, hygiene – safety, etc.). In addition, seasonal workers should be provided with accommodation for their stay.

Figure 6.8: Transfers of workers from third countries in 2023-2024



Source: Ministry of Labor and Social Security.

Factors such as the ageing/retirement of the workforce and young people's perception of the field of work in the sector may prolong the labor shortage in the construction sector in the future as well. Therefore, construction companies should consider actions to alleviate the problem, such as reassessing wages and benefits, implementing training and apprenticeship programmes to renew skills and develop skilled workers, using new technologies and automation to improve productivity and reduce reliance on manual labor, improving working conditions, promoting the image/resonance of the construction industry, connecting more closely with universities, etc. All of this will improve the attractiveness of a career in the construction industry.

Demand for new skills to implement the green and digital transitions is growing and could be an opportunity for the future sustainable competitiveness of Construction. The European Union supports the development of construction through funding for training and capacity building. However, as the available funding is not specifically earmarked for the construction sector, it is up to national initiatives to give priority to supporting and training workers in the sector in an appropriate way.

6.3 Funding of construction and design enterprises

The funding of companies in the construction and design sector should be significantly strengthened in the coming years to meet the increased needs for operational capital, investments, project development, issuing letters of guarantee for participation in tenders, fine execution of projects, etc. This should happen in an environment of high borrowing costs and limited access to borrowed capital, especially for small and medium-sized enterprises.

Issues of letters of guarantee are considered in the overall borrowing of construction companies by financial institutions, which also impose funding limits per sector and firm, in the context of their risk management and the provisions of the regulatory framework[21]. Due to the significant expected development of the construction activity, the number of required letters of performance guarantee is expected to increase significantly. By way of illustration, assuming that the completion of a project takes three years on average (this period is considerably longer for large infrastructure projects), all projects tendered in 2023[22] (with a budget of more than 1 million euros) require the issuance of letters of performance guarantee of approximately 346 million euros[23] (Figure 6.9). If this amount is added to the total amount of letters of performance guarantee for the projects of the previous two years that we consider not to have been completed, this results in a total amount of 805 million euros, which is significantly higher than in previous years of lower activity.

With a view to a further increase in construction projects in the coming years and in the absence of an adjustment of the funding limits by letter-of-guarantee institutions, this amount will not be able to be covered in full, creating problems both in the participation in tenders,

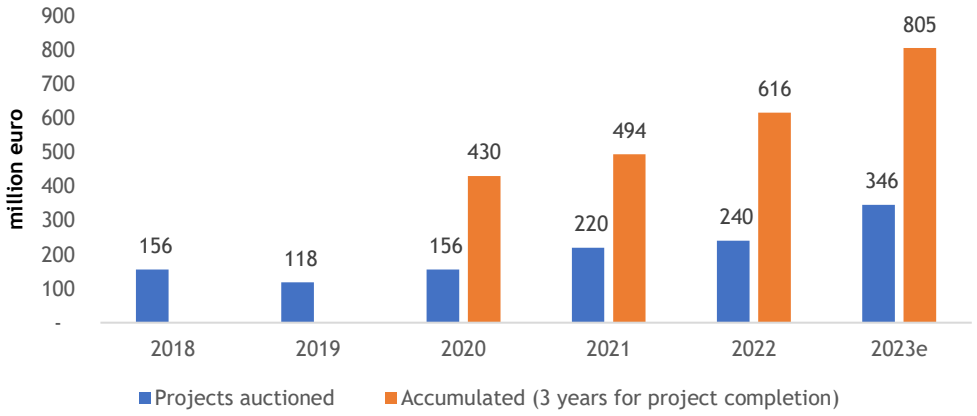
[21] The total amount of the letters of guarantee of each bank shall be determined by decision of the Minister for Finance and may not exceed half of the loans to the Greek economy, as shown by the situation of the remaining loans and placements in bonds of private companies published by the Bank of Greece, broken down by sectors and categories.

[22] This is where the assumption is made that these auctions had final results within the year they were carried out, which is practically not the case. In any case, however, the tenders are expected to be successful in the coming years, creating the need to issue letters of guarantee of a similar amount of money.

[23] The letter of guarantee amounts to up to 5% of the value of the contract, plus VAT.

especially for smaller companies, and in the smooth execution of the projects. A related issue is the time of validity of letters of performance guarantee, which may accumulate despite the completion of projects. To this end, upon final acceptance of a project, the letter of performance guarantee must be returned automatically.

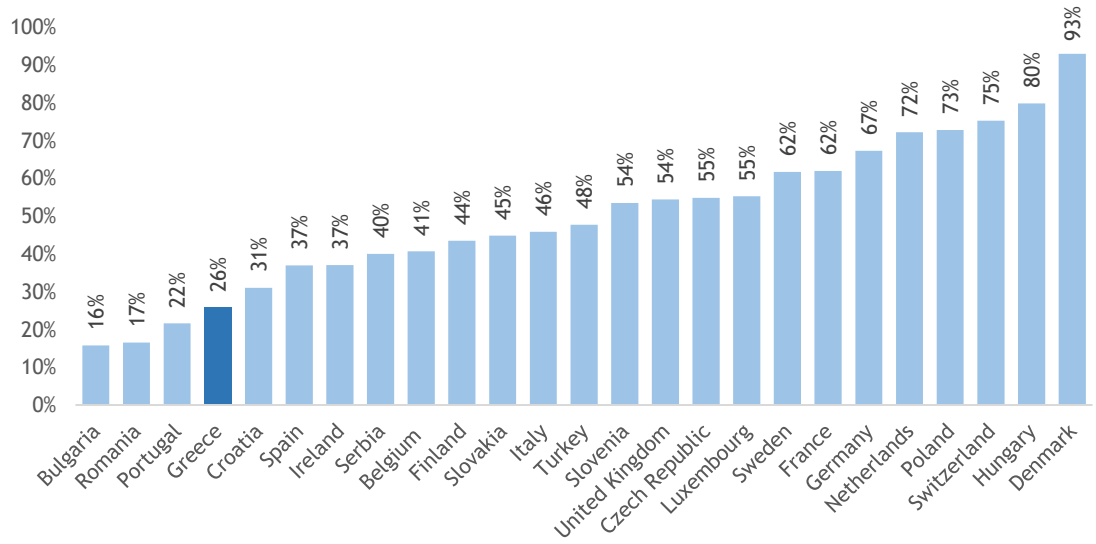
Figure 6.9: Estimated value of letters of guarantee for projects with a budget of more than 1 million euros



Source: IOBE estimates.

The need to seek additional funding and liquidity is compounded by late payments to construction companies, including in the public works sector. As a result of these delays, the rate of timely payments in the construction sector in Greece is among the lowest in Europe, with only one in four payments made on time (Figure 6.10). Measures are therefore needed to address late payments. Difficulties in funding and the financing gap can be alleviated using various financial tools (e.g. guarantee funds, interest subsidy, etc.), so that public and private investments in construction projects can be implemented smoothly in the coming years.

Figure 6.10: Proportion of timely payments to Construction in different countries, Q4 2022



Source: Payment Study 2023. https://www.dnb.com/en-ch/knowledge/study/payment-study-2023-download3.html

6.4 Institutional issues

The tendering of projects with a sound and safe system is of great importance for the construction industry, but also for the national economy, given the strategic importance of the sector for increasing the potential for economic growth and the implementation of the planned projects in the coming period.

The supply chain crisis during the COVID-19 pandemic, followed by the energy crisis, led to a drastic increase in energy and material prices and, more generally, to strong inflationary pressures and an increase in labor and equipment costs, which significantly affected the final construction costs of public and private projects. For public works, and to address such conditions that may eventually lead to the impossibility of implementing projects as they largely overturn the budgeted costs, the legislation[24] provides for the revision of the contractual prices of materials, wages and machine rentals, examined quarterly, to reflect the current construction costs. Such revisions - for material prices only - took place after many years in 2021 and the first quarter of 2022.

In any case, the mechanism for setting revise coefficients should work systematically, covering the full range of individual costs, to reduce uncertainty for participants in public works tenders and related problems that may arise during the implementation of projects. The creation of the Unified System of Technical Specifications and Pricing of Civil Works, which will include an Electronic System for Determining the Costs of the Factors of Production of Civil Works (Price Observatory, System of Price Analysis and Determination of Costs), as well as a System of Uniform Technical Specifications, which is provided for in Law 4782/2021, but has not yet been implemented, will contribute to this.

Other interventions to further improve the public works production system include the expansion of the digitalization of public procurement procedures and the enhancement of interoperability between information systems, the introduction of multiple criteria for the selection of the contractor, the widespread use of out-of-court dispute resolution methods, such as mediation and expert panels and arbitration, regulatory interventions to speed up procedures and ensure continuity between contracts and the execution and maintenance of works, assurance of reliable and enforceable studies, reform of the budgeting mechanism, enhancement of the transparency and assurance of the conditions of free competition, the implementation of Presidential Decree 71/1019 on the registers of production factors of public and private works, studies, technical and other related scientific services, and strict control and supervision during the construction of each project.

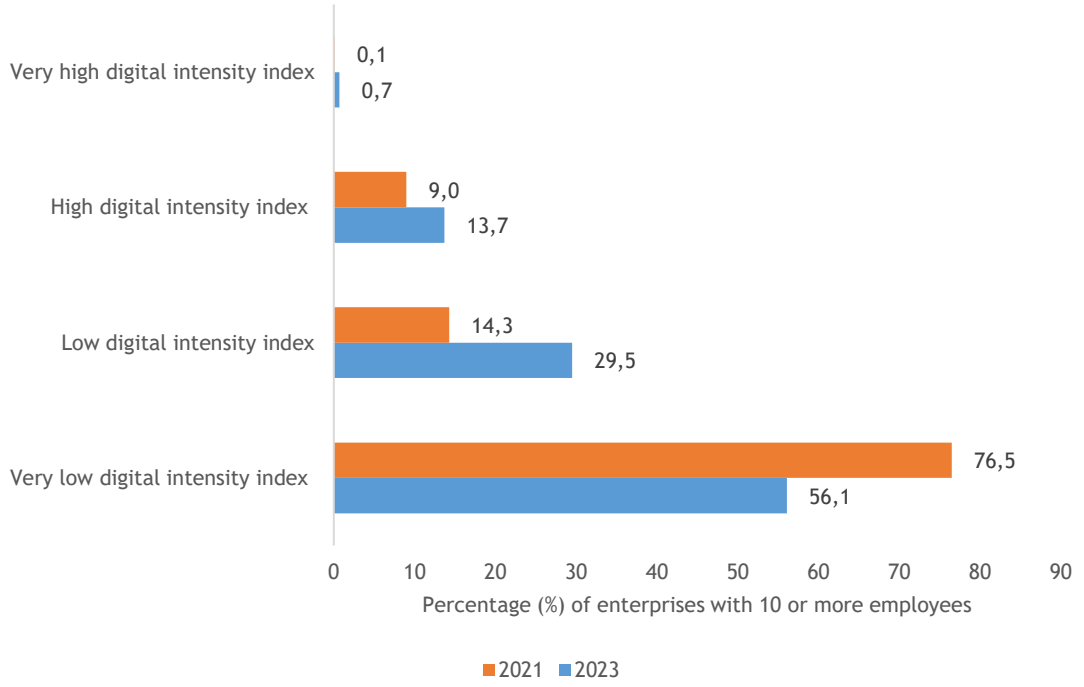
6.5 Technology integration and digitalization

The traditionally high work intensity and multiple individual stages of construction activities, which require the involvement of a multitude of self-employed professionals or micro-enterprises of different specialties to complete a project, make digitization and innovative activity in the construction sector a difficult undertaking. Thus, low digitalization rates, but

[24] The revision of the contractual prices of public works contracts is governed by the provisions of Article 153 of Law 4412/2016, as in force.

also a lack of investment by construction companies, are two major challenges for the resilience and competitiveness of the sector.

Figure 6.11: Digital Intensity Index in Construction sector (DII version 3)



Source: Eurostat.

As the sector is mainly composed of small and medium-sized enterprises, the scope for investment in innovative technologies is generally low and the need for financial support and other financial incentives is high. In 2023, 56.1% of construction companies in Greece employing more than 10 people had a very low digital intensity index and 29.5% had a low digital intensity index. Only 13.7% showed high digital intensity and 0.7% very high digital intensity. Although the improvement since 2021 is large, mainly from the shift of businesses from very low to low digital intensity, the fact remains that the industry has a great distance to travel in the coming years in terms of its digitalization.

The way we build, manage and intervene in the built environment is, however, rapidly transforming with the development of numerous BIM (Building Information Modelling)[25], IoT (Internet of Things) applications, sensors, robots, drones, scanning tools, but also with technologies that increase efficiency, such as on-site automation, prefabrication or 3D printing of modular building elements and automation of building-related processes. Digital

[25]Building Information Modeling (BIM) is a modern process of creating and managing information about a building or technical project throughout its life cycle. One of the main outcomes of this process is the Building Information Model, which is the digital description of every aspect of the project, based on information collected collaboratively and updated at key stages of the project. The creation of a digital building information model or other technical project allows those interacting with the project to optimise their actions, thus adding more value throughout the lifetime of the project. Advantages of implementing BIM include improved virtual representation of the project, increased productivity due to easy retrieval of information, integration and linking of critical project information (e.g. suppliers, location, quantities required for each material) to easily measure and estimate costs, increased speed of project completion and delivery, reduced costs and increased profitability, reduced risks and improved project management during operation.

technologies can accurately record, assess, simulate, measure, monitor and reduce emissions throughout a building's lifecycle. Therefore, further digitalization will significantly contribute to supporting a sustainable built environment and boosting the productivity of Construction.

The public sector can contribute to the digital transition in various ways, such as accelerating the digital issuance of building permits, digitizing information on buildings, etc. Recently, the National Strategy and the Roadmap for the implementation of Building Information Modelling (BIM) in Greece were announced, shaping a strategic plan that highlights the digital transformation of the country's construction sector as a priority, setting out specific strategic axes, actions and interventions. The implementation of BIM is expected to catalyze the production of sustainable and resilient projects, improving the process of designing, constructing and maintaining public works. Integrating the changes required by the National BIM Strategy requires time for the broad development of the necessary skills for companies in the sector to meet the new requirements and procure the necessary equipment.

6.6 ESG criteria for the construction industry

The transition of the Greek economy towards climate neutrality by 2050 in the context of the European Green Deal requires large-scale investments. The financing of these investments will be facilitated using additional financial criteria, which incorporate environmental, social and corporate governance dimensions (ESG criteria or principles). Financial institutions shall use the ESG criteria to finance the necessary investments in new infrastructure and technologies to reduce the environmental footprint of businesses by assessing climate, environmental and social risks in the funding process.

Therefore, the management of environmental, social and corporate governance issues is particularly important to facilitate companies' access to investment and finance. Potential benefits for businesses from adopting sustainable practices with ESG criteria also include improving their environmental performance and avoiding any adverse economic impacts, enhancing their reputation, making it easier to adapt to the legislative framework, integrating circular economy principles and strengthening cooperation with all stakeholders (local communities, customers, investors, staff, etc.).

The growing demand for more sustainable and socially responsible projects calls for the adoption of ESG principles by construction companies. Integrating these principles into their practices will have far-reaching effects, from reducing environmental impacts to improving relations with workers and increasing transparency. The influence of ESG principles on construction companies is increasing, as more and more companies realize their benefits and seek their effective adoption. The main perceived benefits include improving reputation, gaining a competitive advantage and increasing access to capital (KPMG, 2023).

Indicatively, a construction company can manage its environmental impact during the construction process in various ways, such as implementing waste management plans, using energy-saving equipment and practices, using sustainable materials, implementing water-saving measures, protecting natural habitats and offsetting carbon emissions. Regarding the social sector, a construction company can consider the social impact of the projects it carries out in various ways, such as ensuring fair and safe working practices, interacting with local communities, promoting diversity and inclusion, giving back to the community, etc. Finally, a

company's approach to governance refers to the systems and processes in place to ensure ethical behavior, transparency and effective risk management. Some examples of how a company can demonstrate a solid approach to governance in the construction industry are clear ethical guidelines, transparency in business practices, the implementation of effective risk management systems and the implementation of strong internal controls.

There are several ways in which a construction company can monitor and report its performance on ESG issues, such as the drafting of sustainability reports detailing its actions to improve these practices, certification by third-party independent organizations, ESG evaluation by independent organizations, and transparency of information in financial reports. The benefits of ESG practices in construction companies include improved prestige/reputation vis-à-vis stakeholders such as customers, employees, investors and the public, increased efficiency (e.g. reduction of energy consumption, reduction of waste), access to new markets, improved risk management and a positive impact on society.

The implementation of ESG practices by construction companies can face several challenges, such as extra costs and high capital investments that are profitable in the long run, a lack of specialized knowledge, resistance to change, a lack of clear guidance and limited resources.

Overall, because Construction has a significant impact on society and the environment, companies in the sector should include ESG principles in their business operations. Construction companies will thus be able to produce more environmentally friendly and socially responsible projects by reducing their environmental footprint, interacting with local communities affected by the projects and supporting ethical and transparent business practices.

Recognizing the importance of the sustainable development and the adoption of ESG practices, the largest construction companies in Greece have undertaken strategic sustainable development commitments, which are based on and/or aligned with the 17 relevant UN Sustainable Development Goals. Their commitments and targets shall be reported in specific sustainability reports that they publish on an annual basis. Indicative examples of commitments and targets/measures implemented are provided by Table 6.1.

Table 6.1: Commitments and indicative targets in the implementation of ESG principles by construction companies in Greece

Topic	Commitments	Indicative targets / metrics
Environment	• Reducing the greenhouse gas emissions of doing business • Responsible waste management through recycling • Responsible management of the environment on construction sites and integration of good environmental protection practices • Investing in RES to reduce the environmental footprint	• Percentage of energy from RES • Amount of CO2 emissions • Indirect emissions reduction quantity (Scope 2 indirect emissions) • Tonnes of waste managed • Preventing waste from disposal (quantity) • Development of processes to identify and address climate change-related risks • Percentage of environmental training among staff • Minimum number of environmental inspections per project • Maintaining zero incidents of non-compliance with environmental permits, standards and regulations • Maintenance of zero pecuniary fines or other sanctions related to the violation of environmental legislation and related regulations

Society and workers	• Reducing accidents and protecting the health and safety of workers. • Maximizing social value by strengthening local suppliers • Environmental protection training for project workers • Training in effective emergency management • Gender equality and fewer inequalities • Strengthening local suppliers and infrastructure	• Number of employees • Employee benefits • Sales to eligible activities according to Taxonomy • Conducting a private customer satisfaction survey • Amount of investment in the local community • Number of hours of training • Increase rate of practical student growth places • Percentage of domestic suppliers • Zero fatalities • Minimum number of inspections to check compliance on Health & Safety issues per semester, per facility • Activation of e-learning platform and training of all employees • Increased training of all employees in Soft Skills modules • Training of employees in New Technologies modules • Human Rights Training for All Employees • Participation of women at all hierarchical levels • Inclusion of young workers in human resources • Effort to integrate people with disabilities into the labor market
Governance	• Implementing Corporate Governance Commitments by Enhancing Transparency • Integrating Sustainable Development into the operations of the business • Business ethics and regulatory compliance	• Implementation of a Risk Management System • Maintaining zero confirmed cases of corruption and discrimination • Implementation of a human rights policy • Implement a policy against violence and harassment in the world • Development of a system for assessing risks and opportunities related to sustainable development issues • Conducting an educational programme on corruption issues

Source: Sustainability reports of construction companies.

6.7 National strategic infrastructure planning

The current infrastructure planning in Greece has weaknesses, and as it is fragmented can only concern specific sectors, and the implementation of projects depends on the responsibilities of bodies that often overlap, leading to significant delays. Overall, the procedures for planning, prioritizing, implementing and evaluating projects show room for improvement.

The OECD has developed a framework for Good Infrastructure Governance from strategic planning to project delivery to help policymakers manage infrastructure policy (OECD, 2017 and IOBE, 2021). A predictable regulatory framework for investment and the coordination of infrastructure policy at all levels of government, so that investment decisions by central and local governments are coherent, contribute to the effectiveness of planning. Infrastructure policy should also incorporate early enough the required consultation processes, but also mechanisms to assess the performance of infrastructures throughout their life cycle. Finally, addressing the resilience of existing infrastructure to natural and man-made risks and developing relevant guidelines for future infrastructure is an essential element of the infrastructure policy, especially in the context of increasingly frequent climate extremes.

In this context, it is appropriate to draw up a National Strategic Infrastructure Plan with priorities and specialization of funding resources for critical infrastructure projects in the fields of Transport, Energy, Communications, Flood Protection, Irrigation, Water Supply, Waste, Housing, etc., following analyses of the national strategic development objectives and in-depth cost-benefit analyses for candidate infrastructure projects. The strategic plan will also include an analysis of labor and skills needs and will be regularly updated (e.g. every five years) considering input from the construction sector. A similar policy framework is in place in the UK, where the National Infrastructure and Construction Planning sets out planned and projected investments in large economic and social infrastructure for the coming years, identifies workforce requirements for their implementation, and a list of auctions to be held in the coming years[26]. This supports the construction sector to make informed business planning decisions and plan the required investments in skills and productivity improvements.

[26] https://www.gov.uk/government/publications/national-infrastructure-and-construction-pipeline-2023

7 CONCLUSIONS

The present study analyzed the latest data and developments in the Construction sector in Greece and evaluated its prospects. The funding needs of the Construction sector were also investigated, in view of the prospect of a significant increase in investments in infrastructure and other construction projects in Greece in the coming years. The study examined the potential needs of construction and design companies, both for short-term bank loans, which are mainly used as operational capital, and for long-term bank loans, which finance business modernization investments, project development and other purposes. Finally, the study highlighted several important challenges for the sector, which are linked to labor shortages, weaknesses in the public works production system, but also to the needs for funding and rapid adaptation to the new environment of digitalization and sustainable business development through the integration of ESG principles.

The analysis found that thousands of small and medium-sized enterprises and professionals are active in the construction sector, the number of which has been increasing in recent years. The production value of the Construction sector, after a decade of low-level activity and divestment, has also strengthened significantly while improving operational profitability and the contribution of the sector to the Greek economy. However, there is a need for a significant reinforcement of investments in the modernization of the sector and related financing, to increase the production capacity and competitiveness of the sector. Employment in the sector has stagnated somewhat, with a slight upward trend in recent years. The analysis found that Greece records the lowest share of construction investments as a share of GDP among EU countries, mainly due to the lag in housing investments. Nevertheless, the sector's footprint in the Greek economy, regional development and external balance remains significant.

The data in the individual short-term indicators reflect the strong recovery of the sector, with a notable rise in private construction activity, albeit from a very low base, an increase in turnover and a strengthening of positive business confidence. However, significant increases in construction costs and property prices and moderate increases in housing credit amid rising related borrowing costs also emerge.

Particularly strengthened in the last two years is the market for the construction of public works, with an increase in both the number of auctions and the total budget of public works and a decline in the average discount rate, also due to the significant increase in construction costs. The backlog of public and private projects by the country's major construction groups is at a historically high level, because of improved performance and conditions in the Greek economy, the level of European funding, and the large investment lag over the past decade. Successful execution of these projects is, however, a challenge for construction companies, as they require, among other things, adequate human resources, strong liquidity and access to funding.

The outlook for Construction is particularly positive. The Recovery and Resilience Fund (RRF) together with the other European Funds and National Funds will finance infrastructure projects that will fuel the strong growth of Construction in the coming years. Based on the analysis of the actions of the National Recovery and Resilience Plan, it is estimated that grants of 9.9 billion euros will be directed to projects directly related to Construction, mobilizing total resources of 12.8 billion euros. The construction projects to be supported by grants from the

RRF mainly concern the pillars of the Green Transition (6.3 billion euros) and Private Investment (2.7 billion euros).

Investments in Construction – mainly infrastructure – are therefore expected to significantly boost their share in GDP in 2024-2026. In the medium term, *additional* investments in infrastructure and housing are estimated annually at up to 3.0% of GDP on average (compared to 2022) – with the share of investment in construction projects reaching up to 8.6% of GDP in 2025 from 4.8% in 2022.

It is also estimated that the production value of infrastructure and housing construction projects will follow a strong upward trend in 2024-2026, exceeding 18 billion euros in 2025 (from 10.3 billion euros in 2022). Due to the strong impact of NRRP investments, the overall impetus will be driven to a greater extent by investments in non-residential infrastructure and construction projects, but private construction activity has been assumed to strengthen by 56% compared to the level recorded in 2022.

Construction's bank credit balances declined after 2016, with the bulk of this decline being due to write-offs of (non-performing) loans on credit institutions' balance sheets. In the period after 2021, the stocks of loans to Construction stabilized and showed a small increase, while relevant research shows the existence of a financing gap for small and medium-sized enterprises in Greece, which widened after the energy crisis and the subsequent increase in borrowing costs.

The development of public and private construction projects, the participation in public projects and the modernization of the productive capacity of the sector will require significantly increased funding resources from the financial system, both in operational capital and in medium- and long-term borrowed capital. At the same time, the size of enterprises in the sector will be significantly strengthened in the coming years. It was estimated that the overall turnover of the sector would be significantly strengthened in the period 2024-2026, reaching 21.4 billion euros in 2026, if all the resources of the Recovery Fund (grants and loans) that have been assumed to be directed to construction projects are absorbed.

The expected increase in the turnover of technical and design enterprises will also fuel the need to increase their bank lending. Specifically, it is estimated that the total net bank lending of enterprises in the sector over the period 2023-2026 could increase by 972 million to 1.77 billion euros. For micro-enterprises, the increase in total net bank lending ranges from 174 to 317 million euros, representing 18% of the total increase. Small businesses account for 22%, medium-sized businesses for 24% and large businesses for 36% of the overall increase in net bank lending.

However, significant challenges remain for the industry. These include issues related to the workforce and financing of enterprises in the sector, the institutional framework of the public works production system and national infrastructure planning, the integration of technology and the digitalization of construction to enhance the productivity of the sector and, finally, the uptake of ESG standards by construction enterprises.

Labor shortages are projected as the main bottleneck to growth in 2023, while financing difficulties are also assessed negatively in terms of their impact on construction activity. A

shortage of labor leads to delays that may result to an increase in the budget and non-respect of project schedules.

The strong growth of domestic construction activity in the coming years will create additional needs in the workforce of various specialties. According to the estimates of the study, total construction workers should increase in the period 2024-2026 to about 250 thousand employees, a level that is 51 to 55 thousand employees higher compared to total construction employment in 2022 (197 thousand employees).

The prospect of a further increase in construction projects in the coming years creates additional financing needs, including guarantees for project participation and fine execution. The need to seek additional funding and liquidity is compounded by delays in payments by construction companies, mainly in the field of public works. Difficulties in funding and the financing gap can be alleviated using various financial tools (e.g. guarantee funds, interest subsidy, etc.), so that public and private investments in construction projects can be implemented smoothly in the coming years.

In relation to the institutional framework, and given the large increases in construction costs, the need for a systematic operation of the mechanism for setting revision coefficients of prices covering the whole range of individual costs was highlighted, to reduce uncertainty for participants in public works tenders and the related problems that may arise during the implementation of projects. The development, operation and management of the Unified System of Technical Specifications and Pricing of Technical Works and Studies and the Electronic System for Determining the Costs of Production Factors of Technical Works, which has not yet been implemented, will contribute to this.

Low digitalization rates, but also underinvestment by construction companies, are two major challenges for the resilience and competitiveness of the sector. As the sector is mainly composed of small and medium-sized enterprises, the scope for investment in innovative technologies is generally low and the need for financial support and other financial incentives is high. The recent announcement of the National Strategy and the Roadmap for the implementation of Building Information Modelling (BIM) in Greece is a positive development. The implementation of BIM is expected to catalyze the production of sustainable and resilient projects, improving the process of designing, constructing and maintaining public works. Integrating the changes required by the National BIM Strategy requires time for the broad development of the necessary skills for companies in the sector to meet the new requirements and procure the necessary equipment.

Environmental, social and corporate governance (ESG) management is particularly important to facilitate access to investment and finance for construction companies. Potential benefits of adopting sustainable practices with ESG criteria also include improving their environmental performance and avoiding any adverse economic impacts, enhancing their reputation, making it easier to adapt to the legislative framework, integrating circular economy principles and strengthening cooperation with all stakeholders (local communities, customers, investors, staff, etc.).

Finally, the need for a National Strategic Planning for Infrastructure and Construction was highlighted, in which priorities will be set, planned investments in large economic and social

infrastructure will be determined, funding resources for critical infrastructure projects will be specified, including their maintenance, and labor and skills needs for their implementation will be identified. The national infrastructure plan will provide significant support to the Construction sector, helping evidence-based business planning and implementing the required investments in skills and productivity gains.

8 ANNEX

8.1 Input-Output model

Based on the input-output model, the total contribution of an industry is equivalent to the effect on the economy compared to a hypothetical scenario where the intermediate and final demand covered by the industry is entirely met by imports. In this hypothetical scenario not only the added value and jobs created by the sector when it meets the intermediate and final demand for its products are "lost", but also the added value and jobs of all other sectors to the extent that they are involved in the supply chain of the sector in question.

The model is based on tables, known as input-output tables, which describe the interactions of output and demand of sectors of the economy. Each sector uses goods and services from other sectors as an input to its production process. On the output side, the output of each sector is directed as intermediate consumption to other branches of the domestic economy, to the final consumption of households and the state, as an input to investment activities or exported.

The difference between the total value of production and the value of consumption of an industry is the gross value added (GVA) of the industry, which corresponds to the resources available to companies in the industry to pay salaries, employer contributions, depreciation, direct taxes and dividends to their shareholders, as well as to create a profit reserve.

Adding indirect taxes, such as VAT, excise duties, etc., to the GVA of all sectors results the Gross Domestic Product of the country, which is also calculated on the demand side as the sum of final consumption (households and public sector), investments (private and public sector) and net exports (exports minus imports).

The analysis of this study was based on an adjustment for 2021 of the input-output tables of the Greek economy from the Eurostat database, which covers 64 sectors of the economy.

According to the model, the overall economic impact of the sector has three components: direct, indirect and induced effects.

- The **direct effect** refers to the economic result resulting from the production activity of the sector, without considering its interconnections with other sectors of economic activity.
- The **indirect effect** is obtained by considering the interlinkages of production and money flows between sectors of the economy. The activity of an industry affects the industries with which it is connected and trades, as it requires inputs of products and services from the industries that supply it. The expenditure on the supply of goods and services constitutes an income for the suppliers of the industry, which would not have been generated without the initial demand of the industry concerned. In addition, suppliers in this sector will have to source inputs from their own suppliers, spending money on this which is income for their suppliers, and so on. The final indirect effect on the economy is the overall result of this whole chain of economic interconnections.
- The **induced effect** refers to the effect caused by the change in consumption expenditure (private consumption) of employees in the sectors directly or indirectly affected by the envisaged change in final demand. Workers are paid and then spend their wages on the

purchase of goods and services, thus generating income for the industries and firms that provide these goods and services. Increased demand for the products of the sectors of the economy involved in the supply chain of consumer goods is causing an increase in economic activity and employment in these sectors.

8.2 Facts and assumptions about RRF resources

Table 8.1: Total investment resources mobilized by the RRF

Pillars & Axles	Fund budget Recovery	Investment resources where Mobilised
1. Green transition	**(in million €)**	**(in million €)**
1.1 Transition to a new environmentally friendly energy model	1,126	2,202
1.2 Energy upgrading of the country's building stock and spatial reform	2,662	5,130
1.3 Transition to a green and sustainable transport system	520	1,305
1.4 Sustainable use of resources, climate resilience and biodiversity conservation	1,711	2,646
Total Pillar 1 Resources	**6,018**	**11,283**
2. Digital transition	**(in million €)**	**(in million €)**
2.1 Connectivity for citizens, businesses, the state	331,6	369,7
2.2 Digital transformation of the state	1,241	1,241
2.3 Digital transformation of businesses	362,1	458,7
Total Pillar 2 Resources	**1,935**	**2,070**
3. Employment, Skills, Social Cohesion	**(in million €)**	**(in million €)**
3.1 Increasing jobs and promoting labor market participation	776,3	776,3
3.2 Enhancing the digital potential of education and modernizing vocational education and training	2,227	2,308
3.3 Enhancing the accessibility, effectiveness and quality of the health system	1,486	1,486
3.4 Increasing access to effective and inclusive social policies	737,2	737,2
Total Pillar 3 Resources	**5,226**	**5,307**
4. Private investment and transformation of the economy	**(in million €)**	**(in million €)**
4.1 More growth-friendly tax tools and improved tax administration	185,2	213,0
4.2 Modernization of public administration	188,8	188,8
4.3 Improving the efficiency of the justice system	242,8	448,9
4.4 Strengthening the financial sector and capital markets	19,86	19,9
4.5 Promoting research and innovation	447,5	616,8
4.6 Modernizing and improving the resilience of key sectors of the country's economy	4,182	8,081
4.7 Improving competitiveness and promoting private investment and exports	5	5
Technical support	40	40
Total Pillar 4 Resources	**5,311**	**9,614**
General sum	**18,491**	**28,274***
Loans	**17,728**	**44,320***
Total Investment Resources	**36,219**	**72,593***

Source: https://greece20.gov.gr/.* IOBE Estimates.

Table 8.2: Investment resources mobilized by grants to Recovery Fund projects directly related to Construction activity

Title of action	Budget NRRPs	Total resources mobilized for Construction (million euros) (Assessment)
Promotion of electricity interconnection of islands and upgrading of the transmission system	195	417
Actions to revitalize the most affected areas	242	242
Power increase of electricity distribution substations to facilitate the connection of new RES	12	26
Upgrading of the Electricity Distribution Network in forest areas to prevent fires	40	86
Undergrounding and upgrading of the Electricity Distribution Network in urban areas to shield them from extreme weather events	60	129
Creation of Electricity Storage Systems decisive for the development of RES	450	965
Saving at home	1,253	,2108
Strategic urban regeneration	475	799
I save by attempting	450	757
Redevelopment of former Tatoi royal estates	40	40
Saving in the public sector	200	200
Renovation of OAKA	43	43
Support green manufacturing & transport - development of carbon capture & storage technology	300	345
Electrification of public transport	220	152

Construction of 13 regional civil protection centers	19	19
Large irrigation project programme with PPPs to boost agricultural production	200	266
Treatment and purification of urban wastewater of environmentally sensitive agglomerations and modernization of facilities in selected cities	230	230
National reforestation plan	224	224
Drinking water supply and saving projects	200	200
Actions to protect biodiversity	100	100
Flood protection works	110	110
Upgrading water supply in developing regions	290	290
Civil protection strategic risk management planning development projects	74	37
Reinforcement of fire & flood protection	115	115
Fiber Optic Infrastructure in Buildings	131	131
Fifth generation (5G) wireless networks on the national highway network	160	160
Submarine cables in the Greek islands	30	30
Smart cities	73	73
New facilities for laboratories at Papanikolaou General Hospital of Thessaloniki	7	7
Renovations and modernization of hospitals throughout Greece	317	317
Upgrading of justice infrastructure	118	118
Modernization & redefinition of the role of the local Employment Promotion Centers of OAED	41	41
Culture as a driving force for growth	168	118
Protection of flagship sites and cultural heritage sites from climate change (ID: 16433)	20	20
Additional works for the promotion and preservation of the Acropolis	9	9
Creation of cultural routes	28	28
Creation of a museum of underwater antiquities in Piraeus	54	54
Central Greece Motorway E-65 Northern Section	452	452
Northern Road Axis of Crete	427	427
Road safety improvement programme	450	450
Development of business parks	100	100
Infrastructures for the contribution of culture to the "silver economy"; utilization of art to improve mental health	38	26
Upgrading interventions at regional airports	107	107
Suburban railway in West Attica	81	81
Tourism development	260	260
Smart bridges	81	81
Electronic tolls	90	157
Upgrading the railway network with a PPP project	130	226
Smart environmental and cultural infrastructure	174	174
Cultural and natural routes	30	30
Interventions to upgrade regional ports	20	20
SUBTOTAL A	**9,138**	**11,597**
Energy saving	560	942
Hydrogen	75	38
Energy storage	85	71
CCS	75	126
RePowerEU SUBTOTAL	**795**	**1,177**
GENERAL TOTAL	**9,933**	**12,774**

Source: NRRP, IOBE analysis.

Table 8.3: Cases related to the temporal distribution of RRF grants and loans

		Annually			Cumulative			
Date of approval	Payment requests	**Grants**	**Loans**	**Total**	**Grants**	**Loans**	**Total**	**Absorption**
9/8/2021	Pre-financing	2.31	1.65	3.96	2.31	1.65	3.96	11%
28/2/2022	1st request	1.72	1.85	3.56	4.03	3.50	7.53	21%
25/11/2022	2nd request	1.72	1.85	3.56	5.75	5.35	11.09	31%
22/11/2023	3rd request	1.72	1.85	3.56	7.46	7.19	14.65	41%
H1 2024		2.15	2.11	4.26	9.61	9.30	18.91	53%
H2 2024		2.15	2.11	4.26	11.77	11.41	23.17	64%
H1 2025		2.15	2.11	4.26	13.92	13.51	27.43	76%
H2 2025		2.15	2.11	4.26	16.07	15.62	31.69	88%
H1 2026		2.15	2.11	4.26	18.22	17.73	35.95	100%

Source: NRRP, IOBE Assessment.

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