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Remodeling Spending in Major Metropolitan Areas

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I. INTRODUCTION

During the 1990s, homeowner spending on remodeling projects in the U.S. averaged over \$90 billion¹ annually. Previous research has gone far in identifying who remodels, when during the life course homeowners are likely to remodel, and what types of projects are undertaken. However, little research has been conducted on the geographic location of homeowner remodeling. Research has not answered whether these home improvement activities are of similar magnitude across the nation or whether they interact with local characteristics.

This note is a first step in examining the relationship between metropolitan locations and remodeling activity. It establishes that differences exist in homeowner behavior across major U.S. metropolitan areas, and it offers a descriptive account of remodeling activities for these areas. Homeowner spending patterns in the largest metropolitan areas are compared to those of other U.S. homeowners. Also, remodeling behaviors are compared across a set of the 35 metropolitan areas with the largest number of homeowners.²

This paper is the first to give a detailed account of the variation of behavior across a large set of U.S. locations. Aside from a few articles that use simple variables to control for region (Baker and Kaul, 2000; McArdle, 1996) or categorically measure a level of urban development, such as central city, suburb, or nonmetropolitan, (Poulos, 1996; Baker and Kaul, 2000; McArdle, 1996) little has addressed geographic patterns in remodeling. Few articles hypothesize as to how geography could affect remodeling (Pollakowski, 1988; Bodgon, 1996; McArdle, 1996), and interpretation of any results is limited. One article (Pollakowski, 1988) does model home improvement in four different metropolitan areas, and finds significant differences in spending behavior across metros.

¹ All statistics in this paper are generated from American Housing Surveys conducted from 1991 to 1999. All spending estimates are adjusted to 1999 dollars using Consumer Price Index-All Urban Consumers (Current Series).

² A detailed definition of the largest 35 metros is available in the appendix. Analysis is limited to this set because of their large sample sizes in the American Housing Survey.

To examine the range of remodeling behaviors across the country, this paper clusters homeowners by metropolitan area. Metropolitan areas were chosen over states as a major spatial aggregation because social and economic patterns within metropolitan areas tend to be more homogenous than within states. Metropolitan areas are places where people, jobs, and housing are spatially concentrated. Most people living in a metropolitan area both earn and spend money in that same area. Housing-related conditions are more likely to be uniform across any one metropolitan area.

The goal of this paper is to determine whether or not homeowners in different metropolitan areas exhibit differing remodeling behaviors. Later research will analyze the degree to which these variations are due to the characteristics of the homes and homeowners comprising the metropolitan area versus other local area characteristics affecting homeowner decisions. For example, it is likely that remodeling spending is higher in wealthier metropolitan areas or in areas with older stock. At first glance, the results presented here appear to support these hypotheses. However, more formal analyses would be required for stronger conclusions.

II. Description of Remodeling for Metropolitan Areas

Total Spending

Almost half of U.S. spending on remodeling occurs in major metropolitan areas. Between 1990 and 1999, homeowners living in these largest 35 metropolitan areas accounted for an average of \$41 billion of the over \$91 billion spent each year nationally on home remodeling projects. Expenditures are highly concentrated in metropolitan areas; twenty-two percent of U.S. remodeling by homeowners occurs in the largest five metropolitan areas alone. Homeowners in these largest 35 metropolitan areas together accounted for 44% of the national total of homeowner spending on remodeling. This is somewhat higher than the 37% of all owner-occupied housing contained in these metropolitan areas.

Figure 1: Summary of Spending by Metropolitan Location

	Number of Owner-occupied Households		Total Homeowner Spending on Remodeling		Project Type						Labor Source			
					Discretionary Projects	Replacement Projects	Other Projects		Professional	Do-It-Yourself				
	(thousands)		(Billions \$)		(Billions \$)		(Billions \$)		(Billions \$)		(Billions \$)		(Billions \$)	
Total for Top 35 Metros	23,617	37%	406.0	44%	162.8	46%	160.6	44%	82.7	41%	312.0	47%	82.7	38%
	Other Metro Areas	24,354	38%	319.4	35%	119.1	34%	124.7	34%	75.6	38%	228.1	34%	79.8
Nonmetro Areas	16,050	25%	189.0	21%	69.0	20%	77.6	21%	42.4	21%	123.7	19%	56.8	26%
National Total	64,021	100%	914.4	100%	350.9	100%	362.8	100%	200.7	100%	663.9	100%	219.3	100%

Total remodeling spending across the largest 35 metropolitan areas varies widely. The highest-spending metropolitan area is New York - Northern New Jersey - Long Island, with average annual total spending by homeowners during the 1990s averaging \$6.8 billion. The second largest is Los Angeles - Riverside - Orange with \$4.6 billion. The smallest market of these largest 35 metropolitan areas is San Antonio, which had an estimated annual volume during this period of \$200 million.

During this period, the average U.S. homeowner spent \$1430 (1999 \$) annually on remodeling. In the top 35 metros, this level was higher, reaching \$1720. In contrast, homeowners in other areas averaged only \$1180, which is less than 70% of homeowner spending in major metro areas.

Highest spending per homeowner occurred in the San Francisco metropolitan area, where the average homeowner spent over \$2380 ($\pm 16\%$)³ annually between 1990 and 1999. Lowest spending occurred in the Norfolk metro area, where the average homeowner spent only \$970 ($\pm 21\%$) annually. Of the 35 largest metros, eleven had per homeowner spending significantly above and four had per homeowner spending significantly below the national average.

Spending by Project Type

There are many types of remodeling activities, but they can be pooled together into a few categories. Discretionary projects are those that improve, add, or reconfigure space. They tend to reflect owners' desires for additional or updated space in the home. Replacement projects relate to major system upgrades and substitutions that are required during the lifetime of most homes. Like total spending, spending levels for these categories vary widely across metropolitan areas.

³ Due to small sample sizes, confidence intervals for estimates within individual metros are large and have been provided. The appendix includes a fuller explanation and notes which metros differ significantly from average.

Figure 2: Total Spending on Remodeling by Homeowners, 1990-1999

	Total Decade Spending (Billions \$)	Number of Homeowners (Decade Average)	Average Annual Spending Per Homeowner*	Rank	Confidence Interval** (90%)
Atlanta	6.6	452,000	1,460	(23)	17%
Boston	15.3	771,000	1,980 +	(4)	15%
Buffalo	3.2	228,000	1,400	(25)	18%
Chicago	30.8	1,821,000	1,690 +	(11)	6%
Cincinnati	4.2	270,000	1,540	(19)	17%
Cleveland	6.9	503,000	1,360	(27)	11%
Columbus	3.7	229,000	1,640	(13)	29%
Dallas	9.3	634,000	1,460	(24)	12%
Denver	6.7	447,000	1,500	(20)	13%
Detroit	20.2	1,282,000	1,580 +	(18)	6%
Houston	8.7	554,000	1,580	(17)	16%
Indianapolis	2.7	210,000	1,300	(29)	19%
Kansas City	4.1	276,000	1,480	(22)	15%
Los Angeles	46.4	2,325,000	1,990 +	(3)	8%
Miami	10.0	726,000	1,380	(26)	13%
Milwaukee	4.5	303,000	1,490	(21)	21%
Minneapolis	9.4	547,000	1,720 +	(9)	15%
New Orleans	3.9	237,000	1,660	(12)	22%
New York	68.3	3,534,000	1,930 +	(6)	7%
Norfolk	3.0	311,000	970 -	(35)	13%
Orlando	3.3	206,000	1,590	(15)	24%
Philadelphia	24.4	1,265,000	1,930 +	(7)	9%
Phoenix	7.0	549,000	1,270	(30)	13%
Pittsburgh	6.6	492,000	1,340	(28)	14%
Portland	6.1	294,000	2,080 +	(2)	20%
Providence	2.8	222,000	1,260	(31)	20%
Sacramento	4.1	256,000	1,620	(14)	19%
St. Louis	5.3	461,000	1,160 -	(33)	13%
Salt Lake City	4.5	268,000	1,690	(10)	18%
San Antonio	2.0	202,000	1,010 -	(34)	19%
San Diego	6.9	436,000	1,590	(16)	14%
San Francisco	28.0	1,178,000	2,380 +	(1)	16%
Seattle	9.4	538,000	1,740 +	(8)	14%
Tampa	5.4	457,000	1,190 -	(32)	14%
Washington	22.1	1,134,000	1,950 +	(5)	12%
Total for Top 35 Metros	406.0	23,617,000	1,720 +		
Total for Other Metro Areas	319.4	24,354,000	1,310 -		2%
Total for Non-metro Areas	189.0	16,050,000	1,180 -		3%
National Total	914.4	64,021,000	1,430		1%
* Value is statistically significantly larger or smaller from the national average at two-sided 90% confidence are marked with "+" or "-", respectively.					
** These percents can be interpreted as, "With 90% confidence, the true value for average annual spending per homeowner is within X percent of the average."					

Discretionary

Discretionary projects include kitchen or bath remodels, additions, and space reconfigurations. In the U.S. over this period, an annual average exceeding \$35 billion was spent on discretionary projects, which was 38% of total spending on remodeling. Spending in these largest 35 metropolitan areas accounted for over 45% of the U.S. total - averaging nearly \$16 billion annually. Discretionary spending was disproportionately concentrated in the top five metropolitan areas: 24% of total homeowner expenditures were made by the 16% of U.S. homeowners living in these five metropolitan areas. The largest market was New York, where an annual average of over \$3 billion was spent during the decade, which accounted for 9% of the national total.

The average U.S. homeowner spent \$550 on discretionary improvements between 1990 and 1999. In the largest 35 metropolitan areas, the average was \$690. Homeowners in smaller metropolitan areas averaged \$490 and those in nonmetropolitan areas averaged \$430.

The range of variation is wide across metros. Highest spending occurred in San Francisco, where homeowners averaged \$1000 ($\pm 23\%$). Despite the large range of error for this estimate, it is still within a 90% confidence interval higher than spending nationally. Homeowners in eight of these 35 metropolitan areas had spending levels significantly higher than the national average.

Lowest spending per homeowner was \$250 ($\pm 40\%$), which occurred in San Antonio. This is a quarter of per homeowner spending found in San Francisco, showing a broad range of spending behavior on discretionary remodeling projects across metro areas. Again, despite the large margin of error, homeowners in eight metros, including San Antonio, had spending patterns for discretionary work that were significantly lower than the national average.

**Figure 3: Discretionary and Replacement Spending by Homeowners, 1990-1999
(Adjusted to 1999 dollars)**

	Total Decade Spending (Billions \$)	Total Decade Discretionary Spending (Billions \$)	Percent of Total Spending	Total Decade Replacement Spending (Billions \$)	Percent Of Total Spending	Total Decade Other Spending (Billions \$)	Percent of Total Spending	Discretionary			Replacement		
								Average Annual Spending Per Homeowner*	Rank	Confidence Interval	Average Annual Spending Per Homeowner*	Rank	Confidence Interval
Atlanta	6.6	2.6	39%	2.6	39%	1.4	21%	580	(15)	28%	580	(27)	15%
Boston	15.3	7.7	50%	5.1	33%	2.5	16%	1,000 +	(2)	23%	660 +	(16)	11%
Buffalo	3.2	1.2	38%	1.5	47%	0.4	13%	540	(18)	32%	670	(14)	16%
Chicago	30.8	12.0	39%	12.8	42%	6.1	20%	660 +	(11)	11%	700 +	(9)	7%
Cincinnati	4.2	1.1	26%	2.2	52%	0.9	21%	410 -	(31)	26%	810 +	(3)	17%
Cleveland	6.9	2.3	33%	3.2	46%	1.3	19%	460	(25)	21%	640	(21)	11%
Columbus	3.7	1.5	41%	1.5	41%	0.7	19%	650	(12)	41%	660	(17)	34%
Dallas	9.3	2.6	28%	4.2	45%	2.4	26%	410 -	(30)	30%	670 +	(15)	10%
Denver	6.7	2.3	34%	3.0	45%	1.4	21%	510	(23)	27%	680 +	(13)	13%
Detroit	20.2	7.6	38%	8.8	44%	3.9	19%	590	(14)	12%	680 +	(11)	6%
Houston	8.7	3.2	37%	3.6	41%	1.9	22%	570	(16)	34%	650 +	(20)	11%
Indianapolis	2.7	1.1	41%	1.0	37%	0.6	22%	520	(21)	37%	490	(32)	17%
Kansas City	4.1	1.4	34%	2.1	51%	0.6	15%	510	(24)	27%	750 +	(6)	18%
Los Angeles	46.4	19.4	42%	14.7	32%	12.2	26%	840 +	(4)	14%	630 +	(22)	7%
Miami	10.0	3.0	30%	4.8	48%	2.2	22%	420 -	(27)	22%	660 +	(19)	12%
Milwaukee	4.5	1.7	38%	2.2	49%	0.6	13%	560	(17)	39%	730 +	(8)	18%
Minneapolis	9.4	3.8	40%	3.4	36%	2.2	23%	690	(10)	26%	630	(23)	11%
New Orleans	3.9	1.2	31%	1.5	38%	1.2	31%	520	(22)	31%	610	(25)	26%
New York	68.3	31.6	46%	26.1	38%	10.7	16%	890 +	(3)	10%	740 +	(7)	5%
Norfolk	3.0	1.0	33%	1.5	50%	0.5	17%	310 -	(34)	25%	490	(33)	15%
Orlando	3.3	1.1	33%	1.3	39%	0.9	27%	540	(19)	44%	620	(24)	19%
Philadelphia	24.4	10.4	43%	10.1	41%	4.0	16%	820 +	(7)	18%	800 +	(4)	7%
Phoenix	7.0	2.3	33%	2.5	36%	2.2	31%	410 -	(29)	24%	460 -	(35)	12%
Pittsburgh	6.6	2.1	32%	3.2	48%	1.3	20%	430	(26)	25%	660	(18)	17%
Portland	6.1	2.4	39%	2.8	46%	0.9	15%	830	(5)	35%	940 +	(1)	28%
Providence	2.8	0.9	32%	1.3	46%	0.6	21%	400	(32)	37%	590	(26)	23%
Sacramento	4.1	1.3	32%	1.7	41%	1.0	24%	530	(20)	35%	680	(10)	19%
St. Louis	5.3	1.9	36%	2.3	43%	1.1	21%	420 -	(28)	26%	490 -	(31)	12%
Salt Lake City	4.5	1.9	42%	1.3	29%	1.3	29%	720	(9)	27%	490	(34)	17%
San Antonio	2.0	0.5	25%	1.0	50%	0.5	25%	250 -	(35)	40%	510	(30)	17%
San Diego	6.9	2.8	41%	2.3	33%	1.8	26%	640	(13)	23%	530	(28)	18%
San Francisco	28.0	11.8	42%	9.8	35%	6.4	23%	1,000 +	(1)	23%	830 +	(2)	12%
Seattle	9.4	4.1	44%	3.7	39%	1.6	17%	770 +	(8)	22%	680 +	(12)	14%
Tampa	5.4	1.7	31%	2.4	44%	1.3	24%	370 -	(33)	26%	520	(29)	12%
Washington	22.1	9.3	42%	9.0	41%	3.8	17%	820 +	(6)	20%	790 +	(5)	12%
Total for Top 35 Metros	406.0	162.8	40%	160.6	40%	82.7	20%	690 +			680 +		
Total for Other Metro Areas	319.4	119.1	37%	124.7	39%	75.6	24%	490 -		4%	510 -		2%
Total for Nonmetro Areas	189.0	69.0	37%	77.6	41%	42.4	22%	430 -		5%	480 -		3%
National Total	914.4	350.9	38%	362.8	40%	200.7	22%	550		3%	570		1%

* Values statistically significantly larger or smaller from the national average at two-sided 90% confidence are marked with "+" or "-", respectively.

** These percents can be interpreted as, "With 90% confidence, the true value for average annual spending per homeowner is within X percent of the average."

Replacements

Between 1990 and 1999, these largest 35 metropolitan areas saw an annual average of \$16 billion of the national total \$36 billion spent by homeowners. This accounted for just under 45% of total homeowner spending on replacement work. The five largest metros accounted for 20% of national spending. The New York metro area topped the list averaging nearly \$3 billion, or 7% of the national total.

Annual per homeowner spending for replacements averaged \$570 nationally and \$680 in the top 35 metros. Homeowners in smaller metropolitan areas averaged \$510, and nonmetropolitan homeowners averaged \$480.

Patterns for replacement spending are far more consistent across these metropolitan areas than those for discretionary remodeling. Highest spending in these top metros occurred in Portland, where homeowners averaged \$940 ($\pm 28\%$) annually. In total, seventeen of these 35 metropolitan areas had per homeowner spending levels for replacement activities that were significantly higher than the national average. Lowest spending occurred in Phoenix, where homeowners averaged \$460 ($\pm 12\%$) per year. Only two of the 35 metropolitan areas had spending significantly lower than the national average. Although the range across these metros is significant, it is far smaller than the variation seen in discretionary spending.

Professional and Do-It-Yourself Spending

In general, about three-quarters of total spending are dedicated to hiring professionals to do remodeling work; the remaining quarter goes to D-I-Y activities. Across the largest 35 metropolitan areas, spending on professional work and D-I-Y projects varies about equally.

Professional

Between 1990 and 1999, homeowners spent an annual average of \$66 billion on professional remodeling jobs. Forty-seven percent of spending occurred in the largest 35 metropolitan areas. Spending was disproportionately concentrated in the largest metros; 23% of national spending occurred in the five largest metropolitan areas, which only housed 16% of U.S. homeowners.

Nationally, the average homeowner spent \$1040 per year during the 1990s on professional remodeling. Spending in the top metropolitan areas was considerably higher; those

Figure 4: Professional and D-I-Y Spending by Homeowners, 1990-1999
(Adjusted to 1999 dollars)

	Total Decade Spending (Billions \$)	Total Decade Professional Spending (Billions \$)	Percent of Total Spending	Total Decade D-I-Y Spending (Billions \$)	Percent of Total Spending	Professional			Do-It-Yourself		
						Average Annual Spending Per Homeowner*	Rank	Confidence Interval (90%)	Average Annual Spending Per Homeowner*	Rank	Confidence Interval (90%)
Atlanta	6.6	5.1	77%	1.3	20%	1,120	(21)	20%	290	(21)	28%
Boston	15.3	12.1	79%	2.7	18%	1,570 +	(2)	16%	350	(13)	20%
Buffalo	3.2	2.2	69%	0.8	25%	980	(29)	22%	370	(12)	32%
Chicago	30.8	23.8	77%	6.2	20%	1,310 +	(12)	7%	340	(15)	11%
Cincinnati	4.2	3.0	71%	1.1	26%	1,110	(22)	18%	400	(6)	34%
Cleveland	6.9	5.4	78%	1.4	20%	1,070	(25)	12%	270	(25)	27%
Columbus	3.7	3.1	84%	0.6	16%	1,360	(9)	33%	250	(29)	46%
Dallas	9.3	7.5	81%	1.3	14%	1,190	(17)	14%	210 -	(34)	18%
Denver	6.7	4.8	72%	1.7	25%	1,070	(24)	17%	380	(9)	20%
Detroit	20.2	14.8	73%	4.9	24%	1,160 +	(18)	8%	380	(11)	10%
Houston	8.7	7.0	80%	1.5	17%	1,260	(14)	19%	280	(24)	27%
Indianapolis	2.7	2.0	74%	0.7	26%	940	(30)	23%	320	(19)	31%
Kansas City	4.1	3.1	76%	0.8	20%	1,140	(20)	18%	290	(22)	25%
Los Angeles	46.4	36.3	78%	9.1	20%	1,560 +	(3)	10%	390	(7)	12%
Miami	10.0	7.5	75%	2.1	21%	1,040	(26)	16%	280	(23)	25%
Milwaukee	4.5	3.7	82%	0.7	16%	1,230	(15)	23%	240	(32)	44%
Minneapolis	9.4	7.5	80%	1.8	19%	1,360 +	(8)	18%	330	(17)	18%
New Orleans	3.9	3.1	79%	0.6	15%	1,320	(11)	26%	250	(26)	48%
New York	68.3	51.7	76%	14.5	21%	1,460 +	(6)	7%	410 +	(3)	14%
Norfolk	3.0	2.0	67%	0.8	27%	660 -	(35)	16%	250 -	(30)	24%
Orlando	3.3	2.7	82%	0.4	12%	1,330	(10)	28%	180 -	(35)	33%
Philadelphia	24.4	18.5	76%	5.1	21%	1,460 +	(7)	11%	400	(5)	18%
Phoenix	7.0	5.1	73%	1.8	26%	930	(31)	16%	320	(18)	24%
Pittsburgh	6.6	4.9	74%	1.5	23%	1,000	(27)	16%	300	(20)	30%
Portland	6.1	4.5	74%	1.5	25%	1,540 +	(5)	25%	510	(2)	31%
Providence	2.8	2.2	79%	0.6	21%	990	(28)	22%	250 -	(28)	33%
Sacramento	4.1	3.1	76%	0.9	22%	1,220	(16)	21%	340	(16)	42%
St. Louis	5.3	4.0	75%	1.1	21%	880 -	(33)	15%	240 -	(31)	23%
Salt Lake City	4.5	2.9	64%	1.5	33%	1,070	(23)	24%	560 +	(1)	27%
San Antonio	2.0	1.5	75%	0.4	20%	750 -	(34)	23%	210 -	(33)	38%
San Diego	6.9	5.0	72%	1.7	25%	1,150	(19)	15%	380	(10)	37%
San Francisco	28.0	22.9	82%	4.6	16%	1,950 +	(1)	18%	390	(8)	21%
Seattle	9.4	7.0	74%	2.2	23%	1,290 +	(13)	17%	410	(4)	22%
Tampa	5.4	4.1	76%	1.1	20%	890 -	(32)	14%	250 -	(27)	31%
Washington	22.1	17.7	80%	3.9	18%	1,560 +	(4)	14%	340	(14)	29%
Total for Top 35 Metros	406.0	312.0	77%	82.7	20%	1,320 +			350		
Total for Other Metro Areas	319.4	228.1	71%	79.8	25%	940 -			330		
Total for Nonmetro Areas	189.0	123.7	65%	56.8	30%	770 -			350		
National Total	914.4	663.9	73%	219.3	24%	1,040			340		

* Values statistically significantly larger or smaller from the national average at two-sided 90% confidence are marked with "+" or "-", respectively.
** These percents can be interpreted as, "With 90% confidence, the true value for average annual spending per homeowner is within X percent of the average."
Note: Sum of Professional and Do-It-Yourself columns do not equal Total due to some unallocated activities.

homeowners averaged \$1320 per year. This compares to homeowners in smaller metropolitan areas who only spent \$940 annually, and nonmetropolitan homeowners who averaged \$770 annually.

Across metros, the range of spending patterns is moderate. San Francisco had the highest spending; homeowners averaged \$1950 ($\pm 18\%$) annually. Eleven of the 35 metropolitan areas had spending levels significantly higher than the national average. Lowest spending occurred in Norfolk, where homeowners averaged \$670 ($\pm 16\%$) on professional remodeling annually. Only four of these largest metropolitan areas had spending levels significantly lower than the national average.

Do-It-Yourself

Annual homeowner spending on D-I-Y projects in the 1990s nationally approached \$22 billion. Over \$8 billion of this spending, or 37%, occurred in the top 35 metropolitan areas. Eighteen percent of national spending occurred in just the top five metropolitan areas, which is only slightly above those metropolitan areas' share of the U.S. homeowner population.

There is no statistically significant difference across D-I-Y spending in these metropolitan areas, in smaller metropolitan areas, and in nonmetropolitan areas. Nationally, homeowners averaged \$340 annually. This is the only subcategory of spending where levels were not significantly higher in large metropolitan areas.

Variation in D-I-Y spending across specific metropolitan areas is moderate. Although the values fall in a narrow range, they are proportionate to the low levels of spending. Highest spending occurred in Salt Lake City, where homeowners averaged \$560 ($\pm 27\%$) annually. In total, only two of these 35 metropolitan areas had spending levels significantly higher than the national average.

Lowest-spending homeowners were in Orlando, where averages were only \$180 ($\pm 33\%$) annually. Homeowners in seven of the 35 metropolitan areas spent significantly lower amounts on D-I-Y than the national average.

III. SUMMARY

Remodeling spending in the largest metropolitan areas accounts for nearly half of the U.S. home improvement market. Significant differences exist in remodeling spending patterns across these largest U.S. metropolitan areas. Furthermore, behaviors of homeowners in these top metropolitan areas also differ from those across the rest of the nation.

Within job categories, variation is far stronger for discretionary than for replacement projects. Because the ratio of discretionary and replacement spending is close to 1:1, this wide variation in discretionary spending tends to have a strong effect on variations in total spending. By labor source, variation is about the same for professional and D-I-Y. However, because professional and D-I-Y compare at a ratio of about 3:1, total spending is more strongly affected by variations in professional spending.

This research note offers a first step in examining the effects of geography on remodeling behavior. Subsequent research is currently planned to measure numerous metropolitan area characteristics and test hypotheses of how geographic influences interrelate with homeowner determinants of remodeling. Factors such as density, local area housing price appreciation, and affluence will be added to a homeowner model with common determinants of remodeling, such as life course stage, income, and house age.

APPENDIX

Definitional Issues

In these analyses, "metropolitan areas" are defined by the largest spatial description devised by the U.S. census, that is, Consolidated Metropolitan Statistical Areas (CMSAs). Many of these larger divisions include a number of smaller spatial divisions (Primary Metropolitan Statistical Areas or PMSAs). For example, in this analysis, "San Francisco" refers to the San Francisco CMSA which includes the San Francisco, Oakland, San Jose, Santa Rosa, Santa Cruz, Watsonville, Vallejo, Fairfield, and Napa PMSAs as well as other non-delimited areas. However, many PMSAs are included in these analyses because of their large size, such as Atlanta.

This paper is focused on the largest 35 U.S. metropolitan areas. "Largest" is defined by the number of owner-occupied units. All of these metros exceed an average of 233,000 owner-occupied units. Generally these largest metros correspond to the largest metros by population, however there are two exceptions. Las Vegas has a large population, but its high rental rate leaves too few owner-occupied units for analysis. On the contrary, Providence has a smaller population, but a very high owner-occupancy rate.

Data

Analyses are conducted on pooled American Housing Studies data from the 1991 to 1999 waves. All homes that were owner-occupied at during any data collection are included. Homes that were not owner-occupied for all periods are weighted to impact analyses less.

Years of AHS data were pooled because of strong volatility within any single metro across time. The problems of small samples are exacerbated by remodeling being a somewhat uncommon event, and also by the very important effect of outliers on remodeling totals. A number of smoothing algorithms were attempted, but pooled longitudinal homeowner data were deemed more appropriate. Confidence intervals are still large for measures of spending in most individual metropolitan areas, and they have therefore been noted throughout the text. All confidence intervals have been set at 90% for two-tailed distribution. Therefore, the example of discretionary spending in Atlanta would be interpreted as follows: assuming a random and representative sample, there is a 90% chance that the population mean for total per homeowner spending is within 17% of \$1460; that is, between \$1220 and \$1710.

Figure 5: Major Metropolitan Areas Included in Analyses, with Detailed Geography

Atlanta, GA MSA	Los Angeles-Riverside-Orange, CA CMSA	Wilmington-Newark, DE-MD PMSA
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH NECMA	Los Angeles-Long Beach, CA PMSA	Phoenix-Mesa, AZ MSA
Buffalo-Niagara Falls, NY MSA	Orange, CA PMSA	Pittsburgh, PA MSA
Chicago-Gary-Kenosha, IL-IN-WI CMSA	Riverside-San Bernardino, CA PMSA	Portland-Salem, OR-WA CMSA
Chicago, IL PMSA	Ventura, CA PMSA	Portland-Vancouver, OR-WA PMSA
Gary, IN PMSA	Miami-Fort Lauderdale, FL CMSA	Salem, OR PMSA
Kankakee, IL PMSA	Fort Lauderdale, FL PMSA	Providence-Warwick-Pawtucket, RI NECMA
Kenosha, WI PMSA	Miami, FL PMSA	Sacramento-Yolo, CA CMSA
Cincinnati-Hamilton, OH-KY-IN CMSA	Milwaukee-Racine, WI CMSA	Sacramento, CA PMSA
Cincinnati, OH-KY-IN PMSA	Milwaukee-Waukesha, WI PMSA	Yolo, CA PMSA
Hamilton-Middletown, OH PMSA	Racine, WI PMSA	St. Louis, MO-IL MSA
Cleveland-Akron, OH CMSA	Minneapolis-St. Paul, MN-WI MSA	Salt Lake City-Ogden, UT MSA
Akron, OH PMSA	New Orleans, LA MSA	San Antonio, TX MSA
Cleveland-Lorain-Elyria, OH PMSA	New York-Northern New Jersey-Long Island, NY-NJ-CT-PA CMSA/NEC	San Diego, CA MSA
Columbus, OH MSA	Bergen-Passaic, NJ PMSA	San Francisco-Oakland-San Jose, CA CMSA
Dallas-Fort Worth, TX CMSA	Dutchess, NY PMSA	Oakland, CA PMSA
Dallas, TX PMSA	Jersey City, NJ PMSA	San Francisco, CA PMSA
Fort Worth-Arlington, TX PMSA	Middlesex-Somerset-Hunterdon, NJ PMSA	San Jose, CA PMSA
Denver-Boulder-Greeley, CO CMSA	Monmouth-Ocean, NJ PMSA	Santa Cruz-Watsonville, CA PMSA
Boulder-Longmont, CO PMSA	Nassau-Suffolk, NY PMSA	Santa Rosa, CA PMSA
Denver, CO PMSA	New Haven-Bridgeport-Stamford-Waterbury-Danbury, CT NECMA	Vallejo-Fairfield-Napa, CA PMSA
Greeley, CO PMSA	New York, NY PMSA	Seattle-Tacoma-Bremerton, WA CMSA
Detroit-Ann Arbor-Flint, MI CMSA	Newark, NJ PMSA	Bremerton, WA PMSA
Ann Arbor, MI PMSA	Newburgh, NY-PA PMSA	Olympia, WA PMSA
Detroit, MI PMSA	Trenton, NJ PMSA	Seattle-Bellevue-Everett, WA PMSA
Flint, MI PMSA	Norfolk-Virginia Beach-Newport News, VA-NC MSA	Tacoma, WA PMSA
Houston-Galveston-Brazoria, TX CMSA	Orlando, FL MSA	Tampa-St. Petersburg-Clearwater, FL MSA
Brazoria, TX PMSA	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD CMSA	Washington-Baltimore, DC-MD-VA-WV CMSA
Galveston-Texas City, TX PMSA	Atlantic-Cape May, NJ PMSA	Baltimore, MD PMSA
Houston, TX PMSA	Philadelphia, PA-NJ PMSA	Hagerstown, MD PMSA
Indianapolis, IN MSA	Vineland-Millville-Bridgeton, NJ PMSA	Washington, DC-MD-VA-WV PMSA
Kansas City, MO-KS MSA		

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Table 5

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