Assignment 2: Fair Market Rent

Assignment

Objective

- Complete a pairwise comparison of FMR (Fair Market Rent from 2005 through 2013

Deliverables

- Provide descriptive statistics for FMR, both numerical and graphical
- Conduct pairwise analysis of differences in FMR from 2005 through 2013
- Prepare a brief summary report, which includes the above information

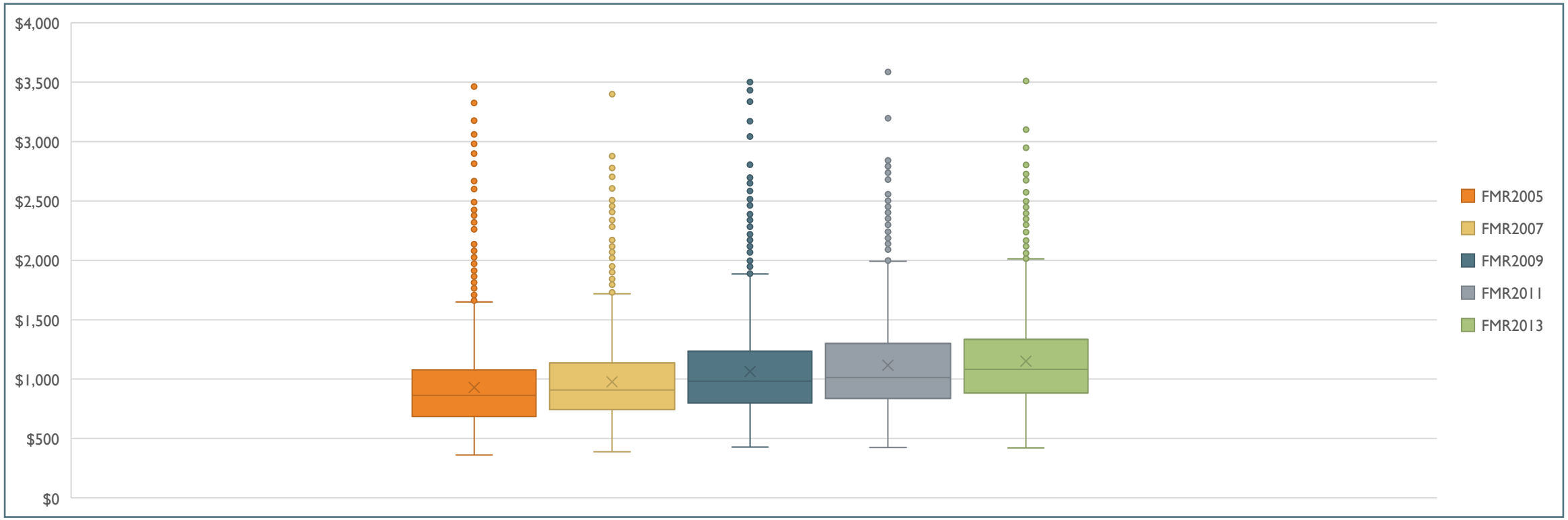
Data Prep

- Merge data from all five years using the CONTROL value
- Remove all rows where FMR is missing or negative for any year

Descriptive Statistics – Fair Market Rent

	2005	2007	2009	2011	2013	All
Mean	$929	$978	$1,064	$1,116	$1,152	$1,048
Std Error	$2	$2	$2	$2	$2	$1
Median	$863	$908	$983	$1,014	$1,082	$968
Mode	$679	$738	$941	$966	$1,032	$966
Std Dev	$331	$337	$367	$397	$394	$376
Sample Var	$109,573	$113,606	$134,956	$157,373	$155,443	$141,134
Kurtosis	$3	$2	$2	$2	$2	$2
Skewness	$1	$1	$1	$1	$1	$1
Range	$3,104	$3,013	$3,074	$3,162	$3,090	$3,226
Minimum	$360	$387	$427	$424	$421	$360
Maximum	$3,464	$3,400	$3,501	$3,586	$3,511	$3,586
Sum	$24,501,566	$25,786,724	$28,057,338	$29,442,330	$30,370,333	$138,158,291
Count	$26,373	$26,373	$26,373	$26,373	$26,373	$131,865

Fair Market Rent



Analysis – 2005 to 2007

We can use a paired t-test to determine if there is a difference in FMR between 2005 and 2007:

H_0: $\mu_{2007} - \mu_{2005} >= 0$ t-stat = 69.4904 t-Cutoff = - 1.6445

We ***cannot reject*** the null hypothesis, meaning that our data does not show a statistical difference in FMR between 2005 and 2007.

t-Test: Paired Two Sample for Means		
	FMR2007	*FMR2005*
Mean	977.7698	929.0398
Variance	113,606.3846	109,572.6799
Observations	26,373	26,373
Pearson Correlation	0.9420	
Hypothesized Mean Differ	0.0000	
df	26,372.0000	
t Stat	69.4904	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.6449	
P(T<=t) two-tail	0.0000	
t Critical two-tail	1.9601	

Analysis – 2007 to 2009

We can use a paired t-test to determine if there is a difference in FMR between 2007 and 2009:

H_0: $\mu_{2009} - \mu_{2007} >= 0$ t-stat = 124.3222 t-Cutoff = - 1.6445

We ***cannot reject*** the null hypothesis, meaning that our data does not show a statistical difference in FMR between 2007 and 2009.

t-Test: Paired Two Sample for Means		
	FMR2009	*FMR2007*
Mean	1,063.8660	977.7698
Variance	134,955.8426	113,606.3846
Observations	26,373	26,373
Pearson Correlation	0.9526	
Hypothesized Mean Differ	0.0000	
df	26,372.0000	
t Stat	124.3222	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.6449	
P(T<=t) two-tail	0.0000	
t Critical two-tail	1.9601	

Analysis – 2009 to 2011

We can use a paired t-test to determine if there is a difference in FMR between 2007 and 2007:

H_0: $\mu_{2011} - \mu_{2009} >= 0$ t-stat = 74.1512 t-Cutoff = - 1.6445

We ***cannot reject*** the null hypothesis, meaning that our data does not show a statistical difference in FMR between 2009 and 2011.

t-Test: Paired Two Sample for Means		
	FMR2011	*FMR2009*
Mean	1,116.3815	1,063.8660
Variance	157,373.2707	134,955.8426
Observations	26,373	26,373
Pearson Correlation	0.9576	
Hypothesized Mean Differ	0.0000	
df	26,372.0000	
t Stat	74.1512	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.6449	
P(T<=t) two-tail	0.0000	
t Critical two-tail	1.9601	

Analysis – 2011 to 2013

We can use a paired t-test to determine if there is a difference in FMR between 2007 and 2007:

H_0: $\mu_{2013} - \mu_{2011} >= 0$ t-stat = 58.2109 t-Cutoff = - 1.6445

We ***cannot reject*** the null hypothesis, meaning that our data does not show a statistical difference in FMR between 2011 and 2013.

t-Test: Paired Two Sample for Means		
	FMR2013	*FMR2011*
Mean	1,151.5691	1,116.3815
Variance	155,443.1071	157,373.2707
Observations	26,373	26,373
Pearson Correlation	0.9692	
Hypothesized Mean Differ	0.0000	
df	26,372.0000	
t Stat	58.2109	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.6449	
P(T<=t) two-tail	0.0000	
t Critical two-tail	1.9601	

Summary

Does pairwise analysis of HADS data from 2005 to 2013 show a difference in FMR (Fair Market Rent)?

- When testing to see if each successive dataset is > or = the previous dataset, we cannot reject the null hypothesis
- Our sample data supports the hypothesis that in each successive dataset, the FMR is greater than or equal to the FMR in the previous dataset