Variation in Development Costs for LIHTC Projects

Final Report

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Executive Summary

This report examines the factors affecting the cost of developing affordable multifamily rental housing using the federal Low-Income Housing Tax Credit Program (LIHTC). Using data provided by 14 LIHTC syndicators, we analyze development cost data for more than 2,500 projects developed through the LIHTC program and placed into service between 2011 and 2016. These projects include over 160,000 housing units.

Our sample includes approximately 47% of the units in properties developed with 9% credits and 20% of the units in properties developed with 4% credits placed into service between 2011 and 2016. The sample spans the country, including at least two projects in every state and more than 25 projects in each of 35 states.[1]

The primary measure of cost used in this quantitative analysis is "per-unit TDC" which reflects the total development cost for a project (including the cost of land) divided by the number of units in the project. The median per-unit TDC in our sample was $164,757, which means that half of the units had TDC below this level and half had per-unit TDC above that level. Three-quarters of units had per-unit TDC at or below $224,903 and one-quarter had per-unit TDC at or below $121,254.

We used descriptive and regression analyses to investigate which geographic and project characteristics were associated with cost differences. In brief, we found that:

- **Location matters**. Costs were higher for projects developed in principal cities of metropolitan areas, difficult development areas (DDAs), and qualified census tracts (QCTs). Costs were also higher for projects developed in New England, the Mid-Atlantic and the Pacific regions, as compared with other regions. These relationships held true even when we analyzed total development costs without land, suggesting the higher cost of land is not the sole factor driving this finding. Nor is the finding due solely to differences in construction-cost wages, since we controlled for state-level differences in these wages, which also had a significant effect on costs. One potential explanation is that developers adjust to higher land costs by employing different construction methods, like taller buildings and structured parking, which carry a higher cost.
- **Project and unit size matter**. Smaller projects were more expensive per unit to build than larger projects, likely due to the economies of scale of developing larger projects. Projects where the unit size averaged more than 2.5 bedrooms were also more expensive on a per-unit basis.
- **Project type matters**. New construction projects were substantially more expensive than projects developed by acquiring and rehabilitating existing structures. Projects with multiple financing sources were more expensive on a per-unit basis, which could be due to the challenges associated with assembling multiple financing sources or could be due to the need to find multiple financing sources to pay for higher-cost projects.

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1 Since the projects in our sample were compiled based on data provided by participating syndicators, rather than selected at random, the sample cannot be said to be statistically representative of all projects in the United States. It is, nevertheless, a large and robust dataset that includes a large share of the U.S. inventory.

These findings illustrate the important tradeoffs involved in developing affordable housing across the U.S. Projects cost more to build in high-cost areas, but people need affordable housing in these locations just as much as (or even more than) in lower-cost areas. Smaller projects cost more to build on a per-unit basis than larger projects, but larger projects are not desirable in all locations. Smaller units cost less to build but are not appropriate for all household types. Developing projects by acquiring and rehabilitating an existing building is less expensive than new construction, but suitable properties for redevelopment are not available in all of the places where affordable housing is needed, and in some settings (such as a greenfield location), new construction is a very efficient development method.

The text and tables below provide more detail on the key findings in three areas: costs over time, costs across geography, and costs by project characteristics.

Costs over Time

In general, the costs of developing LIHTC projects placed in service between 2011 and 2016 grew in line with the average growth of all construction costs nationwide, which was about 8.4% over this period. After adjusting for an index measuring these nationwide changes in construction costs, the total per-unit development costs for projects placed in service in 2011, 2012, and 2016 did not differ in a statistically significant way from the reference year of 2014 in our main regression model. The per-unit development costs for projects placed in service in 2013 and 2015 were lower than 2014, however.

There is some evidence to suggest that the costs of constructing market-rate apartments rose much faster than the 8.4% increase suggested by the construction costs inflator we used from RS Means, which is a composite measure based on a variety of construction types.[2] We did not independently study the costs of developing non-LIHTC properties, however, and did not observe this rate of sharp increase in construction costs among LIHTC properties.

Costs across Geography

Exhibit ES-1 summarizes the findings of our study with regard to geography. In brief, we found strong associations between the location of a project and per-unit TDC. As one might expect, states with higher residential construction wages had higher costs. Similarly, projects located in the principal city of a metropolitan area had higher costs than projects located in a metropolitan area but outside a principal city (a proxy for a suburban location), which in turn had higher costs than rural projects located outside of a metropolitan area. Cost varied by region, as noted above, a finding that may potentially be explained by the more common use of steel construction, structured parking and other high-cost development types, in areas with higher land costs.

While we found associations between per-unit TDC and the poverty rate of a census tract in certain of our models, we did not find consistent associations across all of our models, suggesting the finding may not be as robust as other findings in the report.

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2 See, e.g., Nicco-Annan, Francisco. 2017. Multifamily Market Commentary – March 2017: Multifamily Construction Costs Still Escalating. Washington, DC: Fannie Mae Multifamily Economics and Market Research Group. Retrieved on June 12, 2018 from http://www.fanniemae.com/resources/file/research/emma/pdf/MF_Market_Commentary_031517.pdf .

Exhibit ES-1. Relationship of location characteristics to per-unit TDC

Factor	Description of relationship to per-unit TDC	Statistical Significance
Region	Costs varied strongly by region, even when we analyzed per-unit TDC without land costs. The highest-cost regions were the New England, Mid Atlantic and Pacific regions. The lowest-cost regions were in the South.	Highest-cost regions were highly significantly different from mid-cost regions.
Project location type	Costs varied by type of area. Projects developed in the principal city of metropolitan areas had the highest costs, followed by metropolitan area projects developed outside of principal cities, followed by projects in non-metro areas.	Highly significant
Difficult to develop area	Projects located in DDAs had higher per-unit costs.	Highly significant
Qualified census tract	Projects located in QCTs had higher per-unit costs.	Highly significant
Construction wages	Projects located in states with higher construction wages had higher per-unit costs.	Highly significant
Poverty rate	We found different results in different models, suggesting the relationship between poverty rate and per-unit TDC is not robust.	Mixed
Note: Mixed indicates we found significant relationships for some categories, but not all, included in the regression model, or that results differed in different regression model. Highly significant indicates significance level of $p < 0.001$. Significant indicates a significance level of $p < .10$.		

Costs by Project Characteristics

Exhibit ES-2 summarizes the findings of our study with regard to project characteristics. The most robust findings were that smaller projects have higher per-unit costs than larger projects and new construction projects have higher costs than acquisition-rehab projects. We also found that projects developed with 9% credits had higher per-unit costs than projects developed with 4% credits and that costs increased as the number of financing sources of a project increased.

In general, we found that projects with a higher average bedroom size had higher per-unit costs, but the differences were most apparent at the extremes. In particular, projects with an average bedroom size of 2.5 bedrooms or more had higher per-unit TDC than projects with fewer than 1.75 bedrooms. Projects serving the elderly had lower costs than projects serving families, though this could potentially be explained by the fact that elderly projects tend to have smaller units. Projects developed by non-profit developers had higher costs than projects developed by for-profit developers in some but not all of our models.

Exhibit ES-2. Relationship of project characteristics to per-unit TDC

Factor	Description of relationship to per-unit TDC	Statistical Significance
Development type	New construction projects had higher costs than acquisition-rehab projects.	Highly significant
Total units	Projects with more units had lower per-unit costs.	Highly significant
Tax credit type	Projects developed with 9% credits had higher per-unit costs than 4% credit projects.	Significant
Financing sources	Costs increased as financing sources increased.	Significant
Average bedrooms	While results differed a bit in different models, in general, we found projects with a higher average bedroom size had higher per-unit costs.	Significant.
Target population	Our main model finds that projects for the elderly had lower per-unit costs than family projects and that special needs projects had higher per-unit costs than family projects. However, these effects did not persist in two of our alternative models.	Mixed
Developer type	In our main model, we found that projects developed by non-profit developers had higher per-unit costs than projects developed by for-profit developers. However, we did not find this result in two of our alternative models.	Mixed

Note: Mixed indicates we found significant relationships for some categories, but not all, included in the regression model, or that results differed in different regression model. Highly significant indicates significance level of $p < 0.001$. Significant indicates a significance level of $p < .10$.

Cost drivers we were unable to consider

While our analysis identified many significant predictors of higher or lower developments costs, there are many additional factors likely to be associated with differences in costs that we could not examine because we did not have sufficient data in our dataset. For example, the following factors may be associated with higher per-unit costs:

- A long development timeline related to obtaining local development approval or addressing local opposition
- A tight labor market that leads to higher labor costs (In some cases, higher wages are required even in the absence of a tight market due to legal requirements associated with certain public financing sources used in conjunction with LIHTC.)
- Certain types of construction, such as steel framing (required in many locations for projects of five stories or more) and structured parking

Some factors could also lead to lower development costs, such as donated land or below-market land transfers and location in a master-planned development where the development approval has already been obtained.

1. Introduction

The Low Income Housing Tax Credit (LIHTC) is the largest resource supporting the development of affordable rental housing in the United States. The program provides a federal tax credit which state and a small number of local housing finance agencies allocate to specific projects to support the creation and preservation of multifamily affordable rental housing. There are two main kinds of credits: a 9% credit that is allocated competitively and a 4% credit that is available for projects funded through tax-exempt bonds.[3]

The purpose of this study is to analyze the costs of developing LIHTC properties, explore how costs vary based on project characteristics and locations and identify which observable factors have the largest impact on project costs. The analysis uses a rich database of 2,547 LIHTC properties containing 162,447 units placed into service between 2011 and 2016 compiled from data provided to Abt by 14 syndicators of LIHTCs.[4] Approximately 97% of these units are affordable units that qualify for LIHTC; the rest are market-rate units located in mixed-income developments.

Since the projects in our sample were compiled based on data provided by participating syndicators, rather than selected at random, the sample cannot be said to be statistically representative of all projects in the U.S. It is, nevertheless, a large and robust dataset that includes a large share of the U.S. inventory. Our sample includes approximately 47% of the units in properties developed with 9% Low-Income Housing Tax Credits,[5] and 20% of the units in properties developed with 4% Credits,[6] placed into service between 2011 and 2016. The sample spans the country, including at least two projects in every state plus DC, Puerto Rico and the Virgin Islands and more than 25 projects in each of 35 states.

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3 The availability of tax-exempt bond financing (and hence 4% credits) is limited by the overall availability of tax-exempt bond authority in a state.

4 The 14 syndicators are: Boston Capital, Boston Financial Investment Management, Cinnaire, City Real Estate Advisors (CREA), Community Affordable Housing Equity Corporation (CAHEC), Enterprise Community Partners, Housing Vermont, Midwest Housing Equity Group (MHEG), National Equity Fund, Northern New England Housing Investment Fund (NNEHIF), Ohio Capital Corporation for Housing (OCCH), R4 Capital, RBC Capital Markets, and WNC & Associates.

5 HUD's LIHTC database identifies a total of 222,542 units in projects developed with 9% credits, including projects with both 9% and 4% credits. This total becomes 252,510 after adjusting for unreported credit type. Our database includes 118,214 units (47%) in 9% projects.

6 HUD's LIHTC database identifies a total of 197,970 units in projects developed with 4% credits (and not 9% credits). This total becomes 224,629 after adjusting for unreported credit type. Our database includes 43,822 (20%) units in 4% projects.

1.1 Research questions

The syndicator database allows us to explore the following research questions:

1. How have Housing Credit development costs varied over time?
2. How do Housing Credit development costs vary by project characteristics and geography?
3. What are the principal observable factors that impact the costs of developing LIHTC properties?

This report provides insights into many of the factors that are associated with development costs, including development size, project type and location. However, there are a number of other factors that may be related to the costs of developing LIHTC properties that are not included in our database because they are not collected by most of the syndicators supplying the data, including costs associated with providing structured parking, paying higher wages, and extended development timelines necessary to address and overcome neighborhood concerns.

1.2 How to Read this Report

The main findings of the report are summarized in the Executive Summary, which may be the most helpful presentation of the findings for a general audience. Researchers may find it useful to focus on the executive summary, the methodology, and the appendices, which present the complete regression results. The bulk of this report provides detail on specific findings, which may be most useful as a resource for readers wishing to better understand the relationship between a specific factor and per-unit TDC.

2. Data and Methods

The data used to analyze development costs come from the 14 tax credit syndicators identified in footnote 4 above. Syndicators receive this data from developers via cost certifications that must be audited by an independent, third party CPA for all projects with 11 or more units. These organizations voluntarily provided data about projects which were placed into service between January 1, 2011 and December 31, 2016, including project characteristics and development costs. Exhibit 2-1 outlines the data requested from the syndicators. Note that not all syndicators provided all of these elements, and some projects were submitted with data for some but not all elements. For example, while the total development costs data for all projects includes land, only 1,130 of the 2,547 projects in the dataset separately break out the cost of land. Where possible and appropriate, we have sought to rely on those data elements that are most commonly populated in the database.

Exhibit 2-1. Data elements requested from tax credit syndicators

Development Costs (actual from cost certifications, by category and sub-category if available)	
Year of final cost certification Year placed in service Total development costs Land and building acquisition Site work Rehab & new construction Interim costs	Permanent financing costs Professional fees Soft costs Capitalized reserves Contractor overhead & profit Developer/consultant fees Syndication costs
Property Characteristics	
HUD Project Number Project Name Address(es) Location (geocode) Number of buildings Construction type (new construction or acquisition/rehab) Building type (single-family, townhouse/duplex, walk-up/garden style, low-rise (2-3 stories w elevator), mid-rise (4-6 stories w elevator), high-rise (7+ stories))	Number of units by bedroom size Average square footage per bedroom size Affordability of units (number of low income and market rate) Type of units (elderly, family, disabled, farmworker, homeless, special needs) Historic property Type of parking (lot, garage, underground) Location in a QCT or DDA
Other Information	
Developer Developer type (for-profit, nonprofit) Sponsor Sponsor type (for-profit, nonprofit, for-profit/nonprofit partnership) Financing amounts & sources Type of tax credit Tax-exempt bond financed Credit set-asides (e.g., Rural development, HOPE VI)	Additional low-income housing use period Change in zoning needed for project Whether the developer used a general contractor Wage rate requirements (prevailing wage, Davis Bacon, etc.) Supportive services provided Investment analysis package available?

2.1 Methodology

The primary measure of the cost of producing a LIHTC development used in this study is per-unit total development cost (per-unit TDC). Per-unit TDC is calculated as the total development cost reported by the syndicator divided by the number of units in the project. The development costs for all projects have been standardized to 2016 dollars using an index of construction costs.[7] Our primary measure of per-unit

7 The Historical Construction Cost Index came from RS Means and is available at: https://www.rsmeansonline.com/references/unit/refpdf/hci.pdf

TDC includes land costs. We have also separately analyzed per-unit TDC excluding land costs; when we report these results we clearly note that land costs have been excluded.

This report analyzes per-unit TDC compared to a number of project factors (e.g., project size) in order to explore variations in development costs for LIHTC projects. For each factor, we first describe how per-unit TDC varies based on that factor. For example, we report on how costs vary by project size. We then discuss the extent to which that factor was found to be significant in our multivariate regression model. The regression allows us to look at the effects of all of the factors taken together to determine the unique contribution of any one factor.

These two analytical approaches look at per-unit TDC in slightly different ways. In reporting how per-unit TDC varies by project characteristic, we weight the results by the number of units in the property. This allows us to say what the typical unit costs to produce that has certain characteristics.[8] In the regression model, by contrast, we analyze the per-unit TDC for each project, consistent with the project-level variation in our dataset.

2.1.1 Descriptive results

Throughout the report we present the results of univariate analyses that compare per-unit TDC across various factors one at a time. These descriptive results present the variation in costs based on a single factor, such as state or census region. This analysis does not hold constant other factors which may influence costs. For example, if a particular state tends to have higher construction labor costs, the higher per-unit TDC in that state may be explained by the higher labor costs.

Each row of each of the descriptive tables includes the number of projects and units in the dataset with that particular characteristic and the 25th, 50th and 75th percentile and average per-unit TDC for units with that characteristic. While our discussion focuses primarily on the median (50th percentile) and in some case the average cost, the 25th and 75th percentile costs can also be useful for showing the range of costs for typical units with each characteristic.

This analysis is useful for understanding how project costs vary based on a range of factors, but should be considered in conjunction with the regression analysis which helps identify which factors are significant, as well as the magnitude of the influence of each factor.

2.1.2 Regression analysis

We also present the results of multivariate regression models that look at multiple factors influencing costs together. This analysis can help explain which factors are driving cost variation and document the relationships between the variables. This analysis also identifies which individual factors have a statistically significant relationship to per-unit TDC. The full model results are included in the Appendix, however, we discuss the results as they relate to each specific factor in the subsequent sections of this report.

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8 If we, instead, presented the descriptive results based on projects instead of units, the median would indicate how much it costs to produce a unit in a typical project. Because smaller projects tend to have a higher per-unit TDC than larger projects, weighting by project leads to somewhat higher average costs than weighting by units. Aside from this, the direction and pattern of the project-weighted results are generally similar to that of the unit-weighted results.

We fit the regression model to the subset of the full dataset for which we had complete or near complete data on key factors, creating and analyzing four models:[9] 1) a model of per-unit TDC including land costs for all 2,526 projects in our sample; 2) a model of per-unit TDC including land cost for just the subset of projects for which we have land cost data (1,123 projects), 3) a model of per-unit TDC *excluding* land cost for just the subset of projects for which we have land cost data (1,123 projects), and 4) a model of per-unit TDC including land costs in which we used continuous versions of some variables (average annual construction costs, development size, and average bedroom size) instead of categorical versions of these variables (all 2,526 projects).[10]

Model 1 is the main model that we report on throughout the report. The inclusion and exclusion of land costs in Models 2 and 3 allows us to better understand the effects of land costs and also help address the concern that land costs can be misleading since in some cases they may be donated or provided at significantly below market value for LIHTC projects. Land costs are not broken out for many of the projects in our dataset (for 1,403 projects); in order to analyze the effect of excluding land costs, we can compare the results from Models 2 and 3 since those models isolate this subset of projects that report land costs. Model 4 helps us understand the effect on per-unit TDC of a one-unit increase in the continuous variables tested in this model.

As discussed above, we developed the regression model at the project level. We determined that a unit-weighted version of per-unit TDC (which is used for the descriptive results) is not appropriate for the regression analysis because the variation in our dataset is at the project-level.

We explore a number of explanatory variables in the regression models, which are described in Exhibit 2-2.

9 We used a logarithmic transformation to analyze any of the versions of costs discussed above in the model. We made this transformation in order to make the coefficients easier to interpret. We imputed missing values and added flags for the projects missing those variables in the regression.

10 While we have data for 2,547 total projects in the database, some projects were missing key data needed for the regression model. Model 1, which is our main regression model, and Model 4 are based on 2,526 projects.

Exhibit 2-2: Explanatory variables for regression model

Variable	Description	Potential Relationship to per-unit TDC
Project year	Year project placed in service	We include this in the model to control for potential differences over time not captured in the construction cost inflation factor used to adjust projects in earlier years to 2016 dollars.
Location characteristic variables		
Region	Census region	Costs may vary by area of the country due to regional differences in building costs or the types of projects needed in different areas.
Project location type	Metro area, principal city/metro area, non-principal city/non-metro area	Projects in different types of geographies may have different costs related to differences in building costs, access to financing, or local factors such as community opposition.
Poverty Rate	Percent of census tract population in poverty	Projects in areas with higher poverty rates may be less expensive due to differences in project costs or the types of projects demanded. Areas with low poverty rates could also oppose LIHTC development to a greater extent, which may increase costs.
DDA	Difficult to develop area	This HUD designation is intended to identify areas that have high construction, land, and utility costs relative to area income. These projects receive a basis boost under federal LIHTC rules. We anticipate higher TDC in DDAs.
QCT	Qualified census tract	This designation indicates areas that have high concentrations of low income residents; they receive a basis boost under federal LIHTC rules. We anticipate higher TDC in QCTs.
Construction wages	State annual average wage for construction labor	We expect higher per-unit TDC in states with higher construction wages.
Project characteristic variables		
Tax credit type	9% or 4%	Tax credit projects can qualify for either 9% or 4% credits based on project scope and other criteria. These criteria could be associated with higher or lower costs.
Development type	New construction or acquisition-rehab	Projects with different development scopes may have different costs.
Total units	Total units in the project	Projects with more units may be able to spread fixed costs over more units, reducing per-unit TDC.
Average bedrooms	Average bedrooms per unit for project overall	Larger units might cost more to produce, increasing per-unit TDC.
Target population	Indicates specific population for the development (i.e.: elderly, homeless, etc.)	Projects targeted to specific populations may have features associated with greater costs, like supportive services or physical alterations to accommodate particular needs.

Variable	Description	Potential Relationship to per-unit TDC
Developer type	For profit or non-profit developer	The financial structure of the developer may affect the overall TDC. Previous studies have found that non-profit developers are associated with higher cost projects.
Financing sources	Number of financing sources	Projects with more financing sources face more requirements which may increase TDC.

Sources: These data were primarily reported by each syndicator. Additional data for the following variables was obtained as noted below:

Project location type: OMB defined areas, August 2017

Poverty rate: HUD AFFH Database of ACS 2009-2013 5-year estimates.

DDA: Used indication of location in DDA as reported by each syndicator, but if data were not available, used DDA definitions for 2015.

QCT: Used indication of location in QCT as reported by each syndicator, but if data were not available, used QCT definitions for 2015.

Construction wages: Bureau of Labor Statistics, Department of Labor, Occupational Employment Statistics (OES) Survey, May 2015 OES Estimates for Construction Laborers (OCC Code 47-2061) in Residential Building Construction (NAICS 236100).

We also tested but ultimately did not include some variables in our model. These variables were excluded for a number of reasons. We excluded a variable indicating if a project used tax-exempt bonds because it was too closely related to the type of tax credit used. We excluded a separate variable for each state because we didn't have enough variation to model on that variable. And we excluded three variables – if a general contractor was used or not, if the project included supportive services, and the building type (high rise, garden apartment, etc.) – because the information was missing for too many projects.

Regression analysis is an important analytical tool, but it has some limitations. First, although it can indicate the size and strength of a relationship between a factor and an outcome, it generally does not provide conclusive evidence that the factor causes the outcome. Second, the size and strength of the relationships observed in regression analysis depend on how each regression model is constructed and reflect statistical probabilities rather than certainties. Although it is unlikely that the results are the consequence of random chance or variations in the sample, it is possible.

3. Factors affecting per-unit Total Development Costs

The following section discusses how costs vary based on a number of project characteristics and geographical factors. For each factor, we include descriptive tables which present the relationship between that factor and per-unit TDC and then describe the results of our regression analysis which isolates the relative contribution of that factor.

3.1 Overall Costs

Our database includes 2,547 projects that, together, provided 162,447 housing units of affordable rental housing. Overall, the median TDC for these units was $164,757, which means that half of the units had per-unit TDC below this level and half had per-unit costs above that level. Seventy-five percent of units had per-unit TDC at or below $224,903 and 25 percent had per-unit TDC at or below $121,254. The average (or mean) per-unit TDC was $182,498.

3.2 Costs over time

Exhibit 3-1 shows how the median per-unit TDC changed over time. The first two columns show how the median per-unit cost changed *before* adjusting for general construction costs inflation and the last two columns show how median per-unit costs changed *after* adjusting for construction costs inflation so that all adjusted costs are represented in 2016 dollars. The "unit-weighted" results show the median cost to produce a unit in a LIHTC project and the "project-weighted" results show the median per-unit cost to produce a LIHTC project.

Exhibit 3-1. Median Per-Unit TDC by Year with and without inflation adjustments

	Unadjusted		Adjusted for Construction Cost Inflation	
Year	Unit-Weighted	Project-Weighted	Unit-Weighted	Project-Weighted
2016	$166,817.26	$176,070.14	$166,817.26	$176,070.14
2015	$162,680.09	$171,743.22	$163,662.07	$172,779.90
2014	$175,489.63	$182,593.25	$177,621.09	$184,810.99
2013	$159,182.30	$168,663.48	$164,105.47	$173,879.88
2012	$143,669.99	$161,737.27	$153,166.30	$172,427.79
2011	$147,882.24	$165,015.31	$160,392.88	$178,975.40
All Years	$159,373.94	$171,102.39	$164,757.09	$177,152.95
Note: "Adjusted for Construction Cost Inflation" columns reflect 2016 dollars as adjusted by the RS Means Historical Cost Index.				

This exhibit illustrates a number of points:

- As shown in the unadjusted results, per-unit costs generally rose over time. After adjusting for general construction costs inflation, however, this trend largely disappears. This means LIHTC construction costs generally grew at about the same rate as overall construction costs.
- The per-unit cost to produce a typical project was somewhat higher than the per-unit cost to produce a typical unit. This is likely because the project-weighted results give the same weight to the cost to

produce a 10-unit project as a 100-unit project, despite the economies of scale that lead larger projects to have lower per-unit costs.

- The highest per-unit costs were in 2014 in all of the columns. It is not clear why 2014 is an outlier.

While we show all four columns in Exhibit 3-1, we focus in the balance of this report on the inflation-adjusted costs. By adjusting per-unit costs for annual construction costs inflation, we are able to analyze projects for all years at the same time to create a larger dataset capable of more robust analysis.

Exhibit 3-2 provides more detail on how inflation-adjusted unit-weighted per-unit costs have changed over time. As shown in the exhibit, between 2011 and 2016, median per-unit TDC varied from $153,166 to $177,621with an overall median of $164,757 and average of $182,498. The highest median costs were in projects placed into service in 2014 and the lowest costs were for those placed in service in 2012.

Costs varied by a large degree within each year. From 2013 to 2016, per-unit TDC varied by approximately $100,000 from the 25th percentile to the 75th percentile each year. In all years, even the highest cost year of 2014, 25 percent of LIHTC units were produced for less than $135,000 per unit and 75 percent of units were produced for less than $240,000 per unit. Mean per-unit TDC exceeded the median in all cases, indicating that a minority of high-cost projects pulled up the overall average.

Exhibit 3-2. Per-unit TDC from 2011 to 2016

	Number of projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
2016	399	24,639	$120,906	$166,817	$237,721	$186,325
2015	424	27,733	$121,520	$163,662	$221,236	$177,784
2014	411	26,210	$133,050	$177,621	$233,066	$195,875
2013	467	29,399	$120,473	$164,105	$224,244	$181,162
2012	467	29,888	$115,839	$153,166	$218,719	$175,852
2011	379	24,578	$115,893	$160,393	$214,031	$179,393
All years	2,547	162,447	$121,254	$164,757	$224,903	$182,498
Note: All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.						

Our regression analysis found that the inflation-adjusted per-unit costs for projects placed into service in 2011, 2012, and 2016 did not differ significantly from those placed into service in 2014, confirming that per-unit costs generally increased over time at about the same rate as general construction costs inflation. However, per-unit costs in 2013 and 2015 were statistically significantly lower than those of 2014. We do not know what accounts for this pattern.

There is some evidence to suggest that the costs of constructing market-rate apartments rose much faster than the 8.4% increase reflected in the RS Means construction costs inflator, which is a composite measure based on a variety of construction types.[11] We did not independently study the costs of

[11] See, e.g., Nicco-Annan, Francisco. 2017. Multifamily Market Commentary – March 2017: Multifamily Construction Costs Still Escalating. Washington, DC: Fannie Mae Multifamily Economics and Market Research

developing non-LIHTC properties, however, and did not observe this rate of sharp increase in construction costs among LIHTC properties.

Exhibit 3-3. Regression model results for project year

	Effect (Coefficient)	Statistical Significance
Model 1: All projects, per-unit TDC including land cost		
2011	-$6,646.39	
2012	-$4,949.84	
2013	-$14,271.21	**
2014	**Reference year**	
2015	-$11,320.36	**
2016	-$6,183.90	

Notes: *** indicates statistically significant at the <0.001 level, ** indicates statistically significant at the <0.05 level, * indicates statistically significant at the <0.1 level.
The regression results presented in this table are derived from a model that included all of the explanatory variables. See the Appendix for the full regression results.

3.3 Costs across geography

3.3.1 Regional differences

Units produced in some regions of the country had much higher TDC than units produced in other regions. The differences across Census regions are shown in Exhibit 3-4. Median per-unit TDC was highest in the Middle Atlantic ($237,375), New England ($234,101) and Pacific ($218,107) regions. Median per-unit TDC was lowest in the Southern regions: East South Central ($127,952), South Atlantic ($129,018) and West South Central ($135,104).

Group. Retrieved on June 12, 2018 from http://www.fanniemae.com/resources/file/research/emma/pdf/MF_Market_Commentary_031517.pdf .

Exhibit 3-4. Per-unit TDC by region

	Number of Projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
Northeast						
-- Division 1: New England	183	10,224	$174,277	$234,101	$305,138	$251,197
-- Division 2: Middle Atlantic	233	17,513	$169,068	$237,375	$292,601	$233,935
Midwest						
-- Division 3: East North Central	503	29,234	$110,333	$152,596	$208,776	$166,856
-- Division 4: West North Central	271	12,191	$125,220	$168,564	$200,744	$169,762
South						
-- Division 5: South Atlantic	522	34,429	$98,435	$129,018	$171,546	$141,247
-- Division 6: East South Central	180	9,099	$93,307	$127,952	$172,664	$133,382
-- Division 7: West South Central	170	14,130	$114,172	$135,104	$151,740	$137,409
West						
-- Division 8: Mountain	159	10,407	$146,605	$183,192	$207,206	$179,157
-- Division 9: Pacific	315	24,231	$167,820	$218,107	$284,934	$241,160
All areas[12]	**2547**	**162,447**	**$121,254**	**$164,757**	**$224,903**	**$182,498**

Notes: These regions are the same as the U.S. Census divisions:
Division 1 – New England: Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont
Division 2 – Mid Atlantic: New Jersey, New York, Pennsylvania
Division 3 – East North Central: Illinois, Indiana, Michigan, Ohio, Wisconsin
Division 4 – West North Central: Iowa, Kansas, Minnesota, Missouri, North Dakota, Nebraska, South Dakota
Division 5 – South Atlantic: Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
Division 6 – East South Central: Alabama, Kentucky, Mississippi, Tennessee
Division 7 – West South Central: Arkansas, Louisiana, Oklahoma, Texas
Division 8 – Mountain: Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, Wyoming
Division 9 – Pacific: Alaska, California, Hawaii, Oregon, Washington

A map showing the boundaries of these Census divisions available at:
https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf

All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.

12 Also includes 11 projects in US Territories

Exhibit 3-5 shows results for the subset of projects where we have land costs separately broken out, both with and without land costs included. As one would expect, removing land costs from our calculation of per-unit TDC reduces per-unit costs in all regions. However, the highest-cost areas (Middle Atlantic, New England, Pacific) remain the same as do most of the lowest-cost areas (South Atlantic, East South Central). East North Central falls to one of the lowest cost areas when land costs are excluded.

Exhibit 3-5. Per unit TDC with and without land costs by region

	Number of Projects	Number of Units	Median per unit TDC land costs included	Median per unit TDC land costs excluded
Northeast				
-- Division 1: New England	115	4,280	$229,711	$196,203
-- Division 2: Middle Atlantic	109	8,336	$256,958	$228,884
Midwest				
-- Division 3: East North Central	263	14,726	$149,513	$126,087
-- Division 4: West North Central	177	6,742	$158,584	$145,612
South				
-- Division 5: South Atlantic	126	9,983	$135,380	$111,462
-- Division 6: East South Central	65	3,468	$142,567	$125,159
-- Division 7: West South Central	68	3,898	$151,740	$141,740
West				
-- Division 8: Mountain	74	4,296	$200,477	$180,129
-- Division 9: Pacific	128	9,715	$241,839	$202,852
All areas[13]	**1130**	**65,987**	**$177,799**	**$147,879**
All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.				

Our regression results again confirm the findings from the descriptive analysis. Exhibit 3-6 shows which census regions had a statistically significant per-unit TDC compared to the reference region (Mountain). As expected, New England, Middle Atlantic and Pacific were all statistically significantly higher in costs compared to the reference region, and all by over $60,000. Per-unit TDC in the East North Central region was higher than the Mountain region by a statistically significant, though much lower amount ($17,374); per-unit TDC in the South Atlantic region was statistically significantly lower than costs in the reference region by about $14,000.

[13] Includes 5 projects in US Territories

Exhibit 3-6. Regression model results for region

	Effect (Coefficient)	Statistical Significance
Model 1: All projects, per-unit TDC including land cost		
Northeast		
-- Division 1: New England	$81,683.59	***
-- Division 2: Middle Atlantic	$78,417.40	***
Midwest		
-- Division 3: East North Central	$17,374.35	***
-- Division 4: West North Central	-$5,982.18	
South		
-- Division 5: South Atlantic	-$13,991.49	***
-- Division 6: East South Central	-$3,937.66	
-- Division 7: West South Central	-$6,217.90	
West		
-- Division 8: Mountain	Reference Region	
-- Division 9: Pacific	$67,108.77	***
Notes: *** indicates statistically significant at the <0.001 level, ** indicates statistically significant at the <0.05 level, * indicates statistically significant at the <0.1 level. The regression results presented in this table are derived from a model that included all of the explanatory variables. See the Appendix for the full regression results.		

To better understand whether the inclusion of land costs in our measure of TDC may have influenced these results, we developed two otherwise identical models for only the subset of projects for which we had land cost information. We then tested which model variables were significant in influencing per-unit TDC, when measured with and without land included. In both of these models, the New England, Middle Atlantic, and Pacific regions had higher costs than the reference region (Mountain), indicating that cost differences in these regions are not driven solely by land cost differences.

One potential explanation for these findings is that high land costs may lead to denser development and therefore the use of higher-cost construction features such as construction with structured parking or steel framing. Under this hypothesis, higher land costs are indirectly related to higher per-unit TDC through these types of changes in construction. We did not have the information about differences in construction methods needed to test this hypothesis.

3.3.2 Other area types

In addition to regional and state variations, some types of geographical areas had higher or lower costs. Per-unit TDC was highest in principal cities in metro areas and lowest in non-metro areas, with costs for properties developed in metro areas outside of the principal city (a proxy for suburban areas) in between. Like the regional differences, this could potentially be related to the use of higher-cost construction types in metro areas, and particularly in principal cities. It could also be due to the increased cost of regulatory compliance and infill development in urban areas.

The location of a property in a tract designated as a DDA or a QCT[14] appears to have a strong and clear relationship to project costs. The per-unit TDC of projects located in qualified census tracts (QCT) were higher than other projects. Similarly, median per-unit costs were higher in areas designated by HUD as Difficult to Development Areas (DDAs) than in other areas. Under federal law, projects located in either a QCT or a DDA receive a "basis boost" that qualifies them for additional credits in recognition of the higher costs associated with developing in these areas.

In our descriptive data, per-unit TDC did not show a simple linear relationship to the percentage of poor families in a particular census tract, though costs were highest in areas with a poverty rate of 40 percent or more and higher in areas with a poverty rate at or below 10 percent than in areas with poverty rates between 10.01 and 40 percent.

Exhibit 3-7. Per unit TDC by select location characteristics

	Number of Projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
Area type						
-- Metro Area, principal city	981	73,620	$133,260	$180,912	$250,377	$202,141
-- Metro Area, not a principal city	787	51,121	$122,625	$164,844	$214,467	$178,488
-- Non-metro area	621	24,518	$95,795	$132,265	$179,511	$147,360
Area concentrations of poor families						
-- 0% - 10%	406	23,826	$136,869	$174,034	$232,626	$189,904
-- 10.01% - 20.00%	653	40,632	$118,286	$160,309	$218,107	$177,343
-- 20.01% - 30.00%	538	32,512	$113,544	$161,813	$221,320	$181,079
-- 30.01% - 40.00%	392	25,485	$121,520	$156,106	$217,051	$177,477
-- > 40.00%	318	22,094	$136,060	$189,619	$254,811	$203,561
Difficult to Develop Area						
-- Not in DDA	1733	104,305	$114,875	$151,910	$207,206	$168,775
-- In a DDA	812	58,044	$136,286	$181,975	$255,020	$206,693
Qualified Census Tract						
-- Not in a QCT	1562	94,749	$116,238	$154,558	$206,740	$171,825
-- In a QCT	985	67,698	$128,530	$179,563	$246,567	$197,436
All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.						

The results of our regression analysis confirm a strong, positive relationship between per-unit TDC and location in a DDA or QCT. We also found statistically significant, positive relationships between per-unit TDC and being located in a principal city in a metro area and a statistically significant, negative

14 Projects in these areas receive a 30% basis boost, which means those properties are eligible for up to 30 percent more credit equity.

relationship of being located in a non-metro areas compared to metro areas that are not in a principal city. These effects were quite large. We found smaller, weaker but in some cases still significant relationships between costs and poverty concentration.

Exhibit 3-8. Regression results for select location characteristics

	Effect (Coefficient)	Statistical Significance
Model 1: All projects, per-unit TDC including land cost		
Area type		
-- Metro Area, principal city	$26,128.53	***
-- Metro Area, not a principal city	Reference	
-- Non-metro area	-$21,102.13	***
Area concentration of poor families		
-- 0% - 10%	$8,879.21	**
-- 10.01% - 20.00%	$7,143.05	*
-- 20.01% - 30.00%	Reference	
-- 30.01% - 40.00%	-$13,106.46	**
-- > 40.00%	$3,452.82	
Difficult to Develop Area (DDA)		
In a DDA	$26,081.68	***
Not in a DDA	Reference	
Qualified Census Tract (QCT)		
In a QCT	$19,621.67	***
Not in a QCT	Reference	

Notes: *** indicates statistically significant at the <0.001 level, ** indicates statistically significant at the <0.05 level, * indicates statistically significant at the <0.1 level.

The regression results presented in this table are derived from a model that included all of the explanatory variables. See the Appendix for the full regression results.

Location in a DDA was associated with an increase in per-unit TDC of approximately $26,000, and location in a QCT was associated with an increase in per-unit TDC of nearly $20,000. The positive relationship between costs and these areas persisted when we modeled costs with and without land costs; however, the relationship for QCTs became less significant when land costs are excluded and the magnitude falls to less than $10,000. When land costs are excluded, the relationship between location in either a metro area, principal city, or a non-metro area remained highly significant.

The main regression results show that per-unit TDC was highest in low-poverty areas (0-10%) and costs then dropped for each successive poverty range (10-20%, 20-30%, and 30-40%), bottoming out at projects located in the 30-40% range. Costs then increase for projects located in areas with poverty rates above 40%, but the costs for projects in that range are not significantly different from costs in the 20-30% reference range. This relationship was different in Models 2 and 3, where per-units costs for projects located in area with poverty rates above 40% were the only area that was significantly more expensive than the reference region (20.01-30% poverty). When we treated unit size, average bedroom size and state construction wages as continuous variables in our fourth model, variations in tract poverty rate became insignificant, other than units in census tracts with a poverty rate between 30.01 and 40%, which had a lower cost than the reference range of 20-30%. These results suggest that the relationship of poverty rate to per-unit TDC is neither linear nor robust.

3.3.3 Construction wages

Construction wages vary across the U.S. and are a key component of construction costs, so it was important to control for this variation. In our dataset, annual state residential construction wages ranged from $18,000 to $43,000, with a median of $31,000.

In our regression analysis we observed a highly statistically significant relationship between costs and wages, with projects in states with average annual construction wages of $33,001 or more approximately $26,600 more expensive than projects in states with average annual wages from $30,001 to $33,000 (Exhibit 3-9). This relationship persisted in our models which examined land costs. Per-unit TDC for properties in states with average annual construction wages below $30,000 were lower than the reference range of $30,001 to $33,000, but not significantly different. Since this could be due to how we chose to define the categories, we also tested a model (Model 4) with a continuous (instead of categorical) version of annual construction wages. In this model, an increase of $1,000 in average annual construction wages was highly statistically significantly associated with an increase in per-unit TDC of approximately $4,700.

Exhibit 3-9. Regression results for construction wage categories

	Effect (Coefficient)	Statistical Significance
Model 1: All projects, per-unit TDC including land cost		
Annual Labor Wage: $0 - $30,000	-$3,688.22	
Annual Labor Wage: $30,001 - $33,000	**Reference**	
Annual Labor Wage: $33,001 or More	$26,566.28	***

Notes: *** indicates statistically significant at the <0.001 level, ** indicates statistically significant at the <0.05 level, * indicates statistically significant at the <0.1 level

The regression results presented in this table are derived from a model that included all of the explanatory variables. See the Appendix for the full regression results.

3.4 Costs by project characteristics

Some project characteristics were associated with differences in per-unit TDC. Projects developed through 9% credits tended to have higher costs than projects developed through 4% credits (though this was not true for all of the models examined) and new construction projects tended to have higher costs than acquisition-rehab projects. Projects with more units also tended to have a lower per-unit TDC.

Costs also varied by average bedroom size. In our descriptive results, units had the lowest TDC when they were located in projects that had primarily one- and two-bedroom units, and the highest per-unit TDCs when they were located in projects that had large shares of studios or three-bedroom units. In our regression model, the apparently higher costs of studios disappeared and the results show progressively higher costs as projects have larger bedroom sizes.

3.4.1 Tax credit type

Our dataset included projects developed with both 9% and 4% tax credits.[15] However, we had more 9% projects (2,097 compared to 440) to analyze. In our initial descriptive analysis, which reports the median per-unit cost of all units in the dataset, we did not see a large difference in median costs, as units developed with 9% credit had median costs within approximately $1,500 of both the overall median and the median for units developed with 4% credits. In these results, the median unit in a 9% tax credit project had a slightly lower TDC than the median unit in 4% project but a somewhat higher mean. Analyzing the results on a project-weighted basis (not shown in the table) produces very different conclusions, with the median per-unit TDC of a 4% credit project falling nearly $34,000 below than of the median per-unit TDC of a 9% credit project. This was one of the few times in our analysis when the project-weighted results led to different conclusions from the unit-weighted results.

Exhibit 3-10. Per unit TDC by tax credit type

	Number of Projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
4% Credits	440	43,822	$109,810	$166,262	$223,243	$179,845
9% Credits	2,097	118,214	$124,645	$164,616	$226,038	$183,429
All projects	2,537	162,036	$121,402	$164,912	$224,903	$182,460
All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.						

The regression results were also somewhat difficult to interpret. In three of our four regression models, we found a statistically significant difference in per-unit TDC for 9% projects compared to 4% projects. Nine percent projects had statistically significantly *higher* per-unit TDCs compared to 4% projects in our main model, with costs for 9% projects averaging $12,745 more per-unit. The results of Models 2 and 3 that examined the effects of land costs were somewhat confusing, however. For the subset of projects for which we modeled land costs, the significant and higher costs for 9% projects did not hold when land costs were included (Model 2) but did show up when land costs were excluded (Model 3). Projects developed with 9% credits were also more expensive in Model 4 which included continuous variables.

Overall, these results suggest that projects with 9% credits were more expensive than projects with 4% credits, but the relationship appears sensitive to how it is analyzed, suggesting our finding for this variable may not be quite as robust as some of the other findings noted in this report.

3.4.2 Development type

Features of the development process can also be associated with higher or lower per unit TDC. Our descriptive results found that new construction projects had per-unit TDCs that were nearly $60,000 higher than acquisition-rehab projects. The higher cost of new construction is consistent with findings from other studies.[16] New construction can be more costly since it requires site work, utility development

[15] Some acquisition-rehab projects had both 9% and 4% credits. We treated these as 9% units, as the 4% credits come from within the state volume cap and are not triggered by the use of tax-exempt bonds.

[16] Charles Wilkins, Maya Brennan, Amy Deora, Anker Heegaard, Albert Lee & Jeffrey Lubell (2015) Comparing the Life-Cycle Costs of New Construction and Acquisition-Rehab of Affordable Multifamily Rental Housing, Housing Policy Debate, 25:4, 684-714, DOI:10.1080/10511482.2014.1003141

and construction that are often not part of rehab projects. However, some rehab projects have higher costs than new construction projects, particularly if the building or site has environmental hazards or contamination that requires remediation.

Exhibit 3-11. Per unit TDC by development type

	Number of Projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
New Construction	1,425	81,595	$146,246	$190,804	$249,236	$209,095
Acquisition-Rehab	1,077	77,861	$98,045	$131,074	$183,192	$153,394
All projects[17]	2,547	162,447	$121,254	$164,757	$224,903	$182,498
All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.						

Our regression results confirm that acquisition-rehab projects had much lower costs than new construction. We found that acquisition-rehab projects had a per-unit TDC that was, on average, $44,029 less per unit than that of new construction projects, and the effect was highly significant at the <0.001 level. The direction, scale and significance of the effect persisted in all of our models. This indicates that land costs were not driving the difference in cost between new construction and acquisition-rehab projects.

3.4.3 Total units

As expected, per-unit TDC decreased as the number of units in the project increased. Projects with more units can spread fixed development costs over a greater number of units, which likely drove this trend. Units located within projects of fewer than 100 units had median costs above the median for the entire database, while units located in projects with 100 or more units had median costs below the median for the entire database, suggesting that larger projects benefited from economies of scale.[18] Large projects are not possible or desirable in all settings, however.

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17 Total includes 45 projects that are identified as a mix of both development types.

18 Note that the median TDC for units in projects of more than 200 units was higher than that of units in projects with 101 to 200 units, though this finding did not hold true for the average costs, where the trend was linear throughout the range.

Exhibit 3-12. Per unit TDC by total unit categories

	Number of Projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
0 - 10 Units	15	141	$160,473	$193,440	$216,518	$252,647
11 - 25 Units	352	7,293	$115,130	$187,263	$247,340	$197,628
26 - 50 Units	1040	41,036	$129,816	$182,512	$242,837	$197,305
51 - 100 Units	818	58,046	$128,385	$172,664	$237,769	$190,704
101 - 200 Units	244	33,084	$115,839	$140,485	$195,616	$165,023
201 or more Units	78	22,847	$100,489	$151,740	$180,912	$155,095
All projects	2547	162,447	$121,254	$164,757	$224,903	$182,498
All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.						

As shown in Exhibit 3-13, the regression results support the hypothesis of a strong relationship between per-unit TDC and development size in the expected direction suggested by the descriptive results. These relationships retained their strength, significance and magnitude in the alternative models that tested for including and excluding land costs. We also tested a model (Model 4) with a continuous (instead of categorical) version of development size. In this model, an increase of 10 units was statistically significantly associated with a decrease in per-unit TDC of approximately $3,000.

Exhibit 3-13. Regression results for total unit categories

	Effect (Coefficient)	Statistical Significance
Model 1: All projects, per-unit TDC including land cost		
0 - 25 Units	$16,130.26	***
26 - 50 Units	**Reference**	
51 - 100 Units	-$22,675.83	***
101 or more Units	-$40,402.50	***

Notes: *** indicates statistically significant at the <0.001 level, ** indicates statistically significant at the <0.05 level, * indicates statistically significant at the <0.1 level.

The regression results presented in this table are derived from a model that included all of the explanatory variables. See the Appendix for the full regression results.

3.4.4 Average bedrooms

Per-unit TDC appears to be related to unit size (as measured by the average number of bedrooms in a project); however, in the descriptive results, the pattern in this relationship was not straightforward. We would expect that larger units would have higher per-unit TDCs because they require more square footage, and thus more materials and land, all else being equal. This pattern holds true for projects with a large share of units of 3 or more bedrooms. Per unit TDC increases as the number of bedrooms increases for projects with an average number of bedrooms per unit more than 2. Similarly, projects with the highest average bedroom size had the highest median per-unit TDC. However, for projects with an average unit size of 2 bedrooms or less, per-unit TDC decreases as the number of bedrooms per unit increases, a puzzling finding.

Exhibit 3-14. Per unit TDC by average bedroom categories

	Number of Projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
Zero	34	3,107	$165,435	$230,407	$287,663	$234,628
0.01-0.50	24	3,437	$100,489	$189,619	$229,711	$184,150
0.51-1.00	58	4,318	$123,420	$181,474	$280,206	$201,846
1.01-1.50	716	43,129	$114,172	$152,042	$209,332	$170,036
1.51-2.00	509	33,726	$115,771	$150,615	$195,340	$165,626
2.01-2.50	457	34,648	$116,886	$150,687	$210,571	$174,983
2.51-3.00	156	9,534	$142,964	$196,632	$249,562	$212,567
3.01-3.50	26	1,364	$156,097	$206,553	$232,907	$205,049
3.51-4.00	14	458	$227,303	$240,184	$272,665	$250,990
4.01 or higher	5	206	$245,766	$261,842	$272,608	$259,713
All projects	1999	133,927	$117,170	$158,355	$218,107	$176,891
All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.						

Our regression results help to explain some of these differences. Since we found a non-linear relationship between costs and bedroom size in the descriptive data, we chose to model the relationship by comparing independent categories to a reference category. Our findings suggest that per-unit costs increase as average bedroom size increases, but the relationship was only statistically significant when the average number of bedrooms was 2.5 or more. The higher per-unit cost of projects with an average number of bedrooms of 2.5 or more persisted in the models that explore the effects of land costs (Models 2 and 3).[19] We also tested a model (Model 4) with a continuous version of bedroom size. In this model, an increase of 1 average bedroom was statistically significantly associated with an increase in per-unit TDC of approximately $12,700.

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19 There was some additional variation evident in the models that control for land costs (Models 2 and 3). Specifically, in this subset of properties, we found that when including land in the measure of per-unit TDC (Model 2), projects with average bedroom sizes between 1.25 and 2.499 had significantly higher costs than projects with average bedroom sizes below 1.25. However, those differences become insignificant when we excluded land costs (Model 3), suggesting that the increased cost of land associated with larger bedroom units partially explains the relationship between bedroom size and per-unit TDC.

Exhibit 3-15. Regression results for average bedroom categories

	Effect (Coefficient)	Statistical Significance
Model 1: All projects, per-unit TDC including land cost		
Average Bedrooms: 0 - 1.249	**Reference**	
Average Bedrooms: 1.25 - 1.749	$2,581.98	
Average Bedrooms: 1.750 - 2.499	$6,194.92	
Average Bedrooms: 2.5 or more	$23,733.14	***
Notes: *** indicates statistically significant at the <0.001 level, ** indicates statistically significant at the <0.05 level, * indicates statistically significant at the <0.1 level. The regression results presented in this table are derived from a model that included all of the explanatory variables. See the Appendix for the full regression results.		

3.4.5 Target population

Per-unit TDC was highest for units in projects designated to serve people with special needs and the homeless (including SROs), and lowest for units in projects that serve the elderly. This is not surprising because projects serving people with special needs and the homeless typically include supportive services in addition to living spaces, which may require more common space and private meeting space. Family projects and assisted living projects had median costs around the same as for all projects.

Exhibit 3-16. Per unit TDC by target population

	Number of Projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
Elderly	678	41,809	$120,473	$150,979	$202,710	$166,997
Family	1281	84,030	$119,889	$167,232	$225,012	$183,063
Homeless	107	7,586	$171,661	$229,711	$284,934	$237,180
Special Needs	119	6,758	$157,751	$196,632	$265,380	$216,176
Assisted Living	27	1,617	$146,234	$165,286	$189,781	$170,660
SRO	30	2,301	$101,728	$225,325	$328,293	$225,048
All Projects	2252	145,611	$122,637	$166,425	$225,148	$183,220
Notes: This table only includes categories where the dataset contained more than 25 projects. All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.						

In our regression analysis, we found that costs were lower for projects serving the elderly and higher for projects serving those with special needs. These effects persisted in the model that used continuous rather than categorical variables (Model 4). However, these effects were not significant in either model (Models 2 and 3) that looked at the subset of projects for which we had land cost information. This suggests that these findings may be susceptible to the selection of projects analyzed or that the sample size in Models 2 and 3 was not sufficient to detect an association.

It is possible that the findings of lower costs for elderly properties in Models 1 and 4 may be related to their smaller average bedroom size. While we separately control for project size, elderly properties tend to have fewer bedrooms than other properties so there could be some collinearity between these variable categories.

Exhibit 3-17. Regression results for target population

	Effect (Coefficient)	Statistical Significance
Model 1: All projects, per-unit TDC including land cost		
Elderly	-$10,012.50	**
Family (Reference)	**Reference**	
Special Needs	$13,893.28	**

Notes: *** indicates statistically significant at the <0.001 level, ** indicates statistically significant at the <0.05 level, * indicates statistically significant at the <0.1 level.

The regression results presented in this table are derived from a model that included all of the explanatory variables. See the Appendix for the full regression results.

3.4.6 Developer type

Our descriptive results show that projects where the developer was a non-profit organization had a per-unit TDC approximately $45,000 higher than when the developer was a for-profit organization. This finding confirms similar findings in other studies.[20] Among other possible reasons for this finding: projects developed by non-profit developers may provide more supportive services and non-profit developers may be more willing than for-profit developers to take on projects that have higher land costs, significant neighborhood opposition, or the need for substantial zoning changes.

Our main regression model found that the per-unit cost of projects developed by non-profit developers was $12,179 more than that of projects developed by for-profit developers, a highly statistically significant difference. This effect persisted in Model 4, which included continuous rather than categorical variables. However, this relationship was not found in the models which looked at the subset of projects for which we had land costs. As with the other factors for which we found different results in our different models, this suggests that the selection of projects being analyzed may affect whether developer type is found to be a significant contributor to costs and could raise questions about the strength of the association.

[20] Charles Wilkins et. al. (2015) Comparing the Life-Cycle Costs of New Construction and Acquisition-Rehab of Affordable Multifamily Rental Housing, Housing Policy Debate, 25:4, 684-714, and Jean L Cummings and Denise DiPasquale (1999) The Low-Income Housing Tax Credit: An Analysis of the First Ten Years, Housing Policy Debate, 10:2, 251-307.

Exhibit 3-18. Per-unit TDC by developer type

	Number of Projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
For Profit	1076	64,203	$118,286	$156,159	$208,776	$175,295
Non Profit	791	50,061	$148,053	$202,710	$265,751	$215,983
All projects[21]	1,882	114,968	$128,047	$174,528	$240,098	$193,055
Note: All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.						

3.4.7 Financing sources

The number of financing sources adds complexity, which may add costs to development projects. Alternatively, it's possible that more expensive projects require the developers to compile more financing sources. We found that projects with the most financing sources (four or more) had above average per-unit TDC. For fewer numbers of financing sources, the descriptive analysis did not reveal a clear pattern. Note that LIHTC equity itself is not counted as a financing source in the data.

Exhibit 3-19. Per-unit TDC by financing source categories

	Number of Projects	Number of Units	25th percentile	50th percentile	75th percentile	Mean
One	1,299	75,452	$125,478	$164,296	$216,833	$178,749
Two	651	45,878	$121,402	$169,068	$237,276	$188,942
Three	198	12,075	$102,733	$141,331	$234,548	$175,702
Four or more	169	11,114	$129,949	$189,281	$283,404	$218,426
All projects	2,317	144,519	$123,412	$167,225	$228,669	$184,781
Note: All dollars adjusted to constant 2016 dollars based on the RS Means Historical Cost Index.						

Our regression analysis indicated that, compared to projects with two financing sources, projects with just one financing source had statistically significantly lower costs (by approximately $13,500), all else being equal. We also found that, compared to project with two financing sources, projects with four or more financing sources had statistically significantly higher costs (by approximately $15,000), although this relationship was not as strong in our main model. The significance of number of financing sources persisted in the other models, though the details varied a bit from model to model.

[21] Total includes 15 projects identified as joint ventures.

Exhibit 3-20. Regression results for financing source categories

	Effect (Coefficient)	Statistical Significance
Model 1: All projects, per-unit TDC including land cost		
One	-$13,542.02	***
Two	**Reference**	
Three	-$738.01	
Four or more	$15,104.99	**

Notes: *** indicates statistically significant at the <0.001 level, ** indicates statistically significant at the <0.05 level, * indicates statistically significant at the <0.1 level.

The regression results presented in this table are derived from a model that included all of the explanatory variables. See the Appendix for the full regression results.

Acknowledgments

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Appendix: Regression Results

Model 1 – Main Model

This is our main model which models per-unit TDC including land costs using categorical versions of all variables for all 2,526 projects in our dataset. Model summary statistics are presented in Exhibit A-1. Regression coefficients, standard errors, t-values and p-values are presented in Exhibit A-2.

Exhibit A-1. Model 1 summary statistics

Outcome	Per-Unit TDC
Number of Observations	2,526
Mean	$191,902.40
R-Squared	0.5299
Adjusted R-Squared	0.5222

Exhibit A-2. Model 1 estimated regression coefficients

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	$161,273.30	$10,118.68	15.94	<.0001
Year				
2011	-$6,646.39	$4,988.81	-1.33	0.1829
2012	-$4,949.84	$4,705.51	-1.05	0.2929
2013	-$14,271.21	$4,687.71	-3.04	0.0024
2015	-$11,320.36	$4,518.99	-2.51	0.0123
2016	-$6,183.90	$4,926.14	-1.26	0.2095
Location Characteristics				
Region (reference region = Mountain):				
-- New England	$81,683.59	$7,802.14	10.47	<.0001
-- Mid-Atlantic	$78,417.40	$5,725.97	13.7	<.0001
-- East North Central	$17,374.35	$5,262.66	3.3	0.0010
-- West Central	-$5,982.18	$5,062.66	-1.18	0.2375
-- South Atlantic	-$13,991.49	$4,711.43	-2.97	0.0030
-- East South Central	-$3,937.66	$5,178.37	-0.76	0.4471
-- West South Central	-$6,217.90	$5,327.78	-1.17	0.2433
-- Pacific	$67,108.77	$6,387.25	10.51	<.0001
Metro area (reference = in Metro area, but not principal city):				
--Metro Area, Principal City	$26,128.53	$3,630.13	7.2	<.0001
--Non-Metro Area	-$21,102.13	$3,012.78	-7	<.0001
Poverty rate (reference rate = 20-30% poor):				
-- 0% - 10% Poor	$8,879.21	$4,525.04	1.96	0.0498

Parameter	Estimate	Standard Error	t Value	Pr > |t|
-- 10.01% - 20.00% Poor	$7,143.05	$3,721.93	1.92	0.0551
-- 30.01% - 40.00% Poor	-$13,106.46	$4,966.87	-2.64	0.0084
-- > 40.00% Poor	$3,452.82	$5,846.08	0.59	0.5548
In a DDA (reference = not in a DDA)	$26,081.68	$3,302.41	7.9	<.0001
In a QCT (reference = not in a QCT)	$19,621.67	$4,135.06	4.75	<.0001
Annual Construction Wage (reference = $30,001 - $33,000):				
-- Annual Construction Wage: $0 - $30,000	-$3,688.22	$3,370.53	-1.09	0.2739
-- Annual Construction Wage: $33,001 or More	$26,566.28	$3,666.97	7.24	<.0001
Project Characteristics				
9% Credit Project (reference = 4% credit project)	$12,744.81	$4,571.35	2.79	0.0053
Acquisition-rehab (reference = new construction)	-$44,028.79	$3,138.03	-14.03	<.0001
Development size (reference = 26-50 units):				
-- Number of Units: 0 - 25 Units	$16,130.26	$4,063.43	3.97	<.0001
-- Number of Units: 51 - 100 Units	-$22,675.83	$3,226.30	-7.03	<.0001
-- Number of Units: 101+ Units	-$40,402.50	$4,770.76	-8.47	<.0001
Bedroom size (reference = 0 - 1.249average bedrooms):				
-- Average Bedrooms: 1.250 to 1.749	$2,581.98	$4,376.23	0.59	0.5552
-- Average Bedrooms: 1.750 - 2.499	$6,194.92	$4,260.97	1.45	0.1461
-- Average Bedrooms: 2.5 or more	$23,733.14	$5,922.86	4.01	<.0001
Population served (reference = families):				
-- Elderly	-$10,012.50	$3,306.37	-3.03	0.0025
-- Special Needs	$13,893.28	$5,819.86	2.39	0.0170
Non-profit project (reference = for-profit project)	$12,178.55	$3,647.02	3.34	0.0009
Number of Financing Sources (reference = 2):				
-- Number of Financing Sources: 1	-$13,542.02	$3,610.87	-3.75	0.0002
-- Number of Financing Sources: 3	-$738.01	$4,901.73	-0.15	0.8803
-- Number of Financing Sources: 4 or More	$15,104.99	$7,263.90	2.08	0.0377
Other				
Missing Flag - Average Bedrooms	$25,133.48	$4,976.23	5.05	<.0001
Missing Flag - Developer Type	$3,011.84	$4,003.11	0.75	0.4519
Missing Flag - Development Type	-$13,406.17	$4,479.28	-2.99	0.0028
Combined Missing Flag - Poor/Metro/Num Financing Sources	-$31.97	$4,653.37	-0.01	0.9945

Model 2 – Subset of Properties with Land Cost Data (with Land Costs Included)

This model models per-unit TDC including land costs using categorical versions of all variables for the 1,123 projects in our dataset which had information about land costs broken out. Model summary statistics are presented in Exhibit A-3. Regression coefficients, standard errors, t-values and p-values are presented in Exhibit A-4.

Exhibit A-3. Model 2 summary statistics

Outcome	Per-Unit TDC
Number of Observations	1,123
Mean	$202,259.40
R-Squared	0.56
Adjusted R-Squared	0.5433

Exhibit A-4. Model 2 estimated regression coefficients

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	$172,682.99	$14,920.18	11.57	<.0001
Year				
2011	-$7,674.50	$7,044.89	-1.09	0.2762
2012	-$9,211.07	$6,239.62	-1.48	0.1402
2013	-$18,044.14	$6,516.14	-2.77	0.0057
2015	-$12,941.78	$6,291.81	-2.06	0.0399
2016	-$6,616.51	$6,851.59	-0.97	0.3344
Location Characteristics				
Region (reference region = Mountain):				
-- New England	$64,902.83	$10,147.62	6.4	<.0001
-- Mid-Atlantic	$81,871.58	$8,682.43	9.43	<.0001
-- East North Central	$15,161.31	$9,520.89	1.59	0.1116
-- West Central	-$5,424.42	$8,784.76	-0.62	0.5370
-- South Atlantic	$15,723.12	$7,895.05	1.99	0.0467
-- East South Central	$7,541.59	$9,058.70	0.83	0.4053
-- West South Central	$16,429.60	$8,908.96	1.84	0.0654
-- Pacific	$67,013.22	$10,144.90	6.61	<.0001
Metro area (reference = in Metro area, but not principal city):				
--Metro Area, Principal City	$31,676.83	$5,610.24	5.65	<.0001
--Non-Metro Area	-$19,073.97	$4,159.50	-4.59	<.0001
Poverty rate (reference rate = 20-30% poor):				
-- 0% - 10% Poor	$7,972.78	$5,879.06	1.36	0.1753

Parameter	Estimate	Standard Error	t Value	Pr > |t|
-- 10.01% - 20.00% Poor	$6,964.01	$5,236.22	1.33	0.1838
-- 30.01% - 40.00% Poor	-$8,484.37	$6,980.69	-1.22	0.2245
-- > 40.00% Poor	$17,176.29	$8,381.88	2.05	0.0407
In a DDA (reference = not in a DDA)	$29,180.21	$6,313.13	4.62	<.0001
In a QCT (reference = not in a QCT)	$12,272.36	$5,600.19	2.19	0.0286
Annual Construction Wage (reference = $30,001 - $33,000):				
-- Annual Construction Wage: $0 - $30,000	-$3,136.12	$5,574.94	-0.56	0.5739
-- Annual Construction Wage: $33,001 or More	$49,089.64	$6,557.75	7.49	<.0001
Project Characteristics				
9% Credit Project (reference = 4% credit project)	$6,228.10	$8,543.74	0.73	0.4662
Acquisition-rehab (reference = new construction)	-$40,917.37	$4,631.86	-8.83	<.0001
Development size (reference = 26-50 units):				
-- Number of Units: 0 - 25 Units	$24,600.00	$5,463.29	4.5	<.0001
-- Number of Units: 51 - 100 Units	-$26,755.87	$4,869.17	-5.49	<.0001
-- Number of Units: 101+ Units	-$47,508.78	$8,515.93	-5.58	<.0001
Bedroom size (reference = 0 - 1.249 average bedrooms):				
-- Average Bedrooms: 1.250 to 1.749	$12,082.46	$6,119.32	1.97	0.0486
-- Average Bedrooms: 1.750 - 2.499	$11,789.30	$5,185.81	2.27	0.0232
-- Average Bedrooms: 2.5 or more	$24,289.78	$8,393.32	2.89	0.0039
Population served (reference = families):				
-- Elderly	-$3,763.67	$4,765.92	-0.79	0.4299
-- Special Needs	$862.39	$7,607.00	0.11	0.9098
Non-profit project (reference = for-profit project)	$2,915.56	$5,583.74	0.52	0.6017
Number of Financing Sources (reference = 2):				
-- Number of Financing Sources: 1	-$9,756.18	$6,103.65	-1.6	0.1102
-- Number of Financing Sources: 3	$15,936.75	$8,245.30	1.93	0.0535
-- Number of Financing Sources: 4 or More	$33,523.62	$12,313.92	2.72	0.0066
Other				
Missing Flag - Average Bedrooms	-$2,817.09	$11,266.57	-0.25	0.8026
Missing Flag - Developer Type	-$6,760.27	$10,790.35	-0.63	0.5311
Missing Flag - Development Type	-$39,558.01	$7,080.10	-5.59	<.0001
Combined Missing Flag - Poor/Metro/Num Financing Sources	$8,872.64	$8,772.59	1.01	0.3120

Model 3 – Subset of Properties with Land Cost Data (with Land Costs Excluded)

This model models per-unit TDC excluding land costs using categorical versions of all variables for the 1,123 projects in our dataset which had information about land costs broken out. Model summary statistics are presented in Exhibit A-5. Regression coefficients, standard errors, t-values and p-values are presented in Exhibit A-6.

Exhibit A-5. Model 3 summary statistics

Outcome	Per-Unit TDC
Number of Observations	1,123
Mean	$180,819.20
R-Squared	0.5413
Adjusted R-Squared	0.5239

Exhibit A-6. Model 3 estimated regression coefficients

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	$155,401.13	$14,323.88	10.85	<.0001
Year				
2011	-$9,255.20	$6,484.74	-1.43	0.1538
2012	-$8,793.43	$6,143.18	-1.43	0.1526
2013	-$17,235.92	$6,011.36	-2.87	0.0042
2015	-$12,418.37	$6,002.27	-2.07	0.0388
2016	-$3,905.79	$6,717.61	-0.58	0.5611
Location Characteristics				
Region (reference region = Mountain):				
-- New England	$56,069.53	$10,598.85	5.29	<.0001
-- Mid-Atlantic	$73,030.10	$8,375.50	8.72	<.0001
-- East North Central	$13,620.76	$9,334.61	1.46	0.1448
-- West Central	-$1,070.39	$9,315.22	-0.11	0.9085
-- South Atlantic	$8,040.39	$7,292.24	1.1	0.2704
-- East South Central	$5,955.57	$9,029.22	0.66	0.5097
-- West South Central	$15,889.29	$8,816.89	1.8	0.0718
-- Pacific	$46,435.24	$9,378.68	4.95	<.0001
Metro area (reference = in Metro area, but not principal city):				
--Metro Area, Principal City	$26,429.73	$5,182.50	5.1	<.0001
--Non-Metro Area	-$14,942.51	$4,071.47	-3.67	0.0003
Poverty rate (reference rate = 20-30% poor):				
-- 0% - 10% Poor	$2,645.14	$5,556.76	0.48	0.6342
-- 10.01% - 20.00% Poor	$5,192.97	$5,102.01	1.02	0.3090
-- 30.01% - 40.00% Poor	-$6,473.61	$6,671.29	-0.97	0.3321
-- > 40.00% Poor	$22,916.14	$8,534.19	2.69	0.0074
In a DDA (reference = not in a DDA)	$19,468.94	$5,849.94	3.33	0.0009
In a QCT (reference = not in a QCT)	$9,658.25	$5,471.28	1.77	0.0778

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Annual Construction Wage (reference = $30,001 - $33,000):				
-- Annual Construction Wage: $0 - $30,000	-$1,084.49	$5,483.70	-0.2	0.8433
-- Annual Construction Wage: $33,001 or More	$44,311.40	$6,210.07	7.14	<.0001
Project Characteristics				
9% Credit Project (reference = 4% credit project)	$20,082.08	$7,826.70	2.57	0.0104
Acquisition-rehab (reference = new construction)	-$60,666.48	$4,612.38	-13.15	<.0001
Development size (reference = 26-50 units)				
-- Number of Units: 0 - 25 Units	$25,097.61	$5,360.22	4.68	<.0001
-- Number of Units: 51 - 100 Units	-$24,185.28	$4,468.67	-5.41	<.0001
-- Number of Units: 101+ Units	-$41,255.10	$8,140.55	-5.07	<.0001
Bedroom size (reference = 0 - 1.249 average bedrooms):				
-- Average Bedrooms: 1.250 to 1.749	$6,979.81	$5,774.34	1.21	0.2270
-- Average Bedrooms: 1.750 - 2.499	$3,411.00	$5,092.17	0.67	0.5031
-- Average Bedrooms: 2.5 or more	$18,321.14	$8,241.59	2.22	0.0264
Population served (reference = families):				
-- Elderly	-$1,868.75	$4,820.20	-0.39	0.6983
-- Special Needs	$3,693.99	$7,139.35	0.52	0.6050
Non-profit project (reference = for-profit project)	-$698.57	$5,531.97	-0.13	0.8995
Number of Financing Sources (reference = 2):				
-- Number of Financing Sources: 1	-$5,412.33	$5,953.30	-0.91	0.3635
-- Number of Financing Sources: 3	$14,612.61	$7,937.09	1.84	0.0659
-- Number of Financing Sources: 4 or More	$33,152.53	$11,958.04	2.77	0.0057
Other				
Missing Flag - Average Bedrooms	-$4,898.14	$11,489.61	-0.43	0.6700
Missing Flag - Developer Type	-$10,765.11	$10,549.50	-1.02	0.3077
Missing Flag - Development Type	-$27,122.84	$6,580.65	-4.12	<.0001
Combined Missing Flag - Poor/Metro/Num Financing Sources	$10,782.18	$8,446.36	1.28	0.2020

Model 4 – Variation on Main Model that includes Continuous Variables

This model models per-unit TDC including land costs using continuous versions of some variables for all 2,526 projects in our dataset. Model summary statistics are presented in Exhibit A-7. Regression coefficients, standard errors, t-values and p-values are presented in Exhibit A-8.

Exhibit A-7. Model 4 summary statistics

Outcome	Per-Unit TDC
Number of Observations	2,526
Mean	$191,902.40
R-Squared	0.5379
Adjusted R-Squared	0.5312

Exhibit A-8. Model 4 estimated regression coefficients

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	$12,500.28	$16,916.56	0.74	0.46
Year				
2011	-$6,810.94	$4,949.30	-1.38	0.1689
2012	-$5,641.01	$4,628.96	-1.22	0.2231
2013	-$14,997.96	$4,647.22	-3.23	0.0013
2015	-$11,705.99	$4,483.23	-2.61	0.0091
2016	-$8,156.62	$4,899.57	-1.66	0.0961
Location Characteristics				
Region (reference region = Mountain):				
-- New England	$74,063.44	$7,353.67	10.07	<.0001
-- Mid-Atlantic	$69,607.73	$5,814.55	11.97	<.0001
-- East North Central	$15,839.67	$4,945.96	3.2	0.0014
-- West Central	-$1,035.64	$5,105.85	-0.2	0.8393
-- South Atlantic	-$9,887.61	$4,777.93	-2.07	0.0386
-- East South Central	-$4,522.58	$5,236.25	-0.86	0.3878
-- West South Central	-$2,136.10	$5,388.41	-0.4	0.6918
-- Pacific	$51,095.65	$6,703.78	7.62	<.0001
Metro area (reference = in Metro area, but not principal city):				
--Metro Area, Principal City	$26,021.58	$3,530.41	7.37	<.0001
--Non-Metro Area	-$15,843.00	$2,957.98	-5.36	<.0001
Poverty rate (reference rate = 20-30% poor):				
-- 0% - 10% Poor	$5,526.63	$4,411.14	1.25	0.2104

Parameter	Estimate	Standard Error	t Value	Pr > |t|
-- 10.01% - 20.00% Poor	$5,661.60	$3,676.72	1.54	0.1237
-- 30.01% - 40.00% Poor	-$13,872.06	$4,890.23	-2.84	0.0046
-- > 40.00% Poor	$2,733.81	$5,775.39	0.47	0.6360
In a DDA (reference = not in a DDA)	$23,651.21	$3,291.96	7.18	<.0001
In a QCT (reference = not in a QCT)	$16,941.03	$4,054.24	4.18	<.0001
Annual Construction Wage	$4.77	$0.43	11.06	<.0001
Project Characteristics				
9% Credit Project (reference = 4% credit project)	$10,580.42	$4,541.90	2.33	0.0199
Acquisition-rehab (reference = new construction)	-$42,660.64	$3,051.95	-13.98	<.0001
Number of Units	-$296.14	$29.08	-10.18	<.0001
Average Bedrooms	$12,739.99	$2,491.44	5.11	<.0001
Population served (reference = families):				
-- Elderly	-$7,621.31	$3,190.37	-2.39	0.0170
-- Special Needs	$17,773.09	$5,759.82	3.09	0.0021
Non-profit project (reference = for-profit project)	$13,937.81	$3,581.60	3.89	0.0001
Number of Financing Sources (reference = 2):				
-- Number of Financing Sources: 1	-$10,831.04	$3,508.93	-3.09	0.0020
-- Number of Financing Sources: 3	-$447.11	$4,844.97	-0.09	0.9265
-- Number of Financing Sources: 4 or More	$13,828.21	$7,080.73	1.95	0.0509
Other				
Missing Flag - Average Bedrooms	$22,253.07	$4,310.56	5.16	<.0001
Missing Flag - Developer Type	-$594.01	$3,925.77	-0.15	0.8797
Missing Flag - Development Type	-$14,197.41	$4,394.93	-3.23	0.0013
Combined Missing Flag - Poor/Metro/Num Financing Sources	-$1,814.50	$4,643.17	-0.39	0.6960