DEPARTMENT OF ECONOMICS WORKING PAPER SERIES

Did PLAs on LA Affordable Housing Projects Raise Construction Costs?

Peter Philips

Scott Littlehale

Working Paper No: 2015-03

September 2015

University of Utah
Department of Economics
260 S. Central Campus Dr., Rm. 343
Tel: (801) 581-7481
Fax: (801) 585-5649
http://www.econ.utah.edu

Did PLAs on LA Affordable Housing Projects Raise Construction Costs?

Peter Philips (corresponding author)
Professor of Economics, University of Utah
philips@economics.utah.edu

Scott Littlehale
Senior Research Analyst, Northern California Carpenters Regional Council

Abstract

The cost of building nine affordable housing projects in Los Angeles under the terms of a project labor agreement between the years 2008 and 2012 are compared to 121 affordable housing projects developed and built in the same time period and same area without project labor agreement requirements. We use three approaches to compare costs: 1) simple comparison of average square foot cost and average per unit cost, 2) a visual inspection of the cost data by increasing size of projects measured by square foot size and housing unit size, and 3) "nearest neighbor" analysis comparing the nine PLAs each to the four nearest comparisons along the dimensions of size, units, stories and targeted population. We break our sample down into a subsample for the City of Los Angeles excluding within-county but outside-the-city projects and into a subsample for prevailing wage projects only. Our conclusions are the same using all three statistical approaches to comparing costs and using all three samples: the nine PLA affordable housing projects were not more expensive to build than comparable projects not governed by project labor agreements.

Keywords: project labor agreements, affordable housing
JEL Classification: J41 labor contracts; J45 public sector labor markets; J 48, J 58 and R28 labor and housing public policy; J5 Labor–Management Relations, Trade Unions, and Collective Bargaining

Acknowledgements: The authors gratefully acknowledge Julie Solberg, who obtained and input Low Income Housing project data that came from the California Tax Credit Allocation Committee (TCAC). The authors also are grateful to TCAC staff for cooperation in fulfilling requests for public records associated with federal and state tax credit-supported Low Income Housing projects.

Introduction.

The City of Los Angeles Community Redevelopment Agency (CRA/LA) in 2008 linked its subsidies for the development of affordable housing to a project labor agreement ("PLA") that bound contractors on subsidized projects building 75 or more units to adhere to local collectively bargained compensation packages, to utilize union hiring halls, and to target construction employment opportunities to local residents.[1] Some industry and government observers expressed concern in 2008 that this PLA would raise residential construction costs by as much as 10 percent and thereby would diminish the efficiency of available subsidy funds.

In this research note, we use a dataset of 130 affordable housing projects that were developed between 2008 and 2012 within the County of Los Angeles in order to compare the construction costs of nine PLA-covered affordable housing projects to 121 affordable housing projects that were not covered by the PLA. Of the nine PLA projects, one had only 66 units, despite policy's 75-unit threshold. An additional 121 affordable housing projects were developed during this time period, 62 within the city and 59 outside the city but in Los Angeles County. Within Los Angeles County outside the City of Los Angeles, developers were free to build affordable-housing projects of any size without PLAs. Furthermore, within the city, affordable housing projects of any size were exempt from the CRA/LA policy if they had not been subsidized by the CRA/LA. In our time period, there were 18 affordable housing projects within the city that had 66 or more units and an additional 20 with 66 or more units outside the city in the county. The smallest PLA had 60,241 square feet. There were 36 non-PLA projects within the city and an additional 35 outside the city but in the county that were larger than this smallest PLA project.

Affordable housing projects can be subject to prevailing wage regulations that mandate the payment of specific wages and benefits to construction workers employed on projects funded with federal or state tax dollars. In Los Angeles city and county, mandated wages are often equivalent to collectively bargained wages. All of the PLA projects were also prevailing wage jobs. However, of the 130 projects in our sample, 29 were not prevailing wage projects including 4 within the City of Los Angeles. Of these non-prevailing-wage jobs, 18 were larger than 60,241 square feet (the smallest PLA project by square feet) and 12 had more than 66 units (the smallest PLA project by units). Thus, our sample provides a variety of non-PLA projects to compare with the nine PLA projects.

In addition to analyzing our overall sample, we divide our sample into two subsamples, one consisting of prevailing wage projects only and another consisting of within the City of Los Angeles projects only. The prevailing wage subsample consists of 101 projects, including 34 outside the city while the Los Angeles city subsample consists of 71 projects including four non-prevailing-wage projects. All nine PLA projects are prevailing wage projects and are located within the city.

- **Utilizing three different statistical strategies to analyze all three of these samples, we fail to find any statistically significant cost differences between PLA projects and non-PLA projects.**

We examine the question of hypothetical PLA construction cost impacts using three methods:

[1] See "Construction Careers and Project Stabilization Policy," 2008. Downloaded via http://www.crala.org/internet-site/Policies/Local_Hire_Policy_Programs.cfm on 11/3/2014. In addition to the 75-unit threshold, the policy was to be applied only if a CRA/LA loan or grant exceeded $1 million. The CRA/LA required one 66-unit project was to abide by the PLA.

First we simply compare construction costs per square foot and cost per unit for PLA projects versus non-PLA projects.[2] We do a conventional statistical test of whether the average ("mean") cost per square foot and the average cost per unit for PLA projects differ meaningfully or statistically from the average costs for non-PLA projects.[3]

Second, we visually examine PLA and non-PLA costs with scatter-graphs that show cost by the total structural size of the project and cost by the number of units in the project. Additionally, we use a simple statistical technique called ordinary least squares regression to draw lines that represent the relationship between increased project size and increased project construction costs. We again examine (1) the overall sample, (2) the LA city subsample and (3) the subsample of projects that required prevailing wages. We observe the extent to which PLA projects depart from each regression line compared to non-PLA projects.

Third, because affordable housing projects can differ not only by size, location and regulatory environment but also by the population targeted by these affordable housing projects and the year the project budget is finalized, we use a statistical technique called nearest neighbor analysis to identify the four closest non-PLA projects for each of the PLA projects. We then compare the percent difference in total construction costs by PLA and non-PLA projects between these matched projects which are similar along the dimensions of size, target population, and year. (Projects could be targeted at large families, seniors, special needs, other targeted groups or they could be non-targeted.)

Sample.

Figure 1 shows four measures of the size of the affordable housing projects within our overall sample--average direct construction cost of the project, project square-foot size, project unit size and the number of stories for the project. Breaking these measures down into PLA and non-PLA projects, we find that on average, the PLA projects were larger, taller, and had more units compared to the average for non-PLA projects. Not surprisingly, these larger PLA projects cost more, on average, to build. Finally, in **Table 1** we will also see that the average square foot cost of PLA and non-PLA projects are within 2% of each other with PLAs being slightly higher in the overall sample and slightly lower in the prevailing wage and City of Los Angeles subsamples.

[2] We used the *Engineering News Record* Building Cost Index for Los Angeles to adjust for inflation of material and labor costs. This cost index does not take into account fluctuation of mark-ups for overhead and profit charged to developers by contractors, architects, and other development consultants.

[3] In this report we speak of statistical significance and also introduce the concept of a confidence interval. People are most familiar with the notion of statistical significance in interpreting opinion surveys. Say, for instance, that an opinion poll shows that 50% of the voters favor candidate A and 48% favor candidate B with 2% undecided. But the pollster reports that the margin of error for this survey of 1000 eligible voters is 4%. Because 48% and 50% are within 4% of each other, the pollster will say that statistically the result of the poll is a tie and the election is too close to call. Statistical significance identifies the margin of error of a point estimate obtained from a sample (in our case the cost of construction) and confidence intervals describe the range of possible results surrounding a point estimate within which the true outcome is likely to fall.

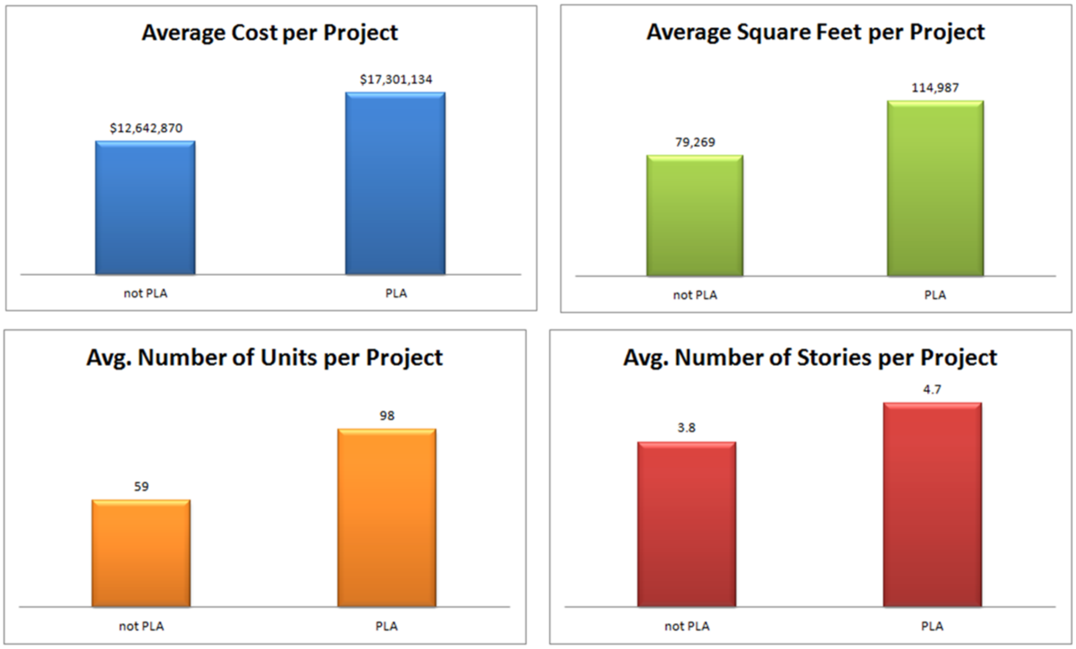


Figure 1: On average, PLAs were larger, taller, had more units and higher total cost compared to non-PLAs

Table 1 describes our sample by number of projects, the average size of project, average construction cost and average unit cost, both for the overall sample and breaking the sample down first into LA-city-only and then into prevailing-wage-jobs-only ("PW Jobs") subsamples.

Table 1: Comparison of size and cost of PLA and non-PLA projects

Location	Project	Number of Projects	Average Square Feet	Average Number of Units	Average Number of Stories	Average Cost per Project	Average Square Foot Cost	Average per Unit Cost
a	b	c	d	e	f	g	h	i
All	not PLA	121	79,270	59	3.8	$12,642,870	$168	$226,064
	PLA	9	114,987	98	4.7	$17,301,134	$171	$176,809
LA City	not PLA	62	74,669	56	4.0	$12,507,621	$173	$231,488
	PLA	9	114,987	98	4.7	$17,301,134	$171	$176,809
PW Jobs	not PLA	92	76,823	57	3.9	$12,691,240	$174	$232,066
	PLA	9	114,987	98	4.7	$17,301,134	$171	$176,809

In our overall sample, the average square foot cost per project is similar with PLAs costing $171 per square foot and non-PLAs costing $168 per square foot. The projects were developed between 2008 and 2012, and we use the *Engineering News Record* Building Cost Index for Los Angeles to adjust for inflation over this period.[4] There are 9 PLAs and 121 non-PLAs in our overall sample. There are also the same 9 PLAs present in each of the subsamples.

In the overall sample, on average, the PLA projects were larger by about 35,000 square feet; they had almost 40 more units and were almost one story higher. These larger PLA projects cost, on average, almost $5 million more to build; they cost on average $3 per square foot more than non-PLA projects and were $50,000 less expensive per unit. The subsample show similar differences, but in the subsamples, the square foot cost of PLAs is slightly lower than for

[4] Other indices such as the Case-Shiller housing cost index for Los Angeles yields similar results.

non-PLAs. In the next section, we will test whether these differences in average costs per square-foot and cost per unit are significantly different from each other by conventional statistical measures.

Location, Regulation and Targets Matter: A Comparison of Averages

Figure 2 shows the average square-foot and average unit costs for PLA projects and non-PLA projects along with the high-low range indicated by the 95% confidence intervals around these averages. A 95% confidence interval indicates that while the average from a sample is a single-point estimate of the true cost of construction, given the variation around each average, the high-low range will encapsulate the true cost with a 95% chance of being right. Confidence intervals around average construction cost vary in breadth based on how much each specific project's cost varies around the group average of all the projects within the selected sample or subsample. When the averages of two groups are compared, odds are that they will not be exactly the same number. If the confidence intervals of the two groups overlap, then statistically we conclude that the two averages are essentially the same. When the confidence intervals of the two groups do not overlap, then we conclude that the two averages statistically are significantly different from each other. We can then look at the point estimates and ask whether the two statistically significantly different averages are meaningfully different. (So for instance, one might conclude that there is a statistically significant 1/2% difference in cost but that difference might not be meaningful from a practical standpoint.)

In the left-hand panel in **Figure 2**, the average square foot cost of PLA projects are compared to non-PLA projects in three samples--the total sample of 130 affordable housing projects, the subsample of 71 projects in LA city only and the subsample of 101 prevailing wage projects only. The average for non-PLA square foot costs are shown in black circles with black high-low lines indicating the 95% confidence interval around each non-PLA average. The average for PLA square foot costs are shown with gray squares. The confidence interval for the PLA average is shown with a single gray high-low line on the far-right of each panel. The PLA average construction cost confidence interval applies to all samples because the same nine PLAs are in each of the samples.

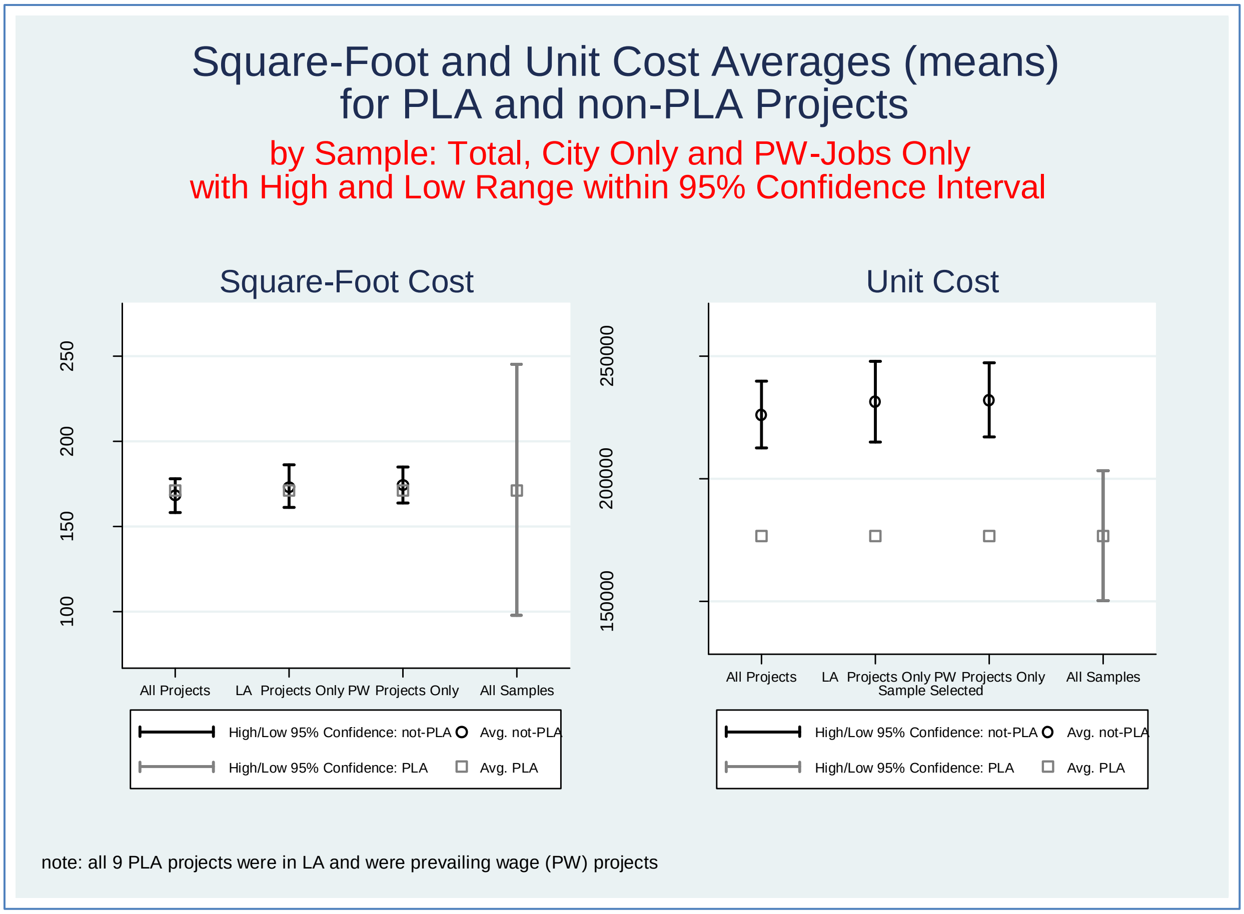


Figure 2: Comparison of averages: square foot cost and unit cost by PLA and non-PLA with 95% confidence interval for non-PLA average

The confidence interval shown in gray is wider for PLA projects because our number of PLA projects is small and because there is considerable variation in square foot costs among these 9 PLA projects. However, the average for these nine projects is always within the much narrower 95% confidence interval for non-PLA projects. Because the average square foot costs for PLA and non-PLA projects are within a couple of dollars of each other, and because the PLA and non-PLA confidence intervals overlap, and because the average square foot cost for PLA projects is always within the confidence intervals for the non-PLA projects regardless of sample, we conclude that there is no statistically significant difference in the square foot cost of PLA affordable housing projects as a group compared to non-PLA affordable housing projects as a group. Given these averages are statistical ties, there is also no meaningful difference in PLA vs. non-PLA costs.

The same cannot be said for costs per unit. In the right hand panel in **Figure 2**, average PLA per unit costs are systematically lower regardless of sample. The PLA average per unit cost is always outside of the 95% confidence interval for non-PLA projects. And the confidence intervals for PLAs and non-PLAs do not overlap regardless of sample. The conclusion is that in our data, per unit costs were statistically significantly lower for PLAs. This is also a meaningful difference. But the meaning of this difference lies in the fact that PLA affordable housing projects were disproportionately targeted to seniors. When the average per-unit cost of PLA and non-PLA senior-target projects are compared, the 5 PLA projects are less expensive ($15,700 less per unit) but this difference is not statistically significant because it falls within the margin of error (that is, the two confidence intervals overlap). Thus, in addition to where the projects were built, and whether projects were regulated by prevailing wages, we must consider the projects' targeted populations. We will further analyze this issue below. But first let us visually examine the data with respect to the size of projects.

Size Matters: Graphical Inspection and Simple Regression Analysis

This section visually examines our data first from the perspective of the overall sample. Here we will notice that there is one 2008 PLA project that seems to be more expensive than the others. But when we focus on this one PLA-governed project, we find that its construction costs were based on 2008 prices, just as the Great Recession was beginning. We find that the affordable housing projects as a group in this year tended to be more expensive than the later affordable housing projects which began after the effects of the Great Recession on construction prices took hold. We then break our sample down into the subsamples for Los Angeles city only and prevailing wage projects only. In these subsamples, PLAs tend to be less expensive per unit and clustered around the general cost tendencies by size. In the prevailing wage sample, the one 2008 PLA outlier has two nearby non-PLA neighbors while in the LA city sample, this outlier does not have a close nearby neighbor along the dimension of square foot size. The general pattern is that 1) PLA projects tend to be near or below the cost-by-size pattern for all affordable housing projects. The outlier pattern in the case of the one 2008 PLA is that it can be found with nearby non-PLA outlier projects of similar size.

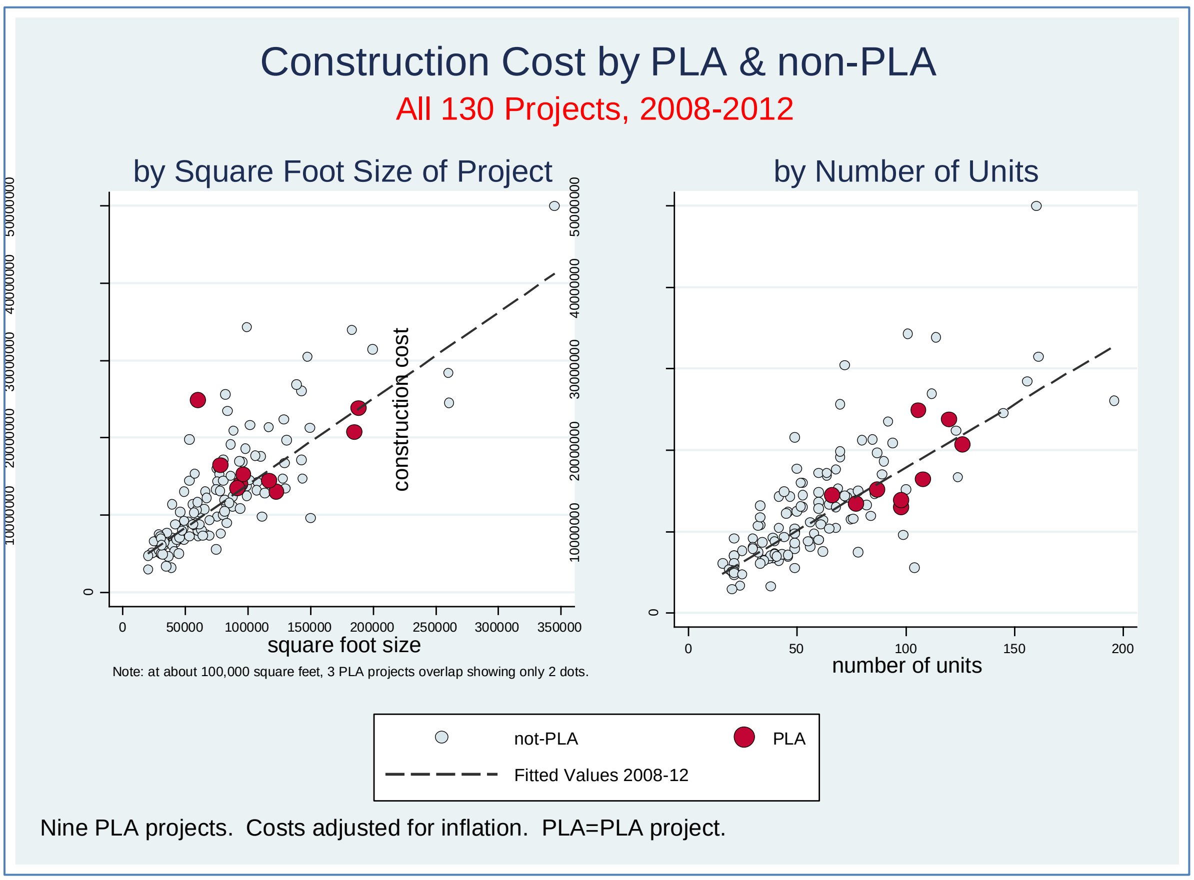
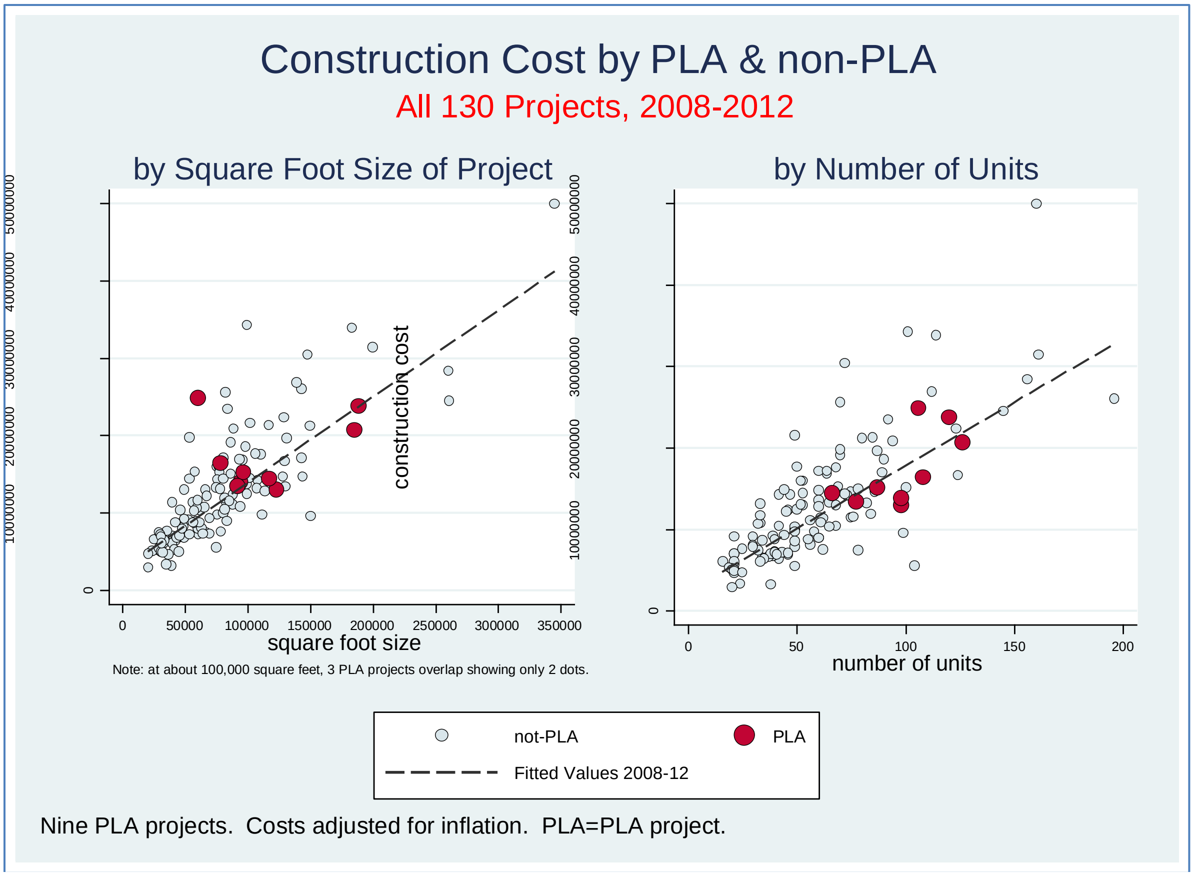


Figure 3 shows the cost of each project in the total sample of 130 projects with PLAs indicated as large red circles and non-PLA projects as gray circles. In the left-hand panel, project cost on the vertical axis is related to the square foot size of the project on the horizontal axis. In the right hand panel, project cost on the vertical axis is related to the number of units in the project on the horizontal axis. A dashed linear regression line is drawn for each panel showing in the left panel the rise in construction costs associated with larger square-foot project-size, and in the right panel the rise in construction cost associated with greater numbers of units in the sample's projects. The regression lines reflect the best fitting straight line relationship between costs and the two different project scale variables. The extent to which data points do not lie on the straight lines indicate individual "errors" of the simple linear model's estimated association between project scale and project cost.

The regression lines have different slopes because they are based on different relationships. On the left, costs rise with increased square-foot-size: on the right, costs rise with increased number of units. One possible reason why costs appear to be less responsive to increases in numbers of units relative to increases in total square foot size could be that residential developments with larger numbers of units tend to include a greater range of unit-types (from 3-bedroom units to studios) as compared to projects with smaller numbers of units. The simple bivariate relationships explored here do not take differences in residential unit-types into account. We do address that additional layer of complexity in our "**Nearest Neighbor Analysis**" section.

In both panels, PLA projects fall on either side of the regression line. Visually, most PLA projects are close to the line and within the scattering of non-PLA projects of comparable size and units. There appears to be on exception in the panel comparing costs by total square foot size.



Nine PLA projects. Costs adjusted for inflation. PLA=PLA project.

FIGURE 3: TOTAL SAMPLE: CONSTRUCTION COST BY SQUARE FOOT SIZE OF PROJECT AND COST BY NUMBER OF UNITS PER PROJECT WITH LINEAR REGRESSION LINES SHOW THE GENERAL RELATIONSHIP BETWEEN SIZE AND COST

While most of the PLA projects are close to the regression line showing the general relationship between increased size and units and increased costs, **Error! Reference source not found.** focuses on the one PLA project that appears to be an exception to this pattern. In both panels the potential outlying case is indicated with a large red diamond marker. This potential outlier is the only PLA project that was shovel-ready & tax-credit-approved in 2008, when the effects of the Great Recession on construction prices was only beginning to take hold. We see in **Error! Reference source not found.** that 2008 affordable housing projects tended to be more expensive relative to projects built later in the recession and subsequent slow expansion.

The 2008 PLA project was more expensive per square foot, but – in comparison to other 2008 projects – it definitely was not more expensive per unit and had several nearby neighbors in terms of square foot size that had comparable or even higher total costs. **Figure 5** brings the questionable “outlier” status of the PLA project into even sharper focus on the panel on the right, where the comparison is limited to non-PLA projects that also were “shovel-ready” & tax-credit approved in 2008.

The insight to be derived from these graphs is that the stage within the business cycle that a project was developed needs to be taken into consideration when assessing the relative costs of PLA versus non-PLA projects. Available construction price indices – which we use throughout this study to adjust for construction wage trends and selected building materials price trends – clearly fail to capture significant difference between affordable housing construction costs in 2008 and the other years in our sample. We incorporate this insight into the "**Nearest Neighbor Analysis**" section of this paper.

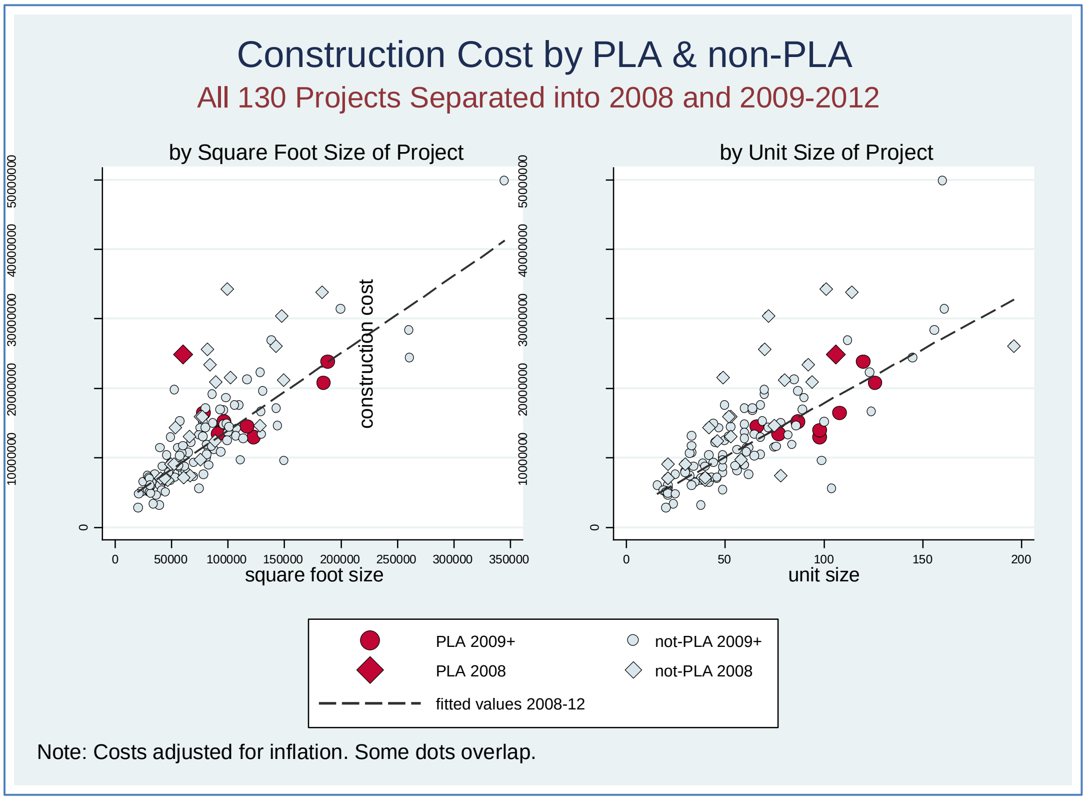


FIGURE 4: IDENTIFYING APPARENT PLA PROJECT OUTLIER: COSTS, SCALE, AND YEAR TAX CREDITS APPROVED

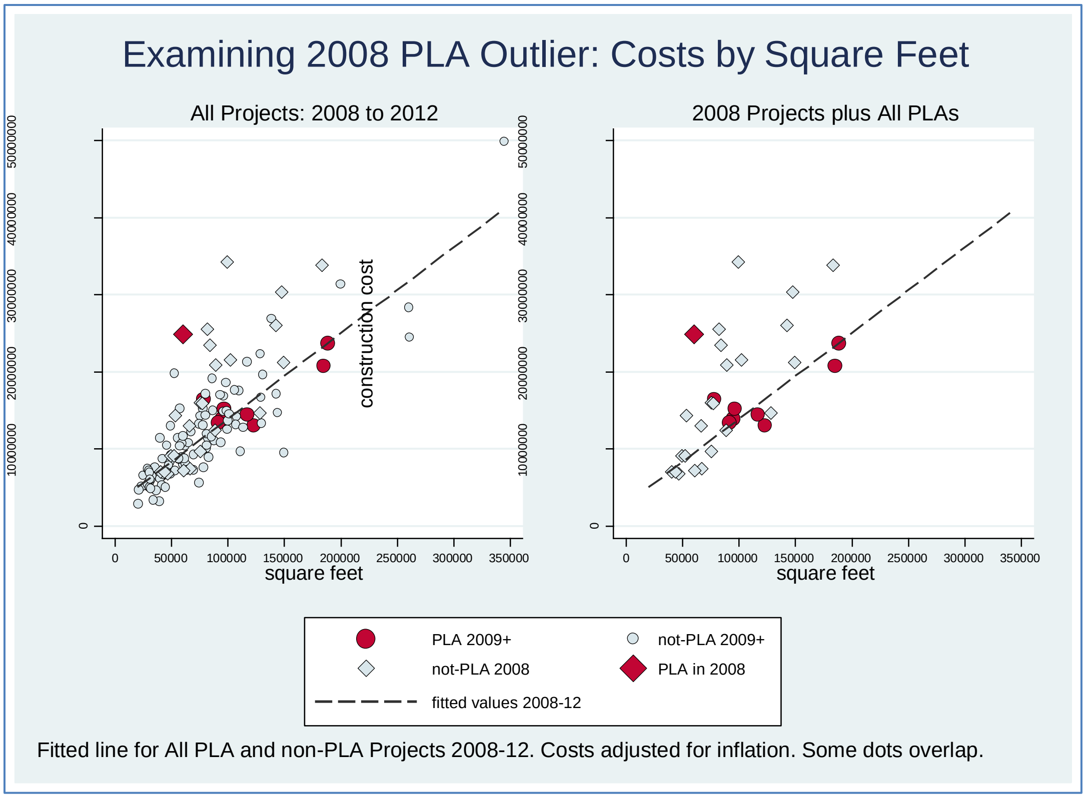


Figure 5: PLA PROJECT OUTLIER? CONSTRUCTION COST BY TOTAL SQUARE FEET AND YEAR TAX CREDITS APPROVED

We now turn to visually inspect our subsamples first LA city projects only then prevailing wage projects only. **Figure 6** shows the same data as

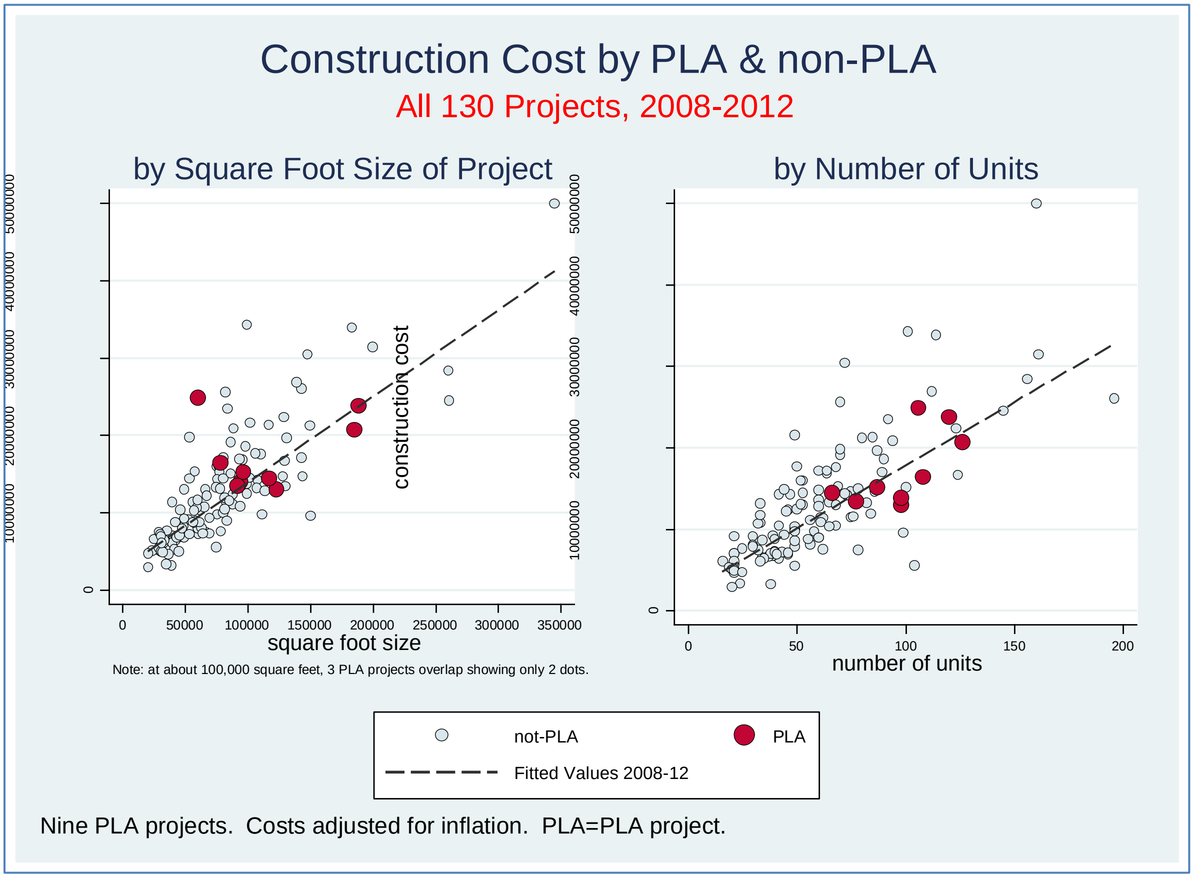
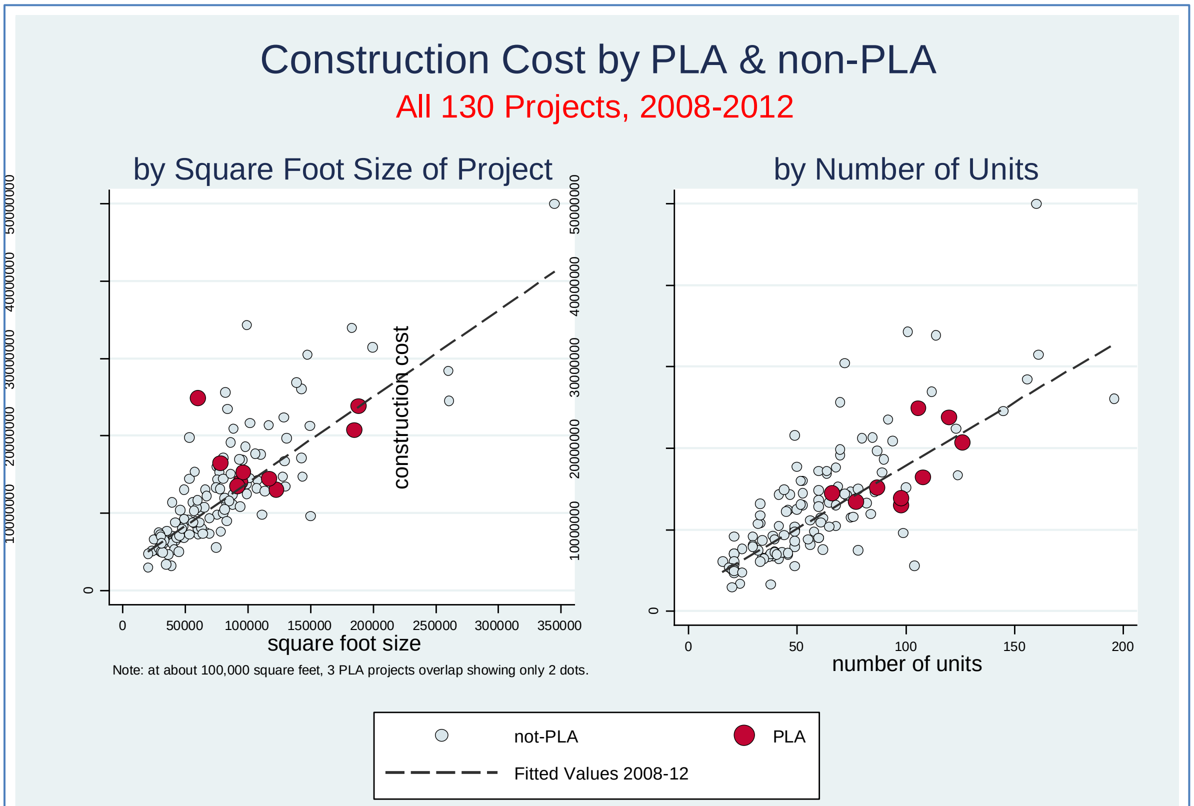


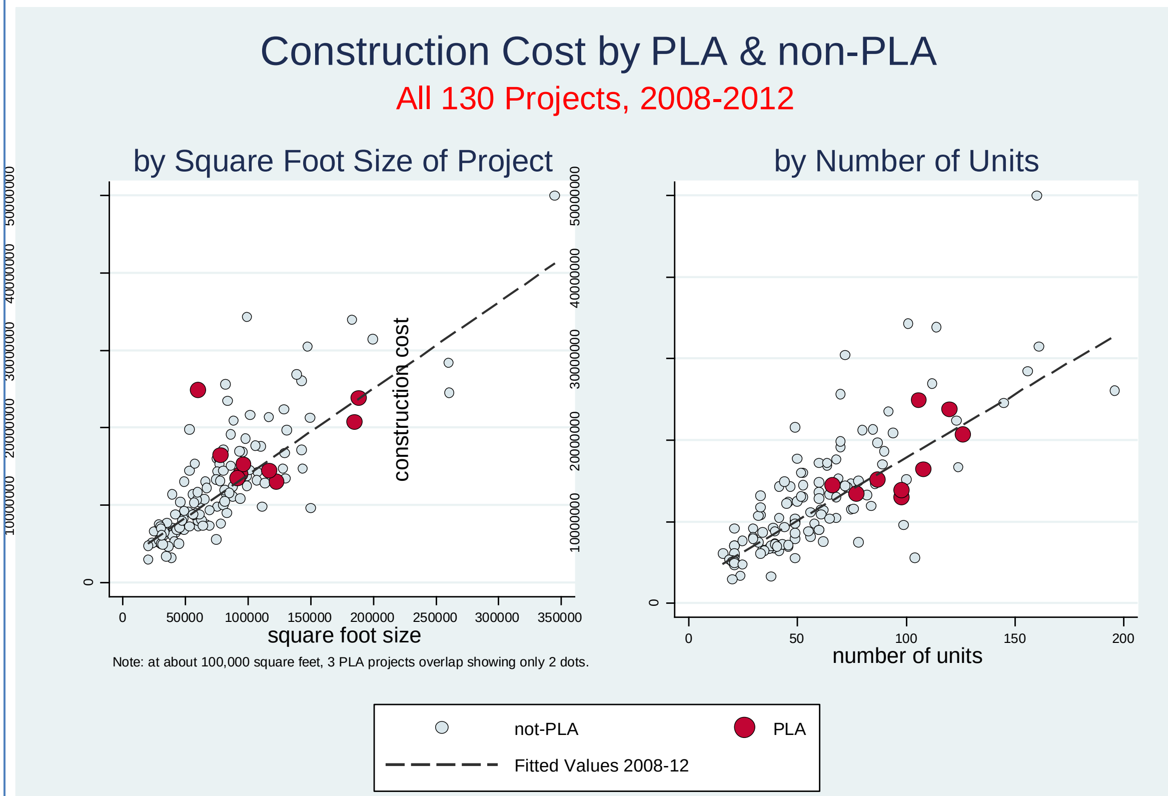
Figure 3 but for the subsample restricted to the City of Los Angeles only. Not surprisingly the PLA projects tend to be larger due to the CRA/LA policy being applied only to projects with 75 units or larger. Still, there are several non-PLA projects as large as or larger than the PLA affordable housing projects. In the left-hand panel showing

square foot size against construction cost, results are similar to the left-hand panel in



Nine PLA projects. Costs adjusted for inflation. PLA=PLA project.

Figure 3 except the one PLA outlier project has fewer nearby neighbors with comparable construction costs. In the right-hand panel showing number of units against total cost, results are also similar to the right-hand panel in



Nine PLA projects. Costs adjusted for inflation. PLA=PLA project.

Figure 3 except that the PLA projects are a bit farther below the line--that is, on balance, PLAs appear a bit less expensive in this subsample comparison.

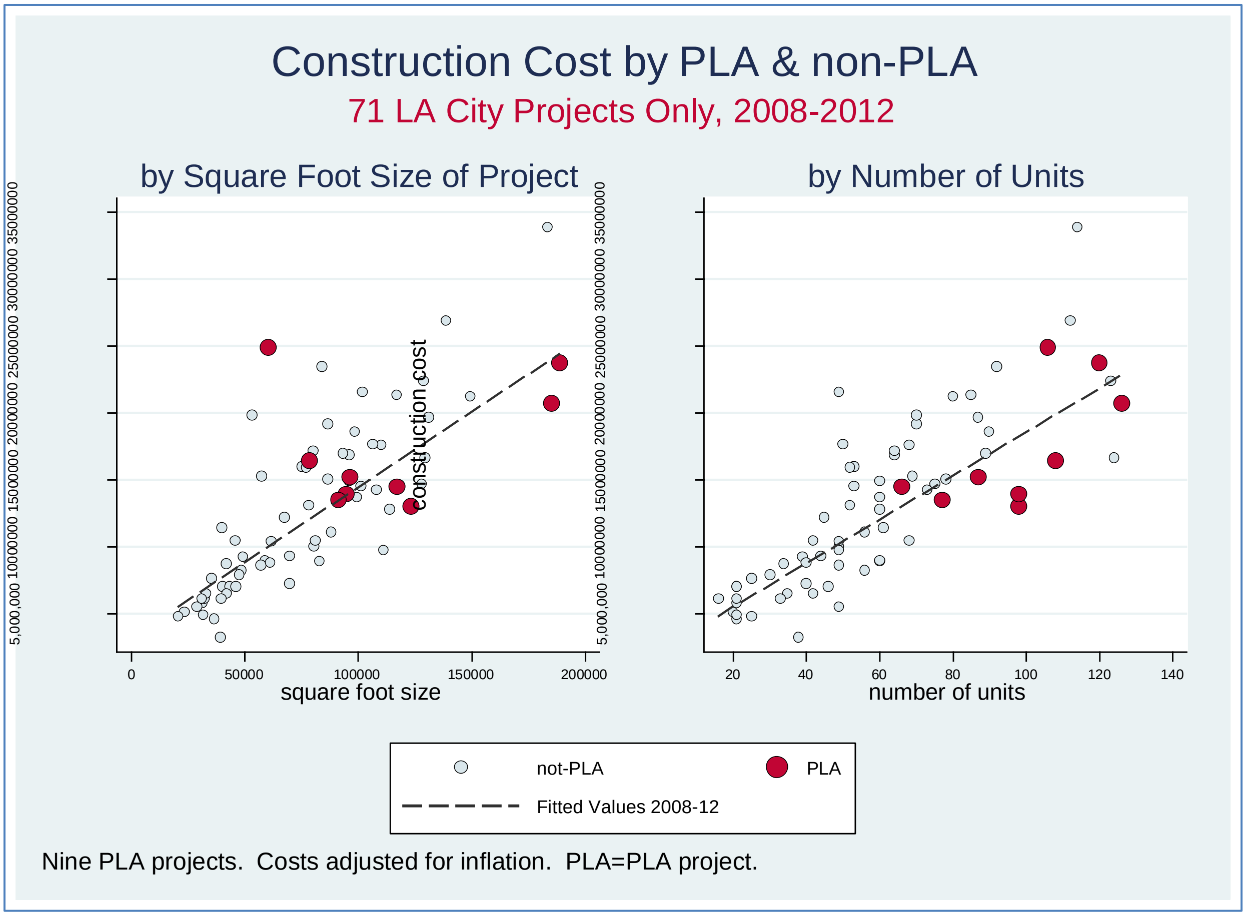


FIGURE 6: LA CITY SAMPLE: CONSTRUCTION COST BY SQUARE FOOT SIZE OF PROJECT AND COST BY NUMBER OF UNITS PER PROJECT WITH LINEAR REGRESSION LINES SHOW THE GENERAL RELATIONSHIP BETWEEN SIZE AND COST

Figure 7 looks at 101 projects located anywhere within the County of Los Angeles that included a requirement to pay construction workers a "prevailing wage," as defined either by the state or the federal government. This subsample includes all nine PLA projects. Again, results are similar. There is one PLA outlier project in the square foot size against total cost left-hand panel with two nearby non-PLA neighbors in terms of cost and square foot size. Most of the PLAs are below the line in the right-hand number-of-units against total cost panel. Taken together, these visual inspections using a linear regression line as a benchmark do not indicate that PLA projects are more expensive.

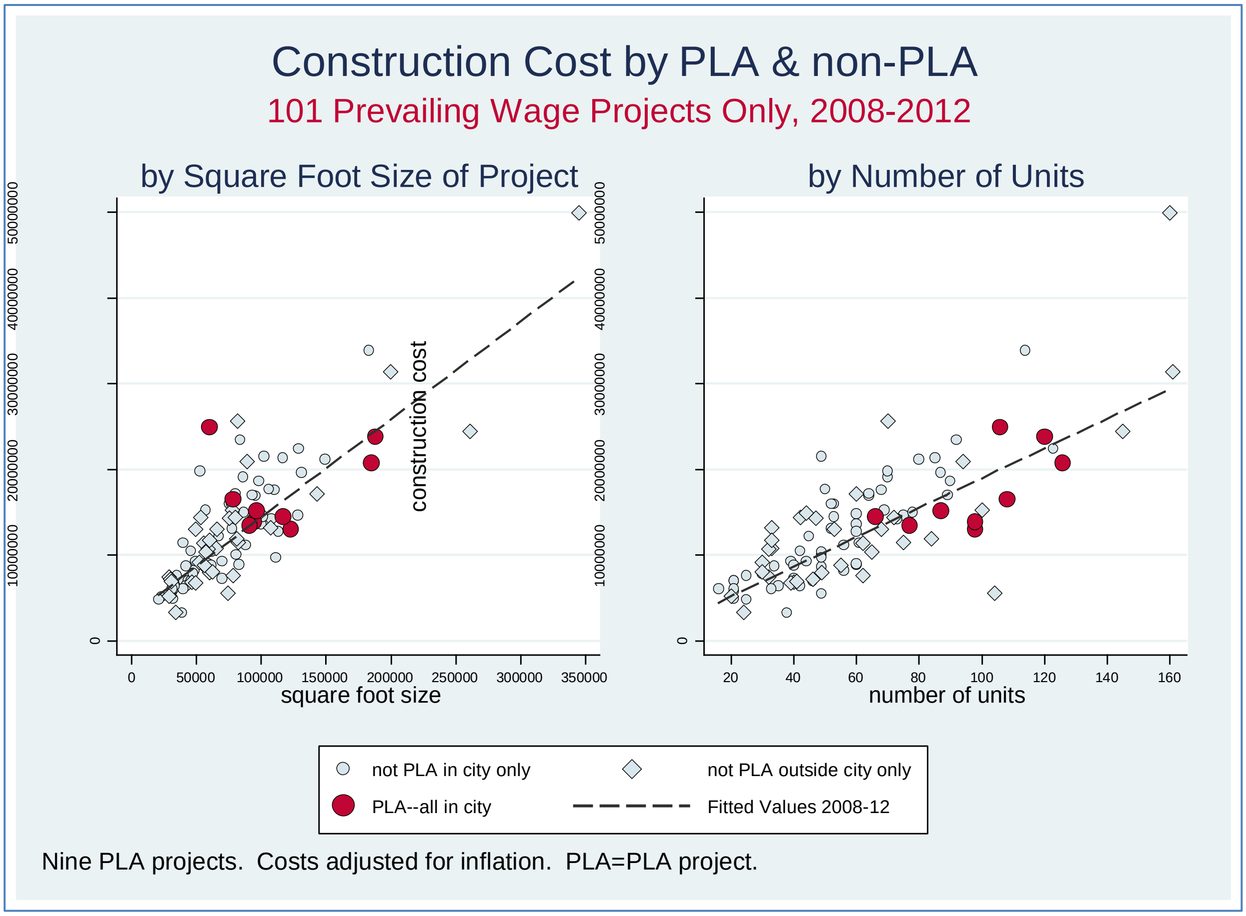


FIGURE 7: PREVAILING WAGE PROJECTS SAMPLE: CONSTRUCTION COST BY SQUARE FOOT SIZE OF PROJECT AND COST BY NUMBER OF UNITS PER PROJECT WITH LINEAR REGRESSION LINES SHOW THE GENERAL RELATIONSHIP BETWEEN SIZE AND COST

We have visually inspected our cost data from the perspective of project size, location and regulatory environment. Along these dimensions, the cost of PLAs appear similar to the cost of non-PLA affordable housing projects. The one outlying exception in 2008 reflects the higher cost of all 2008 affordable housing projects compared to the cost of these projects in 2009 and thereafter when the effects of the Great Recession on costs took hold. Furthermore, this 2008 outlier has non-PLA nearby neighbors in terms of cost and size except in the LA city sample. But these affordable housing projects can also vary along the dimension of targeted population. We look at this variation and then introduce a more formal nearest neighbor analysis to address these differences.

Other Ways Affordable Housing Projects Vary

Affordable housing projects can differ in ways other than square foot size and number of units. In our data, the major additional difference is the population targeted by the affordable housing project.

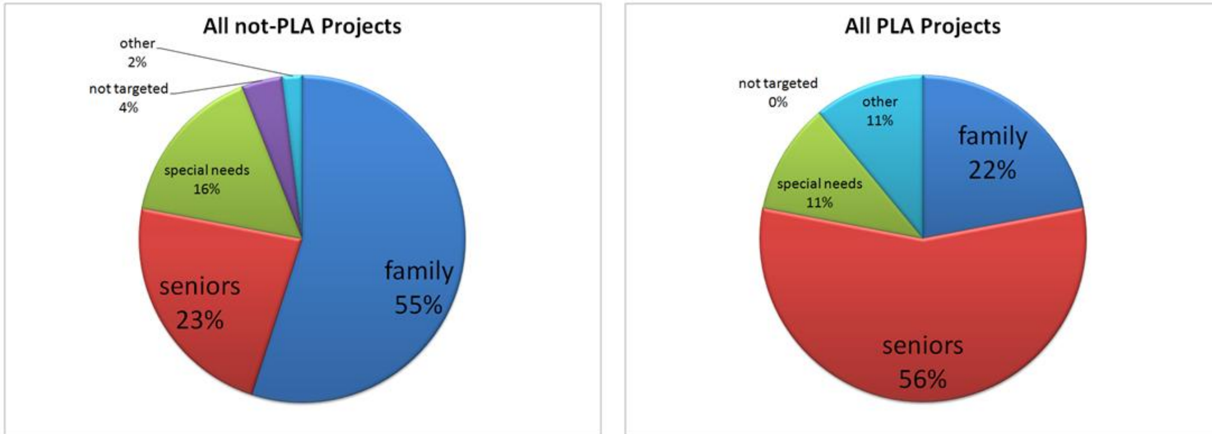


Figure 8 shows that PLAs were targeted more towards seniors (56%) while non-PLA projects were targeted more towards large families (55%). If affordable housing projects aimed at large families had larger units compared to units designed for seniors, this could help explain the result reported above that the per unit cost of PLA projects were statistically significantly lower than non-PLA projects.

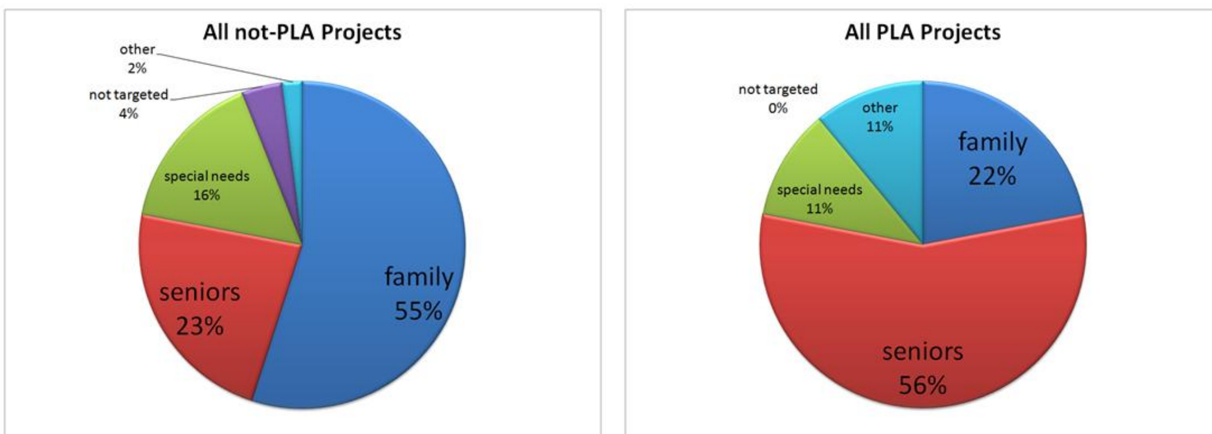


FIGURE 8: COMPARING PROJECT TARGETS FOR PLA AND NON-PLA PROJECTS

Nearest Neighbor Analysis

Affordable housing projects in our sample can vary based on square foot size, number of stories, number of units, targeted population, year of construction, prevailing wage status and whether the project is within the city of Los Angeles or in the country but outside the city. Nearest neighbor analysis provides a method for scaling these multiple dimensions of potential differences along a single metric measuring the similarity of one project with the next. We report results using a standard Mahalonobis metric and we will see that results are similar using other metrics identifying comparable projects.[5] Our nearest neighbor analysis matches each PLA in our sample with a set of four similar non-PLA projects.[6]

[5] "The Mahalanobis distance is a measure of the distance between a point P and a distribution D, introduced by P. C. Mahalanobis in 1936. It is a multi-dimensional generalization of the idea of measuring how many standard deviations away P is from the mean of D. This distance is zero if P is at the mean of D, and grows as P moves away from the mean: Along each principal component axis, it measures the number of standard deviations from P to the mean of D.... Mahalanobis distance is thus unitless and scale-

Figure shows the nearest neighbor point estimate for the percentage difference in total project cost on nine PLA projects compared to similar non-PLA projects. These point estimates are shown by dots while the 95% confidence interval for each point estimate is shown as a line on either side of the dot.

Again we report to total sample result and the results for two subsamples--LA city only and prevailing wage projects only. In the overall sample, nearest neighbor analysis estimates that the nine PLA projects were 2.3% more expensive than their comparable counterparts. In the subsamples for prevailing wage and LA city projects only, nearest neighbor analysis estimates that PLA projects were 3.8% and 2.5% less expensive.

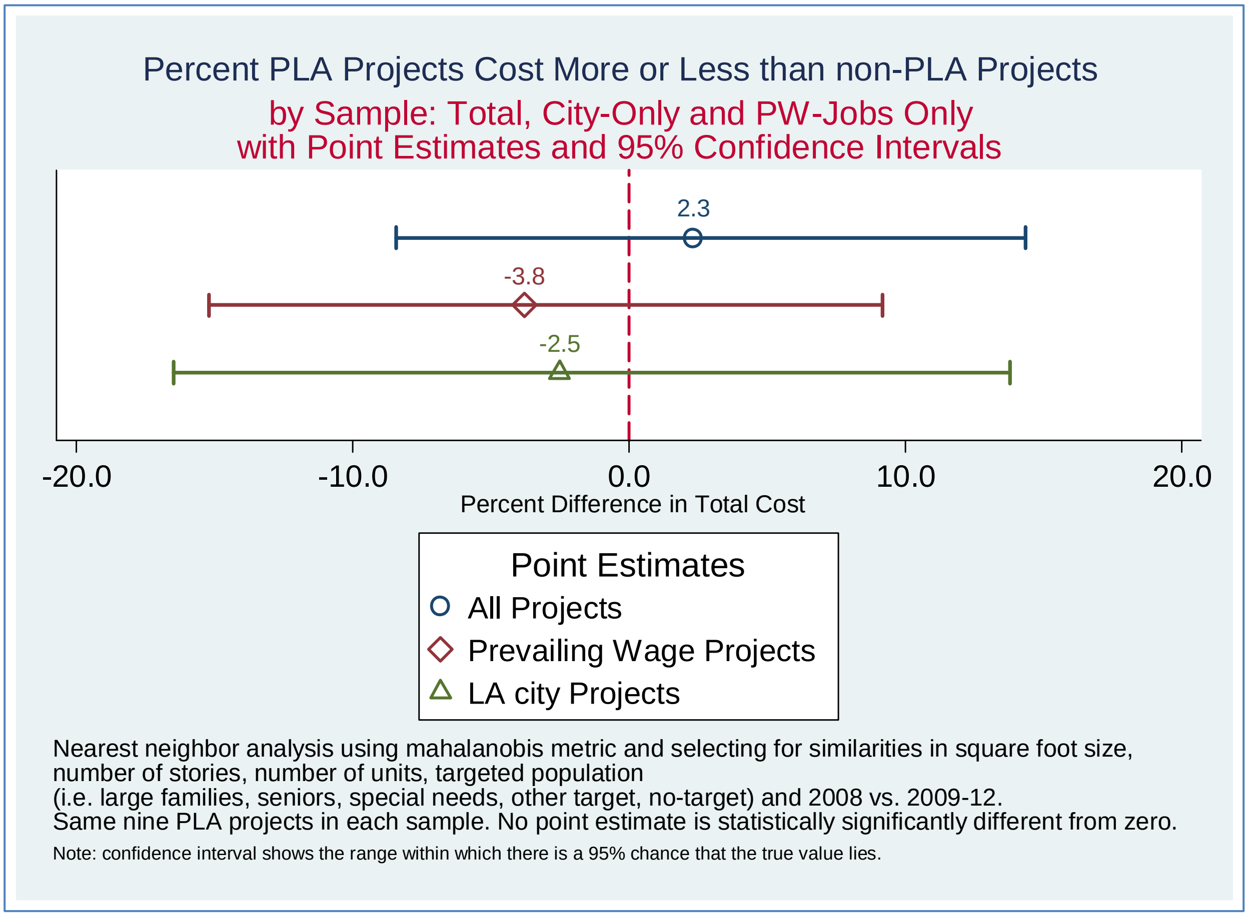


Figure 9: Nearest neighbor analysis: percent construction cost difference PLA projects vs. non-PLA projects

invariant, and takes into account the correlations of the data set." (Wikipedia, "Mahalanobis distance," http://en.wikipedia.org/wiki/Mahalanobis_distance) In our data, square foot size, number of stories, number of units, targeted population and year of construction form the multiple dimensions considered by the Mahalanobis metric. An appendix that contains tables with descriptive variables for the nearest neighbor matches is available from the authors.

[6] In choosing the number of comparisons we follow Alberto Abadie, David Drukker, Jane Leber Herr, and Guido W. Imbens, "Implementing matching estimators for average treatment effects in Stata ," *The Stata Journal* (2004) 4, Number 3, p. 298. They find that using four matches "offers the benefit of not relying on too little information without incorporating observations that are not sufficiently similar."

However, **in all cases, these results were not statistically significant.** This is visually shown by the fact that the 95% confidence intervals overlap the dashed line set at zero. This graphically represents the result that the plus-minus range around the point estimate is wide. Even if the point estimate is positive, the true result might be negative and visa versa. Thus we cannot say with any certainty that PLA requirements had any effect on construction costs one way or the other. This result which takes in the multiple dimensions in which one PLA might differ from another is is consistent both with our visual inspection of the data and the simple approach of taking an average square foot cost and average per unit cost and comparing the PLA with the non-PLA averages.

Our nearest neighbor analysis may be sensitive to the distance metric used to determine each PLA's four nearest neighbor non-PLA projects for comparison. In **Figure 60** we compare the Mahalonobis metric to two alternative metrics of distance between nearest PLA-non-PLA neighbors. We can see that the results are similar. In all cases the point estimate of percent difference in costs between PLA and non-PLA projects are close to zero and more importantly, in all cases, the point estimates are not statistically significantly different from zero. So **regardless of the metric chosen, the conclusion remains the same: there is no statistically significant effect of having applied PLA requirements on these nine PLA projects compared to non-PLA projects built in similar places, similar time periods, of comparable scale and targeted at similar populations.**

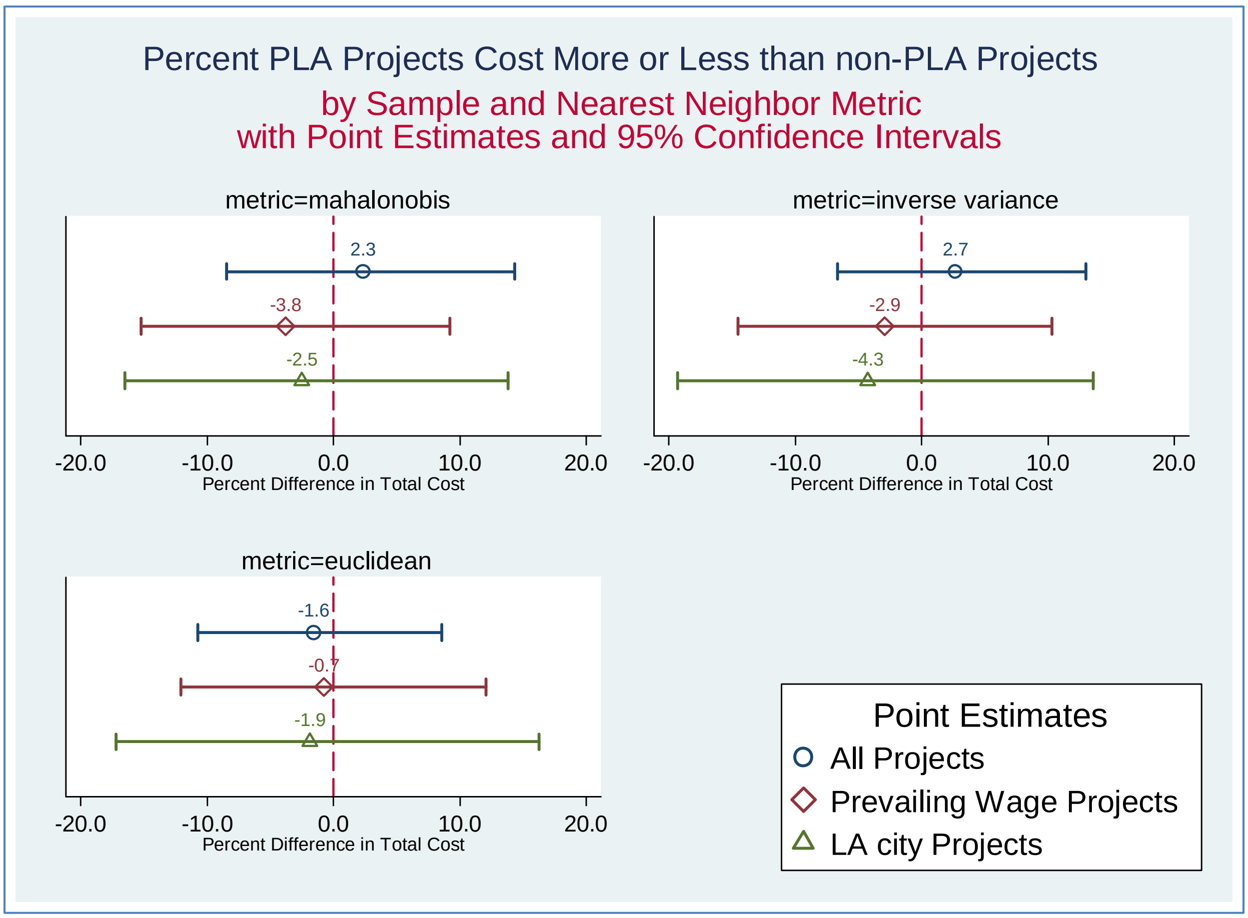


FIGURE 60: COMPARING NEAREST NEIGHBOR RESULTS FOR THREE DISTANCE METRICS

Conclusions and Future Research

We have analyzed construction costs for the nine new affordable housing development projects in Los Angeles that were covered by the CRA/LA's "Construction Careers and Project Stabilization" policy by comparing them to a group of 121 non-PLA new affordable housing developments in Los Angeles county and city. We performed multiple statistical tests on different intra-regional sub-samples. Our conclusion is that there is not even weak evidence to support claims made at the time of adoption of the Construction Careers & Project Stabilization policy that the PLA would increase housing developments' construction costs.

Construction projects are heterogeneous by nature, as are regional markets and institutions that shape the construction industry's economics. The results of this study apply to affordable housing projects between 2008 and 2012 in the Los Angeles metropolitan area. Further research testing the robustness of our findings will require more cases of PLA-covered housing projects in different regions and/or different time periods.

Analysis of data collected for a recent state-sponsored study of affordable housing costs found that in addition to a project's location, the business cycle timing of the project and project scale, *local governmental project approval processes* that require multiple meetings and substantial design revisions can significantly influence affordable housing total development costs. Future research into the variability of land-use approval processes could complement our research and improve knowledge about the sources of cost differences of Los Angeles affordable housing projects.