Do Publicly-Subsidized Economic Development Projects

Increase the Economic Growth in Their Neighborhoods?[1][2]

By Amira Alghumgham
Howard University

November 2017

I.   Introduction

Over the past two decades, the District of Columbia has experienced robust growth in residential and commercial development, population and employment. Underlying this growth is the city's continuous and aggressive effort to spur and facilitate new economic development projects that not only cater to the city's corporate and monied interests, but also to improve and enhance the economics of local neighborhoods and social well-being of their citizens.

State and local government investment in neighborhoods is viewed by many as an economic development tool that helps foster and enhance economic growth in such neighborhoods. (Fisher, 1997; Lynch, 2004) However, some say direct public subsidies to private sector developers and commercial landowners simply divert important and limited public resources from directly helping vulnerable and low-income residents while producing dubious net social and economic benefits to area residents and taxpayers. (Coates and Humphreys, 2001) Critics of public subsidies to private sector developments also say that such arrangements permit developers to unnecessarily reduce both their risks and own resources invested in these projects largely to increase their net private investment returns of such projects. (Vrooman, 2012)

One possible reason why there tends to be a dearth of incontrovertible empirical evidence of significant economic benefits of state and local public investment in neighborhoods is that consistent and reliable data are not often widely available for economic analysis on the neighborhood level. To help determine if the District of Columbia government has invested its public funds into city economic development ventures that improve and enhance the economics of local neighborhoods, this study conducts an economic analysis on the neighborhood level of three large economic development projects in the city that was subsidized by the city government. The objective is to assess if these projects indeed resulted in economic growth in their respective neighborhood. This neighborhood economic study uses parcel level administrative property tax

---

data and administrative city income tax filer data. The data are used to assess whether the three projects significantly increased the household income of residents and residential property values of the immediate area surrounding the three projects (i.e. the three treatment groups) after construction more than the income and property values of nearby respective control groups. Unlike some studies that base broad and equivocal conclusions of neighborhood economic growth on one development project and/or one economic indicator and/or imprecise survey data (Koster and Rouwendal, 2010; Seago, 2013), this study draws conclusions using a difference-in-difference regression methodology and micro-level administrative data for every resident and residential property in the target neighborhoods using.

Even though this study finds that there are mixed results for the neighborhoods that contains the DC USA and Gallery Place projects, the results tend to suggest that the household income and residential property values for these two neighborhoods are higher because of these two projects. For the city's Nationals Park Stadium project, however, the results unequivocally indicate that household income and residential property values in this neighborhood are higher because of the project. This study suggests a few possible reasons why public investment in some economic development projects may produce mixed results while others may produce incontrovertible evidence on the neighborhood level.

II.   The Three Projects

Like in other cities, the District of Columbia city government aggressively and continuously pursues policies and programs that create strong neighborhoods, expand and diversify the local economy, and provide residents with pathways to the middle class. The question asked by many is whether the funds that the city government invest in private-sector development projects produce tangible economic growth realized by residents in respective neighborhoods. To answer this question, we select three very large publicly subsidized projects in the city and subject them to economic analysis and statistical hypothesis testing.

The first economic development project is called DC USA. It is an 890,000-square-foot retail development in the Columbia Heights neighborhood of the city. It is anchored by a Target retail store as well as a Bed Bath & Beyond, Best Buy, Staples, Marshalls, Five Below, Modell's and Petco. The project is a $150 million pedestrian-oriented retail complex with a 1,000 car below-grade parking facility. City government subsidies in the form of tax exempt bonds totaling $47 were issued for this project. Project construction started in 2002 and was completed in 2008.

The second project is the building of the Nationals Park Stadium. It is a 41,487-seat Major League Baseball ballpark that features 79 suites on three levels with estimated cost of $691 million. It is located at the southern part of city in a neighborhood called Old City 1. The city contributed $663 million, paying $135.5 million upfront and borrowing another $534.8 million. Construction started in 2006 and completed in 2008.

The third project in this analysis is Gallery Place. It is in the Chinatown section of the city and is a 660,000 square foot mixed-use urban entertainment complex including residential units, parking spaces, and office space. Approximately one-third of the square footage of the project is devoted to commercial office space, retail, and residential use, respectively. Construction started

in 1999 and was completed in 2004 with a cost of $274 million. In 2002, the District issued $83.3 million in TIF bonds to fund the Project that carry an AAA rating. Figure 1 shows the three city neighborhoods under analysis in terms of the city census tracts. The Columbia Heights neighborhood contains the DC USA project, the Chinatown neighborhood contains the Gallery Place project and the Old City 1 neighborhood contains the Nationals Park Stadium.

Figure 1 The Three Treatment Neighborhoods in the District of Columbia

Treatment and Control Census Tracts by Neighborhood
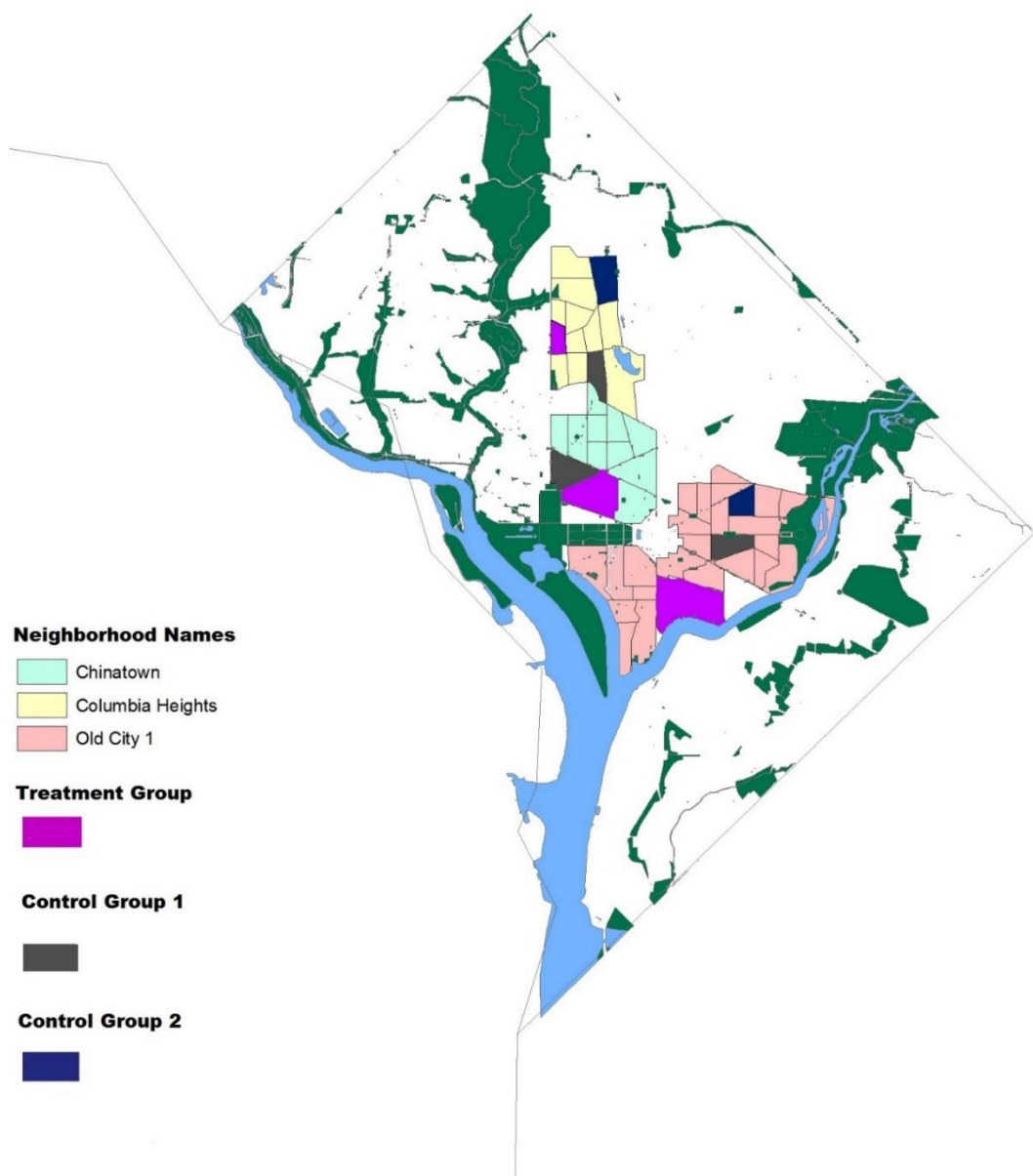
III. Data

This study uses administrative city individual income tax (IIT) data and administrative city residential property tax data(PT). From the IIT data, annual income (federal adjusted gross income) for single filers will be used as a measure of household income. From the PT data, annual residential home values will be used as a measure of a property value. Either these nor comparable data are not available prior year 2002.

For each of the three projects, a panel of data is constructed to measure the effect of the economic development project. This entails comparing the income data and the residential property data for the census tracts containing the project (treatment area) and comparison census tracts within the same neighborhood (control area). The panel contains IIT and PT data for years 2002 to 2015 which covers the pre-development period and the post-development period for each of the three projects. The pre-development period for both the DC USA and Gallery Place projects was 2002 to 2004, and the pre-development period for the Nationals Park Stadium was 2002 to 2006. This study investigated whether there was a statistically significant effect of the DC USA and Gallery Place projects on the economic growth of their treatment areas (census tracts) during years 2005 to 2015 and of the Nationals Park Stadium on the economic growth of its treatment area (census tract) during years 2007 to 2015. The data for all income and property values are adjusted for inflation and are in 2015 dollars.

Income data for only single filers was used because they are the largest share and most dynamic sector of the city's population and income tax data base.[3] Only the residential property sector is analyzed because it, too (in response to population growth, in-migration of new residents and gentrification), is the most dynamic and fastest growing sector of the city's property market. For the DC USA project in the Columbia Heights neighborhood, only small multifamily properties (containing 6 or less housing units) were included in the panel data because this property type was the most common in the treatment and control census tracts and in the pre-development and post-development time periods. For Nationals Park Stadium in the Old City 1 neighborhood, only single-family homes were included in the panel data because this property type was the most common in the treatment and control census tracts and in the pre-development and post-development time periods. For Gallery Place in the Chinatown neighborhood, only large multifamily buildings (containing more than 6 housing units) were included in the panel data because this property type was the most common in the treatment and control census tracts and in the pre-development and post-development time periods.

The treatment areas (census tracts) contains the economic development projects while control areas are comparable census tracts in the same neighborhood as the projects. The control census tracts were selected based on the similarity of growth rates in the pre-development period for residential property (for the property regressions) and for household income (for the income regressions). The income regressions only consider the federal adjusted gross income of single filers in respective census tracts, and the property regressions only consider residential assessment values also in respective census tracts. The effects for each project will be assessed in terms of the

---

[3] In 2002, 55 percent of all individual income tax filers in the District of Columbia were single filers. And in 2015, 63 percent of all income tax filers in the city were single filers.

growth rates in the treatment area's residential property and household income growth rates compared to the residential property and household income growth rates of nearby control groups.

IV.   Methodology

A difference-in-differences method is used to see if there is any difference in growth between the treatment census tracts and the control census tracts for each project.

$$y_{ist} = \beta_0 + \lambda_t T + \gamma_s S + \delta(T * S) + \epsilon_{ist}$$

Where

- y_{ist} is the dependent variable for census block i, given neighborhood S and time T;
- $S = 1$ for the neighborhood with investment, and $= 0$ otherwise;
- $T = 1$ for the period after investment, and $= 0$ otherwise;
- γ_s and λ_t are then the coefficients for S and T respectively.
- $(T * S)$ is a dummy variable indicating treatment (investment) and time status, δ is the treatment effect, or the difference in difference, and
- ϵ_{ist} is an error term.

- The difference in differences estimator for δ is given by:

$$\hat{\delta} = \left(\bar{y}_{p2} - \bar{y}_{p1}\right) - \left(\bar{y}_{s2} - \bar{y}_{s1}\right) = \left(\bar{y}_{p2} - \bar{y}_{s2}\right) - \left(\bar{y}_{p1} - \bar{y}_{s1}\right)$$

- $\bar{y}_{p2}$ = the average tax/assessed value growth rate after investment for neighborhood with investment.

Figure 2   The Theoretical Framework
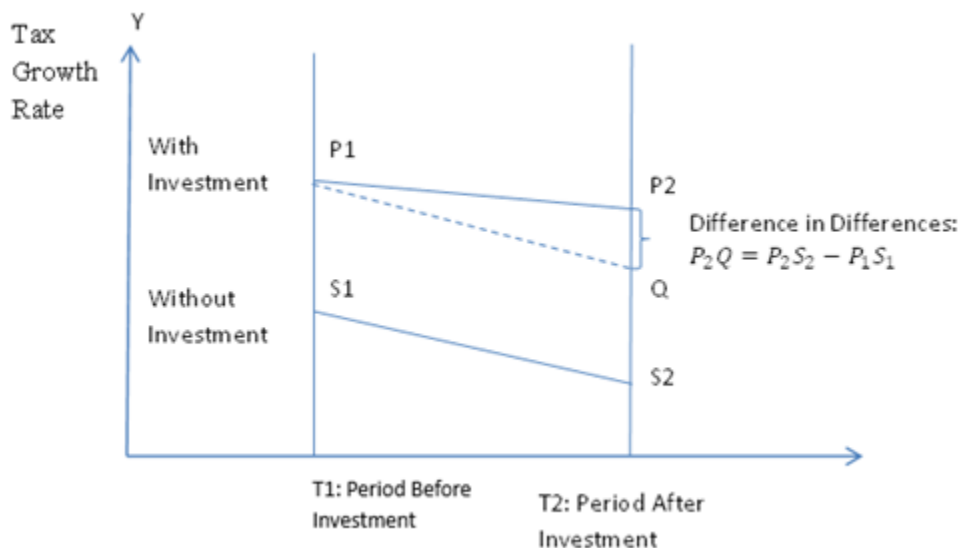
The difference-in-difference model estimates the difference in the treatment area under the policy intervention compared to a similar area absent the intervention.

Using the underlying regression model to estimate the difference-in-differences is

(1) $Y_{ist} = \beta_0 + \beta_1 T_{is} + \beta_2 S_{it} + \beta_3(T_{is} * S_{it}) + \epsilon_{ist}$

   Where:

- Y_{ist} is the dependent variable for income or property value in census tracts or squares i, respectively in a given neighborhood S_{it} and time T_{is} .

- β_0 Is the intercept.

(2) $S_{it} = \begin{cases} 1 & if \text{ the census tract or squares is with investment (treatment)} \\ 0 & if \text{ the census tract or squares is without investment (control)} \end{cases}$

(3) $T_{is} = \begin{cases} 1 & if \text{ time is post} - development\ period \\ 0 & if \text{ time is pre} - development\ period \end{cases}$

- $\beta_1\ and\ \beta_2$, are the coefficients for S_{it} and T_{is} respectively.

- $(T_{is} * S_{it})$ is a dummy variable indicating the interaction between treatment (investment) and time status, β_3 is the treatment effect, or the difference-in-difference, and

- ϵ_{ist} = error term.

- The difference-in-differences estimator for β_3 is given by:

$$\widehat{\beta_3} = (\bar{Y}_{T2} - \bar{Y}_{T1}) - (\bar{Y}_{s2} - \bar{Y}_{s1}) = (\bar{Y}_{T2} - \bar{Y}_{s2}) - (\bar{Y}_{T1} - \bar{Y}_{s1})$$

It captures the interaction between $T_{is}\ and\ S_{it}$ variables, where, $\bar{Y}_{T1}, \bar{Y}_{T2}, \bar{Y}_{S1}$, and $\bar{Y}_{S2}$ are the estimated mean change in time and treatment in each neighborhood.

There are seven steps to quantifying the impact of an economic development project on the treatment area in relation to income and property value. The first step requires calculating $\bar{Y}_{trt,Before}$, the average of the response variable of individual income for the treatment area prior to establishing the development project. In this case, $S_{it} = 1,\ T_{is} = 0$ and the product of these two terms are equal to 0. Regarding equation 1,

(4) $\bar{Y}_{trt,\ Before} = E(Y_{ist} \backslash S_{it} = 1,\ T_{is} = 0) = \beta_0 + \beta_2.$

The second step requires calculating the average of the individual income for the control area, $\bar{Y}_{cnt,\ Before}$ for the time period before development investment in the treatment area.

(5) $\bar{Y}_{cnt,\ Before} = E(Y_{ist} \backslash S_{it} = 0,\ T_{is} = 0) = \beta_0.$

The third step is calculating the difference between the two averages:

(6) $D_1 = \bar{Y}_{trt,\ Before} - \bar{Y}_{cnt,\ Before} = \beta_0 + \beta_2 - \beta_0 = \beta_2.$

Here, D_1 measures the average response of individual income to the treatment and the control area variables due to confounding factors.

The remaining steps involve the time period after the project completion.

(7) $\bar{Y}_{trt,\ After} = E(Y_{ist} \backslash S_{it} = 1,\ T_{is} = 1) = \beta_0 + \beta_1 + \beta_2 + \beta_3$

Equation (7) calculates $\bar{Y}_{trt,\ After}$, the average response of individual income/ property value after the investment in the development projects, in this case $S_{it} = T_{is} = 1$.
The following step is the average response in the control census tracts/squares, S_{cnt}, for the time period after treatment in census tracts/squares, S_{trt}, economic development project completed. It is calculated as

(8) $\bar{Y}_{cnt,\ After} = E(Y_{ist} \backslash S_{cnt} = 0,\ T_{is} = 1) = \beta_0 + \beta_1$

The next step calculates the difference between the averages of the response individual income/ property value of S_{trt} and S_{cnt} for the period of time after S_{trt} completion of projects, so

(9) $D_2 = \bar{Y}_{trt,\ After} - \bar{Y}_{cnt,\ After} = (\beta_0 + \beta_1 + \beta_2 + \beta_3) - (\beta_0 + \beta_1) = \beta_2 + \beta_3.$

The difference between the two means, D_2, is due to the passage of time after investing public money in the treatment areas. The last step derives from the differences-in-differences. The estimate of DD is equal to the difference between D_2 and D_1 or

(10) $DD = D_2 - D_1 = \beta_2 + \beta_3 - \beta_2 = \beta_3$

By assuming the other factors that caused D_1, the difference between the mean response of individual income/property value in the treatment and control areas prior to the treatment area passing its investment in the project are constant and these same other factors are present after the treatment area enacted its project. Subtracting D_1 from D_2 nets out the effect of the other factors that are assumed to be held constant across the two separate time periods. Given this assumption, DD quantifies the effect of that treatment had in the development projects on the change in the dependent variable (property value /or individual income). In this case, the regression estimates of β_3 is the differences-in-differences estimate.

V.   Results

Residential Property Value

The impact of the economic development projects on the residential property value in the treatment census tracts in the post period compared to the control census tracts are presented below.

Table 1 Residential Property Value Growth

	Parameter Estimates (Property data-set)				
Neighborhood/Project	**Interaction Term**	**t-Value**	**Pr $> |t|$**	**Pr $> F$**	**R^2**
Columbia Heights (DC USA)	82,472	4.84	<.0001	<.0001	0.7834
	(14,803)				
Chinatown (Gallery Place)	-24,596,831	-3.30	<.0023	<.0001	0.4294
	(7,454,037)				
Old City 1 (Nationals Stadium)	87,680	8.00	<.0001	<.0001	0.6754
	(10,959)				

Table 1 shows that census tracts containing the DC USA and the Nationals Park Stadium projects had a positive coefficient for the interaction terms, and they were statistically significant with p-values <.0001. The coefficient for the interaction terms indicate that the property assessment values for small multifamily buildings in the treatment census tract in Columbia Heights and single-family homes in the treatment census tract in Old City 1 grew faster than the same property types in the comparison control census tracts. More specifically, the residential property values in these two treatment census tracts were on average more than $80,000 higher than the same type of properties in the control census tracts. This means that the DC USA and the Nationals Park Stadium projects appear to have contributed to those treatment census tracts having a higher growth rate for residential property values than their respective control census tracts. However, the Gallery Place regression had a negative coefficient for its interaction term with a p-value <.0023. This means that even though the property assessment values of large multifamily buildings in both the treatment and control census tracts in Chinatown still grew in value in the post-development period compared to the pre-development period, the property assessment values of large multifamily buildings in the treatment census tract were $25 million lower in assessment value on average than large multifamily buildings in the control census tract. It appears that either Gallery Place negatively impacted the growth rate of residential property values in its census tract relative to its control census tract or residential property assessment values simply grew significantly faster in the control census tract. But in sum, it appears Gallery place did not help accelerate residential property growth in its census tract like the other two projects did for their respective census tracts.

Household Income Values

Table 2 shows that census tracts containing the DC USA, Gallery Place and the Nationals Park Stadium projects all had positive coefficients for their interaction terms and they were statistically significant with p-values <.0001. This means that residents' income in all treatment and control groups grew in the post- development period, but total income for single filer residents in all three treatment groups grew faster than their comparable control groups. The average single filer in the DC USA census tract had income that was almost $5,000 higher than its peer in the comparison census tract. And, single filer residents in the Gallery Place census tract had income that was $44,000 higher, on average, than its comparison census tract. Overall, all three projects appear to have contributed to those treatment census tracts having a higher household income growth post-development than their respective control census tracts.

Table 2 Income Growth

Parameter Estimates (Income dataset)					
Neighborhood/Project	Interaction	t-Value	$Pr > |t|$	$Pr > F$	R^2
Columbia Heights (DC USA)	4,742	5.27	<.0001	<.0001	0.5497
	(826.23)				
Chinatown (Gallery Place)	43,742	82.52	<.0001	<.0001	0.7353
	(530.09)				
Old City 1 (Nationals Stadium)	17,642	39.49	<.0001	<.0001	0.6820
	(446.74)				

The results in Table 2 suggest that the three projects under investigation significantly contributed to income growth in the treatment census tracts. Upon further data analysis, this appears to have been accomplished by attracting more residents with mean incomes that range from $43,000 to $110,000 to the treatment census tracts after the projects were constructed. It appears that the advent of all three projects contributed to new residents and existing city residents, in large degrees, to choose to reside near these high profile economic development projects. The results indicate that the highest income single residents tended to locate in the city's core CBD, the Gallery Place census tract.

From the residential property perspective, however, the treatment census tracts experienced higher property value growth rates only for the DC USA and Nationals Park Stadium census tracts. The residential property value for the Gallery Place area did not grow faster than its comparable control group. This result may be related to the fact that Gallery Place is in the city's core central business district where residential development is not common. Unlike almost everywhere in the city, residential development in the city's core central business district (CBD) is not prevalent. Taxable land use in the CBD is by and large devoted to large commercial office properties. And

since it is the city's most expensive real estate, devoting a large share of Gallery Place's total square footage (approximately 30 percent) to residential development may not have been highest and best use of that land. That is, devoting that land to residential use appears to have lowered the growth rate of total property assessment value of the census tract containing the Gallery Place project.[4] Or, the control census tract simply experienced more residential development than in the treatment census tract, given that residential development in the treatment tract is limited by the preponderance of commercial office buildings in that area. Upon closer inspection of the underlying data, the mean income in the Gallery Place census tract increased 82 percent in the post period, while the mean income in the control census tract increased only 47 percent in the post period. But, the number of single filers in the treatment tract increased from 595 to 982 (387 or 65 percent), while the number of single filers in the control tract increased from 477 to 1,154 (677 or 142 percent). This means that the highest income new single residents gravitated to the Gallery Place census tract, but there were actually more new residents (with slightly lower average incomes) that moved into the control census tract than the treatment census tract.

Robustness check

The above results indicate that each difference-in-difference regression had a statistically significant coefficient for the interaction terms and nearly all of them were positive. But one may argue that the above results could be significantly impacted from the selection of census tracts that served as control groups for each of the projects. In other words, there might have been some form of selection bias in selecting the control groups. For that reason, as a robustness check, this section conducts the same regression analysis (same treatment groups) but with different control groups in the respective neighborhoods. But because data was not available to identify an additional control group for the Gallery Place project in the Chinatown neighborhood, we were only able to do a robustness check for the DC USA and Nationals Park Stadium projects.

From the residential property perspective, Table 3 shows that census tracts containing the Gallery Place and the Nationals Park Stadium projects both had positive coefficients for their interaction terms and they were statistically significant with p-values <.0001. Thus, while income grew in all treatment and control census tract in the post period, income grew faster in the treatment census tracts such that single filers in the treatment census tracts had income that was on average over $137,000 higher than their peers in the control census tracts.

---

[4] Gallery Place is a 660,000 square foot development of which approximately one-third of the area is devoted to commercial office space, one-third is devoted to retail, and one-third is devoted to residential use.

Property Value

Table 3: Residential Property Value Growth

Parameter Estimates (Property data-set)					
Neighborhood/Project	**Interaction**	**t-Value**	**Pr $> |t|$**	**Pr $>$ F**	**R^2**
Columbia Heights (DC USA)	151,380	4.07	<.0001	<.0001	0.7112
	(37,232)				
Old City 1 (Nationals Stadium)	137,116	16.42	<.0001	<.0001	0.7863
	(8,349.23)				

Household Income Values

From the income perspective, Table 4 shows that census tracts containing the Nationals Park Stadium project both had a positive coefficient for its interaction terms and was statistically significant with p-values <.0001. But, the census tracts containing DC USA had a negative coefficient for its interaction terms and was statistically significant with p-values <.0001.

Table 4 Income Growth

Parameter Estimates (Income dataset)					
Neighborhood/Project	**Interaction**	**t-Value**	**Pr $> |t|$**	**Pr $>$ F**	**R^2**
Columbia Heights (DC USA)	-15,737	-29.24	<.0001	<.0001	0.6099
	(538.184)				
Old City 1 (Nationals Stadium)	16,305	35.26	<.0001	<.0001	0.7367
	(462.368)				

Table 4 shows that the Nationals Stadium results confirm our previous findings indicating the household income in the treatment census tracts grew faster than the second control group. But, the household income in the Columbia Heights treatment census tracts grew slower than the second control census tracts. Evidently, the slower growth in Columbia Heights treatment group compared to the second control group is due to sensitivity of the selection of control census tracts. Since Columbia Heights is a well-established neighborhood known for continuously attracting many new and existing city residents as a place of residence, a closer analysis of the underlying

data suggests that many singles continued to not only choose to live immediately near the DC USA project (in the treatment census tracts), but a slightly higher number of high-income residents chose, post-construction, to also live in the nearby second control census tracts. This suggests that available housing units in the DC USA census tract was limited such that the usual in-migrants into Columbia Heights could only find available housing slightly farther away from the neighborhood's commercial core (i.e. immediately near DC USA). And, the boost of these new residents in the second control census tracts gave a significant boost to the household income in that census tracts. On a percentage basis, the household income in the second control group grew faster than the treatment census tracts.

Table 5 Summary of Model Results

|	Effect of Projects on	
	Neighborhood Household Income	Neighborhood Residential Property
Initial Regressions		
Columbia Heights (DC USA)	Increase	Increase
Chinatown (Gallery Place)	Increase	Decrease
Old City 1 (Nationals Stadium)	Increase	Increase
Second Regressions (Second Control Group)		
Columbia Heights (DC USA)	Decrease	Increase
Chinatown (Gallery Place)	N/A	N/A
Old City 1 (Nationals Stadium)	Increase	Increase

The model results are illustrated in Figures 3 through 6 in the context of mean neighborhood incomes. In Figure 3, the mean income for the treatment census tract containing DC USA grew 80.2 percent between years 2005 and 2015. But, the mean income for single filers in the first control census tract did not grow as fast while the income in the second control did grow faster. For Gallery Place, income in the treatment census tract also grew faster than its control census tract. Household income in both neighborhoods grew faster than the citywide average of 31.9 percent between years 2005 and 2015.

Figure 3

Percent Change in Mean Income
DC USA & Gallery Place
2005-2015
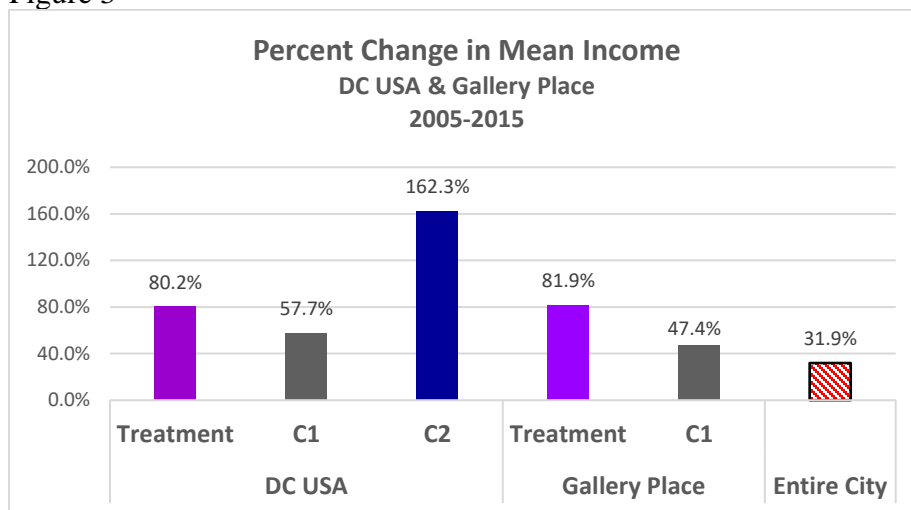
When we look Figure 4, the net in-migration of new single tax filers into the DC USA and Gallery Place treatment census tracts was at a slower rate that its two comparison census tracts. Again, it may be that available housing units in the treatment census tracts were limited such that new in-migrant residents were forced to live in census tracts away from the neighborhood's commercial enter while still choosing the neighborhood (possibly like Gallery Place).

Figure 4

Percent Change in Single Filers
DC USA & Gallery Place
2005-2015
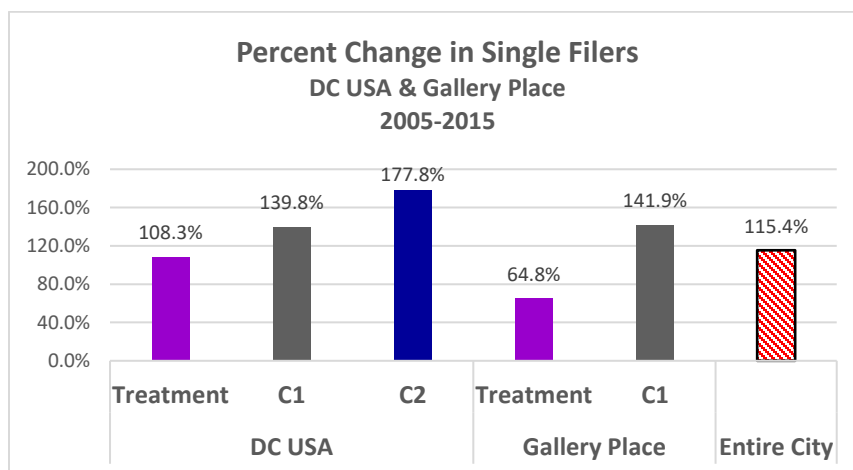
In Figure 5, the mean income for the treatment census tract containing National Park Stadium grew 51.3 percent between years 2007 and 2015. But, the mean income for single filers in the two control census tracts did not grow as fast, albeit that the income growth in both control census tracts was faster the citywide income growth over the same time period. In the Old City 1 neighborhood, Figure 6 clearly shows that the census tract containing the stadium was the major attraction for new residents to the neighborhood. The nearly 700 percent increase in new residents in the Stadium census tract is likely the basis of the unambivalent regression results. Upon closer data analysis of the income tax data, the two control census tracts appear to be more

stable and established residential areas in the Old City 1 neighborhood and did not attract new residents in the same way the treatment census tract did. A key reason for this finding may be that, unlike DC USA and Gallery Place which were basically infill developments,[5] the Nationals Park Stadium area is a 500-acre neighborhood situated between I-395 and the Anacostia River that was newly available area for development. This development project spearheaded by the city government was a unique opportunity to create a new and very large neighborhood to help accommodate a growing population.
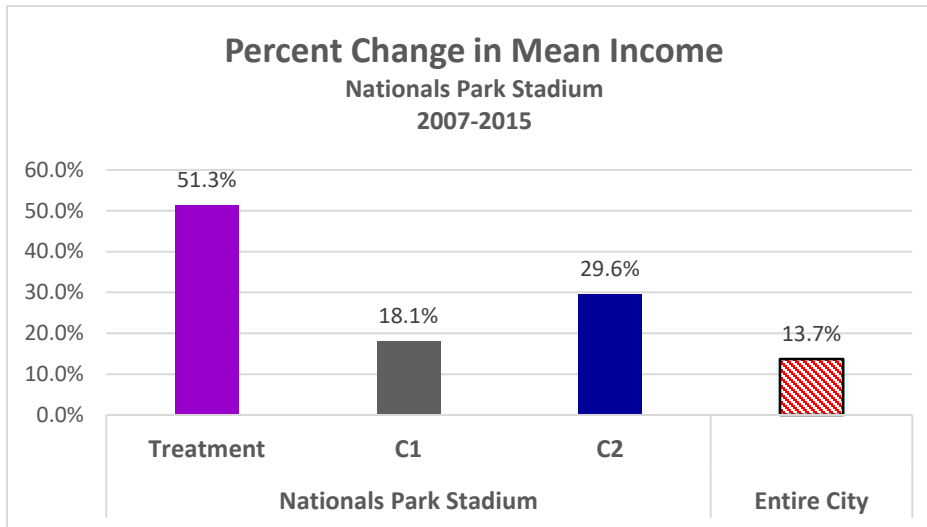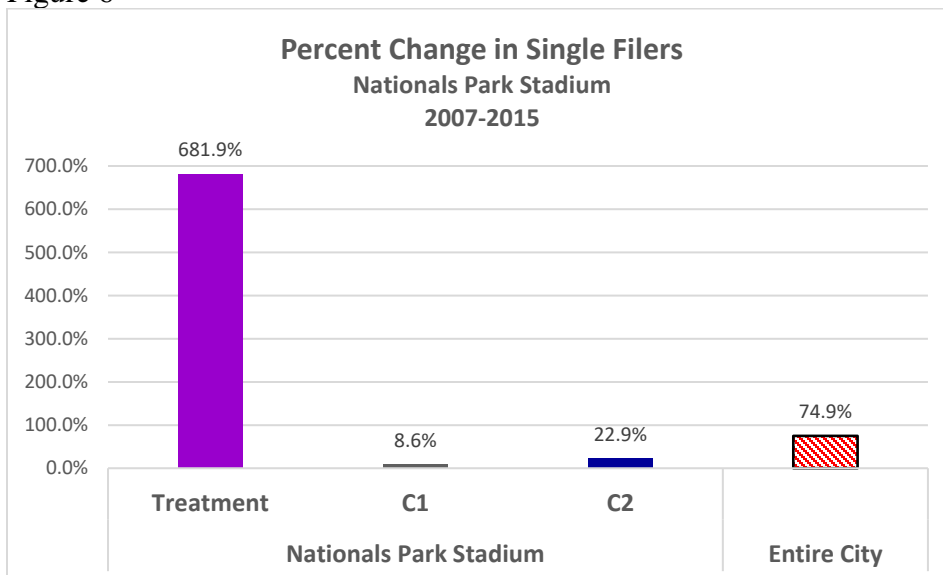
Figure 5

Percent Change in Mean Income
Nationals Park Stadium
2007-2015

Figure 6

Percent Change in Single Filers
Nationals Park Stadium
2007-2015

---

[5] Infill development is the process of repurposing, developing and constructing new buildings on under-used land parcels within existing, built up and (often times) dense urban areas that are already largely developed.

In sum, the three publicly subsidized economic development projects under investigation tend to show that they significantly increased economic growth measured in terms of household income and/or residential property value. The Old City 1 neighborhood containing National Park Stadium unequivocally experienced economic growth after the stadium's construction both in terms of household income and residential property value and compared with two different control groups. The Columbia Heights neighborhood containing the DC USA project also unequivocally experienced economic growth but only in terms of residential property value. The model results for the household income variable were mixed when we ran the regression on a second control groups. It appears the income growth in the treatment group grew faster that the first control group but not the second control group.

The Chinatown neighborhood containing Gallery Place had the least favorable results. The initial model regressions indicate that the neighborhood experienced income growth but slower residential property value growth after the advent of Gallery Place. Neither of these two results could be substantiated via a second regression because a comparable second control census tract did not exist for this project. This development may suggest that large scale residential development in the core CBD area during the study period is not common and may have impeded robust property value growth. A more typical large scale commercial office building might have provided more robust property value growth for that unique location in the CBD, notwithstanding the absence of residential units at the location. Alternatively, Gallery Place control census tract may have simply experienced more residential development than in the treatment census tract since residential development in the treatment tract is severely limited by the preponderance of commercial office buildings in that neighborhood as well as the demand for new commercial office space in the city.

VI.   The Government Investment in The Three Large Economic Development Projects

The shares of the government investment in each project is illustrated in figure7.

Figure 7 Total Cost and The District Contribution to The Three Projects
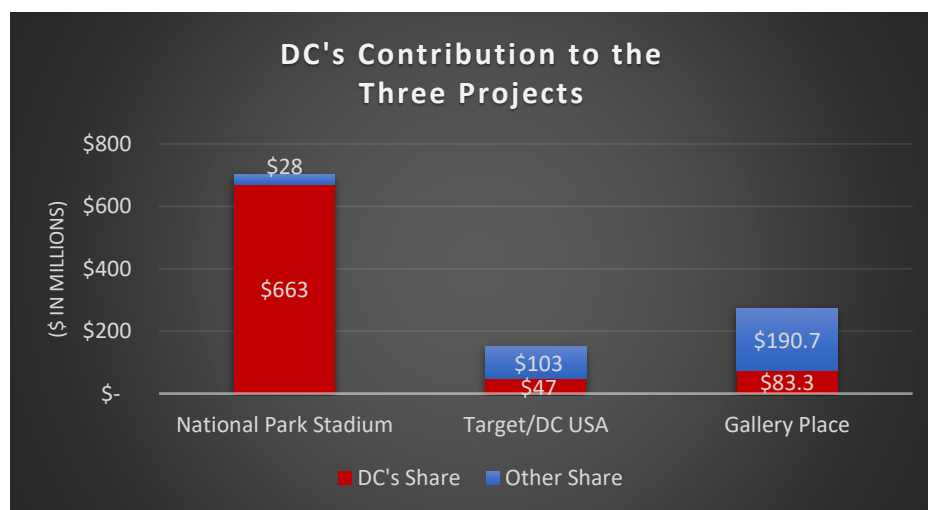
The three projects relied on hundreds of millions of public dollars for construction. The cost of the National Park Stadium was $691 million, Target DC USA $149.5 million, and Gallery Place was about $274 million. The District of Columbia government contributed $663 million (95.9 percent) to the National Park Stadium project, $46.9 million (31 percent) tax-exempt bonds for Target DC USA and issued $83.3 million in TIF bonds (30.4 percent) to fund the Gallery Place Project.

VII. Conclusions and Implications

In the data analyzed for the three projects, we find that these projects that were public subsidized enhanced economic growth in the neighborhoods at least in some regards. The Nationals Park Stadium project unequivocally facilitated higher household incomes and residential property values in the census tracts that contained the stadium and adjacent census tracts. This result might stem from the facts that public investment in this project meant that the city government helped to transform a very large (500 acres), neglected and dismal part of the city into new neighborhood (centered around the new stadium) which numerous developers quickly followed with large investments in residential and commercial development with a plethora of new neighborhood amenities. It appears that the city government remedied a market failure by largely financing a large-scale public funded development project that appeared too large for most private sector developers to undertake. In essence, the city government cleared the way for the private sector to truly transform a large and important part of the city.

At the other end of the spectrum, the city government subsidies to the Gallery Place project may have distorted the economic development in the city's Chinatown neighborhood. The area has some of the city's most expensive real estate and has always been predominated by commercial office development. The model results indicate that devoting a large share of the development to residential usage may have impeded property value growth in the treatment area. Local public subsidies in this project may have helped to distort economic development on the Gallery Place foot print. But for the publicly subsidized Gallery Place, that exact location might have also been developed primarily as a large commercial office building(s) yielding higher property assessment values. This might be an example of how public funds distort development and land use away from its highest and best use. Subsidizing residential development in the core CBD, which is predominated by large commercial office buildings, on some of the city's most expensive land for very high-income residents may not have been the best use of public funds. There appears to have been no market failure that local government intervention needed to address, and the property which contains Gallery Place would likely have been developed in a timely manner without public support.

Between the two above extreme effects of how publicly subsidized economic development can influence neighborhood economic growth is DC USA. This project also unequivocally enhanced residential property growth values in the census tract near the project. But, the effects in household income is mixed. A closer examination of the mixed results indicates the project attracted so many new residents to the area that the housing supply became constrained and likely new residents may have had to live a few city blocks farther away from the neighborhood commercial core (near the DC USA project) in order to still live in the trendy Columbia Heights neighborhood, possibly similar to the Gallery Place experience. Given that the building of the DC USA project was (arguably) only possible with a relatively small amount of public money from the District of Columbia government, the market failure argument may also apply in this situation.

National large-scale retailers tend to not establish a large foot print in densely developed residential neighborhoods of inner cities in one fell swoop. Columbia Heights was an existing heavily residential neighborhood prior to DC USA. But the project introduced a large-scale retail component to the neighborhood that significantly enhanced the attractiveness and vibrancy of the neighborhood. The public-private partnership shared the risks of this development, which translated into a broader based economic growth on the neighborhood level after its construction. Public investment in this project appears to have helped overcome an apparent obstacle for national retailers to make a large investment in inner city retail development.

In a certain regard, this study is simply an economic impact study that uses an experimental research design to assess the treatment effect (a publicly-subsidized large scale economic development project) on neighborhood area incomes and home values vis-à-vis a control group of census tracts in the same neighborhood of the project. But, the use of administrative data and methodology shows the importance of conducting neighborhood economic studies to assess the effects of publicly supported economic development projects. This study suggests that in the case of the District of Columbia, the better cases for public subsidies to private developers involve overcoming seemingly insurmountable impediments/difficulties (i.e. market failures) that prevent or substantially impede the private sector from developing appropriately significant projects in a timely manner. And in the case of the District of Columbia, it may be justifiable to use public subsidies to expedite residential development for low-income and average income neighborhoods that are already highly conducive to large scale residential development (unlike Gallery Place). When public funds are devoted to good and significant projects in good locations at an appropriate stage in the business cycle, it enhances not only city economic growth but also and more importantly local neighborhood economic growth and social well-being.

DISCLOSURE

References

Alghumgham, A. and Liu, S. Muhammad, D. Geng, Y. (2015). The Impacts of Three Economic Development Projects on Neighborhood Property and Personal Income Values – 2002-2013. Office of Revenue Analysis - Office of Chief Financial Officer. Washington, D.C

Baade, R. A., Baumann, R., & Matheson, V. A. (2006). The economic consequences of sports strikes and lockouts: Revisited. College of the Holy Cross, Department of Economics, Faculty Research Series, Working Paper, (06-04).

Coates, D. and B. R. Humphreys (1999). The growth effects of sports franchises, stadia and arenas. Journal of Policy Analysis and Management 18 (4), 601–624.

Coates, D. and Humphreys, B. (2001). The Effect of Professional Sports on Earnings and

employment in the Services and Retail Sectors in U.S Cities. University of Maryland Baltimore County Department of Economics.

Coates, D., & Humphreys, B. R. (2002). The economic impact of postseason play in professional sports. *Journal of Sports Economics*, *3*(3), 291-299.

Coates, D., & Humphreys, B. R. (2008). Do economists reach a conclusion on subsidies for sports franchises, stadiums, and mega-events? *Econ Journal Watch*, *5*(3), 294-315.

Fisher, Ronald. 1997. The effects of state and local public services on economic development. New England Economic Review. March/April.

Koster, H. & Rouwendal, J. (2010). The impact of mixed land use on residential property values. VU University Amsterdam.

Lynch, R. (2004). Rethinking Growth Strategies: How States and Local Taxes and Services Affect Economic Development. Economic Policy Institute. Washington, D.C.

Manong, M. (1999). The Economic Impact of the MCI Center in Chinatown. Economics Department, Howard University.

Morris, N. (2005). Dedicated Funding for Metro. Center of Urban Progress. Howard University.

Pope, D. & Pope, J. (2012). When Walmart Comes to Town: Always Low Housing Prices? Always? National Bureau of Economic Research.

Rosenthal, S. S. (2007). Old homes, externalities, and poor neighborhoods: A model of urban decline and renewal. *Journal of Urban Economics*, *63(3), 816-840.*

Seago, J. (2013). Northgate Mall's Effect on Surrounding Property Values. Urban Economics.

Song, Y. & Knaap, G. (2004). Measuring the effects of mixed land uses on housing values. Department of City Regional Planning, University of North Carolina, Chapel Hill, 27599-3140, USA. And, National Center for Smart Growth Research and Education, University of Maryland, College Park, MD 20742, USA.

Swanstrom, T., Webber, H., & Metzger, M. (2015, April). Rebound neighborhoods in older industrial cities: The case of St. Louis. In *Federal Reserve System Community Development Conference* (pp. 2-3).

Moored, G. (2015). District Measured: Over Past Decade, Share of Low-Income Households Has Decreased in Neighborhoods Close to Downtown. District of Columbia's Office of Revenue Analysis.

Vrooman, E. (2012). An Examination of Public-Private Partnerships: Partnership Structure, Policy Making, and Public Value. Johns Hopkins University.