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Budget Transparency and Financial Sustainability in Inflationary Conditions: Evidence from European and Asian Countries

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Abstract: Objective: Budget transparency is one of the fundamental components of good governance, which helps increase accountability, enhance citizen participation in government financial decision-making, build public trust, and reduce corruption. In inflationary conditions, rising prices and economic volatility can lead to a reduction in budget transparency and subsequently weaken financial sustainability. This study leverages global datasets to examine the relationship between budget transparency and financial sustainability, with a particular emphasis on how inflation acts as a moderating variable. **Method:** This research has been carried out within the economic contexts of some selected Asian and European countries. The dependent variable in this respect is the OBI provided by the IBP, whereas explanatory variables are various financial sustainability indicators. Besides, the inflation rate was also taken as the moderating variable. The research aims will be achieved by analyzing data from selected Asian and European countries, comprising 15 observations for each country, using multiple regression techniques from 2010 to 2021. **Findings:** The findings of this study reveal that the Open Budget Index (OBI), which serves as a benchmark for assessing budget transparency across countries, plays a pivotal role in enhancing financial sustainability within both Asian and European economies. Nevertheless, the analysis highlights that inflation weakens the beneficial association between budget transparency and financial sustainability. Additionally, the results derived from the Fisher test underscore significant differences in the OBI-financial sustainability relationship between these two regions, with the influence of OBI being notably stronger in European contexts compared to Asian ones. These findings, combined with the need for budget transparency, indicate that the areas of financial policy reforms, inflation control, and mechanisms for public oversight of financial activities require further follow-up. The result will be a marked improvement in the sustainability of finance, and hence, countries will realize more sustainable financial and economic management.

Keywords: Inflation; Budget; Budget Transparency; Financial Sustainability

1. Introduction

The 2008 financial crisis, coupled with the challenges posed by the COVID-19 pandemic, has placed significant strain on governments to stimulate economic growth through fresh investments while ensuring fiscal responsibility (Nate et al., 2023). Given the necessity of safeguarding the well-being of future generations, these efforts may influence the long-term financial sustainability of policies and strategies devised by policymakers (Schick, 2005). Moreover, the importance of evaluating past and anticipated governmental policies and programs becomes paramount, potentially affecting the level of budget transparency. One of the essential components of good

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governance is budgetary transparency, which promotes accountability, improves citizen involvement in financial decision-making, fosters public trust, and lowers corruption. Where conditions of inflation make the prices increasingly higher and the economy unstable, financial sustainability may be reduced, and budget transparency may also be weakened.

Research on transparency has traditionally focused on participation and accountability, often approaching the topic from a rather narrow perspective. Building on Michener's (2019) work, this study takes a broader and more integrated approach to advance discussions around budget transparency. Anessi-Pessina et al. (2016) also pointed out the need to delve deeper into the connection between budgeting and performance management, particularly in areas like budget allocation and management processes. While previous studies have primarily explored how budget transparency influences citizen engagement and trust, the link between transparency and financial management remains underexplored. To address this gap, this research focuses on how budget openness relates to financial sustainability at the central government level, offering new insights to the field. By emphasizing financial sustainability, this study aims to enhance the theoretical and practical relevance of the concept (Caruana et al., 2019). Moreover, it investigates the role of inflation in shaping the relationship between financial sustainability and budget openness (Bisogno et al., 2017).

Using models where the OBI from the IBP is the primary emphasis and the other factors are various financial sustainability metrics, this study is carried out within the economic contexts of a few chosen Asian and European nations. The proposal for the study rests on the public value framework (Bozeman, 2007), which suggests that its ideas influence responsibility, managerial positions, budgeting, and decision-making (Douglas and Overmans, 2020). Since analysis and planning are improved by clear information, budget transparency can improve financial sustainability. When people, businesses, and governments have access to accurate information, they may identify financial concerns and enhance the budgeting process as needed. In order to achieve financial sustainability, this could result in less financial uncertainty, improved debt management, and more efficient use of financial resources (Nate et al., 2023). The relationship between fiscal sustainability and budgetary transparency may be influenced by inflation. Budgetary openness barely helps with financial planning or resource management during periods of positive inflation. In these situations, inflation raises prices and lowers purchasing power, negatively impacting financial flow management and debt reduction Cuadrado-Ballesteros and Bisogno (2022). Therefore, in assessing the relationship between financial sustainability and budget transparency, inflationary factors must impact the latter to limit how much people and organizations can use budget transparency to attain financial sustainability.

This study aims to better understand how budget transparency impacts financial sustainability, particularly in inflationary economies across certain Asian and European countries. When budgeting processes are conducted openly, it helps build public trust in budget information, which can, in turn, enhance financial sustainability. Transparent financial information also empowers individuals and organizations to make smarter financial decisions. Despite this, previous research hasn't sufficiently explored the critical role inflation plays in the link between budget transparency and financial sustainability, nor has it fully examined the importance of transparency in fostering financial sustainability. This study seeks to address these gaps. Focusing on selected Asian and European nations, this research explores ways to enhance budget transparency while also evaluating how inflation shapes its impact on financial sustainability. It offers practical insights for policymakers and government officials in these regions. The study is significant for several reasons. Firstly, it bridges two key areas of research, moving beyond the traditional focus on transparency, accountability, and participation. Secondly, it advances the discussion on budget transparency by analyzing its effect on financial sustainability—an area that has been relatively overlooked. Thirdly, it expands the literature on financial sustainability by tackling its complexities and operational challenges. Lastly, the study examines how inflation factors into the relationship between budget transparency and financial sustainability. By shedding light on these relationships, the research provides valuable insights for

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policymakers. It underscores the potential of budget transparency to improve government management through its positive connection to financial sustainability, offering guidance for crafting financial policies and strategies that promote long-term success.

2. Theoretical Framework and Literature Review

2.1. Financial Sustainability

Financial sustainability has become an increasingly important area of research for the public sector. Early studies primarily focused on identifying the root causes of the financial challenges faced by public institutions, as highlighted by researchers like Gleißner, Aspinall, and Poole (2022, 2018). Other studies, such as those by Adams, Drew, and Dollery (2014), examined ways to improve the financial health of public sector departments. More recently, research by Navarroet al., (2016–2024) has shifted toward understanding the factors that influence financial sustainability and the measures governments are taking to address these issues. Across these studies, a shared observation emerges: financial sustainability is a multifaceted and long-term concept that encompasses a range of interconnected dimensions.

The International Public Sector Accounting Standards Board or IPSASB (2013) underscores the importance of considering the dimensions of services, revenue, and debt and deems it essential for entities to manage these aspects effectively and reduce dependence on external factors. This involves the ability of governments to deliver public services both in the short term and the long term (IPSASB, 2013). Financial capacity management should be aligned with maintaining public service levels, and public programs and policies must ensure intergenerational fairness and long-term financial sustainability (Moldavanova, 2016; Caruana et al., 2019). Reaching this harmony could be challenging and cause conflicts between financial sustainability and democratic accountability (Justice and Miller, 2011). Public management must assess the long-term ramifications of their policies and programs, as these can affect the future capacity of a business unit to generate public value and promote economic growth (Cuadrado-Ballesteros and Bisogno, 2019; Ingrams, 2020; Nate, 2023). This study, similar to the investigations of Schick (2005) and Cuadrado-Ballesteros and Bisogno (2022), employs four dimensions: debt repayment, growth, stabilizability, and equity. The first dimension (debt repayment) relates to a governmental entity's ability to meet its financial obligations. The first component has traditionally been relevant for developing nations facing high debt levels financing their expenditures.

Nonetheless, the global financial crisis and the COVID-19 epidemic in 2008 have illustrated that even developed and developing nations encounter difficulties in debt repayment. The second dimension (growth) pertains to financial policies designed to maintain economic expansion. Governments must prevent fiscal deficits and maintain debt within a specified limit. Budget deficits of the European Union should be less than three percent of GDP, and overall debt should be less than sixty percent. Improved economic conditions ensure higher tax revenues, which can facilitate tax reductions or increased public investments (Cuadrado-Ballesteros and Bisogno, 2022; Kulu and Osei, 2024). This methodology is consistent with Keynesian theory (Keynes, 1936), which deems budget deficits appropriate during unfavorable economic circumstances. The third component (stability) pertains to a governmental entity's ability to fulfill future obligations in light of the current tax load. Taxes are expenditures for obtaining governmental services intended to improve living conditions (Prijaković, 2023). Wagner's Law (1912) posits that public services must demonstrate an income elasticity exceeding 1. However, research suggests that this legislation neglects the societal costs linked to distortionary taxes (Florio and Colautti, 2005). Furthermore, corruption, inefficiency, and opportunistic behavior (Schick, 2005; Cuadrado-Ballesteros and Bisogno, 2022), along with a high tax burden, can erode public trust in the government.

Governments are encouraged to prioritize tax stability while maintaining financial equilibrium to promote sustainable fiscal management (Chen et al., 2023). A critical dimension of sustainability, fairness, addresses the ability of public institutions to meet present obligations without passing the

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financial burden onto future generations. However, fairness remains a multifaceted and challenging concept to define and measure, as noted by Cuadrado-Ballesteros and Bisogno (2022). Heller (2003) highlights the lack of a universally accepted definition for fairness, making it particularly difficult to evaluate across generations. Similarly, Schick (2005) conceptualizes fairness as an intergenerational social contract, emphasizing that inequities in tax burdens and benefit distribution are inherently unsustainable.

This study employs budget balance, tax burden, government debt, and economic growth as indicators of the first three dimensions of sustainability: debt, growth, and stability. These metrics provide a tangible framework for assessing financial sustainability. However, fairness is not explicitly measured due to the complexities in operationalizing this concept (Heller, 2003). Even so, the four dimensions—debt repayment, growth, stability, and fairness—are deeply interconnected, with fairness implicitly reflected through the selected metrics.

2.2. Budget Transparency

The term 'budget' derives from both French and English languages. The budget formulation and approval process originated in England (Gupta et al., 2020). In historical France, a budget denoted a leather pouch for holding currency, whereas, in England, it referred to the leather bag that contained the king's financial records (Bergmann et al., 2020). The budget is a microeconomic concept that is important for individuals, families, enterprises, governments, and nations (Srithongrung et al., 2021). A budget is fundamentally an estimation of revenue and expenses over a specific timeframe (usually one year) designed to accomplish specific goals. These policies encompass operational planning, capital expenditure, and cash flow management (Bourne et al., 2018; Neely et al., 2003). A budget is an instrument that establishes the objectives and trajectory of an organization (Martínez, 2019). It aids managers in recognizing financial factors and resolving problems proactively. A budget functions as a financial strategy for managing forthcoming activities and outcomes (Libby and Lindsay, 2010; Chohan and Jacobs, 2018).

Transparency encompasses various facets of governmental functions and can be understood through two main perspectives. The first focuses on accessibility to information, covering aspects like budgets, politics, administration, and operations (Pina et al., 2010; Meijer et al., 2012; Tejedo and Araujo, 2018). The second emphasizes the flow of information, highlighting interactions between public bodies and their stakeholders (Kaufmann and Bellver, 2005; Hollyer et al., 2011). Transparency can be examined across two dimensions: horizontal, including both internal and external aspects, and vertical, involving upward and downward flows (Heald, 2006, 2012). In particular, budget transparency pertains to the full, timely, and systematic sharing of financial details (OECD, 2002). Scholars define it as public access to reliable, timely, clear, and comparable government decision and transaction data (Premchand, 1993; Kopits and Craig, 1998). Such transparency enables citizens to assess government financial performance and observe policy outcomes and strategies (Heald, 2012; Rodríguez et al., 2007; Alt and Lassen, 2006).

External transparency emphasizes the dissemination of information by public entities to citizens, with a particular focus on budgets, which serve as a cornerstone of the citizen-government relationship. A substantial body of research has concentrated on budget transparency (Cucciniello et al., 2017), exploring how governments acquire, distribute, and disclose financial data. This facet of transparency also investigates the effects of budget openness on both citizens and governments (Jung, 2022). Enhanced budget transparency can foster greater citizen engagement, bolster trust in public institutions (Harrison and Sayogo, 2014; Ríos et al., 2017; Bronić et al., 2023), and strengthen governmental accountability (Michener, 2019).

However, areas like financial management remain underexplored. Studies have shown that low transparency correlates with increased budget deficits and debt (Alt and Lassen, 2006), while heightened transparency is linked to reduced reliance on deficits by politicians (Benito and Bastida, 2009). Interestingly, some findings reveal no significant connection between budget transparency and

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government spending (Blume and Voigt, 2013), though it is associated with improved fiscal capacity in the United States (Alt and Lowry, 2010). Further research is needed to understand the intricate links between budgeting and performance management (Anessi-Pessina et al., 2016). Ultimately, budget openness plays a vital role in generating public value and ensuring the long-term financial viability of initiatives (Cuadrado-Ballesteros and Bisogno, 2022; Chen et al., 2023).

2.3. Inflation

Although different theories offer various definitions of inflation, they all refer to the irregular upward price trend (Hein, 2024). Inflation distorts relative prices and complicates economic decision-making and investment; it leads to greater social inequality and exerts economic pressure predominantly on low-income groups. Inflation is a significant economic variable affecting the economy at both micro and macro levels more than other economic factors (Gafurdjan, 2024). In fact, the impact of inflation on the economy can be either positive or negative, depending on the economic conditions in each country. While a given rate of inflation may be regarded as harmful and thus impose economic and social costs on one society, the same rate may be considered necessary for growth and development in another (Borio et al., 2023). Accordingly, this study examines the role of budget transparency in financial sustainability under inflationary conditions in selected Asian and European countries, considering two distinct economic environments with different inflationary experiences. Due to various economic, political, and social conditions, the Asian economic environment typically experiences higher inflation than the European economic environment (Izvorski et al., 2023).

2.4. Hypothesis Development

This study explores the connection between budget transparency and financial sustainability through the public value framework. Public value underscores the rights and responsibilities of citizens as well as the principles that regulate governments and programs (Bozeman, 2007). It demonstrates that the government's capacity to fulfill its population's needs (Spano, 2009) must be reflected in governmental performance. Public value is understood as a mechanism for transitioning from consultation to action (Bozeman, 2007) and encompasses political engagement, accountability, and transparency (Douglas and Overmans, 2020). The budget allocation function is regarded as a mechanism to achieve desired communal objectives and a prerequisite for improved decision-making and openness. Douglas and Overmans (2020). Although managerial performance in the public sector has been somewhat overlooked, the public value framework emphasizes the necessity of achieving budget-related output objectives and necessitates enhanced openness in management practices. Douglas and Overmans (2020). Accountability originally centered on formal evaluations, but as managerial duties evolved, the focus transitioned to the outcomes attained (Gains and Stoker, 2009). Transparency is considered essential for generating public value, and integrating public value into budgeting improves budget transparency and clarity. Institutional and legislative frameworks aim to mitigate politicians' proclivity for opportunistic behavior (Cuadrado-Ballesteros and Bisogno, 2019), while external forces may necessitate the disclosure of information, leading to the adoption of transparent budgeting procedures.

Transparency is a key factor in holding public entities accountable (Barrett, 2002). Specifically, budget transparency encourages politicians to allocate resources more effectively, fostering financial sustainability (Schick, 2005; Reddick et al., 2017). It plays a vital role in creating public value and ensuring the welfare of current and future generations by supporting the financial sustainability of government programs (Bisogno and Cuadrado-Ballesteros, 2022; Cuadrado-Ballesteros and Bisogno, 2022). Transparent budgeting reassures citizens about the fair and efficient use of public financial resources (Borio et al., 2023), enabling more accurate and well-informed financial decisions that strengthen policy sustainability (Elsayed et al., 2023).

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Moreover, increased budget transparency can reduce the reliance of politicians on deficits and excessive debt, thereby promoting a balanced relationship between revenues and expenditures (Cuadrado-Ballesteros and Bisogno, 2022). Taken together, these insights highlight that effective budgeting and transparency are fundamental for generating public value, protecting the welfare of present and future generations, and maintaining long-term fiscal responsibility. They also serve to limit politicians' inclination to depend on deficits or escalate public debt levels.

As a result, this study aims to explore the relationship between budget transparency and sustainability by proposing the following hypothesis: Based on existing literature, it is anticipated that budget transparency significantly improves financial sustainability.

H_1: There is a positive and significant correlation between budget transparency and government financial sustainability.

Budget transparency plays a crucial role in fostering public value, protecting the welfare of both current and future generations, and ensuring the financial sustainability of policies. Additionally, it helps mitigate politicians' reliance on budget deficits and their tendency to escalate debt levels (Benito and Bastida, 2009; Reddick et al., 2017; Cuadrado-Ballesteros and Bisogno, 2022; Marín-Rodríguez, 2023).

However, it is important to note that inflation, as a moderating factor, can impact this relationship. Inflation can weaken the effect of budget transparency on financial sustainability, as rising costs and reduced purchasing power complicate financial planning and management (Afonso et al., 2023). In inflationary conditions, even with budget transparency, achieving financial sustainability becomes more challenging (Cuadrado-Ballesteros and Bisogno, 2023). Inflation can disrupt the balance between revenues and expenditures, forcing politicians to rely on budget deficits (Agénor and da Silva, 2013). This indicates that in examining the impact of budget transparency on financial sustainability, the effects of inflation must also be considered. With this understanding, the following hypothesis is developed for the present study: Despite budget transparency, financial sustainability is influenced by inflation. Therefore, budget transparency alone is insufficient to guarantee financial sustainability, and inflation management must also be considered to achieve financial sustainability.

H_2: Inflation significantly weakens the positive impact of budget transparency on government financial sustainability.

3. Research Methodology

The first step in this study was using the library research method to review theoretical foundations and examine prior studies. Since the research is based on actual public sector data, the data were collected cross-sectionally from economic statistics provided by the IBP through open budget data CDs and the World Development Indicators (WDI) database. The IBP has published open budget survey results from 2006 to 2021, although some gaps exist. Specifically, data are available for 2006, 2008, 2010, 2012, 2015, 2017, 2019, and 2021. Schick (2005) identifies these sustainability indicators as debt repayment, growth, fiscal stability, and equity. Considering that the chosen countries were determined by accessible budget transparency data, sustainability measures were primarily taken from World Bank data.

Furthermore, the results were adjusted for several socio-economic and political variables. Socio-economic data was sourced from the World WDI database. Political data were sourced from the Political Institutions Database (DPI), which offers information on institutional and electoral outcomes, including checks and balances, government tenure and stability, party affiliation and ideology, as well as the fragmentation of opposition and government parties within the legislature. This study employs panel data and a multivariate regression method to test the hypothesis. Excel

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2019 was used to prepare the data for the necessary variables in the models for hypothesis testing. Next, data analysis and hypothesis testing were conducted using EViews version 13.

For this study, selected countries from Asia and Europe were chosen based on the availability of budget transparency data from the open budget surveys for 2010, 2012, 2015, 2017 and 2019. The Asian countries include Iraq, Saudi Arabia, China, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Afghanistan, Bangladesh, India, Nepal, Pakistan and Sri Lanka. The European countries are Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Macedonia, Poland, Romania, Serbia, Slovakia, Slovenia, Turkey, Ukraine, France and Germany.

This study adopts the methodology of Cuadrado-Ballesteros and Bisogno (2022), utilizing model (1) to examine the correlation between budget transparency and financial sustainability, and model (2) to investigate the moderating influence of inflation on this relationship:

Model 1

$$Sustainability_{i,t} = \alpha_0 + \alpha_1 Sustainability_{i,t-1} + \alpha_2 OBI_{i,t-1} + \alpha_3 Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

Model 2

$$Sustainability_{i,t} = \alpha_0 + \alpha_1 Sustainability_{i,t-1} + \alpha_2 OBI_{i,t-1} + \alpha_2 Inflation_{i,t-1} + \alpha_3 Inflation * OBI_{i,t-1} + \alpha_4 Controls_{i,t} + \varepsilon_{i,t} \quad (2)$$

In Models 1 and 2, while *i* represents each country, *t* denotes each year. The α parameters require estimation, and ε indicates the standard error term in the model.

Sustainability refers to the ability of central governments to maintain their financial viability, which is evaluated using four main indicators: balance, debt, revenue, and growth. These indicators cover three of the four elements commonly used in contemporary sustainability frameworks (Schick, 2005): debt servicing capacity, stability, and growth. The focus is on the government's ability to manage current financial obligations and future commitments while regulating the tax burden and maintaining fiscal equilibrium to promote economic growth. The fourth dimension, equity—defined as the government's ability to meet present responsibilities without shifting costs to future generations—is difficult to implement and is not explicitly discussed here. However, since these dimensions overlap, the indicators used (balance, debt, revenue, and growth) are indirectly linked to equity. In detail:

1- Financial balance is determined by subtracting government expenditure and net investment in non-financial assets from government revenue. It is expressed as a percentage of GDP and indicates whether the position is one of net lending (+) or net borrowing (-) (Cuadrado-Ballesteros and Bisogno, 2022).

2- Short-term debt, expressed as a percentage of the central government's total external debt, serves as a critical measure of debt repayment challenges. A higher ratio of short-term debt highlights an increased demand for immediate resources to fulfill obligations maturing within the year (Kumar et al., 2025).

3- The tax burden is measured as the ratio of central government revenue, excluding grants, to GDP. To address future financial obligations, this ratio needs to increase. Revenue encompasses monetary inflows from taxes, social contributions, and other sources like fines, fees, rents, income from assets, and sales (Chen et al., 2023).

4- Economic development (growth) is a key objective for governments and must be sustainable. This requires careful financial management to ensure future prosperity and expansion. Financial imbalance can hinder future growth; thus, economic growth serves as an indicator of fiscal sustainability. This study uses per capita GDP growth as a metric (European Commission, 2020).

The OBI assesses the degree of budget openness of central governments through the OBI scores released by the IBP. The OBI is measured on a scale from 0 to 100, reflecting the spectrum from minimal to maximal transparency. The evaluation criteria consist of 92 questions assessing the availability and promptness of public budget information across eight essential budget documents mandated for publication by each country (De Renzio and Masood, 2011): the pre-budget statement,

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the executive budget proposal, the enacted budget, the citizens' budget, the annual financial report, the mid-year review, the year-end report, and the audit report. Furthermore, the variable OBI-mean was established to rectify the annual gaps in the OBI data, facilitating the utilization of a comprehensive dataset devoid of missing values in the primary index, OBI. This study adopts the traditional approach outlined by Gelman and Hill (2006) to handle missing data, replacing each missing OBI value with the mean of the observed values for the corresponding variable.

- The value for 2011 is the average of 2010 and 2012.
- The value for 2013 is the average of 2012 and 2015 due to the unavailability of 2014 data.
- The value for 2014 is the average of 2012 and 2015 due to the unavailability of 2013 data.
- The value for 2016 is the average of 2015 and 2017.
- The value for 2018 is the average of 2017 and 2019.
- The value for 2020 is the average of 2019 and 2021.

According to Bisogno et al. (2017), control variables encompass diverse social, economic, and political dimensions influencing financial sustainability. Socio-economic characteristics reflect the overarching economy, while political factors pertain to central government dynamics. These variables include population size, unemployment rate, natural resource wealth, governmental ideology (Left-leaning), government fragmentation, political competition (Fragmentation and Votes), and the timing of elections as well as pre-election periods (Elections). The definitions and sources for each variable are detailed in Table 1.

Table 1. Definition.

Variables	Description	Data Source
OBI	Open Budget Index (OBI) ranges from 0-5 (low) to 100-5 (high), assessing the quality and timeliness of government budget data in eight publicly available documents, based on international guidelines.	International Budget Partnership (IBP)
Balance	Net loans as a percentage of GDP, derived from income minus expenses and net investment in non-financial assets (government financial balance).	World Bank Open Data (WDI)
Unemployment	Total unemployment as a percentage of the labor force, indicating the proportion actively seeking employment.	World Bank Open Data (WDI)
Debt	Short-term debt expressed as a percentage of total external debt, including maturities within a year and accrued interest on long-term obligations, repayable in currency, goods, or services.	World Bank Open Data (WDI)
Population	Natural logarithm of total population, encompassing all residents irrespective of legal or citizenship status.	World Bank Open Data (WDI)
Revenue	Income as a percentage of GDP, excluding grants, comprising cash inflows from taxes, social contributions, fines, fees, rent, and revenue from property or sales.	World Bank Open Data (WDI)
Votes	Dummy variable representing whether all government parties share a single vote share in elections (1) or not (0).	Database of Political Institutions (DPI)
Growth	Annual per capita GDP growth rate, determined by dividing GDP by the midyear population, expressed in constant 2010 US dollars.	World Bank Open Data (WDI)

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Left	Dummy variable denoting whether the government is communist, socialist, social-democratic, or left-leaning (1) or otherwise (0).	Database of Political Institutions (DPI)
Fragmentation	Probability that two randomly selected representatives from governing parties belong to different parties, assigned a value of 1 if true and 0 if false.	Database of Political Institutions (DPI)
Elections	Dummy variable representing whether elections occurred in both the current and previous year (1) or not (0).	Database of Political Institutions (DPI)
Inflation	Annual inflation rate.	World Bank Open Data (WDI)
Nat_resources	Total natural resource rents as a percentage of GDP, including oil rents, natural gas rents, coal rents, mineral rents, and forest rents.	World Bank Open Data (WDI)

4. Research Findings

Table 2 provides the descriptive statistics of the research variables organized into two sections: Asia and Europe. The data show that the financial sustainability index is 8.212 in Asia and 12.297 in Europe, and suggests that Europe performs better than Asia. Similarly, the average OBI is 40.044 in Asia and 57.944 in Europe, indicating Europe's superior budget transparency. The logarithm of the population is 17.633 for Asia and 16.253 for Europe. The unemployment rate is 7% in Asia and approximately 11% in Europe. The rent ratio is 10% in Asia compared to 1% in Europe. The percentage of left-leaning government presence is 93% in Asia and 88% in Europe.

Table 2. Descriptive statistics.

Variable	Mean	Median	Maximum	Minimum	SD	Obs
Section A. Selected Asian countries						
Sustainability	8.212	7.535	23.94	-4.116	5.64	180
OBI	40.044	43	87	0	21.527	180
Inflation	5.403	5.543	16.636	-2.093	3.371	180
Population	17.633	17.251	21.069	15.126	1.752	180
Unemployment	7.093	5.6	20.2	0.65	3.763	180
Nat_resources	10.001	2.437	51.195	0.065	13.488	180
Binary variables						
Left			93%			
Elections			57% (7)			
Fragmentation			61%			
Votes			70%			
Section B. Selected European countries						
Sustainability	12.297	12.262	18.658	2.004	2.519	180
OBI	57.944	59.75	87	32	12.367	180
Inflation	3.226	1.954	48.699	-1.545	4.965	180
Population	16.253	15.794	18.248	14.533	1.307	180
Unemployment	11.134	9.445	33.13	2.02	6.743	180
Nat_resources	1.186	0.783	7.908	0.027	1.342	180
Binary variables						
Left			88%			
Elections			62% (7)			
Fragmentation			69%			

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Votes	85%

Additionally, the findings reveal that the proportion of government parties is 70% in Asia and 85% in Europe. The average inflation rate in Asia is higher than in Europe. The highest inflation rate occurred in Ukraine in 2015.

Table 3 presents the correlation coefficients among the research variables. These coefficients show that the variables are not perfectly correlated. This means that they are relatively independent of each other.

Table 3. Correlation matrix.

Section A. Selected Asian countries						
	Sustainability	**Obi**	**Inflation**	**Population**	Unemployment	Nat_Resources
Sustainability	1.000					
Obi	-0.095	1.000				
Inflation	-0.322	0.241	1.000			
Population	-0.165	0.579	0.215	1.000		
Unemployment	-0.281	0.582	0.418	0.652	1.000	
Nat_Resources	0.491	-0.198	-0.317	-0.304	-0.338	1.000
Section B. Selected European countries						
	Sustainability	Obi	Inflation	Population	Unemployment	Nat_Resources
Sustainability	1.000					
Obi	-0.121	1.000				
Inflation	-0.413	0.237	1.000			
Population	-0.253	0.356	0.511	1.000		
Unemployment	-0.133	0.342	0.389	0.296	1.000	
Nat_Resources	0.438	-0.254	-0.202	-0.346	-0.232	1.000

5. Hypothesis Testing Results

The findings from the H_1 testing for selected countries in Asia and Europe are shown in Table 4. In the Asian context, the OBI positively and significantly affects financial sustainability. Additionally, the findings show that budget transparency is vital in enhancing financial sustainability in the Asian economic environment. Likewise, in European nations, the OBI positively and significantly affects financial sustainability. Consequently, budget transparency also significantly boosts financial sustainability in the European context. The findings confirm that H1 is supported in European and Asian contexts. The data indicates that improved budget transparency leads to better financial sustainability in the selected countries in these regions. This highlights the need for proper record-keeping and openness in budgeting and budget execution. Nonetheless, the influence of budget transparency on financial sustainability may differ from region to region. For example, although this positive impact is evident in the selected Asian and European countries, it could differ in other regions. These outcomes suggest that budget transparency can be an effective tool for enhancing financial sustainability in nations. However, it requires more in-depth analysis and consideration of the specific contexts to make its impact the strongest in all countries and regions.

Table 4. Research hypothesis test results.

variable	Asian countries	European countries
SUSTAINABILITYT	0.867***	0.696***
	-0.025	-0.044
OBI	0.576***	3.355**
	-0.202	-1.387

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POPULATION	0.197**	0.024
	-0.096	-0.091
UNEMPLOYMENT	0.003	-0.006
	-0.04	-0.021
NAT_RESOURCES	-0.385***	-0.045
	-0.07	-0.087
LEFT	-0.201***	-0.600*
	-0.043	-0.319
ELECTIONS	3.655***	0.197
	-0.492	-0.419
FRAGMENTATION	0.776	0.535
	-0.673	-0.42
VOTES	0.095	-0.373
	-0.488	-0.342
C	-41.169***	2.568
	-9.177	-1.649
Adjusted R-squared	0.816	0.629
F-statistics	82.215***	32.015***
Durbin Watson	1.851	1.891
***sig. at 0.10 / **sig. at 0.05 / ***sig. at 0.01**		

The results of testing the H_2 for selected Asian and European countries are presented in Table 5. In Asian countries, the negative and significant variable (OBI*Inflation) indicates that inflation significantly weakens the positive impact of budget transparency on financial sustainability. This means that inflation makes budget transparency less effective in enhancing financial sustainability in Asian countries. On the other hand, it is also evident that the variable (OBI*Inflation) in European countries significantly weakens the positive impact of budget transparency on financial sustainability. This means that similar to Asian countries, inflation in European countries reduces the impact of budget transparency on enhancing financial sustainability. Based on these findings, the study's second hypothesis is confirmed for European and Asian economic environments. According to the results of H_2, in the presence of inflation, budget transparency cannot improve financial sustainability as effectively as it can in inflation-free conditions. Both that of Asian and European countries confirm this finding. Therefore, the results indicate the relevance of controlling inflation to produce more budget transparency effects on financial sustainability. These findings suggest that budget transparency can function as a tool for improving countries' financial sustainability, albeit that inflation also serves a role in balance. The control and management of inflation within the two sets of Asian and European countries will increase the full realization of its attendant benefits of budget transparency. These findings also emphasize that policymakers should simultaneously focus on budget transparency and inflation control in the budgeting process to achieve greater financial sustainability. Finally, this study indicates that, in order to fully use the tool of budget transparency, a more detailed examination and attention should be paid to the specific conditions of each country and region.

Table 5. Research hypothesis test results.

variable	Asian countries	European countries
SUSTAINABILITYT	0.286***	0.191***

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	-0.037	-0.028
OBI	0.038***	0.262***
	-0.009	-0.038
Inflation	-0.001**	-0.221***
	0	-0.04
OBI*Inflation	-0.336***	-0.240***
	-0.05	-0.022
POPULATION	0.799*	0.008
	-0.44	-0.013
UNEMPLOYMENT	0.22	-0.08
	-0.59	-0.36
NAT_RESOURCES	-0.271***	-0.312
	-0.058	-0.408
LEFT	-0.085***	-0.190***
	-0.015	-0.039
ELECTIONS	6.282***	0.147
	-2.516	-0.14
FRAGMENTATION	0.38	0.155
	-0.679	-0.491
VOTES	0.014	-0.182
	-0.041	-0.156
C	-50.422***	14.205**
	-76.549	-5.392
Adjusted R-squared	0.816	0.741
F-statistics	66.095***	43.019***
Durbin Watson	1.562	1.783
***sig. at 0.10 / **sig. at 0.05 / ***sig. at 0.01**		

6. Comparison of Two Economic Environments

To assess the relationship between two variables (the OBI and financial sustainability) across two independent samples, the Fisher's z-test for correlation was utilized. This test assumes the null hypothesis that the correlation coefficients in the two samples are equal, and the alternative hypothesis posits that they are not equal. If the p-value is below the significance threshold (e.g., 0.05), it indicates a significant difference between the correlation coefficients of the two samples. Table 3 indicates that the OBI and financial sustainability correlation coefficients are -0.095 for Asia and -0.121 for Europe. After calculating the Pearson correlation coefficient for each sample, this coefficient is converted to a z-score. This transformation makes the distribution of the correlation coefficient closer to a normal distribution. The formula for converting the correlation coefficient to a z-score is as follows:

$$z = \frac{1}{2} \ln \frac{1+r}{1-r}$$

where r represents the Pearson correlation coefficient and z is the corresponding transformed value. This transformation was performed for both samples. Based on this, it is determined that:

The z-score in Asia:

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$$z_1 = \frac{1}{2}\ln\frac{1+(-0.095)}{1-(-0.095)} = -0.9529$$

The *z*-score in Europe:

$$z_1 = \frac{1}{2}\ln\frac{1+(-0.121)}{1-(-0.121)} = -0.12116$$

The next step is to calculate the Fisher's correlation coefficient test statistic. The formula for this statistic is:

$$Z = \frac{z_1 - z_2}{\sqrt{\frac{1}{n_1 - 3} + \frac{1}{n_2 - 3}}}$$

where *z1* and *z12* represent the z-values for the two samples, and *n1* and *n2* denote the sizes of these samples. This statistic can be compared to the standard normal distribution to determine the p-value. If the p-value is below the significance threshold, it indicates that there is a significant difference between the correlation coefficients of the two samples. As a result, it is revealed that:

$$Z = \frac{-0.9529 - (-0.12116)}{\sqrt{\frac{1}{180 - 3} + \frac{1}{180 - 3}}} = -7.824$$

The calculated statistic is compared with the standard normal distribution to obtain the p-value. Based on the standard normal distribution table, the p-value for the statistic of -7.824 is less than 0.05. Thus, it can be inferred that there is a significant difference between the correlation coefficients of the two samples. In other words, the relationship between the OBI and financial sustainability varies significantly across the two economic environments. Furthermore, since Fisher's z-test statistic is negative, the correlation coefficient in the Asian sample is lower than that of the European sample. This indicates that the effect of the OBI on financial sustainability is more substantial in Europe than in Asia. The results show that the OBI (which indicates budget transparency at the country level) significantly improves financial sustainability in Asian and European environments. Additionally, the findings show a significant difference in the relationship between the OBI and financial sustainability in these two economic environments.

7. Discussion and Conclusion

Budget transparency is a cornerstone of good governance, fostering accountability and enhancing citizen participation in financial decision-making. It builds public trust, curbs corruption, and supports financial sustainability. However, inflation and economic volatility can erode transparency and hinder sustainability. This study examines the link between budget transparency and financial sustainability, with inflation as a moderating factor, using international data. The research focuses on selected Asian and European countries, utilizing the Open Budget Index (OBI) by the International Budget Partnership (IBP) as the dependent variable, alongside various financial sustainability indicators and inflation as explanatory variables. In order to achieve the research objectives, data from selected Asian (15 observations) and European (15 observations) countries from 2010 to 2021 were analyzed using multiple regression. The findings indicate that OBI, representing budget transparency at the national level, significantly improves financial sustainability both in the Asian and European economic contexts. This is supported by earlier theories and studies indicating that budget transparency will facilitate efficiency and effectiveness in resource allocation, cut unavoidable costs, enhance accountability and responsiveness, reduce corruption, and build public trust. These improvements in indicators can positively affect financial sustainability indicators such as the debt-to-GDP ratio, expense-to-revenue ratio, tax-to-GDP ratio, and general budget-to-GDP ratio. The findings support those of Cuadrado-Ballesteros and Bisogno (2022) in showing that budget transparency is positively related to financial sustainability beyond the traditional goals of increasing trust and citizen engagement.

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Results of the present study indicate that similar to those in Asian countries, inflation in European countries decreases the positive effect of budget transparency on financial sustainability. In other words, budget transparency is less effective in enhancing financial sustainability in an inflationary environment than in a non-inflationary environment. The findings underline that keeping inflation under control is as crucial as increasing budget transparency in reaching a higher level of financial sustainability. The results reveal that to reach financial sustainability, policymakers must pursue budget transparency and inflation control together. In both sets of Asian and European countries, budget transparency alone is insufficient, and only with effective inflation control can the full benefits of budget transparency be realized. Therefore, every financial and budgetary policy must consider the specific conditions in the country or region and thus formulate strategies according to those needs. Besides, further research is needed to establish how budget transparency and inflation interact in various countries to develop holistic solutions to enhance financial sustainability. This research is an important step in better understanding this issue and can serve as a basis for future research and policymaking.

The result of Fisher's z-test, showing a significant difference in the strength of the relationship between OBI and financial sustainability across the two economic environments since OBI had a more significant influence on financial sustainability in Europe than in Asia, supported this fact. Probably, it is due to the fact that the culture of European countries is generally more budget transparent and more inculcating among the general masses and creating greater public demand for access to financial information. Another reason is that the financial and budgetary policies adopted or implemented have strong regulatory systems under audits with more ease by European countries to enforce effectiveness actuarially. Therefore, they may benefit better due to regional cooperation with coordination giving the extra needs, increasing the stingencies for making finances transparent and becoming sustainable with less corruption of these budgets being passed.

The findings indicate that full publication of budget documents and reports in an understandable manner to the public should be timely. Also, opportunities and facilities for citizen and civil society participation in budget preparation, approval, implementation, and oversight should be provided. In addition, suitable mechanisms for monitoring and auditing government financial activities should be established and strengthened. These will contribute to increased financial sustainability and enlarge the countries' capacity to deal with economic and financial challenges. Given the budget transparency issue, those countries with lower levels of budget information publication should continue working on increasing budget transparency, reforming financial policy, and developing proper mechanisms of public oversight over financial activities. Such measures could largely improve financial sustainability and help countries manage their finances and economies more sustainably.

Without consideration of inflation control and management, budget transparency policies alone cannot guarantee increased financial sustainability. As such, the control of inflation should, therefore, be treated as an equally important goal in improving budget transparency. Inflation control demands a practical design and implementation strategy on the part of policymakers. Monetary and fiscal tools include interest rate adjustments, liquidity management, and expansionary and contractionary fiscal policies. This may also include education and awareness programs for government employees and budgetary officials about the importance of budget transparency and inflation control.

In light of these findings, policymakers are recommended to use budget transparency to build public trust and reduce corruption. The budget information is to be made transparent, presented, and accessible to citizens through the modern and electronic modes of publication and oversight of the budget. They must also pursue balanced, sustainable fiscal and budgetary policies and avoid wasting and losing resources. Conclusively, it is required that the OBI development is an active interaction between the financial institutions, government, and society. The development of the index should be inclusive and accessible to all sections of society. The representation of financial information has to be clear and easily understandable to the general public. Besides, financial corruption must be fought harder, and control mechanisms for financial operations must be enhanced. The increased level of

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transparency regarding financial operations and regular informing of the citizens on measures concerning the aforementioned also would lead to a decrease in corruption. One must also present new approaches towards making financial information available to the public. In this respect, developing reliable and accessible online platforms for young people and social activists may increase transparency and enhance public monitoring.

Furthermore, more profound reforms in financial and economic systems, such as effective resource management and achievement of economic goals in a sustainable manner, are to be pursued. Establishing appropriate mechanisms of public monitoring of financial activities ensures significant improvements in financial stability and management in countries. A key limitation of this study is the restricted access to necessary data, such as the OBI, which constrained the geographical scope of the research.

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