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EARLY VIEW

Construction Sector Dynamics in Turkey: Economic Advancements and Vulnerabilities

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ABSTRACT

The construction sector has strong linkages with other sectors, enormous potential to absorb unemployment, and cyclical characteristics that are sensitive to macroeconomic conditions. Moreover, it is commonly regarded as a critical sector for achieving desired economic growth and development in a country. Therefore, it is important to understand its effects on an economy to develop an appropriate economic policy. This paper discusses the construction sector from a macroeconomic perspective in order to gain insight into the sector's interaction with the economy. The central question is whether a construction-centred economy can sustain economic growth and development in the long run. Turkey's developing construction-centred economy in the 2000s is used as a case study in this paper. To this end, macroeconomic data obtained from official data providers are subjected to descriptive statistical analysis. The selection of macroeconomic indicators in this study—such as input costs, GDP, and money supply, among others—is based on economic theory, which suggests that these variables significantly affect the dynamics of the construction sector. Empirical studies have consistently revealed the interdependence between these macroeconomic variables and the performance of the construction sector, thereby confirming their inclusion in this analysis. The results reveal that a disproportionate

allocation of resources to the sector, coupled with misaligned support policies, can be detrimental to the long-term economic landscape.

Keywords: construction economics, Turkish construction sector, economic growth and development, government policies

1. INTRODUCTION

Construction is one of the most dynamic and cyclical sectors of an economy. It is usually the first sector to react to macroeconomic fluctuations in interest rates, consumer confidence, and investment spending. Therefore, it is crucial to understand its dependence on macroeconomic decisions and outcomes, particularly for developing countries that rely on this sector for economic growth and development. Researchers have discussed the construction sector from different perspectives, but no consensus has been reached thus far.

The first prominent argument in the literature focuses on the two main outputs of the construction sector—infrastructure and housing, both of which are essential for economic growth and development—and emphasises the profound effects of these outputs on an economy. Apart from these two significant outputs of the construction sector, its strong backward and forward linkages with other sectors and significant potential to absorb the unskilled labour force make it attractive for economic growth and employment policies. Consequently, the construction sector is strongly poised to stimulate economic activity (Gruneberg, 1997; Hillebrandt, 2000; Giang and Peng, 2011; Dinlersoz and Fu, 2022), particularly during periods of high unemployment and economic stagnation (Donnges, 2010).

Another perspective argues in favour of the social, spatial, macroeconomic, and environmental effects of uncontrolled growth in the construction sector (Balaban, 2012; Ilhan and Yobas, 2019). These discussions aim to prevent the excessive allocation of limited economic resources to the construction sector, which could hinder genuine and sustainable economic growth (Drewer,

1980; Orhangazi and Yelden, 2021). Flyvbjerg (2008) highlights the adverse impacts of infrastructure projects that have excessive supply compared to economic demand. Nevertheless, only a few studies have explored the detrimental effects of unnecessary construction activities on an economy.

In the literature, different outcomes have been observed for different countries depending on their stage of development, macroeconomic fragility, and built environment. The primary objective of this paper is to delve deep into the intricate relationship between the construction sector and macroeconomic dynamics. By doing so, we aim to bridge the existing gaps in the literature, particularly regarding the potential benefits and pitfalls of a construction-oriented economy. Turkey, with its unique economic trajectory and the pivotal role the construction sector has played in its development, offers a compelling case study. The nation's construction sector has witnessed significant fluctuations affected by various economic, political, and environmental factors. This makes Turkey an ideal candidate to explore the broader implications of a construction-centric economic approach.

The Turkish construction sector has experienced significant fluctuations due to various economic and political changes in the country since the late 1990s. The intertwined dynamics of high inflation, rising public debt, seismic vulnerability, and economic crises have created a pivotal turning point for Turkey's construction sector. Recognising the need for a holistic reform, the government adopted a policy to strengthen building standards and prioritise the development of strategic infrastructure. These initiatives aimed not only to improve safety, efficiency, and resilience but also to stimulate economic growth while prudent economic measures further facilitated the sector's revival. The 2001 financial crisis led to economic stabilisation measures, which indirectly benefitted the construction sector by facilitating access to credit and creating a favourable investment environment. Between 2002 and 2007, economic reforms helped Turkey's economy recover, thereby driving rapid expansion in the construction sector. Government-backed housing projects

and large-scale infrastructure investments further fuelled this growth. In addition, urban transformation initiatives became increasingly prominent, thereby stimulating construction and attracting foreign investment in real estate.

The global financial crisis of 2008–2009 adversely affected the Turkish economy and the construction sector. However, government measures—such as a temporary reduction in the value-added tax on housing—mitigated the negative effects; infrastructure projects continued during this period, albeit with delays. Turkey's initial recovery was driven by domestic consumption and investment, with moderate growth in the construction sector. However, challenges like high inflation, political instability, and concerns over housing bubbles emerged. Further, although mega-projects and urban transformation persisted, concerns regarding resource misallocation, environmental degradation, and social displacement arose.

The 2018 currency crisis—characterised by the depreciation of the lira, high inflation, and rising borrowing costs—affected the construction sector by increasing material costs and reducing investments. The sector's vulnerability to macroeconomic shocks became evident as companies faced financial difficulties and the housing market slowed down. The COVID-19 pandemic further complicated the situation and led to a decline in construction activity and demand. The government implemented stimulus measures, such as low-interest housing loans and tax incentives, to support the construction sector. Despite these efforts, the sector has not yet shown any signs of recovery, unlike the post-2001 and post-2008 crisis periods.

Therefore, this study seeks to comprehensively examine the interaction between the construction sector and the broader Turkish economy during the 2000s. By analysing a set of macroeconomic data and employing descriptive statistical methods, we aim to provide a holistic understanding of the complex relationship between the construction sector and the economy in Turkey. The overarching goal is to determine whether a construction-

oriented economy, as observed in Turkey, can sustainably achieve the desired economic growth and development in the long run. The other objectives of this research are to examine the factors that drive the performance of the construction sector during different phases of Turkey's economic development between 1998 and 2021; to investigate the effects of the construction sector on the overall economy during periods of growth, stagnation, and turbulence; to establish cause-and-effect relationships between the construction sector and the economy, considering the interplay among economic policies, political decisions, and global market conditions; and to draw lessons from experiences for other developing countries.

By examining the evolution of the Turkish construction sector and its economic interplay, this study offers insights for policymakers, stakeholders, and researchers regarding the implications of a construction-centric economy. The findings enhance our understanding of the construction sector's role in economic growth and development, highlighting the factors that affect its performance. Moreover, these insights can guide policy recommendations to foster sustainable growth in the sector while mitigating potential adverse effects of over-expansion.

2. LITERATURE REVIEW

The impact of the construction industry on an economy has been extensively discussed in the literature by researchers who have examined various aspects, such as economic growth (Yiu et al., 2004; Wilhelmsson and Wigren, 2011; Ertugrul and Pirgaip, 2021; Qabaja and Tenekeci, 2022), capital formation (Esfahani and Ramirez, 2003; Lakshmanan, 2011; Ansar et al., 2016; Gunluk-Senesen, Kaya and Senesen, 2018), employment (Wells and Wall, 2003; Chiang, Tao and Wong, 2015), and sectoral relationships (Ilhan and Yaman, 2011; Gregori and Pietroforte, 2015; Ali, Sabir and Muhammad, 2019). Apart from this, contemporary issues such as renewable energy investments (Bekun, 2022), digital transformation (Klinc and Turk, 2019), and circular

economy (Norouzi et al., 2021) are deal with in the construction economics addressed in the literature.

Upon examining mainstream literature, Bon (1992, 2000) found that the construction industry's share of gross national r prit (GNP) follows an inverted U-shaped pattern, which suggests that the growth rate of the construction sector slows down as a country develops. As countries develop, the focus of the construction sector shifts more towards repair and maintenance activities. However, these findings are not consistent across developing countries, possibly due to differences in their economic structures and capacities.

One area of debate is the direction of causality between construction and gross domestic product (GDP). Tse and Ganesan (1997) reported that GDP has a causal effect on construction activity in Hong Kong, while Chan (2001) and Zheng and Liu (2004) observed a bi-directional causal relationship between construction activities and GDP in Singapore and China, respectively. Lewis (2009) found that the relationship between GDP and construction varies depending on the economic situation; during an upturn, the causality runs from GDP to construction, while during a downturn, it runs from construction to GDP. Furthermore, Alaloul et al. (2021) revealed that the output of the service and agriculture sectors influences the level of output of the construction industry.

The World Bank (1984) defines a construction activity as an assembly process that primarily involves unskilled labour and domestic resources. This characteristic of construction activity creates strong backward linkages, thereby increasing demand for products and services from other supply industries when the construction sector expands (Bon, Birgonul, and Ozdogan, 1999). However, Zhu, Hu, and Lui (2020) indicated that construction effects through sectoral linkages are becoming weaker in promoting economic growth. However, the effects of the adaptive capacities of other

sectors on the construction industry's supply remain largely unexplored (Giang and Peng, 2011).

Due to its labour-intensive nature and reliance on a less qualified workforce, the construction industry has significant potential to absorb unemployment (Turin, 1978). Consequently, many countries use the industry as a tool for employment generation policies through labour-intensive public works projects, particularly during economic downturns (Gruneberg, 1997; Hillebrandt, 2000). However, using the industry to generate employment for the unskilled labour force through unplanned public works may harm both the industry and the entire economy (Turin, 1978). Hildebrandt (2000) suggests that these risks can be managed by adjusting public expenditure through fiscal policy and altering interest rates on loans that finance public works projects through monetary policy.

On the other hand, increased construction activity does not always result in economic growth. Excessive allocation of scarce resources to the construction industry and overestimation of infrastructure demand relative to economic scale may lead to idle capacity in housing and infrastructure (Drewer, 1980; Flyvbjerg, 2008; Balaban, 2012). The economic recessions experienced in various countries serve as examples of this phenomenon (Lewis, 1984; Ganesan, 2000; Aveline and Li, 2004). A surplus in housing supply can result in the depreciation of residential buildings, bankruptcy of companies, or even the onset of an economic crisis, as seen in the US in 2008. For example, Orhangazi and Yeldan (2021) highlighted the negative effects of construction-centred growth in the Turkish economy, while Devarajan et al. (1993) emphasised how political factors in decision-making can exacerbate the situation. The worst-case scenario for developing countries is when governments use the construction industry to build publicly visible projects that consolidate their political power and transfer revenues generated from these projects to equity owners (Balaban, 2012).

In conclusion, the literature on the impact of the construction industry on an economy presents a complex picture regarding the relationship between the construction sector and economic growth, capital formation, employment, and sectoral production. On one hand, there are studies that emphasise the significance of the construction industry in creating employment and promoting economic growth. On the other hand, there are studies that address the potential long-term challenges faced by construction-centric economies.

3. METHODOLOGY

The methodology adopted in this study aims to examine the relationship between the construction industry and the economy from a multidimensional perspective. This approach ensures a holistic understanding, thereby enabling a comprehensive analysis of the sector's multifaceted impact on the broader economy. To achieve this, various variables have been selected based on both theoretical foundations and empirical studies. The theoretical underpinnings suggest that certain variables play a crucial role in understanding the economic dynamics of the construction industry, while empirical evidence provides real-world validation of these theories.

The cost of inputs, production, and turnover variables are selected to provide insights into the efficiency of the construction sector and its profitability. Empirical studies—such as those that examine industry benchmarks and performance metrics—have consistently shown that these variables are pivotal in assessing an industry's operational efficiency and its ability to generate profit. Theoretically, these variables are essential in understanding the industry's capacity to generate economic value and contribute to overall economic growth. Aggregate output, labour force, and investment variables effect the construction industry's direct contribution to economic growth, employment generation, and capital formation. Grounded in economic theories like the production function and labour market dynamics, these variables emphasise the role of the construction industry in job creation,

economic stimulation, and infrastructure development. Empirical studies, such as labour market analyses and growth metrics, further validate the significance of these industries. Money supply, interest rates, and loan variables are selected based on their proven importance in empirical studies that analyse the construction industry's impact on financial stability, credit availability, and the broader monetary environment. Moreover, theoretical frameworks like the monetary policy and credit market theories emphasise their relevance in understanding the financial dynamics of the construction sector. Plans approved is another essential variable, which is selected for its theoretical relevance in indicating the future trajectory of construction projects; theories related to project forecasting and predictive economic modelling suggest its importance. Empirical studies, particularly those focusing on project success rates and industry growth predictions, further emphasise the significance of this variable in predicting sectoral growth.

Data for the analysis are obtained from reputable national and international third-party statistic providers, such as the Turkish Statistical Institute (TurkStat), the Central Bank of the Republic of Turkey (CBRT), the Organisation for Economic Co-operation and Development (OECD), and the World Bank (WB). The data from national sources are expressed in Turkish Lira, unless otherwise indicated. To prepare the data for analysis, it is first classified into quarterly or yearly time frames. If the data series have different base years, they are linked using procedures described by the data provider.

Additionally, nominal values are converted to real values using a suitable deflator, such as the consumer price index (CPI) or the producer price index (PPI).

Statistical tools are used to analyse the relationship between selected variables and to show the impact of policies on them. The benefit of employing these tools is their ability to provide a rigorous and objective analysis of the data. Summary statistics provide a snapshot of data distribution and variability. Scatter plots reveal correlations and potential

causal relationships, while time series graphs depict trends over time. By utilising these tools, the study aims to provide a clear and comprehensive understanding of the relationships among variables, the patterns and trends in the data, and the underlying factors that drive these relationships. Furthermore, these analyses serve as a foundation for more advanced inferential statistical tests and econometric modelling in future research. By identifying and describing the relationships between the selected variables, the analysis provides valuable insights that can inform the development of policy recommendations, enhance understanding of the impact of the construction industry on the economy, and contribute to sustainable development in the construction sector and the wider economy.

4. FINDINGS

4.1. The Labour Cost and Prices of the Construction Material

The supply of a product is inversely affected by the prices of production factors. The changes in the construction cost inputs may help us reveal one determinant of construction production. The two main cost parameters of construction products are labour and material. In this section, we provide a detailed analysis of the hourly labour cost indices for the construction sector and the overall economy between 2009 and 2020 as well as the construction material price index and the PPI between 1994 and 2020. The data for the hourly labour cost indices has been obtained from TurkStat and it is adjusted to real values using the PPI. The time series of the hourly labour cost indices for the construction sector and the overall economy between 2009 and 2020 are presented in Figure 1.



Figure 1. Hourly labour cost index for the construction sector and all sectors.

The analysis of time series reveals that both series follow a similar pattern. However, since 2012, the average labour cost index (LCI) in the construction sector exceeds the average of all sectors. This difference becomes more evident in 2015. The increase in labour costs in the construction sector can be attributed to various factors such as the increase in demand for construction services due to rapid urbanization, economic growth in the 2000s, and the shortage of a qualified labour force. The differentiation between the construction sector and the overall economy in terms of labour costs has consequences for the employment and competitiveness in the sector.

The time series graph of the construction material price index and the PPI between 1994 and 2020 is presented in Figure 2. The construction cost index has been derived from the PPI using the classifications in the Statistical Classification of Economic Activities in the European Community, revision 2 (NACE Rev. 2)

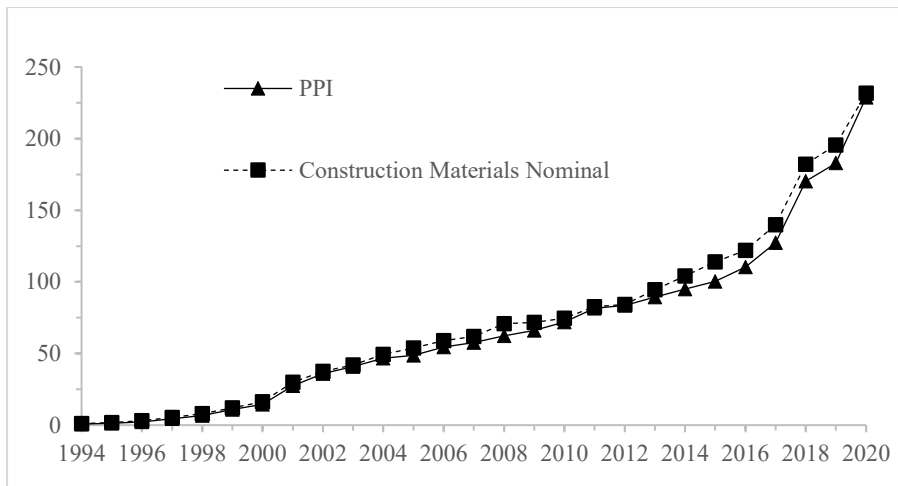


Figure 2. Construction materials index (nominal) and PPI.

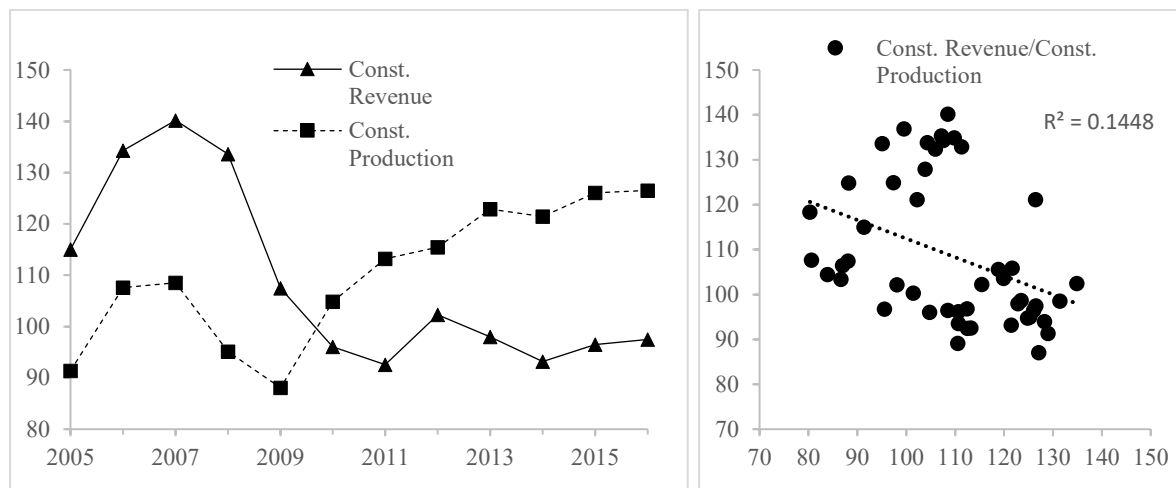
The analysis of the time series reveals that the construction material price index has been growing at a higher rate than the PPI, thereby indicating that the cost of construction materials has been rising faster than the overall inflation in the economy. These findings may vary between countries depending on the level of development of the construction sector and the economy. This upward trend in construction material prices revealed in the present study is due to various factors, such as increased demand for construction materials as the construction sector expanded, fluctuations in global commodity prices, and increase in the exchange rate which could have affected the import prices of the construction materials. These findings may vary among countries depending on the level of development of the construction sector and the economy—for example, wages and retail prices in other industries are ahead of wages and construction materials in Trinidad and Tobago (Lewis, 2004).

It is evident from the findings of the analyses of labour cost and construction material price indices that the construction sector in Turkey has experienced significant changes in terms of input costs during the 2000s. The increase in labour and material costs for the construction sector in Turkey may have several consequences, including reduced profitability, increased housing and infrastructure costs, reduced attractiveness for investment, and increased inflationary pressures on the economy.

4.2. Production and Turnover

The production and turnover indices of the construction and industrial sectors in Turkey from 2005 to 2017 reveal distinct patterns, thereby reflecting the sectors' unique dynamics and their responses to broader economic events. To understand the causes and consequences of these differences, the economic context and the structural characteristics of the sectors are considered in this study. The required data for the analyses was obtained from TurkStat. Turnover index values were converted to real values using the PPI to provide a more precise representation of the relationship between the indices.

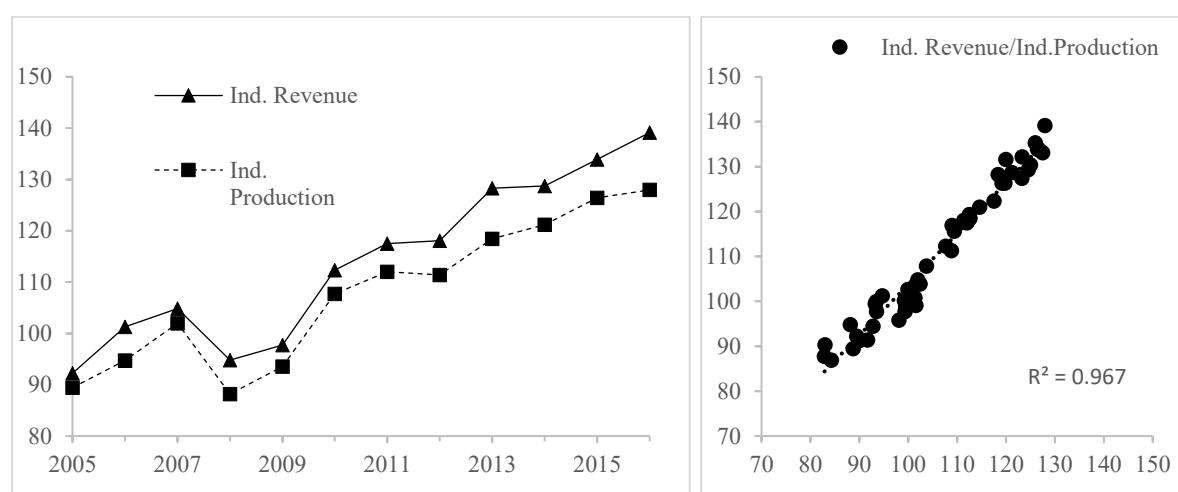
As depicted in Figures 3 (a) and 3 (b), the construction sector's production and turnover indices displayed a negative relationship, with a weak correlation. The factors contributing to this outcome include the long durations, high sunk costs, and uncertainties inherent in construction projects. Additionally, the higher elasticity of demand for construction goods and services than that of industrial goods made the sector more sensitive to economic fluctuations, as evidenced by the volatility in the turnover index between 2011 and 2017.



Figures 3 (a) and 3 (b). Time series and scatter diagram of the construction revenue and production, respectively.

Inefficiencies in the construction sector—including a lack of standardization and enforcement, insufficient investment in technology and innovation, and a lack of skilled labour—have also played a significant role in the negative relationship between production and turnover indices. These inefficiencies have increased the opportunity cost of allocating resources to the construction sector, as investments in more productive sectors could have yielded higher returns. The elasticity of demand in the construction market has also contributed to the fluctuations observed in the turnover index. Therefore, addressing these inefficiencies and improving the sector's productivity and competitiveness could lead to a more stable and sustainable construction market in the long term.

In contrast, the industrial sector's production and turnover indices exhibited a positive relationship, with a strong correlation, which is evident from Figures 4 (a) and 4 (b). This can be attributed to the industrial sector's diversified production base, which enabled it to better absorb shocks from economic events like the 2008 financial crisis and recover more rapidly. Additionally, the less elastic demand for industrial goods made the sector less susceptible to economic fluctuations, as demonstrated by the strong positive relationship between the production and turnover indices.



Figures 4 (a) and 4 (b). Time series and scatter diagram of the industry revenue and production, respectively.

In summary, the production and turnover indices of the construction and industrial sectors reveal significant differences in their behaviour and relationships. These differences can be attributed to the Turkish economic structure and dynamics in the 2000s in terms of efficiency in production, elasticity of demand, and opportunity cost.

4.3. Gross Domestic Product and Construction Output

In this section, the relationship between the construction output and GDP in the country is analysed for the period between 1998 and 2020 using time series data from TurkStat. The focus of the analysis is to investigate the trends in the construction sectors and identify the factors that contribute to their growth and decline over time. Examining these time series enables us to understand the dynamics of the construction sector and its effects on the overall economy as well as the effectiveness of government policies and incentives in supporting the construction sector during critical periods.

Figure 5 illustrates a growing share of construction in GDP from 2002 to 2017, with a peak at 7.5% in 2017. This increase was only interrupted in the period 2008–2009, and the share began declining in 2018 and fell to 5.5% in 2020. In contrast, the share of industry in GDP fluctuated between 18% and 20% during the same period. This indicates the growing importance of construction in the Turkish economy and the potential vulnerability of the sector to external shocks.

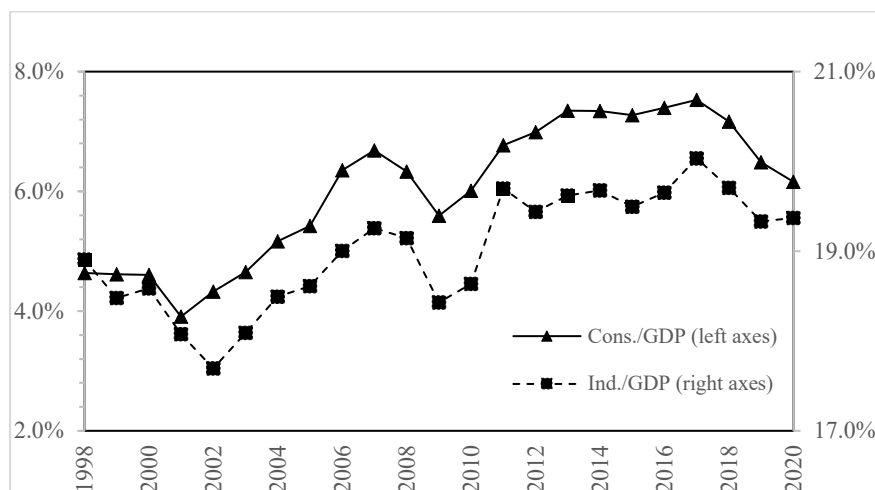


Figure 5. The share of the construction and industry output in GDP.

Figure 6 indicates that construction output and GDP followed a similar pattern in the 2000s, with a decrease in 2001 and the 2008–2009 period, followed by a rapid recovery until 2018. However, after 2018, the correlation between construction output and GDP deteriorated, as construction output did not respond to the increase in GDP.

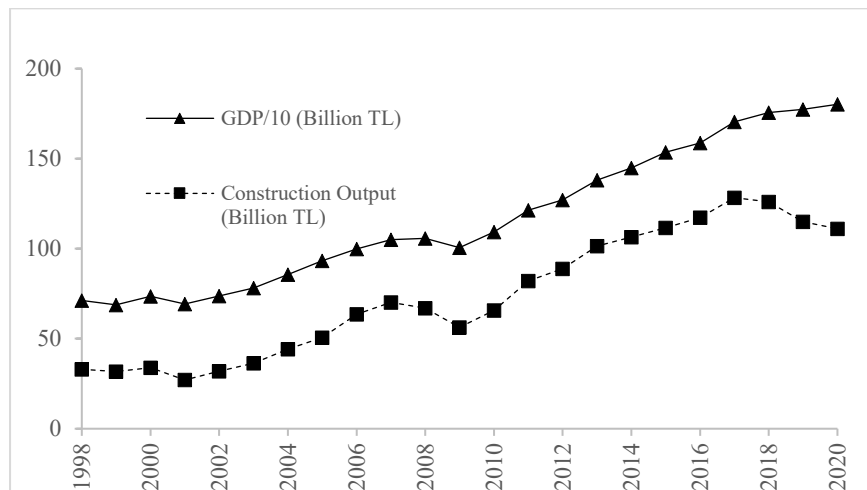


Figure 6. Construction output and GDP at real prices in Turkish Lira.

This deterioration is more evident in the graph of construction output and GDP in US dollars, as depicted in Figure 7.

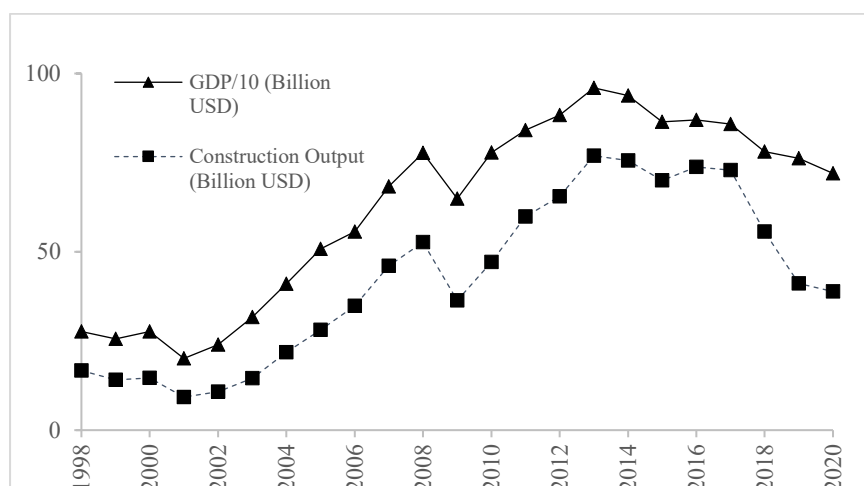
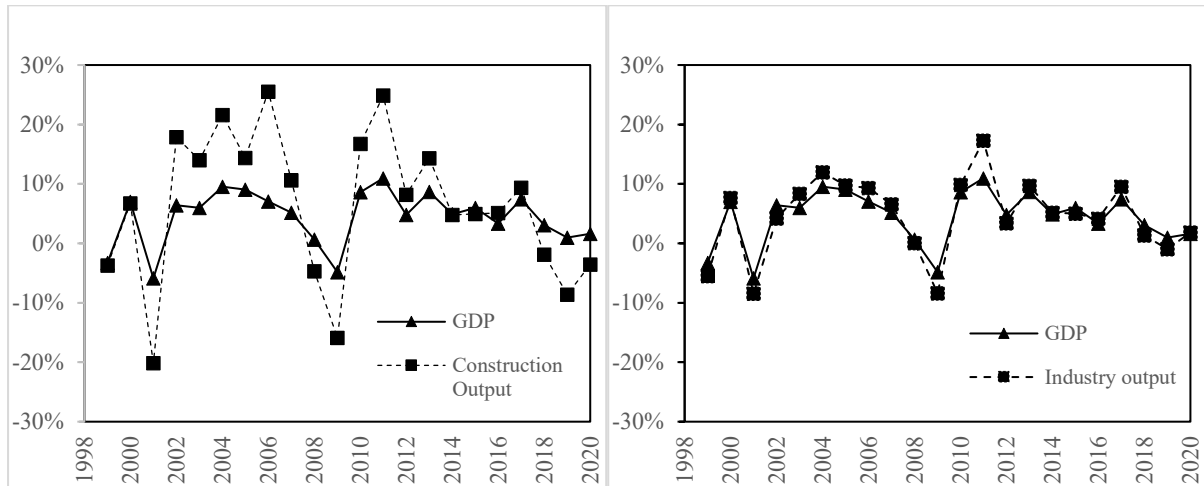


Figure 7. The construction output and GDP at nominal prices in US dollars.

Lewis (2004) observed that the percentage change in construction output tends to be exaggerated during booms and slumps compared to GDP.

Consistently, Figures 8 (a) and 8 (b) demonstrate that the annual change in construction output experienced more extreme fluctuations than that in GDP, while industry output shows a similar pattern as GDP. This suggests that the construction sector is more sensitive to economic cycles and more vulnerable to various factors, such as government incentives and global economic conditions.



Figures 8 (a) and 8 (b). The annual rates of change in the construction output, industry output, and GDP.

To better understand the dynamics of construction and industrial production in GDP and their relationship with economic development, it is essential to consider the broader context of the Turkish economy in the 2000s. Key economic events—such as the crises in 2001 and 2008, the post-crisis growth periods, the currency crisis in 2018, and the COVID-19 pandemic in 2019—played a role in shaping the performance of the construction sector. Moreover, the government's policies—including urban transformation law, infrastructure investments, tax breaks, and subsidised loans—significantly affected the construction sector's growth trajectory. However, unlike the previous experiences in 2001 and 2008, construction output lost its correlation with GDP since 2018 and has not shown signs of recovery thus far. In 2018, the Turkish economy faced a currency crisis and high inflation, which adversely affected the construction sector; the situation was further exacerbated by the COVID-19 pandemic in 2020. The deterioration of the correlation

between construction output and GDP in Turkey after 2018 can be attributed to a combination of factors, including economic imbalances, overreliance on the construction sector, changes in global economic conditions, shifts in government priorities due to the COVID-19 pandemic, and problems of access to finance. Moreover, the credit and incentives provided to boost demand for construction fuelled inflationary pressures and distorted the macroeconomic environment. This expansionary credit policy resulted in higher inflation, thereby causing the central bank to increase interest rates to contain inflationary pressures. Consequently, higher interest rates made borrowing more expensive, thereby discouraging investments in the construction sector and further weakening its connection to overall GDP growth.

The deteriorating macroeconomic environment also led to problems in accessing external financing. As the country's inflation and interest rates rose, investor confidence in the Turkish economy declined. This reduced the availability of external financing, which is crucial for large-scale infrastructure projects. Consequently, numerous infrastructure projects faced financial difficulties and a few were not sustainable, thereby further contributing to the weakening correlation between construction output and GDP. Thus, the construction sector's ability to contribute to GDP growth was significantly hindered over time.

4.4. Construction Labour Force and Unemployment

This section presents the employment trends in the construction and industrial sectors and how the unemployment rate has changed during that period. Moreover, it investigates the patterns of the construction output and unemployment rate. The data covering 2005 and 2020 were obtained from TurkStat because TurkStat highlights that comparisons between unemployment data before and after 2004 may be misleading due to revisions made to population calculations in 2008 and household labour force surveys in 2014. The primary purpose of analysing these data is to obtain a

comprehensive understanding of labour market dynamics in the construction sector, evaluate the effects of macroeconomic changes and significant events on the construction sector, and identify potential policy interventions to enhance employment rates and sector performance.

According to Figure 9, the unemployment rate reached its highest point at 13% in 2009, decreased to 8.5% in 2012, and has been on an upward trend since then, reaching 13.6% in 2019 and remaining around that level.

Concurrently, the construction employment rate increased from an average annual rate of 5.6% in 2005 to 7.2% in 2011, remained stable until 2017, but fell sharply to 5.6% in 2019. The industrial employment rate fluctuates between 19% and 21% on an annual average but shows a steady increase between 2018 and 2020, thereby coinciding with the significant decrease in the construction employment rate.

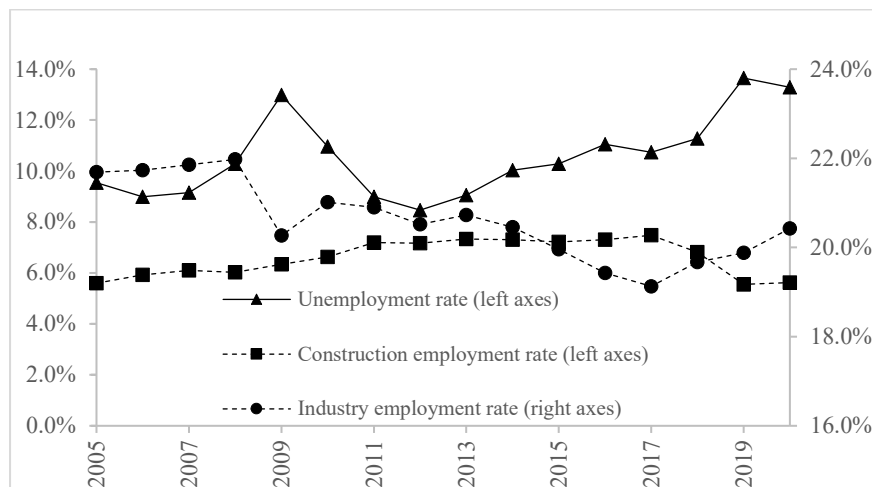


Figure 9. The unemployment rate, the employment rate in the construction industry, and the industry employment rate.

Figure 10 reveals that the construction employment rate and construction output rose similarly from 2005 to 2011, deteriorating only in 2009. However, after 2011, the construction employment rate fluctuated around 7.3%, even though construction output continued to increase. Since 2018, construction output has steadily declined, while construction employment has fallen by almost 25%.

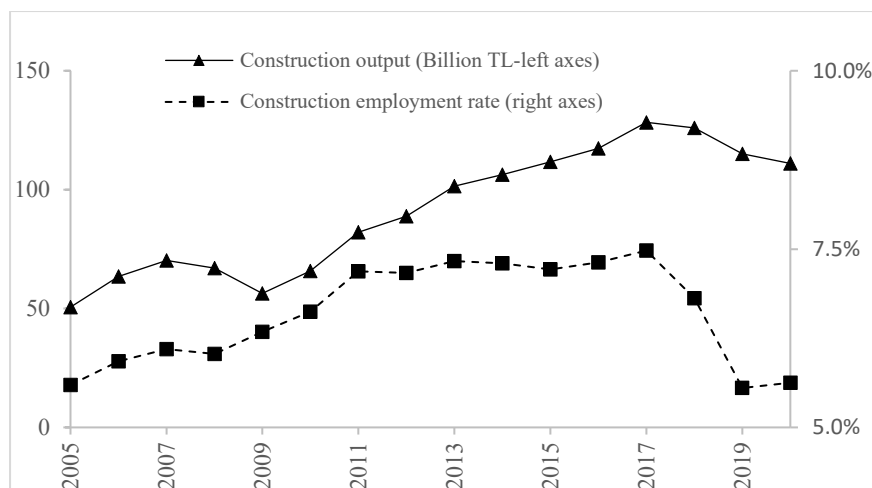


Figure 10. The output and employment rate in the construction industry.

The construction sector in Turkey has experienced fluctuations in employment rates and output, with several factors contributing to these observations and results. Economic events, including the financial crises of 2001 and 2008–2009, the 2018 currency crisis, and the COVID-19 pandemic had significant impacts on the labour force in the construction sector. These events caused shifts in demand for construction labour, altered funding availability for projects, and disrupted supply chains, thereby highlighting the need for improved resilience and adaptability to mitigate future shocks. Another significant factor contributing to the fluctuations in construction employment rates is the high degree of informality and foreign workers in the Turkish labour market. Many workers are unregistered or lack social security benefits, thereby making them more susceptible to job losses during economic downturns. Addressing informality could improve workers' social protection and reduce vulnerability to economic shocks.

Further, the construction sector in Turkey also faces challenges in developing a skilled workforce, with the industry experiencing shortages of skilled professionals and technicians. Enhancing the skill levels of the labour force through improved education and vocational training, particularly in the construction sector, may improve the sector's adaptability to economic changes and technological advancements. The Turkish government's policies and regulations—including housing policies, infrastructure investments, and

construction permits—also have a significant impact on the construction sector. Changes in these policies can directly impact the demand for construction labour and, subsequently, employment rates and output. Understanding the relationship between these policies and construction labour dynamics can help inform future policy interventions to promote stable growth in the construction sector.

4.5. Gross Fixed Capital Formation and Construction Output

The analysis of GDP, gross-fixed capital formation (GFCF), construction investment, and output data highlights the significant contribution of the construction sector to the Turkish economy through investments. Figure 11 exhibits how the share of GFCF in GDP has changed over time in the 1998–2020 period. The most considerable increase was observed between 2002 and 2007, from 15.5% to 27.5%. However, there were declines in 2001, 2009, and 2019 due to the global financial crisis, economic recession, and political instability.

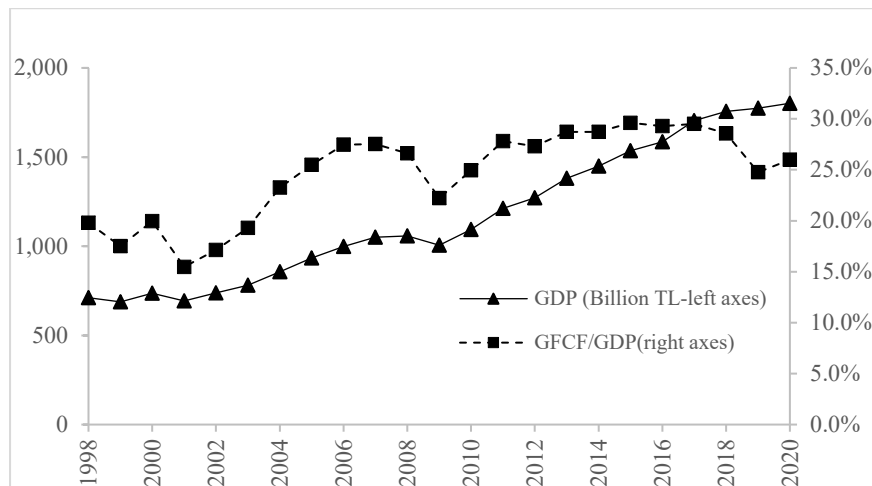


Figure 11. The share of GFCF in GDP and GDP.

Figure 12 indicates that construction investments within the GFCF rose from 49.3% in 2010 to 57.7% in 2018 but declined to 45.8% by 2020. This growth in construction investments led to a substantial increase in construction output, which surged by 128% in real terms from approximately 56 billion Taiwanese lira in 2009 to 128 billion Taiwanese lira in 2017. However, a downward trend in

construction output began in 2017, falling to 109 billion Taiwanese lira by 2020.

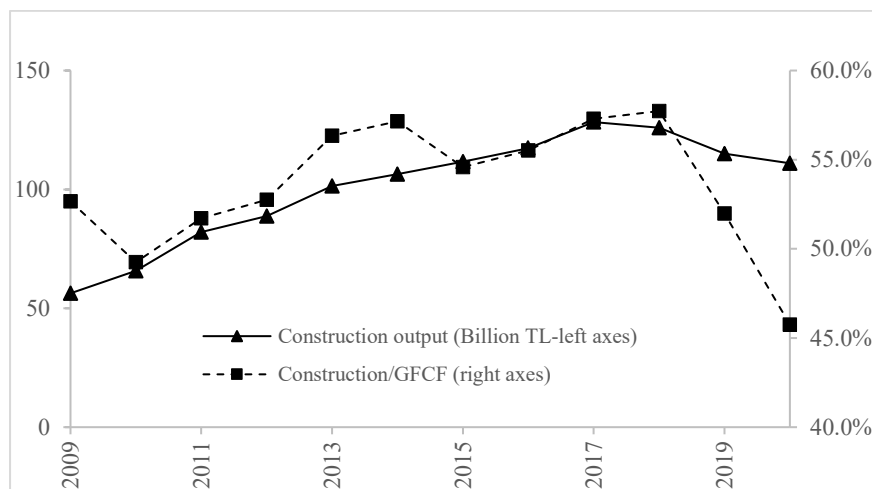


Figure 12. The share of construction investments in GFCF and the construction output.

The increase in construction investments and output can be attributed to the government's policies and incentives, including tax breaks, subsidies, and loans to support the construction sector. Additionally, the growing population and urbanization trend in Turkey have led to an increase in the demand for housing and infrastructure, which has boosted the construction sector. From an economic perspective, the construction sector in Turkey has had a positive impact on the economy, thereby contributing significantly to GDP and generating employment opportunities. The increase in construction investments and output has also boosted income generation and led to a decline in housing prices, thereby making housing more affordable for the population until 2017. However, the decline in construction output since 2017—combined with high inflation rates—is leading to a shortage of housing supply, which is causing a rapid increase in housing prices. This highlights the importance of ensuring stability and predictability in the economic environment to encourage investment and reduce uncertainty in the construction sector.

Thus, the experience of the Turkish construction sector in the 2000s offers valuable lessons for developing countries. Key takeaways include recognizing the construction sector's potential in promoting economic growth and reducing poverty as well as the importance of policies and incentives for long-term investments, energy efficiency, and sustainability. Infrastructure investments and stable policy environments can further boost the sector and overall economy. However, overconfidence in the sector, inadequate legal framework and regulations, potential vulnerabilities of the sector to external shocks, and the damage to the economy caused by monetary and fiscal policy steps taken to support supply and demand in the sector should not be overlooked.

4.6. Money Supply, Interest Rates, and Construction Output

Understanding the responsiveness of economic activity to changes in monetary policy variables is crucial for designing a successful monetary policy. While monetary policy instruments, such as money supply and interest rates, affect real variables such as growth and unemployment through various transmission mechanisms, they also affect the dynamics of economic sectors. In the construction sector, where output is more volatile than other components of national output, monetary policy measures affect both the demand and supply sides of the sector. Economic growth is an important driver of demand for construction output, but other factors such as the availability of funds and the cost of borrowing affect supply-side behaviour. Figure 13 reveals the variation in money supply, CBRT overnight interest rates, and construction output over time in real terms.

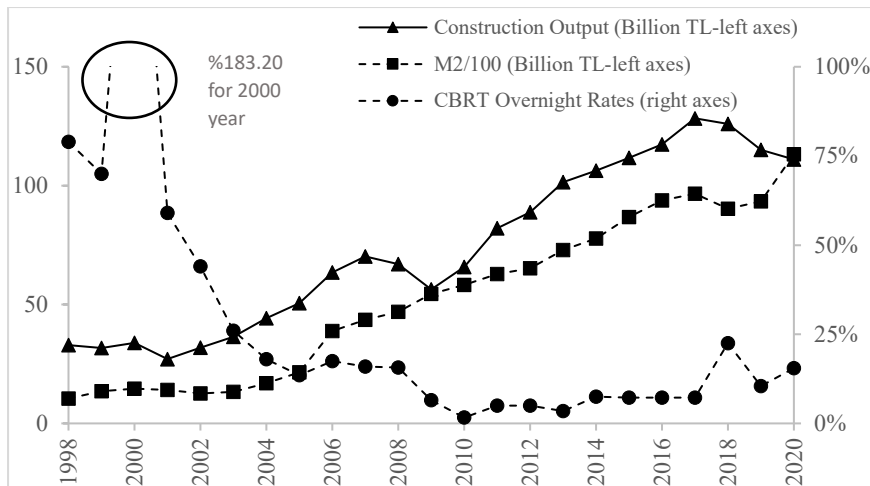


Figure 13. The construction output, money supply, and the CBRT overnight rates.

It is evident that in the late 1990s and early 2000s, money supply and construction output were relatively low in real terms due to the effects of high interest rates. After the economic crisis of 2001, interest rates fell significantly and the levels of money supply and production began to rise. The trend in money supply and construction output followed a similar pattern after the 2001 crisis until 2019, except for a sharp decline in construction output in 2009 due to the impact of the 2008 global financial crisis. A similar pattern was observed for Hong Kong by Tse and Raftery (2001). In 2018, the level of money supply fell due to the rapid depreciation of the Turkish lira and the rise in interest rates; in the same year, the level of construction output also entered a downward trend. In the following years, as a result of the rising inflation rate and the depreciation of the Turkish lira, the money supply began to recover and reached a new peak in 2020 when the quantitative easing policy was introduced in 2019 to reduce the negative effects of COVID-19.

Further, regulatory changes to the active ratio force banks to lend. This monetary policy action leads to an increase in both mortgage sales and house prices, which helps the housing sector to clear its inventories. However, the level of construction output continues to suffer and fall in real terms, which is in contrast to the previous correlation with money supply. The

unbearable inflation rate and the record low level of the Turkish lira at the end of 2020 forced the economic administration to abandon the loose monetary policy. Although a quantitative easing policy stimulates housing demand, it worsens price stability and forces the economy to cope with a higher inflation rate for a longer period of time. In addition, the repayment of these mortgage loans in the future could become a contentious issue, as the real income level of households has fallen and the unemployment rate has risen due to the global recession.

4.7. Construction Loans, Plans Approved, and Construction Output

Central banks primarily affect the money supply by adjusting interest rates or the active ratio. Low interest rate policies and credit growth have a direct impact on an economy's investment environment. The two main sources of investment finance are debt and equity. When borrowing costs are low and access to finance is readily available, financing the investment with less equity and more debt becomes a natural outcome. However, if the investment output is a low value-added product, achieving sustainable economic growth with a high debt ratio is debatable. In the context of the Turkish construction sector, a loose monetary environment and government incentives for the real estate sector have made it one of the most popular investment areas in recent years. The factors contributing to this popularity include easy entry into the sector, relatively low investment costs, a less specialised industry, a young population that generates sustainable demand, and government incentives that focus on both supply and demand. Consequently, numerous companies from other sectors and individual entrepreneurs have shown significant interest in the property sector during the 2000s.

Figure 14 displays the changes in construction output (divided by 10 as a scale factor) and the number of building permits (second axis) in relation to construction loans between 1998 and 2020 in real terms. High interest rates caused construction loans and construction output to fall between 1999 and

2003. However, a significant increase was observed between 2003 and 2017 as a result of construction-oriented economic policy. During the 2008 global financial crisis, the expansionary monetary policies of the world's major central banks prevented this trend from being interrupted. On the other hand, the deterioration of the financial environment due to the economic crisis in 2018 disrupted the real growth of construction loans and caused the sector's loan volume to contract in real terms in both 2018 and 2019. Despite the excessive depreciation of the Turkish lira and high inflation, real growth resumed in 2020 and was driven by the low interest rate policy that continued until the end of 2020 to mitigate the effects of the COVID-19 pandemic and stimulate the economy through loan growth.

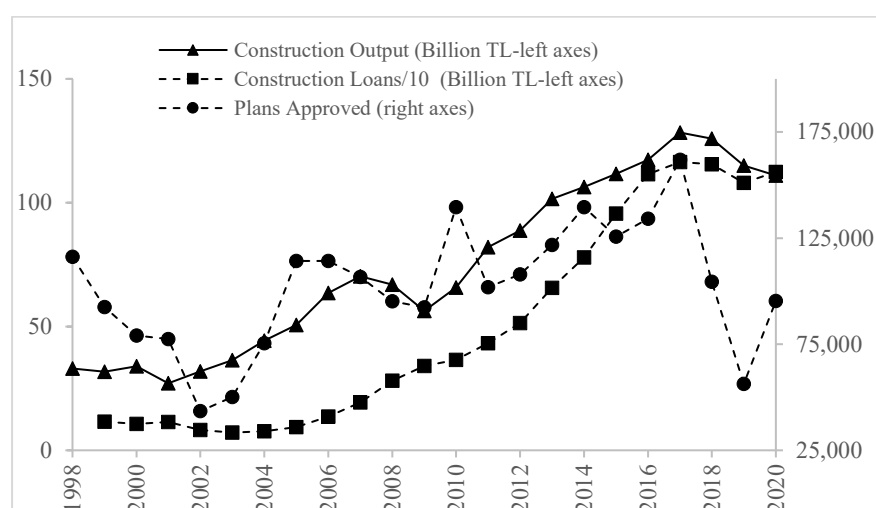


Figure 14. The construction output, construction loans, and plans approved.

The level of construction output and loans in real terms follow a similar pattern, with a few exceptions. The first break occurred in 2008–2009. During this period, construction loans increased by 76.91%, despite construction output and the number of approved plans decreasing by 19.24% and 13.42%, respectively. This is due to easier access to finance as a result of global monetary easing. The second breach occurs in 2020. Since 2018, the level of construction output has decreased by 13.51% and the number of approved plans has plummeted by 43.61% due to the effects of the Turkish currency crisis and COVID-19. However, in 2020, construction loans showed signs of

slight recovery, increasing by 4.11%. The real estate sector, more sensitive to financial conditions, responded to this weak recovery with an increase of 4.63%, but the level of construction output continues to suffer. During the 2018 crisis, the construction sector emerged as the second-largest sector with external debt problems, following the energy sector. The increase of almost 40% in the basket rate had a rather negative impact on the balance sheets of companies, with many facing serious difficulties in obtaining financing, having to cease operations, and, in the worst cases, being forced to declare a concordat. The addition of the pandemic to this situation made it extremely challenging for companies to operate. Furthermore, the inability to halt the depreciation of the Turkish lira, despite numerous controversial economic interventions, indicates that the sector's growth under high leverage is unsustainable.

5. DISCUSSION AND POLICY RECOMMENDATIONS

The findings of this study provide valuable insights into the complex relationship between the Turkish economy and the country's construction sector during the 2000s. The results suggest that while the construction sector plays a significant role in promoting economic growth and development, over-reliance on the sector can lead to several challenges and vulnerabilities that may hinder long-term sustainable growth.

The upward trends in input costs, such as labour and construction material costs, indicate the need for policymakers and industry stakeholders to monitor these costs and adopt measures to mitigate the possible consequences of rising input prices on profitability, cost control, inflationary pressures, and investment attractiveness. Further, the weak correlation between the construction sector's production and turnover indices indicate issues such as low-efficiency and elastic demand. An additional aspect to consider is the opportunity cost of focusing on the construction sector in terms of inefficient production. As resources are allocated to the construction sector, other sectors that might have higher efficiency and productivity could

be neglected, which may result in suboptimal resource allocation and reduced overall economic growth. To promote sustainable economic growth and diversification in the long-run, policymakers should consider these factors when developing strategies tailored to the unique characteristics of the construction sector.

Developing countries can learn from Turkey's experience with the contribution of the construction sector to economic growth, its impact on the development of other sectors through infrastructure investments, and the employment it generates. Supporting policies (such as urban renewal laws and infrastructure investment) and incentives (such as tax cuts and credit expansion for the sector) can be effective in reviving the sector during economic downturns in the short term. However, the sensitivity of the construction sector to economic changes and external shocks experienced in the financial crises of 2001, 2008–2009, the 2018 currency crisis, and the COVID-19 pandemic reveal that overdependence on the construction sector may result in a deterioration in macroeconomic stabilisation. Even worse, excessive investment and incentives may cause a total collapse of the economy, particularly when the internal dynamics of the sector—such as inefficient production, demand elasticity, low value-added production, and opportunity costs—are considered. For example, the decline in construction output since 2017, caused by COVID-19 and high inflation rates, has led to a shortage of housing supply, a rapid increase in housing prices and rents, and social unrest. This poses challenges for sustainable development and emphasises the need for balanced growth across various sectors of the economy. Another important issue that must be emphasised is the structure of the labour force in the construction sector. Policies should be adopted to address the various issues affecting the performance of the construction sector, such as informality in the labour market, dependence on foreign labour, and lack of skilled professionals and technicians. Addressing these issues is essential for the construction sector to have a labour force that is

resilient to economic shocks and adaptable to evolving construction techniques.

In conclusion, one of the most important key lessons for developing countries is to ensure balanced economic growth and diversification, which can reduce vulnerabilities to external shocks and create a more resilient economy. The other lesson is to establish a robust legal framework and effective regulations to manage the growth and performance of the construction sector along with ensuring transparency, accountability, and compliance with safety and environmental standards. Moreover, addressing inefficiencies—such as lack of standardization, insufficient investment in technology and innovation, and skills shortages—is crucial for improving productivity and efficiency. Workforce development, through education and training programs, can help address the shortage of skilled professionals and technicians in the construction sector. Finally, policymakers should consider the impact of fiscal and monetary policies on the construction sector and ensure that these policies are sustainable in the long term. By learning from the challenges and opportunities encountered by the Turkish construction sector, developing countries can adopt effective policies and strategies to create a sustainable construction sector that contributes to long-term economic growth and development in a country.

6. CONCLUSION

In this study, the relationship between the construction sector and the economy of a country was examined through the case study of Turkey within the framework of two main concepts in the construction economics literature. The first one perceives the construction sector as the driving force of the economy and highlights its sectoral linkages, and potential to absorb unemployment. The second and opposing one focuses on issues in the sector's relationship with the economy, such as its sensitivity to macroeconomic conditions, the problem of idle capacity, and excessive resource allocation.

Classical economic theories emphasise that the main goal of economic development is the achievement of economic growth. Although economic growth is necessary for development, it is not sufficient on its own (Todaro and Smith, 2020). It is debatable whether an economic model centred on the construction sector is sufficient to achieve this level of long-term economic growth. In order to eliminate this question—a set of macroeconomic data, each dealing with a different aspect of the relationship between the sector and the economy—was analysed using descriptive statistical tools and interpreted in the light of local and global economic developments in the 2000s.

The results revealed that, particularly in periods when the construction output-turnover ratio is negative—that is, when there is inefficient production in the sector—the transfer of more resources to the sector does not provide the desired real and sustainable economic growth. In addition, monetary policies that are not in line with economic realities in order to maintain demand for the sector continue to make the economy fragile and cause currency shocks in countries with high current account deficits, such as Turkey. The high inflation caused by these exchange rate shocks reduces the purchasing power of households and limits their access to goods and services. In turn, this has a significant impact on the quality of life, which is one of the objectives of economic development.

There are two significant limitations to this study: The first limitation arises from the data provider's alteration of the computation methods for the data, which have not been linked with the old series. This situation renders more comprehensive research meaningless and makes it impossible to compare the data with that of other countries. The second limitation pertains to the methodology. Within the scope of this study, only general trends and patterns were intended to be identified. Therefore, only descriptive statistical tools and graphics were utilised. However, analysing the long-term and short-term relationships between the data using econometric methods would lead to

more precise conclusions. Thus, future research should be conducted using comparable and robust data and econometric models for different countries. Moreover, future research should focus on the possible effects of excessive growth in the construction sector from social, spatial, and environmental perspectives.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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