

Home Building Jobs

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Employment in the home building industry is difficult to measure, because most of the available statistics mix home building with nonresidential construction. Moreover, data about self-employed workers—perhaps more than one-third of construction industry workers—are not as detailed or as accurate as data on payroll employees.

It appears that total employment in residential construction in 1987 was between 2.2 million and 2.9 million, with about 70 percent of that total working in new construction and 30 percent in remodeling. In 1992, the total was about 13 percent lower, or between 1.9 million and 2.6 million. The equivalent of slightly more than one full-time year-round job in the construction industry was required to build a single-family home, in addition to the jobs in manufacturing, transportation, trade, and other industries that provide materials and services for home building. It appears that labor requirements per unit have increased over the past 20 years, with increases in the size and quality of new homes, as well as regulatory requirements and other sources of inefficiency, offsetting whatever productivity gains have been achieved with new methods and materials.

The Bureau of Labor Statistics (BLS) reported that an average of 4,471,000 workers were on construction industry payrolls in 1992.¹ In addition, there were nearly 1,466,000 self-employed workers² in the construction industry.

There are no official statistics on employment in residential construction, as opposed to total construction. General contracting firms are classified separately as residential or nonresidential, but special trade contractors, such as carpentry or

plumbing contractors are not. Special trade contractors account for nearly 60 percent of the payroll jobs in construction and work in either residential or nonresidential construction.

Construction Put In Place

A rough measure of the division of construction industry employment between residential and nonresidential activity can be calculated from the value of construction put in place (P-I-P). In 1992, private residential construction accounted for 43 percent of total construction;³ private nonresidential and public construction accounted for the rest. This suggests that there were 2.6 million workers in residential construction in 1992. Within this total, an estimated 1,329,000 employees and 436,000 self-employed workers

(29.7 percent of the total) built new units, while 597,000 employees and 196,000 self-employed workers (13.4 percent) produced residential improvements (Table 1).

Census of Construction

Alternative estimates of employment can be developed using data from the Census of Construction (COC), which is conducted every five years. The most recent year for which data are available is 1987. The 1987 data show total payroll employment for construction industry establishments as 5,015,000, of which 3,979,000 employees were construction workers, and 1,035,000 employees held nonconstruction positions such as managers, sales people, or clerical workers. Land developers employed another 40,000 people,

Table 1 Estimated Home Building Jobs From Aggregate Data

	1987			1992
	(1) BLS Empl. & P-I-P	(2) Census of Constr	(3) Adjusted Census	(4) BLS Empl. & P-I-P
Total Construction				
Payroll	4,958,000	5,054,367	5,054,367	4,471,000
Self Employed	1,384,000	1,523,459	1,523,459	1,466,000
Total Workers	6,342,000	6,577,826	6,577,826	5,937,000
Residential				
Payroll	2,301,342	1,389,400	1,498,900	1,925,816
Self Employed	642,408	660,100	700,000	631,458
Total Workers	2,943,749	2,049,500	2,198,900	2,557,274
New Residential				
Payroll	1,654,160	995,900	1,061,100	1,328,863
Self Employed	461,750	456,700	479,200	435,722
Total Workers	2,115,911	1,452,600	1,540,300	1,764,586
Remodeling				
Payroll	647,181	393,500	437,800	596,953
Self Employed	180,657	203,400	220,800	195,735
Total Workers	827,839	596,900	658,600	792,688

Source: (1) & (4) Calculated from BLS employment data and value of construction put in place; (2) Based on employment in each detailed industry group and residential share of revenues; (3) Adjusted for differences in productivity between residential and nonresidential construction.

including 9,000 construction workers.⁴ The total payroll employment figure is remarkably close to the 4,958,000 reported by the BLS for that year, even though the COC numbers come from a survey of employers while the BLS numbers are based primarily on unemployment insurance data.

In addition to the payroll employees shown in the Census of Construction, there were 1,524,000 proprietors and working partners, mostly in firms without any payroll employees.⁵ As with the number of employees, the COC figure for proprietors and working partners is similar to the BLS figure for self-employed construction workers. For establishments with no employees, the COC relies on income tax data, while the BLS data on self-employed workers are based on a household survey.

For each of the detailed industry categories in the COC, a breakdown of the gross revenues for employer establishments is provided, showing the type of construction (single-family detached houses, office buildings, sewage treatment plants, etc.) and the type of work (new construction; additions, alterations, and reconstruction; and maintenance and repair). Where the P-I-P data indicate that 46 percent of the \$419 billion in construction value in 1987 was residential building, the 1987 COC showed only 29 percent of \$500 billion in construction revenues for firms with employees coming from single-family and multifamily residential construction.⁶ The P-I-P data are probably more accurate measures of the volume of activity.

For establishments with no employees, the COC gives very little data, but it appears that the vast majority of their \$82 billion in revenue comes from residential construction.

Because employment of special trade contractors is not classified separately as residential or nonresi-

dential, estimates of the residential share of employment must be based on the residential share of revenues for those industry categories. The results of that calculation indicate that a total of 1,389,400 payroll employees worked in residential construction in 1987, with 995,900 in home building and 393,500 in remodeling. This is much smaller than the estimate of 2.3 million payroll employees based on the 1987 BLS and P-I-P data, reflecting the discrepancy in the estimated residential share of the value of construction. For proprietors and working partners, the calculated employment numbers are 456,700 in new home building and 203,400 in residential remodeling, for a total of 660,100, a bit more than the corresponding estimate of 642,408 from the BLS and P-I-P data.

This calculation from the Census of Construction indicates that proprietors and working partners account for about a third of the residential work force, compared to a share of less than 20 percent for nonresidential construction, due solely to the greater share of self-employed workers in industry categories such as carpentry that are largely residential. It has been conservatively assumed that the residential share of self-employed workers in each industry category is identical to the residential share of revenues for establishments with payroll employees, even though self-employed workers within each specialty are more likely than payroll employees to be involved in residential construction.

Productivity Adjustment

The number of jobs per dollar of output may be higher (i.e., output per worker lower) in home building than in other types of construction, because home building is less capital-intensive and uses lower cost materials than most other construc-

tion sectors. If so, the residential share of construction employment is probably higher than the residential share of revenues.

Limited data from the COC on special trade establishments that specialize in a particular type of construction indicate that output per worker for establishments specializing in residential construction is indeed lower than output per worker for all special trade contractors, implying that the residential share of special trade employment is about 12 percent higher than the revenue share implies. That translates into a difference of about 6.5 percent for all construction.

Applying productivity adjustment factors to the initial estimates of employment in residential new construction and remodeling, we get slightly larger estimates of employment. As shown in column 3 of Table 1, payroll employment in new construction and remodeling now appear as 1,061,100 and 437,800, respectively. The number of proprietors and working partners becomes 479,200 for new construction and 220,800 for remodeling.

Both the BLS data and the COC data on employment include full-time and part-time workers. The total number of jobs expressed as full-time equivalents would be a bit lower. The 1987 Census of Construction data indicate that for residential construction workers, the average annual number of hours worked was 1,632, or 90.7 percent of the 1,800 hours that BLS has estimated to be a full-time year-round schedule for a construction worker. No data on hours were given for the 21 percent of employees in the construction industry who were not construction workers.

BLS Labor Input Studies

The employment generated by additional home building is a subject of perennial interest. A series of studies by BLS in the late 1960s and early 1970s attempted to answer the question. The BLS studies found that each single-family unit in 1969 represented 0.869 worker-year of employment in construction and each multifamily unit in 1971 represented 0.402 worker-year. In addition, the BLS studies estimated that single-family and multifamily units generated 0.969 and 0.433 jobs, respectively, in manufacturing, trade, transportation, and other supplier industries. These data are shown in

Table 2 in terms of jobs per unit, per 100 square feet, and per \$1,000 of construction value.

Since the BLS labor input studies were conducted, homes have become larger and more elaborate. If we assume that the labor input per square foot has remained constant, the implied number of worker-years per single-family unit in construction alone was 1.020 in 1987 and 1.122 in 1992. For multifamily units, the corresponding values are .403 and .428. Alternatively, assuming labor per dollar of real value remained consistent, the implied requirements were 1.042 worker-years per single-family unit in 1987 and 1.075

worker-years in 1992, with values of .503 in 1987 and 0.477 in 1992 for multifamily units.

There have been a number of technological innovations in home building, including the introduction of new tools and greater use of prefabricated components. But comparison of the industry employment estimates derived from the P-I-P and COC data with the employment implied by the labor coefficients and the level of construction suggests that the per-unit labor requirements have not declined. Indeed, labor requirements per square foot in today's larger homes appear to be similar to those measured in 1969 or 1971. The productivity improve-

Table 2 BLS Estimates of Labor Inputs Adjusted For Changes in Value and Size

	On Site	Off Site	TOTAL CONST	Manf	Trade Trans & Svc	Mining & Other	TOTAL
SINGLE-FAMILY							
1969 Survey Hours:							
per Unit	1330	260	1590	1054	519	357	3520
per 100 Sq. Ft.	82	16	98	65	32	22	217
per \$1,000	52	10	62	41	20	14	137
1969 Jobs (person-years):							
per Unit	0.739	0.130	0.869	0.505	0.289	0.175	1.837
per 100 Sq. Ft.	0.046	0.008	0.054	0.031	0.018	0.011	0.113
per \$1,000	0.029	0.005	0.034	0.020	0.011	0.007	0.072
1992 Jobs per Unit:							
Size Adjusted	0.954	0.168	1.122	0.652	0.373	0.226	2.373
Value Adjusted	0.916	0.159	1.075	0.622	0.353	0.218	2.268
1987 Jobs per Unit:							
Size Adjusted	0.868	0.152	1.020	0.593	0.340	0.205	2.158
Value Adjusted	0.888	0.154	1.042	0.603	0.343	0.211	2.199
MULTIFAMILY							
1971 Survey Hours:							
per Unit	636	98	734	548	196	127	1606
per 100 Sq. Ft.	65	10	75	56	20	13	164
per \$1,000	50	8	58	43	15	10	126
1971 Jobs (person-years):							
per Unit	0.354	0.049	0.402	0.262	0.109	0.062	0.836
per 100 Sq. Ft.	0.036	0.005	0.041	0.027	0.011	0.006	0.085
per \$1,000	0.028	0.004	0.032	0.021	0.008	0.005	0.066
1992 Jobs per Unit:							
Size Adjusted	0.376	0.052	0.428	0.279	0.116	0.066	0.888
Value Adjusted	0.417	0.060	0.477	0.309	0.125	0.073	0.984
1987 Jobs per Unit:							
Size Adjusted	0.354	0.049	0.403	0.263	0.109	0.062	0.837
Value Adjusted	0.440	0.063	0.503	0.326	0.132	0.078	1.039

Source: Labor and Material Requirements for Construction of Private Single-family Houses, Bulletin 1755 (Bureau of Labor Statistics, 1972), Labor and Material Requirements for Private Multifamily Housing Construction (Bulletin 1892, Bureau of Labor Statistics, 1976).

ments from new tools and materials may have been offset by additional regulatory burdens. The BLS studies did not include land development, but a conservative estimate of per-unit development requirements would be 0.100 worker-year for single-family and 0.050 worker-year for multifamily.

Multiplying the 1969 and 1971 per-unit labor coefficients by the number of units built (using the average of starts and completions) gives an estimate of total home building employment that is relatively low. For 1987, even after adding in an estimate of land development jobs, the implied employment for home building is only 1,330,000.

When the labor input coefficients are adjusted by the increase in average home size or in real value per unit, the 1987 estimates of employment in new home building based on labor input coefficients increases to 1,502,000 or 1,578,000. That's more comfortably within the 1,317,000 to 1,919,000 range of estimates for full-time equivalents in 1987 based on the aggregate employment data (Table 3). Because

there are reasons to think that the lowest aggregate employment estimates are too low (based on the low COC value for aggregate revenues for new residential construction and the conservative allocation of self-employed workers between residential and nonresidential) the labor input estimates that incorporate the adjustment for changes in square footage or in real value per unit are probably better than those where labor per unit is assumed constant.

There are several possible explanations for the apparent failure of the labor input coefficients to decline. First, the 1969 and 1971 estimates may have understated actual labor requirements at that time, but we have no evidence of that. Second, there could have been a decline in the quality of the labor force such that more hours of work were required to accomplish the same task. Although there is a widespread perception in the industry that workers today are not as well trained and dedicated as workers a generation ago, the share of construction industry workers who are in skilled trades has increased, while the share who are unskilled laborers has declined.

A third, and more likely, explanation of the apparent stagnation in home building productivity is that the real value per unit has increased by more than the statistics show. In creating the house price index used to translate current dollar measures to real (constant) dollars, the Census Bureau adjusts for changes in the size of the home, the number of bathrooms, the region, and so forth, but there have been a number of improvements, particularly in the areas of safety and energy efficiency, that have not been accounted for.

The problem of adjusting for quality change in price indices is not unique to home building, yet other goods-producing industries have managed to achieve measurable productivity growth over recent decades. Even after considering the possible effect of uncounted quality change, productivity growth has been limited.

¹U.S. Bureau of Labor Statistics. *Employment and Earnings*. June 1993, Table B1, p. 69.

²*Employment and Earnings*. January 1993, Table 24, p. 202.

³U.S. Department of Commerce News Release, July 1, 1993 (CB-121), Table 5.

⁴U.S. Bureau of the Census. 1987 Census of Construction. United States Summary (CC87-1-28), p.10.

⁵*Ibid.*, p.7.

⁶Total construction work, *net* of subcontracting, for all construction establishments with payrolls in the 1987 COC was \$368 billion. Generally, a larger share of nonresidential work is subcontracted than of residential work, so there is more double-counting in the nonresidential revenues, partly explaining the smaller residential share of gross receipts. The net value of receipts for employer establishments from the COC of \$368 billion is below the \$419 billion put-in-place. Nonemployer establishments accounted for another \$82 in gross (not net) receipts in the COC. Do-it-yourself work, construction by nonconstruction establishments, and purchases of building materials by customers are not counted in the Census of Construction. Maintenance and repairs, which are not counted in the P-I-P, represented 10 percent of total construction work and 8 percent of residential construction work in the 1987 COC.

**Table 3 Estimated Jobs Building New Homes
Labor Input Coefficients vs. Aggregate Employment**

	1987	1992
ESTIMATES FROM INPUT COEFFICIENTS		
All New Homes -- Building Jobs:		
1969/71 Surveys	1,330	1,047
Adjusted for Size	1,502	1,303
Adjusted for Value	1,578	1,265
ESTIMATES FROM CONSTRUCTION EMPLOYMENT		
BLS Employment and P-I-P Value	2,116	1,764
1987 Census of Construction	1,453	
Productivity Adjusted	1,540	
Full-time Equivalents:		
BLS empl and value put in place	1,919	1,599
1987 Census of Construction	1,317	
Productivity Adjusted	1,397	

Source: Tables 1 and 2 with construction data from U.S. Bureau of the Census.