

ECONOMIC FACTORS IMPACTING THE HOUSTON APARTMENT MARKET

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ABSTRACT

This paper explores the demand and pricing of apartments in Houston, Texas from 1980 to 2011. Both the price of apartments and the occupancy rate during this period are considered. The purpose of this paper is to determine how factors such as employment and population affect the demand for apartments. Some simple models are developed to forecast future occupancy rates and rental prices.

INTRODUCTION

The objective of this paper is to develop models to help forecast occupancy rates and rental rates for apartments in the Houston area. This would help investors understand the apartment market and make better decisions about new apartment construction. The price of rental units is decided by supply and demand for those units just as it is with other goods. The actual relationships among factors impacting supply and demand are the focus of this paper.

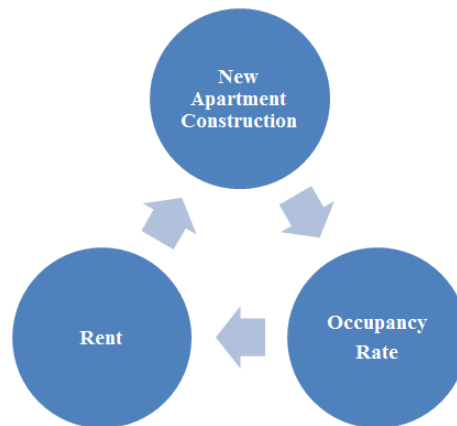
BACKGROUND AND LITERATURE REVIEW

Estimating future price for apartments has historically presented problems to practitioners in the field. Supply and demand are constantly at work in the market place. Figure 1 provides a simple model for the relationship between rental rates, new apartment construction, and the occupancy rate for apartments. It is circular because as units are filled and occupancy rate increases, there is an incentive to raise the rates because the demand is increasing relative to the supply of units. As the rents increases, developers have an incentive to build more units. As more units become available, the occupancy rates are again affected but in the opposite direction.

However, there are other factors external to the model shown in Figure 1 that must be considered. Two important ones are employment and population. If population is increasing faster than apartment availability is increasing, occupancy rate may continue to increase as demand outpaces the increase in supply. This may lead to another increase in rents, and the process continues. What might cause population to increase? One cause would be a growth in

jobs (employment). Even with these factors considered, this is a simple model. Other factors, such as changes in the supply due to older apartments being torn down, new single family rentals on the market, may impact this process. Further study in this area is ongoing.

Figure 1. The Apartment Rental Cycle

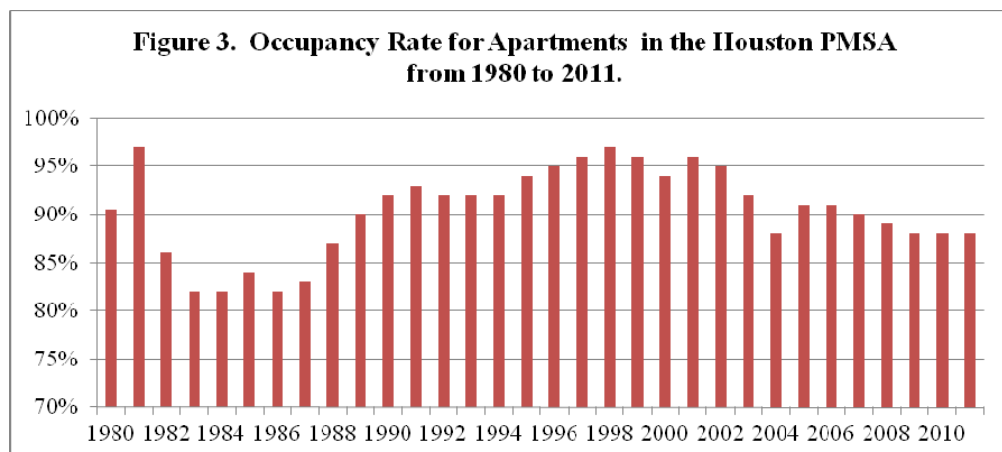
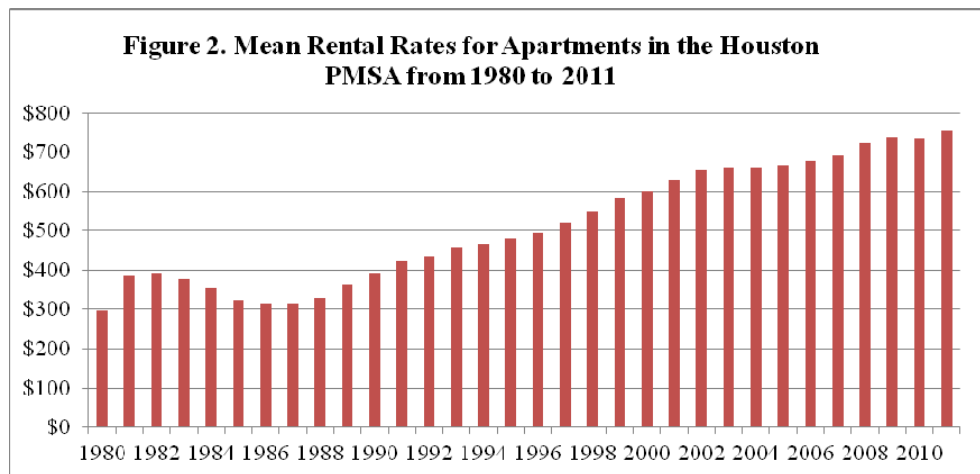


Understanding the demand for apartments and other commercial space has been the focus of many studies. Malizia (1991) recognized that long-term demand-side forecasting models needed to include economic development variables. Wheaton and Torto (1990) linked job growth to industrial supply and demand. There is a plethora of empirical data linking employment to various factors influencing demand for real estate. Numerous methods and models to forecast one aspect of real estate or another have appeared. In one of these, Valente, Wu, Gelfand and Sirmans' (2005) present a spatial model for predicting apartment rents.

Lentz and Tse (1999) present models to relate the performance and needs of the goods market to the demand for commercial real estate. They noted, "The commercial real estate market is frequently observed to be in an extended state of disequilibrium." Since there is a time lag between the beginning of the construction cycle and the time when the finished space is available for rent, it can be difficult to make an accurate estimate of future space demands. It is common to overbuild or fail to build enough space simply because the market changed at some point during the construction cycle. The decision to build new apartment space should be made after weighing expectations of future demand, apartment space under construction, absorption rates and the amount of vacant space already in the market. Lentz and Tse further observed, "With future demand uncertain, the supply (quantity) of space and the realized demand for space may not match. If the supply is less than the realized demand, the space producer will be able to lease out all the new space. On the other hand, if the supply is greater than the realized demand, the excess supply will cost the space producer holding costs on the vacant units."

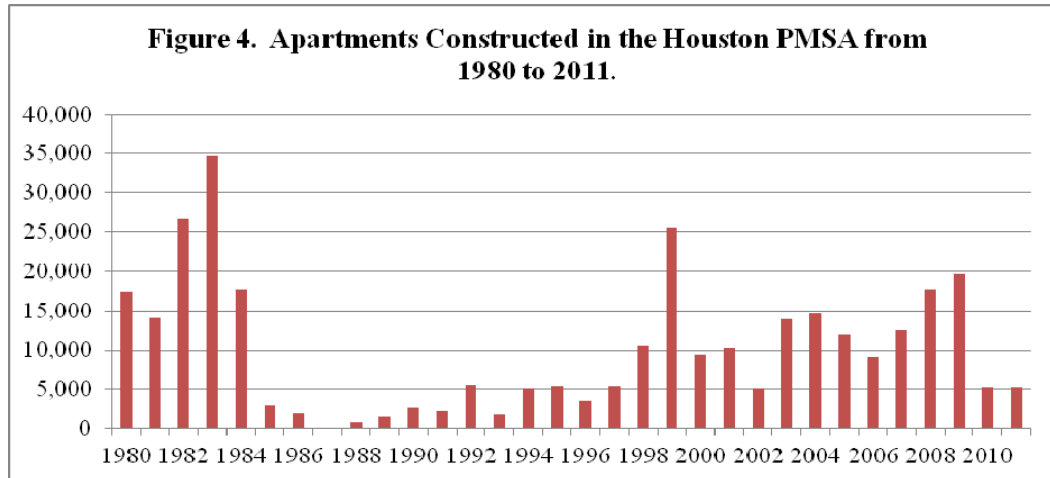
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Figure 2 provides information about the mean rental rates for apartments from 1980 to 2011. In the early 1980s, the rents were rising and reached a peak in 1982. They began falling and did not return to the 1982 high until 1990. During this same period, the occupancy rate (percentage of apartments that were rented) demonstrated a similar pattern as seen in Figure 3. With more vacant apartments, the apartment managers were forced to lower the rents and provide other incentives to attract new tenants and to keep the existing ones.

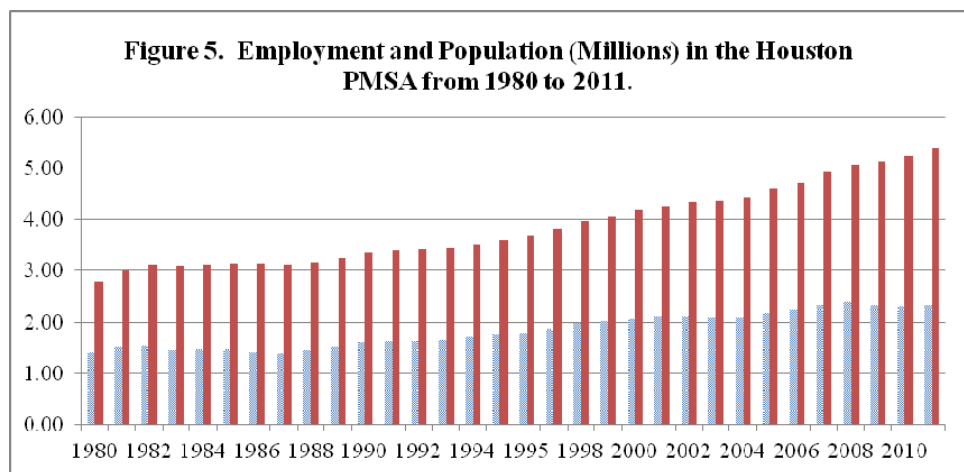


With lower rents and lower occupancy numbers in the mid-1980s, there was little need to construct new apartments. Figure 4 shows the construction of new apartments, and the early 1980s saw a large number of units coming onto the market. This was consistent with the increasing rents and occupancy rates at that time. What caused this? In the prior decade, the 1970's, Houston's economy was one of the fastest growing in the nation, mainly due to

Houston's role in the petroleum industry and the jobs created related to that industry. During this time, Houston construction was consistently among the highest in the nation.



On the demand side, it was the strong Houston economy that attracted more and more people to the Houston area looking for employment. Figure 5 shows how these two paralleled one another during the 1980s. The growth in population from the 1970s and early 1980s caused an increase in the demand for housing, which caused rents and occupancy of apartments to rise. Houston was very dependent on the petroleum industry in the 70's and 80's, and it obviously prospered when oil prices went up but it suffered as oil prices went down (e.g. mid-1980s), resulting in tremendous fluctuations. The Houston area is more diversified today, but the petroleum industry is still a large factor in its economic well-being.



It should be noted that, while increase in population may be due to employment opportunities, it also may be caused by other things. For example many retirees have chosen to move to Florida not because of employment, but because of the weather or lifestyle or other factors. However, in Houston, the growth in population was strongly tied to job opportunities as the correlation between jobs and population was about 98 percent. Thus, in this study, our focus is on employment rather than population.

As we have seen, the changes in employment caused changes in the demand and in the rental prices for apartments. However, alternative types of housing in a particular market can also affect the apartment rents. For example, if there is a glut of single family houses to rent and the rents are relatively low, then apartment rents will be curtailed to some degree. This is also true of duplexes and other types of available rental housing.

In addition to single-family rental properties, the price and availability of houses for sale also may impact the demand and the rents for apartments. Many people rent as an alternative to buying a home or they may rent while saving for a down payment or looking for a house to buy. Factors influencing home purchases may be local in nature, such as availability and pricing of alternative housing, but they may be national in nature, such as interest rates. As interest rates go down homes become more affordable and the impact on apartment rents is negative, since people are buying and don't need to rent. As interest rates go up, as they did in the 1970's, they make buying a house much more difficult. Higher interest rates result in higher monthly payments, which is often the determining factor in whether a person buys a new house or chooses to rent. Government regulations and incentives also affect home buying which in turn affects apartment rental rates. Building codes and zoning laws are a few examples that most people are familiar with (these tend to be local), but changes in tax rules have a large impact as well (these are mostly national in scope). In the 1970's the government gave a tax credit up to 5% in some cases to people who bought new homes. Recently tax credits of up to \$8,000 were made available to some home buyers. This greatly reduced the price and impact of things like down payments on houses and stimulated the sale of houses. The new home purchases had a negative impact on the demand for rental units, and this lowered the rents that apartment owners could charge.

While many things impact the rents and occupancy rates for apartments, this study will be limited in scope. Housing rentals and purchase are not considered in this study, but they will be the focus of future research.

THE ANALYSIS

In trying to understand the Houston apartment market, we focus on two variables – monthly rent and occupancy rate (percentage of apartments that are occupied). The data used in our analysis included employment, population, and apartment units constructed. Appropriate

lags on some variables were tested, and the growth in the number of jobs and growth in the population were computed when appropriate.

A regression model was developed to predict the average monthly rent adjusted for inflation. The independent variables used in the stepwise regression model were occupancy rate, new apartments constructed, change in population and change in population lagged 1 year, and change in employment and change in employment lagged 1 year. The only two variables to enter the regression model were new apartments constructed and occupancy rate. Together they provided an r-squared value of 0.70. Certainly we expect the occupancy rate to be highly correlated with the rent. As an apartment approaches 100% occupancy, the rents would typically be raised, although this might take some time due to lease conditions.

The next model investigated the factors impacting the occupancy rate of the apartment. To see if it would be possible to predict changes in occupancy rates, a stepwise regression model was used. The variables included in this model were change in employment, change in population, and apartments constructed. The same three variables were lagged one year and also included in the model. Upon running the model, the employment change was the first variable to enter the model, and this was followed by the employment change lagged one year. The r-squared for the resulting regression equation was 0.36. This increase in occupancy rate that occurs when employment increases is certainly to be expected. People move in to the area to take a new job, and an apartment is one housing alternative that is popular.

The final model that we developed was intended to see how developers might use this data to make decisions about apartment construction. The dependent variable in the model was number of units constructed. These new units do not appear overnight as the construction process is often quite long. Therefore, the variables used to predict this are all lagged one year. These are lagged variables for employment, population, adjusted rent, and occupancy rate. The significant variables found using the stepwise regression were the adjusted rent lagged one year and the adjusted population lagged one year. The resulting r-squared value was 0.66.

SUMMARY AND CONCLUSIONS

The data from the Houston PMSA for the years 1980 to 2011 were used to develop models to investigate the apartment market. The best regression model to predict the average rent included the new apartments constructed and the occupancy rate, and it had an r^2 of 0.70. A high occupancy rate would drive up the price. The fact that new apartments were constructed would indicate that there was a high demand. While other factors impacted the new apartment construction, this variable captures the information provided by those other factors.

The best regression model for predicting the occupancy rate included the change in employment and the change in employment lagged one year. This is consistent with what was expected. However, the model yielded an r^2 of 0.36, and this was somewhat lower than was expected.

The final regression model was used to predicted new apartment construction. The two significant variables in this model were the adjusted rent lagged one year, and the population change lagged one year. Higher rents would make building new apartments more profitable, and more people moving into the area would cause an increase in the demand for apartments. The model yielded an r^2 of 0.66.

The models presented here provide some information that may help us understand the Houston apartment market. However, there is much more to be discerned. Future studies in this area will incorporate additional variables, including alternative housing, in an attempt to develop even better models and to better understand this market.

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