Institute of
Business and
Economic Research

Fisher Center for
Real Estate and
Urban Economics

PROGRAM ON HOUSING AND URBAN POLICY

WORKING PAPER SERIES

WORKING PAPER NO. W03-003

THE EFFECTS OF PREVAILING WAGE REQUIREMENTS ON THE COST OF LOW-INCOME HOUSING

By

Sarah Dunn
John M. Quigley
Larry A. Rosenthal

January 2004 rev.

UNIVERSITY OF CALIFORNIA, BERKELEY

The Effects of Prevailing Wage Requirements
On the Cost of Low-Income Housing

Sarah Dunn
srd8r@uclink.berkeley.edu

John M. Quigley
quigley@econ.berkeley.edu

Larry A. Rosenthal
lar@uclink.berkeley.edu

Program on Housing and Urban Policy
University of California, Berkeley
Berkeley, CA 94720-6105

January 2004

JEL Codes: D24, H23, J51
Keywords: Prevailing wages, housing costs

This research is supported by a grant from the U. S. Department of Housing and Urban Development and by the Berkeley Program on Housing and Urban Policy. The authors acknowledge the helpful comments of Andrew Blauvelt, Shawn Blosser, Scott Littlehale, Matt Newman, Jeanne Peterson, Scott Smith, and Fran Wagstaff.

The Effects of Prevailing Wage Requirements On the Cost of Low-Income Housing

Abstract

Recent California legislation extends the application of prevailing wage regulations to subsidized low-income residential construction projects. This paper estimates the cost and supply effects of this legislation. Econometric evidence based on recently completed tax-credit projects in California demonstrates that construction costs increase substantially under prevailing wage requirements. Estimates of additional construction costs in our most extensive models range from 9 to 32 percent. The analysis controls for variations in cost by geographical location and for differences in project characteristics, financing, and developer attributes. We estimate the effect of uniform imposition of these regulations on the number of new dwellings for low-income households produced under the tax credit program. Under reasonable conditions, our mid-range estimate of this prospective decrease exceeds 2,600 units per year.

The Effects of Prevailing Wage Requirements
On the Cost of Low-Income Housing

I. Introduction

In October 2001, following heated political debate, the California legislature voted to extend the application of the state’s "prevailing wage" laws to many construction projects not previously covered, including housing subsidized with public funds and even some private construction. The passage of Senate Bill 975 (SB 975) amended section 1720 of the California Labor Code, expanding the scope of "public funds" which trigger prevailing wage obligations when used to finance new construction.

The new law brings to the forefront of the policy debate concerns over the costs and benefits of prevailing wage laws, specifically in the context of subsidized housing for low-income households. Since prevailing wage rates are almost invariably higher than market wages, the new law may significantly increase construction costs in affected projects, perhaps to the point that they will no longer be financially feasible. Although SB 975 and subsequent enactments exempted some subsidized projects – such as those already underway at the time of the new law's passage, as well as certain self-help projects and transitional housing for the homeless - prevailing wage requirements have come to affect more and more residential development in California, including many housing projects targeted towards low- and moderate-income families.

While SB975 itself applies only in California, the impact of prevailing wage policy is of national importance. Several studies have estimated the impact of the provisions of the longstanding federal prevailing wage law, the Davis-Bacon and Related Acts of 1931, on the cost of government contracts, but there is little hard evidence on the impact of prevailing wage policy on housing or residential construction costs, or on subsidized projects in particular. While some supporters argue that prevailing wage laws increase the efficiency or stability of construction labor markets, these claims remain unsubstantiated. Rather, redistribution of income appears to be the ultimate goal, and the principal effect (Allen, 1983; Goldfarb and Morrall, 1981).

This paper presents new evidence on some of these issues. It estimates the effect of prevailing wage requirements on the cost of construction of state-subsidized low-income housing in California. The evidence is based upon micro data covering newly constructed units funded in part by the Low-Income Housing Tax Credit Program (LIHTC) from 1997 to 2002.

The results indicate that prevailing wage regulation increased the costs of these projects by at least 9 percent and by perhaps as much as 32 percent. The most credible estimates suggest cost increases of 10 to 20 percent. These effects are precisely measured, as a statistical matter, and the estimates are quite robust to variations in the statistical models which form the basis for analysis. The results are also consistent across a variety of cost measures, and an analysis of potential sample selectivity increases our confidence in the numerical results. There can be little doubt that prevailing wage requirements in California substantially increase the cost, and thus decrease the supply, of subsidized dwellings available to low and moderate income households.

Section II below provides a brief review of the new prevailing wage legislation. Section III reviews the rather sparse literature on the economic effects of such regulation. Section IV describes our original data and analysis documenting cost and supply effects. Section V is a brief conclusion.

II. Prevailing Wage Legislation in California

California's prevailing wage law passed in 1931, the same year as the Davis-Bacon Act. A 1995 study of state prevailing wage laws found it to be one of the most stringent in the nation (Thieblot, 1995). The California statute extends to areas beyond the scope of the federal law, such as demolition work, site and sewer construction, and some janitorial and hauling work.

The administration of the California statute falls under the jurisdiction of the state's Department of Industrial Relations (DIR), and determination of the regulated wage rates is left to the discretion of the director of the DIR. California's determination of "prevailing wages" is similar to the federal standard, in that it effectively employs the modal wage rate. This usually results in the selection of a negotiated wage rate (under a union collective bargaining agreement) since free market wages are unlikely to be identical to the penny.

Local prerogative on construction wage regulation varies within the state. By 1995, two California localities had won judicial approval of ordinances exempting certain projects from prevailing wages requirements. A handful of other cities imposed prevailing wage obligations on some industrial construction projects wholly outside the public sphere (Thieblot, 1995).

Since passage of the Davis-Bacon Act, construction of low-income housing sponsored directly by the U. S. Department of Housing and Urban Development (HUD), such as public housing and most Section 8 New Construction and Substantial Rehabilitation projects, has necessitated payment of "prevailing wages."[1] But there has been some ambiguity about coverage of housing projects subsidized indirectly through tax credits or federal grants to lower levels of government. The 2001 California law resolves this ambiguity. It extends this coverage to

[1] The application of the Davis-Bacon Act to HUD-sponsored construction is subject to a variety of detailed regulations, and HUD has provided wage surveys to assist the DOL in its determination of wage rates (see HUD, 1981).

subsidized housing construction utilizing federal, state, and local public funding sources such as the Community Development Block Grant Program and other common sources of grants for subsidized housing.

III. Effects of Prevailing Wage Requirements

A. On Construction and Costs

A large literature has developed on the efficiency and distributional effects of minimum wage laws generally (see Card and Krueger, 1995, for a review), and of the implications of Davis-Bacon legislation. Goldfarb and Morrall (1981) reviewed a number of empirical studies of the costs of Davis-Bacon, concluding that the legislation could hardly be attractive on efficiency grounds. The same authors (Goldfarb and Morrall, 1978) examined construction wage data to estimate the large cost savings achievable by utilizing mean wages (rather than modes) as the regulatory benchmark for defining prevailing wages. Metzger and Goldfarb (1983) developed an economic model to evaluate claims that output quality improves under a prevailing wage regime, concluding that quality may easily decrease as a consequence of the increased costs imposed by regulation.

Estimates of increased project costs under Davis-Bacon vary considerably. To establish a control group for comparing costs, some researchers studied projects proposed before and after the suspension or repeal of wage regulation. Others analyzed differences among jurisdictions that had adopted prevailing wages compared with those that had not. Still others simulated the effects of regulations on typical projects using published wage surveys of the construction industry (e.g., the surveys conducted by F.W. Dodge, Inc.). A one-month suspension of the Act in 1971 forced contractors to rebid for projects in the pre-award phase. Thieblot (1975) found an increase of about one-half percent on prevailing-wage projects. By accounting more fully for institutional factors and inflation, Gould and Bittlingmayer (1980) estimated the increase to be between 4 and 7 percent. Using contractor surveys to compile a sample of affected and unaffected projects in rural areas, Fraundorf, *et al.* (1984) concluded that the Act increased costs by an average of more than 26 percent.

A series of simulations and empirical studies fueled by the proposed repeal of Utah's prevailing wage law (e.g., Philips, *et al*, 1995; Philips, *et al.*, 1995; Prus, 1996) found that decreased construction earnings and associated losses in tax revenue might exceed savings in public construction costs. Prus (1996) compared the costs of government construction projects across states, finding a differential averaging 18 percent between prevailing wage and non-prevailing wage states. Thieblot (1996) questioned all of these studies on methodological grounds.

Several papers analyzed public school construction projects (Prus, 1999; Philips, 1999; Azari, *et al.*, 2002; Bilginsoy and Philips, 2000; Philips, 2001), finding inconsistent effects of prevailing wage regulation upon construction costs, using before and after comparisons or interstate comparisons. It is difficult to know whether conditions have been controlled for adequately in these unpublished studies, and in several cases, statistical results are reported in an unconventional manner.

B. On Housing Markets

One paper prepared for the President's Commission on Housing relates housing construction costs to prevailing wage legislation (HUD, 1981), but that document is merely a compendium of assertions. There is apparently no other direct evidence on the link between prevailing wage regulations and housing costs.

However, cost estimators used by house builders, and rules of thumb used by lenders may yield rough estimates of the link between prevailing wage requirements and housing costs. For California, we can utilize existing information – on the labor share of residential construction costs, and on the premium of prevailing wages over market wages – to make some rough approximations.

Rough estimates[2] for selected California cities – the labor share in housing output times the wage premium – are presented in Table 1. Increases in project cost due to prevailing wages average 20.8 percent for the ten cities considered. Increases range from 13.5 percent in Stockton to 25.6 percent in Bakersfield. Major cities have a lower average increase in project cost (17.5 percent) than the six smaller cities included in the table (23 percent).

Of course, these rough estimates do not account for a number of possible influences prevailing wage legislation may have on overall project cost. For example, affected developers can substitute away from more expensive labor inputs, for example, by using more prefabricated components, and reducing the costs of on-site assembly. The enforcement of wage regulations might impose increased administrative cost due to more complex reporting requirements. There are likely labor and materials economies present in multi-unit projects for lower-income families, compared to the single-family basis used in the published wage-share figures. Finally, increased

[2] The labor share of construction cost, available at (http://www.building-cost.net), is based on a wood-frame, single-family home of average quality and size. Percent increases in mean market wages were obtained from the California Employment Development Department's "Occupational Employment Statistics" survey and state prevailing wage determinations published by the Department of Industrial Relations (as compiled in Newman and Blosser [2003]). An average of wages from four construction occupations – Carpenters, Electricians, Plumbers, and Drywall Installers -- was used to yield an overall labor rate.

wage levels may attract more productive workers, working fewer hours over the duration of an affected project. The subtle interactions of these effects are ignored in these rough approximations. We turn to more precise econometric models estimating the cost impacts based on the actual cost of housing projects completed in California.

Table 1

Rough Estimates of Increased Housing Costs Due to Prevailing Wage Requirements for Selected California Cities

Location	Labor Share of Construction Cost (Percent)	Prevailing Wage Differential (Percent)	Project Cost Increase (Percent)
Major Cities			
Los Angeles	43.5	48.9	21.3
Sacramento	44.9	41.7	18.7
San Diego	43.6	37.6	16.4
San Francisco	47.2	28.7	13.5
Average Major Cities	44.8	39.2	17.5
Other Cities			
Bakersfield	42.6	60.0	25.6
Fresno	42.6	45.2	19.2
Marysville	45.0	50.1	22.5
Oxnard	43.9	50.1	22.0
Redding	43.2	56.5	24.4
San Bernardino	42.6	56.3	24.0
Average Other Cities	43.3	53.0	23.0

Source: http://www.building-cost.net, Newman and Blosser, 2003. See text for assumptions and methods.

IV. Empirical Analysis

We analyze the structure of costs for newly constructed dwellings for California Low-Income Housing Tax Credit (LIHTC) housing projects whose applications for funding were filed after January 1, 1997 and which were placed in service before May 1, 2002. All projects were selected to receive federal (and some state) tax credits by the California Tax Credit Allocation Committee (TCAC), the administrator of the federal LIHTC program in California.[3]

In accordance with program regulations, only rental housing projects are eligible for credits. The allocation process is competitive, so that projects that best fulfill housing needs and public policy objectives (as determined by TCAC) have priority. For newly constructed units to be eligible for tax credits, they must meet both rent and income requirements. The rents charged may not exceed thirty percent of the imputed income for the unit.[4] At initial occupancy, the income of a resident household may not exceed fifty or sixty percent of the area median income (AMI). Developers choose between a "20/50" or "40/60" minimum set aside, meaning that at least 20 (or 40) percent of the units must be "affordable" to families with incomes at 50 (or 60) percent of the median income. Only "affordable" units are eligible for tax credits. To increase attractiveness of projects in the competition for credits, most applicants designate a greater proportion than the minimum set aside as "affordable," and many target occupants with incomes

---

[3] The federal LIHTC program, authorized by Congress in 1986 and administered nationally by the Internal Revenue Service, enables developers of qualifying rental housing to raise project equity through the sale of federal tax credits to investors. TCAC allocates additional state tax credits to those projects which are selected to receive federal credits. TCAC may also authorize tax credits for rehabilitation of low-income housing. Due to their heterogeneity, housing rehabilitation projects are excluded from this analysis.

[4] Income is imputed assuming an occupancy of 1.5 persons per bedroom, and the area median income for a family of that size. The rent charged must not exceed 30 percent of this imputed income.

lower than the 50/60 percent AMI threshold. Units receiving federal tax credits are required to remain "affordable" according to the above definition for 15 years.[5]

A number of criteria are considered in the allocation process. Federal guidelines grant a priority for those projects which serve the lowest income tenants and which maintain affordability for the longer periods. Other selection criteria include project location and the housing needs of that location (including consideration of public housing waiting lists and target populations with special needs), project characteristics, and projects intended for eventual tenant ownership. In California, the demand for credits usually exceeds their availability by about four to one, and an elaborate priorities and guidelines has been established.[6]

Two hundred and ninety-two New Construction Projects were approved by TCAC from the application years 1997 through 2002 and completed before May 1, 2002. Of these, we were able to gather complete data (described below) on 205 projects, including *ex post* cost data on each project, reflecting certification by external auditors upon completion.[7] Other data about these projects were assembled from the Committee's electronic database, from paper files of TCAC, and from telephone interviews. For each project, we assembled information about project

---

[5] Units benefiting from California state tax credits are generally required to maintain "affordability" for 55 years.

[6] For example, both state and federal law require that ten percent of annual credit be awarded to projects that involve non-profit developers. In addition, the state law requires that at least twenty percent of the credits be used for projects located in rural areas, and at least two percent be set aside for small projects (consisting of twenty or fewer units). California also has guidelines to maintain geographic distribution of the tax credits, awarding a certain percentage of annual credits to each of twelve geographic regions across the state. Preference for credit allocation is also given to projects which promote certain public policies such as smart growth, energy efficiency, and community revitalization efforts. The *Residential Construction Cost* variable was only available for 203 of these 205 projects.

[7] There were a total of 454 approved projects, of which 162 were classified as Acquisition or Rehabilitation projects. Project files for 76 of 292 New Construction projects were not available at the time of data collection during the fall of 2002. (This typically meant that the files were in use by TCAC staff or other state officials at the time data were assembled.) Complete data could not be assembled for 11 of the 216 remaining projects.

characteristics and costs and about whether the project paid labor at "prevailing wages" as the result of local, state or federal requirements.

Three measures of project costs were compiled based on expenditures reported *ex post* in the final cost certification. The broadest definition reported in the TCAC data is *Residential Project Cost*, which includes all costs associated with residential construction. These costs include land acquisition and development, construction (labor, materials, contractor profit and overhead), survey and engineering costs, financing, legal fees, developer fees and other expenses. *Residential Construction Cost* includes only the expenses associated with site work and structures, general requirements, contractor overhead and contractor profit. Land and project "soft costs" (other than those included in contractor overhead and profit) are not included. Finally, *Site and Structure Cost* includes only site preparation and building-construction costs (i.e., excluding contractor overhead and profit and general requirements). This measure of cost is directly linked to changes in labor and materials costs.

As shown in Figure 1, the distribution of these three cost measures is highly skewed and roughly lognormal. Figure 2 presents scatterplots of the three cost measures. A straight line through the origin fits each of these scatter diagrams quite well.[8] On a per unit basis, *Residential Construction Cost* averages 62 percent of *Residential Project Cost* and *Site and Structure Cost* averages about 56 percent of *Residential Project Cost*.

We also compiled information on a number of project characteristic variables: target populations (e.g., senior citizens, special needs residents, etc.), affordability levels, and the minimum set aside chosen by the applicant ("20/50" or "40/60"). All of these indicia are

---

[8] In simple linear regressions, the intercept terms are insignificantly different from zero, implying a proportional relationship among the three cost measures.

reflected in the criteria for allocating tax credits. In addition, we gathered information on project location, special facilities and features, structure and construction details, the applicant and developer, and financing. We also identified those projects constructed while paying prevailing wages according to interpretations of the regulations governing prevailing wages in force in California at the time of construction.[9] Table 2 presents summary information on the observed projects.

[9] Beginning in 1999, applicants for LIHTC funding were asked to identify "projects where use of federal, state or local subsidies requires that higher than normal wages must be paid." To avoid any ambiguity in the classification of projects subject to prevailing wage regulations, we contacted developers by telephone to verify the payment of prevailing wages for each project. This information was supplied for 175 of the 205 projects. The remaining 30 were unknown because the developer was unreachable, or because the developer no longer had the information (this arose with a few of the oldest projects). In the analysis below, the prevailing wage dummy has a value of one when we have confirmed that prevailing wages were paid, and is zero otherwise.

Figure 1. Cost Distributions for Sample Projects 1997-2002

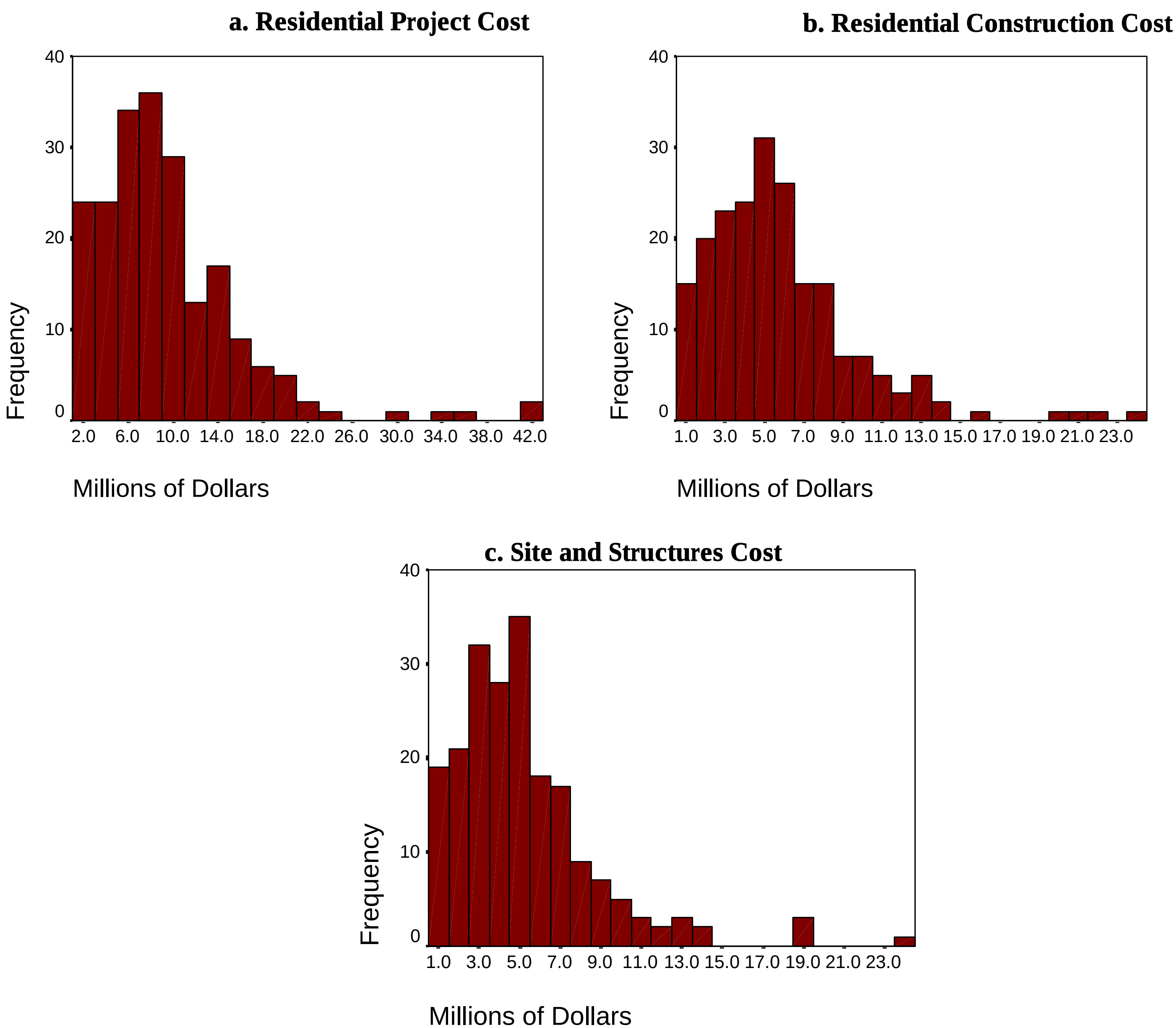

Figure 2. Relationships Among Cost Measures

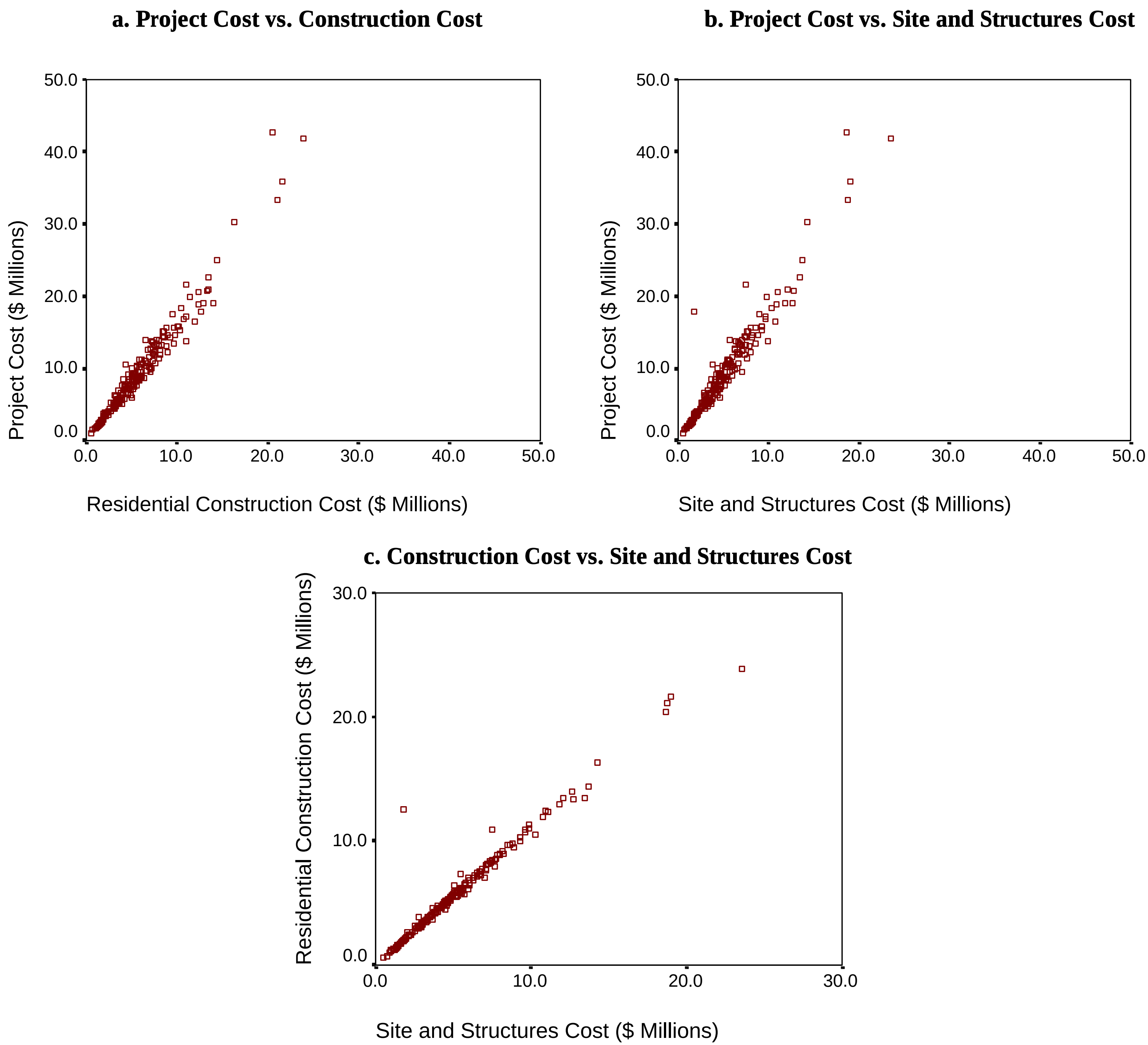

Table 2
Variable Definitions and Descriptive Statistics
(205 Observations on LIHTC Housing Projects, 1997-2002)

Variable	Definition	Mean	Standard Deviation
Prevailing Wages	One if prevailing wages were paid as a result of federal, state or local requirements, zero otherwise	0.200	0.40
Affordability	Fraction of units in project that meet affordability guidelines	0.947	0.14
Targeting			
Non targeted	One if units are not targeted to a specific population, zero otherwise	0.088	0.28
Senior	One if units are targeted to seniors, zero otherwise	0.278	0.45
SRO	One if units are single room occupancy, zero otherwise	0.024	0.15
Needs	One if units are targeted to special needs populations, zero otherwise	0.044	0.21
Family	One if units are targeted to large families, zero otherwise	0.566	0.50
Set Aside	One if at least 20 percent of units are affordable to applicants with incomes at one half of area median income (AMI); zero if at least 40 percent of units are affordable to applicants with incomes at 60 percent of AMI	0.034	0.18
High Cost	One if project is in a HUD High Cost Designation Area, zero otherwise	0.520	0.50
Elevator	One if project contains at least one elevator, zero otherwise	0.340	0.48
Density	Number of units per acre	31.97	38.96
Time	Occupancy date. Elapsed time in days from July 19, 1995	1700	376
Three Stories	One if project contains buildings with three or more stories, zero otherwise	0.120	0.32
Child Care	One if project contains childcare facilities on site, zero otherwise	0.044	0.21
Parking	One if project contains parking beneath the structure, zero otherwise	0.170	0.37
Three Bedrooms	One if 50 percent or more units have 3 or more bedrooms, zero otherwise	0.310	0.46
Island	One if project is on an island, zero otherwise	0.005	0.07
Special Facilites	One if project contains special needs facilities, zero otherwise	0.034	0.18
Mitigation	One if project required substantial environmental mitigation, zero otherwise	0.054	0.23
Urban	Fraction of housing units classified as urban in census place	0.984	0.12
Applicant			
CORP	One if applicant is a corporation, zero otherwise	0.063	0.24
LP	One if applicant is a limited partnership, zero otherwise	0.690	0.46
SP	One if applicant is a sole proprietorship, zero otherwise	0.010	0.10
JV	One if applicant is a joint venture, zero otherwise	0.010	0.10
Non Profit	One if applicant is a non-profit organization, zero otherwise	0.220	0.42
Developer			
JV	One if developer is a joint venture, zero otherwise	0.361	0.48
For Profit	One if developer is a for-profit organization, zero otherwise	0.220	0.42
Non Profit	One if developer is a non-profit organization, zero otherwise	0.410	0.49
Funding	Fraction of project funding from public sources	0.187	0.21
Sources	Number of different funding sources	3.630	1.45
Bonds	One if project is eligible for tax-exempt bond finance	0.400	0.49

Table 2
Variable Definitions and Descriptive Statistics
(205 Observations on LIHTC Housing Projects, 1997-2002)
(continued)

Variable	Definition	Mean	Standard Deviation
Structure			
Townhouse	One if project is a townhouse, zero otherwise	0.180	0.39
Cooperative	One if project is a cooperative, zero otherwise	0.005	0.07
Two Stories	One if project has two or more stories, zero otherwise	0.500	0.50
Single Family	One if project is single family detached, zero otherwise	0.010	0.10
Garden Apartment	One if project is garden apartments, zero otherwise	0.310	0.46
Infill	One if development is an inner city infill site, zero otherwise	0.150	0.35
Location			
San Francisco	One if development is in San Francisco, Oakland, San Jose CMSA	0.250	0.43
Sacramento	One if development is in Sacramento MSA	0.088	0.28
Fresno	One if development is in Fresno MSA	0.039	0.19
Bakersfield	One if development is in Bakersfield MSA	0.034	0.18
Los Angeles	One if development is in Los Angeles, Riverside, Orange County CMSA	0.340	0.47
Merced	One if development is in Merced MSA	0.020	0.14
Salinas	One if development is in Salinas, Seaside, Monterrey MSA	0.024	0.15
San Diego	One if development is in San Diego MSA	0.078	0.27
San Luis Obispo	One if development is in San Luis Obispo, Atascadero, Paso Robles MSA	0.024	0.15
Santa Barbara	One if development is in Santa Barbara, Santa Maria-Lompoc MSA	0.020	0.14
Redding	One if development is in Redding MSA	0.010	0.10
Modesto	One if development is in Modesto MSA	0.010	0.10
Yuba City	One if development is in Yuba City MSA	0.005	0.07
Visalia	One if development is in Visalia, Tulare, Porterville MSA	0.020	0.14
Other	Other locations	0.044	0.21
Residential Project Cost	Millions of Dollars	9.390	6.54
Construction Cost	Millions of Dollars	5.766	3.86
Site and Structure Cost	Millions of Dollars	5.145	3.50
Units	Number of units in project	82.790	56.41

A. The Basic Statistical Models

Table 3 presents results of simple ordinary least squares (OLS) regression relating various measures of residential construction costs to the descriptors listed in Table 1.[10] Regressions are presented for two of the three cost measures analyzed: "site and structure" cost, including all construction wage expenditures; and total "residential project cost."[11] In the first specification (columns 1 & 2), the dependent variable is the logarithm of cost, and the logarithm of the number of units is included as a regressor. In the second specification (columns 3 & 4), we impose constant returns to scale; the logarithm of cost per unit is the dependent variable.

As reported in Table 3, project costs vary by type of project, type of developer, and type of structure. There is also some evidence that projects with larger fractions of "affordable" units have lower total costs and lower costs per unit. Projects completed more recently tend to be more expensive, and those providing beneath-structure parking have higher costs. Projects with larger dwellings are more costly, as are those constructed on urban infill sites. There are some differences in costs by location; projects located in San Francisco, Sacramento, and Los Angeles tend to be more expensive to build.

The cost relationships reported in Table 3 are generally consistent for both specifications and both definitions of cost. In columns 1 and 2, the estimated coefficient for the logarithm of the number of units is significantly less than one, suggesting that there are modest economies of scale in projects containing more dwellings. Despite this, models using the logarithm of cost per unit as the dependent variable (thereby constraining the model to reflect constant returns to scale)

---

[10] In preliminary regressions, eleven project characteristics listed in Table 1 were insignificant. They are omitted from these regressions. All 14 geographical identifiers are retained.

[11] Results for the "residential construction cost" category were essentially the same as those for the other two cost categories. They are omitted here for ease of exposition.

are quite similar; the magnitudes and statistical significance of the coefficients are also similar. In particular, the simple OLS models indicate that, holding other factors constant, projects paying prevailing wages are nine to eleven percent more costly than otherwise identical projects not subject to these regulations.

When the geographic identifiers are removed from the specification, the explained variation is slightly lower than in the more elaborate specification, and the magnitude of the other coefficients and their statistical significance is quite comparable. However, the estimated coefficients for the prevailing wage variable are substantially larger, suggesting cost increases of 16 to 18 percent for those projects paying prevailing wages as compared to projects for which this requirement has not been imposed. This may suggest that the magnitude of the prevailing wage effect varies by geographical location.

Table 3
Models of Construction Costs
Ordinary Least Squares Models
Dependent Variables in Logarithms
(t-ratios in parentheses)

	Total Cost		Cost Per Unit	
Variable	Site and Structure Cost	Project Cost	Site and Structure Cost	Project Cost
Prevailing Wage	0.103	0.097	0.097	0.091
	(2.41)	(2.82)	(2.22)	(2.56)
Log Units	0.913	0.917	-	-
	(33.39)	(41.67)	-	-
Affordability	-0.352	-0.144	-0.303	-0.097
	(2.91)	(1.49)	(2.47)	(0.97)
Targeting				
Non targeted	-0.150	-0.065	-0.138	-0.053
	(2.56)	(1.39)	(2.30)	(1.10)
Senior	-0.168	-0.200	-0.184	-0.215
	(4.06)	(5.99)	(4.37)	(6.27)
SRO	-0.541	-0.641	-0.577	-0.675
	(5.62)	(8.28)	(5.88)	(8.46)
Needs	-0.011	-0.093	-0.009	-0.091
	(0.13)	(1.40)	(0.11)	(1.32)
Time	4.878	6.561	4.597	6.290
	(3.04)	(5.08)	(2.79)	(4.70)
Parking	0.173	0.155	0.201	0.182
	(3.35)	(3.73)	(3.87)	(4.30)
Three Bedrooms	0.144	0.082	0.156	0.094
	(3.86)	(2.74)	(4.11)	(3.04)
Island	0.625	0.379	0.625	0.379
	(2.94)	(2.22)	(2.87)	(2.14)
Special Facilities	-0.223	0.035	-0.257	0.002
	(2.19)	(0.42)	(2.47)	(0.02)
Mitigation	-0.061	0.053	-0.073	0.041
	(0.84)	(0.90)	(0.98)	(0.68)
Applicant				
Non Profit	-0.005	0.029	-0.008	0.026
	(0.10)	(0.78)	(0.16)	(0.68)

Table 3
Models of Construction Costs
Ordinary Least Squares Models
Dependent Variables in Logarithms
(t-ratios in parentheses)
(continued)

	Total Cost		Cost Per Unit	
Variable	Site and Structure Cost	Project Cost	Site and Structure Cost	Project Cost
Developer				
For Profit			-0.017	-0.006
			-0.14	-0.06
Non Profit	0.115	0.052	0.147	0.083
	(2.69)	(1.53)	(3.46)	(2.40)
Funding	-0.118	0.142	-0.015	0.241
	(1.25)	(1.87)	(0.17)	(3.26)
Sources	0.016	0.005	0.014	0.003
	(1.39)	(0.54)	(1.18)	(0.31)
Bonds	-0.065	-0.035	-0.098	-0.067
	(1.59)	(1.08)	(2.43)	(2.05)
Structure				
Townhouse	0.155	0.134	0.168	0.146
	(3.17)	(3.39)	(3.35)	(3.57)
Cooperative	0.697	0.459	0.874	0.629
	(2.81)	(2.30)	(3.51)	(3.11)
Two Stories	0.102	0.061	0.106	0.065
	(2.65)	(1.96)	(2.69)	(2.01)
Single Family	0.371	0.243	0.399	0.271
	(2.43)	(1.98)	(2.55)	(2.13)
Infill	0.161	0.073	0.179	0.091
	(3.15)	(1.77)	(3.44)	(2.14)

Table 3
Models of Construction Costs
Ordinary Least Squares Models
Dependent Variables in Logarithms
(t-ratios in parentheses)
(continued)

	Total Cost		Cost Per Unit	
Variable	Site and Structure Cost	Project Cost	Site and Structure Cost	Project Cost
Location				
San Francisco	0.302	0.403	0.280	0.381
	(4.08)	(6.77)	(3.69)	(6.18)
Sacramento	0.194	0.206	0.188	0.200
	(2.35)	(3.11)	(2.22)	(2.91)
Fresno	0.014	-0.033	0.030	-0.018
	(0.15)	(0.42)	(0.30)	(0.22)
Bakersfield	-0.076	-0.076	-0.085	-0.085
	(0.72)	(0.89)	(0.78)	(0.96)
Los Angeles	0.173	0.202	0.162	0.191
	(2.35)	(3.42)	(2.15)	(3.11)
Merced	-0.026	-0.015	-0.017	-0.006
	(0.22)	(0.15)	(0.14)	(0.06)
Salinas	0.183	0.202	0.185	0.204
	(1.45)	(1.99)	(1.43)	(1.93)
San Diego	0.088	0.195	0.070	0.178
	(1.04)	(2.87)	(0.81)	(2.53)

Table 3
Models of Construction Costs
Ordinary Least Squares Models
Dependent Variables in Logarithms
(t-ratios in parentheses)
(continued)

	Total Cost		Cost Per Unit	
Variable	Site and Structure Cost	Project Cost	Site and Structure Cost	Project Cost
San Luis Obispo	0.066	0.179	0.150	0.260
	(0.55)	(1.85)	(1.24)	(2.64)
Santa Barbara	-0.132	-0.025	-0.116	-0.009
	(0.95)	(0.22)	(0.81)	(0.08)
Redding	0.247	0.177	0.235	0.166
	(1.60)	(1.43)	(1.48)	(1.29)
Modesto	0.149	0.073	0.140	0.065
	(0.93)	(0.57)	(0.86)	(0.49)
Yuba City	0.047	-0.050	-0.012	-0.107
	(0.22)	(0.29)	(0.06)	(0.61)
Visalia	0.080	-0.103	0.073	-0.110
	(0.66)	(1.06)	(0.59)	(1.09)
Constant	6.313	4.951	6.190	4.831
	(3.80)	(3.70)	(3.63)	(3.48)
R^2	0.932	0.955	0.732	0.802

Note: Regressions are based upon 205 observations on LIHTC housing projects in California completed 1997-2002.

B. Instrumental Variables Estimates

It is possible that the requirement to pay prevailing wages imposed on some of these construction projects is not exogenous to the other factors determining project costs. For example, if projects located in higher cost areas (for example, in highly urbanized areas) were more likely to be required to pay prevailing wages (for example, because unions are able to exercise more political influence in these regions), then simple ordinary least squares regression models would falsely attribute these higher costs to the payment of prevailing wages.

Estimation of the models by the method of instrumental variables (IV) eliminates this source of bias and yields consistent estimates of the effect of prevailing wage requirement on construction costs. Appropriate instruments are variables which are correlated with the regulatory classification of projects – i.e., identifying those paying prevailing wages as opposed to those paying market wages – and which do not themselves cause construction costs to vary.

From computerized voting information, we obtained the election results on ten statewide California propositions for the city in which each of the 205 sample projects was located. We also measured the party registration of voters in each jurisdiction, and the percent working in highly unionized industries and occupations by census place.[12] Finally, we tabulated homeownership rates and age distributions of the population in each jurisdiction, as well as union membership in the relevant geographical location, as a fraction of total wage and salary employment.

---

[12] Highly unionized industries and occupations are defined based on Current Population Survey data analyzed by Barry T. Hirsch and David A. Macpherson (2003). Highly unionized industries are those in which national union membership was 18 percent or higher, and highly unionized occupations were those in which national membership was 20 percent or higher. US census data on employment by industry and occupation for employed persons 16 years and older in each census place were used to compute the variables "highly unionized industries" and "highly unionized occupations" associated with each of the 205 housing projects.

Arguably, these demographic and political variables affect the propensities of local government and regional officials to require payment of prevailing wages. These demographic and political variables have no direct causal effect on construction costs. Table 4 summarizes these measures of political and demographic variation across the sample of construction projects, reporting the mean and standard deviation of these variables in the sample. The table also reports the results of the first stage regressions of the instrumental variables procedure.

In this first stage, the dependent variable is the dummy representing whether prevailing wages were required to be paid. Two models are presented, both including the complete set of instruments and including all other variables presented in Table 1. As shown in the table, a number of the instruments are individually significant at about the 0.10 level. An F-test for the joint significance of the instruments when no other regressors are included is highly significant. When the other regressors are included, the F-ratio is significant at the 0.10 level.

Table 5 presents instrumental variables estimates of the same models reported in Table 3. The pattern of magnitudes and significance of the coefficients in Table 5 is nearly identical to that previously reported. The coefficient on the logarithm of the number of units is significantly less than one, suggesting modest scale economies when additional units are produced in a given project. When the coefficient is constrained to one, representing constant returns to scale – in the third and fourth columns of the table– the substantive results are unchanged.

Note that when the model is estimated using instrumental variables, the coefficient on the prevailing wage variable is larger in magnitude and is more precisely measured than in the ordinary least squares regression. The results in Table 5 imply that – for otherwise identical low-income projects – prevailing wage construction is between 18 and 25 percent more costly.

Importantly, the finding that prevailing wage legislation increases housing costs does not arise because prevailing wages are more likely to be required in high cost housing markets.

Table 4
First Stage Instruments in Two Stage Least Squares Models
Dependent Variable: Prevailing Wage
(t-ratios in parentheses)

Variable	Mean (Standard deviation)	First Stage Coefficent* Model 1[a]	Model 2[b]
Number of Adjacent Jurisdictions	7.440	0.002	0.002
	(9.49)	(0.49)	(0.40)
Fraction Yes Vote on Prop 199	0.386	-0.013	0.057
Low-income Rental Assistance, 1996	(0.08)	(0.02)	(0.10)
Fraction Yes Vote on Prop 107	0.533	1.090	1.084
Housing and Homeless Bonds, 1990	(0.09)	(1.24)	(1.23)
Fraction Yes Vote on Prop 168	0.422	-1.283	-1.306
Low Rent Housing Projects, 1993	(0.10)	(1.56)	(1.59)
Fraction Yes Vote on Prop 155	0.496	-0.877	-0.973
School Facilities Bonds, 1992	(0.12)	(0.93)	(1.03)
Fraction Yes Vote on Prop 156	0.483	0.723	0.757
Passenger Rail and Clean Air Bonds, 1992	(0.09)	(0.82)	(0.86)
Fraction Yes Vote on Prop 157	0.330	-0.275	-0.427
Toll Roads and Highways, 1992	(0.13)	(0.26)	(0.41)
Fraction Yes Vote on Prop 160	0.503	1.734	1.762
Project Tax Exemptions, 1992	(0.07)	(1.74)	(1.77)
Fraction Yes Vote on Prop 164	0.575	-0.617	-0.776
Term Limits, 1992	(0.12)	(0.72)	(0.89)
Fraction Yes Vote on Prop 167	0.413	-1.730	-1.724
State Taxes, 1992	(0.07)	(1.65)	(1.64)
Fraction Yes Vote on Prop 210	0.649	1.769	1.770
Mimimum Wage Increase, 1996	(0.09)	(1.47)	(1.47)
Percent of voters registered as Democrats	0.597	-1.136	-1.102
	(0.13)	(1.35)	(1.31)
Percent of population over 40 years old	0.341	-0.209	-0.117
	(0.06)	(0.34)	(0.19)

Table 4
First Stage Instruments in Two Stage Least Squares Models
Dependent Variable: Prevailing Wage
(t-ratios in parentheses)
(continued)

Variable	Mean (Standard deviation)	First Stage Coefficent* Model 1[a]	Model 2[b]
Percent of housing units owner-occupied	0.554	-0.682	-0.717
	(0.13)	(1.60)	(1.68)
Percent working in highly unionized industries	0.339	0.841	0.836
	(0.07)	(1.31)	(1.31)
Percent working in highly unionized occupations	0.265	-1.065	-1.093
	(0.07)	(1.57)	(1.61)
Percent Unionized	0.166	1.446	1.667
	(0.06)	(1.13)	(1.28)
F-ratio[c]		1.492	1.492
[p value]		[0.10]	[0.10]
F-ratio[d]		2.981	2.981
[p value]		[0.00]	[0.00]

Notes:

*t-ratios in parentheses

[a]Regression also includes all other variables reported in Table 1 (coefficients not shown).

[b]Regression also includes all other variables reported in Table 1 (coefficients not shown), as well the logarithm of the number of units.

[c]F-test for the joint significance of the instruments.

[d]F-test for the joint significance of the instruments in an equation including no other covariates.

Table 5
Instrumental Variables Estimates of Cosntruction Costs
Dependent Variables in Logarithms
(t-ratios in parentheses)

Variable	Total Cost: Site and Structure Cost	Total Cost: Project Cost	Cost Per Unit: Site and Structure Cost	Cost Per Unit: Project Cost
Prevailing Wage	0.225	0.177	0.248	0.196
	(2.58)	(2.50)	(2.76)	(2.67)
Log Units	0.910	0.914	-	-
	(33.26)	(41.25)	-	-
Affordability	-0.363	-0.152	-0.315	-0.105
	(3.01)	(1.55)	(2.58)	(1.05)
Targeting				
Non targeted	-0.187	-0.089	-0.182	-0.084
	(2.98)	(1.76)	(2.85)	(1.62)
Senior	-0.161	-0.195	-0.176	-0.210
	(3.87)	(5.78)	(4.18)	(6.08)
SRO	-0.554	-0.649	-0.595	-0.688
	(5.75)	(8.32)	(6.08)	(8.59)
Needs	-0.047	-0.117	-0.053	-0.122
	(0.55)	(1.68)	(0.61)	(1.70)
Time	4.327	6.200	3.900	5.806
	(2.64)	(4.67)	(2.33)	(4.24)
Parking	0.169	0.152	0.198	0.180
	(3.28)	(3.65)	(3.83)	(4.25)
Three Bedrooms	0.147	0.084	0.161	0.097
	(3.94)	(2.79)	(4.24)	(3.13)
Island	0.677	0.413	0.689	0.424
	(3.16)	(2.38)	(3.15)	(2.36)
Special Facilities	-0.236	0.026	-0.275	-0.011
	(2.32)	(0.31)	(2.66)	(0.13)
Mitigation	-0.041	0.066	-0.049	0.058
	(0.56)	(1.11)	(0.66)	(0.94)
Applicant				
Non Profit	-0.022	0.018	-0.029	0.011
	(0.46)	(0.46)	(0.61)	(0.28)
Developer				
Non Profit	0.105	0.046	0.136	0.076
	(2.45)	(1.32)	(3.22)	(2.18)

Table 5
Instrumental Variables Estimates of Cosntruction Costs
Dependent Variables in Logarithms
(t-ratios in parentheses)
(continued)

Variable	Total Cost: Site and Structure Cost	Total Cost: Project Cost	Cost Per Unit: Site and Structure Cost	Cost Per Unit: Project Cost
Funding	-0.172	0.106	-0.078	0.197
	(1.73)	(1.31)	(0.81)	(2.52)
Sources	0.015	0.004	0.013	0.002
	(1.32)	(0.49)	(1.10)	(0.24)
Bonds	-0.073	-0.041	-0.110	-0.075
	(1.78)	(1.23)	(2.70)	(2.27)
Structure				
Townhouse	0.148	0.129	0.160	0.140
	(3.02)	(3.24)	(3.20)	(3.43)
Cooperative	0.725	0.477	0.916	0.659
	(2.92)	(2.37)	(3.70)	(3.25)
Two Stories	0.090	0.053	0.092	0.055
	(2.32)	(1.69)	(2.32)	(1.69)
Single Family	0.418	0.274	0.459	0.312
	(2.70)	(2.18)	(2.90)	(2.41)
Infill	0.159	0.072	0.179	0.090
	(3.13)	(1.74)	(3.46)	(2.13)
Location				
San Francisco	0.285	0.392	0.257	0.365
	(3.82)	(6.47)	(3.38)	(5.86)
Sacramento	0.194	0.206	0.188	0.200
	(2.36)	(3.10)	(2.24)	(2.92)
Fresno	0.033	-0.021	0.054	-0.001
	(0.33)	(0.27)	(0.54)	(0.02)
Bakersfield	-0.078	-0.077	-0.088	-0.087
	(0.73)	(0.90)	(0.81)	(0.98)
Los Angeles	0.166	0.198	0.153	0.185
	(2.26)	(3.32)	(2.04)	(3.01)
Merced	-0.017	-0.008	-0.005	0.003
	(0.14)	(0.09)	(0.04)	(0.03)

Table 5
Instrumental Variables Estimates of Cosnstruction Costs
Dependent Variables in Logarithms
(t-ratios in parentheses)
(continued)

Variable	Total Cost: Site and Structure Cost	Total Cost: Project Cost	Cost Per Unit: Site and Structure Cost	Cost Per Unit: Project Cost
Location				
Salinas	0.184	0.202	0.186	0.205
	(1.46)	(1.98)	(1.45)	(1.95)
San Diego	0.114	0.212	0.102	0.200
	(1.32)	(3.05)	(1.16)	(2.79)
San Luis Obispo	0.097	0.199	0.192	0.289
	(0.79)	(2.02)	(1.57)	(2.90)
Santa Barbara	-0.102	-0.005	-0.078	0.017
	(0.73)	(0.04)	(0.54)	(0.15)
Redding	0.253	0.182	0.243	0.171
	(1.64)	(1.45)	(1.54)	(1.33)
Modesto	0.112	0.049	0.094	0.033
	(0.70)	(0.38)	(0.58)	(0.25)
Yuba City	0.079	-0.030	0.024	-0.082
	(0.37)	(0.17)	(0.11)	(0.46)
Visalia	0.110	-0.084	0.109	-0.084
	(0.90)	(0.85)	(0.88)	(0.83)
Constant	6.926	5.352	6.943	5.354
	(4.07)	(3.88)	(4.00)	(3.76)

Note: Regressions are based on 205 observations on LIHTC housing projects in California completed in 1997-2002.

V. Conclusions

This paper presents the first systematic evidence on the effects of prevailing wage requirements on the costs of constructing low-income housing. A sample of 205 low-income housing projects subsidized by the California Tax Credit Allocation Commission during the 1997-2002 period forms the basis for the empirical analysis. We estimate statistical models using several definitions of cost certified by TCAC and by an independent auditor, in two specifications – one allowing for scale economies in construction and the other imposing constant returns to scale. Finally, we estimate models by both ordinary least squares regression and by instrumental variables techniques. Ceteris paribus, low-income housing projects are significantly more expensive if developers are required to pay prevailing wages. Importantly, these costs increases do *not* arise simply because prevailing wages are more likely to be required in high cost housing markets.

The statistical models explain about 90 percent of the variation in construction costs across a broad sample of low-income housing projects, and about 80 percent of the variation in cost per unit built. The results confirm that costs vary by type of project. Single room occupancy projects are considerably less expensive to build,[13] while projects targeted toward large families are more expensive. Underground parking and greater numbers of three-bedroom units also add significantly to the cost of these projects.

Construction costs may vary by type of applicant and type of developer. Cooperatives and single-family dwellings appear more costly to build. Some differences in construction costs are

[13] Single room occupancy units lack individual bathrooms, kitchens, and living areas. To consider these aspects of housing costs, we also produced estimates of the same models reported in the text using on cost per square foot as the dependent variable. The results do not differ substantially from those reported in the text.

also apparent by geographical region. In particular, newly constructed units in San Francisco are more than twenty percent costlier than elsewhere. There is also clear evidence of economies of scale in multifamily housing construction.

Table 6 provides a summary of the results of various econometric specifications as they pertain to prevailing wage requirements. It presents estimates of the percentage increase in construction costs arising from the imposition of prevailing wage regulation, holding constant characteristics such as the project's sponsorship, its financing and its location.

Using the most realistic specifications of costs where geographic variation is accounted for, ordinary least squares models imply that prevailing wage requirements increase the cost of low-income housing construction between nine and ten percent. The instrumental variables models imply that cost increases are higher – between eighteen and thirty-two percent for the most realistic specifications. When the control variables for location are relaxed, the OLS estimates indicate that costs are sixteen or seventeen percent higher for prevailing wage projects than for non-prevailing wage projects, and IV estimates indicate that costs as much as 38 percent higher.

These increases in cost surely lead to reductions in the number of newly constructed low-income housing units produced through public subsidy. Consider, for example, new dwellings completed under the LIHTC. The federal allocation of tax credits provided financing for an average of 19,129 low-income housing units per year from 2000 to 2002 (including both new construction and rehabilitation).[14] We can estimate the effect of applying new prevailing wage

[14] See *TCAC Annual Reports, 2000-2002*. The total credits reported combine those issued at the 9 percent and 4 percent levels, the latter being applied to projects using federal subsidies or tax-exempt fund sources beyond tax credits alone. The two categories are subject to different rules concerning the state's total credit-issuing authority.

requirements to the share of annual production (about 15,686 units annually[15]) not previously subject to these regulations. If costs were increased by just 9.1 percent as a result of prevailing wage legislation (the smallest increase predicted by any of our statistical models), 1,308 fewer subsidized dwellings would have been built. A cost increase of 20 percent, a mid-range level among the estimates presented in Table 6, would have resulted in 2,614 fewer low-income housing units. And at a cost increase of 31.6 percent – our upper bound estimate, excluding models which ignore geographical differences – the imposition of prevailing wage legislation would have prevented 3,767 low-income housing units from being developed. In this way, state regulation of construction wages conflicts with the federal goal of increasing access to new housing for California's low-income households.

These estimates are illustrative rather than definitive. But they do demonstrate how the imposition of prevailing wages would affect the supply of low-income housing provided by the federal tax credit program. Of course, the LIHTC is not the only program providing low-income housing in California. In November 2002, California voters approved Proposition 46, a $2.1 billion bond measure dedicated toward affordable housing development and related programs. About half these funds are directed toward new multifamily construction. If prevailing wage requirements apply to dwellings built using proceeds from the tax-exempt bonds and those from other existing programs – the HOME program, the Community Development Block Grant Program, for example – the effect upon low-income housing production would be much larger.

[15] On the basis of our dataset, it appears that approximately 18 percent of the LIHTC units, or about 3,443 annually, may have been governed by prevailing wage prior to the application of SB 975.

Table 6
Cost Increases for Low-Income Housing Projects in California
Due to Prevailing Wage Requirements
(in Percent)

Statistical Model	Scale Economies Assumed?	Increased Site and Structure Cost	Increased Project Cost
A. Ordinary Least Squares Estimation			
Extended	YES	9.9 %	10.4 %
	NO	8.9	9.5
Basic	YES	10.3	9.7
	NO	9.7	9.1
Excluding location	YES	16.7	17.2
	NO	15.8	16.4
B. Instrumental Variables Estimation			
Extended	YES	29.9	29.2
	NO	31.6	30.7
Basic	YES	22.5	17.7
	NO	24.8	19.6
Excluding location	YES	38.6	38.5
	NO	38.2	38.3

Note: "Extended" models include all variables listed in Tables 2.
"Basic" models include only the variables reported in Table 3.
"Excluding location" refers to models which exclude the 14 dummy variables for geographical location.

References

Steven G. Allen, "Much Ado About Davis-Bacon: A Critical Review and New Evidence," *Journal of Law and Economics*, 26, October 1983: 707-736.

Hamid Azari, Peter Philips, and Mark Prus, "Making Hay When It Rains: The Effect Prevailing Wage Regulations, Scale Economies, Seasonal, Cyclical and Local Business Patterns Have on School Construction Costs," *Journal of Education Finance*, 27, Spring 2002: 997-1012.

Cihan Bilginsoy and Peter Philips, "Prevailing Wage Regulations and School Construction Costs: Evidence from British Columbia," *Journal of Education Finance*, 24, Winter 2000: 415-432.

David Card and Alan B. Krueger, *Myth and Measurement: The New Economics of the Minimum Wage*. Princeton University Press, 1995.

Martha Norby Fraundorf, John P. Farrell, and Robert Mason, "The Effects of the Davis-Bacon Act on Construction Costs in Rural Areas," *The Review of Economics and Statistics*, 66(1), February 1984: 142-146.

General Accounting Office/HEHS-99-21, "Davis-Bacon Act: Labor Now Verifies Wage Data, but Verification Process Needs Improvement," Washington, DC: January 1999.

General Accounting Office/HRD-79-18, "The Davis-Bacon Act Should be Repealed," Washington, DC: April 27, 1979.

Robert S. Goldfarb and John F. Morrall III, "Cost Implications of Change Davis-Bacon Administration," *Policy Analysis*, Fall 1978.

Robert S. Goldfarb and John F. Morrall III, "The Davis-Bacon Act: An Appraisal of Recent Studies," *Industrial and Labor Relations Review*, 34(2), January 1981: 191-206.

John P. Gould and George Bittlingmayer, *The Economics of the Davis-Bacon Act: An Analysis of Prevailing Wage Laws,* American Enterprise Institute for Public Policy Research, Washington, DC, 1980.

Barry T. Hirsch and David A. Macpherson, "Union Membership and Coverage Database from the Current Population Survey: Note," *Industrial and Labor Relations Review,* 56(2), January 2003: 349-54.

HUD. U. S. Department of Housing and Urban Development, "Housing Under the Davis Bacon Act" Prepared for the President's Commission on Housing, November 1981 (mimeo).

Kentucky Legislative Research Commission, "An Analysis of Kentucky's Prevailing Wage Laws and Procedures," Research Report No. 304, December 13, 2001.

Michael R. Metzger and Robert S. Goldfarb, "Do Davis-Bacon Minimum Wages Raise Product Quality?" *Journal of Labor Research*, 4(3), Summer 1983.

Matthew Newman and Shawn Blosser, "An Analysis of Market and Prevailing Wage Rates for the Construction Trades in California." Sacramento, California Institute of County Government, unpublished mimeo, 2003.

Ohio Legislative Service Commission, "SB 102 Report: The Effects of the Exemption of School Construction Projects from Ohio's Prevailing Wage Law," Staff Research Report No. 149, May 20, 2002.

Peter Philips, Garth Mangum, Norm Waitzman, and Anne Yeagle, "Losing Ground: Lessons from the Repeal of Nine 'Little Davis-Bacon Acts," working paper, University of Utah Economics Department, February 1995

Peter Philips, "A Comparison of Public School Construction Costs in Three Midwestern States that Have Changed Their Prevailing Wage Laws in the 1990s: Kentucky, Ohio, and Michigan," February 2001.

Peter Philips, "Kentucky's Prevailing Wage Law: Its History, Purpose and Effect," University of Utah Department of Economics, October 1999.

Peter Philips, "Kansas and Prevailing Wage Legislation," prepared for the Kansas Senate Labor and Industries Committee, February 20, 1998.

Mark J. Prus, "Prevailing Wage Laws and School Construction Costs," prepared for Prince George's County Council, Maryland, January 1999.

Mark J. Prus, "The Effects of State Prevailing Wage Laws on Total Construction Costs," January 1996.

Armand J. Thieblot, *The Davis-Bacon Act*, Labor Relations and Public Policy Series, Report No 10, Philadelphia: University of Pennsylvania Press, 1975.

Armand J. Thieblot, "A New Evaluation of Impacts of Prevailing Wage Law Repeal," *Journal of Labor Research*, 17(2), Spring 1996: 297-322.

Armand J. Thieblot, "Prevailing Wage Laws and Market Recovery Strategies of Construction Unions," *Journal of Labor Research*, 18(1), Winter 1997.

Armand J. Thieblot, "Prevailing Wage Laws and Black Employment in the Construction Industry," *Journal of Labor Research*, 20(1), Winter 1999.

Armand J. Thieblot, "State Prevailing Wage Laws," prepared for Associated Builders and Contractors, Inc., 1995.