IBN HALDUN UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF ECONOMICS

MASTER'S THESIS

ANALYZING THE IMPACT OF FISCAL AUSTERITY POLICY ON URBAN RESILIENCE IN TÜRKİYE

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ISTANBUL, 2025

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by
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A thesis was submitted to the School of Graduate Studies in partial fulfillment of the requirements for the Master's degree in Economics

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ÖZ

TÜRKİYE'DE MALİ KISITLAMA POLİTİKASININ KENTSEL DAYANIKLILIĞA OLAN ETKİSİNİN ANALİZİ

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Kentsel dayanıklılık, kentsel ekonomilerin ekonomik krizler, politika değişiklikleri, doğal afetler ve sosyo-politik kesintiler dahil olmak üzere dış ve iç şokları absorbe etme, bunlara yanıt verme ve bunlardan kurtulma yeteneği olarak tanımlanır. Mali krizler sırasında, hükümetler genellikle hükümetin vergileri artırması veya kamu harcamalarını azaltması gibi yöntemleri içeren en kapsamlı politika yanıtlarından biri olan mali kemer sıkma politikaları yoluyla ekonomiyi istikrara kavuşturmaya çalışır. Ancak, bu tür politikaların gelişmekte olan ülkelerdeki sosyo-ekonomik etkisi henüz araştırılmamıştır. Bu nedenle, bu araştırmanın amacı Türkiye'nin mali kemer sıkma politikasını ve bölgesel kentsel dayanıklılık için potansiyel etkilerini ampirik olarak analiz etmektir.

Çoğu literatür ağırlıklı olarak mali politikaların makro düzeydeki etkilerini araştırırken, bu araştırma 2008 ile 2024 yılları arasında Türkiye'nin 81 ilinde kentsel dayanıklılık ve mali kemer sıkma hakkındaki verileri kullanarak bölge çapında karşılaştırmalı bir araştırma yürütmektedir. Temel Bileşen Analizi (PCA) ile kentsel dayanıklılık endeksi, üç boyutta 14 kapsamlı gösterge kullanılarak geliştirilmiştir; ekonomik, sosyal ve altyapısal olarak analizin kentsel uyum ve mali baskılar arasındaki ilişkinin daha ayrıntılı bir yorumunu sunmasına olanak tanır. Ayrıca, kentsel dayanıklılıktaki mekansal farklılıkları görselleştirmek ve yorumlamak için R programı aracılığıyla gelişmiş haritalama tekniği kullanıldı. Panel VAR analizi, zaman

içinde dinamik politika etkilerini yakalamayı amaçladığı için bu analizin bir diğer önemli bileşenidir; sabit etkiler tahmini ise mali kemer sıkma ile kentsel dayanıklılık arasındaki ilişkiyi yakalar.

Çalışma, mali kemer sıkmanın kamusal kalkınma projelerine yapılan yatırımları azaltarak yerel büyümeyi sınırladığını ortaya koymaktadır. Bu, bölgesel kentsel dayanıklılığı tehdit ederek daha zayıf ekonomiler üzerindeki etkileri zayıflatır ve mekansal eşitsizlikleri daha da kötüleştirir. Çalışma, politika yapıcıların eşitlikçi kentsel kalkınmayı teşvik etmek için kapsayıcı mali stratejiler geliştirmeleri gerektiğini öne sürmektedir. Sürdürülebilir kentsel ekonomilerin bir parçası olarak mali kemer sıkma için gerçek dünya politika değerlendirmeleri ve çıkarımları sağlar.

Anahtar Kelimeler: Kentsel Dayanıklılık, Mali Sıkı Tedbirler, Türkiye'nin Mali Politikası.

ABSTRACT

ANALYZING THE IMPACT OF FISCAL AUSTERITY POLICY ON URBAN RESILIENCE IN TÜRKİYE

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Urban resilience is defined as the ability of urban economies to absorb, respond to, and recover from external and internal shocks, including economic crises, policy changes, natural disasters, and socio-political disruptions. During financial crises, governments often attempt to stabilize the economy through fiscal austerity policies, which is one of the most comprehensive policy responses, including methods such as the government increasing taxes or reducing public spending. However, the socioeconomic impact of such policies in developing nations remains unexplored. Therefore, the objective of this research is to empirically analyze Türkiye's fiscal austerity and its potential implications for regional urban resilience.

While most literature predominantly explores the macro-level impacts of fiscal policies, this research conducts cross-regional comparative research using data on urban resilience and fiscal austerity in all 81 provinces of Türkiye between 2008 and 2024. With Principal Component Analysis (PCA), the urban resilience index is developed using 14 comprehensive indicators across three dimensions: economic, social, and infrastructural, allowing the analysis to provide a more nuanced interpretation of the relationship between urban adaptability and fiscal pressures. Moreover, an advanced mapping technique was employed through the R program to visualize and interpret spatial disparities in urban resilience. Panel VAR analysis is another important component of this analysis, as it intends to capture dynamic policy

effects over time, while fixed effects estimation captures the relationship between fiscal austerity and urban resilience.

The study reveals that fiscal austerity limits local growth by lowering investments in public development projects. This threatens regional urban resilience, undermining the impacts on weaker economies and exacerbating spatial inequalities. The study suggests that policymakers should develop inclusive fiscal strategies to promote equitable urban development. It provides real-world policy considerations and implications for fiscal austerity as part of sustainable urban economies.

Keywords: Fiscal Austerity, Türkiye,'s Fiscal Policy, Urban Resilience.

DEDICATION

It is dedicated to my beloved mother in heaven.

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I want to thank Allah Almighty, who granted me the ability to undertake and complete this research project. I am sincerely grateful to my advisor, Prof. Dr. Muhittin Kaplan, for his invaluable guidance, support, and patience with me throughout this project.

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I present my endless love and gratitude to my mother and my best friend for their constant love and support throughout this project.

Zoha Memon

İSTANBUL, 2025

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS AND ABBREVIATIONS

URI	Urban Resilience Index
PEXP	Public Expenditure % of GDP per Capita
TREV	Tax Revenue % of GDP per Capita
PGWTH	Population Growth Rate
PVAR	Panel Vector Autoregression
FE	Fixed Effect Method
IRF	Impulse Response Function

CHAPTER I

INTRODUCTION

After the Global Financial Crisis of 2008, governments imposed austerity policies for fiscal consolidation. These policies consisted of increasing taxes and reducing spending to limit surging debt levels and restore macroeconomic stability (Alesina, 2013). Yet, an emerging literature has begun to consider the longer-term socioeconomic effects of austerity measures, particularly at the subnational level. For instance, when European authorities implemented austerity policies in response to the 2008 crisis, analysts soon began to question their appropriateness due to the subsequent years of poor economic growth and rising bond yields (Born & Muller, 2015). A case study of Swansea, South Wales, further illustrated the localized consequences of austerity by analyzing its effects on community risk and resilience. The study found that austerity worsened the performance of various government departments responsible for risk management, while also weakening collective institutions of social protection. As a result, community resilience declined, and vulnerability to social and economic shocks increased (Wright, 2016).

The factual effects of austerity policies can differ markedly between regions due to the timing, intensity, and scope of austerity measures, as well as the differentiated effects of austerity upon social, economic, ecological, and community conditions. This is due to the fact that different regions have their unique economic, social, and infrastructure circumstances. Appreciation of this sectoral and spatial heterogeneity is important for understanding the more general social impacts of austerity, especially in cities where multiple intersecting vulnerabilities are often located.

At the same time, urban space—particularly in the case of developing countries—has become critical for national economic performance as urbanization continues to diffuse the demand for resources away from the periphery and into cities. Building resilient urban systems—systems that can withstand economic shocks, recover from

stresses on infrastructure and services, or thrive under periods of disaster—are now part of sustainability development agendas (UN, 2018).

Urban resilience is, however, profoundly impacted by the fiscal landscape. Public systemic supports can foster the foundational elements of regional resilience through resources allocated to public infrastructure, social welfare, and municipal resources. Austerity measures, especially in countries with significant regional disparities, could end very differently across space. Some cities may absorb the shock while others may experience long-lasting stagnation or harm to the quality of services.

Previous studies have been conducted at the macroeconomic level to understand the impact of fiscal austerity policies on the aggregate level. These studies generally analyse how an increase in taxes and cuts in public spending impact the budget deficit and economic stability of the region. However, a significant literature gap exists in analysing the socioeconomic impact of fiscal austerity policies at the sub-national level. Therefore, this study critically examines the case of Türkiye's fiscal policies and their impact on urban resilience. Türkiye poses a unique environment to shed light on this question. Given that Türkiye is a developing country that has gone through multiple rounds of fiscal adjustments in the past twenty years (namely, the aftermath of the 2008 economic crisis and the earthquakes in 2023), Türkiye offers a way to see how fiscal consolidation produced variability in urban resilience at the regional level. Türkiye has enacted many policies intended to promote urban transformation and to promote disaster-risk urban transformation (Law No. 6306); while these are indicative of the country's commitment, the resilience-building policies are contingent on the preservation of fiscal capacity.

Additionally, numerous studies have examined the national implications of fiscal policy in Türkiye. However, very few have examined empirically the differentiated regional effects of austerity on urban resilience indicators (e.g., household HDI, employment, infrastructure quality, access to public services). The spatiality of austerity as it pertains to local differences and inequalities between regions has been largely ignored. This study proposes to address this gap and investigate the empirical impacts of austerity on urban resilience in Türkiye's provinces. It further divides the 81 provinces into three different regions based on HDI level, i.e., low-HDI provinces,

middle-HDI provinces, and high-HDI provinces, to see the policy impact on regions with different levels of development. It also seeks to learn whether differences in changes in public investment are correlated with reductions in socioeconomic and infrastructural resilience, and whether the impacts are statistically different between regions.

The study makes five primary contributions:

i. It provides evidence from a developing country, at a regional level, that will elucidate how austerity influences urban resilience;
ii. It develops a composite urban resilience index, using economic, social, and infrastructural indicators;
iii. It describes the relationship between fiscal policy and spatial inequalities, and offers conclusions on how fiscal planning can lead to more equitable and resilient futures;
iv. It provides empirical analysis of policy shocks of fiscal austerity on urban resilience through panel vector autoregression and fixed effect method;
v. It uses advanced mapping techniques through the R program to show spatial disparities, visualize urban resilience, and provide a comprehensive interpretation of the asymmetric impact of fiscal austerity policies across regions.

The thesis is structured around the following sections: Section 2 provides a comprehensive review of the literature on fiscal austerity policies and urban resilience. Section 3 is an outline of the data, description of variables, and details of the empirical methodology employed in the study. Section 4 provides insights into the empirical results established in the study. Section 5 concludes the discussion of the mechanisms, policy implications, and limitations of the study.

1.1. Hypotheses Proposed by the Study

H_1: Fiscal austerity is negatively correlated with regional urban resilience, based on socioeconomic and infrastructure measures.

H_2: Cuts in public investment and social spending decrease the regional capacity to recover from economic and environmental shocks.

H_3: Public services cuts and cuts to public investment, due to austerity measures, are likely to be more detrimental to the economically vulnerable regions.

H_4: Austerity increases inter-regional disparities in urban resilience outcomes.

CHAPTER II

LITERATURE REVIEW

A considerable body of theoretical and empirical work has analyzed the more complicated and nuanced relationship of fiscal austerity, budgetary constraints, economic equilibrium, and adaptive urban governance. The relationship and implications for adaptive governance and the ability to invest have growingly received attention regarding fiscal policies, especially for developing nations, since they tend to face higher probabilities of exogenous shocks. It is significant that with that interest in understanding how fiscal constraints impact economic sustainability, interest in how local policy adaptation and austerity measures intersect is also increasing. Thus, this paper aims to present the impact of fiscal retrenchment on the ability to execute resilience strategies for local governments and how adaptive fiscal management can help influence broader economic stability and urban sustainability.

The following sections of the literature review address important elements of fiscal austerity and urban resilience. First, they outline the conceptual foundation of fiscal austerity, exploring its role in macroeconomics and the conflicting evidence of its impact. Then, it elaborates on urban resilience and the social, economic, and governance dimensions. Furthermore, it discusses the themes together, evaluating how austerity affects municipal governance, infrastructure, and sustainability issues. It examines the political and economic Tradeoffs of austerity at the local level and conducts a historical exploration of Türkiye's fiscal policies and their implications for local resilience. Finally, the literature addresses the challenges of urban resilience in Türkiye, including fragmented governance, institutional barriers, and adaptation strategies. These pieces form an overall framework for understanding how austerity-induced policies impact certain dynamics of urban resilience.

2.1. Conceptual Framework of Fiscal Austerity Policies

Fiscal austerity—the strategies aimed at decreasing deficits and public debt through reductions in levels of government expenditure or tax increases—has been a central aspect of macroeconomic management. Overall, fiscal policy encompasses all public expenditure decisions, including transfer payments and tax policies, encompassing three broad dimensions regarding public and economic policy: allocations of resources, redistributing wealth given limited public resources, and macroeconomic stabilisation (Şimşek, 2010). Typically, austerity represents a policy response rationalized in some way to promote future fiscal sustainability by restoring confidence in the country's finances to reduce borrowing costs. More broadly, however, austerity impacts are much wider than simply future economic stability, specifically affecting the capacity of government to govern, the levels of infrastructure expenditures, and urban resilience.

The theoretical and empirical literature suggests a complex and contested understanding of the direct and indirect impacts of austerity. For example, the Keynesian multiplier suggests that government expenditure generates economic activity, while government austerity reduces expenditure, expanding the potential impacts for inducing deeper recessions, as well as further undermining the potential for recovery. Empirical literature certainly documents that austerity appears to lead to deeper economic downturns, widening social inequalities, or undermining social cohesion, therefore threatening the levels of resilience cities should build up to endure shocks (Zezza, 2012). Beyond connecting it back to Keynes, Zezza (2012) provides a general overview of the differences between recent monetary theories and traditional Keynesian economic arguments that challenge the effectiveness of fiscal stimulus, arguing that, instead, interest rates and inflation shape macroeconomic performance.

The Ricardian equivalence hypothesis complicates matters further by positing that individual agents foresee future tax increases when governments operate at a deficit, and thus do not spend as much, negating the federal government's stimulus intention (Barro, 1974). However, in a real-world context, the assumption of rational economic agents is weakened by the growing public debt and unwillingness to fully pay debts. These assumptions surrounding rational responses to government-imposed budget constraints do not seem universally valid.

In addition to their overarching macroeconomic implications, national fiscal austerity creates different responses to economic impediments between cities, particularly in countries where there is large financial divergence between municipalities. Wealthier urban areas with varying streams of revenue might withstand cuts to budgets better than economically worse areas, which are usually funded through public services. As Zhang (2016) pointed out, the decline in public expenditure, especially for capital grounds, can destabilize long-term economic activity. This is partly due to the fact that municipalities with public investments, where previous shocks and associated risks were diminished, were less physically capable of dealing with financial shocks. In the case of Türkiye, fiscal retrenchment was more impactful in lower-HDI provinces, which rely heavily on government funding to help economic activity, and equally important social benefits. These regions, more than others, relied on necessary components of fiscal safety because their limits with fiscal retrenchment, compared to public services, otherwise exacerbated poverty, limiting their viability for future disruption.

Governance capacity is also an important consideration in establishing how municipalities cope with fiscal austerity. Ribeiro (2019) argues that sound governance mechanisms can diminish some negative outcomes of budgetary constraints because they allow municipalities to proactively prioritize resources and service delivery. Frequent fiscal austerity degrades institutional responsiveness, which restricts the ability of local governments to take a long-term view on investments in resilience initiatives.

Tyler and Moench (2012) advocate for adaptive financial structures to prioritize long-term investments in resilience measures, climate adaptation, disaster preparedness

needs, and economic diversification. When financial consolidation creates fragmentation of governance, municipalities struggle to coordinate an effective policy response. As a result, municipalities bear additional vulnerabilities in urban systems. In the context of the Asian Cities Climate Change Resilience Network (ACCCRN), this framework was applied across 10 cities to support resilience planning.

This conceptual framework is concerned with the wider socioeconomic and political costs of fiscal austerity, particularly in relation to urban resilience. Whether direct cuts or slow manifestation of fiscal austerity measures, the cost of paying low levels of investment to urban services, physical infrastructure, and social safety net services may limit cities' ability to absorb and recover from shocks. The relationship between fiscal tightening and urban resilience indicates a larger set of tensions and tradeoffs that policymakers can re-examine and consider. In relation to urban governance, the implications reinforce the need for a more balanced stance to reconcile fiscal prudence with long-term urban sustainability.

2.2. Theoretical Foundations of Urban Resilience

Urban resilience provides a framework for analyzing how cities absorb, respond to, and recover from economic, environmental, and social shocks that affect their long-term viability. In Türkiye, where the public budget and priorities can change dramatically based on fiscal austerity measures, resilience cannot be disentangled from fiscal capacity and longer-term economic sustainability. The financial capacity of municipalities to deal with constraints directly relates to their ability to sustain infrastructure, provide essential services, and protect vulnerable populations during adverse shocks.

A major influence on urban resilience is the degree to which local governments have fiscal autonomy to plan effectively and in the long term. Contrarily, policies of fiscal austerity—characterized by a decrease in public spending or an increase in taxation—threaten municipalities' fiscal capacity to adapt and recover. Cities cannot afford to be proactive in preparing for economic downturns and unexpected external shocks without appropriate financial resources. Urban systems can only endure through long-

term bundled resources. It is important to balance fiscal constraints and continuous investment in ways that promote resilience so that fiscal constraints do not inhibit the ability of cities to adapt and withstand uncertainty.

2.2.1. Economic Foundations of Urban Resilience

Resilience, originally developed in ecological sciences by Holling (1973), describes the extent to which systems absorb shocks, retaining their core functions. As the resilience theory was applied to urban systems, the role of many other factors, including the economic, social, and governance factors that allow for acceptance of stressors and the ability to maintain the core functions, was also recognized.

The resilience of urban areas, from an economic perspective, stems from the economic and fiscal stability of the governments, in addition to the ability of municipalities and governments to make investments in the tangible (physical infrastructures, e.g., transportation, utilities, housing), intangible (i.e., social services), and preparedness (and subsequent recovery). Godschalk (2003) pointed out the role of effective public investment and governance for maintaining economic, social, and physical functions. Austerity measures (in terms of reducing government spending) diminish these aspects of investment, and this can create a downward spiral in productive investments, deteriorating infrastructure, and weakened social safety nets, which cities need not only in financial downturns but also when responding to a disaster.

While Klein (2004) offered the narrowest definition of resilience as merely the ability to withstand shocks without changing fundamentally (continually maintaining employment, productivity, and service provision), an economically productive endeavor, Pickett (2004) clearly posited that adaptability and transformations (critical aspects of resilience) require fiscal flexibility. Fiscal austerity will only diminish the level of flexibility available and limit the ability of the government to redirect resources to innovative recovery or transformative approaches. Governance structures are the backbone of urban resilience (Campanella, 2006), but such structures are dependent upon fiscal autonomy and fiscal strength. This is especially true for Türkiye, as the repeated rounds of fiscal tightening severely limited budgets at the local level, clearly hampering local governments' ability to respond to shocks. Reduced fiscal

capacity also limits the community's ability to invest in anticipatory infrastructure as well as the community projects that will best assist in building long-term resilience.

The introduction of urban resilience vision into spatial planning and governance (Coaffee & O'Hare, 2008) is dependent on adequate public funding. Cuts attached to the urban development budget during an austerity period can increase a city's vulnerability through inflating disturbances that achieve the impact of degrading its infrastructure and constraining its response (Tyler & Moench, 2012).

Chelleri (2012) provides a rich description of resilience that includes persistence, adaptation, and transformation, all of which require ongoing funding. Without sufficient fiscal resources, urban areas often cannot persist (maintain their infrastructure), adapt (each system may change to realities produced by changed conditions), or transform (some systems may not change fundamentally, but attempt to optimally address enmeshed conditions).

Social capital development and community participation are also essential components of urban resilience (Kapucu, 2024) but are largely premised on public investment in governance and social programs. Fiscal constraints ascribed to austerity place limitations on such forms of engagement and impairment of social capital, and undermine the socioeconomic underpinnings necessary for resilience.

2.2.2. Key Dimensions of Urban Resilience

Consideration of the different perspectives of urban resilience is important in designing appropriate policy responses to fiscal constraints while ensuring economic resilience and equity. As policymakers think about the interplay of social, economic, and infrastructural resilience, they can formulate adaptive strategies that help to alleviate the negative pressures of austerity on urban development. Zeng and Yu (2021) characterize urban resilience into social, economic, and environmental/infrastructural significance, with each separately contributing to a city's capacity to withstand shocks, adapt to changing conditions, and transform in relation to longer-term challenges. Given Türkiye's regions, in which austerity measures operated by top-level governments impact municipal budgets and investment,

understanding the different dimensions of resilience as illustrated in these definitions provides a way to assess how regions respond to negative economic shocks and limits to public spending.

- **Social Resilience**

Social resilience is the ability of urban communities to face, adapt, and recover from shocks and external stresses while still maintaining levels of social cohesion, social well-being, and social justice. Socioeconomic indicators of social resilience include health care, education, strong social service systems, inclusive social services and structures, and resilience to crisis. Social resilience involves community-based events or participatory governance that can build a foundation for local adaptive capacity because it enables grassroots development and creates opportunities for social innovations and further local adaptive capacity. Mehmood (2016) illustrates that social and other resources are woven together in a variety of ways by individuals and their communities who share common goals and collaboratively problem solve and share information.

For example, it has been widely documented that prolonged austerity can fracture societies. Galofré-Vilà (2017) revealed that austerity increased the disruption leading to social unrest and political extremism in interwar Europe. Blyth (2013) states that austerity has not only served to deepen inequality and political uncertainty but has also not led to a stable economy in the long term or improvements toward debt repayment.

- **Economic Resilience**

Economic resilience is one of the constituent parts of urban resilience. It encompasses the ability of a city to absorb, manage, and recover from economic shocks, be it external (global shifts in the marketplace and financial instability) or internal (eg, collapse of local industry). This dimension is characterized by economic diversification and indicators such as employment rates, HDI generation and sustainability, access to financial institutions, entrepreneurship, and adaptive governance. Economic resilience allows urban economies to carry on their functions (livelihoods, social services, and public revenue) in contexts of fiscal stress. Coaffee

(2013) argues that economic diversification and adaptive governance are pivotal, while Zhang (2016) points to agglomeration economies, local job creation, and government spending on infrastructure as the influential factors. Moreover, economic resilience includes transforming and shifting existing economic structures to new growth trajectories after shocks.

- **Infrastructure and Environmental Resilience**

Infrastructure and environmental resilience-governance deal with the physical systems and ecological conditions underpinning urban functioning. It includes the physical state and degree of resilience of critical infrastructure (transport systems, utilities, housing systems, disaster risk management systems) and physical conditions in relation to the environment (urban green space and biodiversity, air and water quality, waste and energy). Tyler and Moench (2012) argue that ecosystem-based adaptation approaches and investments in green urbanism are pivotal to increasing resilience in these areas. For example, infrastructure resilience provides continuity of essential services, whereas environmental resilience contributes to the long-term sustainability and livability of urban areas. Fiscal consolidation, in particular, has an adverse effect on public investment in both physical infrastructure and human capital. Streeck (2011) points out that austerity frequently leads to underinvestment in educational, health, and labor market programs, which directly affects long-term productivity by undermining implicit social contracts, trust between economic agents, and social cohesion.

By integrating these dimensions, urban resilience becomes a multifaceted construct encompassing social equity, economic stability, and sustainable infrastructure, each reinforcing the others in a dynamic siysem.

2.3. Fiscal Austerity and Urban Resilience: An Integrated Framework

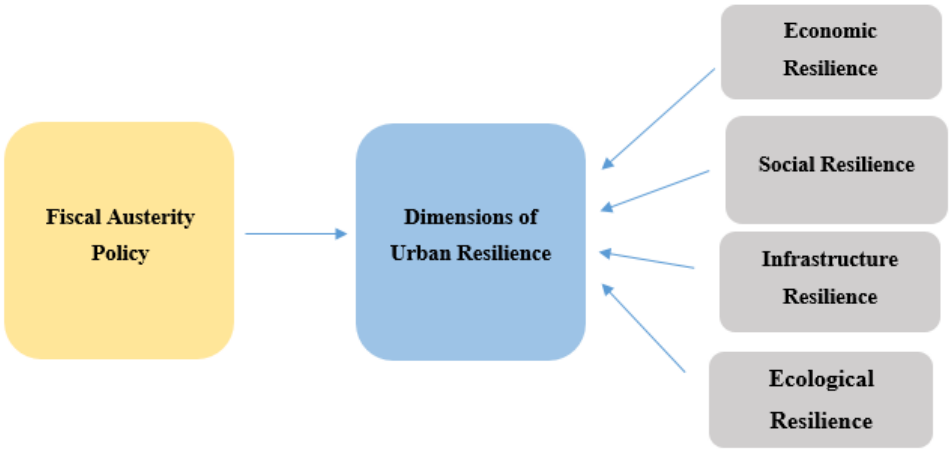

Figure 1.1. Fiscal Austerity and Urban Resilience: An Integrated Framework

Fiscal austerity, often seen as a tool for stabilizing public finances, can affect urban resilience by dictating municipal budgets, infrastructure investments, and the provision of fundamental social services. While macroeconomic stability is still a policy goal because of the true importance of municipal budgets to the economy's long-term viability, the austerity-driven budget cuts often limit the ability of local governments to provide public goods that cannot be replicated in the private market or to collectively respond to crises (like adapting to external shocks), for instance, in Türkiye, where measures of fiscal consolidation have been a regular aspect of economic management in a country with multiple fiscal consolidations, municipal budgeting births a difficult trade-off between upholding fiscal discipline and long-term principles of resilience. The following section explains how fiscal austerity impacts urban resilience.

I. Economic Channel: Limits to Local Growth, Investment, and Diversification.

Fiscal austerity imposes direct constraints on the economic foundations of urban resilience by limiting municipal spending and investment capacity in local economies. Budget cuts made to achieve macroeconomic stabilisation restrain local government autonomy and flexibility to support economic diversification, innovation ecosystems, and labour market activation policies, all of which are critical for cities to adapt to

economic shocks and maintain growth paths. In fiscal consolidation systems of public financial management, local governments respond with expenditure cuts, which affect long-term development processes such as SME support, industrial upgrading, and innovation infrastructure spending. These restrictions make it difficult for urban areas to develop a local economy that is flexible and resilient, particularly in the most fiscally constrained areas. Meanwhile, the effects of reduced public investment associated with austerity also impair agglomeration economies and the productivity gains of urban density, thus strangling the endogenous growth possibilities of cities.

II. Social Channel: Erosion of Soft Public Investment and Community Resilience.

A second channel for austerity undermining resilience cannot simply be about the erosion of the social systems produced by soft public investment. Cuts to public spending usually mean cuts to programs related to education, healthcare, family support, and broader community development—all of which provide the basis for human capital and social connectivity. These investments are fundamental for equitable urban development and build collective adaptive capacity in the face of crisis. In this context, competing bureaucratically for typically limited financial resources means local governments give less priority to key elements of the governance process, such as participative democratic participation, capacities of networks created through community-led initiatives, and so on—all critical components of bottom-up resilience building. This, in turn, limits urban communities' abilities to harness or build their capacity to organize, respond, and adapt to shocks. In Turkey, austerity (most things are state-sponsored) drives more discrimination (more gaps) in social safety nets, regional welfare systems vary considerably across liberating spaces and provinces—and if are not undermined by crisis—creates variable forms of vulnerability 'in the moment', and sustains long-term forms of social inequity; entrenched patterns of social immobility and instability.

III. Infrastructure and Governance Channel: Slow Adaptation, Lower Service Provision.

Urban resilience is also reliant on sound infrastructure and adaptive governance. Both infrastructures and adaptive governance are placed in jeopardy by austerity. Fiscal consolidation often forces municipalities to delay maintenance of or scrap a planned infrastructure upgrade, degrading the hard assets that support resilient cities. Public transport, water systems, housing, and environmental infrastructure are all affected by downward funding pressures, which creates vulnerability in urban centres by limiting our physical infrastructure. Resilient cities are therefore undermined due to inadequate investment in their public transport, water, and environmental systems. Austerity also reduces municipalities' fiscal autonomy, especially where a system of asymmetric decentralization exists, as is the case in Türkiye. When cities do not have room to plan beyond the immediate action and service pressures impacting them, governance becomes fragmented and short-sighted, undermining institutional resilience and limiting urban systems' capabilities to better engage in transformative planning, co-produce across policy sectors, or manage across administrative levels, which is critical to a sustainable urban resilience response to future uncertainty.

Fiscal Austerity and Urban Resilience: An Integrated Framework

Atas (2023) points out that public austerity, while contributing to macroeconomic stability, may also further develop regional disparities concerning economies with relatively weak fiscal capacities (i.e., provinces). The World Bank (2023) notes that reduced public investment has negative implications, particularly with respect to infrastructure renewal and social services, which reduces municipal investment capacity and limits the capacity of municipalities to adapt to urban challenges. Arestis (2021) noted that resilience requires an approach that is holistic (i.e., fiscal, monetary, and financial policies which are necessitated for economic stability) and is flexible enough to adapt and transform.

Urban resilience is not only a technical or economic concept, but a multidimensional process encompassing ecological, social, economic, and governance aspects. Meerow (2016) defines urban resilience as the ability of cities to endure disturbances, adapt to

shifting conditions, and continue their core functions. It indicates that the primary issue was supported by financial and governance systems and was ready for future payment contingencies.

Streeck (2011) mentions a specific aspect of soft public investment: education, research and development (R&D), family support, and active labor market policies - all of which he notes are critical elements of public investment that facilitate equality of economic treatment. He examined the national governments of Germany, Sweden, and the United States between 1981 and 2007 and found that fiscal restrictions provide obstacles to governments from reallocating their investments to soft public investment, entrenching long and permanent cyclical economic immobility or stagnation. In Türkiye, where fiscal retrenchment often involves the municipalities' allocation of expenditures, how austerity affects soft public investment continues to be of interest to evaluate long-term urban resilience and sustainability of policies.

Financial constraints, particularly in terms of restrictions on discretionary spending, also condition how municipalities are able to support social capital development or engage in community-led resilience initiatives. For example, Germany's discretionary spending declined from 40% in 1970 to 22% in 2008 (Streeck & Mertens, 2010b), which points to the structural crowding out of future-oriented investments for short-term fiscal targets. Mehmood (2016) has emphasized the importance of participatory governance and local innovation for resilience. However, austerity policies and budget constraints that limit financial flexibility reduce municipalities' ability to legitimize bottom-up environmental resilience efforts.

Economic diversification provides a contextual and operational form of adaptability for cities, allowing them to weather shocks to their fiscal resilience and position for continued growth into the future. While economic diversification and a diverse growth strategy are supported by the government policies being made, enforced austerity and other restrictive fiscal policies often force municipalities to rethink how they are allocating resources and pursuing investment to shift to various strategies involving infrastructure resourcing, local industry, and innovation promotion. These fiscal conditions constrain how cities can restructure and invest in their resilient

programming and strategies towards resilient drivers of adaptability (Coaffee, 2013), reducing urban adaptability in uncertain fiscal conditions.

Agglomeration economies and sustained public investment in infrastructure help to build levels of urban economic stability by generating productivity growth, encouraging public sector-led long-run investments, regional investment, and urban adaptability. However, fiscal conditions often induce expenditure cuts indirectly, or even directly, forcing municipalities to manage the conditions from sustaining vital infrastructure programs and activities or strategies while compromising their ability to foster urban economic resilience for the long run. The mitigating impact of social and regional inequalities caused by government austerity on the productivity advantages of agglomeration economies appears to impede urban development and hinder the area's ability to diversify its economy and its growth strategy (Zhang, 2016).

Governance structures matter for urban resilience, providing the mechanisms for cities to design governance structures to address collaborating adaptive and transformative change agendas while responding to fiscal pressures and macroeconomic uncertainty. Urban planning integration and fundamental governance coordination for urban resilience, as Ribeiro (2019) suggests, relates to permitting forms of decision-making to become less fragmented and, as a result, better resilient outcomes to inequalities that they can generate or reflect. Türkiye's decentralised model of governance offers both opportunities and challenges; for example, there are municipalities in Türkiye that have sufficient financial independence to reduce the effects of the austerity, while other municipalities receive limited or no direct financial support, which restricts their adaptability to that restructuring. In situations of fiscal austerity, cities have difficulty implementing long-term resilience strategies because they somehow delay their potential opportunities for the future, therefore increasing susceptibility to both economic and environmental shocks.

Theoretical frameworks about fiscal resilience give more context to how cities approach their financial environments. Zezza (2012) covers fiscal federalism in crisis and discusses the inherent tensions in executing centralized macroeconomic stabilization, federalism, and decentralized governance. Barro's (1974) initial suggestion of rational economic agents adjusting their expenditures according to

anticipated future taxes and public debt is often difficult because of ongoing and persistent public debt, limiting the practical assessment of the insight. Meerow and Stults (2016) describe urban resilience as a continuous process comprised of continual institutional adjustment and careful financial planning to maintain the ability for cities to adaptively manage fiscal pressures and external disturbance.

When all is said and done, urban resilience is less about learning to absorb economic shocks and crises than it is about developing the ability to transform. Cities face challenges to resilience-building in the absence of fiscal resources to maintain infrastructure, social services, and adaptive governance, particularly under an ongoing austerity approach. As austerity continues to shape the economic context of Türkiye, policymakers must consider how fiscal tools may support urban resilience rather than completely undermine it. Macroeconomic stability and sustained urban investment, within an equitable and dynamic context, promote resilience and attention to future required transformations.

2.4. The Political and Economic Tradeoffs of Austerity

Fiscal austerity exists at a crossroads, driven by economic necessity and political acceptability, policy design, and long-term economic outcomes, ultimately dictated by policy implementation. While supporters of austerity measures argue that austerity supports fiscal sustainability by decreasing public deficits and interest rates on government debt, critics identify the detrimental effects of austerity on public trust in a democratic state, public welfare, and the real economy. As Hastings (2017) argues, fiscal retrenchment is not simply an economic intervention; it is a political project, one closely aligned with neoliberal intentions that re-imagines a lesser state role and welfare spending, creating a social and economic context for austerity that ignores the political consequences. There is extensive work illuminating these political consequences of austerity in empirical studies like Biten and Kuhn (2022), who argue that austerity induced cuts to public sector budgets in EU countries has diminished public trust in institutional actors, and important distinctions demonstrate that so too has trust in the political sphere especially for citizens directly affected by austerity with respect to the socioeconomiccontext.

Becker, Fetzer (2017), and Fetzer (2018) also relate the approved austerity measures to the Brexit vote, demonstrating that, in addition to diverse factors, economic hardship acts as a catalyst for populist backlash. Talving (2017) continued with the argument that voter turnout declined in countries that had adopted austerity plans between 2004 and 2014, and interprets this to mean a more profound feeling of political 'disengagement' with formal politics, whose origins can be outlined by fiscal reasons of government credibility and consolidation.

Austerity measures also have distinctions beyond electoral instability or political volatility. Fiscal consolidation usually results in political turnover, either as a result of elections or otherwise, especially when fiscal consolidation was not intended and was done during a time of crisis (Paul & Matthew, 2013). The European debt crisis provides illustrations of this pattern, as in nine cases, OECD governments lost power after implementing austerity-related economic adjustments. These outcomes strengthen the claim that democratic governments are likely to postpone difficult fiscal reforms until the reality of crisis pushes them into instant action, resulting in sudden and severe policy changes that may undermine investor confidence and recovery from the damage done by the prior crisis (Ortiz & Cummins, 2021). In any case, the tension between short-term political reward and long-term fiscal responsibility is key to both the implementation of austerity and its effectiveness.

The economic effects of austerity are similarly complex, as the timing, composition, and size of fiscal consolidation will matter for economic recovery. Keynesian economics tells us that cutting government spending during downturns is contractionary and contributes to a fall in aggregate demand, making the recession worse (Blanchard & Leigh, 2013). Alesina and Ardagna (2010), however, claim that expenditure-based consolidations are less contractionary than tax-based consolidations and help reduce fiscal deficits effectively. Even so, empirical research challenges the claim that austerity gives rise to long-term growth in all contexts and highlights the relevance of the design of policies and sociological factors.

Analyzing data with microsimulation and CGE models, Muñoz and Cardenete (2022) hold that austerity measures in Spain have raised both poverty and inequality, creating a dilemma between a fiscal debate and one's social obligations. Callan (2011)

illustrates that the distributional impacts of austerity change depending on the country and different policy decisions, which can include decreases in pensions, social benefits, and public services that hurt the poor disproportionately. Gechert and Horn (2017) provide more evidence, demonstrating that fiscal consolidation after 2008 occurred too soon, increasing recessions with hysteresis, which reduced the capacity for future growth.

Collectively, this evidence provides plausible evidence that fiscal consolidation does not happen uniformly. Rather, the rigidity and Tradeoffs built into political and economic decisions about austerity policy involve balancing timing, social impact, and institutional stability. Austerity policies enacted under highly illogical circumstances or in an uncalibrated manner can magnify the very social inequities that are perceived to be rooted in an inefficient economy and are live threats to the legitimacy of the governing institution, while delaying economic recovery. For a sustainable economy, policies must achieve a healthy economy composed of agent behaviour that does not ignore a 'social conscience' that may undermine both growth and governance.

2.5. Rethinking Fiscal Policy: Toward Balanced Approaches

The urban characteristic of austerity is by far the most daunting. Given that austerity manifest itself through new forms of fiscal retrenchment at the scale of municipalities, it stands to reason caution is needed when considering Peck's (2012) notion of "austerity urbanism"; quoting proposals as municipal fiscal stress and falling revenues constrict budgets, cuts to public services, reductions in labour, and ultimately rolling back longer term planning for investments. The hollowing-out process of fiscal austerity undermines urban resilience by stripping away the institutional and infrastructural baseline for urban areas to absorb economic shocks. Urban areas vary in their exposure, as they are often highly cyclically exposed and rely heavily on transfers from the central government. As such, the consequences of restrained fiscal policy disproportionately shape the nature and intensity of investments in subnational government, as well as urban social services, employment programs, and civil infrastructure, which are the very components central to sustaining the economy.

Given these constraints, the literature increasingly advocates for a more balanced and context-sensitive approach to fiscal consolidation. The overall reduction of the deficit remains an important priority; yet examining aggressive expenditure cuts at a time when public investment must be protected from deterioration presents a further chance of worsening economic conditions in the long term.

As Gechert and Horn (2017) note, the necessity for counter-cyclical fiscal policies to support recovery and resilience is most effectively articulated through public investment in the context of stability, drawing attention to the critical importance of protecting public investments (both hard and soft) going forward.

According to the literature, empirical evidence has suggested that slowly coming to terms with the impact of austerity is premised on political institutions and social trust, as well as the prevailing composition of fiscal adjustments. Because decisions regarding fiscal policy also affect settings that go beyond macroeconomic stabilization, regional bias and distributional effects come rapidly into play, and future regional effects on urban resilience need to be considered. As the literature suggests, fiscal responses towards an economic downturn or stability must also consider intentional negative or otherwise adaptive strategies so that the capacity to integrate the stability of economic growth with social and infrastructural investments supports the sustainability of local solutions, above providing a simple narrative of fiscal consolidation.

2.6. Historical Evolution of Fiscal Austerity Policies in Türkiye

The development of fiscal austerity in Türkiye since the 1990s has been dispersed in time and established under episodes of macroeconomic instability, financial crises, and institutional reform. Austerity has commonly been applied as a response to restore fiscal balance - and ultimately, to promote investor confidence - and the differing implications for economic resilience at the urban and regional levels remain open to question.

Empirical studies provide insight into the complexity of Türkiye's fiscal policies and whether their implementation was effective in stabilising macroeconomic conditions.

Karagöz (2016) found that using a Bayesian Vector Autoregression (BVAR) model, changes in government revenue and spending had little or no effect on key macroeconomic variables, leading to questions about the role of austerity in fostering fiscal stability. In a similar vein, Kiziltan and Yereli (2022) also investigate the geographical variations in fiscal capacity post-Türkiye's local government reforms and show through spatial econometric models that the reforms unintentionally compromised municipal fiscal autonomy and increased reliance on the transfer system from the central government. The institutional concern is very relevant in assessing urban resilience over the long-term impact of austerity measures.

Türkiye's fiscal policy has been determined not only by homegrown fiscal requirements but also by some managerial challenges, including IMF programs, financial globalization, and political centralization. These external factors have entrenched austerity's dominance as a policy paradigm and, in some cases, excluded municipalities from generating their own fiscal policies.

Türkiye's fiscal experience mirrors wider global trends where austerity has been pursued in response to financial instability, as both a 'correction' strategy and a more structural method of economic governance. This section provides an overview of the main phases of fiscal policy adjustments over the period from the early 2000s to the present, and highlights the effects of national austerity policy on local fiscal capacity, governance arrangements, and urban development. The subsequent sub-sections also provide a historical account of the main phases and outcomes related to urban fiscal sustainability.

- **Post-2002 Consolidation: Institutional Reforms and Macroeconomic Recovery**

From 2002 to 2007, Türkiye implemented an austere fiscal consolidation with the aim of reducing the national debt and attaining a primary surplus. During this time, there were meaningful reforms within the banking sector as well as greater financial visibility for the general public, which reduced the inflation rate and increased investor confidence, causing the macroeconomic transition to enhance Türkiye's financial position internationally. There were remaining structural issues like dependence on

foreign funding and municipal governments having small tax bases, which still continued to inhibit municipalities from funding long-term urban expenditures.

- **The 2008 Global Crisis: Counter-Cyclicality and Fiscal Reversal**

As a consequence of the global financial crisis of 2008, Türkiye had to abandon its previous approach and implement counter-cyclical fiscal policies, which increased public expenditure in response to the need to mitigate the shock of the economic downturn. Although this counter-cyclical fiscal approach minimized the effect of the impending recession, it also indicated the weaknesses in Türkiye's institutional arrangements and played an important part in undermining long-term fiscal restraint. The lack of accompanying structural reform during this period meant cities were further reliant on central transfer payments to support their local economies, which weakened their overall economy.

- **2010s: Partial Austerity and Fiscal Centralization**

Türkiye attempted to reorganize its spending and revenue system during the 2010s by implementing reforms to enhance tax collection and limit potential excessive public expenditure. However, state-imposed fiscal centralization and limited municipal autonomy limited these attempts. Local, fiscal roles were garnished again in 2012 with the passing of Law No. 6360, which only slightly enhanced local fiscal roles but did not do much to establish fiscal independence. Local governments continued to be rote and reliant on central transfers that undervalued their potential to absorb local economic shocks and reduce urban resilience capacity.

- **2020–2024: Populist Spending, Crisis Response, and Austerity Revisited**

Expansionary fiscal policies, politically motivated in the early twenties, were the cause of macroeconomic instability and an inflationary context. Lastly, in 2023, the government instituted a new round of austerity measures, which included significant public spending cuts, hiring freezes in the public sector, and budget constraints. These measures did reduce the inflationary context and were able to restore a sense of

confidence for investors, but ultimately, the debt centralization and the absence of institutional will render any long-term sustainability questionable.

Furthermore, the government's austerity measures were restrictive in nature, affecting procurement, employment, and legislative arrangements. The Turkish government announced a three-year austerity plan in 2024, aiming to reduce public spending by 100 billion liras. Kiziltan (2022) argues that, notwithstanding austerity measures, local governments still exercised limited fiscal autonomy and would be poorly equipped to deal with shocks to the economy or enact plans for resilience separately.

2.6.1. Implications for Urban Resilience

During Türkiye's cycles of fiscal austerity, the restricted fiscal autonomy of local government entities and reliance on central transfers have historically proven to be a precarious challenge. This reliance has undermined the capacity of municipalities to respond decisively with regard to their contributions to infrastructure, social support, and economic recovery, all of which comprise the mainstays of urban resilience. The fiscal centralization of Türkiye, along with adjustments to budgets as reactive and sudden shifts, has confined the capacity of its cities to develop long-term adaptive modes of action with respect to developing resilience to economic shocks and environmental threats. Cities lacking the freedom to respond to their financial situations in context will often struggle to deliver, at basic levels, regularly required services, especially in lower-HDI provinces, where entrenched monetary stress exacerbates structural inequities in social support and economic growth.

Translating this into a more practical context means we will observe delayed availability of infrastructure projects, resourcing the response of climate adaptation, and the capacity delay as an effect on an emergent response, and subsequent issues that will challenge cities, perhaps even more so when the economy is doing poorly.

As Türkiye's economy will continue to be volatile, policymakers must work to find and transcend the constraints of centralized fiscal policies and think about how to give municipalities some measure of financial independence. Increasing local fiscal capability and having access to a diversity of revenue and potential investment

mechanisms can improve urban resilience, allowing cities to sustain fiscal shocks, and/or intentionally commit to sustainability to be embedded into their governing structures and financial plans. The balance of disciplined fiscal responsibility, with the targeted investments required for urban health, is critical to creating cities that can adapt in a fair, equal, and resilient manner across Türkiye's provinces. This historical review is an important context in which to think through how fiscal austerity hinders urban resilience in Türkiye's provinces, which is the primary question of this thesis.

2.7. Challenges and Adaptation of Urban Resilience in Türkiye

Urban resilience is a complex process that requires a multidimensional approach (considering social, economic, and infrastructural aspects), as cities contend with growing frequency and intensity of global shocks (financial crises, climate change, demographic shifts). In order to respond to, absorb, and recover from these disruptions, cities need adaptive mechanisms in their urban systems. Resilience must also consider long-term, transformative change, whereby urban systems are able to evolve in response to dynamic risks. In Türkiye, this challenge was exacerbated by fiscal austerity policies, limiting municipalities' ability to invest and constraining governance flexibility.

2.7.1. Institutional and Governance Challenges in Urban Resilience

The fragmentation of governance is one of the most significant obstacles to urban resilience in Türkiye. Fragmented governance limits the planned coordination of activities and limits the effective allocation of resources in Türkiye. Ribeiro (2019) points out that equitable distribution of fiscal resources and integrated policy regimes are indispensable to creating resilient cities. In practical terms, however, Türkiye's governance regimes often act apart from one another, and any notion of a resilience strategy nests merely weakly within a municipality; thus, it acts not as a strategy but merely as a collection of policies by each municipality.

Moreover, there are no standards or ways to assess resilience, beyond the occasional note made by large offices or by larger NGOs, thus limiting evidence-based evaluations of policy and complicating follow-up monitoring that helps to justify a

long-term commitment of funding and capital. Kiziltan and Yereli (2022) were able to show that economic centralization in Türkiye has further exacerbated the inefficiencies of governance, especially where provincial and metropolitan level governments could self-organize, they were obliged to be fiscally too dependent on central government actions once their own local economies were impacted by a shock-type event.

One progressive initiative by Türkiye was establishing important institutions to foster urban resilience at many levels, such as the authority of the Ministry of Environment and Urbanization (MoEUCC), the Mass Housing Administration (TOKİ), and the Disaster and Emergency Management Presidency (AFAD). However, their impact is limited to central government support and fragmented governance. At the same time, institutions like the National Earthquake Strategy and Action Plan (2012-2023) and the Turkish Building Earthquake Codes present institutional commitments, as Streeck (2011) notes, building resilience requires financial investment.

Political competition and inconsistent funding mechanisms frequently impede the successful delivery of resilience actions and leave municipalities exposed to economic shocks. The disorganized response to the Kahramanmaraş earthquake highlighted even further challenges in financial preparation and the coordination of institutional responsibilities, and demonstrated the importance of governance mechanisms. (Askan, 2023)

Further, the economic and governance issues also create challenges for resilience planning and implementation. Türkiye's regional development planning activities are coordinated by the Ministry of Development, outlined in the relevant Regional Development Agencies, which seek to instill greater coordination of economic growth and how Provincial Infrastructure Investment integrates with Disaster preparedness, but which are often undermined by binding and established metropolitan land-use planning.

The focus on resilient development can compel disjointed planning efforts. Zhang (2016) illustrated how, when there are no explicit institutional incentives, collective economic planning actions often remain retrospective and present limited long-term sustainability. The disjointed governance structures discourage municipalities from

making proactive fiscal contributions, increase vulnerabilities, and lessen their capacity to recover from disruptions.

2.7.2. Fiscal Policy and Sustainable Recovery

Fiscal policy has major implications for urban resilience by directing resources for rebuilding infrastructure, public services, and recovery after disaster. (Ercoşkun, 2012) As Newell (2016) articulates, while resilience is an ongoing process, it requires ongoing financial planning, not an episodic one.

Türkiye has historically taken a fiscal stance that privileges post-disaster rebuilding short-term budget decisions, until another disaster occurs. Callan (2011) discusses the risks of a temporary "rebuild to status quo" cycle wherein post-disaster fiscal expenditures focus on rebuilding altogether. When disaster budgets focus on rebuilding as budget options, not long-term mitigation strategies or forest development planning, long-term planning is more vulnerable and thus expensive.

Fiscal austerity measures that are justified reduce the reallocation of needed funds to invest in resilience-enhancing infrastructure, which contributes to long-term vulnerabilities that will require additional readjustments and inequitable fiscal practices. Gechert and Horn (2017) state that counter-cyclical fiscal measures such as the targeted investment in climate adaptation efforts or economic diversification are necessary to reduce extended declines.

2.7.3. Towards a Resilient Fiscal Framework

A noticeable trend is evident in all phases of Türkiye's fiscal development. From limited fiscal agency to unified control of resources to reactive expenditure policies, the lack of financial flexibility signifies an inability to accomplish urban resilience. The lack of flexibility prevents cities from committing to resilience building for the long term and requires them to simply react to economic stagnation and environmental disasters.

As Türkiye looks ahead, fiscal policies must take a long view. Rather than simply implementing policies for fiscal stabilization, we're moving towards the complexity of integrating resilience planning with fiscal policy.

The strengthening of financial agency for municipalities (along with diversification of revenue sources) and the incorporation of resilience into financial processes are critical to ensuring that the cities become adaptive and sustainable. It is imperative that fiscal discipline is balanced with long-term strategic investing in infrastructure, governance, and social systems that contribute to resilience and economic adaptiveness, which will contribute to sturdy economies in the future.

CHAPTER III

DATA, METHODOLOGY, AND MODEL SPECIFICATION

This chapter introduces the empirical model on the relationship between urban resilience and fiscal austerity, data and variable definitions, and the econometric methodology employed in the estimation of the model. Section 3.1 provides the empirical model. Section 3.2 gives definitions of the variables and details the measurement of these variables. The data employed in the empirical analysis of this study were obtained from the Ministry of Treasury and Finance, TUIK, BDDK, and TBB. Descriptive statistics related to the variables of the urban resilience model are also provided in this section. Sections 3.3, 3.4, and 3.5 explain the econometric methodology that will be used in the estimation of the empirical urban resilience model. Section 3.6 presents the panel VAR model framework.

3.1. Urban Resilience Model

Building on the existing literature, this study conceptualizes urban resilience as a function of fiscal austerity measures and population growth. The empirical model of urban resilience has been given in Equation (1), capturing how public expenditure, tax revenue, and population growth influence regional resilience outcomes.

The functional representation of this relationship is as follows:

$$URI = \int(\boldsymbol{PEXP},\ \dot{\boldsymbol{TREV}},\ \boldsymbol{PGWTH}) \ldots \textbf{(1)}$$

This nexus is expressed as a panel data model as follows:

$$URI_{it} \doteq \boldsymbol{\alpha_{it}} + \boldsymbol{\beta_1}\ \boldsymbol{PEXP} + \boldsymbol{\beta_2}\ \boldsymbol{TREV} + \boldsymbol{\beta_3}\ \boldsymbol{PGWTH} + \boldsymbol{\varepsilon_{it}} \ldots \textbf{(2)}$$

where i implies each unit of the panel (81 Provinces), t denotes the data period (2008-2024).

URI, Urban Resilience Index, is the dependent variable. Independent variables are Public Expenditure % of GDP per capita (PEXP), Tax Revenue % of GDP per capita (TREV), and Population Growth (PGWTH). The proxies used for fiscal austerity policy are public expenditure % of GDP per capita and tax revenue % of GDP per capita.

3.2. Definition of Variable of the Urban Resilience Model

Although the impact of fiscal austerity on urban resilience has been represented with variables, XX and YY in Equation (1), the data for these variables are not readily available, and furthermore, it is not easy to conceptualize and measure these variables in practice. The following section provides detailed information on how to conceptualize and measure the variables of the model presented in equation (1), subject to empirical analysis in turn.

3.2.1. Dependent Variable: Urban Resilience

The dependent variable in Equation (1) is Urban Resilience Index (URI), and it is conceptualized as a composite indicator. Urban resilience reflects urban regions' ability to withstand, adapt to, and recover from adverse shocks. For a region, the economic, social, and infrastructure base are critical components for its resilience. That is why the concept of urban resilience should encompass all these different aspects of resilience. Following Jiang and Jiang (2024), the urban resilience index for Chinese provinces, we developed an urban resilience proxy that captures several dimensions and key components of urban resilience.

This study chooses 14 indicators to represent the resilience of urban systems based on the availability, representativeness, and completeness of data presented in Table 1, and computes the urban resilience index using the Principal Component Analysis (PCA) method for 81 provinces of Türkiye.

Among the indicators of urban resilience, real GDP is a proxy used for economic capacity and productivity; the unemployment rate indicates labor market vulnerability because higher unemployment often links to lower adaptive capacity, plus increased economic insecurity. Tourism arrivals, especially in regions reliant on tourism for HDI and employment, feature as a service sector strength and an economic openness proxy.

Furthermore, the health infrastructure is another critical dimension of resilience, particularly in the context of public health shocks. Thus, healthcare capacity is measured by variables like the total hospitals and hospital beds that are needed to maintain public health and ensure rapid crisis response. Moreover, the average household size is a reflection of population density and also of potential overcrowding within the housing domain. Total house sales represent housing market liquidity in addition to consumer confidence, so both are sensitive in terms of economic expectations as well as fiscal conditions. The resilience or strain of urban systems depends on how these variables interact with fiscal variables that influence housing, infrastructure, and services demand.

Moreover, human capital, another critical resilience factor, is approximated through the population with education over age six. This indicator reflects how the population can innovate, adapt, and engage productively in the labor market. Another important factor is financial infrastructure indicators, which include the total number of ATMs and POS machines. These indicators show access to and integration with modern financial systems because they improve economic transactions and enable economic continuity during disruptions. Bounced checks and checks that are paid upon their presentation signal both liquidity and trust and the financial health of local economies. Both measures rely on capturing the stability of the business environment.

Together, these variables form a coherent theoretical framework that links fiscal policy instruments with the economic, social, infrastructural, and institutional dimensions of urban resilience, and this framework enables an empirically grounded analysis of how fiscal austerity affects regional adaptive capacity in Türkiye.

3.2.2. Independent Variables

Austerity is a form of fiscal policy that is pursued by governments to reduce budget deficits by reducing spending, increasing taxes, or a combination of both spending cuts and an increase in taxes. Austerity is normally introduced during periods of fiscal crises, such as high public debt, that endanger financial stability and/or market confidence and come with the intention of rectifying that instability. While fiscal consolidation, i.e., austerity measures, are aimed at restoring long-term economic viability, this process often comes at the expense of public investment and severely limited institutional capacity. For instance, cuts to essential public investments, such as infrastructure, healthcare, education, and social services, can negatively impact a government's ability to support vulnerable communities. When spending reduces their capacity, it may also decrease their resilience and ability to withstand and recover from economic, social, or environmental shocks.

Building on this perspective, this study operationalizes fiscal austerity by two primary proxies: public expenditure as a percentage of GDP per capita and tax revenue as a percentage of GDP per capita. We use public expenditure as a percentage of GDP per capita as the main proxy to measure fiscal austerity shock, similar to the study done by Arias and Stasavage (2019). These indicators reflect the two main instruments of fiscal austerity policy.

One thing to note is that tax revenue as a percentage of GDP per capita is also addressed in the analysis, but merely serves as an auxiliary fiscal indicator and is not the primary explanatory variable. Though increases in tax revenue might indicate some attempts to improve fiscal health through new revenues, in the case of austerity, they would also translate into additional burdens placed on households and businesses, maybe without commensurate improvements in public service delivery. Thus, again, while both are aspects of fiscal policy, public expenditure has been highlighted as the main indicator of austerity because of a more direct association with the relative amount and quality of public goods and services that support urban resilience.

Finally, population growth is used as a control variable to ensure that demographic variation and growth that influence urban resilience and fiscal policy. For example,

under heightened fiscal austerity, regions with higher rates of population growth could face increasing pressures on infrastructure and public services, which could undermine their urban resilience. Hence, the population growth control helps identify the impact of austerity measures on urban resilience, independent of demographic pressure.

Table 3.1. Variable Definitions

		Variables	Unit	Source
Fiscal Austerity	**PEXP**	Public Expenditure % of GDP per capita	**%**	**Ministry of Treasury and Finance**
	TREV	Tax Revenue % of GDP per capita	**%**	
	PGWTH	Population Growth	**%**	
Urban Resilience Index	**URI**	Real GDP	**TL**	**TUIK/ BDDK/ TBB**
		Total Number of Beds in the Hospitals	**Count**	
		Total Number of Hospitals	**Count**	
		Total Number of Arrivals (Tourism)	**Count**	
		Total Unemployment Rate	**%**	
		Average Number of House Size	**Persons per household**	
		Total Number of House Sales	**Count**	
		Educated Population > age 6	**Count**	
		Total Number of ATMs	**Count**	
		Total Number of POSs	**Count**	
		Distribution of Bounced Checks	**Count**	
		Population Count (Kişi Sayısı)	**Count**	
		Number of Units (Adet)		
		Distribution of Checks Paid Upon Presentation	**Count**	
		Population Count (Kişi Sayısı)	**Count**	
		Number of Units (Adet)		

3.3. Mapping Urban Resilience Index

Using sophisticated spatial analytics tools in R-Studio, we generated provincial-level maps of the Urban Resilience Index (URI) in Türkiye for the period 2008-2024. This

methodology has the advantage of allowing for the clear visualization of regional differences and temporal mobility in resilience, and provides a deeper analysis of the varying degree to which different provinces have adapted to changing economic conditions, as well as the potential impacts of fiscal austerity policies. The spatial mapping of URI is necessary to identify geographic patterns of vulnerability and strength and how austerity measures and their responses can affect units of analysis (i.e., provinces) differently. These mapped representations give the opportunity to provide evidence-based analyses of typical policy outcomes and indicate those provinces that tend to have greater vulnerability and/or would necessitate additional or intentional fiscal or infrastructural assistance.

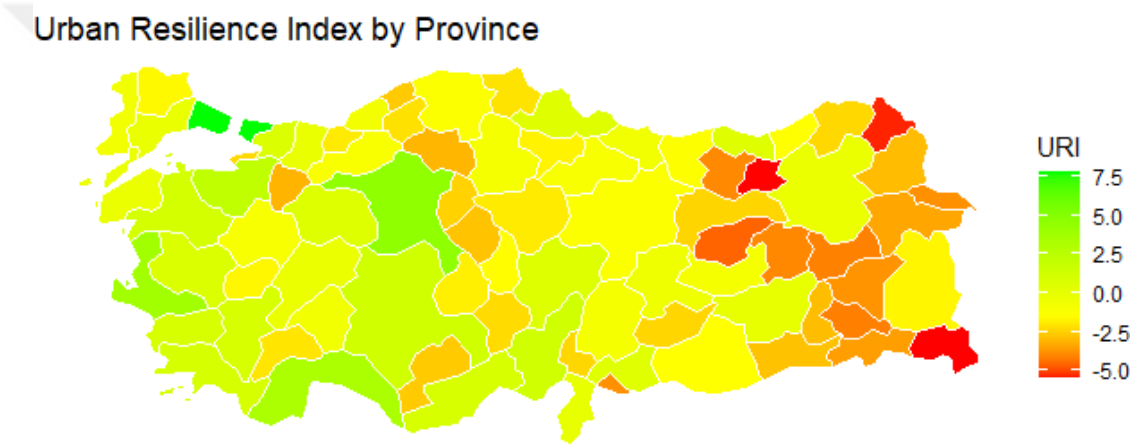

Figure 3.1. Year 2008

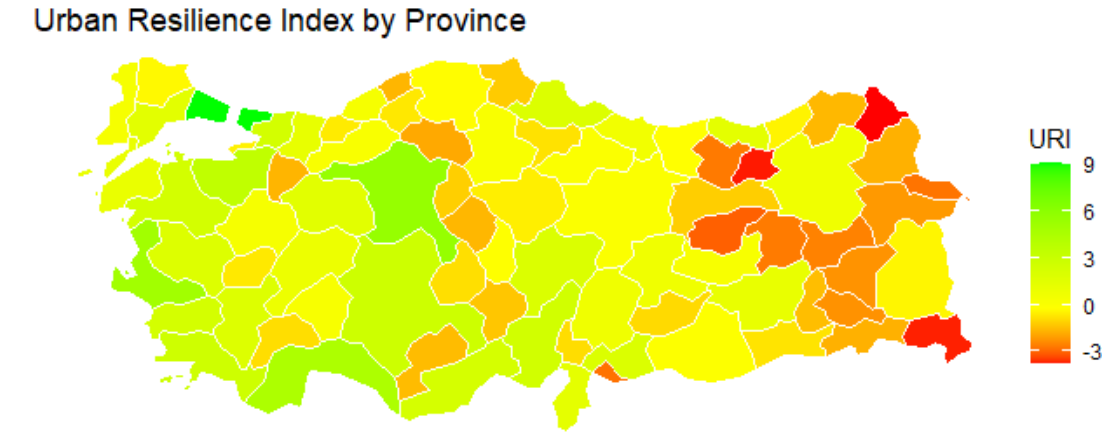

Figure 3.2. Year 2014

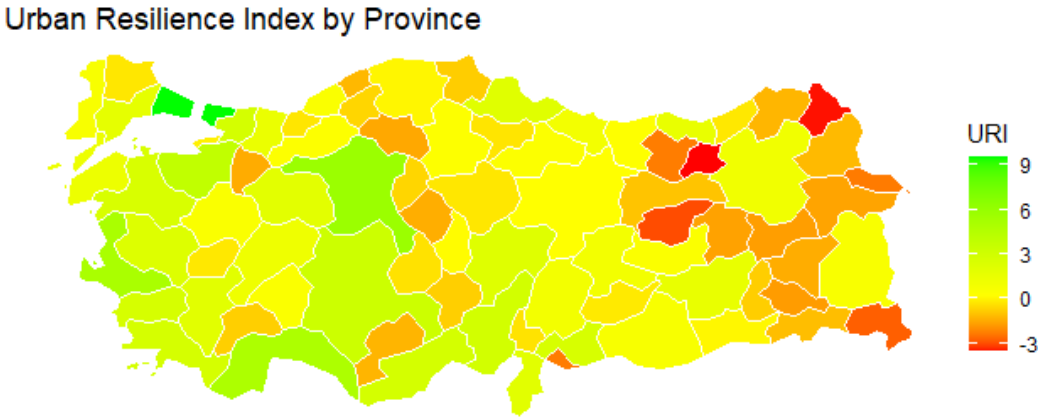

Figure 3.3. Year 2019

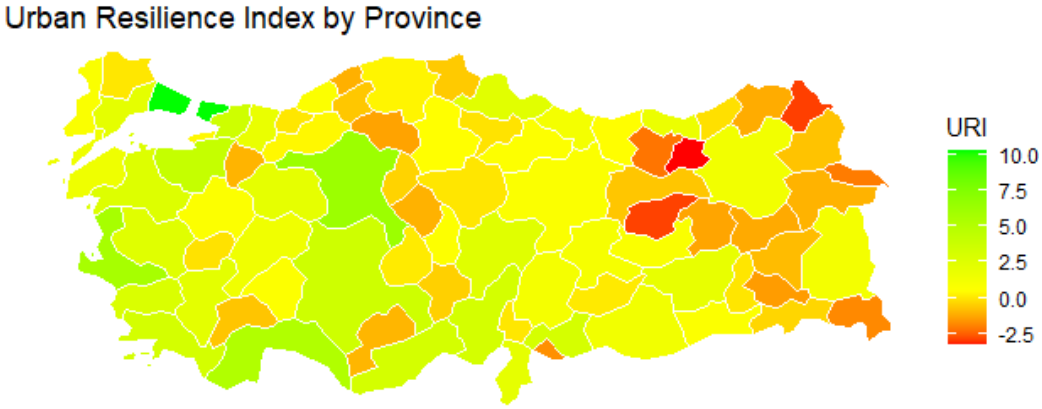

Figure 3.4. Year 2024

The map reveals that in 2008, resilience in the western provinces of Türkiye was concentrated and demonstrated because of the stronger historical investment in the western provinces, better infrastructure, and stronger institutional positions. At the same time, the eastern provinces' resilience concentrations were low based on deeper levels of structural underdevelopment and reduced fiscal room. Nevertheless, over time, increasing national policies that reflect the regional development agenda—such as additional public investments, the decentralization of the national government, and

the expansion of social and health infrastructure—have enabled regional economies to reduce the resilience gap positively and progressively. By 2014, there was enough success in the alignment of the regional resilience and national policy agenda for resilient development, which began to translate into adaptive capacity in previously lagging regions. This trend continued through to 2019 with macroeconomic growth, support for local services, capital investment for urban infrastructure, and improvements in typically underserved regions, primarily in central Türkiye.

In 2024, the URI map is indicative of pending cross-regional convergence, even if regions are still noticeably not converging. For example, at a high level, most regions are demonstrating moderate resilience capacities to absorb shocks affecting service delivery and recovery, indicating that there has been some capacity improvement in these regions. However, it is telling that there are still major east vs. west resilience gaps, suggesting that an undifferentiated policy focus indicates a lack of region-specific economic strategies for sustained growth.

The findings contributing to the continued evolution of the urban resilience landscape across Türkiye represent an important dimension of the overall resilience story for policymakers. It shows that long-term, fair, and inclusive frameworks for economic planning—where investment, leadership, governance, and service provisions are linked—can help to facilitate incremental improvements in systemic resilience across a geographically and economically diverse region.

3.4. Provincial vs. Regional Division (Based on HDI)

This study analyzed the link between fiscal austerity and urban resilience utilizing a panel dataset of 81 Turkish provinces, while also highlighting regional differences based on the Human Development Index (HDI). To account for regional socioeconomic disparities, provincial groups were separated into three HDI categories. High HDI regions were with HDI higher than 0.855, Middle HDI regions were between 0.820 – 0.855 HDI, and Low HDI regions were HDI with less than 0.822. A detailed HDI categories are given below:

- **High HDI Regions:** Istanbul Region, West Anatolia, East Marmara, West Marmara, and Aegean Region
- **Medium HDI Regions:** Central Anatolia, Mediterranean, East Black Sea, and West Black Sea Regions
- **Low HDI Regions:** Northeast Anatolia, Southeast Anatolia, and Central East Anatolia Regions.

This typology captures differences in terms of economic potential, quality of infrastructure, institutional capacity, and regional development. High-HDI areas such as İstanbul, Ankara, İzmir, Kocaeli, and Bursa would have the urban infrastructure and fiscal capacity to respond to austerity shocks as they arise. Medium-HDI areas like Kayseri, Mersin, Trabzon, and Zonguldak would potentially demonstrate moderate degrees of resilience with regard to growth occurring while operating within structural constraints. Low-HDI areas such as Ağrı, Hakkari, Batman, and Mardin face common development gaps that persistently limit their growth and make them more susceptible to public cuts. Ultimately, by combining HDI-based regional differences throughout the investigation, we were able to demonstrate the ways in which differing levels of human development featured in a region's ability to hold onto or rebuild urban resilience when faced with austerity. By focusing attention on the ways austerity produces different outcomes based on Turkey's varied development, this response broadens our understanding of the spatiality of resilience and inequality.

Table 3.2. Regional Division Based on Human Development Index (2022)

	Region 1 – Low HDI Provinces	Region 2 – Middle HDI Provinces	Region 3 – High HDI Provinces
1	Adıyaman	Amasya	Afyonkarahisar
2	Ağrı	Adana	Ankara
3	Ardahan	Aksaray	Aydın
4	Batman	Antalya	Balıkesir
5	Bayburt	Artvin	Bilecik
6	Bingöl	Bartın	Bolu
7	Bitlis	Burdur	Bursa
8	Diyarbakır	Çankırı	Çanakkale
9	Elazığ	Çorum	Denizli
10	Erzincan	Giresun	Düzce
11	Erzurum	Gümüşhane	Edirne
12	Gaziantep	Hatay	Eskişehir
13	Hakkâri	Isparta	Istanbul
14	Iğdır	Kahramanmaraş	İzmir
15	Kars	Karabük	Karaman
16	Kilis	Kastamonu	Kırklareli
17	Malatya	Kayseri	Kocaeli
18	Mardin	Kırıkkale	Konya
19	Muş	Kırşehir	Kütahya
20	Şanlıurfa	Mersin	Manisa
21	Siirt	Nevşehir	Muğla
22	Şırnak	Niğde	Sakarya
23	Tunceli	Ordu	Tekirdağ
24	Van	Osmaniye	Uşak
25		Rize	Yalova
26		Samsun	
27		Sinop	
28		Sivas	
29		Tokat	
30		Trabzon	
31		Yozgat	
32		Zonguldak	

3.5. Econometric Methodology

The study intends to examine the effect of fiscal austerity policy on urban resilience amid population growth using a Panel VAR model. Other similar studies have been conducted analysing the effect of fiscal policy on macroeconomic variables, including a study by Giordano et al. (2007) which studied the effects of fiscal policy in Italy between 1982 and 2004 employing a structural VAR model. Their model was also capable of separating the effect of government spending and found that shocks to purchases of goods and services (output) generated a significant but transitory expansionary effect on private GDP, employment, consumption, and investments.
Another study applied a Bayesian panel Vector Autoregression (VAR) to the study of macro-financial imbalances found across 27 EU countries from 1994-2012, by Mariarosaria Comunale (2021). This study assessed the relationships between current account misalignment, real effective exchange rate (REER) misalignment, and financial gaps. Caldara and Kamps (2008) used a comparative analysis based on VAR for the USA from 1955-2006; they assessed the effect of fiscal policy shocks, generally government spending and taxation interventions, on the USA economy.

3.6. Panel VAR Model Framework

Initially, when the panel VAR approaches have been validated, we select the lag order on the estimation sample (PVARSOC) and test for unit roots for stationarity purposes. This is the pre-diagnostics stage. Then we run the main estimation with Panel VAR, which captures the interdependencies and dynamics between the variables. Accordingly, after the estimation, post-diagnostic tests for the PVAR are conducted, such as Granger causality tests for directionality, diagnostics for stability, and residuals are carried out to validate robustness. In addition to these, Forecast Error Variance Decomposition (FEVD) and Impulse Response Function (IRFs) are used to understand the relative strength and permanence of shocks over time. The estimations therefore follow a multi-stage process which ensures a thorough exploration of the dynamic effects of fiscal austerity measures on urban resilience across regions.

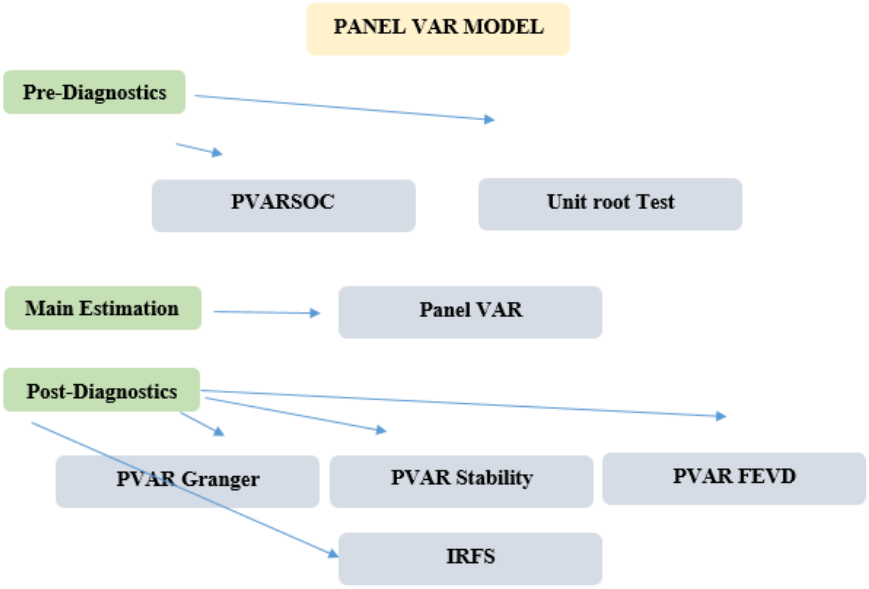

Figure 3.5. Panel VAR Model Framework

3.7. Model Specification

The PVAR, as designed by Abrigo and Love (2016), is the estimation procedure based on the analysis of the Generalized Method of Moments (GMM). This method provides a complete framework for empirical evidence because it allows long-run coefficient estimation, causality assessment, variance decomposition assessment, and impulse-response plots for the relationship of interest.

The construction of the first PVAR model is:

$$Y_{pt} = \dot{\sum}_{\boldsymbol{\iota=1}}^{\boldsymbol{T}} \boldsymbol{A_\iota}\, Y_{pt-i} + \dot{\boldsymbol{U}}_{\boldsymbol{c}} + \dot{\boldsymbol{\mu}}_{\boldsymbol{ct}\ldots} \quad \textbf{(3)}$$

Where Y_{pt} = $[PEXP_{pt}, TREV_{pt}, PGWTH_{pt},]$ implies a vector of the endogenous variables, PEXP is public expenditure % of GDP per capita, TREV is tax revenue % of GDP per capita, and PGWTH is population growth rate. $\boldsymbol{A_i}$ represents the coefficient matrices. Y_{pt} is a (kxk) vector of the dependent variable urban resilience index. $\dot{\boldsymbol{U}}_{\boldsymbol{c}}$ is a vector of country-fixed effects and $\dot{\boldsymbol{\mu}}_{\boldsymbol{ct}}$t is idiosyncratic error.

The PVAR technique is capable of accounting for unobserved heterogeneity while also eliminating cross-sectional dependent estimation errors. Panel VAR models add the cross-section to standard VAR models to make them a panel, and the rest is the same as standard VAR in that all the variables are both endogenous and interdependent. However, the panel VAR technique has a couple of other distinguishing aspects. First, the variables have a dynamic interdependence with each other due to the accounting for delays in all of the endogenous variables. Second, the error terms are typically correlated across units, which we have labeled static interdependence. Finally, the intercept, slope, and variance of the shocks could be allowed to vary across units. This implies, according to Canova and Ciccarelli (2013), that cross-sectional heterogeneity is available.

In this investigation, Eq. (2) is estimated using PVAR (panel vector autoregression) methodology. In the first stage of the analysis, the series is tested to determine whether or not it is stationary. Both the IPS and CIPS test results are presented in Table 5. The IPS test (Im, 2003) and the CIPS panel unit root test (Pesaran, 2007) are used to test if the variables have a unit root. The unit root tests are preferred because the CIPS addresses cross-section dependence, and the IPS contributes to panel heterogeneity. According to the IPS test results, it is understood that the independent variables and control variables are stationary at the level while the dependent variable is stationary at first difference. When the results of the CIPS unit root test, which is another unit root testing approach adopted in this study, are examined, it is seen that all the variables are stationary at the level. For the sake of this study, we used all the stationary variables to stabilize the panel VAR model. After the unit root tests, the panel VAR procedure is followed, and the optimal lag length is determined. According to Table 4, it is concluded that the optimal lag length is two since the MBIC and MQIC have the lowest values at lag (2).

CHAPTER IV

RESULTS AND DISCUSSIONS

4.1. Provincial Level Empirical Estimations

This section mainly discusses the results of the econometric techniques employed in this study, including panel vector autoregression (PVAR), Granger causality tests, impulse response functions (IRFs), and forecast error variance decomposition (FEVD) and fixed effects regression, to examine the dynamical effects of public expenditure (PEXP) and tax revenue (TREV) shock on urban resilience (URI) for 81 provinces in Turkey. The results offer asymmetric evidence of the channels of transmission and the structural effects of fiscal policies that have significant implications for resilience-oriented policies.

4.2. Descriptive Analysis

The first stage of the analysis is the calculation of descriptive statistics of the original datasets, which provide measures of central tendency, including mean, median, and variance, including standard deviation, followed by the presentation of the data in graphical form, such as a line chart. The descriptive statistics in Table 3 reveal some insightful results regarding urban resilience across regions. URI displays considerable dispersion across provinces, with values ranging from -5.49 to 10.20, suggesting large disparities in local resilience capacities. Public expenditure (PEXP) and tax revenue (TREV) are more stable, although some interprovincial variation is evident. The population growth (PGWTH) shows substantial volatility, reinforcing the relevance of exploring dynamic relationships.

Table 4.1. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
URI	1377	0.0857	2.256	-5.491	10.203
PEXP	1377	13.00	0.841	11.136	15.962
TREV	1377	12.11	1.446	7.845	17.407
PGWTH	1377	13.239	0.949	11.247	16.582

4.3. Panel VAR Analysis

Pre-estimation diagnostics (Table 4) indicate an optimal lag structure of two lags based on MAIC and MQIC criteria to ensure the model is capturing both the short- and medium-run dynamics. Both the IPS and CIPS unit root tests (Table 5) show the stationarity of all variables at the level. This establishes the use of stationary variables in conclusion to use in the PVAR framework.

The GMM-based PVAR estimates (Table 6) show that contemporaneous public expenditure has a significant and positive effect on urban resilience, with the second lag (probably because of some tighter interaction with resilience) exhibiting a positive and significant time-lagged impact on urban resilience. The coefficient for PEXP lagged 2 (0.329, $p<0.000$) indicates a significant and strong lagged effect for fiscal spending related to resilience, again supporting that investments made by the government have a time lag, indicating the delayed impact of the expenditure on the development of urban resilience. TREV indicates no statistical significance at either lag, implying that increases of tax revenue from hikes in tax rates alone are not associated with changes in URI. Finally, URI reported a modest but statistically significant impact of PGWTH on resilience dynamics, indicating an enhanced impact of economic diversification.

Table 4.2. Pre-Estimation: Running Panel VAR Lag Order Selection on Estimation Sample

Lag	CD	J	J-Pvalue	MBIC	MAIC	MQIC
1	1.000	208.805	0.000	-196.978	80.805	-27.603
2	1.000	74.322	0.009	-230.015	-21.678	-102.984
3	1.000	29.271	0.605	-173.621	-34.729	-88.933
4	1.000	18.391	0.301	-83.054	-13.609	-40.711

Table 4.3. Unit Root Test Results

	IPS		CIPS	Conclusion
Indicator	**At Level**	**First Difference**	**At Level**	
URI	-1.4881	-4.3931***	-2.215***	I(0)
PEXP	-1.9920***	-	-2.152**	I(0)
TREV	-2.1191***	-	-2.153**	I(0)
PGWTH	-4.6330***	-	-3.755***	I(0)

*, **, and *** denote 10%, 5%, and 1% statistically significance level, respectively

Table 4.4. Panel Vector Autoregression

Panel vector autoregression
GMM Estimation
Final GMM Criterion Q(b) = 2.86e-33
Initial weight matrix: Identity
GMM weight matrix: Robust
No. of obs = 1377
No. of panels = 81
Ave. no. of T = 13.000

	Coefficient	Std. err	z	P>z	[95% conf interval]	
URI						
URI						
L1.	0.093	0.044	2.100	0.036	0.006	0.180
L2.	0.083	0.040	2.060	0.039	0.004	0.161

Table 4.4. (cont.)

PEXP						
L1.	0.093	0.046	2.010	0.044	0.002	0.183
L2.	0.329	0.055	5.950	0.000	0.221	0.438
TREV						
L1.	0.013	0.032	0.390	0.694	-0.051	0.076
L2.	0.001	0.031	0.020	0.981	-0.060	0.062
PGWTH						
L1.	0.012	0.004	2.790	0.005	0.004	0.020
L2.	0.004	0.003	1.130	0.025	-0.003	0.010

Instruments: l(1/2).(URI PEXP TREV PGWTH)

4.4. Post-Diagnostic

The post estimation diagnostics suggest that all of the eigenvalues are located within the unit circle (Table 7), which indicates that the PVAR model meets the stability condition. The Granger causality tests (Table 8) corroborate the central nature of public expenditure, whereby there is strong evidence of PEXP Granger-causing URI ($\chi^2 = 37$, $p < 0.00$). Conversely, TREV does not Granger-cause URI ($p = 0.905$), which lends further support to the insignificance of austerity on the revenue side with respect to building resilience.

The forecast-error variance decomposition (Table 9) provides further understanding of the relative contribution of each contributor to the variability in URI. When t=10, public expenditure accounts for roughly 34 % of the variation in URI at t=10, while TREV accounts for nearly zero variance. This highlights the ongoing role of the expenditure side of fiscal policy in producing resilience paths. The contribution from PGWTH is slight, but remains stable; it indicates that broad macroeconomic performance plays a small role in urban resilience development when compared to targeted government expenditure.

The IRF analysis captures the temporal profile of the response of the URI to structural shocks in fiscal variables. A positive one-standard-deviation shock to public expenditure generates a statistically significant and persistent increase in URI, with the

peak effect occurring at around the second to fourth periods. This reinforces the notion that fiscal expansions, particularly when targeting investment in public services, infrastructure, and social programs, contribute positively to urban resilience, although with some lag. In contrast, shocks to tax revenue produced a very small or statistically insignificant response in URI for all forecast horizons. This asymmetry serves as an important reminder that not all fiscal instruments have symmetric effects on resilience results.

Table 4.5. Eigenvalue Stability Condition

Eigenvalue		**Modulus**
Real	**Imaginary**	
0.715	-0.414	0.826
0.715	0.414	0.826
-0.412	0	0.412
-0.227	-0.207	0.307
-0.227	0.207	0.307
0.067	-0.224	0.234
0.067	0.224	0.234
-0.186	0	0.186

All the eigenvalues lie inside the unit circle.
pVAR satisfies stability condition.

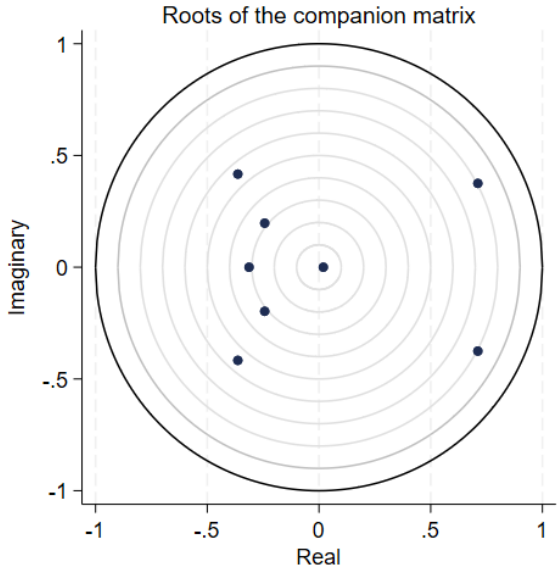

Figure 4.1. Eigenvalue Stability Condition

Table 4.6. Panel VAR-Granger Causality Wald Test

Equation	Chi2	df	Prob > chi2
URI			
PEXP	36.999	2	0.000
TREV	0.199	2	0.905
PGWTH	8.323	2	0.016
All	55.201	6	0.000

Ho: Excluded variable does not Granger-cause Equation variable
Ha: Excluded variable Granger-causes Equation variable

Table 4.7. Forecast-Error Variance Decomposition

Response variable and Forecast horizon	Impulse variable			
	URI	PEXP	TREV	PGWTH
URI				
0	0	0	0	0
1	1	0	0	0
2	0.978	0.008	0.000	0.014
3	0.801	0.187	0.000	0.012
4	0.690	0.292	0.000	0.018
5	0.633	0.331	0.000	0.036
6	0.619	0.331	0.000	0.049
7	0.618	0.325	0.001	0.056
8	0.616	0.326	0.001	0.057
9	0.610	0.333	0.001	0.057
10	0.603	0.340	0.001	0.057

- **Impulse Response Function: Capturing Austerity Policy Shock**

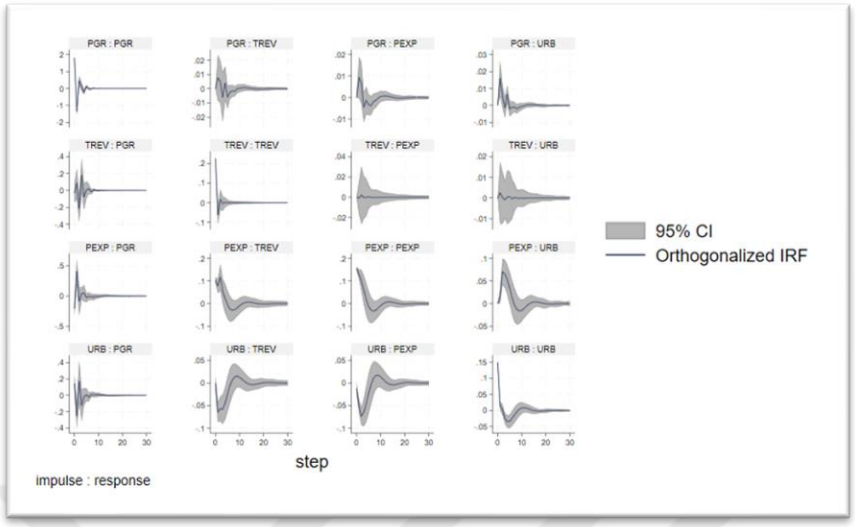

Figure 4.2. Impulse Response Function: Capturing Austerity Policy Shock

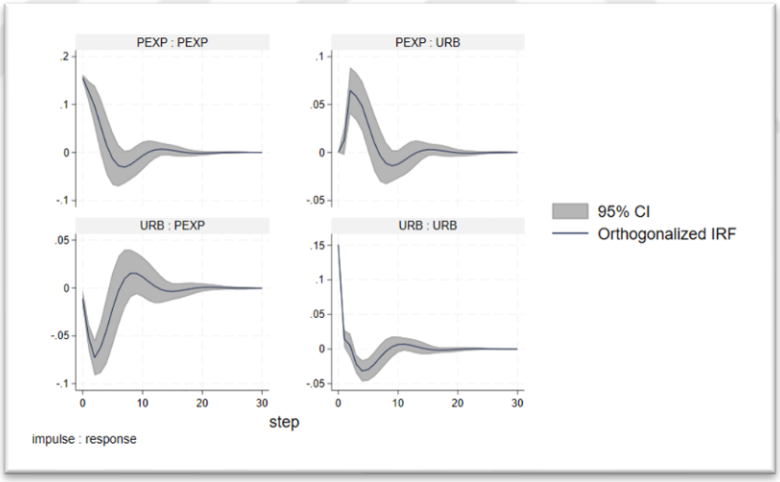

Figure 4.3. URI Response to PEXP (IRF)

4.5. Fixed Effect Robust Analysis

To further substantiate the panel VAR findings and control for unobserved time-invariant heterogeneity across Turkish provinces, we conducted a fixed effects panel regression analysis. This specification is particularly useful in accounting for latent provincial characteristics—such as geography, political capacity, and institutional

quality—that may confound the relationship between fiscal policy and urban resilience.

The Hausman specification test ($\chi^2 = 536.444$, $p = 0.000$) strongly rejects the null hypothesis concerning the consistency of random effects estimators, and thereby lends strong support for using a fixed effects model. This suggests that there is systematic provincial heterogeneity correlated with the regressors. The implication is severe: not controlling for fixed characteristics yields biased and inconsistent coefficients that distort the relationship between fiscal stability and resiliency.

Table 11 presents the results of the fixed effects estimation. Public expenditure (PEXP) remains a statistically significant and positive determinant of URI, with a coefficient of 0.649 ($p < 0.01$). This implies that a 1-unit increase in PEXP—interpreted here as inflation-adjusted per capita public expenditure—raises urban resilience by approximately 0.65 units, ceteris paribus. This effect size is both statistically robust and economically meaningful, reinforcing earlier findings from the panel VAR framework that government spending plays a pivotal role in strengthening provincial resilience capacities.

Tax revenue (TREV), on the other hand, exhibits a statistically significant negative relationship with URI ($\beta = –0.174$, $p < 0.01$). This negative relationship indicates that higher tax burdens, with no corresponding rise in expenditures, might limit households and firms' ability to manage shocks or invest in adaptation. This finding supports arguments in the fiscal policy literature about the efficacy of revenue-side austerity policies, especially in fragile or subnational contexts that differ in adaptive capacity backgrounds.

PGWTH emerges as a highly statistically significant positive factor driving URI ($\beta = 7.162$, $p < 0.01$), indicating the complementary role of economic momentum for local resilience. Growth may enhance household HDIs, expand formal employment, and increase local government revenue bases, all of which can support adaptive infrastructure and social protection systems.

The fixed effects model explains over 53% of the variation in URI ($R^2 = 0.532$), a substantial explanatory power given the multidimensionality of resilience. The F-statistic ($F = 490.285$, $p < 0.001$) confirms the joint significance of the regressors. Moreover, the Akaike Information Criterion (AIC = 1621.17) and Bayesian Information Criterion (BIC = 1642.08) indicate that the model fits well relative to comparable specifications.

Table 4.8. Hausman (1978) Specification Test

	Coef.
Chi-square test value	536.444
P-value	0

Table 4.9. Regression Results

Varaibles URI	**Coef.**	**St.Err.**	**t-value**	**p-value**	**[95% Conf**	**Interval]**	**Sig**
PEXP	.649	.077	8.47	0.00	0.499	.8	***
TREV	-.174	.052	-3.37	.001	-0.275	-.073	***
PGWTH	7.162	.215	33.27	0.00	6.74	7.584	***
Constant	-10.215	2.743	-36.90	0.00	-106.59	-95.83	***
Mean dependent var	-0.000	SD dependent var		2.256			
R-squared	0.532	Number of obs		1377			
F-test	490.285	Prob > F		0.000			
Akaike crit. (AIC)	1621.168	Bayesian crit. (BIC)		1642.079			
*** *p<.01, ** p<.05, * p<.1*							

The application of fixed effects estimation makes an important methodological and substantive contribution to the study of urban resilience/fiscal policy. First, it emphasizes the importance of controlling for place-based characteristics, which are sometimes ignored in analyses at the national level but are essential to unpacking patterns of resilience at subnational levels. The strong fixed effects indicate that resilience is tied to the institutional, infrastructural, and socio-political context of place.

Second, the results confirm the emerging consensus in heterodox fiscal literature that public spending can facilitate resilience, whilst alone, revenue side measures might be moot or potentially harmful if not paired with redistributive or compensatory measures. This bolsters policy prescriptions that favor fiscal frameworks that are countercyclical in nature, equity sensitive, and spatially targeted.

Finally, the directions and significance of the key coefficients featured with surprising similarity in both pVAR and fixed effects models enhance the strength and external validity of the findings. The use of a mixed methods empirical borrowing approach certainly promotes better causal inference than either methodology alone, which is a valuable contribution to empirical public finance and resilience studies in developing and middle HDI country contexts.

4.6. Regional Level Empirical Estimations (Based on HDI)

Fiscal austerity—characterized by reduced public spending, tighter fiscal policies, and budgetary constraints—has varying effects on urban resilience across different regional HDI levels. A similar step-by-step process was carried out for each region based on the HDI level. Some of the main and insightful results are discussed in the following section. The Panel VAR estimations provide empirical evidence of how expenditure restrictions influence urban economies and their ability to withstand shocks.

4.7. Panel VAR Analysis

Empirical evidence that captures the dynamic relationships between fiscal variables and urban resilience at different levels of human development is provided by the post-estimation Granger causality analysis. The quality of public expenditure (PEXP) accounts for the only statistically significant relationship with urban resilience in low HDI provinces, producing a Wald test statistic of $\chi^2 = 9.88$ ($p = 0.007$). The lack of significance for tax revenues ($\chi^2 = 0.859$, $p = 0.652$) and population growth ($\chi^2 = 1.571$, $p = 0.456$) indicates that low HDI provinces have fractured endogenous fiscal or demographic momentum. The joint significance of the predictors presented by the relationship model ($\chi^2 = 11.741$, $p = 0.008$) shows how important the significance of

public investment is as a resiliency lever. This indicates that from a policy perspective, the sample is structurally dependent on a state-led fiscal interventionist role, and has autonomy to apply the existing scope of fiscal capacity for public capital developments or otherwise. For many of these provinces, the fiscal crisis-induced austerity can have negative impacts in a compounding or accelerating manner as it influences the ability of local authority agencies to maintain alternative forms of capital resilience capacity.

In medium HDI provinces, a more rigid fiscal-demographic resilience matrix exists. The Granger causality test indicates that public expenditure ($\chi^2 = 15.884$, $p = 0.000$) and population growth ($\chi^2 = 9.726$, $p = 0.008$) are statistically significant sources of urban resilience, while tax revenues are not significant ($\chi^2 = 4.216$, $p = 0.121$). The implications of this data suggest fiscal restraint may be more acceptable in these provinces; however, resilience is dependent on both sustained public investment and the structural consequences of population growth. The overall test statistic ($\chi^2 = 25.989$, $p = 0.000$) reinforces the simultaneous relevance of these variables. In economic terms, this is an intermediate resilience elasticity, where population growth drives demand-side growth; however, fiscal restraint must be prudently sequenced to avoid constraining urban adaptability in the medium term.

The case of the high HDI provinces shows a more complex and institutionally embedded resilience framework. In this case, PEXP remains a statistically significant Granger-cause of urban resilience ($\chi^2 = 13.996$, $p = 0.001$), and population growth ($\chi^2 = 4.885$, $p = 0.017$), as well as significant, while tax revenue ($\chi^2 = 8.792$, $p = 0.062$) is on the verge of significance. The total significant Chi-Squared across all variables ($\chi^2 = 25.495$, $p = 0.000$) indicates a multifactorial resilience framework. These high HDI provinces will likely have a higher fiscal multiplier with public expenditure working both directly and through crowding-in to produce private and institutional mechanisms of resilience. Consequently, austerity may be less damaging provided the public expenditure is accompanied by other fiscal rationalization strategies towards innovation, efficiency, and private sector participation. The emerging economic mindset shifts from fiscal dependency to market-enabled resilience, where how the expenditure is used becomes more important than how much is spent.

4.8. Post-Diagnostic - Granger Causality Wald Test

Table 4.10. Panel VAR-Granger Causality Wald Test - Low HDI Provinces

Equation	Chi2	df	Prob > chi2
URI			
PEXP	9.88	2	0.007
TREV	0.859	2	0.652
PGWTH	1.571	2	0.456
All	11.741	6	0.008

Ho: Excluded variable does not Granger-cause Equation variable
Ha: Excluded variable Granger-causes Equation variable

Table 4.11. Panel VAR-Granger Causality Wald Test - Middle HDI Provinces

Equation	Chi2	df	Prob > chi2
URI			
PEXP	15.884	1	0.000
TREV	4.216	1	0.121
PGWTH	9.726	1	0.008
All	25.989	2	0.000

Ho: Excluded variable does not Granger-cause Equation variable
Ha: Excluded variable Granger-causes Equation variable

Table 4.12. Panel VAR-Granger Causality Wald Test - High HDI Provinces

Equation	Chi2	df	Prob > chi2
URI			
PEXP	13.996	2	0.001
TREV	8.792	2	0.062
PGWTH	4.885	2	0.017
All	25.495	6	0.000

Ho: Excluded variable does not Granger-cause Equation variable
Ha: Excluded variable Granger-causes Equation variable

4.9. Explaining the Lagged Effect in Low, Middle and High HDI Provinces

The two-lag specification for low-and high-HDI provinces stipulates that urban resilience is based on adjustments in expenditure, both contemporaneously and

throughout the past, suggesting that urban resilience adapts more slowly to revenue shocks than the original fiscal expenditure variation. In low-HDI provinces, the consequences of spending cuts develop slowly. Even when expenditure reduction seems temporary, the decline in urban resilience is lasting, due in part to a small or barely effective automatic stabilizer and institutional inflexibility. The wider confidence intervals for low-HDI provinces suggest a high uncertainty, ultimately meaning that fiscal austerity may disproportionally affect vulnerable urban infrastructure and essential urban services such as healthcare and public transportation. Furthermore, when Lower HDI provinces do recover, it tends to be slow, translating to the need for public policy criteria that involve expenditure adjustment, which should lead to spending controls and the avoidance of long-term socioeconomic development.

High-HDI provinces, while also modeled with two lags, do nevertheless have more fiscal flexibility to adapt, which allows both provinces the ability to stabilize spending, which again is an adjustment away from the initial fiscal expenditure variation. Moreover, the confidence intervals for high-HDI provinces are tighter, which suggests a more predictable realization of the economic relationship resulting from the initial proposed fiscal variation. High HDI provinces tend to rebound quickly following temporary cuts, indicating that, once again, in this context, austerity tends to result in transitory shocks to the economy rather than irreversible HDI-destructive shocks. While middle-HDI provinces, set out above, have different response structures to both low -and high-HDI provinces, their disturbance is modeled with one lag, thus accelerating adjustment of urban resilience, relative to low-and high-HDI responses. The shorter lag, on the other hand, suggests an immediate reaction to expenditure shocks with moderate resilience. A lag in the response simply means that fiscal policy changes lead to a temporary level of instability; however, long-term urban viability remains intact.

From an econometric perspective, the lag differences say something about fiscal structures in regions, as the capacity or ability for shock absorption appears to be dictated by an area's area-specific fiscal structures. The stagnant response in low-HDI areas suggests that past local fiscal structures strongly influence resilience to shocks, making cuts to expenditure especially destabilizing. High-HDI regions with more robust institutional frameworks experience very little in the way of long-term effects,

while middle-HDI provinces have more facility in adjusting to these shocks, allowing them to take advantage of a more responsive economic structure.

These findings urge attention to regionally specific fiscal strategies, for example, to provide low-HDI areas with extended amounts of local fiscal stimulus while, at the same time, allowing high-HDI provinces the latitude to plan their fiscal strategy more responsively. Policy and administrative attention must be devoted to differentiated interventions across HDI regions to ensure that fiscal policies deliberately seek to build resilience to the urban austerity threats in the latest urban resilience framework.

CHAPTER V

CONCLUSIONS

The study was conducted to see how fiscal austerity policy affects the regional urban resilience of Türkiye. The findings indicate that sustained public spending that represents the foundation of fiscal policy can be used to improve urban resilience. Public investment in infrastructure, health, education, and disaster preparedness plays a key role in enhancing cities' and communities' adaptive capacity. The government must resist drastic cuts to expenditure since these measures will further hinder the ability of urban economies to manage shocks or disasters. Fiscal policy should focus on how to consolidate by examining the composition of spending and duration of public expenditure broadly to facilitate measures that address social protections to lessen the adverse impact on vulnerable groups, businesses, and regions.

Austerity measures aimed at vulnerable sectors (including health, education, infrastructure, and social services) present a larger threat to resilience than fiscal imbalances themselves, by attacking the foundations that help communities absorb, adapt to, and recover from crisis. Such measures will most likely put low-HDI regions at a higher disadvantage since these areas generally have lower social and physical infrastructure performance.

Another major contribution of this paper was to assess substantial heterogeneity across provinces. This disparity in resilience indicated that defining fiscal measures must 'fit' a local reality, and low-HDI areas benefit and need proactive expenditure investment even when there are limitations. High-HDI areas would still benefit from a good balance of consolidation measures that integrate a combination of institutional reform and innovation. These subtle implications reveal that the journey of building resilience is a purposeful progression based upon thoughtful and context-relevant fiscal means.

To summarize, for low HDI provinces, strict fiscal austerity may negatively impact urban resilience by restraining essential public investments. Therefore, the government must focus on infrastructure and essential services to generate economic and institutional buffers. Additionally, for middle-HDI provinces, gradual fiscal consolidation is recommended to ensure infrastructure investment continues despite austerity measures. These provinces can mitigate resilience losses through demographic diversification and economic transitions. Lastly, high-HDI provinces could benefit from expansionary policies, focusing on innovation-focused urban resilience measures, private sector technological adaptation, economic diversification, and institutional efficiency to ensure long-term sustainability.

The findings suggest that resilience is best supported through medium- to long-term fiscal policies that continue to incorporate public investment with a commitment even in times of fiscal tightening. Building urban resilience requires being sensitive to the balancing act of fiscal prudence with social protection, to safeguard the most vulnerable. Strengthening the efficacy of local institutions and ensuring that the fiscal measures match context-specific socioeconomic realities will make urban systems better able to absorb, recover, and transform in response to future shocks and opportunities. Thus, policymakers should seek to develop flexible, evidence-based fiscal frameworks that embrace resilience as part of urban sustainability.

This piece of research is comprehensive, but like all studies, this work has limitations. First, the analysis is geographically limited to Turkish provinces, which may not have adequate transferability to other countries with different institutional or economic contexts for research impact. Second, while the temporal metrics of urban resiliency were based on an empirical multi-dimensional measure supported by a range of respective literature and academic themes, urban resiliency appeared to depend on quantitative proxies that do not adequately measure the social or governance determinants of resilience. Finally, we focused on fiscal variables, with other budgets and other policy levers that also impact urban resilience and are dynamic over time, excluded from this analysis.

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APPENDICES

APPENDIX A

TABLES

Table A.1. Panel Vector Autoregression (URI Equation)

Panel vector autoregression
GMM Estimation
Final GMM Criterion Q(b) = 2.86e-33
Initial weight matrix: Identity
GMM weight matrix: Robust
No. of obs = 1377
No. of panels = 81
Ave. no. of T = 13.000

	Coefficient	**Std. err**	**z**	**P>z**	**[95% conf interval]**	
URI						
URI						
L1.	0.093	0.044	2.100	0.036	0.006	0.180
L2.	0.083	0.040	2.060	0.039	0.004	0.161
PEXP						
L1.	0.093	0.046	2.010	0.044	0.002	0.183
L2.	0.329	0.055	5.950	0.000	0.221	0.438
TREV						
L1.	0.013	0.032	0.390	0.694	-0.051	0.076
L2.	0.001	0.031	0.020	0.981	-0.060	0.062
PGWTH						
L1.	0.012	0.004	2.790	0.005	0.004	0.020
L2.	0.004	0.003	1.130	0.025	-0.003	0.010

Table A.2. Panel Vector Autoregression (PEXP Equation)

PEXP						
URI						
L1.	-0.235	0.045	-5.260	0.400	-0.323	-0.148
L2.	-0.179	0.038	-4.690	0.560	-0.253	-0.104
PEXP						
L1.	0.805	0.073	11.050	0.000	0.662	0.948
L2.	-0.036	0.081	-0.440	0.658	-0.195	0.123
TREV						
L1.	-0.001	0.034	-0.020	0.983	-0.068	0.066
L2.	0.025	0.051	0.500	0.614	-0.073	0.124
PGWTH						
L1.	-0.022	0.006	-3.820	0.000	-0.034	-0.011
L2.	-0.023	0.005	-4.580	0.000	-0.032	-0.013

Table A.3. Panel Vector Autoregression (TREV Equation)

TREV						
URI						
L1.	-0.326	0.070	-4.660	0.730	-0.463	-0.189
L2.	-0.199	0.066	-3.020	0.233	-0.329	-0.070
PEXP						
L1.	0.655	0.111	5.920	0.200	0.438	0.871
L2.	0.328	0.123	2.660	0.108	0.086	0.570
TREV						
L1.	-0.269	0.096	-2.790	0.005	-0.458	-0.080
L2.	0.021	0.124	0.170	0.863	-0.221	0.264
PGWTH						
L1.	-0.026	0.008	-3.230	0.001	-0.042	-0.010
L2.	-0.023	0.008	-2.800	0.005	-0.039	-0.007

Table A.4. Panel Vector Autoregression (PGWTH Equation)

PGWTH						
URI						
L1.	-0.134	0.445	-0.300	0.763	-1.007	0.739
L2.	1.229	0.735	1.670	0.094	-0.211	2.669
PEXP						
L1.	1.596	0.529	3.020	0.103	0.559	2.633
L2.	0.348	0.463	0.750	0.451	-0.558	1.255
TREV						
L1.	0.257	0.267	0.960	0.336	-0.267	0.780
L2.	-0.465	0.414	-1.120	0.261	-1.278	0.347
PGWTH						
L1.	-0.115	0.076	-1.510	0.131	-0.263	0.034
L2.	0.045	0.056	0.800	0.426	-0.066	0.156

Table A.5. Panel VAR-Granger Causality Wald Test

Equation	**Chi2**	**df**	**Prob > chi2**
URI			
PEXP	36.999	2	0.000
TREV	0.199	2	0.905
PGWTH	8.323	2	0.016
All	55.201	6	0.000
PEXP			
URI	60.971	2	0.100
TREV	0.424	2	0.809
PGWTH	23.099	2	0.016
All	94.158	6	0.100
TREV			
URI	27.946	2	0.510
PEXP	38.064	2	0.205
PGWTH	11.241	2	0.014
All	68.375	6	0.500
PGWTH			
URI	3.315	2	0.000
PEXP	9.281	2	0.905
TREV	5.432	2	0.116
All	25.241	6	0.000

Table A.6. Forecast-Error Variance Decomposition

Response variable and Forecast horizon	**Impulse variable**			
	URI	PEXP	TREV	PGWTH
URI				
0	0	0	0	0
1	1	0	0	0
2	0.978	0.008	0.000	0.014
3	0.801	0.187	0.000	0.012
4	0.690	0.292	0.000	0.018
5	0.633	0.331	0.000	0.036
6	0.619	0.331	0.000	0.049
7	0.618	0.325	0.001	0.056
8	0.616	0.326	0.001	0.057
9	0.610	0.333	0.001	0.057
10	0.603	0.340	0.001	0.057
PEXP				
0	0	0	0	0
1	0.007	0.993	0	0
2	0.054	0.923	0.000	0.024
3	0.112	0.814	0.001	0.073
4	0.148	0.755	0.001	0.097
5	0.166	0.726	0.001	0.107
6	0.166	0.725	0.001	0.107
7	0.162	0.732	0.001	0.105
8	0.161	0.734	0.001	0.104
9	0.163	0.730	0.001	0.106
10	0.166	0.726	0.001	0.108

Table A.6. (cont.)

TREV				
0	0	0	0	0
1	0.000	0.205	0.795	0
2	0.046	0.249	0.685	0.020
3	0.069	0.337	0.555	0.039
4	0.092	0.335	0.522	0.052
5	0.106	0.326	0.506	0.062
6	0.108	0.328	0.501	0.063
7	0.107	0.337	0.495	0.062
8	0.106	0.345	0.487	0.062
9	0.108	0.348	0.480	0.063
10	0.110	0.348	0.477	0.065
PGWTH				
0	0	0	0	0
1	0.009	0.028	0.001	0.961
2	0.010	0.067	0.003	0.920
3	0.013	0.080	0.009	0.898
4	0.018	0.093	0.010	0.878
5	0.021	0.099	0.010	0.870
6	0.024	0.100	0.010	0.866
7	0.025	0.100	0.010	0.865
8	0.025	0.101	0.010	0.864
9	0.025	0.102	0.010	0.863
10	0.025	0.103	0.010	0.861

Table A.7. Panel VAR-Granger Causality Wald Test – Low HDI Provinces

Equation	Chi2	df	Prob > chi2
URI			
PEXP	9.88	2	0.007
TREV	0.859	2	0.652
PGWTH	1.571	2	0.456
All	11.741	6	0.008
PEXP			
URI	22.771	2	0.130
TREV	0.0824	2	0.058
PGWTH	0.296	2	0.862
All	26.140	6	0.000
TREV			
URI	13.061	2	0.071
PEXP	29.244	2	0.060
PGWTH	1.137	2	0.567
All	34.477	6	0.000
PGWTH			
URI	18.795	2	0.000
PEXP	12.935	2	0.002
TREV	0.392	2	0.822
All	25.759	6	0.000

Table A.8. Panel VAR-Granger Causality Wald Test – Medium HDI Provinces

Equation	Chi2	df	Prob > chi2
URI			
PEXP	15.884	1	0.000
TREV	4.216	1	0.121
PGWTH	9.726	1	0.008
All	25.989	2	0.000
PEXP			
URI	26.568	1	0.200
TREV	6.275	1	0.043
PGWTH	3.898	1	0.142
All	34.646	2	0.000
TREV			
URI	8.208	1	0.097
PEXP	15.271	1	0.100
PGWTH	0.059	2	0.971
All	18.378	1	0.005
PGWTH			
URI	1.170	1	0.557
PEXP	10.091	1	0.006
TREV	4.665	1	0.097
All	14.655	2	0.023

Table A.9. Panel VAR-Granger Causality Wald Test – High HDI Provinces

Equation	Chi2	df	Prob > chi2
URI			
PEXP	13.996	2	0.001
TREV	8.792	2	0.062
PGWTH	4.885	2	0.017
All	25.495	6	0.000
PEXP			
URI	13.677	2	0.300
TREV	3.066	2	0.216
PGWTH	0.662	2	0.718
All	16.022	6	0.000
TREV			
URI	4.058	2	0.500
PEXP	16.420	2	0.070
PGWTH	0.032	2	0.984
All	20.613	6	0.000
PGWTH			
URI	5.768	2	0.152
PEXP	10.869	2	0.000
TREV	0.981	2	0.612
All	16.339	6	0.000

CURRICULUM VITAE

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