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USING PESTLE ANALYSIS TO FORECAST THE FISCAL VULNERABILITY OF REAL ESTATE TAXATION IN CRISIS SCENARIOS

Abstract

The article explores the fiscal consequences of real estate price declines in the context of reduced revenues for national and local budgets. It focuses on the increasing vulnerability of tax systems to external factors that affect both the real estate market and the tax base. The hypothesis assumes that a modified PESTLE model serves as an effective analytical tool for shaping fiscal policy, as it allows forecasting the vulnerability of real estate taxation systems in crises and adapting tax instruments to the dynamics of external shocks. The aim of the research is to identify the causes of declining real estate prices, assess their fiscal impact, and formulate recommendations for strengthening tax policy resilience. The methodology combines a review of real estate taxation mechanisms with an adapted PESTLE analysis and a comparative case study of the US, Spain, China, and Ukraine. The findings confirm the hypothesis: macroeconomic factors, prolonged effects of crisis shocks, and the limited resilience of local budgets are key manifestations of fiscal vulnerability, which can be mitigated through the use of the modified PESTLE model in designing adaptive tax policy. The article offers practical tools such as regular

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property revaluation, flexible rate regulation, and compensation funds. Its originality lies in the application of a multi-level risk assessment model and the identification of common patterns of fiscal vulnerability during market disruption.

Key words: real estate taxation; fiscal vulnerability; PESTLE analysis; real estate price decline; local budgets; property valuation; comparative analysis; tax policy; economic crisis; fiscal adaptation

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1. Introduction

The decline in real estate prices significantly affects not only the real estate market itself but also has substantial fiscal consequences, leading to a reduction in tax revenues for both national and local budgets. The loss of income from property taxes, transfer taxes, and related economic activities can cause budget deficits, restrict public investment, and force governments to seek alternative sources of funding for essential public services. This creates a need for a comprehensive analysis of how declining property values impact the tax system, particularly regarding the fiscal stability of local budgets. Such processes require thorough reflection not only from an economic but also from a fiscal and legal perspective, as their effects extend beyond the property market and encompass broader social, budgetary, and institutional risks. The relevance of the study is driven by the increasing frequency and intensity of crises that reshape the real estate market and lead to fiscal instability. In particular, during global recessions, debt crises, or armed conflicts, states face a sharp decline in tax revenues, which threatens the ability to finance core social functions. Experiences from recent decades demonstrate that property taxes are not only a stable source of revenue but also a sensitive indicator of overall macroeconomic conditions. Numerous studies [e.g., Grote, Wen 2024] have emphasized the structural role of property taxation in public finance and the need for reforms to improve its resilience. At the same time, PESTLE-based models have been increasingly applied to policy and strategic management as diagnostic tools to anticipate external shocks [Akman 2020; Rastogi, Trivedi 2016], yet their systematic adaptation to the fiscal domain—particularly in the context of real estate taxation—remains underdeveloped and insufficiently explored in the literature.

The purpose of this article is to thoroughly examine the nature of real estate price declines by identifying the key factors driving this process, analyzing

its economic and fiscal consequences—especially the impact on property-related tax revenues at both the national and local levels—and formulating practical recommendations for state and municipal authorities to mitigate adverse effects and prevent substantial future fiscal losses. The hypothesis underpinning this article posits that a modified PESTLE model—incorporating fiscal classification criteria—is an effective analytical and managerial tool for central and local governments to anticipate fiscal vulnerability in real estate taxation during crisis conditions. Such a model enables governments to develop adaptive and timely tax responses aligned with structural shifts in the real estate market.

The research methodology combines several complementary analytical approaches. First, a systematic review of property-related taxes is conducted, with a particular focus on recurrent property tax and real estate transfer tax, which serve as primary instruments for funding local budgets. This review includes an analysis of the structure of property taxation, methods for determining the tax base, valuation approaches (based on area, market value, rental potential), valuation standards, and revaluation frequency. Second, an adapted PESTLE analysis model is employed as a tool for comprehensively assessing external factors influencing both the real estate market and the tax system. Within this model, factors are classified by level of impact (macro, meso, micro), duration [short-term shocks vs. long-term trends], and nature (direct or indirect impact on taxation). This framework enables the identification of structural patterns of fiscal vulnerability during periods of market turmoil. Third, the study applies a comparative case study approach covering four countries: the United States (2008–2010), Spain (2010–2013), China (2021–2023), and Ukraine (from 2022]) These countries were selected for their representativeness of diverse tax models (decentralized, centralized, mixed), levels of economic development (developed, transitional, emerging), and types of crises [financial, debt, speculative, military).

This integrated approach not only allows for an in-depth analysis of the scale and specificity of fiscal consequences resulting from falling property prices but also contributes to the development of coherent recommendations aimed at enhancing the resilience of tax systems under crisis conditions. Among the identified patterns are the dominance of macro-level factors in price dynamics, long-term effects of short-term shocks, the high vulnerability of local budgets, and the asymmetric regional impact. Based on these

findings, the article formulates policy recommendations such as regular revaluation of properties in line with market conditions, flexible adjustment of tax rates in crisis-affected regions, the creation of compensation mechanisms to support local budgets, and the digital transformation of property management systems.

2. The Fiscal Role of Real Estate Taxes

Real estate has traditionally been one of the main objects of taxation in most countries of the world. Real estate tax plays an important role in the formation of both state and local budgets, ensuring the financial capacity of local governments to perform their functions [Chyrkova, Petryshyn 2023]. This, in turn, also encourages taxpayers, as the best promotion of tax compliance is the proper use of tax revenues in the public interest and the provision of effective, high-quality, and desirable services The best advertisement for the tax payment is a proper use of tax revenues in the public interest and the supply of effective, efficient and desirable services [Radvan, Franzsen, McCluskey, Plimmer 2021]. According to international statistics, in low- and middle-income countries, real estate tax revenues average 0.3–0.6% of GDP. In developed countries, particularly in the OECD, this figure rises to 1.1% of GDP, and in some countries, such as the United States, Canada, and the United Kingdom, real estate tax revenues can reach 2–3% of GDP. Despite the fact that this tax usually accounts for only 1–2% of the total structure of state tax revenues, its share in local budgets can be much higher – from 15 to 40% [Bahl, Martinez-Vazquez, Youngman 2020]. In addition to the basic recurrent real estate tax, most countries also have a real estate transfer tax, which applies when legal title to real estate is transferred to another party. It is usually administered by the central government, although in some cases it may be administered at the local level [Grote, Wen 2024]. In many developed and developing countries alike, property transfer tax is a significant source of budget revenues, and in a number of them, these revenues significantly exceed revenues from recurrent real estate tax. For example, as of 2020, in a number of countries, including China, South Korea, and Singapore, revenues from taxes on financial and capital transactions were more than twice as high as revenues from recurrent real estate tax and amounted to at least 0.6% of GDP [McCluskey, Bahl, Franzsen 2022]. Formally, the real estate transfer tax can take different forms, depending on the legislation of a particular country. In most cases,

it is levied either as a transfer tax [focusing on the legal basis for the change of ownership, such as a purchase and sale agreement] or as a stamp duty [focusing on the document itself – the agreement or deed of transfer]. Despite the different terminology and calculation mechanisms, the result is usually the same, as both taxes are applied to the full value of the real estate transaction [Grote, Wen 2024].

An important financial instrument is also the capital gains tax, which is levied on profits made from the sale of real estate if its market value has increased during the period of ownership. In most countries, capital gains are taxed on a realization basis, meaning that the tax is charged not when the value of the asset increases, but when it is actually sold. In this case, capital gains are usually calculated as the difference between the sale price and the purchase price of the asset, adjusted for expenses and allowable tax deductions [OECD 2025]. A separate category in the real estate taxation system is made up of taxes on inheritance, estate and gift taxes. Estate taxes are levied on the entire estate of the deceased and are paid from the general inheritance fund. Inheritance taxes, on the other hand, are imposed only on a portion of the assets that are transferred to a particular heir and are paid directly by the heir. Gift taxes apply when property is transferred during the donor's lifetime. Although these taxes are often seen as a potential tool for reducing wealth inequality – in particular, in OECD recommendations – in practice, their fiscal efficiency is limited. They can have a negative impact on entrepreneurial activity, savings rates, and motivation to work, which gives grounds to reconsider the feasibility of strengthening them or even their existence [Tax Foundation 2024]. In addition, some countries apply a wealth tax, which is levied on an individual's net worth, i.e., the market value of all assets owned by the individual minus liabilities. Depending on the fiscal approach, this tax may be narrowly or broadly defined, and depending on how the components of wealth are interpreted, the tax base may differ significantly [Tax Foundation n.d.].

Taken together, these taxes form a comprehensive real estate taxation mechanism that reflects both the economic and social characteristics of each country. They not only provide budget revenues, but also perform a regulatory function, influencing the real estate market and the financial behavior of property owners. Given the broad system of real estate taxation, this article will focus on recurrent real estate tax and real estate transfer

tax, as these two taxes have the largest fiscal impact on budgets in most countries.

Property taxation policy begins with the definition of the tax base. This process involves establishing a list of taxable items and principles for their valuation. In most countries, the property tax base includes both land and buildings, but there are exceptions: for example, in Ghana, Haiti and Tanzania, only buildings are taxed [Bahl, Martinez-Vazquez, Youngman 2020], while in Australia, Estonia and New Zealand, only land [Tax Foundation 2022]. In countries where both land and buildings are taxed, the approach to their taxation may differ: either a single tax is applied, where land and buildings are treated as one economic unit under one law, or separate taxes are applied, where land and buildings are taxed under different regulations. In addition to land and buildings, some states include machinery and equipment in the tax base, although they are mostly taxed under corporate income tax [Bahl, Martinez-Vazquez, Youngman 2020]. In the case of the property transfer tax, the tax base is usually determined based on the market value of the property, the price of the sale agreement or the appraised value established by the authorized body [Grote, Wen 2024]. In order to determine the size of the tax base, countries must choose an appropriate basis for assessing the value of property. The most common approaches are the area-based assessment [where the tax is calculated based on the size of the property, regardless of its value] and the value-based assessment (where the tax calculation depends on the monetary value of the property) [Chyrkova, Petryshyn 2023]. While the value-based model prevails in Western Europe, some Central and Eastern European countries still use the area-based system [Grote, Wen 2024]. However, the distinction between these two approaches is not always clear, as even in area-based systems, adjustment factors may be applied that take into account location, building type, materials, etc. If these adjustments reflect market or contingent values, the area-based system actually becomes a value-based system [Bahl, Martinez-Vazquez, Youngman 2020]. Regarding value-based systems, there are two main approaches: capital value assessment [based on the possible sale price of the object] and rental value assessment [based on market rent]. Most countries use capital valuation as it better reflects the real market value of the object, while rental valuation is more commonly used in the CIS countries [Grote, Wen 2024].

Another important aspect is the choice of valuation standard. It can be based on either current use (e.g., agricultural land is valued at its agricultural value even if it has the potential for development) or best use (property is valued based on its potential commercial use). Many countries prefer the current use standard for agricultural land to prevent speculation and support the agricultural sector [Bahl, Martinez-Vazquez, Youngman 2020]. The methodology for property valuation may be fixed at the national level or delegated to local authorities. The main methods of real estate valuation include the cost approach, which involves calculating the cost of restoring or constructing an object, taking into account physical wear and tear and functional obsolescence; the income approach, which is based on determining the value of an object based on expected income, such as from rent, and is often used for commercial real estate; the comparative (market) approach, which involves analyzing the sale prices of similar properties on the market, with adjustment factors (such as location, condition, size, etc.), allowing for the most accurate assessment of a property's market value [Ivchenko 2020]. In countries with underdeveloped markets, mixed models are most often used, combining zonal land valuation, the cost approach for buildings and additional valuation tools. In addition to choosing a method, countries must address a number of related issues: how often to revalue real estate (in some countries it is done every few years, in others it is flexible depending on market changes); whether local governments can choose their own valuation method (e.g., to adapt the system to local conditions); whether indexation is allowed between valuation periods [this allows the tax base to be kept up to date without a complete revaluation] [Bahl, Martinez-Vazquez, Youngman 2020]. All these factors together form the basis for a fair, efficient and adaptive real estate tax system. However, the effectiveness of this mechanism can be significantly reduced by external factors. In particular, in the face of falling real estate prices, the real estate tax partially loses its stability and predictability as a source of budget revenues. A decline in market value automatically reduces the tax base, and in the absence of regular revaluation, the official value of real estate often remains overstated. This creates a sense of injustice and causes dissatisfaction among taxpayers, which in turn reduces tax compliance and worsens the overall perception of the tax system. In combination with the property transfer tax, this can also discourage market activity, complicate transactions and negatively affect the investment attractiveness of the sector.

3. External Factors Affecting the Real Estate Market: A PESTLE Analysis

To identify and systematize the main factors that affect the dynamics of the real estate market in a crisis and shape the fiscal implications for the budget, we propose to apply an adapted PESTLE-analysis model. PESTLE (or PEST) is an analytical tool developed by Harvard University professor Francis Aguilar in 1967 and first presented in the publication Scanning the Business Environment [Kenton 2025]. Its original purpose was to serve as a framework model for strategic planning and analysis aimed at studying the micro and macro environment and developing strategic thinking. In modern practice, PESTLE is widely used by companies, think tanks, and government agencies to assess the external environment in which they operate or plan to implement new projects, policies, or initiatives [Akman 2020]. As an element of the situational analysis, the PESTLE model covers six key factor groups that determine the overall "climate" of the external environment: political (P), economic (E), social (S), technological (T), legal (L) and environmental (E) [Rastogi, Trivedi 2016]. The application of this model in the real estate market allows for a comprehensive assessment of the complex of external factors that cause price drops, generate risks for the tax base, and directly affect the state of public finances.

Taking into account the complex context typical for crisis periods in different countries of the world – such as recession, market destabilization, armed conflicts or budgetary pressure – this study uses PESTLE analysis not as a universal static matrix, but as a flexible tool for analyzing external influences on the real estate market and tax revenues. Based on the experience of using PESTLE-analysis in complex multi-level systems (such as in the context of the European Union) [Tub, Hajdinjak, Schmid 2020], the scope of the analysis is expanded beyond the classical categories and supplemented with a fiscal perspective, i.e., an assessment of the impact of each factor on the real estate taxation system. Particular attention is paid to two main taxes: regular real estate tax and property transfer tax. Along with traditional methods, this approach allows us to create a universal analytical model that is relevant for countries with different levels of economic development and different tax systems, while being sensitive to the specifics of crisis phenomena that change the dynamics of the real estate market.

For further analysis, it is first necessary to define what exactly is meant by the term "factor". Within the PESTLE analysis, a factor is interpreted as an active variable – a condition, event or trend that directly or indirectly affects a certain result [Tub, Hajdinjak, Schmid 2020]. In order to enhance the analytical depth of the study, we divide the factors identified within the PESTLE model by three criteria: the level of influence, the duration of the effect and the nature of the impact on the tax system.

According to the level of influence, we distinguish between macro factors, meso factors, and micro factors. **Macro factors** operate at the national or global level and cover broad phenomena such as economic recession, inflation, military conflicts, or large-scale changes in fiscal policy. Their impact extends to the entire taxation system and the structure of the real estate market. **Meso-factors** are related to specific sectors or regions and include processes such as internal migration, local changes in legislation, and fluctuations in housing demand in certain areas. **Micro factors** refer to the behavior of individual market participants: taxpayers, buyers and sellers of real estate. These include, for example, access to mortgages, household solvency, or trust in the tax authorities.

The factors are classified as short-term (shocks) or long-term (trends) **according to the duration of their impact. Short-term** factors are the result of sudden changes and mostly have an immediate effect. They include, among others, energy crises, geopolitical tensions, sharp inflation or unforeseen legislative changes. **Long-term** factors are formed gradually, affect the structural parameters of the market and can transform the tax base in the long run. These include urbanization, demographic aging, changes in housing preferences, etc.

Direct and indirect factors are distinguished **by the nature of their impact**. **Direct** factors have a direct impact on taxation parameters, such as changes in the value of real estate, the volume of transactions, or tax rates. For example, a decline in housing prices automatically reduces the tax base. **Indirect** factors affect the tax system indirectly, through changes in market participants' behavior, administration, trust in tax authorities, or the availability of financial instruments. They do not directly change the tax base, but can significantly affect the efficiency of its formation. This structuring allows not only to describe the factors within the six categories, but also to assess how and in what perspective they affect real estate taxation in times of crisis.

Below is a summarized overview of the PESTLE factors in the real estate market and their impact on the taxation system, classified by level, duration and nature of impact:

Political factors (P) cover phenomena related to political instability, armed conflicts, and international sanctions. These are usually macro factors with an immediate effect and a direct impact on tax revenues. For example, a war can lead to an outflow of investments, a halt in construction, and a reduction in the volume of transactions. As a result, revenues from property transfer tax and capital gains are reduced.

Economic factors (E) include recession, inflation, rising unemployment, and falling real incomes. These are mainly macro factors that can be either short-term shocks or long-term trends that directly affect the tax base. Declining purchasing power reduces the market size, and the need for subsidies increases pressure on the state budget.

Social factors (S) include demographic changes, migration, household downsizing, and the transformation of housing preferences (including the shift from buying to long-term renting). These are long-term meso-factors with a mostly indirect impact: they reduce the volume of transactions and, consequently, the revenue from property transfer taxes.

Technological factors (T) relate to the digitalization of the real estate management system, the introduction of automated property valuations, and online platforms for buying and renting. These are usually long-term micro factors that have an indirect and gradual impact. They can improve the efficiency of tax administration, but in the short term their fiscal effect is limited.

Legal factors (L) include changes in tax or land legislation, lack of regular revaluation of property, and an unstable regulatory environment. They can be both long-term and immediate in effect and have a direct impact on the amount of tax liabilities and tax compliance.

Environmental factors (E) are related to climate risks, such as flooding, erosion, and reduced suitability of areas for development. These are meso- and macro-factors with a long-term and direct impact: they reduce the market value of properties and, consequently, the amount of tax revenues from real estate in vulnerable areas.

The PESTLE analysis allows us to identify the key external factors that shape the crisis dynamics in the real estate market and create fiscal risks for the state and local budgets.

4. International Comparative Analysis of the Fiscal Consequences of Real Estate Price Declines

To further deepen the analysis, it is advisable to move from the general model to its practical application on specific examples of countries that have experienced a significant drop in real estate prices and had significant tax consequences. In this way, we can test the effectiveness of the proposed analytical framework on real cases and trace the causal links between market changes, tax losses, and government fiscal policy.

4.1. USA [2008–2010]: mortgage crisis and collapse of the tax base [analysis through the PESTLE lens]

The prerequisites for the 2008–2010 mortgage crisis in the United States began to form long before the actual collapse of the real estate market. To comprehensively understand the roots of fiscal vulnerability, it is appropriate to trace the origins of the crisis back to the 1990s—a period that marked the beginning of structural shifts in the U.S. financial system, which gradually created the conditions for future instability. These included changes in investment behaviour, liberalisation of credit policy, and a shift toward risky financial instruments. In the 1990s, the rapid growth of the technology sector led to the creation of the "dot-com bubble", accompanied by massive inflows of capital into tech company stocks. The collapse of this bubble at the end of the decade resulted in a loss of investor confidence, increased household debt, and a general economic slowdown [Rizescu, Popescu 2008: 3335–3345; Pospíšilová 2012]. In response, the U.S. Federal Reserve significantly lowered the federal funds rate—from 6.54% to 0.98% between 2000 and 2003—which made mortgage financing much more accessible [Musílek 2008]. This stimulated housing demand, drove up property prices, and gradually inflated a speculative bubble in the real estate market [Pajarskas, Jočiené 2015]. At the same time, banks—under pressure from government policy aimed at expanding homeownership—began lending more actively to high-risk borrowers, particularly through adjustable-rate mortgages (ARMs) and subprime loans [Nguyen 2011]. The gradual increase in interest rates after 2004 (reaching 5.25% in 2007) made debt servicing

significantly more difficult, leading to a wave of defaults and a market crash [Board of Governors of the Federal Reserve System, Subprime mortgages]. As a result, housing prices collapsed and the tax base—largely tied to market property values—shrank considerably, which had a direct fiscal impact, particularly for local budgets dependent on property taxes and real estate transfer taxes.

Using an adapted PESTLE model, we can identify a set of external factors that contributed to the crisis and directly affected tax revenues, particularly at the local level:

Political (P): Insufficient regulatory oversight of financial institutions and political tolerance for risky financial practices were preconditions for the systemic collapse. This is a macro factor with a delayed but powerful direct impact. After the crisis began, the government intervened by introducing the TARP bailout program, which was an attempt to reduce tax losses and support the financial system.

Economic (E): The most powerful set of factors are macro factors, which acted as short-term shocks with long-term consequences. The recession, the collapse of the mortgage market, a sharp drop in GDP and rising unemployment led to a significant decline in real estate values, a decrease in the volume of transactions and a shrinking tax base.

Social (S): The massive foreclosures on borrowers led to increased social tensions and changes in housing preferences. Many families have lost confidence in the mortgage lending system, which has reduced purchasing activity. These are meso factors with an indirect long-term impact on tax revenues from the real estate market.

Technological (T): In the period before the crisis, complex financial instruments (e.g., CDOs) were actively used, technologically sophisticated but poorly regulated. In the tax administration itself, technological factors did not play a key role, but contributed to the complexity of financial risk assessment. Indirect macro factor.

Legal (L): Imperfect mortgage legislation, lack of proper supervision, and delays in adopting anti-crisis regulations contributed to the deepening of the crisis. These are direct macro factors that worsened the situation with real estate tax revenues.

Environmental (E): In this case, environmental factors were not crucial.

Fiscal implications:

The crisis has led to a significant decline in revenues from regular property taxes, which are the main source of local budget revenues in the United States. As a result, many municipalities were forced to cut spending on education, security and infrastructure. Property transfer taxes have also fallen due to a decrease in the number of sales and purchases.

Classification of factors according to the research approach:

- Level: mainly macro factors
- Duration: short-term shocks with long-term effects
- Nature: both direct (economy, legislation) and indirect (social trust, market behavior)

The United States responded to the 2008–2010 economic crisis with a series of large-scale fiscal and monetary measures aimed not only at stabilising the financial system but also at mitigating budgetary losses—particularly at the local level—resulting from declining revenues from property tax and real estate transfer tax. The first step was the lowering of the federal funds rate by the Federal Reserve System (FRS), intended to stimulate lending. However, mortgage interest rates remained relatively stable, and household debt levels did not significantly decline. Consequently, local government revenues continued to fall due to reduced real estate market activity. To support the financial system that underpinned credit provision and formed the basis of the tax system, the Troubled Asset Relief Program (TARP) was introduced in 2008. The initial purpose of TARP was to purchase toxic assets—particularly mortgage-backed securities—that had become unmarketable. In practice, however, the programme shifted focus toward direct recapitalisation of banks and mortgage institutions to preserve their ability to serve the mortgage market [U.S. Department of the Treasury, Troubled Asset Relief Program]. In this way, the real estate market—on which property-related tax revenues are based—was indirectly supported. Total expenditure under the programme amounted to USD 443.5 billion [U.S. Government Accountability Office, Troubled Asset Relief Program: Lifetime Cost]. Particular attention was also given to strengthening regulation of the mortgage sector as a component of fiscal stabilisation. Starting in 2007, the Federal Reserve initiated updates to the regulatory framework, particularly through the Home Ownership

and Equity Protection Act (HOEPA), to combat predatory lending practices that had contributed to the mortgage crisis. In 2010, the Dodd-Frank Act expanded the scope of HOEPA to cover purchase mortgages and open-end credit plans and introduced stricter requirements for risk assessment and disclosure [Bureau of Consumer Financial Protection, HOEPA Rule; Moore, Brauneis 2008: 18–48]. These reforms helped stabilise the mortgage market—an essential condition for the recovery of transaction volumes, which are directly tied to transfer tax revenues.

Thus, the United States' crisis response in the fiscal context focused primarily on maintaining the functioning of financial institutions that provided credit to the real estate market and on preventing further declines in housing prices, which helped avoid a catastrophic contraction of the tax base. At the same time, measures were taken to support real estate transactions by stabilising mortgage lending—crucial for preserving revenue from property transfer taxes. Equally important was the goal of gradually restoring confidence in the market, without which long-term fiscal stability would have been unattainable. Taken together, these measures helped reduce the fiscal vulnerability of local budgets, although full recovery of tax revenues required several years of structural adjustment and ongoing monitoring of the real estate sector.

4.2. Spain (2010–2013): collapse after the "construction boom" and fiscal vulnerability

Following a period of rapid economic growth in the 2000s—driven by large-scale construction and aggressive lending—Spain faced a severe real estate crisis. Key contributing factors included excessive credit exposure, housing oversupply, and declining demand, exacerbated by external shocks such as the global financial crisis [Pérez 2010: 1571–1601; Baudino, Herrera, Restoy 2023]. Between 2000 and 2003, an influx of capital—diverted from financial markets into real estate—led to an overheated property market. By 2006, housing prices had reached their peak, creating an illusion of fiscal stability sustained by high revenues from property taxes and real estate transactions [Kubátová 2018]. At that time, Spain had become one of the EU countries with the highest number of housing units per capita [Pérez 2010: 1571–1601]. However, beginning in 2008, following the bursting of the housing bubble, property prices dropped sharply, undermining the fiscal base

of local governments. The significant fall in asset values and the decline in transaction volumes led to a sharp decrease in revenues from property transfer taxes and recurrent property taxes. Additionally, rising unemployment, the collapse of development firms, and overall economic slowdown further worsened the fiscal conditions at the local level [European Stability Mechanism, Spain; Martí, Pérez 2016].

Analysis using the PESTLE model:

Political (P): Insufficient strategic planning during the boom phase, weak control over municipal developments, and excessive decentralization created the political preconditions for the crisis. This is a macro factor with an indirect impact that complicated the response at the time of the collapse.

Economic (E): The main block of factors is macro factors with a short-term effect and long-term consequences. Explosive growth in supply, mortgage affordability, and then a drop in demand, a freeze in construction, and a 30–40% decline in real estate values. The market virtually froze, transactional activity fell, and so did tax revenues.

Social (S): High youth unemployment, changing housing preferences, increased migration, and declining confidence in the mortgage system are meso factors with indirect effects that have exacerbated the market crisis.

Technological (T): In this case, technological factors played a secondary role. The digital transformation of tax administration was not yet developed, and thus the effectiveness of the response was limited.

Legal (L): The lack of flexible legislative instruments and the revaluation of real estate at the old rates led to an increase in the fiscal burden on taxpayers during the market downturn. These are direct legal macro factors with a long-term effect.

Environmental (E): Environmental factors in this case were insignificant, although in some regions exceeding the permissible levels of development could cause local environmental risks.

Fiscal implications:

Local budgets, which were dependent on property transfer taxes, construction fees, and regular real estate taxes, were hit hardest. As demand, the number

of transactions, and housing prices fell, municipal revenues plummeted. Some regions accumulated debts that required financial support from the center.

Classification of factors according to the research approach:

- Level: mainly macro factors, with the addition of meso factors
- Duration: Initially a short-term shock that turned into a long-term structural decline
- Nature: direct (price revaluation, loss of income) and indirect (change in housing behavior, distrust of the market)

Starting in 2009, the Spanish government implemented a series of anti-crisis measures aimed at stabilising the budgetary system, particularly in the area of tax revenues, which had sharply declined following the collapse of the real estate market. However, these efforts proved insufficient to effectively contain the fiscal crisis, and the situation remained critical in 2011–2012. A key direction of response was the fiscal consolidation programme launched in late 2011. It involved a revision of tax policy, the introduction of new levies (such as an environmental tax), and significant reductions in public spending at both the central and regional levels. The most severe cuts affected funding for education and healthcare, which comprised a substantial portion of local government budgets [Martí, Pérez 2016]. In response to falling revenues from property taxes and real estate transfer taxes, the government sought to offset the losses by increasing the overall tax burden and optimising public expenditures. However, without a recovery in real estate market activity, these measures failed to deliver the expected fiscal results. It was only after seeking financial assistance from European institutions in 2012 that Spain began implementing structural reforms aimed at gradually restoring market confidence, stabilising the financial system, and preparing for the long-term strengthening of the property-related tax base [Royo 2020]. Thus, Spain's fiscal response included not only budget cuts but also attempts to reconfigure the tax system in light of the profound dependence of local governments on revenues linked to real estate.

4.3. China (2021–2023): debt crisis of developers and fiscal pressure on the local level

The financial model adopted by Chinese developers since the 1990s was based on large-scale debt financing of long-term construction projects and a pre-sale system for residential property, which effectively served

as interest-free advance funding for development. By 2021, this model had led to a deep debt crisis, as companies such as Evergrande accumulated more than USD 300 billion in liabilities and became unable to meet their obligations [BBC, Evergrande: Why should I care if China property giant collapses?; Voice of Asia, Tracking the timeline of China Evergrande's debt crisis]. The default of Evergrande triggered a widespread loss of confidence in the market, construction stoppages, protests by homebuyers, and severe financial difficulties for other major developers, including Country Garden, Kaisa, and Sunac. The common practice of paying in advance for unfinished properties, coupled with insufficient regulatory oversight, exposed systemic vulnerabilities [Veselý 2024]. In China, unlike in most developed countries, local government budgets are not primarily funded by property taxes but are heavily dependent on land-use rights sales. In 2019, revenues from land transactions accounted for 38% of local government income. Despite the market downturn, land prices remained artificially high: from 2019 to 2022, the number of land deals fell by 45%, yet the average land price increased by 16% [Chang, Wang, Xiong 2024]. This fiscal dependence on land transactions discouraged local authorities from allowing price corrections, which in turn exacerbated financial pressure on developers. High land prices suppressed demand, made property sales more difficult, and undermined market stability—particularly in regions with the highest debt burdens. The introduction of the "three red lines" policy in 2020 aimed to curb excessive borrowing among developers. However, under already high debt levels, the new restrictions led to a liquidity crisis, halted projects, and further eroded trust in the market [Japan Research Institute; Veselý 2024].

Analysis using the PESTLE model:

Political (P): The government's strict centralized policy of curbing speculation (the "three red lines") was a trigger for the market downturn. This is a macro factor with an immediate and direct impact – restrictions on debt capital deprived companies of financial flexibility, leading to a cascade of defaults.

Economic (E): The main driver of the crisis. Overheating of the market, dependence of local budgets on land sales revenues, declining demand for housing, slowdown in GDP and growing financial instability are macro factors with long-term consequences. The decline in construction has reduced revenues from transactions and local land taxes.

Social (S): Growing public distrust of developers (especially due to problems with unfinished projects), falling consumer confidence, and refusal to buy housing "at the planning stage." These are meso-factors with an indirect long-term impact that undermine fiscal stability by reducing market activity.

Technological (T): The Chinese government had to quickly introduce digital platforms to record construction, supervise project implementation, and control public funding. These are micro factors with an indirect effect that play a role in reducing tax losses in the long run.

Legal (L): The introduction of new lending rules, restrictions on the use of borrowed funds, and mandatory financial reports for developers are direct legal macro factors aimed at stabilizing the sector, but with a negative short-term effect on budget revenues.

Environmental (E): Certain environmental restrictions on construction in regions with high pollution or seismic risks played a meso-role, but were not key factors in the crisis.

Fiscal implications:

Local budgets, which were heavily dependent on revenues from land sales, one of the main sources of local finance in China, were particularly sensitive. With market confidence falling, demand declining, and lending restrictions, these revenues have significantly decreased. The government had to look for new sources of revenue and support developers through state-owned banks and stabilization funds.

Classification of factors according to the research approach:

- Level: mainly macro factors, with some meso and micro factors
- Duration: a combination of a short-term shock and a long-term structural decline
- Nature: direct (credit restrictions, falling prices) and indirect (changes in investor behavior, lost confidence)

Since 2021, the Chinese government has introduced a series of anti-crisis interventions aimed at curbing the growing indebtedness of developers and stabilising the real estate market, which remains critically important for the fiscal sustainability of local governments. That year marked the first decline in housing prices since 2015, signalling the onset of a deeper market downturn. Following the COVID-19 pandemic, the decline in prices

accelerated, and the decreasing affordability of housing gained socio-political significance, prompting a reassessment of national housing policy [Sheng, Cheng, Yin 2024]. In 2023, amid growing fiscal pressure on local governments, discussions began regarding the possible introduction of a broad-based property tax as an alternative and more stable source of municipal revenue. The idea was to reduce fiscal dependence on land sales through a gradual transition toward taxing property ownership. However, these discussions have not yet resulted in a comprehensive reform, and tax revenues remain vulnerable to market fluctuations. Despite ad hoc policy measures, housing prices continued to fall throughout 2023, primarily due to persistently low investor and consumer confidence. This significantly reduced transaction volumes and adversely affected potential revenues from real estate transfer taxes, which could otherwise serve as an additional source of local government funding. Thus, in response to the crisis, the Chinese government initiated a shift from a one-time revenue model (based on land sales) toward a potentially more stable system—grounded in regular property taxation—that could provide a more predictable fiscal base for local authorities. Nonetheless, in the absence of systemic tax reform, fiscal stability remains at risk given the declining market dynamics and the uneven distribution of budgetary burdens across regions.

4.4. Ukraine (from 2022): War, destruction and market transformation

Russia's full-scale invasion of Ukraine in 2022 triggered a profound real estate crisis with not only socio-economic but also significant fiscal consequences. Widespread destruction, internal displacement of the population, and legal uncertainty led to a sharp decline in real estate transactions and a reduction of the tax base, directly affecting revenues from property tax and real estate transfer tax. In 2022–2023, the market entered a phase of stagnation, but beginning in 2024, signs of moderate recovery emerged. The increase in development projects, decreasing inflation, and renewed investor interest indicated a gradual stabilisation of the situation. In 2024, the number of real estate purchase transactions increased by 3.36%, although the total volume of operations remained 45.15% below the pre-war level of 2021 [Global Property Guide, Ukraine's Residential Property Market Analysis 2025]. A notable aspect was the regional shift in market activity toward Western Ukraine, where prices and demand rose significantly due to relative safety. Meanwhile, in the East, stagnation or declining prices persisted. This

regional asymmetry has led to an uneven tax burden and has exacerbated fiscal imbalances between local governments [Integra-Dom, Ukrajinský trh s nemovitostmi v roce 2025: trendy a předpovědi]. Furthermore, construction costs—expected to rise by 15–20% in 2024—complicate the implementation of new projects and limit future real estate tax potential. Despite partial recovery, household purchasing power remains constrained by high mortgage rates, which continues to hinder expansion of the property tax base. Thus, the war has fundamentally transformed the structure and geography of the real estate market, placing the sustainability of property-related tax revenues at risk and highlighting the need for a reassessment of local fiscal strategies under conditions of crisis-driven segmentation [Ivanova, Frolov 2024].

Analysis according to the PESTLE model:

Political (P): Armed aggression, the introduction of martial law, mobilization measures and partial loss of control over certain territories are macro factors with immediate effect and direct impact on the real estate market. In addition, the unstable political environment has made it impossible to implement long-term tax strategies, in particular with regard to property valuation and revaluation.

Economic (E): A sharp decline in GDP, rising unemployment, devaluation of the hryvnia and a decline in investment activity have led to a general decline in the purchasing power of the population. These are macroeconomic factors that have a direct short- and long-term effect on the real estate tax base.

Social (S): Massive internal and external migration, changing housing priorities (e.g., increased demand for housing in the western regions), and declining consumer confidence are meso-factors with a long-term and indirect impact. Different regions of the country have an asymmetrical market situation: the frontline areas are in decline, while the western regions are experiencing growing demand.

Technological (T): Despite the war, Ukraine has continued to digitize its administration, particularly in the e-real estate system, accounting for damaged property, and registries. These are micro factors with long-term potential to increase transparency and efficiency of administration, but with limited short-term fiscal impact.

Legal (L): Rapid legislative changes (temporary abolition or postponement of some taxes, IDP benefits, updated compensation mechanisms for destroyed housing) have a direct impact. The unstable regulatory environment has complicated tax administration, especially in the context of damaged registries.

Environmental (E): Massive destruction of infrastructure, soil contamination, and destruction of agricultural land are macro factors with a long-term impact that change the value and suitability of areas for development. This, in turn, affects the long-term structure of the tax base.

Fiscal implications:

As a result of the loss or damage to the housing stock, the cessation of construction activity, and the suspension of transactions in some regions, revenues from regular real estate tax and property transfer tax have declined significantly. At the same time, the fiscal burden on regions with high demand for housing [primarily in the western part of the country], where the tax base has actually changed, has increased. The government was forced to increase intergovernmental transfers and develop mechanisms to compensate for losses at the local level.

Classification of factors according to the research approach:

- Level: mostly macro factors, with regional meso and micro factors
- Duration: a combination of acute short-term shocks and long-term structural changes
- Nature: direct (loss of tax base, destruction) and indirect (migration, behavioral change)

Forecasts for Ukraine's real estate market in 2025 remain moderately optimistic: prices in the primary housing market are expected to increase by at least 20%, and for high-demand properties—by as much as 25–30% [Global Property Guide, Ukraine's Residential Property Market Analysis 2025]. This growth is driven by a combination of factors, including the influence of the state mortgage programme "YeOselya," rising construction and labour costs, the strengthening of the US dollar, and expectations of increased taxes on real estate transactions. From a fiscal perspective, this upward trend has the potential to restore tax revenues, particularly from real estate transfer taxes, as both rising prices and transaction volumes directly affect the scale of such payments. In addition, the increase in market property values is gradually expanding the base for property taxation. Government initiatives

such as "YeOselya" not only stimulate market activity but also support local budget stability by creating a more predictable tax base. The anticipated adjustment of tax policy to improve the efficiency of real estate transaction taxation is considered an additional tool for fiscal consolidation amid gradual market recovery [Global Property Guide, Ukraine's Residential Property Market Analysis 2025].

5. Conclusion

In conclusion, based on the analysis of four crisis case studies—those of the United States, Spain, China, and Ukraine—it is possible to formulate a set of practical recommendations aimed at strengthening the resilience of tax systems under conditions of real estate market destabilisation. These recommendations are relevant both for countries with well-developed tax infrastructures and for economies undergoing structural transformation or experiencing crisis. The use of a modified PESTLE analysis model enabled not only the classification of external factors by their nature (political, economic, social, technological, legal, environmental) but also the expansion of the analytical framework through the integration of a fiscal dimension. The additional typological division of factors by level (macro, meso, micro), duration (shock/trend), and nature of impact (direct/indirect) provided deeper insight into how crisis dynamics translate into fiscal risks. A comparative analysis of four case studies — the United States (2008–2010), Spain (2010–2013), China (2021–2023), and Ukraine (since 2022) — revealed a set of recurring patterns: the dominance of macroeconomic factors, the prolonged effects of short-term shocks, the high vulnerability of local budgets, and the asymmetric distribution of fiscal effects across regions. These trends show that in the absence of proactive fiscal instruments, crisis-induced volatility in the real estate market can rapidly erode the tax base and undermine budgetary stability. Each of the examined cases demonstrated the necessity of targeted tax responses. In the United States, national-level stabilization tools (such as TARP) were used to protect local budgets; Spain's experience highlighted the risks of overreliance on revenues from construction; the case of China showed how systemic indebtedness in the real estate sector threatens the fiscal autonomy of subnational entities; Ukraine illustrated extreme territorial asymmetries and administrative challenges in maintaining tax functionality during armed conflict. The findings support the hypothesis that the modified PESTLE model serves not only as a diagnostic framework

but also as a practical tool for fiscal governance. It enables the development of adaptive tax strategies that reflect the structure, timing, and scale of crisis impacts.

Methodological recommendations:

1) Use the PESTLE model as a dynamic analytical matrix with a fiscal component, responsive to external volatility.
2) Apply a multi-level typology (macro/meso/micro; shock/trend; direct/indirect) to improve scenario planning and targeted responses.
3) Incorporate territorial differentiation into fiscal analysis — especially in countries with uneven regional development — to ensure locally relevant tax measures.

Practical tax policy recommendations:

1) Ensure regular revaluation of real estate. In times of crisis, the tax base should accurately reflect market value. Regular revaluation helps prevent fiscal distortions, minimize imbalances in tax burdens, and preserve taxpayers' trust in the fairness and legitimacy of the tax system.
2) Implement flexible tax regulation during emergencies. Swift measures such as rate adjustments, payment deferrals, or temporary tax holidays in affected regions can stabilize short-term revenues while preserving tax discipline and easing the burden on vulnerable economic groups.
3) Establish reserve compensation mechanisms. National stabilization funds or targeted support programs (such as TARP in the United States) enable the rapid provision of financial assistance to local budgets experiencing sudden revenue declines, ensuring continuity of essential public services.
4) Strengthen transparency and digitalization of real estate records. The development of digital registries, automated valuation systems, and electronic administration enhances tax management efficiency, reduces administrative costs, and improves data accuracy — particularly important during crises, as shown in the cases of China and Ukraine.
5) Account for regional asymmetries in the design of tax measures. Since crises do not affect all regions equally, fiscal responses must be geographically differentiated. Some areas require tax relief, while others benefit from targeted incentives aimed at economic recovery.

Thus, the combination of empirical evidence from recent crises with the structured application of the modified PESTLE model can significantly improve the resilience of real estate tax systems and reduce fiscal vulnerability during future periods of market instability.

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