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Economic Value and Costs of Capital Cities: The Trenton Case Study

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Executive Summary

Capital cities serve as the administrative centers of state governments and perform many functions, such as housing the seats of state government and often serving as the focal points of culture and history in their states. Many capital cities across the United States incur large direct and indirect costs (Reitmeyer, 2019) to host their respective state governments. Additionally, capital cities generate benefits for citizens across their respective states; however, due to the "public good" nature of such services, a substantial portion of the economic value generated is likely what economists call non-market value[1] (Haefele et al, 2016; Choi and Marlow, 2012). There is a real need to understand the costs and benefits to capital cities that come from hosting state government, especially for cities like Trenton that depend heavily on intergovernmental transfers[2].

Little academic research has been conducted into the costs and benefits of capital cities. At the request of Mayor Reed Gusciora, the Harvard Kennedy School team examined the unique costs incurred by the City of Trenton and the economic value generated to New Jersey by hosting the capital city.

This paper presents quantitative order-of-magnitude[3] estimates for costs incurred by the City of Trenton in providing services to host the New Jersey State Government, and conservative estimates of economic benefits[4] generated by the City of Trenton in hosting the state capital (Figure 1). Although this study is not intended to be a full cost-benefit analysis, insights can be gained through comparison of cost and benefit estimates. The cost estimate includes both direct and indirect costs to the City for provision of municipal services to host the State and County.[5] The benefits estimate includes an estimate of New Jersey residents' willingness to pay for municipal services to host the state capital in Trenton.

We find that the benefits that accrue to New Jersey residents from having Trenton as the capital are significantly larger than the costs incurred by the City of Trenton in hosting the state capital.

[1] Because there are no formal markets for many aspects of government activities, 'prices' are not revealed by the market. Total economic value includes both market and non-market value.

[2] Intergovernmental transfers constituted 38% of local government revenues in 2006 (Wildasin, 2009).

[3] An order-of-magnitude cost estimate is a rough and preliminary assessment of cost before detailed budgeting. The estimates presented in this paper are not meant to replace more detailed budgeting activities.

[4] The benefits estimate includes survey results of a representative sample of 401 New Jersey residents, using a contingent-valuation method to capture the nonmarket value of benefits generated by the City of Trenton hosting the New Jersey state government.

[5] In calculating the costs of municipal services, we included fire and police protection costs associated with supporting state government, as well as street cleaning, snow removal and pension costs associated with all of these services.

Table 1. *Summary of costs incurred by the City of Trenton and benefits generated for New Jersey in hosting the state capital.*

$43–$86 million	*Costs* incurred by City of Trenton
$7.6-$9.9 million	*Direct costs* for municipal services provided to the state and county properties
$35.3-$76.2 million	*Forgone revenue* from hosting state and county governments
$80 million (at least)	*Benefits* to New Jersey

The cost to Trenton of hosting state government is between $43 million and $77 million per year in direct costs and forgone revenue, due in large part to foregone property taxes. The city incurs an additional $9 million in direct costs and foregone revenue from hosting the Mercer County government. If collected, the foregone revenue would generate an additional $22.0–45.9 million of secondary economic activity in the local economy. Using a contingent valuation method, we calculated that Trenton as the state capital creates at least $80 million in nonmarket value for residents of New Jersey. We also found that state capitals in general create market value, with capital city status being associated with an average increase in median home value of 11.6% compared to non-capital peer cities.

Although all capital cities bear costs of hosting higher government entities (including state and federal services, and in some cases including Trenton, holding the county seat), we find that the situation of Trenton is unique for several reasons. Compared to similar state capitals, Trenton has a larger state government footprint, which decreases the available tax base, and its tax base itself is more diverse, poorer, and more highly taxed than in peer cities. Based on conservative assumptions, we find that the City of Trenton incurs significant costs, and generates significant benefits, associated with being the capital of the State of New Jersey. Given the highly conservative nature of our estimates, New Jersey residents may derive far greater benefits than those presented in this paper. By providing a better understanding of costs, benefits, and context, we hope to contribute to evidence-based policymaking regarding funding for capital cities in the future. We recommend further assessment of the role and importance of capital cities, not only in New Jersey but across the country.

Background

The literature on the economic municipal costs and benefits of hosting state government is minimal, but there is some evidence to suggest that there are benefits to accompany the costs. In Tallahassee, an uptick in spending is observed when the Florida Legislature is in session, and local residents report a difference in impact between a session that starts in January and one that starts in March (Mueller, 2020). However, there are few studies of this nature, and we have not been able to identify any full economic impact studies of capital cities in the United States.

There is some international evidence for the costs and benefits of capital status. For example, when the Federal Republic of Germany moved its capital from Bonn to Berlin after reunification, there was fear that moving the entire apparatus of government would leave Bonn hollowed out, as well as being expensive at a time when funds were needed for reintegration of the East. The vote to move the seat of government was close, and it was structured to provide a "soft landing" for Bonn, in which the national government continued to situate some of its ministries, and some international organizations in Bonn (Zimmerman, 2009). The debate highlighted some of the benefits of hosting a government.

We undertook this study at the request of Mayor Reed Gusciora and the City of Trenton. The Mayor observed that the mix of municipal services provided to the state, as well as the state government's impact on the property tax base in Trenton, had a significant fiscal impact. Therefore, we worked to quantify as much as possible the costs and benefits of hosting state government on Trenton and to place that in the broader context of the common experience of state capital cities in the United States.

Methodology

We have developed order-of-magnitude estimates of costs incurred by the City of Trenton in providing services related to serving as the capital of New Jersey and conservative estimates of economic benefits generated by the City of Trenton in serving as the state capital. Although this study is not intended to be a complete cost-benefit analysis, insights can be gained through comparison of cost and benefit estimates.

Two types of costs were estimated, direct costs and forgone revenues. The direct costs were estimates of services provided by the City of Trenton to the State of New Jersey (e.g., street maintenance, snow removal, firefighting). Forgone revenues are an indirect cost to the City of Trenton and consist of the value of tax revenue that would have been raised by the City from private entities. Four general lines of forgone revenue were identified and estimated; forgone property tax revenues from state- and county-owned property; forgone parking revenues from state employees; forgone residential property taxes attributed to low State employee residency in Trenton; and forgone commercial property tax revenue attributed to the relocation of businesses to avoid Trenton's high average effective property tax rate.

In addition, we calculated two measures of value[6] – an estimate of market value created by state capitals in general and non-market value generated by the City of Trenton for residents of New Jersey. To calculate market value, we used a hedonic regression model to measure the impact of capital city status on median home values for a dataset of 72 paired capital and noncapital cities[7]. We also measured the nonmarket value of Trenton to New

[6] While we have identified benefits likely to accrue to state capitals, our list is not exhaustive, and we did not attempt to quantify benefits received by Trenton because of its status as a state capital. We did, however, identify compelling qualitative evidence that Trenton benefits less from its status than do other state capitals.

[7] Hedonic regression typically uses ordinary least squares to estimate the extent to which several factors affect the price of a product or a piece of real estate, like a home. The price is defined as the dependent variable and is regressed on a set of independent variables that are believed to influence the price. It is commonly used in analyses of real estate and the housing market.

Jersey residents via a contingent-valuation survey administered to a representative sample of 401 New Jersey residents. Contingent valuation is a commonly used method to calculate the value individuals place on goods, especially goods for which there is not a natural marketplace. With this method survey respondents are asked to state whether they would be willing to pay a specific amount to obtain a good or avoid giving one up.[8]

The Case of Trenton

It should be noted that while a number of economic benefits can accrue to capital cities, Trenton, N.J., is poorly positioned to take advantage of them, either through direct revenue streams or indirectly through enhanced economic activity[9]. Unlike in many states, New Jersey cities do not collect their own sales tax, so the City of Trenton does not collect money on sales to visitors. Additionally, Trenton tends towards the extremes on economic and demographic indicators when compared to peer cities. As such, we compared Trenton to a contingent of "peer" capitals and New Jersey cities[10] and assessed compensation models to contextualize the findings from the cost and value models. The "Peer" capital city cohort consisted of capital cities in the Middle Atlantic and New England U.S. Census Divisions. "Peer" New Jersey cities are either similar in population and/or near in geographic proximity.

Peer City Benchmarking

Trenton is an outlier on key economic and demographic indicators. Based on stakeholder interviews and research of publicly available databases, we benchmarked Trenton against other capital cities and cities in the state[11]. New Jersey peer cities consist of municipalities within New Jersey with similar populations and were selected in discussion with the City of Trenton and the New Jersey Treasury Department. We also paid particular attention to other state capitals in the Northeast region. Indicators were related to income, employment, education, and other measures. Trenton is a high-density city with high taxes relative to its peers, with a population that suffers from low levels of income and education. It has the second highest poverty rate in the nation (See Table2).

[8] See, for example Bilmes and Loomis (2019) on the value of national parks in the United States.

[9] Commuters working in New Jersey State Government frequently eat in State cafeterias rather than venturing out to restaurants, a point of contention for the city. Additionally, as New Jersey is a relatively small state, legislators frequently go home every night, reducing economic demand associated within Trenton (e.g., hotel stays, dining activities). Trenton also cannot collect the 3% municipal occupancy tax, as there is no hotel in the city limits. Aside from state aid paid directly to the City of Trenton, the city seems to benefit less from its status as a capital than other capital cities such as Tallahassee or Indianapolis.

[10] Further information on the Peer City Benchmarking analysis is included in the Appendix.

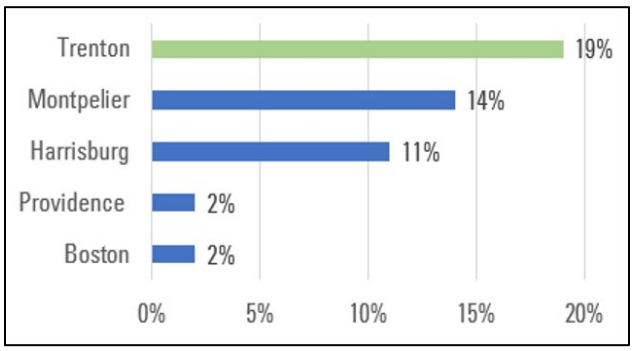
[11] New Jersey peer cities include New Brunswick, Camden, Newark, Jersey City, Paterson, Elizabeth, Princeton, Hamilton Township.

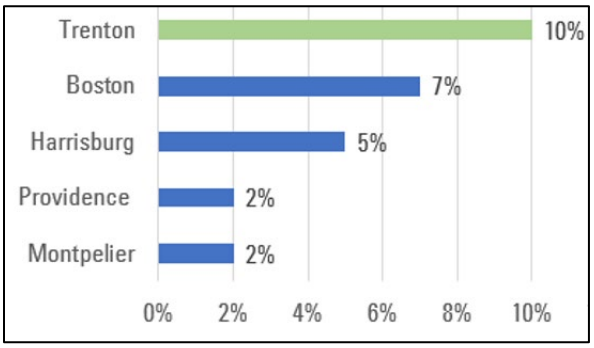
Table 2. *Benchmarking analysis: Key economic and demographic indicators.*

Indicator	Ranking System	Ranking	Comparison Cohort
Poverty Rate	1: Low; 50: High	49/50	All Capital Cities
Per Capita Income	1: High; 50: Low	50/50	All Capital Cities
Education Level (% with High School Degree)	1: High; 50: Low	50/50	All Capital Cities
Population Density	1: High; 50: Low	2/50	All Capital Cities
Effective Tax Rate	1: High; 565: Low	8/565	All New Jersey
State Aid per Capita	1: High; 9: Low	2/9	Peer New Jersey Cities

Notably, Trenton has a high population density, in large part due to its small geographic size. As a result, the impact of hosting large areas of state- and county-owned land is substantial. Relative to other capital cities, the City of Trenton is poorer and has a larger population of minority residents. Requiring its citizens to bear the burden of being the capital city has serious equity concerns, with the City's high property tax rate providing a dramatic example.

Figure 1. *Percentage of assessed value in city that is state-owned (left)*
Figure 2. *Percentage of land that is state-owned (right)*





We compared Trenton to other capital cities in the Northeast[12]. The New Jersey state government has a larger geographic and financial footprint in Trenton than in peer capital cities (Figures 1 and 2). The increase in these footprints decreases the available property tax base.

Compensation models

Local governments that depend on property taxes for their main source of revenue are burdened by the presence of tax-exempt property owners. For capital cities, the state government itself can be a significant source of burden, as is the case in Trenton, N.J. However, universities, charities and other non-profits may have a detrimental effect on municipal revenue, especially if they control a significant portion of otherwise taxable property. The size of that burden also depends a

[12] The capital cities of Boston, MA, Montpelier, VT, Harrisburg, PA, and Providence, RI, were selected both because of their location in the Northeast and full and accurate data sets were identified (allowing for an "apples-to-apples" comparison). This analysis was conducted using publicly available GIS data.

great deal on the proportion of local revenue that the property tax accounts for. This varies enormously from state to state, with Alabama cities on average generating just 12.58% of their revenue on average from property taxes, whereas at the other extreme, municipalities in New Hampshire depend on property taxes for 63.66% of their revenue. New Jersey cities are found toward the high end, on average depending on property taxes for 59.1% of their revenue (Lincoln Institute of Land Policy, 2020).

Most states do not compensate capital cities for revenue lost due to the state's footprint. However, two models do exist, the first targeting capital cities specifically via capital city aid, the second providing assistance to any municipality that contains state-owned property via a payments-in-lieu-of-taxes scheme (PILOT). Capital cities do appear to benefit from having a basis for state aid enshrined in state law. However, even in those cases, complaints about state government not fully funding its commitments are a perennial issue.

Capital City Aid

Albany, N.Y., and Trenton, N.J., have both benefited from dedicated capital city aid lines in their states' respective budgets, but both cities have faced challenges in maintaining a consistent level of aid year over year. For FY 2020, Albany anticipated $12.5 million in capital city aid. The mayor (City of Albany, 2019) hopes to make this level permanent, citing the services that Albany provides to support the seat of government, even as non-taxable property owned by the state erodes the tax base. This aid works out to about $128 per capita.

Trenton, N.J., faces a situation similar to Albany. The State of New Jersey controls a significant amount of land in the city, and New Jersey's local governments are highly dependent on property tax revenue. Historically, New Jersey has provided Trenton with capital city aid. However, Governor Chris Christie ended that assistance in 2010 in favor of a "transitional aid" program for cities across New Jersey (Duffy, 2013). The transitional aid appropriation to Trenton was much lower than the previous capital city aid appropriation, and it was intended to diminish over time, ultimately dropping to zero. The current administration of Governor Phil Murphy restored capital city aid, with a minimum annual appropriation of $10 million, while the City of Trenton has sought $35 million.

Payments in Lieu of Taxes

Trenton has experienced a particularly severe shortfall in terms of its loss of capital city aid. Some states pay some amount to cities in compensation for property taxes lost to untaxable state-owned property. These payments in lieu of taxes (or PILOTs) are generally not exclusive to capital cities but are paid to any municipality with state-owned properties within their boundaries.[13]

Although most states provide neither capital city aid nor PILOTs, at least nine states make some kind of formula-based PILOT payments to local governments. Connecticut offers one of the more generous PILOT formulas, with a statute entitling local governments to payments of at least 45% of what the property tax would be for state-owned properties,

[13] Nonprofit organizations rather than state governments are parties to most PILOT arrangements, with about 3/4 of payments taking place in the Northeast, especially Pennsylvania and Massachusetts. See Langley, et al. (2012).

with larger allowances for some categories of property such as correctional facilities and some tribal lands (State of Connecticut Office of Policy and Management, 2020). However, Hartford, alleges that it has been denied $376 million that it was due to receive since FY 2011 (Bordonaro, 2019).

Vermont likewise has set up PILOT arrangements to compensate local governments for taxes they are unable to collect on state-owned buildings (State of Vermont, 2020). Other states offer PILOTs for more narrowly drawn categories. For instance, Michigan (State of Michigan, 2020), Minnesota (Minnesota Department of Natural Resources, 2020) and Wisconsin (Wisconsin Department of Natural Resources, 2020) offer compensation to local governments for property held by the state Department of Natural Resources. These programs appear to be modeled off the federal Payments in Lieu of Taxes (PILT) program administered by the United States Department of the Interior, which is geared primarily toward compensating for large land holdings in rural areas, rather than improvements in urban areas (U.S. Department of the Interior, 2020).

Unique Costs to Capital Cities

Municipal governments in state capitals incur unique costs due to their status as capital cities. We decomposed these costs into direct costs and forgone revenue. Based on our analysis, the annual impact to the City of Trenton's budgets ranges from approximately $43 to $76 million. Of this, between $35 to $76 million consist of forgone revenue from being the seat of State and County governments, with the remainder accounting for direct costs to the City for provision of municipal services needed to host State and County entities. Of the $86 million upper bound estimate, approximately $8.9 million is attributed to Mercer County and $77.2 million attributed to the State of New Jersey, while the $43 million lower bound estimate is attributed entirely to the State of New Jersey (Table 3.)

Table 3. *Costs incurred by the City of Trenton in hosting the state capital.*

$43–$86 million	***Costs* incurred by City of Trenton**
$7.6 million	*Direct costs* for municipal services provided to State properties
$35.3-$76.2 million	*Forgone revenue* from hosting the state government
$8.9 million	*Direct costs and foregone revenue* from hosting the county government

Direct Costs

Direct costs for municipal services provided to the state and county properties are approximately $7.6 million (only state) or $9.9 million (State and County). We analyzed the City of Trenton's financial statements to identify the proportion of services attributed to the State and County for various municipal services. For the purposes of our analysis, we assumed that the proportion of services attributable to the State and County were

proportionate to the share of land owned by the State (10%) and County (3%) within the City of Trenton.

Forgone Revenue

Forgone revenue from hosting state and county governments ranges from $35.3 to $76.2 million (Table 4). Four general lines of forgone revenue were identified and estimated. These include forgone tax revenues from state- and county-owned property taxes; value of potential parking revenues from state employees; forgone residential property taxes attributed to low State employee residency in Trenton; and estimated loss in commercial property tax collection due to Trenton's high average effective property tax rate. For each of these inputs, we estimated upper-bound and lower-bound scenarios to generate the overall range.

Table 4. *City of Trenton forgone revenue attributed to hosting the state government*

$35.3–$76.2 million	*Forgone Revenue*
$13.6–$42.4 million	*Forgone Property Taxes* from State and County-owned properties
$26.8 million	*Forgone parking revenues*
$0.7–$3.4 million	*Forgone residential property tax revenues*
$1.7–$3.4 million	*Forgone commercial property tax revenues*

Forgone Property Taxes from State- and County-owned Properties

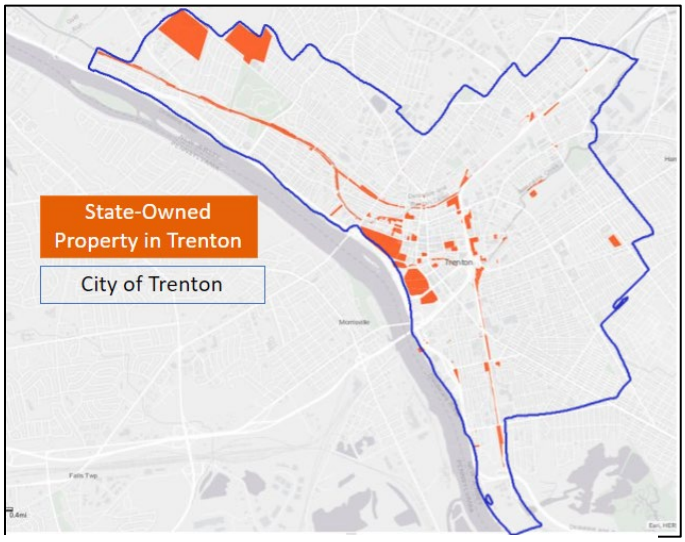


Figure 3. State-owned property in Trenton.

Because property tax is one of the largest sources of revenue for municipalities (Tax Policy Center, 2020) and State- and County-owned properties do not generate revenue for Trenton, we quantified forgone property tax revenues for State and County properties within the City of Trenton (Figure 3). Forgone revenues from State properties range from $13.6 to $35.3 million. An additional $7.1 million in forgone revenue can be attributed to County properties. This forgone property tax range was determined through valuations of state-owned properties (City of Trenton, 2019) multiplied by either municipal property tax rates or PILOT policies from other states.

Forgone Parking Revenues

Parking inventory in many United States cities have extremely high estimated values[14] (Scharnhorst, 2018; VTPI, 2016). As the majority of the approximately 27 thousand State employees who drive to work park in State-owned parking facilities, there is significant amount of forgone revenue to the City of Trenton. We estimate[15] that Trenton forgoes $26.8 million in revenue on an annual basis through State employees parking in State facilities.

Forgone Residential Property Tax Revenues

State ownership of land in the high potential downtown area alongside low state employee residence[16] in Trenton limits residential development. We assessed three scenarios to determine the forgone residential property tax revenue, including increased employee residence in Trenton to meet median rate of peer cities; providing State land to meet current market demand using demand estimates from Greater Trenton (2018); and providing State land to meet increased market demand using demand estimates from Greater Trenton (2018). We estimate that Trenton forgoes between $0.7 and $3.4 million in residential property tax revenues on an annual basis.

Forgone Commercial Property Tax Revenues

A high effective property tax rate, due to the quantity of tax-exempt land, disincentivizes commercial development in Trenton and limits tax revenues. Changes to local property tax rates affect business real estate value and business have been found to relocate when commercial property tax rates are lower in neighboring jurisdictions, as is the case with Trenton.[17] We estimated the City of Trenton forgoes between $1.7 and 3.4 million in commercial property tax revenues on an annual basis.[18]

Value of a capital city

In addition to the unique costs of being a capital city, we quantified the value created by capital cities. To capture a significant portion of the market value created by state capitals, we conducted a hedonic regression analysis on a dataset of capital cities paired with the most comparable noncapital city in the same state to measure the impact of capital city

[14] Scharnhorst (2018) generated a conservative estimate of $50,000 per household per parking space in an average U.S. city, ranging from $6,570 per space in New York City to $192,138 per space in Jackson, WY.

[15] Forgone parking revenues were estimated by the number of State employees (provided by NJ Treasury Department), multiplied the average share of employees who drive alone vs. carpool (Esri Business Analyst, 2020) and the average annual parking rates (VTPI, 2016).

[16] We assumed 4.25% of State employees reside within Trenton city limits. We used Census Bureau (2020) commuting behavior information to determine the share of employees working in Trenton who also live there. This assumption was confirmed through interviews with State of New Jersey officials.

[17] We assumed a 10% reduction in property taxes increases the tax base by 1.7% over three years, consistent with estimates made by Skidmore et al (2012). The value estimated from the following publication was used. This value is similar to other estimates found during the literature review. Empirical evidence reviewed includes the following publications: Kang et al, 2015; Hanson, 2019; Rolheiser, 2017; McDonald, 1993.

[18] The current average property tax rate in Trenton is approximately 5.05%. The lower estimate corresponds with an approximate 1% drop in property taxes, whereas the larger estimate assumes Trenton had the Mercer County average property tax rate of 2.76%.

status on median home values, while controlling for other significant factors. To capture nonmarket value for Trenton, we administered a contingent valuation survey among New Jersey residents, in which they were asked whether they would be willing to pay a hypothetical set amount per month to prevent the capital from being relocated from Trenton, NJ to New York City or Allentown, PA.

Market value

Our hedonic regression model measures the impact of capital city status on median home values, while controlling for median income, elevation, and distance to the coastline. It is commonly used in real estate analysis. We find that being a capital city is associated with a median home value of 11.6% (~$27,385) higher than in capitals' peers. This figure reflects an overall national trend, rather than an amount of market value created by any particular capital city, and that result does not quite reach the conventional level of statistical significance of 0.05.

As for the controls, a $1 increase in median income is associated with about an $8 increase in median home value. Being more than 100 miles from the coastline is associated with an average lowering of median home value of about $8,600, and each one-foot increase in elevation is associated with a $13 increase in median home value. All these results are statistically significant at well above the conventional 0.05 level.

The hedonic regression indicates that being a capital city in the United States on average is associated with about a 11.6% increase in median home values when compared to non-capital city peers, when the control variables are considered. This figure should be interpreted cautiously, as the P value of 0.13[19] approaches, but does not surpass, the conventional 0.05 standard for statistical significance. However, the R^2 value for the model is 0.64, indicating that the model captures nearly two-thirds of the variance in home values between capital and noncapital cities, and the F value for the model as a whole, as well as the P values for each of the other coefficients, easily surpass the 0.05 standard, which instills confidence in the overall model.

The associated uncertainty indicates that the market value generated can change for each individual city depending on other city specific factors. Although we were not able to quantify a market value generated specific to Trenton's capital city status, the patterns in median home values demonstrate that capital cities indeed generate market value.

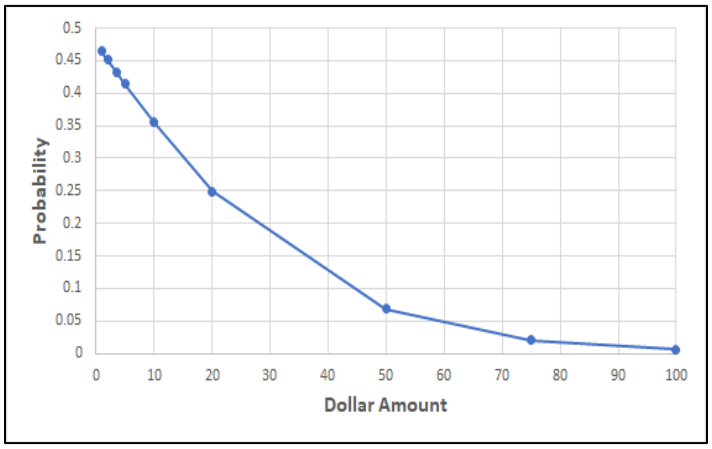
Non-Market Value

We quantified the nonmarket value Trenton provides as New Jersey's capital via a survey of New Jersey residents, employing a contingent valuation method (CVM) to quantify New Jersey residents' willingness to pay for unique costs Trenton bears as a capital city. The

[19] Table 2 in the Appendix shows the results of our hedonic regression model. Signs on each variable were in the expected direction, and with the exception of capital city status, all variables were statistically significant at a minimum of the 0.05 level. The adjusted R-squared indicates that this model accounts for about 62% of the variance in median home value.

highly structured survey employed a dichotomous choice CVM, which mimics market purchases (Boyle, 2017) allowing quantification of value as stated by New Jersey residents. Survey respondents were asked whether they were willing to pay specific dollar increases to their monthly income taxes for municipal services to maintain the state capital in Trenton, New Jersey. This referendum style question followed recommendations from a blue-ribbon panel to increase reliability of CVM estimates (NOAA, 1993).

Figure 4. Cumulative distribution function (i.e., Probability of "Yes" response by dollar amount)



We estimated New Jersey residents' average **willingness to pay** (WTP) for municipal services needed to operate the state capital to be **$12.89 per month**. The value was derived geometrically from the binomial logistic regression (Figure 4) produced from the survey results in a procedure described by Loomis (1988)[20]. To address possible hypothetical bias that may occur in WTP surveys (Loomis, 2011), we interpreted any 'yes' response as a 'no' if the survey respondent indicated they were less certain than 7 on a scale of 1 to 10.

In order to scale the average WTP to an aggregate value for the state of New Jersey, we multiplied the number of individual income tax and employment tax filings in New Jersey reported by IRS (2019), 6,178,888, by the average monthly WTP. The City of Trenton generates at least ***$80 million annually*** in economic value to the residents of New Jersey by hosting the New Jersey State Government. We did not increase the monthly value when scaling to an annual value, ensuring a conservative average WTP estimate.

Conclusion

Capital cities incur a number of direct and indirect costs associated with being the seat of state government, as well as benefits. We examined the costs and benefits associated Trenton, NJ and conclude that **investment by the State of New Jersey in municipal services needed to host the state government provides a net benefit to New Jersey residents**.

Additionally, Trenton is uniquely disadvantaged among state capitals, as well as among peer cities in New Jersey. Like other cities in New Jersey, Trenton is heavily reliant on property taxes, leaving few of the benefits familiar to other state capitals to be captured by the City. Currently, there are no hotels in Trenton, so those who come to do business in the capital do not stay there overnight; additionally, few state employees live or dine within the

[20] The willingness to pay value is equivalent to the area under the curve in Figure 8. The value can either we calculated mathematically or geometrically. We used both approaches to confirm the value.

city. However, it does bear a high burden, providing important services to the State of New Jersey, while having its property tax base diminished by the substantial untaxable property owned by the State. There is an **annual impact of $43-$86 million on the City of Trenton's budget** due to direct costs to the City of providing municipal services to State and County properties, as well as forgone revenues attributed to hosting these properties. If the City were able to raise the revenue it forgoes, it could generate an additional $22.0–45.9 million[21] of secondary economic activity in the local Trenton economy.

Our study estimates results indicate that **Trenton as the capital generates at least $80 million in monthly nonmarket value to the residents of New Jersey**. Finally, we find that state capitals in general also generate significant market value. Controlling for other factors, median home values are 11.6% higher in capital cities than their non-capital city peers.

Further research is needed to understand the full extent of the benefits generated by Trenton, and capital cities in general. By adjusting the survey approach to take into account residents' willingness-to-pay over different time periods, a larger, more accurate estimate of the nonmarket benefits would be quantified. Additionally, further research could be conducted to understand the market benefits specific to Trenton, which would be added to the nonmarket benefit estimates**. Together, these estimates would likely be significantly larger than the current baseline $80 million per year estimate of benefits generated by Trenton to New Jersey.** There would also be value in a fuller quantification of benefits that accrue to capital cities in general as a result of hosting state government.

The findings in this report are sufficient to inform a fiscal policy approach by the New Jersey State Government that adequately funds the City of Trenton for hosting State entities. Policy mechanisms that could be further explored include expansion of Capital City Aid appropriations, parking levies, incentives for increased participation of New Jersey State employees in the local economy, or a mix thereof. As **3 in 4 New Jersey residents state that it is important to them for New Jersey to have a capital city**, there could be support for such initiatives.

Although this paper is not a full cost-benefit analysis, our conservative estimates demonstrate real costs incurred by the City of Trenton and benefits generated for the State of New Jersey. By providing a better understanding of costs, benefits, and context, we hope to contribute to evidence-based policymaking regarding funding for capital cities in the future. We recommend further assessment of potential benefits to more fully understand the role and importance of capital cities, not only in New Jersey but across the country.

[21] We developed this estimate to understand Trenton's "municipal fiscal multiplier" (i.e., the secondary economic activity generated in the local economy from municipal spending). Further description is contained in the Appendix.

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Appendix: Methodology and Assumptions

The following Appendix sections contain a more detailed methodology used for benchmarking Trenton to "peer" cities and quantification of benefits and secondary economic activity generated from municipal spending in Trenton.

Peer City Benchmarking

The peer capital city cohort consisted of capital cities in the Middle Atlantic and New England U.S. Census Divisions. Peer New Jersey cities are either similar in population and/or near in geographic proximity. Staff from the City of Trenton and New Jersey Treasury Department were consulted in choosing peer cities.

Table 5. *List of Peer Cities*

Peer Capital Cities	Peer New Jersey Cities
Hartford, CT	New Brunswick
Albany, NY	Camden
Augusta, ME	Newark
Boston, MA	Jersey City
Harrisburg, PA	Paterson
Providence, RI	Elizabeth
Concord, NH	Princeton
Montpelier, VT	Hamilton Township

Online Tableau visualizations of the data collected through this analysis can be found here:

Capital Cities
https://public.tableau.com/profile/peggy.moriarty7232#!/vizhome/CapitalCitiesStory/CapitalCityStory?publish=yes

New Jersey Cities
https://public.tableau.com/profile/peggy.moriarty7232#!/vizhome/NJCitiesStory/NewJerseyStory?publish=yes

The following table includes data sources for our analysis.

Table 6. *Peer city benchmarking analysis data source and description*

Source	Data
U.S. Census Bureau	• Median Household Income • Poverty Rate • Per Capita Income • Poverty Rate • Participation Rate • Population Size • Population per Square Mile • Geographic Size • Population Change Since 2010 • Percent of Population with a Bachelor's Degree or Higher • Percent of Population with a High School Degree or Higher • Per pupil education spending
Esri Business Analyst	• Percent of those employed in the city who live in the city • Number, percent, and total sales of businesses by location • Number of eating and drink
State of New Jersey Publicly Available Documents	• Effective Property Tax Rate • General Property Tax Rate • Transitional Aid Request • Transitional Aid Award • Total Aid Award
City Audits and Budget Documents	• Property Tax Revenue • Total Revenue

Market Value: Hedonic Regression

Hedonic regressions are used to determine market value of a particular good revealed using market data. To conduct our analysis, we paired state capitals with non-capitals in the same state with as similar-sized populations as possible. Because of challenges obtaining data for very small cities, we excluded state capitals with fewer than 50,000 residents. We also excluded Juneau, Alaska, and Honolulu, Hawaii, which are outliers geographically. Additionally, Hawaii does not have local governments below the county level, and Juneau is administered by a combined city-borough government, leaving both cities with large amounts of nonurban territory within their respective jurisdictions. Excluding the smallest capitals and those from the noncontiguous states leaves 36 capitals, each paired with another city, for a total of 72 cases. The cities included are in Table 1.

Our dependent variable is median home value, which we collected from Zillow's United States Home Values and Prices (2020) dataset. We assumed any market value created by a

city would appear in the home values there. Although this does not capture the entire market value created by a city, we assume this measure captures a meaningful portion of it.

Our model includes three control variables – household median income, distance to the coastline and elevation in feet – along our primary independent variable, capital city status, which is dichotomous.

Household median income was collected from the U.S. Census Bureau's American Community Survey 2018 estimate (U.S. Census Bureau, 2020). In general, there is a strong positive relationship between income and home values in the United States, and we expected that relationship to be maintained in our 72 cities (U.S. Department of Housing and Urban Development, 2005).

Distance to the coastline was measured as the distance from the central city to the NOAA High Resolution Coastline, based on an insurance dataset provided by HazardHub (2020). This dataset designates all distances greater than 100 miles as simply ">100 miles," rather than with a precise distance. Therefore, we collapsed this variable into dichotomous form, with all cases being labeled either greater than 100 miles or not greater than 100 miles. As coastal property is frequently attractive to buyers, despite the risks involved, we anticipated that being more than 100 miles from the coast would be associated with lower median home values.

We obtained elevation in feet for each city from the U.S. Geological Survey (2020). Higher elevations have long been associated with higher home values (Wu, et al., 2004; Mahan, et al., 2000; Willie, 1961). We anticipated that the same result would hold true for our dataset, that is that higher elevations would be associated with higher home values.

Finally, our primary independent variable is capital status, with each city in our dataset coded as a capital or not. Consistent with our understanding of capital cities as creators of value for their states, we anticipated a positive relationship between capital city status and median home value.

Table 7. *Capital-noncapital pairs.*

State	City	Non-capital pair
Alabama	Montgomery	Mobile
Arizona	Phoenix	Mesa
Arkansas	Little Rock	Fort Smith
California	Sacramento	Fresno
Colorado	Denver	Colorado Springs
Connecticut	Hartford	Waterbury
Florida	Tallahassee	Cape Coral
Georgia	Atlanta	Augusta-Richmond County
Idaho	Boise	Meridian
Illinois	Springfield	Elgin
Indiana	Indianapolis	Fort Wayne

Iowa	Des Moines	Cedar Rapids
Kansas	Topeka	Olathe
Louisiana	Baton Rouge	Shreveport
Massachusetts	Boston	Worcester
Michigan	Lansing	Ann Arbor
Minnesota	St. Paul	Minneapolis
Mississippi	Jackson	Gulfport
Nebraska	Lincoln	Omaha
New Jersey	Trenton	Camden
New Mexico	Santa Fe	Rio Rancho
New York	Albany	New Rochelle
North Carolina	Raleigh	Greensboro
North Dakota	Bismarck	Grand Forks
Ohio	Columbus	Cleveland
Oklahoma	Oklahoma City	Tulsa
Oregon	Salem	Eugene
Rhode Island	Providence	Cranston
South Carolina	Columbia	Charleston
Tennessee	Nashville	Memphis
Texas	Austin	Fort Worth
Utah	Salt Lake City	West Valley
Virginia	Richmond	Newport News
Washington	Olympia	Tacoma
Wisconsin	Madison	Green Bay
Wyoming	Cheyenne	Casper

Table 8. *Hedonic regression results.*

Regression Statistics	
Multiple R	0.801575
R Square	0.642523
Adjusted R Square	0.621181
Standard Error	75542.71
Observations	72

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	6.87E+11	1.72E+11	30.1062	2.43E-14
Residual	67	3.82E+11	5.71E+09		
Total	71	1.07E+12			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-167169	46832.78	-3.56948	0.000667
Capital?	27385.69	17847.19	1.534454	0.129627
Median income	8.166717	0.864131	9.450789	6.00E-14
More than 100 miles to coastline?	-86636.7	20784.12	-4.16841	9.00E-05
Elevation in feet	13.17767	6.317074	2.08604	0.040786

Non-Market Value

We employed a *dichotomous choice contingent valuation method (CVM)*[22], consisting of a highly structured willingness-to-pay survey administered to residents of New Jersey to determine the value they place on a hypothetical change to municipal services provided by the City of Trenton.

Figure 5. *Questionnaire cover page.*



The *survey design* clearly defined the municipal services and the change in the service being valued (Figure 9 displays the questionnaire cover page[23]). We employed a "yes/no" referendum style question of whether residents were willing to pay additional income taxes for municipal services in Trenton needed to host the State Government. We developed eighteen versions of the willingness-to-pay question (Figure 10), consisting of nine different monetary values and two changes to hosting the New Jersey State Government. We asked respondents how certain they were that they would pay additional taxes. We used a web-based survey, creating formats for computer and smartphone displays.

[22] Dichotomous choice CVM mimics the behavior of people in regular marketplaces, and reduces the cognitive burden placed on the respondent, minimizing bias. A more complete description of contingent valuation techniques can be found in the following primer by the Food and Agriculture Organization of the United Nations (FAO): http://www.fao.org/3/X8955E/x8955e03.htm

[23] The cover page images were intended to represent state government in New Jersey. We reviewed the images used with stakeholders in Trenton before including in the questionnaire.

Figure 6. *Willingness to pay question example from questionnaire.*

Please consider the following:

Due to the current COVID-19 pandemic, the New Jersey State Government is experiencing financial difficulty and could consider moving facilities out of Trenton, New Jersey to save money. New York City could potentially host New Jersey State Government offices at less cost than remaining in Trenton. If the New Jersey State Government did adopt this plan to save money, it would relocate the capital and its functions to New York City, eliminating its presence in Trenton.

- Trenton would no longer function as the capital of New Jersey.
- Citizens would have reduced access to New Jersey State Government workers as they would have to travel to New York City for in-person business.
- Current renovations to the State House would cease, and the building would fall into further disrepair and would possibly have to be demolished.

Would you vote to increase your monthly income tax bill by $1 to avoid having the New Jersey State Government move from operations out of Trenton, New Jersey?

☐ **Yes** ☐ **No**

We *piloted the CVM survey* to a small random group (~40) of New Jersey residents. The initial dollar amounts included in the pilot were $1, $2, $3.50, $5, $10, and $20. After the pilot, the willingness-to-pay question dollar values were adjusted. We eliminated the $3.50 dollar value so as only to include whole dollar amounts. Additionally, we added $50, $75, and $100 versions of the willingness-to-pay question as pilot results indicated survey respondents were likely to pay higher amounts than initially anticipated. After adjustment, we *administered the survey* to the full random sample consisting of 401 New Jersey residents, representative[24] of key demographic groups in New Jersey (i.e., age, gender, race, income).

After administering the survey, we *analyzed the results*. To address hypothetical bias, we asked respondents how likely they would vote for taxes on a scale of 1-10 and interpreted any 'yes' response as 'no' if there was a certainty less than 7 out of 10. We then ran a binomial logistical regression to derive residents' willingness to pay for municipal services provided by the City of Trenton to host the State of New Jersey in a procedure described by Loomis (1998). A graphical representation of the results can be found in Figure 8. We then derived geometrically New Jersey residents' monthly willingness to pay for municipal services needed to host the state capital by calculating the area under the cumulative probability distribution function. We estimated New Jersey residents' average **willingness to pay** for municipal services needed to operate the state capital to be **$12.89 per month**. We scaled the average WTP to an aggregate value for the state of New Jersey by multiplying the average willingness to pay value by the number of individual income tax and employment tax filings IRS (2019) reported for the state of New Jersey in 2019 (i.e.,

[24] The survey sample design identified the affected population of the issue in question, namely benefits to residents of the state of New Jersey. Our survey sample was representative of the population of the state of New Jersey. We used demographic statistics from the U.S. Census Bureau (2020) for the state of New Jersey to design the sample demographic percentages.

6,178,888). The City of Trenton generates at least ***$80 million annually***[25] in economic value to the residents of New Jersey by hosting the New Jersey State Government.

Secondary Economic Activity

There are secondary effects to the local economy of decreased state spending in Trenton, NJ. To quantify the effects of decreased spending, we developed an estimate of the secondary economic activity generated in the local economy from the City of Trenton's municipal spending. We incorporated a modified version of a procedure developed by Chirinko and Wilson (2016) to estimate a "back of the envelope" economic multiplier[26] for job creation tax credits.

$$Fiscal\ Multiplier = \frac{\Delta L_m}{\Delta G} * \frac{\Delta Q}{\Delta L_i}$$

We assumed the fiscal multiplier was equivalent to the change in municipal jobs (ΔL_m) by the change in municipal spending (ΔG) multiplied by the change in local economic output (ΔQ) by the change in state employment (ΔL_i). We assumed minimal substitution affect[27], as the City of Trenton forms a small share of the State of New Jersey tax base (>1%)[28]. We assessed these data for a nearly two-decade period (2001-2019) to generate the fiscal multiplier of 1.48, which appears to be within the range of state government spending multipliers seen in the literature[29]. This value was multiplied by the range of forgone revenues to derive lost secondary economic activity in Trenton's local economy.

Trenton loses between $22 and $45.9 million in secondary economic activity from forgone revenue. Municipal spending generates secondary economic activity in the local Trenton economy and if the City were able to raise and spend forgone revenue, this would generate additional indirect economic benefits to the local economy.

[25] We did not increase the monthly aggregate statewide value, $79.6 million, when scaling to an annual basis because survey respondents do not distinguish well between different payment schedules (e.g., annual vs. monthly income taxes; Stevens et al, 1997; Johnson et al, 2006). Although benefits are probably significantly larger than $80 million, further research is needed to determine how much larger.

[26] The economic or fiscal multiplier effect is an estimate of increased economic output in relation to increased fiscal spending (Ganti, 2020). Chirinko and Wilson's (2016) procedure regresses the change in real GDP on the change in quarterly private nonfarm payroll employment similar to Okun's Law but using employment instead of unemployment and the absolute change in GDP instead of percentage change.

[27] When estimating fiscal spending in jobs, "new" spending may in fact come from elsewhere in the economy and not generate net new jobs. As State spending was largely imported from elsewhere in the state, it was assumed that the substitution effect from Trenton's perspective was minimal.

[28] Mercer County's GDP in 2018 was approximately 4.58% that of New Jersey state-wide GDP. In the same year, Trenton reported an income (defined as per capita income times population) of approximately 10% that of Mercer County.

[29] Shoag (2011) and Suárez Serrato and Wingender (2011) estimated state fiscal multipliers of 2.1 and 1.9 with a standard error of 0.9 (Clemans and Miran, 2012).

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