It is not (just) the Economy, Stupid: Policy Innovation and Retrospective Voting in São Paulo, Brazil[[1]](#footnote-1)\*

# Abstract

# This study investigates the electoral rewards of policy innovation, focusing on São Paulo's Smart Card policy in public transit. Our analysis leverages a unique dataset, combining electoral data, transportation surveys, and census information to assess the policy's impact on the incumbent's vote share. We employ an OLS regression model with control variables and interaction terms to isolate the Smart Card's effect from pre-existing voting preferences and pork-barrel policies. Our findings reveal that successful policy implementation can sway voter support towards the incumbent, even when benefits are not explicitly targeted. The research contributes to the literature on retrospective voting by providing empirical evidence on the sub-municipal impacts of public transit policies, extending beyond conventional economic factors. The Smart Card policy, which streamlined fare collection and reduced travel costs, significantly influenced the voting behavior of its beneficiaries, underscoring the political viability of non-targeted, innovative public policies.

**Keywords**: Retrospective Voting; Policy Innovation; Public Transit Systems; Electoral Behavior; Smart Card Policy; Urban Governance

# Introduction

Do policymakers reap electoral rewards for innovative policies? While successful policymaking often translates into votes (Burnett & Kogan, 2017; Fiorina, 1978; Healy & Malhotra, 2013; Hopkins & Pettingill, 2018), voter bias due to partisan allegiance (Healy et al., 2017; Sigelman et al., 1991) or ambiguity regarding policy architects (Jilke, 2018) can impede this. Such obstacles present a quandary for politicians keen on pioneering policy changes, as the dual risk of failing to enhance voters' lives and going unrewarded for effective policies looms large (Hong et al., 2022; Mullin & Hansen, 2023).

This paper offers three novel insights. First, diverging from the conventional focus on national economic policies in retrospective voting studies, we concentrate on local policy impacts. Inspired by Burnett and Kogan (2017), who examined the electoral benefits of road maintenance in U.S. cities, we explore the electoral implications of a transformative public transit initiative in a developing context. The adoption of the Smart Card (SC) in São Paulo, Brazil, revolutionized payment methods, digitized passenger flow, and facilitated the integration of transit routes within the bus network, among other advancements. This innovation enabled residents, especially the working class, to utilize multiple bus services for the price of one, enhancing affordability and efficiency in their daily commutes.

Second, we refine our analysis by employing georeferencing to dissect policy impacts within São Paulo's diverse neighborhoods. By correlating the density of SC beneficiaries with the incumbent's vote share before and after its implementation, we attribute voting patterns to the policy's direct benefits, distinguishing areas with heightened advantages from those with fewer.

Lastly, we contend that the implications of such policy innovations extend beyond typical pork-barrel strategies. Urban transit reforms must balance economic, technical, and political considerations, striving to cut costs, reduce commute times, alleviate traffic, and elevate service standards, all within the constraints of administrative and bureaucratic agendas (Yoo & Lee, 2023). The multifaceted nature of urban transportation challenges precludes its simple use as a political lever. Our analysis accounts for additional policies by the same government that might confound our results. We conclude that the SC's impact persists even when factoring in these variables and through various sensitivity analyses.

**Policy Innovation in Public Transit**

Public transit stands as a cornerstone of metropolitan governance and a historical flashpoint for political contention. Early 20th-century dialogues, such as those by Coker (1920), highlight the sector's longstanding inadequacies, with debates around the regulation and ownership of urban transport systems resonating through the decades. The intersection of mass transit systems with capitalist urbanization—and their consumption primarily by the working class—has consistently situated them at the political forefront (Castells, 1978).

In the contemporary urban landscape, the displacement of low-income workers from city centers to peripheral areas lacking public services (Murphy & Wallace, 2010) underscores the urgency for efficient transportation. This necessity has sparked global mobilization and political strategies, illustrated by divergent approaches in London by mayors Ken Livingstone and Boris Johnson, and by the protest-triggering gasoline tax in France under Emmanuel Macron (Doering et al., 2021).

We posit that public transit operates as a distributive policy (Weingast, Shepsle, and Johnsen, 1981), providing benefits through subsidized solutions that predominantly serve lower-income populations. As a result, these solutions can garner electoral support, rewarding incumbents with votes from the targeted beneficiaries (Woodhouse, 2023). Furthermore, broader societal benefits, such as reduced congestion from increased bus usage, may accrue even to those not directly subsidized.

Economically, public transit policies play a pivotal role in enhancing mobility within the ever-evolving metropolitan areas. They counter the inefficiencies of systems overly reliant on single-occupant vehicles (Watkins, 2018) and remain vital. Recent research aims to bolster mass-transit ridership, lower costs, harness user data for system enhancements, and improve access for disadvantaged groups (Nnene et al., 2023; Faroqi et al., 2023; Yoo & Lee, 2023). Yoo and Lee's (2023) "transit service need index" for Sydney exemplifies the nuanced considerations behind transit reform, balancing efficiency with social equity.

The literature reveals two key challenges in public transit policy reform: the inherently contentious politics due to its distributive nature and the sector's complex technical aspects. Technological solutions, while diverse and innovative, are not universally applicable, necessitating a tailored approach that acknowledges the unique demands of each urban context.

Elected officials, thus, are tasked with balancing innovative transportation solutions against the prospect of political support. However, change introduces informational costs, necessitates new habits, and imposes budgetary constraints. According to Hong, Kim, and Kwon (2022), innovation in policymaking is contingent upon citizen demand, external pressures from successful precedents, and the alignment of a politician's characteristics with the policy.

Consequently, while innovative, distributive transportation policies have the potential for electoral dividends, the inherent risks may deter risk-averse politicians from implementation. Our theoretical framework builds on the premise that such policy innovations, if desirable and visible to constituents, may indeed result in electoral rewards for incumbents. However, the uncertainty of electoral gain compels a cautious approach to innovation.

# Policy Impact and Electoral Choice

The nexus between policymaking and electoral outcomes is well-documented; elections act as a barometer for public sentiment on reforms and can influence an official’s willingness to innovate (Flom, 2023). Politicians often craft policies with electoral ambitions in mind, aiming to maximize votes by tailoring investments and initiatives to strategic regions (Albertus, 2013; Woodhouse, 2023).

Voters’ appraisal of policies can be nuanced. Performance-based models suggest that effective policymaking is rewarded at the ballot box. This reward manifests as increased citizen satisfaction and positive retrospective voting—where voters assess government performance and cast their votes accordingly (Healy & Malhotra, 2013).

Although economic policy is a common focus, performance-linked electoral outcomes span various sectors. Studies have shown that quality local roads can boost electoral support for local officials (Burnett & Kogan, 2017), school board members are judged by academic performance (Berry & Howell, 2007), and incumbents’ handling of natural disasters (Healy & Malhotra, 2009) and wartime decisions (Grose & Oppenheimer, 2007) significantly impact voter perceptions.

However, several factors can distort this performance-reward correlation, including biased perceptions, ambiguity in policy responsibility, and complex policy interests. Debates around the *sociotropic* versus *pocketbook* voting underscore this complexity; voters may weigh overall economic health against their financial wellbeing when casting ballots (Kramer, 1971; Hansford & Gomez, 2015).

Biases and responsibility attribution further muddy these waters. Voters often view policy outcomes through the lens of partisanship, rewarding co-partisan initiatives and penalizing opposing ones (Lenz, 2013; Marvel, 2015 and 2016). Such cognitive biases are exacerbated when policy responsibility is dispersed, leaving voters uncertain about who to credit or blame (Jilke, 2018).

Unexpected demographics may also respond to policies in unanticipated ways. Holland (2023) finds that support for new metro stations in Bogotá came predominantly from upper-class households, not the working-class users who stand to benefit directly. These findings suggest that secondary benefits, like reduced traffic congestion, can influence support for public initiatives.

The path from innovative policymaking to electoral rewards is complex and fraught with potential voter biases, misattribution of responsibility, and unforeseen reactions. Moreover, the immediate performance of a new policy is not guaranteed. Yet, when policy innovations tangibly benefit constituents—such as reducing commute times and costs—voters are likely to support the responsible incumbent, transcending partisan allegiances.

We argue that the effects of policy innovations are more discernible among direct beneficiaries. These individuals, whose daily lives are markedly improved by new policies, may prioritize personal gains over party affiliation, viewing the incumbent as a catalyst for positive change. Therefore, we hypothesize that the greater the number of public transit policy beneficiaries in a region, the more substantial the support for the incumbent official in the subsequent election. This hypothesis is the basis of our empirical approach.

**The Integrated Public Transit Initiative in São Paulo**

In Brazil, municipalities are tasked with public transit, often outsourcing to private operators under monopolistic conditions. These contracts detail fares, routes, and quality standards, yet often fall prey to inefficiencies due to urban evolution and technological advances. In 1998, authorities in São Paulo identified a yearly diseconomy of R$ 346 million due to a disjointed transit network (São Paulo, 2004).

To combat these inefficiencies, Mayor Marta Suplicy's administration initiated the Interconnected São Paulo plan. Recognizing the inadequacies of the current radial bus routes, an interdisciplinary task force suggested comprehensive reforms: electronic billing to streamline fare systems, improved bus terminal facilities for better route connectivity, prioritization of bus transit, and enhanced monitoring to rationalize operations.

Central to these reforms was the contactless smart card (SC), pivotal for the tariff policy and as a facilitator of route integration. With SC technology, commuters could seamlessly transfer between buses, avoiding additional costs and lengthy waits, thus making neighborhood-to-neighborhood commutes more efficient.

The SC's rollout occurred in four stages, beginning with technical trials and legal preparations. The program initially targeted the elderly and students, extending to formal workers through partnerships with private companies offering transportation vouchers. The final phase saw broad public distribution, where users registered at city offices or through *Caixa Econômica Federal*, a prominent public bank.

By February 2005, the SC system was fully operational, revolutionizing payment for public transit and subsequently integrating with subway and rail systems under the next city administration. This innovation set a precedent for public transit payment in Brazil, with cities like Rio de Janeiro and others with populations over 500,000 adopting similar systems.

**Empirical Strategy**

Our analysis treats the Smart Card Policy as an exogenous intervention, impacting the citizens of São Paulo non-selectively. Variations in the policy's impact were inherently tied to the existing transport infrastructure, which was beyond the scope of short-term political influence. This natural variance provides a unique opportunity to assess the incumbent's electoral performance across different city zones, each experiencing the policy's economic benefits to varying degrees.

São Paulo's transport network—a mix of bus routes, corridors, terminals, commuter rails, and the subway—was considered fixed as of 1997, before policy implementation. In zones where bus services were limited ("Zone A"), commuters had to make multiple transfers, often at double the cost. Conversely, in well-connected zones ("Zone B"), such transfers were less necessary. The Smart Card policy, by offering fare exemptions for transfers, had a more pronounced effect in Zone A, where pre-existing network conditions necessitated multiple bus journeys.

The policy's technical nature meant that it could not be used by the incumbent mayor to strategically target specific zones for electoral gain, as the benefits were dictated by the pre-treatment bus infrastructure. Our empirical approach, using a difference-in-differences (DID) model with intensity variation, compared zones by the degree of policy impact, rather than a binary treated-versus-untreated framework.

We recognize the limitations in establishing causality, particularly due to data constraints that prevent us from examining trends prior to the 2000 baseline election. To mitigate this, we incorporated the baseline vote share as a control for pre-existing voting patterns in our model.

Addressing potential confounders is crucial, as other concurrent policies, such as the Bus Rapid Transit system, or historical voting shifts, particularly the Labor Party's growing influence in the city's peripheries, could influence the incumbent's performance. Our model accounts for these through additional controls and interaction terms, evaluating the stability of the Smart Card policy's effect across various specifications.

The empirical model is defined by Equation 1, where is the change in the incumbent's vote share from 2000 to 2004, is the vote share in 2000, measures the Smart Card intensity in 1997, represents a vector of census covariates, encompasses public policies implemented before the Smart Card Policy, and is the standard error term. A comprehensive list of variables, aligned with the prior discussion, is detailed in the appendix.

(1)

Our model posits that the incumbent's vote share change from 2000 to 2004 is influenced by past voting patterns, the Smart Card policy's reach, demographic characteristics, and other public policy interventions. We employ Ordinary Least Squares (OLS) regression to estimate the coefficients, focusing particularly on which represents the change in the incumbent's vote share per percentage point increase in Smart Card beneficiaries.

If is statistically significant and positive, it suggests that the Smart Card policy positively influenced the incumbent's electoral support. To evaluate the substantive significance of this effect, we assess the policy's actual impact on vote share:

(2)

Where is the average number of Smart Card beneficiaries. This gives us the mean impact in percentage points. To contextualize this impact, we compare it to the overall change in votes:

(3)

Where is the average change in the incumbent's vote share, with the absolute value used due to a general decrease in votes from 2000 to 2004. These impact measures allow us to discuss the electoral weight of the Smart Card policy.

To capture potential heterogeneity in the policy's electoral impact and to strengthen the model against confounding variables, we introduce interaction terms between the treatment variable and demographic or policy characteristics. This step helps determine whether the policy's impact varied among different voter groups and ensures robustness in the model's predictions:

(4)

In essence, by integrating these interactions, we not only refine the model to reflect varied electoral responses but also fortify it against external variables that could skew the results, aligning with the methodology suggested by Angrist and Pischke (2009), *inter alia*.

In our enhanced model, the Smart Card variable interacts with other terms, preventing a straightforward interpretation of as we previously detailed. This complexity means we can no longer directly apply the average impact formula from equation (2). To accurately estimate the electoral influence of the Smart Card policy, we must use a modified equation that accounts for these interactions:

(5)

Here and represent the average demographic characteristics and policy features, respectively. To determine the relative impact, we refer to equation (3), which incorporates all interaction terms outlined in equation (5).

By factoring in these interactions, we can more precisely gauge the policy's differential effects across the electorate and ensure a robust assessment of the Smart Card's true influence on voting behavior.

**Data Assembly and Variable Construction**

To evaluate the interplay between regional voting patterns and transportation changes, we synthesized a unique dataset from diverse sources. The electoral data was sourced from the *Centro de Política e Economia do Setor Público* (FGV CEPESP), informed by Brazil's Federal Electoral Court (TSE). Additionally, the 1997 Origin and Destiny Survey (OD) by São Paulo's subway company, conducted every decade, offered insights into transit and socio-economic patterns. These primary sources were supplemented with demographic data from the 2000 Census and municipal policy records from 2001 to May 2004, enriching our control variables.

The treatment variable was derived from the OD Survey, which profiles metropolitan trips and socio-economic data, allowing aggregation at the zone level based on the OD Zones—areas delineated by demographic and transportation criteria. We defined a potential Smart Card policy beneficiary as anyone who, in 1997, required one or more bus transfers, indicating the policy's benefit potential. Hence, treatment intensity is a ratio: the number of voting-age potential Smart Card beneficiaries to the total voting-age population within an OD Zone.

Our dependent variable tracks the change in votes for incumbent Mayor Marta Suplicy from her 2000 election to the 2004 re-election bid, disaggregated by OD Zone. TSE data, aggregated from ballot boxes to polling places, was geolocated using *Centro de Estudos da Metrópole* (USP CEM) data to form Voronoi Polygons, which helped attribute votes to the corresponding OD Zone by proximity.

Control variables incorporated census data and municipal policy information from GeoSampa, including proximity to transport amenities and the Unified Educational Centers (CEU)—a significant PT administration policy. The CEU's influence on voting was modeled as a binary variable, indicating whether a zone's centroid was within a kilometer of a CEU, the average walking distance for accessing educational and cultural facilities in Brazil.

Additional data from GeoSampa informed our understanding of the transport infrastructure's impact on voting. Notably, we considered the distance from OD Zones to bus corridors of the BRT system and to the nearest train or subway station, acknowledging potential voter misattribution between municipal and state responsibilities.

To explore the phased policy implementation's effects, we distinguished between the elderly, students, and formal workers with Transport Vouchers, building variables to represent the proportion of each group within the OD Zone populations.

# Does SC Policy Pays Off?

Table 1 showcases the outcomes of five OLS regression models, which progressively incorporate control variables and interaction terms to assess the robustness and impact of the Smart Card variable on the incumbent's vote share. The initial model indicates a positive association between the Smart Card policy and a 0.37 percentage point increase in the incumbent's vote share for each additional point in Smart Card coverage.

Table 1. OLS estimates of incumbent party voting difference (2004 - 2000)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) |
| Smart Card Users Coefficient | 0.370\*\*\* | 0.233\*\*\* | 0.213\*\*\* | 2.635\*\* | 2.108\* |
|  | [0.065] | [0.063] | [0.061] | [1.034] | [1.264] |
| Impact on vote share change | 1.85% | 1.17% | 1.07% | 0.50% | 0.45% |
| Relative Impact on vote share change | 84% | 53% | 48% | 23% | 20% |
| **Controls** |  |  |  |  |  |
| Vote share Labor Party (2000) | Yes | Yes | Yes | Yes | Yes |
| Income, Rail and Transportation Voucher | No | Yes | Yes | Yes | Yes |
| BRT, Students and CEU | No | No | Yes | Yes | Yes |
| Interactions with Income, BRT, Students and CEU | No | No | No | Yes | Yes |
| Interactions with Rail and Transportation Voucher | No | No | No | No | Yes |
| Observations | 614 | 614 | 614 | 614 | 614 |
| Adjusted R-squared | 0.278 | 0.347 | 0.367 | 0.406 | 0.406 |
| Interaction terms F-test statistic¹ |  |  |  | 12.59\*\*\* | 9.15\*\*\* |
| Degrees of freedom F-test |  |  |  | (df = 5; 601) | (df = 7; 599) |
| Full model F-test statistic² |  |  |  | 35.97\*\*\* | 30.87\*\*\* |
| Degrees of freedom full model F-test |  |  |  | (df = 12; 601) | (df = 14; 599) |

***Robust Standard Errors in Brackets. \*\*\*, \*\*, \* denote significancy at the 1%, 5%, and 10% levels respectively.***

***¹F-statistic refers to a restricted model that only excludes the interaction terms.***

***²F-statistic is the conventional F-test.***

***Source: Own Estimation based on data from TSE, São Paulo Metro (OD Survey, 1997), Centro de Estudos da Metrópole, IBGE (2000 Census) and Geo Sampa.***

Moving forward, we refine the model to account for variables outside the mayor's policy actions that might still correlate with Smart Card distribution or voting patterns. When we adjust for average income, formal worker demographics, and proximity to the nearest rail station, the Smart Card's influence on votes lessens but remains significant, affirming its positive electoral impact.

The subsequent models incorporate policy-related variables reflecting deliberate mayoral strategies, such as the expansion of Bus Rapid Transit systems and the allocation of Smart Cards to students, as well as the presence of CEU facilities. The inclusion of these variables slightly reduces the Smart Card policy's coefficient, suggesting that while other policies play a role, the Smart Card initiative itself remains a significant electoral factor.

Our most complex models introduce interaction terms to explore potential heterogeneous effects across voter groups and mayoral policies. Interestingly, the marginal effects of the Smart Card policy hold up even when accounting for variations in income and the early distribution of cards to students. Although the magnitude of the policy's effect diminishes with the introduction of more nuanced variables, it still presents as a meaningful contributor to electoral outcomes.

An F-test confirms that the interaction terms collectively contribute to the model, reinforcing the validity of our findings. Ultimately, despite the expected decrease in the policy's marginal impact as the model grows in complexity, the persistent significance and substance of the effect from Smart Card distribution to voting behavior underscore its importance as an electoral asset. We can attribute to SC policy at least 20% of the change in incumbent’s vote share from 2000 to 2004.

**Robustness Checks: Addressing Endogeneity Concerns**

Our robustness analysis confronts potential endogeneity that may arise from regional political leanings, especially the Labor Party’s historical patterns in São Paulo, where poorer outskirt areas—characterized by intense bus transfers—could inadvertently amplify the Smart Card policy's perceived impact. To disentangle the policy effect from this "periphery effect," and address socioeconomic and voting behavior variations, we employ a matching approach.

We use a binary treatment based on whether zones are above (treated) or below (non-treated) the median Smart Card implementation level. Propensity score matching pairs treated zones with their nearest non-treated counterparts, excluding zones without close matches. This matching narrows our focus to middle and outer zones, enhancing the internal validity of the sample by reducing income-related influences.

Figure 2 illustrates the pre-matching imbalance between treated and non-treated zones, which is notably rectified post-matching, affirming a more comparable set of zones. Furthermore, the matching process naturally eliminates zones in the central business districts that might confound the results.

Figure 2. Matching Covariate Balance

A graph with red and blue dots

Description automatically generated

Table 2 replicates the regression models of Table 1 but with the matched sample. It reveals that while the estimates for the full and matched samples are consistent, the matched sample yields a slightly diminished effect size, particularly in the initial specification without control variables. This expected reduction bolsters our confidence in the matching process.

In specifications (4) and (5), the matched sample exhibits a stronger Smart Card policy impact on votes, with conditional impacts reaching up to 0.8 percentage points. However, the SC variable is not significant at usual levels. As expected, the reduction of the sample size reduces precision of the estimates, but the magnitude is quite consistent.

The consistency across both samples supports the credibility of our exogeneity assumption. The robustness checks substantiate our hypothesis: voters rewarded the incumbent mayor for the Smart Card Policy implementation, with politically meaningful magnitudes of impact.

Table 2. OLS estimates of incumbent party voting difference (2004-2000) (matched sample)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | (1) | | (2) | | (3) | | (4) | | (5) |
| Smart Card Users Coefficient | | 0.316\*\*\* | | 0.230\*\*\* | | 0.194\*\* | | 0.395 | | -0.659 |
| Smart Card Users Coefficient | | [0.088] | | [0.079] | | [0.078] | | [1.306] | | [1.713] |
| Impact on vote share change | | 1.58% | | 1.15% | | 0.97% | | 0.80% | | 0.75% |
| Relative Impact on vote share change | | 72% | | 52% | | 44% | | 36% | | 34% |
| **Controls** | |  | |  | |  | |  | |  |
| Vote share Labor Party (2000) | | Yes | | Yes | | Yes | | Yes | | Yes |
| Income, Rail and Transportation Voucher | | No | | Yes | | Yes | | Yes | | Yes |
| BRT, Students and CEU | | No | | No | | Yes | | Yes | | Yes |
| Interactions with Income, BRT, Students and CEU | | No | | No | | No | | Yes | | Yes |
| Interactions with Rail and Transportation Voucher | | No | | No | | No | | No | | Yes |
| Observations | 422 | | 422 | | 422 | | 422 | | 422 | |
| Adjusted R-squared | 0.251 | | 0.386 | | 0.402 | | 0.401 | | 0.401 | |
| Interaction terms F-test statistic¹ |  | |  | |  | | 2.65\*\* | | 2.12\*\* | |
| degrees of freedom F-test |  | |  | |  | | (df = 5; 409) | | (df = 7; 407) | |
| Full model F-test statistic² |  | |  | |  | | 24.46\*\*\* | | 21.12\*\*\* | |
| degrees of freedom full model F-test |  | |  | |  | | (df = 12; 409) | | (df = 14; 407) | |

***Robust Standard Errors in Brackets. \*\*\*, \*\*, \* denote significancy at the 1%, 5%, and 10% levels respectively.***

***¹F-statistic refers to a restricted model that only excludes the interaction terms.***

***²F-statistic is the conventional F-test.***

***Source: Own Estimation based on data from TSE, São Paulo Metro (OD Survey, 1997), Centro de Estudos da Metrópole, IBGE (2000 Census) and Geo Sampa.***

# Conclusion

Our research demonstrates that beneficiaries of a non-targeted successful policy innovation are more inclined to support the incumbent, irrespective of existing voting habits or the influence of pork-barrel politics. This outcome suggests that voters have the acuity to acknowledge effective policies, even when not directly aimed at any specific demographic.

This study enriches the research on retrospective voting by providing substantial evidence through a distinctive lens—focusing on public transit rather than economic metrics, examining sub-municipal impacts, and transcending conventional pork-barrel cases. Public transit, a domain marred by political contestation, presents complex challenges that blend political maneuvering with economic and technical considerations. Nonetheless, it also operates as a distributive policy, targeting specific communities while being funded through general taxation, thus addressing urgent urban economic issues related to spatial segregation of income.

The Smart Card policy, initiated by Mayor Marta Suplicy, revolutionized São Paulo’s transit by introducing an automated fare collection system that facilitated integrated ticketing. This policy led to a significant reduction in transit time and costs, proving particularly beneficial for the working class in outlying regions.

Our findings hold significant implications for the intersection of public policy and political strategy. Innovating public policies is inherently fraught with risks, particularly when the direct beneficiaries are challenging to identify, diverging from traditional pork-barreling strategies. Yet, our study offers evidence that successful policy innovation can be politically rewarded, potentially emboldening policymakers to pursue reforms that enhance citizens’ quality of life despite budgetary constraints and the inherent risks involved. This could signal a shift towards a political landscape in which daring to innovate is not only a public service imperative but also an electorally prudent endeavor.

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# Appendix A: Detailed Regression Results

Table A.1. Detailed OLS estimates of incumbent party voting difference (2004 - 2000) (Full Sample)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) |
| Proportion of Smart Card Users | 0.370 [0.065] | 0.233 [0.063] | 0.213 [0.061] | 2.635 [1.034] | 2.108 [1.264] |
| Vote share Labor Party (2000) | 0.566 [0.056] | 0.179 [0.073] | 0.141 [0.076] | 0.152 [0.071] | 0.155 [0.071] |
| Average Nominal Income (log) |  | -0.040 [0.006] | -0.040 [0.007] | -0.030 [0.007] | -0.033 [0.008] |
| Distance to the nearest rail station (Km) |  | 0.004 [0.002] | 0.003 [0.002] | 0.003 [0.002] | 0.002 [0.002] |
| Distance to nearest bus corridor (Km) |  |  | -0.0002 [0.001] | -0.001 [0.001] | -0.001 [0.001] |
| The proportion of Transport Voucher users |  | 0.043 [0.030] | 0.054 [0.029] | 0.042 [0.028] | 0.022 [0.029] |
| Proportion of Students |  |  | 0.037 [0.026] | 0.019 [0.029] | 0.022 [0.029] |
| Presence of CEU unit (1 km radius, dummy) |  |  | 0.058 [0.015] | 0.047 [0.015] | 0.048 [0.015] |
| *Interaction terms:* |  |  |  |  |  |
| Smart card x Income |  |  |  | -0.376 [0.146] | -0.317 [0.166] |
| Smart card x bus corridor |  |  |  | 0.015 [0.010] | 0.015 [0.010] |
| Smart card x students |  |  |  | 0.223 [0.580] | 0.176 [0.573] |
| Smart card x CEU |  |  |  | 0.051 [0.183] | 0.044 [0.190] |
| Smart card x rail station |  |  |  |  | 0.018 [0.038] |
| Smart card x Transport Voucher |  |  |  |  | 0.495 [0.656] |
| Constant | -0.234 [0.018] | 0.174 [0.064] | 0.179 [0.066] | 0.119 [0.066] | 0.119 [0.066] |
| Observations | 614 | 614 | 614 | 614 | 614 |
| Adjusted R-squared | 0.278 | 0.347 | 0.367 | 0.406 | 0.406 |
| Interaction terms F-test statistic |  |  |  | 12.59 | 9.15 |
| Degrees of freedom F-test |  |  |  | (df = 5; 601) | (df = 7; 599) |
| Full model F-test statistic |  |  |  | 35.97 | 30.87 |
| Degrees of freedom full model F-test |  |  |  | (df = 12; 601) | (df = 14; 599) |

***Robust Standard Errors in Brackets.***

***¹F-statistic refers to a restricted model that only excludes the interaction terms.***

***²F-statistic is the conventional F-test.***

***Source: Own Estimation based on data from TSE, São Paulo Metro (OD Survey, 1997), Centro de Estudos da Metrópole, IBGE (2000 Census) and Geo Sampa.***

Table A.2. OLS estimates of incumbent party voting difference (2004-2000) (matched sample)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) |
| Proportion of Smart Card Users | 0.316 [0.088] | 0.230 [0.079] | 0.194 [0.078] | 0.395 [1.306] | -0.659 [1.713] |
| Vote share Labor Party (2000) | 0.795 [0.093] | 0.209 [0.106] | 0.14 [0.109] | 0.153 [0.109] | 0.169 [0.108] |
| Average Nominal Income (log) |  | -0.075 [0.012] | -0.074 [0.012] | -0.071 [0.017] | -0.078 [0.019] |
| Distance to the nearest rail station (Km) |  | 0.004 [0.003] | 0.004 [0.003] | 0.003 [0.003] | 0.0001 [0.006] |
| Distance to nearest bus corridor (Km) |  |  | 0.0001 [0.001] | -0.001 [0.001] | -0.001 [0.002] |
| The proportion of Transport Voucher users |  | 0.023 [0.041] | 0.033 [0.042] | 0.029 [0.042] | -0.023 [0.065] |
| Proportion of Students |  |  | 0.080 [0.041] | 0.080 [0.062] | 0.090 [0.063] |
| Presence of CEU unit (1 km radius, dummy) |  |  | 0.053 [0.019] | 0.025 [0.032] | 0.028 [0.032] |
| Interaction terms: |  |  |  |  |  |
| Smart card x Income |  |  |  | -0.045 [0.179] | 0.073 [0.217] |
| Smart card x bus corridor |  |  |  | 0.010 [0.013] | 0.013 [0.014] |
| Smart card x students |  |  |  | 0.024 [0.775] | -0.086 [0.762] |
| Smart card x CEU |  |  |  | 0.237 [0.253] | 0.215 [0.264] |
| Smart card x rail station |  |  |  |  | 0.040 [0.057] |
| Smart card x Transport Voucher |  |  |  |  | 0.833 [0.871] |
| Constant | -0.311 [0.03] | 0.410 [0.109] | 0.400 [0.108] | 0.383 [0.135] | 0.444 [0.155] |
| Observations | 422 | 422 | 422 | 422 | 422 |
| Adjusted R-squared | 0.251 | 0.386 | 0.402 | 0.401 | 0.401 |
| Interaction terms F-test statistic1 |  |  |  | 2.65 | 2.12 |
| degrees of freedom F-test |  |  |  | (df = 5; 409) | (df = 7; 407) |
| Full model F-test statistic2 |  |  |  | 24.46 | 21.12 |
| degrees of freedom full model F-test |  |  |  | (df = 12; 409) | (df = 14; 407) |

***Robust Standard Errors in Brackets.***

***¹F-statistic refers to a restricted model that only excludes the interaction terms.***

***²F-statistic is the conventional F-test.***

***Source: Own Estimation based on data from TSE, São Paulo Metro (OD Survey, 1997), Centro de Estudos da Metrópole, IBGE (2000 Census) and Geo Sampa.***

1. \* This article subsumed Bueno (2018) master thesis. [↑](#footnote-ref-1)