

APPENDIX K. DETAILED DATA FOR EQUIPMENT PRICE MARKUPS

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APPENDIX K. DETAILED DATA FOR EQUIPMENT PRICE MARKUPS

K.1 INTRODUCTION

This appendix provides further details on information presented in Chapter 7, Markups for Equipment Price Determination.

K.2 DETAILED WHOLESALER COST DATA

Based on data provided in the *1998 Wholesaler Profit Survey Report* of the Air-conditioning & Refrigeration Wholesalers Association (ARW), Table 7.3.1 of Chapter 7, section 7.3, *Estimation of Wholesale Mark-ups* shows wholesaler revenues and costs in aggregated form. Table K.2.1 below provides the complete breakdown of costs and expenses as provided in the *1998 Wholesaler Profit Survey Report*.^a The column labeled “Scaling” in Table K.2.1 indicates which expenses DOE assumed to scale with only direct “labor” costs and which scaled with “all direct” costs. As Chapter 7, section 7.3 describes, only those expenses that scale with “all direct” costs are marked-up when there is an incremental change in equipment costs.

^a Table K.2.1 presents wholesaler costs and expenses as *percentage* values as opposed to *per dollar of sales revenue* values, as shown in Table 7.3.1.

Table K.2.1 Disaggregated Costs and Expenses for Wholesalers

Item	Percent of Revenue	Scaling
Cost of Goods Sold	73.6%	
Gross Margin	26.4%	
Payroll Expenses		
Executive Salaries & Bonuses	2.7%	Labor
Inside Sales Salaries/Wages	3.2%	Labor
Outside Sales Salaries/Commissions	2.2%	Labor
Warehouse & Delivery Salaries/Wages	2.3%	Labor
All Other Salaries/Wages & Bonuses	2.1%	Labor
Payroll Taxes	1.1%	Labor
Group Insurance	0.7%	Labor
Benefit Plans	0.5%	Labor
Total Payroll Expenses	14.8%	
Occupancy Expenses		
Utilities: Heat, Light, Power, Water	0.4%	Labor
Telephone	0.6%	Labor
Building Repairs & Maintenance	0.2%	Labor
Rent or Ownership in Real Estate	2.4%	Labor
Total Occupancy Expenses	3.6%	
Other Operating Expenses		
Advertising and Promotion	0.9%	All Costs
Insurance	0.4%	All Costs
Depreciation	0.7%	All Costs
Bad Debt Losses	0.3%	All Costs
All Other Operating Expenses	3.2%	All Costs
Total Other Operating Expenses	5.4%	
Operating Profit	2.7%	All Costs

K.3 DETAILED GENERAL CONTRACTOR COST DATA

Based on U.S. Department of Census data, Table 7.4.1 of Chapter 7, section 7.4, *Estimation of General Contractor Mark-ups* shows general contractor revenues and costs in aggregated form. Table K.3.1 below shows the complete breakdown of costs and expenses as the U.S. Department of Census^b provided. The column labeled “Scaling” in Table K.3.1 indicates which expenses DOE assumed to scale with only direct “labor” costs, and which scale with “all direct” costs. As Chapter 7, section 7.4 describes, only those expenses that scale with “all direct” costs are marked-up when there is an incremental change in equipment costs.

^b Table K.3.1 presents general contractor costs and expenses first as *total dollar* values and then as converted to *percentage* values. This is in contrast to the *per dollar of sales revenue* values shown in Table 7.4.1.

Table K.3.1 Disaggregated Costs and Expenses for General Contractors

Item	Dollar Value	Percentage	Scaling
Cost of materials, components, and supplies (Direct Materials and Equipment Installed)	\$28,087,296	16.03%	
Payroll, construction workers (Direct Labor)	\$10,797,116	6.16%	
Cost of construction work subcontracted out to others (Direct Subcontract)	\$101,952,864	58.18%	
Cost of selected power, fuels, and lubricants (Direct Other)	\$827,160	0.47%	
Total Cost of Sales	\$141,664,436	80.84%	
Gross Margin	\$33,566,396	19.16%	
Operating Expenses			
Depreciation charges during year (Depreciation)	\$808,477	0.46%	All Costs
Rental cost for machinery, equipment, and buildings + Purchased communication services (Occupancy Costs)	\$1,657,257	0.95%	Labor
Fringe benefits, all employees (Payroll Taxes/Fringe Benefits)	\$4,524,436	2.58%	Labor
Payroll, other employees (Officer Salaries, Sales and Estimating Salaries, Administration Salaries, Warehouse Salaries)	\$8,379,046	4.78%	Labor
Cost of repairs to buildings and other structures + Cost of repairs to machinery and equipment (Vehicle/Maintenance Repairs)	\$558,930	0.32%	All Costs
Total Operating Expenses	\$15,928,146	9.09%	
Net Profit Before Income Taxes	\$17,638,250	10.07%	

K.4 DETAILED MECHANICAL CONTRACTOR DATA

Based on data in the 1995 edition of *Financial Analysis for the HVACR Contracting Industry*, which the Air Conditioning Contractors of America (ACCA) publishes, Table 7.5.1 of Chapter 7, section 7.5, *Estimation of Mechanical Contractor Markups* shows mechanical contractor revenues and costs in aggregated form. Table K.4.1 below provides the complete breakdown of costs and expenses as provided in the *Financial Analysis* report.^c The column labeled “Scaling” in Table K.4.1 indicates which expenses DOE assumed to scale with only direct “labor” costs and which scale with “all direct” costs. As Chapter 7, section 7.5 describes, only those expenses that scale with “all direct” costs are covered when there is an incremental change in equipment costs.

^c Table K.4.1 presents mechanical contractor costs and expenses as *percentage* values as opposed to *per dollar of sales revenue* values, as shown in Table 7.5.1.

Table K.4.1 Disaggregated Costs and Expenses for Mechanical Contractors

Item	Percentage	Scaling
Direct Materials	22.70%	
Equipment Installed	14.22%	
Direct Labor	19.01%	
Direct Subcontract	5.55%	
Direct Other	3.97%	
Total Cost of Sales	65.45%	
Gross Margin	34.55%	
Operating Expenses		
Advertising	1.10%	All Costs
Bad Debts	0.16%	All Costs
Depreciation	1.02%	All Costs
Interest Expenses	0.33%	All Costs
Liability Insurance	1.12%	All Costs
Other Insurance	1.36%	All Costs
Occupancy Costs	1.24%	Labor
Payroll Taxes/Fringe Benefits	4.02%	Labor
Selling Expense	1.49%	All Costs
Officer Salaries	3.80%	Labor
Sales and Estimating Salaries	2.69%	Labor
Administration Salaries	3.18%	Labor
Warehouse Salaries	0.46%	Labor
Unapplied Labor	1.04%	Labor
Vehicle/Maintenance Repairs	1.82%	All Costs
Other Operating Expenses	5.13%	All Costs
Total Operating Expenses	29.96%	
Net Operating Profit	4.59%	All Costs
Other Income	0.79%	All Costs
Other Expenses	-0.49%	All Costs
Net Profit Before Income Taxes	4.89%	

K.5 ESTIMATION OF WHOLESALER AND CONTRACTOR MARK-UP STANDARD DEVIATIONS

The Department used U.S. Census survey data to estimate commercial air conditioner wholesaler, general contractor, and mechanical contractor markup distributions. The survey data include state-level heating, ventilating, and air-conditioning (HVAC) total value of work, number of firms, cost of goods sold, cost of subcontract work, cost of materials, and construction payroll (Tables K.5.1 through K.5.3). The Department used these data to calculate individual state baseline markups. The Department did not calculate markups for some small states because the Census Bureau withheld data for those states. The Department did not calculate the general contractor markup for one state, Nevada, because the data for that state are sufficiently different than for any other state.

Markups may vary across states for several reasons, including differences in firm size. For example, the average North Dakota wholesale firm sells \$938,000 in goods and services annually and has a 1.85 baseline markup. The average Oregon wholesale firm sells \$7,156,000 and has a 1.23 baseline mark-up (Table K.5.1).

The Department estimated the size of the baseline markup distribution from the standard deviation of across-state markups. The wholesale markup standard deviation is 0.11, the general contractor markup standard deviation is 0.05, and the mechanical contractor markup standard deviation is 0.04. These standard deviations suggest that wholesale markups vary more than general contractor or mechanical contractor markups, a result that seems reasonable because there are fewer firms, and thus less competition, at the wholesale level than at the builder or contractor distribution levels. The Department assumed that new construction and replacement market mechanical contractor markups have the same relative standard deviation as that developed from the baseline markups for all contractors.

The Department defined the relative standard deviation as the standard deviation as a percent of the baseline markup. The wholesale relative standard deviation is 8.2 percent, the general contractor relative standard deviation is 3.9 percent, and the mechanical contractor relative standard deviation is 3.1 percent of their respective baseline markups. The fact that the mechanical contractor relative standard deviation is 3.1 percent of the baseline markup implies that the standard deviation for the new and replacement markets, relative to their respective baseline markups, is also 3.1 percent.

The Department also assumed that wholesale, general contractor, and mechanical contractor incremental markups have the same relative standard deviation as wholesale, general contractor, and mechanical contractor baseline markups. It used this assumption to calculate the standard deviation of wholesale, general contractor, and mechanical contractor incremental markups.

Table K.5.1 Wholesale Baseline Markups by State

States with Available Data	Number of Firms	Total Sales (\$000)	Average Firm Size (\$000)	Cost of Goods Sold (\$000)	Baseline Markup
Alabama	106	310,246	2,927	230,160	1.35
Arizona	70	281,826	4,026	216,368	1.30
Arkansas	51	109,982	2,157	83,093	1.32
California	325	1,037,453	3,192	688,575	1.51
Colorado	67	206,248	3,078	153,600	1.34
Connecticut	43	161,945	3,766	113,816	1.42
Florida	387	1,037,529	2,681	720,113	1.44
Georgia	179	577,898	3,228	426,361	1.36
Illinois	198	529,087	2,672	379,812	1.39
Indiana	113	391,395	3,464	288,678	1.36
Kentucky	84	227,761	2,711	167,535	1.36
Louisiana	118	272,837	2,312	202,058	1.35
Maryland	92	312,671	3,399	251,925	1.24
Michigan	159	526,458	3,311	402,887	1.31
Minnesota	62	260,501	4,202	175,585	1.48
Missouri	114	265,762	2,331	195,549	1.36
Montana	16	28,924	1,808	20,059	1.44
New Jersey	155	462,301	2,983	329,644	1.40
New York	217	578,251	2,665	419,642	1.38
North Carolina	201	683,453	3,400	465,177	1.47
North Dakota	6	5,625	938	3,038	1.85
Ohio	193	542,633	2,812	391,311	1.39
Oklahoma	80	198,092	2,476	147,117	1.35
Oregon	45	322,038	7,156	262,250	1.23
South Carolina	100	254,564	2,546	170,129	1.50
Tennessee	128	619,069	4,836	459,644	1.35
Texas	459	1,267,425	2,761	911,112	1.39
Virginia	122	407,048	3,336	304,818	1.34
Washington	87	273,753	3,147	183,174	1.49
Wisconsin	85	294,943	3,470	238,470	1.24
Average Markup					1.39
Standard Deviation					0.11

Table K.5.2 General Contractor Baseline Markups by State

States with Available Data	Number of Firms	Value of Construction (\$000)	Average Firm Size (\$000)	Cost of			Baseline Markup
				Subcontract Work (\$000)	Materials (\$000)	Construction Payroll (\$000)	
Alabama	620	3,671,344	5,922	1,938,672	891,334	223,420	1.20
Arizona	684	3,207,554	4,689	2,115,160	461,056	132,227	1.18
Arkansas	296	1,581,357	5,342	813,659	346,693	88,820	1.27
California	3722	17,972,242	4,829	11,428,343	2,376,960	1,105,505	1.21
Colorado	722	4,097,791	5,676	2,701,063	624,008	192,516	1.16
Connecticut	421	2,053,545	4,878	1,326,976	270,198	101,770	1.21
Florida	1975	8,209,136	4,157	4,984,231	1,272,181	423,086	1.23
Illinois	1439	7,622,243	5,297	4,830,124	961,727	499,422	1.21
Indiana	842	3,221,499	3,826	1,680,696	588,727	279,203	1.26
Iowa	579	1,509,129	2,606	679,536	400,534	164,324	1.21
Kentucky	532	1,546,834	2,908	834,196	283,717	121,643	1.25
Louisiana	526	1,516,624	2,883	798,086	313,290	121,031	1.23
Maine	239	305,850	1,280	143,347	73,147	24,054	1.27
Maryland	910	5,069,038	5,570	2,906,817	825,685	296,674	1.26
Michigan	1261	4,691,150	3,720	2,849,590	734,559	264,675	1.22
Minnesota	702	4,205,630	5,991	2,587,111	683,656	285,175	1.18
Mississippi	318	1,759,778	5,534	839,964	471,620	144,351	1.21
Missouri	746	4,526,190	6,067	2,731,605	967,587	322,037	1.13
Nevada*	254	2,357,883	9,283	1,018,206	218,406	203,157	1.64
New Jersey	918	4,345,635	4,734	2,196,849	726,720	293,666	1.35
New York	2743	11,335,125	4,132	7,236,674	1,459,728	646,693	1.21
North Carolina	919	5,362,934	5,836	3,069,432	1,092,447	321,427	1.20
Ohio	1582	5,682,205	3,592	3,186,775	940,113	408,422	1.25
Oregon	635	2,686,263	4,230	1,673,248	463,588	163,376	1.17
Pennsylvania	1317	7,026,616	5,335	4,059,173	1,138,910	485,052	1.24
South Carolian	355	1,656,716	4,667	780,080	356,487	108,530	1.33
Tennessee	603	3,867,887	6,414	2,341,046	720,239	235,680	1.17
Texas	2857	12,574,184	4,401	7,532,096	2,015,494	606,620	1.24
Utah	330	2,117,642	6,417	1,328,584	340,226	113,326	1.19
Virginia	1018	4,566,645	4,486	2,732,596	799,822	269,492	1.20
Washington	1084	4,212,206	3,886	2,449,727	834,143	341,591	1.16
Wisconsin	663	3,497,723	5,276	1,709,278	711,185	339,862	1.27
Average Markup							1.22
Standard Deviation							0.05

* Data not used in determination of average markup and standard deviation.

Table K.5.3 Mechanical Contractor Baseline Mark-ups by State

State	Number of Firms	Total Value of Work (\$000)	Average Firm Size (\$000)	Cost of Subcontract Work (\$000)	Cost of Materials (\$000)	Construction Payroll (\$000)	Baseline Markup
Alabama	1413	1227115	868	71884	469589	261627	1.53
Alaska	187	191222	1023	26999	62114	39063	1.49
Arizona	1344	1558535	1160	105390	670620	314727	1.43
Arkansas	980	587503	599	38859	233542	123406	1.48
California	6776	8179446	1207	752768	3074373	1829630	1.45
Colorado	1654	1693660	1024	163179	681129	360281	1.41
Connecticut	1254	1004514	801	92352	363915	211448	1.50
Delaware	288	409763	1423	33040	137526	97407	1.53
Florida	4803	4270074	889	387328	1743206	808674	1.45
Georgia	2589	2707372	1046	226200	1068051	509764	1.50
Hawaii	243	262209	1079	31120	84395	53728	1.55
Idaho	546	534485	979	71998	203012	99646	1.43
Illinois	3756	4666573	1242	421160	1612309	1111017	1.48
Indiana	1973	2415608	1224	248396	880509	551694	1.44
Iowa	938	941814	1004	90092	333338	201583	1.51
Kansas	1065	991048	931	88986	413221	199495	1.41
Kentucky	1178	1069652	908	71707	420424	233198	1.47
Louisiana	1200	1032992	861	123727	390003	189221	1.47
Maine	552	271742	492	22337	109332	54823	1.46
Maryland	2037	2706074	1328	431681	996255	518575	1.39
Massachusetts	2172	2197054	1012	354209	788930	404929	1.42
Michigan	3187	3345829	1050	386971	1168701	704768	1.48
Minnesota	1416	1744406	1232	185449	645039	376324	1.45
Mississippi	746	561720	753	37622	246454	104011	1.45
Missouri	1824	1850266	1014	223236	630723	411300	1.46
Montana	412	248138	602	20278	110880	51205	1.36
Nebraska	662	585515	884	54614	228098	126247	1.43
Nevada	515	881622	1712	70133	355908	194926	1.42
New Hampshire	462	362465	785	42964	140289	68677	1.44
New Jersey	3320	2809386	846	348499	995667	578431	1.46
New Mexico	600	393575	656	35545	155469	93895	1.38
New York	5234	5292794	1011	665391	1887074	1012489	1.48
North Carolina	3057	2989371	978	238119	1184341	608150	1.47
North Dakota	248	225388	909	20210	84540	52237	1.44
Ohio	3329	3847492	1156	484047	1349187	841751	1.44
Oklahoma	1156	737958	638	59705	291994	134307	1.52
Oregon	1079	1349767	1251	148845	498268	332455	1.38
Pennsylvania	3546	4001213	1128	431042	1485212	830817	1.46
Rhode Island	356	240887	677	36581	91233	43832	1.40
South Carolina	1351	1189389	880	109630	484566	262120	1.39
South Dakota	311	171663	552	15506	71723	34206	1.41

Tennessee	1612	1940866	1204	187255	815782	380309	1.40	
Texas	5516	5988883	1086	571356	2482127	1147065	1.43	
Utah	835	899015	1077	114587	313840	173567	1.49	
Vermont	245	149893	612	11891	55013	33780	1.49	
Virginia	2391	2109902	882	143031	863964	475238	1.42	
Washington	1746	1894359	1085	134056	693627	417457	1.52	
West Virginia	496	307942	621	15757	138747	66039	1.40	
Wisconsin	1981	2108422	1064	168459	740090	512820	1.48	
Wyoming	264	130175	493	12688	52717	26025	1.42	
							Average Markup	1.45
							Standard Deviation	0.04