Joint Center for Housing Studies
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Estimating National Levels of Home Improvement and Repair Spending by Rental Property Owners

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Introduction

After many years of rapid expansion, national expenditures for home improvements and maintenance and repairs topped $325 billion in 2007 according to the Joint Center for Housing Studies' market size estimates. While spending for improvements and repairs to owner-occupied units comprises the majority of the remodeling market, renovation and repairs to rental units is not insignificant by any means. In fact, the Census Bureau estimated expenditures by rental property owners for improvements and maintenance reached $52 billion in 2007, nearly one-sixth of the entire remodeling market. Unfortunately, the remodeling industry lost a key source for measuring rental remodeling activity when in 2007 the U.S. Census Bureau discontinued its quarterly Residential Improvements and Repairs Statistics, also known as the C-50 series.

With the discontinuation of the C-50, the remodeling industry was left with few options for measuring the rental improvements and repairs segment of the market. Currently there exist no other public or private sources of rental remodeling data with the same frequency and detail as was available with the C-50. Until the Census Bureau or another agency is able to once again survey owners of rental units about their remodeling activity, the industry will need to estimate the amount of rental improvement and repair spending. A simplistic estimation method is to assume that rental remodeling activity follows the same trends as measured in the owner-occupied portion of the market. Yet while these major sectors are often grouped together, the drivers of home improvements by homeowners and rental property owners tend to be very different. Between 2001 and 2005, for example, homeowner expenditures on improvement activities averaged double-digit annual growth rates, but expenditures by rental property owners barely budged. Then in 2006 and 2007 home improvement expenditures on rental units began to recover, while spending by owners slowed significantly. With such divergent trends, this method would certainly provide only crude estimates of actual rental remodeling spending.

The purpose of this research note is to describe a more preferred method for estimating national levels of both home improvement and maintenance and repair spending by owners of rental properties in absence of any reliable survey data. The suggested method uses related industry measures, namely commercial and industrial

alterations and the consumer price index for rent of primary residence, both of which have relatively high correlations with rental improvements and repair spending in the C-50 series. By benchmarking these industry measures to the C-50, it is possible to estimate annual levels of remodeling and repair expenditures by rental property owners.

Sources of Rental Remodeling Spending

The long-standing source for rental remodeling activity was the Census Bureau's C-50 series, which tabulated both homeowner improvement and repairs as well as improvement and repair spending by rental property owners from 1965-2007. The C-50 tabulated survey data on homeowner improvements and repairs from the Consumer Expenditure (CE) survey, while remodeling and repair spending by owners of rental units came from the Survey of Residential Alterations and Repairs (SORAR). The SORAR was mailed monthly to approximately 4,000 non-resident owners of rental or vacant properties with 1-4 housing units and owners of rental or vacant properties containing five or more housing units, as identified in the CE household survey. The SORAR collected detailed maintenance and improvement expenditures for the entire rental property.[1] The published C-50 tabulations of the SORAR data was provided on a quarterly basis and included a fair amount of detail such as a breakout of total expenditures into additions to housing structures, alterations to housing structures, other property improvements, and maintenance and repairs. The C-50 provided further detail on spending by type of project, property type (i.e. single family or multi-family) and regional location on an annual basis.

SORAR data collection was problematic for many reasons, but simply obtaining the proper contact information for owners of rental, vacant, or seasonal properties was a major obstacle. Moreover the quality of the SORAR data was questionable at best with very low response rates and very high standard errors of estimated spending levels. Because of the difficulties gathering quality data, the quarterly estimates of rental remodeling exhibited unusual volatility and inconsistency and were subjected to numerous revisions throughout the years including a change of survey methodology. For

[1] A copy of the SORAR questionnaire can be found at: http://www.census.gov/const/C50/sorar705.pdf.

all of these reasons, when the Census Bureau faced increasing budget constraints, the SORAR did not make the cut and was thus discontinued as of 2007.

There are a few other government-produced surveys that provide some data on rental remodeling, but none are adequate for regularly estimating the size of the rental remodeling market. Perhaps the most comprehensive survey of the rental housing stock was the Property Owners and Managers Survey (POMS) sponsored by the Department of Housing and Urban Development, but this was a one-time survey conducted between 1995 and 1996. The Bureau's 2001 Residential Finance Survey also included questions for rental property owners on the value of capital improvements and maintenance and repairs, but like the POMS, this was a one-time survey and thus insufficient for ongoing estimations of the rental remodeling industry. While the American Housing Survey (AHS) asks detailed questions concerning improvements and maintenance expenditures for owner-occupied homes, it does not attempt to collect such information from renters, or owners of rental units in the AHS sample.

Some private sources of rental remodeling are available that might have potential for estimating the size of the rental remodeling market. Associations and consulting businesses such as the Institute of Real Estate Management (IREM) and CEL & Associates, Inc. undertake rental income-expense surveys to serve as a basis of comparison for rental property companies. Maintenance and improvement expenditures are often included in the expense surveys, from which national estimates of rental remodeling could be derived. Since these surveys are designed specifically for the purpose of capturing maintenance and improvement expenses for rental properties, the reliability of the estimates might prove better than with the C-50. On the other hand, the sample frame of these surveys would tend toward large rental properties, thereby overlooking rental owners who might rent out just a few properties, not as a main profession, but simply to earn additional income, for example. In fact, most renters in the U.S. live in single-family homes or small multi-family buildings. According to the 2009 American Housing Survey, more than one third of renters resided in single-family properties and another 20 percent of renters resided in properties with 2-4 units.

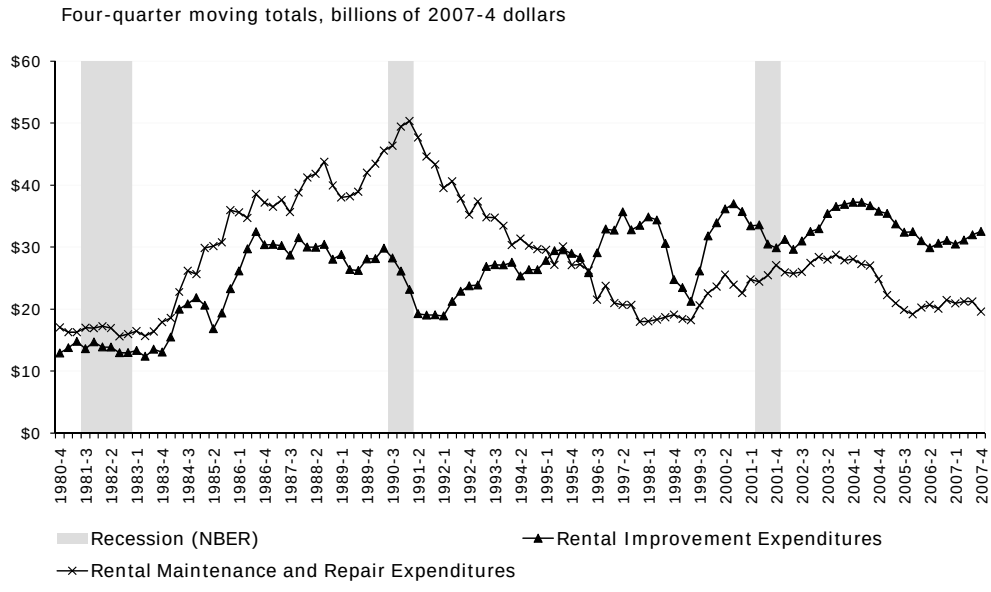
With the discontinuation of the C-50 and the lack of adequate alternatives for collecting data on rental property remodeling expenditures, limited options exist for estimating the national rental remodeling market size.

Methodology for Estimating Rental Improvement and Repair Spending

In the absence of any comprehensive and reliable survey data that directly measures the size of the national rental remodeling market post-2007, the next best alternative is to devise a straightforward method for approximating the level of improvement and repair expenditures for rental units. The method presented here first identifies related industry measures that correlate well with historical spending trends in rental improvements and repairs in the C-50. These measures are then benchmarked to the 2007 spending levels in the C-50 in order to produce separate estimates for rental improvement expenditures and rental maintenance and repair expenditures.

The C-50 data on rental improvements and repairs was collected from 1965-2007, which provides substantial historical data over several industry cycles for calculating correlations. The data in the C-50 are highly volatile, however, even more so than would be expected of a cyclical industry like remodeling (Figure 1).

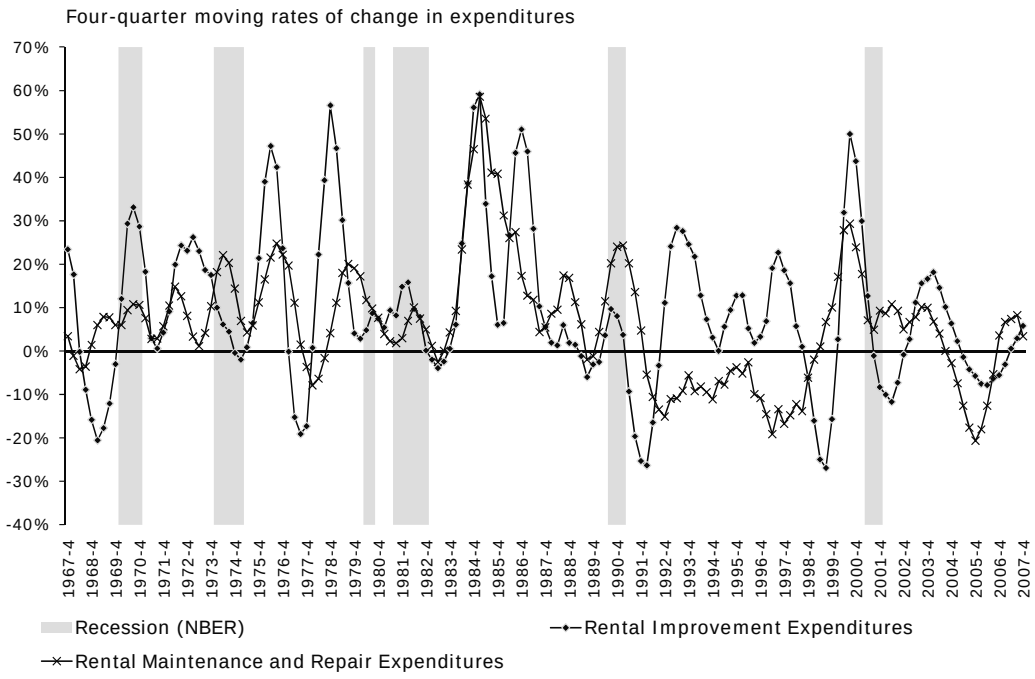
Figure 1: Rental Remodeling Spending is Unusually Irregular



Source: U.S. Census Bureau Residential Improvements and Repairs Statistics (C-50).

The erratic fluctuations in the quarterly C-50 estimates point more toward data quality problems and issues of small sample sizes rather than real changes in remodeling activity. Therefore, in order to accurately compare trends in rental remodeling spending to trends in other industry measures, it was necessary to first try to reduce some of the volatility in the C-50 data series. Calculating a four-quarter moving average of the rental improvement and repair spending levels and then taking the four quarter moving rate of change of these averages helped smooth the C-50 data somewhat, though not entirely, as seen in Figure 2.

Figure 2: Rental Remodeling Spending Fluctuates Dramatically



Source: U.S. Census Bureau Residential Improvements and Repairs Statistics (C-50).

The next step in developing a rental remodeling estimation method involved identifying other available metrics for the construction industry that have some theoretical basis for being associated with rental remodeling spending. Variables that were tested for correlation with rental improvement and repair spending from the C-50 include the Consumer Price Index for rent of primary residence, multi-family housing starts, alterations to multi-family housing, alterations to commercial and industrial

buildings, rental vacancy rates, median asking rent of vacant units, and the value of new multi-family construction put in place (Table 1).[2]

Table 1: List of Variables Tested for Correlation with Rental Remodeling Activity

Data Series	Source	Start Date
CPI: Urban Consumer - Rent of primary residence, (1982-84=100)	U.S. Bureau of Labor Statistics: Consumer Price Index	1956
Privately Owned Multi-Family Housing Starts	U.S. Census Bureau: New Residential Construction	1959
Alterations to Multi-Family Housing	McGraw-Hill Construction	1980
Alterations to Commercial and Industrial Buildings	McGraw-Hill Construction	1980
Rental Vacancy Rates	U.S. Census Bureau: Housing Vacancies & Homeownership Rates	1980
Median Asking Rent of Vacant Units	U.S. Census Bureau: Housing Vacancy Survey	1988
Value of New Private Residential Multi-Family Construction	U.S. Census Bureau: Value of Construction Put in Place	1993

The four-quarter moving rates of change in each of the above variables were correlated with both rental improvements and rental maintenance and repairs spending from 1980-2007 (unless otherwise noted), encompassing nearly thirty years and several full cycles in the rental remodeling data. Most of the tested measures had very low correlation coefficients (near zero) with one or both of the C-50 rental remodeling data series as seen in Table 2, likely due to the unusual volatility in the C-50 estimates.

[2] The National Association of Home Builders' Remodeling Market Index (RMI) for renter-occupied properties was also considered for correlating with rental remodeling spending in the C-50, but was deemed to have insufficient historical data since the RMI was only started in 2001.

Table 2: Correlation Coefficients with Rental Improvement and Maintenance and Repair Expenditures, 1980-2007

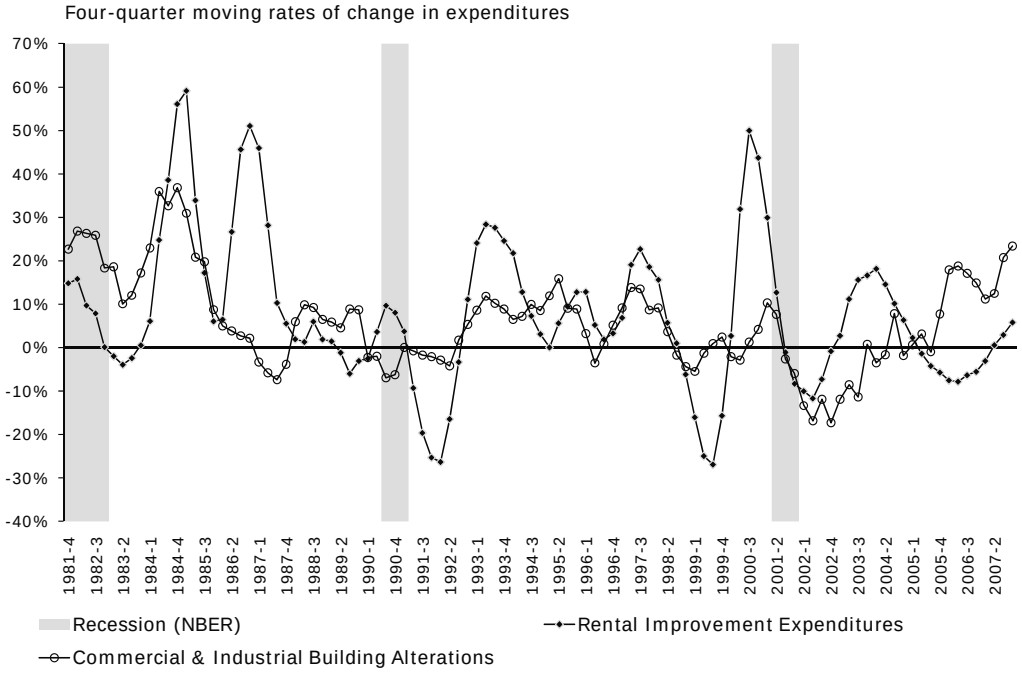
	Improvements		Maintenance & Repairs
Alterations to Commercial and Industrial Buildings	**0.3255** 0.0007	**CPI: Rent of Primary Residence**	**0.5101** 0.0000
CPI: Rent of Primary Residence	**0.1630** 0.0966	**Median Asking Rent of Vacant Units** (1988-2007)	**0.4819** 0.0000
Rental Vacancy Rates	**0.1988** 0.0420	**Rental Vacancy Rate**	**0.3943** 0.0000
Multi-Family Housing Starts	**0.0665** 0.5003	**Alterations to Commercial and Industrial Buildings**	**0.1640** 0.0945
Multi-Family Housing Alterations	**-0.0832** 0.3987	**Multi-Family Housing Alterations**	**-0.1915** 0.0504
Value of Multi-Family Construction (1993-2007)	**-0.1406** 0.3154	**Multi-Family Housing Starts**	**-0.2082** 0.0331
Median Asking Rent of Vacant Units (1988-2007)	**-0.1571** 0.1843	**Value of Multi-Family Construction** (1993-2007)	**-0.4798** 0.0003

Note: The significance level of each correlation coefficient is reported in the line below the coefficient as a p-value indicating the level of confidence that the correlation is not equal to zero.

Of all the tested variables, alterations to commercial and industrial buildings had the strongest correlation with rental improvement expenditures at .3255 where a correlation coefficient of 0 means the two series are not at all correlated and 1 means the series are perfectly positively correlated, i.e. when the rate of change in commercial and industrial alterations increases (decreases), the rate of change in rental improvement spending also increases (decreases). Of course, a correlation never implies that one series causes the change in the other series, but merely that the two data series tend to move together in either the same direction (positively correlated) or opposite directions (negatively correlated) with some consistency. Although a correlation coefficient under 0.5 is not terribly strong, it makes sense that these two subsectors of the larger construction industry are positively related because both commercial properties and

residential rental properties are essentially business investments for the property owners, and are thus subject to similar economic drivers. Owners of large multi-family rental properties are especially likely to make property improvement decisions in response to the same incentives as investors in commercial and industrial properties. Indeed, while non-residential alterations are considerably less volatile than rental improvements spending, historically the two data series move together fairly well as seen in Figure 3.

Figure 3: Non-Residential Alterations Tend to Move with Rental Improvement Spending

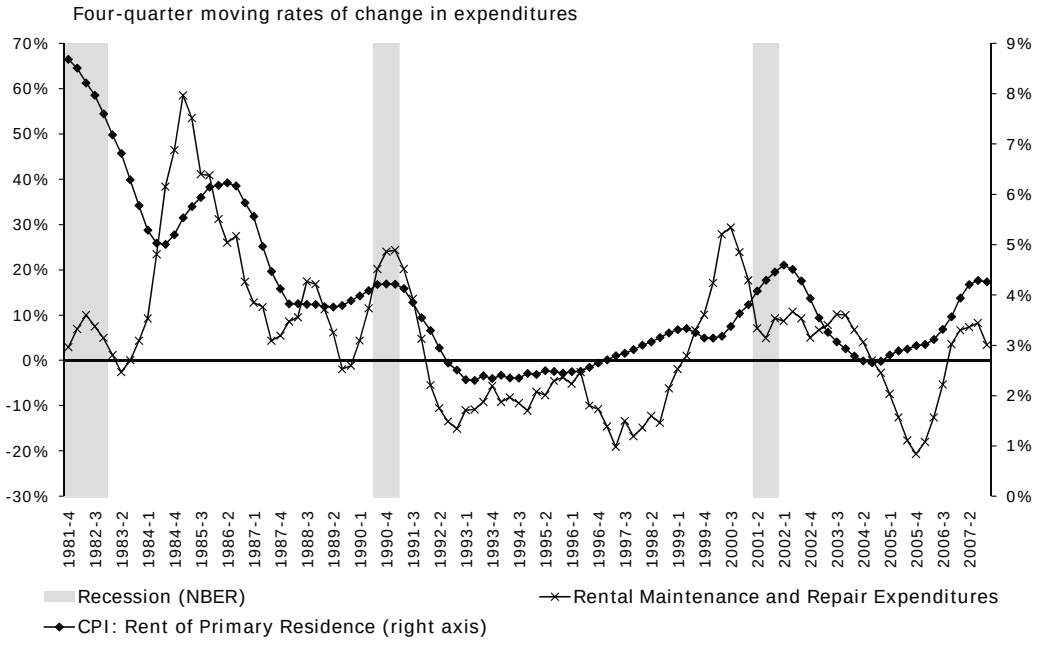


Sources: U.S. Census Bureau Residential Improvements and Repairs Statistics (C-50) and McGraw-Hill Construction.

As for maintenance and repair expenditures to rental properties, the Consumer Price Index for rent of primary residence had the strongest correlation of the tested measures at .5101. Again, a positive correlation coefficient indicates that expenditures for repairs to renter-occupied units have historically tended to increase (decrease) when rents increase (decrease). This is logical because a rental property owner would be more interested in maintaining an appreciating asset, such as when rents are increasing, than a depreciating rental unit when rents are falling. While the CPI for rent is historically very

stable, upticks and downticks in the index from year to year sync well with maintenance and repair spending for renter-occupied units as seen in Figure 4.

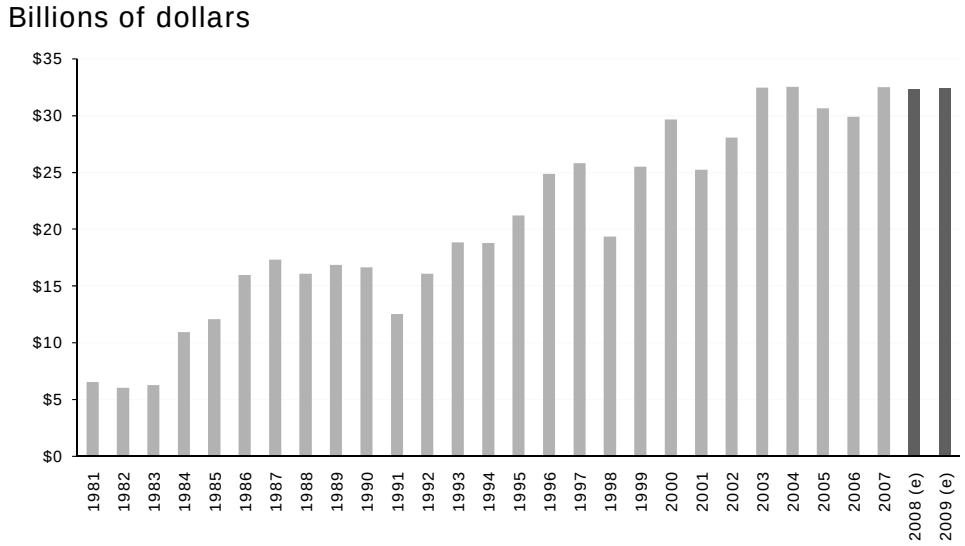
Figure 4: Consumer Price Index for Rent is Positively Associated with Rental Maintenance and Repair Spending



Sources: U.S. Census Bureau Residential Improvements and Repairs Statistics (C-50) and U.S. Bureau of Labor Statistics Consumer Price Index.

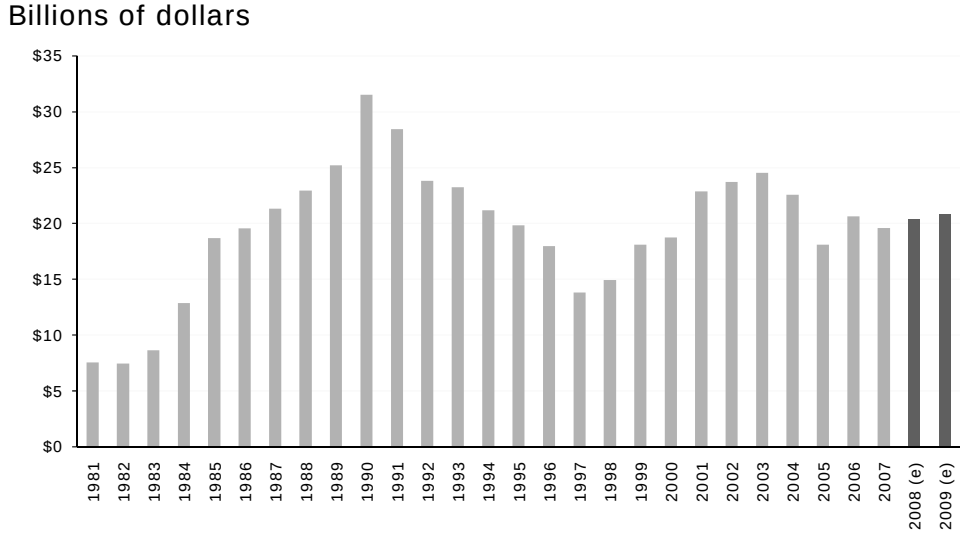
By benchmarking the four-quarter moving rates of change in commercial and industrial alterations to the 2007 levels of renter-occupied improvement spending from the C-50 and respectively benchmarking the CPI for rent of primary residence to levels of renter-occupied maintenance and repair expenditures, it is possible to estimate annual rental improvement and repair levels for 2008 and beyond. Using the methodology described above, national spending for improvements to renter-occupied units is estimated to be $32.4 billion in both 2008 and 2009, essentially remaining flat throughout the economic and industry downturn (Figure 5). National estimates for rental maintenance and repairs are $20.3 billion in 2008 and $20.8 billion in 2009, which is a slight increase from 2007 levels of $19.6 billion (Figure 6).

Figure 5: Improvements to Rental Units Remained Flat in 2008 and 2009



Notes: Estimates for 2008 and 2009 were produced by benchmarking the annual rate of change in commercial and industrial property alterations to the C-50.
Sources: U.S. Census Bureau Residential Improvements and Repairs Statistics (C-50) and McGraw-Hill Construction.

Figure 6: Maintenance and Repairs to Rental Units Grew Slightly in 2008 and 2009



Notes: Estimates for 2008 and 2009 were produced by benchmarking the annual rate of change in CPI: Rent of Primary Residence to the C-50.
Sources: U.S. Census Bureau Residential Improvements and Repairs Statistics (C-50) and U.S. Bureau of Labor Statistics Consumer Price Index.

Conclusion

The Census Bureau's C-50 series provided quarterly estimates of remodeling and repair expenditures to both owner-occupied and renter-occupied properties. The rental portion of the C-50 was based on the Survey of Residential Alterations and Repairs (SORAR) and had been the best source for estimating rental improvement and maintenance expenditures. Unfortunately, the C-50 and SORAR were discontinued in 2007 and consequently, there is very little means to accurately measure the size of the rental remodeling industry, which stood at over $50 billion in 2007. In fact, due to data limitations, very little research and analysis has been done on improvements and repairs to rental properties. Such research is more than warranted, however, given the significant size of the market and the fact that growing owner affordability problems and still-high foreclosure rates should focus considerable attention back on the rental stock in coming years.

While a comprehensive survey of the remodeling and repair behavior of rental property owners would best serve in-depth research of the rental remodeling market, a first step is to keep track of the overall size of the market. By benchmarking the year-over-year trends in related industry measures that strongly correlate with historical rental data, such as commercial and industrial alterations and the Consumer Price Index for rent of primary residence, to the rental data in the C-50, annual levels of rental remodeling and repair expenditures can be estimated for 2008 and beyond. Using this methodology, the total size of the national rental remodeling and repair market is estimated at $52.7 billion in 2008 and $53.2 billion in 2009. That rental remodeling spending is estimated to have increased during one of the worst industry downturns on record indicates the importance of better understanding the drivers and composition of spending in this market segment.

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Appendix

Table A1: Estimating Rental Improvement Expenditures Using Rates of Change in Commercial & Industrial Building Alterations, 1981-2007

	C-50 Rental Improvements	Commercial & Industrial Building Alterations		
	Four-Quarter Moving Total, (Mil. $, NSA)	Four-Quarter Moving Rate of Change	Estimated Rental Improvements[1]	Difference from C-50 Improvements
1981Q4	6,561	22.68%	6,450	-1.7%
1982Q1	6,249	26.87%	7,307	16.9%
1982Q2	6,334	26.35%	7,999	26.3%
1982Q3	6,030	25.90%	7,533	24.9%
1982Q4	6,055	18.31%	7,763	28.2%
1983Q1	6,212	18.60%	7,412	19.3%
1983Q2	5,846	10.09%	6,973	19.3%
1983Q3	6,456	12.04%	6,756	4.6%
1983Q4	6,290	17.18%	7,095	12.8%
1984Q1	7,542	22.98%	7,640	1.3%
1984Q2	9,841	35.95%	7,947	-19.2%
1984Q3	10,384	32.69%	8,566	-17.5%
1984Q4	10,956	36.80%	8,605	-21.5%
1985Q1	10,409	30.96%	9,877	-5.1%
1985Q2	8,602	20.86%	11,894	38.3%
1985Q3	9,963	19.74%	12,434	24.8%
1985Q4	12,099	8.76%	11,916	-1.5%
1986Q1	13,614	4.98%	10,928	-19.7%
1986Q2	15,437	3.88%	8,936	-42.1%
1986Q3	17,006	2.75%	10,237	-39.8%
1986Q4	15,991	2.15%	12,359	-22.7%
1987Q1	16,201	-3.29%	13,167	-18.7%
1987Q2	16,309	-5.82%	14,539	-10.9%
1987Q3	15,657	-7.37%	15,752	0.6%
1987Q4	17,333	-3.82%	15,380	-11.3%
1988Q1	16,598	5.99%	17,172	3.5%
1988Q2	16,788	9.84%	17,914	6.7%
1988Q3	17,281	9.27%	17,109	-1.0%
1988Q4	16,082	6.52%	18,464	14.8%
1989Q1	16,706	5.89%	17,576	5.2%
1989Q2	15,554	4.58%	17,557	12.9%
1989Q3	15,590	8.89%	18,817	20.7%
1989Q4	16,856	8.69%	17,479	3.7%
1990Q1	17,179	-2.26%	16,329	-4.9%
1990Q2	18,386	-1.96%	15,249	-17.1%
1990Q3	17,712	-6.91%	14,512	-18.1%
1990Q4	16,648	-6.20%	15,811	-5.0%

Table A1: Estimating Rental Improvement Expenditures Using Rates of Change in Commercial & Industrial Building Alterations, 1981-2007 Continued

	C-50 Rental Improvements	Commercial & Industrial Building Alterations		
	Four-Quarter Moving Total, (Mil. $, NSA)	Four-Quarter Moving Rate of Change	Estimated Rental Improvements[1]	Difference from C-50 Improvements
1991Q1	14,886	0.03%	17,184	15.4%
1991Q2	12,442	-0.73%	18,251	46.7%
1991Q3	12,395	-1.69%	17,413	40.5%
1991Q4	12,514	-2.06%	16,305	30.3%
1992Q1	12,486	-2.84%	14,463	15.8%
1992Q2	14,146	-4.23%	11,916	-15.8%
1992Q3	15,358	1.74%	12,611	-17.9%
1992Q4	16,064	5.36%	13,184	-17.9%
1993Q1	16,283	8.63%	13,563	-16.7%
1993Q2	18,472	11.86%	15,823	-14.3%
1993Q3	18,733	10.22%	16,928	-9.6%
1993Q4	18,844	8.86%	17,488	-7.2%
1994Q1	19,259	6.52%	17,345	-9.9%
1994Q2	17,831	7.18%	19,798	11.0%
1994Q3	18,710	9.96%	20,599	10.1%
1994Q4	18,796	8.56%	20,456	8.8%
1995Q1	20,025	11.94%	21,559	7.7%
1995Q2	21,343	15.92%	20,669	-3.2%
1995Q3	21,543	9.05%	20,404	-5.3%
1995Q4	21,223	8.87%	20,463	-3.6%
1996Q1	20,926	3.24%	20,674	-1.2%
1996Q2	19,307	-3.53%	20,589	6.6%
1996Q3	21,817	0.87%	21,730	-0.4%
1996Q4	24,872	5.19%	22,325	-10.2%
1997Q1	24,900	9.19%	22,850	-8.2%
1997Q2	27,260	13.85%	21,982	-19.4%
1997Q3	25,138	13.54%	24,770	-1.5%
1997Q4	25,798	8.67%	27,029	4.8%
1998Q1	26,908	9.17%	27,184	1.0%
1998Q2	26,672	3.65%	28,254	5.9%
1998Q3	23,827	-1.70%	24,711	3.7%
1998Q4	19,352	-4.37%	24,670	27.5%
1999Q1	18,417	-5.47%	25,435	38.1%
1999Q2	16,830	-1.30%	26,326	56.4%
1999Q3	20,834	0.97%	24,059	15.5%
1999Q4	25,518	2.42%	19,819	-22.3%
2000Q1	27,480	-2.10%	18,031	-34.4%
2000Q2	29,618	-2.87%	16,348	-44.8%
2000Q3	30,525	1.31%	21,106	-30.9%
2000Q4	29,649	4.23%	26,598	-10.3%

Table A1: Estimating Rental Improvement Expenditures Using Rates of Change in Commercial & Industrial Building Alterations, 1981-2007 Continued

	C-50 Rental Improvements	Commercial & Industrial Building Alterations		
	Four-Quarter Moving Total, (Mil. $, NSA)	Four-Quarter Moving Rate of Change	Estimated Rental Improvements[1]	Difference from C-50 Improvements
2001Q1	28,009	10.33%	30,319	8.2%
2001Q2	28,424	7.64%	31,881	12.2%
2001Q3	25,843	-2.60%	29,732	15.0%
2001Q4	25,250	-5.96%	27,882	10.4%
2002Q1	26,487	-13.35%	24,271	-8.4%
2002Q2	25,404	-16.87%	23,629	-7.0%
2002Q3	26,664	-11.87%	22,776	-14.6%
2002Q4	28,091	-17.29%	20,883	-25.7%
2003Q1	28,754	-11.89%	23,338	-18.8%
2003Q2	31,002	-8.55%	23,233	-25.1%
2003Q3	32,169	-11.33%	23,642	-26.5%
2003Q4	32,462	0.80%	28,316	-12.8%
2004Q1	33,066	-3.51%	27,744	-16.1%
2004Q2	33,524	-1.66%	30,486	-9.1%
2004Q3	33,164	7.84%	34,690	4.6%
2004Q4	32,544	-1.83%	31,867	-2.1%
2005Q1	32,422	0.65%	33,282	2.7%
2005Q2	31,273	3.13%	34,572	10.5%
2005Q3	30,399	-0.97%	32,842	8.0%
2005Q4	30,645	7.78%	35,076	14.5%
2006Q1	29,425	17.95%	38,241	30.0%
2006Q2	28,824	18.82%	37,157	28.9%
2006Q3	29,695	17.14%	35,608	19.9%
2006Q4	29,887	14.94%	35,222	17.9%
2007Q1	29,603	11.22%	32,725	10.5%
2007Q2	30,820	12.47%	32,418	5.2%
2007Q3	31,753	20.78%	35,865	12.9%
2007Q4	32,516	23.42%	36,886	13.4%
2008Q1		21.38%	35,931	
2008Q2		16.05%	35,768	
2008Q3		5.36%	33,453	
2008Q4		-0.42%	32,380	
2009Q1		-6.92%	33,446	
2009Q2		-5.71%	33,727	
2009Q3		-2.90%	32,482	
2009Q4		0.15%	32,427	

(1) Estimates of four-quarter rental improvement spending are calculated by applying the four-quarter rate of change in commercial and industrial alterations to actual survey data from the C-50.

Sources: JCHS tabulations of the U.S. Census Bureau's Residential Improvements and Repairs Statistics (C-50) and McGraw-Hill Construction's Commercial & Industrial Alterations.

Table A2: Estimating Rental Maintenance & Repair Expenditures Using Rates of Change in the Consumer Price Index-Rent of Primary Residence, 1981-2007

	C-50 Rental Maintenance and Repairs	CPI: Rent of Primary Residence		
	Four-Quarter Moving Total, (Mil. $, NSA)	Four-Quarter Moving Rate of Change	Estimated Rental M&R[1]	Difference from C-50 M&R
1981Q4	7,554	8.68%	7,568	0.2%
1982Q1	7,773	8.51%	7,382	-5.0%
1982Q2	7,744	8.21%	7,530	-2.8%
1982Q3	7,266	7.97%	8,093	11.4%
1982Q4	7,456	7.60%	8,128	9.0%
1983Q1	7,671	7.18%	8,331	8.6%
1983Q2	7,392	6.81%	8,272	11.9%
1983Q3	7,830	6.29%	7,723	-1.4%
1983Q4	8,647	5.78%	7,887	-8.8%
1984Q1	9,062	5.29%	8,077	-10.9%
1984Q2	11,222	5.03%	7,764	-30.8%
1984Q3	13,047	5.01%	8,222	-37.0%
1984Q4	12,864	5.20%	9,096	-29.3%
1985Q1	15,080	5.53%	9,563	-36.6%
1985Q2	15,438	5.76%	11,868	-23.1%
1985Q3	15,848	5.94%	13,822	-12.8%
1985Q4	18,693	6.14%	13,654	-27.0%
1986Q1	18,539	6.18%	16,012	-13.6%
1986Q2	18,035	6.23%	16,399	-9.1%
1986Q3	20,199	6.17%	16,825	-16.7%
1986Q4	19,571	5.83%	19,783	1.1%
1987Q1	19,445	5.56%	19,570	0.6%
1987Q2	20,292	4.96%	18,930	-6.7%
1987Q3	19,441	4.47%	21,101	8.5%
1987Q4	21,329	4.12%	20,378	-4.5%
1988Q1	22,818	3.82%	20,188	-11.5%
1988Q2	23,454	3.83%	21,068	-10.2%
1988Q3	24,854	3.81%	20,182	-18.8%
1988Q4	22,928	3.81%	22,142	-3.4%
1989Q1	22,069	3.77%	*23,678*	7.3%
1989Q2	22,520	3.76%	24,336	8.1%
1989Q3	23,130	3.79%	25,796	11.5%
1989Q4	25,203	3.89%	23,819	-5.5%
1990Q1	26,534	3.98%	22,947	-13.5%
1990Q2	28,112	4.08%	23,440	-16.6%
1990Q3	29,094	4.21%	24,104	-17.2%
1990Q4	31,512	4.22%	26,266	-16.6%

Table A2: Estimating Rental Maintenance & Repair Expenditures Using Rates of Change in the Consumer Price Index-Rent of Primary Residence, 1981-2007 Continued

	C-50 Rental Maintenance and Repairs	CPI: Rent of Primary Residence		
	Four-Quarter Moving Total, (Mil. $, NSA)	Four-Quarter Moving Rate of Change	Estimated Rental M&R[1]	Difference from C-50 M&R
1991Q1	32,361	4.21%	27,652	-14.6%
1991Q2	30,824	4.13%	29,272	-5.0%
1991Q3	29,063	3.85%	30,214	4.0%
1991Q4	28,441	3.55%	32,630	14.7%
1992Q1	26,131	3.29%	33,426	27.9%
1992Q2	27,090	2.95%	31,732	17.1%
1992Q3	25,423	2.65%	29,832	17.3%
1992Q4	23,821	2.51%	29,154	22.4%
1993Q1	25,488	2.31%	26,736	4.9%
1993Q2	23,955	2.30%	27,713	15.7%
1993Q3	23,999	2.39%	26,031	8.5%
1993Q4	23,254	2.34%	24,378	4.8%
1994Q1	21,236	2.40%	26,101	22.9%
1994Q2	22,105	2.35%	24,518	10.9%
1994Q3	21,478	2.35%	24,562	14.4%
1994Q4	21,173	2.44%	23,821	12.5%
1995Q1	21,271	2.42%	21,750	2.2%
1995Q2	19,697	2.49%	22,656	15.0%
1995Q3	21,934	2.48%	22,010	0.3%
1995Q4	19,838	2.45%	21,691	9.3%
1996Q1	20,095	2.47%	21,797	8.5%
1996Q2	19,592	2.48%	20,186	3.0%
1996Q3	16,166	2.56%	22,496	39.2%
1996Q4	17,958	2.65%	20,363	13.4%
1997Q1	15,966	2.71%	20,639	29.3%
1997Q2	15,790	2.79%	20,139	27.5%
1997Q3	15,849	2.84%	16,625	4.9%
1997Q4	13,817	2.91%	18,481	33.8%
1998Q1	13,898	3.00%	16,445	18.3%
1998Q2	14,237	3.06%	16,274	14.3%
1998Q3	14,564	3.15%	16,349	12.3%
1998Q4	14,940	3.24%	14,265	-4.5%
1999Q1	14,454	3.31%	14,358	-0.7%
1999Q2	14,433	3.33%	14,712	1.9%
1999Q3	16,448	3.25%	15,038	-8.6%
1999Q4	18,102	3.14%	15,410	-14.9%
2000Q1	19,156	3.14%	14,908	-22.2%
2000Q2	20,948	3.18%	14,892	-28.9%
2000Q3	19,744	3.37%	17,003	-13.9%
2000Q4	18,743	3.63%	18,759	0.1%

Table A2: Estimating Rental Maintenance & Repair Expenditures Using Rates of Change in the Consumer Price Index-Rent of Primary Residence, 1981-2007 Continued

	C-50 Rental Maintenance and Repairs	CPI: Rent of Primary Residence		
	Four-Quarter Moving Total, (Mil. $, NSA)	Four-Quarter Moving Rate of Change	Estimated Rental M&R[1]	Difference from C-50 M&R
2001Q1	20,766	3.80%	19,885	-4.2%
2001Q2	20,692	4.08%	21,802	5.4%
2001Q3	21,566	4.29%	20,591	-4.5%
2001Q4	22,873	4.45%	19,578	-14.4%
2002Q1	22,021	4.59%	21,720	-1.4%
2002Q2	22,078	4.51%	21,625	-2.1%
2002Q3	22,386	4.28%	22,489	0.5%
2002Q4	23,726	3.93%	23,772	0.2%
2003Q1	24,814	3.54%	22,801	-8.1%
2003Q2	24,535	3.26%	22,797	-7.1%
2003Q3	25,342	3.07%	23,073	-9.0%
2003Q4	24,517	2.93%	24,421	-0.4%
2004Q1	24,916	2.78%	25,505	2.4%
2004Q2	24,551	2.69%	25,195	2.6%
2004Q3	24,433	2.65%	26,014	6.5%
2004Q4	22,578	2.68%	25,174	11.5%
2005Q1	20,378	2.80%	25,615	25.7%
2005Q2	19,431	2.89%	25,260	30.0%
2005Q3	18,645	2.92%	25,147	34.9%
2005Q4	18,090	2.99%	23,254	28.5%
2006Q1	19,195	3.01%	20,992	9.4%
2006Q2	19,955	3.11%	20,036	0.4%
2006Q3	19,484	3.32%	19,263	-1.1%
2006Q4	20,644	3.57%	18,735	-9.2%
2007Q1	20,322	3.94%	19,951	-1.8%
2007Q2	21,023	4.21%	20,794	-1.1%
2007Q3	21,057	4.29%	20,319	-3.5%
2007Q4	19,608	4.26%	21,523	9.8%
2008Q1		4.06%	21,147	
2008Q2		3.85%	21,833	
2008Q3		3.77%	21,851	
2008Q4		3.66%	20,326	
2009Q1		3.55%	21,898	
2009Q2		3.38%	22,570	
2009Q3		2.93%	22,493	
2009Q4		2.28%	20,789	

(1) Estimates of four-quarter rental maintenance and repair spending are calculated by applying the four-quarter rate of change in the CPI for rent of primary residence to actual survey data from the C-50.

Sources: JCHS tabulations of the U.S. Census Bureau's Residential Improvements and Repairs Statistics (C-50) and Bureau of Labor Statistics' Consumer Price Index.