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# EFFECTS OF PARTICIPATORY BUDGETING AND TRANSPARENCY ON BUDGET ALLOCATION OUTCOMES IN SOUTH KOREA*

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**Abstract**

Despite a growing literature stream, debates continue regarding the effects of citizen participation in public budgeting on budget allocation outcomes. This study addresses this research gap by analyzing data from the early stages of mandatory participatory budgeting implementation in South Korea and providing empirical evidence. It examines the effects of two independent variables: participatory budgeting maturity and enhanced transparency through information disclosure. These factors are hypothesized to influence budget allocation by shifting decision-making power from bureaucrats to citizens. This study models these effects as sequential interactions, showing that increased citizen involvement results in a statistically significant increase in social expenditures, including welfare, education, and health services, while having a smaller effect on administrative expenses. Information disclosure further reduces participation costs, thereby enhancing the overall effect of participatory budgeting on promoting more equitable public resource distribution.

**Keywords:** participatory budgeting, transparency, budgeting allocation, sequential game, South Korea.

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## 1. Introduction

Citizen participation in budgeting has long been a central topic in public administration and political science, with ongoing debates regarding its merits and challenges (Ebdon and Franklin, 2006; Muthomi, 2024). Research has consistently highlighted that public involvement can help ensure that budgetary decisions more accurately reflect citizens' preferences, thereby strengthening legitimacy, transparency, trust, and effectiveness in public financial management.

Participatory budgeting (PB) was introduced in Porto Alegre, Brazil, and has since gained international prominence, exemplifying how institutionalized citizen engagement can shape budget allocations and foster a more inclusive, deliberative democracy (Baiocchi, 2001, 2005; Wampler, 2007). The success of PB in Porto Alegre spurred global adoption, and extensive research has focused on both normative outcomes, such as enhanced transparency and deliberation, and instrumental outcomes, including the redistribution of resources to underserved communities (Gonçalves, 2014; Wampler and Hartz-Karp, 2012). This global diffusion has enabled comparative studies of the effects of PB across diverse contexts.

Empirical research has indicated that PB has substantive benefits, including improved social welfare, targeted resource allocation, and more efficient public services (Boulding and Wampler, 2010; Calabrese, Williams and Gupta, 2020; Gonçalves, 2014; Hong and Cho, 2018; Neshkova and Guo, 2012; No and Hsueh, 2022; Sintomer, Röcke and Herzberg, 2016; Sintomer, Traub-Merz and Zhang, 2013; Shybalkina and Bifulco, 2019; Touchton and Wampler, 2014). In Brazil, PB has contributed to significant reductions in infant mortality and poverty (Boulding and Wamper, 2010; Gonçalves, 2014; Touchton and Wampler, 2014). Furthermore, PB has facilitated the transfer of public funds to low-income districts in South Korea (Hong and Cho, 2018; No and Hsueh, 2022) and led to more efficient public services and improved infrastructure in the United States (Neshkova and Guo, 2012). European studies have highlighted the role PB plays in advancing local democracy, government modernization, social justice, gender mainstreaming, and sustainable development (Sintomer, Traub-Merz and Zhang, 2013; Sintomer, Röcke and Herzberg, 2016).

Despite these advantages, PB presents theoretical and empirical challenges, particularly in establishing causal links between participatory processes and budgetary outcomes (Calabrese, Williams and Gupta, 2020). PB fundamentally alters the distribution of decision-making power, thus enabling citizens to exert greater control over budget allocation and potentially reduce administrative costs. However, the degree of information asymmetry between citizens and bureaucrats shapes the effects of PB, with greater transparency lowering participation costs and amplifying citizens' influence (Stewart, 2007).

This study uses a game theory approach to examine the effects of PB on budget allocation, focusing on the dynamics of information asymmetry between citizens and bureaucrats. We use data from local governments in South Korea, where PB is legally mandated

but participatory modes vary, to develop theoretical models and empirically analyze how public spending responds to different PB designs. Our analysis aims to clarify how PB influences budget allocation and maximizes citizens' utility while simultaneously exploring the understudied effects on bureaucrat incentives and behaviors. By assessing PB-related outcomes in South Korea, we offer insights relevant to international comparative research and contribute to a broader understanding of the potential PB holds across diverse governance contexts.

## 2. Theoretical model

### *2.1. Contextual background*

In a democracy, budgeting decisions should ideally promote citizens' welfare. However, the traditional public budgeting process is often viewed through the lens of a principal – agent problem, in which citizens (principals) delegate the authority to manage public resources to bureaucrats (agents). A substantial body of literature rooted in public choice theory posits that information asymmetry between these groups allows bureaucrats to pursue their self-interests, such as budget maximization or administrative slack, rather than strictly adhering to citizens' preferences (Migué and Bélanger, 1974; Niskanen, 1971). Bureaucratic control over budgetary information often leads to allocations that diverge from the public good, as it creates significant barriers for citizens who want to monitor government activities and ensure accountability (Ebdon and Franklin, 2006).

PB has emerged as a key institutional innovation to address this democratic deficit. Originating in Porto Alegre, Brazil, and now a global phenomenon, PB is designed to alter traditional power dynamics by creating formal channels for citizen involvement in budgetary decision-making (Baiocchi, 2001, 2005; Wampler, 2007). From a theoretical standpoint, PB seeks to mitigate the principal – agent problem in several ways, such as reducing information asymmetry, increasing the transparency of bureaucratic actions, and raising the political cost of ignoring citizen preferences. However, the comparative literature has demonstrated that the effectiveness of PB is not uniform but varies significantly depending on the institutional design, political context, and degree of authority delegated to citizens (Sintomer, Traub-Merz and Zhang, 2013; Sintomer, Röcke and Herzberg, 2016; Touchton and Wampler, 2014). This variation highlights the need for theoretical models that can explain 'how' and 'under what conditions' citizen participation translates into substantive changes in budget outcomes.

This study precisely models these strategic interactions by extending Aghion and Tirole's (1997) seminal work on formal versus real authority. Their framework is particularly salient because it directly addresses how the allocation of formal decision-making rights (e.g., legal PB mandate in South Korea) translates into real influence under conditions of information asymmetry. Their original model analyzed these dynamics in a simultaneous game; however, the PB process is inherently sequential. Citizens typically provide their input before bureaucrats finalize and propose a budget. Recognizing this,

and building on Aghion and Tirole's (1997) suggestion to adapt their model, we develop a sequential game model to explore how early-stage citizen influence alters bureaucrats' strategic incentives and, consequently, final budget allocation. This approach allows us to formally test the conditions under which PB empowers citizens and how transparency reduces participation costs to moderate this relationship.

### *2.2. Influential power and participatory budgeting*

Citizens and bureaucrats are linked by a principal – agent relationship in the context of local public service provision. Ideally, bureaucrats should allocate budgets to maximize citizens' quality of life. However, under significant information asymmetry, bureaucrats may prioritize their own interests, leading to inefficient resource allocation and moral hazard (Migué and Bélanger, 1974; Niskanen, 2008). The high costs of citizen participation, such as those of gathering and processing information, can exacerbate this dynamic, resulting in rational ignorance and reduced public engagement (Aghion and Tirole, 1997).

Aghion and Tirole's (1997) framework distinguishes between formal authority (legal decision-making rights) and real authority (effective control over decisions). In South Korea, local governments are legally required to prioritize citizens' welfare in budgeting decisions (Local Finance Act, Article 3, Section 1). However, bureaucrats can dominate the decision-making process if they hold more information than citizens, who would then have only a nominal influence. PB is designed to counter this imbalance by reducing information asymmetry and strengthening citizen involvement.

PB becomes especially important when the preferences of citizens and bureaucrats diverge (Stewart, 2007). The degree of citizen engagement directly affects budget outcomes, making a sequential game model particularly useful for analyzing PB dynamics. In such a model, citizens and bureaucrats make decisions in sequence, with each party's choices influencing the other's subsequent actions (Osborne and Rubinstein, 1994). This approach captures how early citizen input can shape bureaucratic responses and increase the likelihood that the final budget reflects public preferences.

However, participation costs, such as those of opportunity and information, significantly affect citizen engagement. From a rational choice perspective, citizens weigh these costs against the expected benefits of participation. High costs can lead to rational ignorance, thus undermining the democratic potential of PB. Therefore, institutional mechanisms that reduce participation costs and increase transparency are essential for meaningful citizen involvement.

Enhanced transparency decreases information asymmetry, making it easier for citizens to access and understand budget information. This shift increases the expected benefits of participation relative to its costs, thereby encouraging greater civic engagement and prompting bureaucrats to adapt their strategies in response to public preferences. Thus, within a sequential game framework, PB not only strengthens citizen participation but also fosters a more deliberative and responsive budgeting process.

## 3. Hypotheses development

### *3.1. Participatory budgeting benefits and costs for citizens and bureaucrats*

In public budgeting, the utility functions of citizens and bureaucrats are shaped by how well budget allocations align with their respective preferences. Citizens derive satisfaction from expenditures on welfare, education, and healthcare, whereas bureaucrats benefit from administrative resources. The degree of alignment between these preferences determines the overall efficiency and effectiveness of resource allocation. Specifically, greater alignment leads to higher utility for both groups.

However, the costs associated with citizen participation, such as the effort required to gather information, can significantly limit engagement, especially when these costs outweigh the perceived benefits. This may result in rational ignorance, whereby citizens are disengaged from the process. Thus, effective PB aims to foster greater public involvement and ensure that budgets better reflect citizen priorities by lowering participation costs and reducing information asymmetry.

The interplay between citizens and bureaucrats is inherently strategic. Resource allocation is more likely to satisfy both parties when their goals are aligned. Conversely, conflicting interests can result in inefficient allocations that favor one group, reducing overall utility. Notably, one group's efforts to influence the process may diminish the other's utility, highlighting a strategic substitution effect.

The sequential nature of PB, in which citizens express their preferences through participatory mechanisms before bureaucrats finalize budget decisions, is critical. This structure allows citizen input to guide bureaucratic actions, potentially increasing social expenditures in areas that the public prioritizes and reducing administrative expenses that are less relevant to citizens' daily lives. Empirical research supports the redistributive impact of PB by demonstrating its positive effects on social welfare in various contexts (Boulding and Wampler, 2010; Gonçalves, 2014; Hong and Cho, 2018; No and Hsueh, 2022).

Given these dynamics, we hypothesize that PB influences budget allocation decisions by strengthening citizens' influence on social expenditure and constraining administrative costs. Specifically, greater citizen engagement through PB is expected to increase allocations toward public welfare and decrease those toward administrative purposes, reflecting the strategic and redistributive potential of PB.

- H1: PB is positively associated with increased social expenditures in local government budgets.

Furthermore, citizen involvement in the budgeting process increases scrutiny of budget allocations, potentially reducing administrative spending that does not directly benefit the public. In the game of PB, citizens constrain bureaucrats' budgetary resources, which could reduce their own utility by monitoring bureaucrats' budget-maximizing behaviors. In a national-level comparative study, Crossman and Fischer (2016) found that PB enhances budget transparency by allowing citizens to monitor bureaucrats' local budget use and allocation. In Korea, PB was introduced to prevent wasteful and excessive budget

practices by local governments (Cho, No, and Park, 2020). In the early 1990s, citizen participation in local government budgeting emerged through budget watch movements in response to budget mismanagement during the early stages of the local autonomy system. The central government later institutionalized PB, mandating that all local governments adopt it to improve fiscal soundness by monitoring unnecessary spending through citizen participation. Accordingly, PB is assumed to reduce administrative spending in budget allocation by checking and balancing bureaucrats' budgetary decisions within participatory mechanisms.

- H2: PB is negatively associated with administrative expenditure in local government budgets.

### *3.2. Information disclosure as a moderating factor of participation costs*

Information disclosure has a moderating effect on the budgeting process by enhancing transparency and reducing information asymmetry between citizens and bureaucrats. Providing citizens with access to detailed budget data and spending reports lowers the efforts and costs required for their effective participation because transparency reduces the information gap between citizens and bureaucrats (Dowley, 2007; Grimmelikhuijsen, 2010; Kim and Lee, 2012). This accessibility enables citizens to make more informed contributions and advocate for allocations that better reflect their preferences, particularly toward public welfare initiatives such as social services, education, and healthcare.

Furthermore, transparency through information disclosure requires bureaucrats to justify their decisions and spending choices, creating an environment that holds them more accountable (Ferry, Eckersley and Zakaria, 2015; Grimmelikhuijsen and Meijer, 2014; Park and Blenkinsopp, 2011; Pina, Torres and Royo, 2010). This accountability can reduce administrative expenditures that do not align with public interests because citizens are better equipped to scrutinize and question budgetary decisions. Valle-Cruz, Sandoval-Almazan and Gil-Garcia (2016) found a moderate relationship between transparency and corruption. Consequently, information disclosure not only facilitates more active and informed citizen participation but also ensures a more transparent and equitable budgeting process. This helps ensure that budget outcomes align more closely with the overall public interest, thereby enhancing the legitimacy and fairness of the budgeting process.

Thus, information disclosure has moderating effects because it reduces information asymmetry, which lowers participation costs and enables citizens to contribute more informed input. This leads to more effective PB outcomes, in which budget allocations and public preferences are more closely aligned. Specifically, higher information disclosure is expected to enhance the effects of PB by increasing social expenditure and reducing administrative expenditure.

- H3: The level of information disclosure moderates the relationship between PB and budget allocation outcomes.

This study uses a sequential game model to apply a theoretical framework that analyzes strategic interactions between citizens and bureaucrats during PB. According to our

theoretical framework, citizen participation in PB changes decision-making equilibrium by modifying the strategic incentives of bureaucrats. We evaluate whether theoretical predictions match what occurs in real-world scenarios. Our investigation aims to eliminate the theoretical – empirical disparity by including a dataset of South Korea's local government PB programs. Our empirical analysis of budget allocation patterns in relation to PB maturity and information disclosure levels tests the validity of the sequential game model's predictions regarding expenditure redistribution. Our research suggests that greater PB participation boosts social spending, and transparency reduces participation barriers to strengthen this effect. In the subsequent sections, this study's hypotheses are empirically evaluated to determine how well our assumptions based on game theory apply to practical PB implementation.

## 4. Empirical analyses

### *4.1. Contexts of participatory budgeting in South Korea*

We empirically tested our theoretical model by examining various aspects of PB in South Korea. The concept of PB was first introduced following the 2002 local elections and was initially implemented by several pioneering local government leaders. Some local governments autonomously implemented PB before it was formally codified into law. An amendment to the Local Autonomy Act, effective as of January 27, 2005, included explicit provisions for PB that significantly advanced its adoption nationwide. This broader national implementation of PB allowed local governments to develop and operate PB models tailored to their specific contexts. Consequently, specific ordinances and administrative practices have created wide variations in the extent of PB implementation across local governments.

Sintomer, Traub-Merz and Zhang (2013) highlighted the global interest in South Korea's PB system, particularly for its use of various online and offline channels to encourage citizen participation in the budgeting process. Stewart (2007) conceptualized that the institutional mechanisms within PB programs can be categorized based on the extent of citizen involvement into informative, consultative, and delegative modes. In South Korea, PB operates in many local governments primarily through channels that inform citizens about budget programs via newsletters or documents published on government websites. However, these systems often fall short of genuine participation, because citizen input is not actively considered during the decision-making process.

Some local governments have established consultative mechanisms in their PB frameworks. Although these mechanisms do not grant citizens direct decision-making authority, they do allow them to provide input through budget committees, surveys, and online platforms such as social media. For example, Sejong City, the administrative capital of South Korea, has organized citizen budget committees that review budget programs across three policy sectors: general administration, economic policies, and social policies. Bureaucrats in Sejong City are not obligated to follow the committees' recommendations;

however, they must transparently address how these suggestions are incorporated into budget allocations.

Moreover, certain local governments operate highly empowered PB systems in which citizens have significant decision-making roles. For example, citizens in the Northern Gwangju (Buk-gu, Gwangju) district can propose and ultimately select budget programs. Although citizens do not control all budget allocations, their involvement in suggesting and selecting programs significantly influences the budgetary process. Local councils in these areas typically do not veto citizen-initiated budget proposals.

Thus, South Korea's PB system is characterized by varying degrees of citizen participation, ranging from minimal involvement to significant decision-making power. This variation creates a complex interplay between citizens and bureaucrats, particularly when budgetary resources are limited. The extent of citizens' PB participation not only determines their influence on the budgeting process but also shapes budget allocation dynamics, thereby affecting the overall utility the budgeting process provides to citizens and bureaucrats.

### *4.2. Data and variables*

This study analyzed various datasets from local governments to investigate the effects of PB on budget allocation decisions in South Korea. We primarily utilized data from a 2016 survey conducted by the Korean Institute of Public Finance to measure citizens' influence on PB. Although the 2016 survey dataset may be outdated, it remains valuable because Korean local governments' PB systems have since rapidly undergone institutional isomorphism, gradually reducing the variations between them. The 2016 survey, which targeted public managers responsible for PB, comprised a sample of 243 South Korean local governments and achieved a response rate of 69.5%. The PB index is a composite indicator derived from three questions, rated on a 5-point Likert scale (1 = 'very little' to 5 = 'very much'), used to assess citizens' influence on the PB process. The index was calculated as the arithmetic mean of the responses to the following questions:

1. To what extent are citizens involved in local executive budget review processes?
2. To what extent do citizens interact with local bureaucrats during these reviews?
3. To what extent do citizens directly decide the amount of budget allocation?

In addition to the survey data, we utilized archival data from 2016 to maintain consistency. Specifically, we analyzed the proposed executive budget data rather than the finalized budget, focusing on the dynamics between citizens and bureaucrats during the executive budgeting process before local council reviews. The data include social expenditure and administrative expenses, sourced from the Local Finance Integrated Open System (LOFIN). Social expenditure encompasses spending on social welfare, education, and health, which is directly related to citizens' welfare. Administrative expenses, which we defined in this study as operational costs, exclude labor costs regulated by the Public Officials Remuneration Regulations, but include travel expenses, business operating expenses, and extra pay, which are closely tied to bureaucratic benefits.

We derived information disclosure from the Local Administration Integrated Information System (LAIIS). We assessed the moderating effects following Hayes, Glynn and Huge (2012) and generated interaction terms by multiplying the PB index and mean-centered information disclosure rates. This approach helped us estimate the effects of PB on budget allocations as moderated by information disclosure level.

Furthermore, we included the following control variables: total expenditure and public debt (LOFIN), number of public officers (LAIIS), population (Korean Statistical Information Service), and statistics regarding local government chiefs' party affiliation (progressive party = 1) and gender (female = 1) (National Election Commission). Larger fiscal size in local governments may correlate with increased economic expenditure, thereby potentially reducing social expenditure. Similarly, larger populations may increase social expenditure because of citizen demand and administrative efficiency. The number of public officers can also influence social expenditure because social services require adequate staffing. Additionally, higher public debt may constrain administrative expenses. Political factors, such as whether chief executives are progressive or their gender, may also influence budget allocations toward social welfare services, as suggested by Slegten and Heyndels (2020). Local political engagement, indicated by voter turnout, can affect various types of expenditure, thereby reflecting how responsive local politicians are to their active electorate. Table 1 presents the descriptive statistics for all the variables used in this study.

**Table 1**: Descriptive statistics of variables

| Variable | N | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Social expenditure (% of total) | 169 | 34.75503 | 15.51779 | 10.66039 | 72.8801 |
| Administrative expenses (% of total) | 169 | 7.432374 | 1.812833 | 1.663561 | 12.99487 |
| Participatory budgeting (composite indicator) | 169 | 3.094675 | 0.899870 | 1 | 5 |
| Citizen involvement (5-point Likert scale) | 169 | 3.307692 | 1.046536 | 1 | 5 |
| Citizen interaction (5-point Likert scale) | 169 | 3.355030 | 1.019740 | 1 | 5 |
| Citizen decision (5-point Likert scale) | 169 | 2.621302 | 1.199611 | 1 | 5 |
| Information disclosure (% of request) | 169 | 97.63826 | 1.292707 | 93.19872 | 99.72452 |
| Total expenditure (thousand won) | 169 | 1236.432 | 3157.666 | 165.5 | 29822.38 |
| Population (thousand people) | 169 | 438.0333 | 1300.381 | 10.001 | 12716.78 |
| Number of public officers | 169 | 1267.095 | 1737.118 | 371 | 17373 |
| Public debt (% of total) | 169 | 2.975207 | 4.675247 | 0 | 30.41 |
| Progressive party = 1 | 169 | 0.366864 | 0.483381 | 0 | 1 |
| Female chief = 1 | 169 | 0.035503 | 0.185597 | 0 | 1 |
| Turnout rate (% of total) | 169 | 58.82599 | 5.326355 | 34.8206 | 69.54853 |

**Source:** The authors

We assessed the representativeness of the sample compared to that of the broader population of South Korean local governments by conducting t-tests to compare the main variables between respondents and non-respondents. The analysis revealed significant

between-group differences, confirming that the sample is sufficiently representative of the population (Table 2).

**Table 2:** Mean differences between respondents and non-respondents

| Group | Respondents | Non-respondents | Differences |
|---|---|---|---|
| N | 169 | 74 | |
| Social expenditure (% of total) | 34.75503 | 34.73518 | 0.0198 |
| Administrative expenses (% of total) | 7.432374 | 7.393948 | 0.0384 |
| Information disclosure (% of request) | 97.63826 | 97.3808 | 0.257 |
| Total expenditure (thousand won) | 1236.432 | 1105.203 | 131.2 |
| Population (thousand people) | 438.0333 | 384.867 | 53.17 |
| Number of public officers | 1267.095 | 1237.905 | 29.19 |
| Public debt (% of total) | 2.975207 | 2.874054 | 0.101 |
| Progressive party = 1 | 0.366864 | 0.364865 | 0.002 |
| Female chief = 1 | 0.035503 | 0.040541 | -0.00504 |
| Turnout rate (% of total) | 58.82599 | 59.00393 | -0.178 |

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1.

**Source:** The authors

### *4.3. Findings*

Before conducting the regression analysis, we preliminarily explored the variations in the dependent variables across PB levels (Figure 1). The analysis showed that the variations

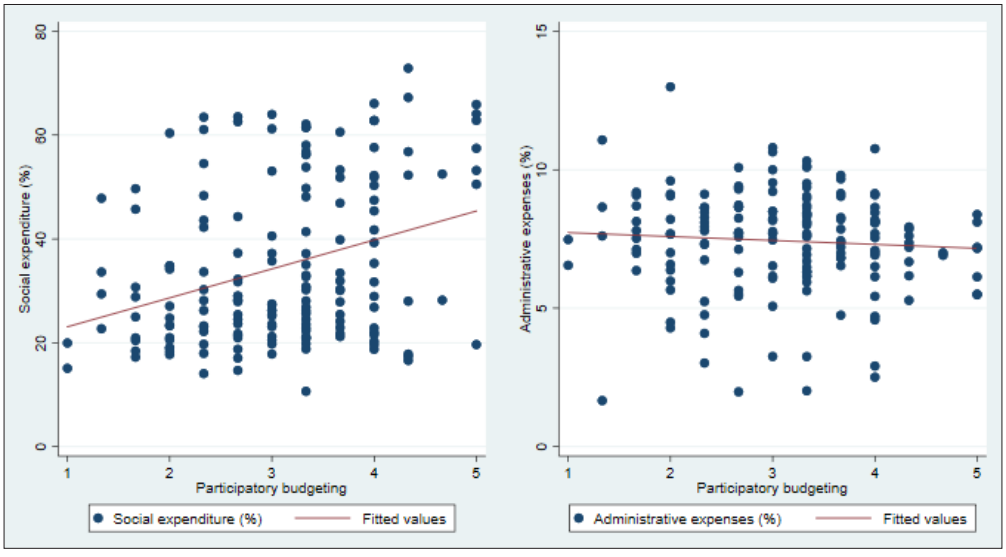


**Figure 1:** Social expenditure and administrative expenses by participatory budgeting

**Source:** The authors

in both social expenditure and administrative expenses were consistent with our theoretical model. Specifically, as citizens' influence on local PB increased, social expenditure also tended to increase, whereas administrative expenses declined slightly.

We used seemingly unrelated regression (SUR) models to estimate parameters because SUR allows all equations to be estimated simultaneously while accounting for correlations across error terms. In our model, the budgeting decisions of citizens and bureaucrats are interdependent, resulting in correlated equations for predicting these decisions. Consequently, SUR is particularly suitable for our study because it captures the simultaneous effects of PB and other explanatory variables on budget allocation. The estimated regression equations are formulated as follows:

$$\text{Citizens:} \quad E_i = a_C + b_C PB_i + c_C ID_i + d_C PB_i ID_i + \sum_j c_C \; C_{j,i} + \epsilon_C \quad (1)$$

$$\text{Bureaucrats:} \quad e_i = a_B + b_B PB_i + c_B ID_i + d_B PB_i ID_i + \sum_j c_{B_j} C_{j,i} + \epsilon_B \quad (2)$$

Subscripts and denote citizens and bureaucrats. Variables and $E_i$ represent the efforts of citizens and bureaucrats in local government $i$. $PB_i$ and $ID_i$ indicate the levels of PB and information disclosure. $PB_i ID_i$ captures the interaction terms to test the moderating effects. Vector $c_{j,i}$ includes the control variables; $\alpha$ and $\epsilon$ denote the constant and error terms, respectively.

Zellner (1962) developed the SUR estimator to address the contemporaneous correlations among a set of equations. The SUR method estimates the parameters of all equations simultaneously, accounting for correlations across error terms, thereby making it more asymptotically efficient than ordinary least squares estimation (Wooldridge, 2010). As Table 3 shows, the Breusch–Pagan test confirms a significant correlation between the error terms of the two equations ($p < 0.01$), validating our decision to use SUR rather than separate ordinary least squares regressions. This correlation suggests that the factors that affect social expenditure allocation are interconnected with those that influence administrative expenses, thus supporting our theoretical framework of strategic interactions between citizens and bureaucrats.

The SUR results demonstrate a moderate but adequate model fit for the cross-sectional fiscal data. The adjusted R-squared values are 0.41 and 0.28 for the social expenditure and administrative expense equations, respectively. Although these values may appear modest, they are consistent with those of other studies that have used similar methodologies to examine budget allocation patterns (Calabrese, Williams and Gupta, 2020; Shybalkina and Bifulco, 2019).

The regression results in Table 3 show the statistically significant effects ($p < 0.01$) of PB and information disclosure on budget allocation. These empirical findings align with the predictions of the game model. From a benefit – cost perspective, PB benefits citizens and imposes costs on bureaucrats by transferring influential power in budgeting decisions from bureaucrats to citizens. Thus, Hypothesis 1 was supported, whereas Hypothesis 2 was rejected across all models.

**Table 3:** Regression results

| Model<br>Dependent variable | (1)<br>Social expenditure | (2)<br>Administrative expenses | (3)<br>Social expenditure | (4)<br>Administrative expenses |
|---|---|---|---|---|
| Index of participatory budgeting (PB) | 3.257*** | -0.223 | 3.159*** | -0.211 |
| Information disclosure (ID) | 2.943*** | -0.0835 | 2.671*** | -0.0502 |
| PB×ID | | | 1.647* | -0.201* |
| Total expenditure | -0.0173*** | 0.000110 | -0.0175*** | 0.000134 |
| Population | 0.0205*** | -0.000567 | 0.0202*** | -0.000531 |
| Number of public officers | 0.0191*** | -0.000171 | 0.0195*** | -0.000215 |
| Public debt | -0.211 | -0.0969*** | -0.174 | -0.101*** |
| Progressive party | 4.481** | -0.122 | 4.299** | -0.0998 |
| Female chief | 7.690 | 0.130 | 7.673 | 0.132 |
| Turnout rate | -0.633*** | -0.00618 | -0.636*** | -0.00585 |
| Constant | -238.5*** | 17.29 | 58.86*** | 8.463*** |
| N | 169 | 169 | 169 | 169 |
| R-squared | 0.4733 | 0.2836 | 0.4839 | 0.2952 |
| Correlation of residuals | -0.4595 | | -0.4496 | |
| BP test | 35.683*** | | 34.160*** | |

Notes: BP test stands for the Breusch–Pagan test of independence ($\chi^2(1)$).
*** p < 0.01, ** p < 0.05, * p < 0.1.

**Source:** The authors

The positive coefficient of PB in the social expenditure equation translates to substantial practical significance. An increase of one standard deviation in PB maturity corresponds to an increase in social expenditure allocation. These findings demonstrate that PB serves as an effective mechanism for citizen agenda-setting by allowing residents to redirect public resources toward services that directly affect their daily lives. The effect is particularly pronounced in municipalities where citizens have genuine decision-making authority rather than merely consultative roles.

Although the non-significant effect on administrative expenses is contrary to our hypothesis, it provides important insights into bureaucratic behavior and institutional constraints. This null finding suggests that bureaucrats retain considerable discretion over administrative costs, even when citizen participation mechanisms are in place.

Moreover, information disclosure ($p < 0.1$) positively moderates the effects of PB on budget allocation by reducing the search costs associated with citizen participation (Figures 2 and 3). Thus, information disclosure mitigates information asymmetry between citizens and bureaucrats, thereby enhancing citizens' utility and curbing bureaucrats' moral hazard. However, the moderating effect on bureaucrats becomes significant only after a sufficient level of information disclosure is reached.

The significant interaction terms ($p < 0.1$) demonstrate that transparency amplifies the effectiveness of participatory mechanisms. Higher information disclosure levels reduce citizens' 'participation costs' by making budget data more accessible and understandable.

Regarding social expenditure, the moderating effect suggests that transparency enables citizens to make more informed redistributive spending demands (Figure 2). For administrative expenses, the marginally significant moderating effect indicates that transparency may eventually constrain bureaucratic discretion, but only when combined with highly empowered citizen participation (Figure 3). This finding suggests that information disclosure alone is insufficient and must be coupled with institutional mechanisms that grant meaningful oversight authority to citizens.

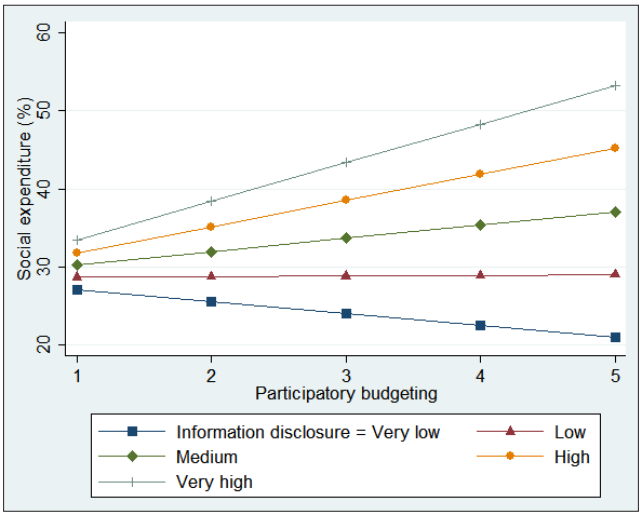


**Figure 2:** Moderating effects on social expenditure

**Source:** The authors

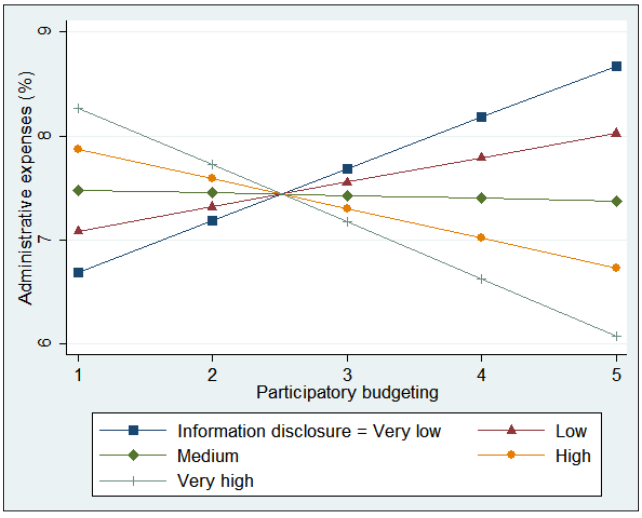


**Figure 3:** Moderating effects on administrative expenses

**Source:** The authors

Regarding the regression analysis results for each questionnaire item comprising the composite indicator, information disclosure has no moderating effects on citizen involvement or interaction (Tables 4 and 5). However, for citizen decision-making, the composite indicator reflects not only the effects of PB and information disclosure but also the direct impact of reducing administrative expenses through citizen decisions (Table 6). These results indicate that although citizens participate in the budgetary process and engage with bureaucrats, information disclosure has a limited impact on strengthening their influence unless they are granted decision-making authority. Thus, empowering citizens to make decisions is essential for enhancing the influence of PB.

**Table 4:** Regression results: citizen involvement

| Model | (5) | (6) | (7) | (8) |
|---|---|---|---|---|
| Dependent variable | Social expenditure | Administrative expenses | Social expenditure | Administrative expenses |
| Citizen involvement in budget review | 2.035** | -0.151 | 1.971** | -0.146 |
| Information disclosure (ID) | 2.968*** | -0.0834 | 2.887*** | -0.0767 |
| PB×ID | | | 1.012 | -0.0842 |
| Total expenditure | -0.0180*** | 0.000154 | -0.0181*** | 0.000161 |
| Population | 0.0211*** | -0.000606 | 0.0208*** | -0.000582 |
| Number of public officers | 0.0199*** | -0.000216 | 0.0202*** | -0.000243 |
| Public debt | -0.151 | -0.101*** | -0.164 | -0.100*** |
| Progressive party | 4.890** | -0.146 | 4.849** | -0.143 |
| Female chief | 8.588* | 0.0704 | 8.691* | 0.0618 |
| Turnout rate | -0.618*** | -0.00722 | -0.608*** | -0.00804 |
| Constant | -239.3*** | 17.21 | 56.42*** | 8.631*** |
| N | 169 | 169 | 169 | 169 |
| R-squared | 0.4588 | 0.2797 | 0.4649 | 0.2828 |
| Correlation of residuals | -0.4643 | | -0.4609 | |
| BP test | 36.425*** | | 35.904*** | |

Notes: BP test stands for the Breusch–Pagan test of independence ($\chi^2(1)$).
*** p < 0.01, ** p < 0.05, * p < 0.1.

**Source:** The authors

**Table 5:** Regression results: citizen interactions

| Model | (9) | (10) | (11) | (12) |
|---|---|---|---|---|
| Dependent variable | Social expenditure | Administrative expenses | Social expenditure | Administrative expenses |
| Citizen interaction in budget review | 1.584* | -0.109 | 1.446 | -0.0950 |
| Information disclosure (ID) | 3.098*** | -0.0940 | 2.938*** | -0.0782 |
| PB×ID | | | 1.015 | -0.101 |
| Total expenditure | -0.0183*** | 0.000175 | -0.0186*** | 0.000208 |
| Population | 0.0210*** | -0.000598 | 0.0211*** | -0.000612 |
| Number of public officers | 0.0206*** | -0.000274 | 0.0209*** | -0.000303 |
| Public debt | -0.261 | -0.0935*** | -0.212 | -0.0983*** |
| Progressive party | 5.186*** | -0.170 | 5.074** | -0.159 |
| Female chief | 8.219* | 0.0944 | 8.210* | 0.0953 |
| Turnout rate | -0.623*** | -0.00692 | -0.639*** | -0.00534 |
| Constant | -250.6*** | 18.11* | 57.97*** | 8.498*** |
| N | 169 | 169 | 169 | 169 |
| R-squared | 0.4524 | 0.2765 | 0.4566 | 0.2795 |
| Correlation of residuals | -0.4678 | | -0.4649 | |
| BP test | 36.979*** | | 36.526*** | |

Notes: BP test stands for the Breusch–Pagan test of independence ($\chi^2(1)$).
*** p < 0.01, ** p < 0.05, * p < 0.1.

**Source:** The authors

**Table 6:** Regression results: citizen decisions

| Model | (13) | (14) | (15) | (16) |
|---|---|---|---|---|
| Dependent variable | Social expenditure | Administrative expenses | Social expenditure | Administrative expenses |
| Citizen decision in budget review | 2.677*** | -0.173* | 2.601*** | -0.161 |
| Information disclosure (ID) | 3.132*** | -0.0968 | 2.863*** | -0.0528 |
| PB×ID | | | 1.081* | -0.177** |
| Total expenditure | -0.0172*** | 0.000106 | -0.0171*** | 0.000104 |
| Population | 0.0203*** | -0.000554 | 0.0199*** | -0.000487 |
| Number of public officers | 0.0190*** | -0.000170 | 0.0191*** | -0.000186 |
| Public debt | -0.211 | -0.0969*** | -0.175 | -0.103*** |
| Progressive party | 4.365** | -0.118 | 4.192** | -0.0901 |
| Female chief | 7.368 | 0.147 | 7.271 | 0.163 |
| Turnout rate | -0.641*** | -0.00576 | -0.639*** | -0.00604 |
| Constant | -253.3*** | 18.33* | 59.49*** | 8.434*** |
| N | 169 | 169 | 169 | 169 |
| R-squared | 0.4798 | 0.2845 | 0.4891 | 0.3029 |
| Correlation of residuals | -0.4583 | | -0.4466 | |
| BP test | 35.502*** | | 33.704*** | |

Notes: BP test stands for the Breusch–Pagan test of independence ($\chi^2(1)$).
*** p < 0.01, ** p < 0.05, * p < 0.1.

**Source:** The authors

## 5. Discussion and conclusion

The theoretical and empirical analyses conducted in this study support the instrumental utility of PB for both citizens and bureaucrats in the budget allocation context. Our game theory approach between citizens and bureaucrats extends the contributions of prior studies that have focused on the benefits of PB from the perspective of citizens' well-being (Boulding and Wampler, 2010; Gonçalves, 2014; Hong and Cho, 2018). Our analytical model posits that PB can influence the benefits that both citizens and bureaucrats receive by simultaneously increasing citizens' utility and reducing that of bureaucrats. Furthermore, to the best of our knowledge, this theoretical model is the first to explain how information disclosure moderates the relationship between PB and budget allocation across various policy areas.

Our empirical findings align with the theoretical model's predictions, particularly regarding the increased social expenditure associated with PB, which is directly linked to citizens' quality of life. These findings support prior research indicating that PB can increase spending on health and other social services that benefit low-income populations (No and Hsueh, 2022; Touchton and Wampler, 2014). Clear practical implications are that enhancing citizen participation in the budgeting process can lead to budget allocations that address public welfare needs more effectively. This suggests the need for efforts to expand citizen budget committees and potentially implement PB at the national level to ensure the broader inclusion of citizen voices in budget decisions.

Contrary to our expectations, PB did not significantly reduce bureaucrats' utility. Aligning with Niskanen's (1971) budget-maximizing model, this may be attributable to inauthentic PB implementation, in which bureaucrats retain substantial control over the budget. Despite the theoretical model's prediction that PB would restrict bureaucratic discretion by increasing citizen oversight, empirical evidence suggests that bureaucrats may still prioritize budget allocations that favor their interests. This discrepancy potentially arises from bureaucratic resistance to PB, which they may perceive as a threat to their decision-making power and economic benefits (Oh, Shin and Park, 2022). In financial management, PB may be considered threatening because opening the budgeting process to citizens can restrict bureaucrats' budget-maximizing behaviors. Therefore, although PB can theoretically mitigate bureaucratic self-interest, its practical implementation may not fully achieve this goal. However, in our moderated model, information disclosure becomes increasingly crucial when citizen decision-making is highly empowered because it helps control bureaucratic budget-maximizing behaviors and enhances the influence that citizens have on their daily lives.

Information asymmetry is a primary factor that contributes to moral hazard in the principal – agent relationship (Fozzard, 2001). By reducing information asymmetry, information disclosure not only increases social utilities but also restricts bureaucratic budget-maximizing behaviors. Our findings indicate that high levels of information disclosure can amplify the benefits of PB by ensuring greater transparency and accountability in the budgeting process. Thus, citizens can scrutinize and influence budget programs,

particularly those that directly affect their lives, as well as indirect administrative expenses, when they have a high level of decision-making power in PB. Regarding this study's theoretical contribution, the empirical results confirm the effect of transparency on budget allocation within PB. The evidence of moderating effects also has the important practical implication that significant information must be made available to activate the budget allocation review process within actual PB programs.

This study's findings have direct policy implications for local governments aiming to enhance PB effectiveness. First, local governments should prioritize the establishment of structured PB mechanisms that encourage early citizen involvement. Our results indicate that citizen participation in the budget formulation stage significantly increases social expenditure allocation, particularly in the welfare, education, and healthcare sectors. Therefore, municipal governments should implement institutional frameworks, such as digital platforms, participatory workshops, and citizen advisory committees, to facilitate earlier and more meaningful engagement.

Second, narrowing the knowledge gap between citizens and officials heavily depends on transparency. Our findings indicate that governments can reduce participation costs and increase civic involvement by proactively disclosing budget-related information. Therefore, to guarantee that individuals can intelligently contribute to financial talks, policymakers should fortify information disclosure laws, such as open budget platforms and public data-sharing programs.

Finally, bureaucratic opposition may compromise the full effectiveness of PB, even while increasing citizen involvement. According to our findings, bureaucrats frequently maintain control over administrative spending, which restricts the reallocation of funds to initiatives preferred by the public. Local governments should incorporate participatory processes that legally compel bureaucrats to consider public feedback when making budget distribution choices to combat this. Actions could be taken, such as implementing mandatory response requirements or participatory monitoring boards to guarantee increased accountability and conformity to public preferences in budgeting outcomes. With these steps, PB could be transformed from a symbolic participatory exercise to a useful instrument for fiscal policy reform and democratic government.

Despite its theoretical and practical contributions, this study has some limitations. First, it focuses on expenditure types rather than specific social outcome indicators, such as academic performance, poverty rates, or mortality rates. Future research should incorporate these social outcomes to provide a more comprehensive assessment of the effects of PB. Furthermore, the study's non-experimental design, which relied on regression models, may have introduced statistical biases affecting the internal validity of the findings. Future studies should consider field experiments or simulation models to explore the interactions between citizens and bureaucrats in the PB context. This study's external validity may be limited by its focus on South Korea, where PB is legally mandated. Additional empirical research in other countries with varying levels of PB implementation is required to determine the generalizability of the findings. Such studies would provide valuable insights into the broader applicability of our theoretical and empirical models.

Nevertheless, this study contributes to the literature by providing the first theoretical and empirical analysis of PB using game theory. The findings enhance the current understanding of the dynamics between citizens and bureaucrats in the budgeting process and highlight the critical role of information disclosure in maximizing the benefits of PB.

Our study of South Korea's various PB systems shows that the potential to shift resources toward social expenditures is realized only when citizens are granted genuine delegative authority. This core finding provides transferable policy recommendations based on three key principles from a comparative perspective. First, effective PB requires moving beyond consultation to the formal delegation of authority. This can be institutionalized through citizen budget committees empowered to propose and select a portion of public projects directly, ensuring that citizens' decisions are formally integrated into the final budget. This approach would grant the binding influence needed to achieve diverse goals, such as social redistribution in Brazil, infrastructure upgrades in the United States, or advancing local democracy in Europe. Second, this must be paired with proactive transparency. Instead of merely publishing raw data, governments should create dedicated open budget platforms and provide simplified 'citizen's budgets' that clearly explain the rationale and costs of projects under deliberation. This would lower participation costs and, as our findings show, significantly amplify the positive effects of PB. Finally, countering the bureaucratic inertia, demonstrated by our data and documented globally, requires formal oversight via independent committees to ensure the faithful implementation of citizen-led decisions.

In conclusion, although the specific goals of PB may differ globally, such as enhancing social justice in Brazil, improving public services in the United States, or modernizing governance in Europe, our research suggests a universal path to success. The journey from symbolic participation to substantive effects requires a clear commitment to three principles: delegating authority, integrating transparency, and creating robust oversight. This will provide an evidence-based roadmap for policymakers worldwide from a comparative perspective on citizen participation.

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