

THE PENNSYLVANIA STATE UNIVERSITY  
SCHREYER HONORS COLLEGE

DEPARTMENT OF FINANCE

THE CORRELATION OF REAL ESTATE INVESTMENTS IN COLLEGE TOWNS WITH  
MARKETS DURING ECONOMIC RECESSION

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Spring 2021

A thesis  
submitted in partial fulfillment  
of the requirements  
for a baccalaureate degree  
in Finance  
with honors in Finance

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## ABSTRACT

This paper intends to examine and determine the effects of an economic recession on College town real estate values and compares them to other markets across the United States. College real estate investments are a unique investment alternative for risk averse investors or investors looking to diversify their portfolio. These investments tend to rely on other microeconomic factors providing more stability during economic downturns. Some of the main microeconomic factors include stable or growing student enrollment, lower unemployment rate, university expansion, supply and demand of housing, proximity to campus, and university policies. Prior literature was utilized to understand how some external factors have an effect on college town home prices. Some college town real estate markets that were analyzed were not as recession proof as other markets due to a spillover effect other nearby metropolitan areas had on the market. The initial analysis was conducted by focusing on five college town real estate market indices for all transaction home prices in the area and compared them to the overall housing market index. This original analysis gave us a good starting point before diving deeper into our analysis. The majority of college town markets were very recession proof while we had one outlier which was explained by this spillover effect. The in depth analysis compared each college town real estate market and five more non college town real estate markets of similar size from across the United States to the overall S&P Case Shiller National Home Pricing index. Overall, we found very supportive correlation and  $R^2$  values for the majority of our group with a few interesting cases. Further research could be conducted to determine how much each variable affects the price of investments in these markets.

## TABLE OF CONTENTS

LIST OF FIGURES .....	iii
LIST OF TABLES .....	iv
ACKNOWLEDGEMENTS .....	v
Chapter 1 Introduction .....	1
Chapter 2 Literature Review .....	3
Upsides.....	3
Recession Proof .....	4
College Town.....	5
Proximity to Other Metros .....	5
Downsides.....	6
Conclusion Based on My Literature Review .....	8
Chapter 3 Analyzing the Markets .....	10
College Town Real Estate Markets.....	10
Spill Over Effect .....	12
Ann Arbor and Flagstaff .....	14
Unemployment.....	16
Overall Comparison .....	17
Primary Drivers.....	18
Secondary Drivers.....	18
Chapter 4 Methodology .....	19
Overview.....	19
Finding Comparison Metros .....	19
Data Process.....	20
Chapter 5 Analysis of Results.....	21
Summary of Findings.....	21
State College vs S&P Case Shiller Index .....	22
Morgantown vs S&P Case Shiller Index .....	23
Ann Arbor vs S&P Case Shiller Index .....	23
Athens vs S&P Case Shiller Index.....	24
Boulder vs S&P Case Shiller Index .....	25
Flagstaff vs S&P Case Shiller Index.....	25
Allentown vs S&P Case Shiller Index .....	26
Hartford vs S&P Case Shiller Index .....	27
Chico vs S&P Case Shiller Index .....	27

Bend vs S&P Case Shiller Index .....	28
San Angelo vs S&P Case Shiller Index .....	28
Chapter 6 Limitation and Further Research .....	30
Areas of Limitation .....	30
Areas of Further Research .....	30
Chapter 7 Conclusion.....	32
Appendix A Condensed Data for Analysis .....	33

**LIST OF FIGURES**

Figure 1 College Town Indices vs S&P Case-Shiller U.S. National Home Price Index.....	11
Figure 2 Hardest Hit Metros during the Great Recession.....	12
Figure 3 Flagstaff House Price Index Comparison.....	13
Figure 4 Ann Arbor House Price Index Comparison .....	14
Figure 5 Flagstaff and Ann Arbor .....	15
Figure 6 Overall Indices Comparison.....	17
Figure 7 State College Regression Analysis.....	22
Figure 8 Morgantown Regression Analysis .....	23
Figure 9 Ann Arbor Regression Analysis.....	24
Figure 10 Athens Regression Analysis.....	24
Figure 11 Boulder Regression Analysis .....	25
Figure 12 Flagstaff Regression Analysis.....	26
Figure 13 Allentown Regression Analysis .....	26
Figure 14 Hartford Regression Analysis .....	27
Figure 15 Chico Regression Analysis.....	27
Figure 16 Bend Regression Analysis.....	28
Figure 17 San Angelo Regression Analysis .....	29
Figure 18 Non College Town Unemployment Rates .....	29

**LIST OF TABLES**

Table 1 College Town Unemployment Rates.....	16
Table 2 Non College Town Student Population.....	20
Table 3 Summary Results for Correlations and R squared.....	21

## ACKNOWLEDGEMENTS

I would like to thank my thesis supervisor and professor, Mallory Meehan. Professor Meehan has given invaluable advice and knowledge to help get me through the process. She provided insights that allowed me to refine my approach as this paper developed.

I would also like to thank Dr. Brian Davis for his guidance throughout this process as my professor, honors advisor, and faculty reader. He encouraged me to research something I am truly passionate about, leading to the incorporation of my interests in real estate and finance into my thesis.

Finally, I would like to thank my family and friends, especially my parents, for teaching me invaluable skills and providing the support of my academic pursuits. I couldn't have done it without them.

## **Chapter 1**

### **Introduction**

Real estate investments in college towns can be an attractive investment for risk averse investors looking to diversify their portfolio. In the past, college towns have tended to be unaffected when compared to the larger overall housing market during financial swings. One of the first locations this was observed is in State College, Pennsylvania. The State College area was not hit as hard as the rest of the country during the Great Depression due to Penn State University's influence on the surrounding area, coining the name "Happy Valley." College town housing prices are affected by many different factors that create a more risk averse investment. Student housing is mainly affected by college enrollment. The higher the enrollment the higher the demand for living. However, with the rapid adoption of technology and increased adoption of remote education and work environments, will these trends continue to prevail?

A college town is a town or a city that is dominated by a local university's population. A true college town is one in which over 20% of the overall population in the area is made up of students enrolled on campus. A college education is a highly valued asset in both good and bad economic conditions, creating a non-cyclical variable of demand. In a booming economy college education provides students the opportunity to differentiate themselves and prepare for the "Real World" while in a bad economy individuals tend to go back to school to improve their job prospects while the supply of jobs is scarce.



Recession proof investments are not as cyclical as other markets during a recession. When referring to “recession proof” or “recession resistant” throughout my thesis I want to specifically define it as an asset that is not as cyclical and not as correlated to the overall economy because they rely on different variables other than economic cycles. This does not mean real estate investments in college towns provide great returns during the decline. I want to determine how much safer these investments are compared to other investments.

Understanding the variables that affect real estate investments in college towns is essential when determining how recession proof these investments are when compared to markets affected by cyclical variables. These variables include enrollment, demographics, supply of housing and future growth in supply, expansion or reduction of institution, unemployment rate, vacancy rates, and proximity to campus and other cities. It is also important that I standardize the type of home when comparing the data from college town housing prices and houses from similar size cities that do not have as strong of a university influence.

For the purpose of this thesis, we will be performing an overall market analysis of several different geographical areas that fit our criteria for a college town to get a big picture of the overall housing environment in each geographical location. We will be looking at State College, Pennsylvania; Morgantown, West Virginia; Ann Arbor, Michigan; Athens, Georgia; and Boulder, Colorado. Then we intend to zoom in on a more focused perspective and will conduct a case study for each location more specifically, studying the investment properties within a particular proximity to campus to fully understand the micro market college towns hold for investing in college town real estate.

## Chapter 2

### Literature Review

#### Upsides

Over the years one of the most attractive and safest real estate investments has been housing within close proximity to a university. The niche market's steady and somewhat predictable demand over the years has made the investment extremely risk averse and reliable. One of the main variables that determines the demand for such investment is college enrollment which is up 27% between 2000 and 2017 with another 3% by 2028 according to the National Center for Education Statistics (Yale, October 10, 2019). The investment is accompanied by most often yearlong leases in which a student must sign with a guarantor. On top of all this the majority of college towns are lacking the supply of college town living not meeting current demand. This drives up rent rates and the value of existing properties. A college education is a highly valued asset in both good and bad economic conditions, creating a non-cyclical variable of demand. In a booming economy college education provides students the opportunity to differentiate themselves and prepare for the "Real World" while in a bad economy individuals tend to go back to school to improve their job prospects while the supply of jobs is scarce.

Another reason college town investments are attractive to risk averse investors is the steady simple cash flow the investment provides with relatively low vacancy. In fall 2018, the vacancy rate in student housing units was 2.6 percent and it was forecasted to fall 2.3 percent in fall of 2019 (Statista, 2020). These are extremely low vacancy rates and once the student is locked into a yearlong lease it is nearly impossible to get out of it unless they find another tenant to take over their lease. We have seen this across many campuses during Fall 2020. Due to

Covid-19 and a transition to online learning many students have decided to stay home rather than coming back to campus, many still having to pay their leases they signed last fall (Trapasso, September 2, 2020).

### **Recession Proof**

In the past, college towns have tended to be unaffected when compared to the larger overall housing market during financial swings. Recession proof investments are not as cyclical as other markets during a recession. When referring to “recession proof” or “recession resistant” throughout my thesis I want to specifically define it as an asset that is not as cyclical and not as correlated to the overall economy because they rely on different variables other than economic cycles. Student housing is mainly affected by college enrollment. The higher the enrollment the higher the demand for living. Student enrollment during the Great Recession from 2007 to 2009 saw “the number of student enrollment in college in the United States increased from 2.4 million in 1955 to 19.1 million in 2015. From 2006 to 2011, total college enrollment grew by 3 million, contributing to the overall growth of postsecondary enrollment” (United States Census Bureau, 2018). This does not mean real estate investments in college towns provide great returns during the decline. I want to determine how much safer these investments are compared to other investments.

College town housing prices are affected by many different factors that create a more risk averse investment. Understanding the variables that affect real estate investments in college towns is essential when determining how recession proof these investments are when compared to markets affected by cyclical variables. These variables include enrollment, demographics,

supply of housing and future growth in supply, expansion or reduction of institution, unemployment rate, vacancy rates, and proximity to campus and other cities.

### **College Town**

A college town is a town or a city that is dominated by a local university's population. A true college town is one in which at least 20% of the overall population in the area is made up of students enrolled on campus. A college education is a highly valued asset in both good and bad economic conditions, creating a non-cyclical variable of demand. In a booming economy college education provides students the opportunity to differentiate themselves and prepare for the "Real World" while in a bad economy individuals tend to go back to school to improve their job prospects while the supply of jobs is scarce. College town also provide more stable jobs to the local population. Since the university will continue to run throughout an economic downturn they will continue to need essential worker, providing job security throughout the business cycle. This in return helps lower the local unemployment rate.

### **Proximity to Other Metros**

During recessions some geographical areas are hit harder than others for a variety of reasons. One variable that could play a role in how recession proof a college town is proximity to other cities and how they were affected by the recession. This can be a very important variable to consider when choosing a specific college town to invest in. Some metros such as Detroit and Las Vegas were hit hard by the Great Recession while others like Austin and Denver were less hard hit (Bloomberg). A study on metro business cycles showed that the type of workforce has a big effect of the growth and development of the

area. The study found that less educated metros are hit much harder by the economic downturn mainly because the workers in the area have a harder time finding jobs (Arias, Gascon, & Rapach, 2016). The study also showed that metros that had lower housing price elasticities are more vulnerable to recession therefore are more exposed to changes in home prices (Arias, Gascon, & Rapach, 2016). Most importantly the study found that metros are affected by what happens to nearby and adjacent metros and the effects of the economic cycle spills over to the other areas.

### **Downsides**

One of the biggest downsides that has been presented over this year during the Covid-19 Pandemic is the risk of students not returning to campus. The rapid adoption of technology and increased adoption of remote education and work environments could have a major impact on future enrollment. If education continues to adopt the remote learning trend students will no longer have to go away to school and can attend class from anywhere. Other variables also present risk as well including changes in interest rates, unemployment, credit markets, etc. can directly affect the performance of a real estate investment. Also the risk of holding an illiquid leveraged asset presents downsides to investors such as being stuck with a property that has negative cash flow that you cannot get rid of leading to foreclosure.

When estimating the value of real estate one of the main assumptions is the interest rate whether you are estimating the value of property using discounted cash flow (DCF) or direct capitalization.

DCF:

$$DCF = CF_1 / (1+r)^1 + CF_2 / (1+r)^2 + \dots + CF_n / (1+r)^n$$

DCF = Value

CF<sub>i</sub> = cash flow period i

r = interest rate

n = time in years before cash flow occurs

Direct Cap:

$$\text{Value} = \text{NOI} / \text{CAP Rate}$$

Interest rates are inversely proportional to the value of property therefore when rates decrease the value of property goes up and when interest rates rise the value of property decreases. Mortgage interest rates have recently hit an all-time low and are projected to increase slightly. The 30 year fixed rate hit its lowest point since the Freddie Mac survey began at 2.78%. The Federal Reserve plans on continuing to keep interest rates near zero for the foreseeable future which likely means through 2024. The Fed has been purchasing \$80 billion of Treasury securities and \$40 billion of mortgage backed securities every month on its balance sheet (Payne, November 10, 2020). This provides more liquidity as more cash is freed up which could in return cause an increase in inflation. The Fed said it is willing to tolerate inflation levels above 2% for a time. A big future concern looms where inflation may be headed as more and more stimulus is dumped into the

economy and national debt approaches \$27.5 Trillion (U.S. Debt Clock). Inflation relies on two factors money supply and the velocity of money. Recently we have seen a huge increase in money supply over the past few months and a decrease in the velocity of money due to Covid-19 (Zimmerman, September, 1 2020). Eventually, we may see a rise in interest rates in order to counterbalance the rise of inflation. Quite a bit of uncertainty lies within this variable and could have a huge effect on real estate investments in the future.

Another downside is that college town real estate investments can be very management intensive. Leases are usually twelve months creating a high turnover rate and the turnover period is very short as well. Most leases begin in August and end in July. This gives property management less than a month to clean, repair, and prepare the property for the next tenant. This can present very high property management expenses. Additionally, due to the demographics and behavior of the population renting out the investment the properties tend to require more maintenance, repair, and higher insurance costs.

### **Conclusion Based on My Literature Review**

The review of the literature provides many supporting facts in favor of college town real estate investments being a safer alternative investment for risk adverse investors, but also addresses some important issues with looming uncertainty and risk associated with the investment.

When investing in college town real estate investments it will be important to take into account a variety of factors that could affect the performance of the investment vehicle. There are a lot of smaller factors that could affect the investment on a smaller more property specific

level but we are focusing on the overall economic drivers. It will be important to look at the proximity and historical performance of other nearby metros, how much of the local population is represented by college students, unemployment in the area, median local income, and university policy.

The advantage to investing in college town real estate:

1. Provides diversification
2. College enrollment expected to continue to grow in the near future
3. Steady stream of cash flows and high occupancy rates

The disadvantages to investing in college town real estate:

1. Lack of liquidity
2. High expenses and maintenance
3. Uncertainty with remote learning



## **Chapter 3**

### **Analyzing the Markets**

#### **College Town Real Estate Markets**

Initially we decided to focus on five areas throughout the country that fit the description of a college town. The five college towns included State College, Pennsylvania; Ann Arbor, Michigan; Athens-Clarke County, Georgia; Morgantown, West Virginia; and Boulder, Colorado. All five college towns had a population in which over 20% of the overall population in the area was made up of students enrolled on campus, were distanced from other urban areas, and covered a variety of locations across the country. In State College 96.13% of the population was college students, 93.7% in Morgantown, 37.04% in Ann Arbor, 30.15% in Athens, and 31.25% in Boulder (Bureau).

In order to make the initial comparison easier we used an index to more accurately make the comparison over time. To get a broader understanding of how each area responded to previous economic downturns we gathered all transaction house price index data from FRED economic research and compared it to the S&P Case Shiller U.S. National Home Price Index.

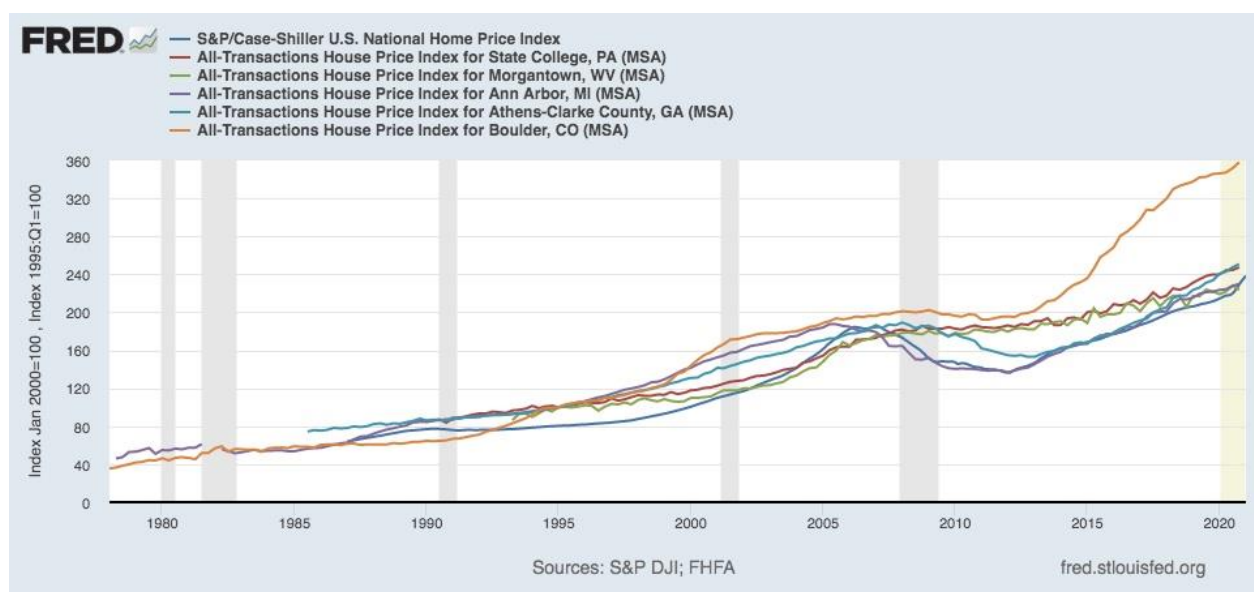


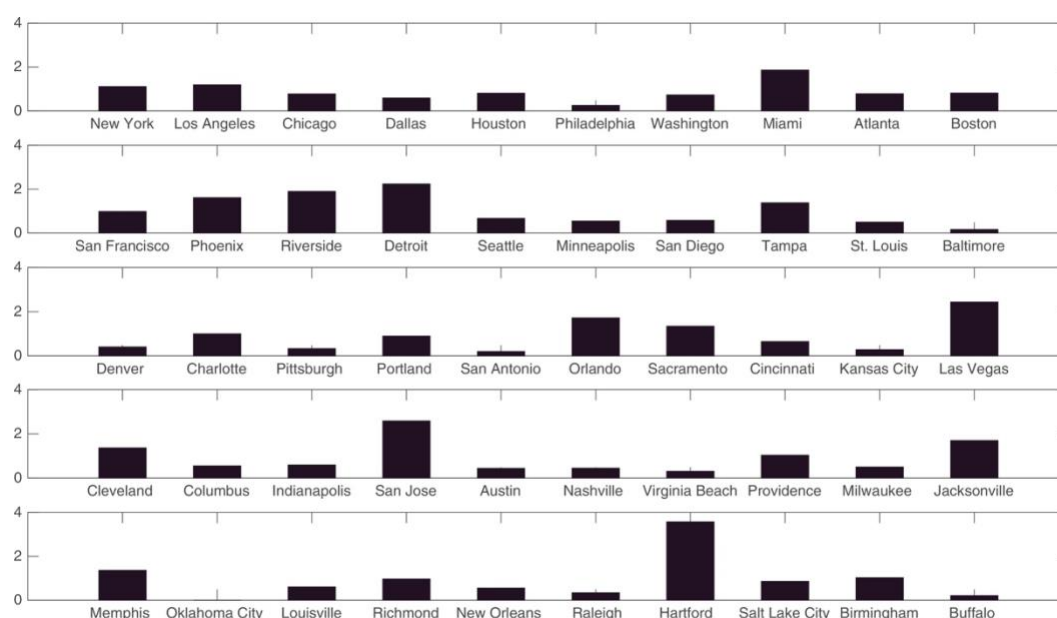
Figure 1 College Town Indices vs S&P Case-Shiller U.S. National Home Price Index

During the Great Financial Recession we saw a lot of volatility in the U.S. national home price index, taking a big dip from 2008-2010. Home price index for State College and West Virginia have steadily increased overtime, never taking a large dip during the Great Recession. Both index are very correlated and have the highest percentage of college students in the local population. In Boulder, Colorado we have also seen a steady incline through 2013 never declining during the recession and greatly increasing compared to the overall U.S. Index in recent years. In Athens, Georgia we see a slight decline during 2008-2010 but nothing as steep as the overall U.S. Index. Although while the overall U.S. Index eventually began to recover we saw a continued slight decline in Athens and it has met up with the overall U.S. Index in 2013. The only outlier was Ann Arbor, Michigan which was somewhat more volatile compared to the U.S. Home Index during 2008-2010 and has been positively correlated with the overall market throughout time.

From Q1 in 2008 to Q2 in 2009 the S&P Case Shiller index changed -24.14%, State College changed by 1.17%, Morgantown changed by -0.76%, Athens changed by -5.93%, Boulder changed by -0.75%, and Ann Arbor changed by -17.59%.

## Spill Over Effect

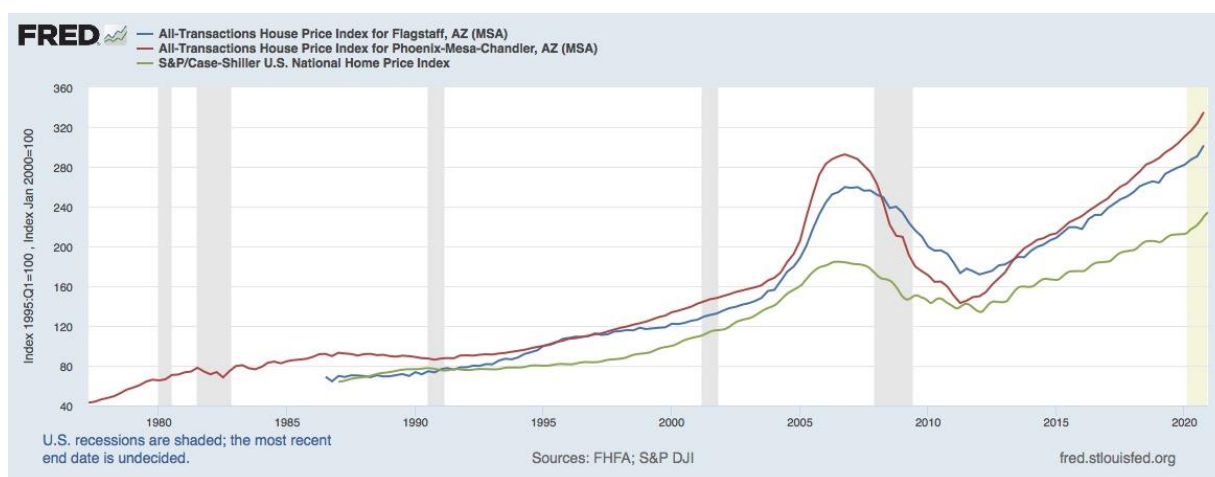
After looking through this data we needed to further understand what factors are the most significant. We needed to figure out how much proximity to other urban areas affect housing prices. Ann Arbor, Michigan could be an outlier because it is located relatively close to Detroit therefore we decided to add another college town similar to Ann Arbor that was also located near a city that was hit hard by the Great Recession.



**Figure 2 Hardest Hit Metros during the Great Recession**

We decided to find another college in an area of housing deflation to compare with Ann Arbor and the other group of four that also got hit hard by the housing crisis. In a recession some cities are hit much harder than others depending on their geographical location. Economic downturns tend to hit the hardest in manufacturing oriented Rustbelt metros such as Detroit (Bloomberg). The two biggest factors affecting larger cities during economic downturns are less educated metros because their workers have a tougher time finding jobs and metros that have lower housing price elasticities which are more vulnerable to recession thus more vulnerable to movements in

housing prices (Arias, Gascon, & Rapach, 2016). In order to find another college town to help explain why Ann Arbor was an outlier we decided to find a college town near Phoenix, Arizona since it was also hit very hard during the Great Recession similar to Detroit. In order to keep our study consistent with our definition of a college town we had to find a college relatively close but not located within the city of Phoenix therefore we decided to use Northern Arizona University in Flagstaff, Arizona. Flagstaff also had a population in which 40.1% were made up of students fitting our criteria.



**Figure 3 Flagstaff House Price Index Comparison**

As you can see similar to Ann Arbor, Michigan it was much more volatile compared to the U.S. home index. Phoenix was a massive bubble and got hit hard during the Great Recession. In Phoenix two thirds of all residential mortgages went under with median home prices down 53% since the bubble peaked in 2006 (Wood, 2011). Northern Arizona University had also got hit hard during the same time period but not as bad as Phoenix.

## Ann Arbor and Flagstaff

Both Ann Arbor and Flagstaff were both college towns hit hard during the Great Recession due to their geographical location. This has led us to believe that both Ann Arbor and Flagstaff were not as recession proof as the other college towns due to the spillover effect that Detroit and Phoenix had on them. Both Detroit and Phoenix were some of the areas that got hit the hardest during the Great Recession. As we mention earlier from the Metros Business Cycle study by Arias, Gascon, and Rapach that many cities are affected by what happens to nearby and adjacent metros and the effects of the economic cycle spills over to the other areas. This may also explain why Boulder has been booming in recent years because Denver has been booming as well.

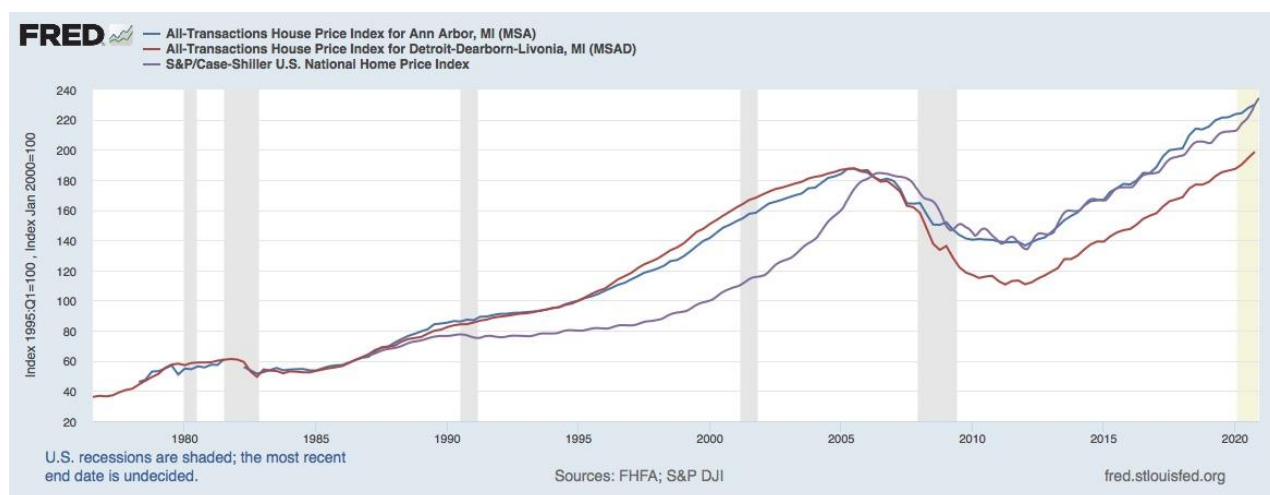


Figure 4 Ann Arbor House Price Index Comparison

It is still important to note that even though these two college towns were not very recession proof when compared to the overall housing index the local university could have still had a positive effect on the home prices in the area, it is just was not as effective. Further

research would have to be done but when comparing the nearby Phoenix with Flag staff from Q1 2008 to Q2 2009 Phoenix saw a -71.64% change while Flag staff only saw a -28.14% change and Detroit saw a -29.59% change and Ann Arbor saw a -17.59% change.

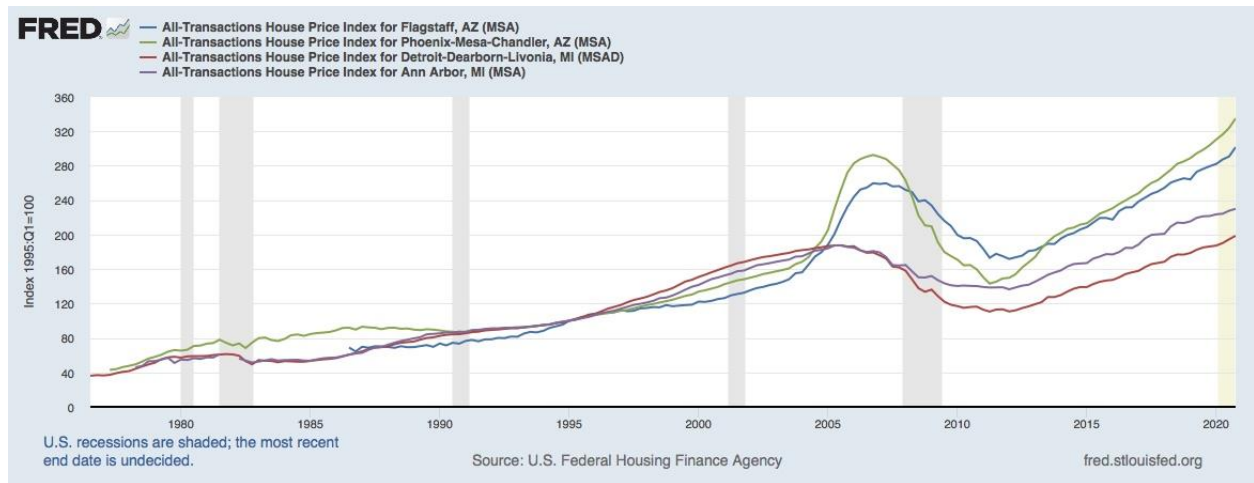


Figure 5 Flagstaff and Ann Arbor

## Unemployment

**Table 1 College Town Unemployment Rates**

	Unemployment Rate		
	1/1/08	1/1/09	1/1/10
<b>State College</b>	4.5	6.0	7.1
<b>Morgantown</b>	3.3	3.9	6.0
<b>Ann Arbor</b>	4.9	6.8	8.7
<b>Athens</b>	4.5	7.5	9.5
<b>Boulder</b>	3.9	6.0	7.4
<b>Flagstaff</b>	4.8	8.0	11.5

Above we pulled the unemployment rate from 2008, 2009, and 2010 for each college town. The markets that are more recession proof tend to have a much lower and more stable unemployment rate over time. The unemployment rate can be a great indicator and variable to take into account when looking into a college town real estate market. Morgantown, State College, and Boulder had much lower rates throughout the Great Recession and were the areas that have shown to be most resistant. Athens, Georgia when compared to the overall market did not get hit as hard but had a relatively high unemployment rate toward the end of the Great Recession. Athens eventually resembled the overall market toward the end of 2010 although proved to be more recession proof throughout the Great Recession. Ann Arbor and Flagstaff both had higher unemployment rates throughout this time period.

## Overall Comparison

As you can see overall while compared to S&P Case Shiller Index college towns did not take as hard of a hit. The two outliers, Ann Arbor and Flagstaff, got hit harder than the rest due to the spillover effect nearby cities had on them.

### Index Change from Q1 2008 to Q2 2009:

S&P Case Shiller: -24.135%

State College: 1.17%

Ann Arbor: -17.59%

Athens: -5.93%

Boulder: -0.75%

Morgantown: -0.76%

Flagstaff: -28.14%

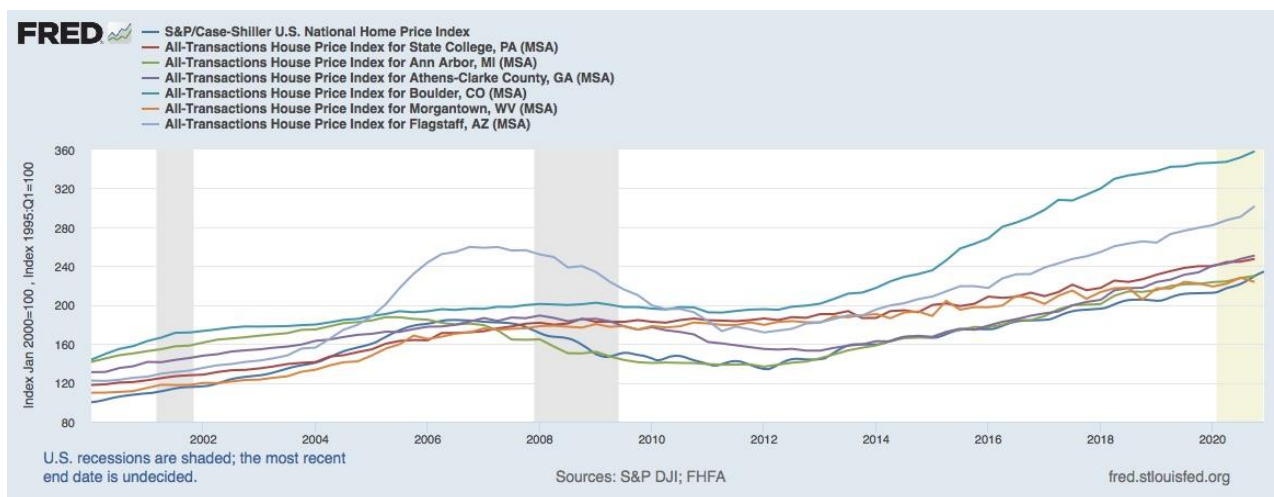


Figure 6 Overall Indices Comparison



### **Primary Drivers**

The primary drivers in the local college town real estate market are unemployment rate, percentage of college students that make up the population, and university policy and expansion. The more the local population is made up of college students provides not only more demand but stable demand. Growing universities that are increasing enrollment is more advantageous for the investment. The lower and more stable the unemployment rate the better. Low unemployment shows that population and businesses surrounding the university are not getting hit as hard as well. Much of this population may work at the university. University policy may have a huge impact on local investments. Many universities have requirements for how long students are required to live on campus. If they were to increase or decrease the duration of on campus living this could have a big impact on off-campus demand.

### **Secondary Drivers**

The main external secondary driver is proximity to other metros and the health of that market. As we saw in Ann Arbor and Flagstaff this could have a huge effect on the college town real estate market. When comparing Detroit and Phoenix with Ann Arbor and Flagstaff we can see that the primary drivers of the market have some effect on the market but when comparing it to the overall market and other college town markets it is very minimal. When determining which college town market to invest in it will be extremely important to analyze neighboring metros and understand their economic health.

## **Chapter 4**

### **Methodology**

#### **Overview**

The primary analysis of this paper is to determine how recession proof college town real estate investments are when compared to other markets in order to understand how they can fit within a risk averse investors portfolio. In order to determine how recession proof each college town is we had to find the correlation of each college town market with the overall S&P Case Shiller Home Index. To standardize the process we had to find the correlation of both college towns and non-college town markets of similar size.

#### **Finding Comparison Metros**

Our first step in the process was to find non-college town metros that were of similar size that did not have any university influence on the real estate market. The college towns we chose for our study had a population range between 50,000 and 150,000 people. Almost every city of that size has some sort of university or institution in the area. Therefore, we had to sort through and make sure every non college town did not meet the criteria for a college town, therefore the population had to be made up of less than 20% college students.

After sorting through lists of cities of similar size we found five non college town metros that fit the requirements. These areas include Allentown, Pennsylvania; Hartford, Connecticut; Chico, California;

Bend, Oregon; and San Angelo, Texas. Again, similar to how we chose our college towns we made sure to pick a variety of metros across the United States to help get a better picture.

**Table 2 Non College Town Student Population**

	<b>Population</b>	<b>Student Enrollment</b>	<b>Student/Population</b>
<b>Allentown, Pennsylvania</b>	120,915	7119	5.89%
<b>Hartford, Connecticut</b>	123,088	7025	5.71%
<b>Chico, California</b>	94,529	17,488	18.50%
<b>Bend, Oregon</b>	93,917	1204	1.28%
<b>San Angelo, Texas</b>	100,031	10775	10.77%

### **Data Process**

We pulled raw index data from FRED economic research on all transaction house prices for each location and pulled the raw data for the S&P Case Shiller U.S. National Home Price Index. We decided that it was best to use data from a five year time frame from starting January 1, 2008 to January 1, 2013. After collecting all the data we compared each individual college town and non-college town with the S&P Case Shiller data and calculated the correlation and R squared for each.

Correlation will help us understand the linear relationship between each location and the overall housing market index. Correlation can range anywhere from -1 to +1. A positive 1 indicates a perfect correlation, 0 represents no correlation, and -1 indicates a perfectly inverse correlation. In order to support our hypothesis we want the college town market's to have a lower correlation as far from 1 as possible and we want the non-college towns to have a correlation as close to 1 as possible to match the overall housing market index. Correlation of determination or  $R^2$  is always between 0% and 100%. In general the higher the  $R^2$  the better the model fits the data. In our case the lower the  $R^2$  the better because this means that the area is less correlated with the overall market.

## Chapter 5

### Analysis of Results

#### Summary of Findings

Table 3 Summary Results for Correlations and R squared

	Correlation	R Squared
<b>State College</b>	-0.52	0.275
<b>Morgantown</b>	-0.46	0.216
<b>Ann Arbor</b>	0.91	0.827
<b>Athens</b>	0.79	0.631
<b>Boulder</b>	0.66	0.439
<b>Flagstaff</b>	0.91	0.834
<b>Allentown</b>	0.88	0.776
<b>Hartford</b>	0.88	0.780
<b>Chico</b>	0.92	0.853
<b>Bend</b>	0.93	0.863
<b>San Angelo</b>	-0.52	0.274

From the findings we found State College, Morgantown, Athens, and Boulder to support our hypothesis that college town real estate investments are more recession proof than other markets during economic down turns. As you can see above State College and Morgantown were both negatively correlated to the overall S&P home price index with very low R<sup>2</sup>. Both college towns strongly support our hypothesis and would provide great diversification. Athens and Boulder were positively correlated to the overall market but when compared to non-college town areas they correlated much less and have lower R<sup>2</sup>.

Ann Arbor and Flagstaff do not support our hypothesis as previously mentioned and shown here. In some cases they have a stronger correlation to the overall housing market than Chico and Bend. Additionally, they have a higher R<sup>2</sup> than Allentown and Hartford. As mentioned previously Ann Arbor

and Flagstaff can be explained by the spillover effect from larger metros, Detroit and Phoenix, that were hit hard by the great recession.

San Angelo was a very unique finding along the way. San Angelo had a negative correlation that was the same as State College and had an  $R^2$  value greater than all the college town markets. After looking into this outlier we found that a military base was located within the area. The unemployment rate in the area was low and stable across time. This makes sense because military jobs are very stable.

### State College vs S&P Case Shiller Index

The correlation between State College and the US Home index was -0.52 and the  $R^2$  was 0.275. A negative correlation indicates an inverse relationship between the State College housing market and the overall market which supports our hypothesis. The two markets have a relatively strong negative correlation. The  $R^2$  value of 0.275 is also consistent with our hypothesis in that 27.5% of the data fit the regression model. For our analysis we want this number to be as low as possible because we do not want our data fit the model. State College has proved to be a very recession proof market that relies heavily on the university variables. The location of the Campus is far enough away from bigger metros such as Philadelphia and Pittsburgh that it has avoided any spillover effect from these areas.

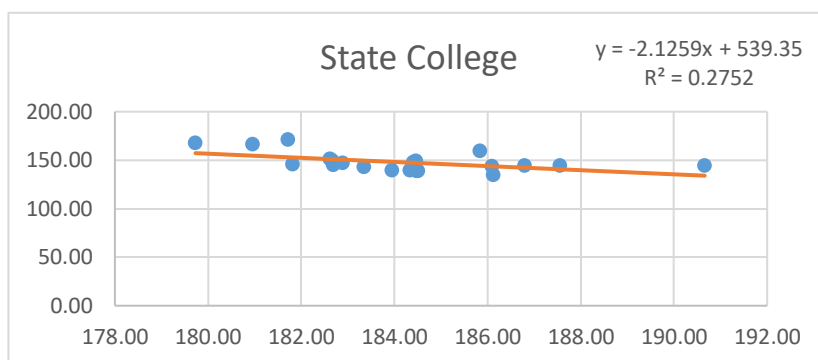


Figure 7 State College Regression Analysis

### Morgantown vs S&P Case Shiller Index

The correlation between Morgan Town and the US Home index was -0.46 and the  $R^2$  was 0.216. Similar to State College, Morgantown supported our hypothesis. A negative correlation indicates an inverse relationship between Morgantown and the overall market which supports our hypothesis. The two markets have a relatively strong negative correlation. The  $R^2$  value of 0.216 is also consistent with our hypothesis in that 21.6% of the data fit the regression model.

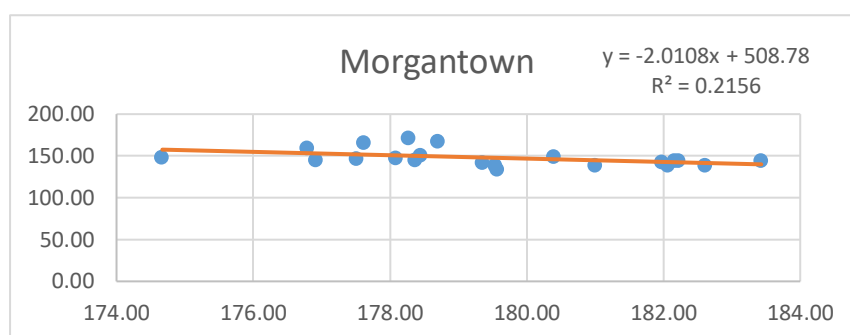


Figure 8 Morgantown Regression Analysis

### Ann Arbor vs S&P Case Shiller Index

The correlation between Ann Arbor and the US Home index was 0.91 and the  $R^2$  was 0.827. Ann Arbor did not fit our hypothesis mostly due to spillover from Detroit. Ann Arbor was highly correlated to the overall housing index and 82.7% of its data fit the regression model.

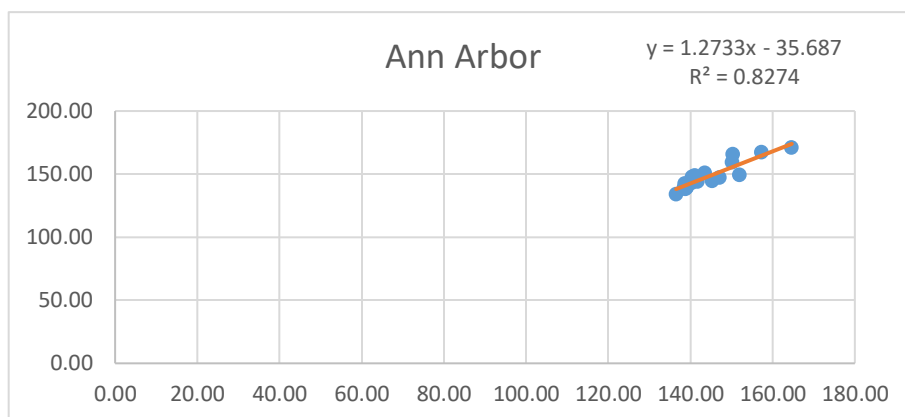


Figure 9 Ann Arbor Regression Analysis

### Athens vs S&P Case Shiller Index

The correlation between Athens and the US Home index was 0.79 and the  $R^2$  was 0.631. Athens had a high correlation to the overall market index but only 63.1% of its data fit the regression model. Athens does not strongly support our hypothesis like State College and Morgantown but it still proves to be somewhat more recession proof than the other non-college town areas when compared to the overall housing market.

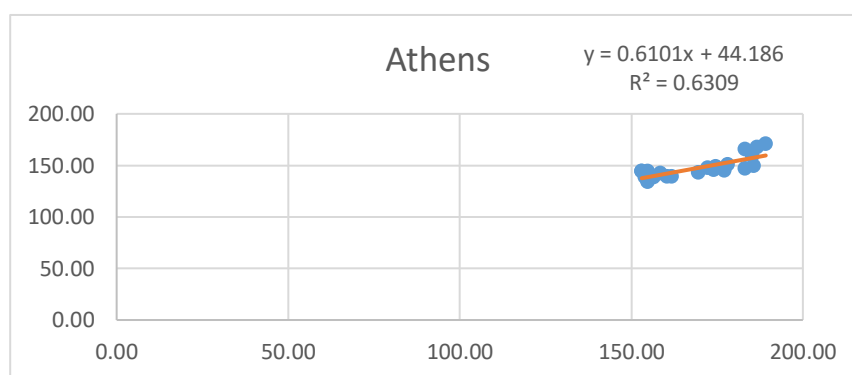


Figure 10 Athens Regression Analysis

### Boulder vs S&P Case Shiller Index

The correlation between Boulder and the US Home index was 0.66 and the  $R^2$  was 0.439.

Interestingly over the five year period Boulder had a high correlation to the overall market but had a low correlation coefficient only representing 43.9% of the regression model. Boulder supports our hypothesis in that it is more recession proof than the overall housing market.

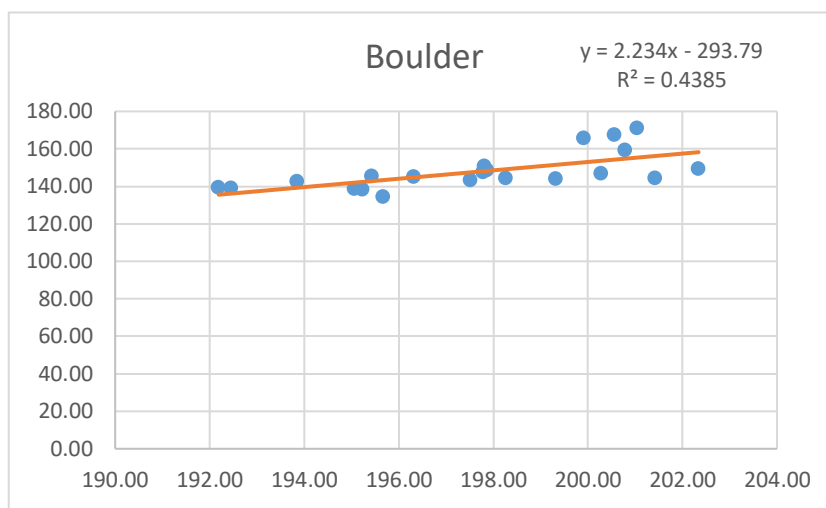


Figure 11 Boulder Regression Analysis

### Flagstaff vs S&P Case Shiller Index

The correlation between Flagstaff and the US Home index was 0.91 and the  $R^2$  was 0.834.

Flagstaff was strongly correlated with the overall housing index as we expected mainly due to the spillover effect from Phoenix and 83.4% of the data fit the regression model.



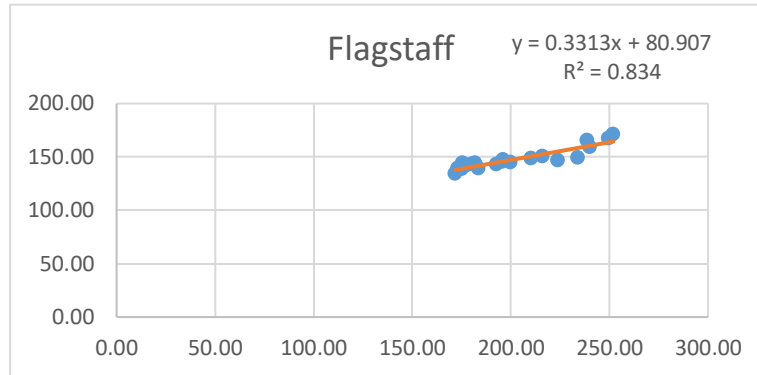


Figure 12 Flagstaff Regression Analysis

### Allentown vs S&P Case Shiller Index

The correlation between Allentown and the US Home index was 0.88 and the  $R^2$  was 0.776. As we expected Allentown had a strong correlation and a high correlation coefficient.

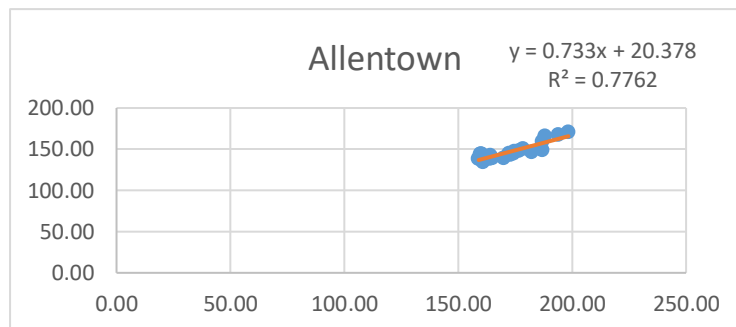


Figure 13 Allentown Regression Analysis

### Hartford vs S&P Case Shiller Index

The correlation between Hartford and the US Home index was 0.88 and the  $R^2$  was 0.780. As expected Hartford had a strong correlation and a high correlation coefficient.

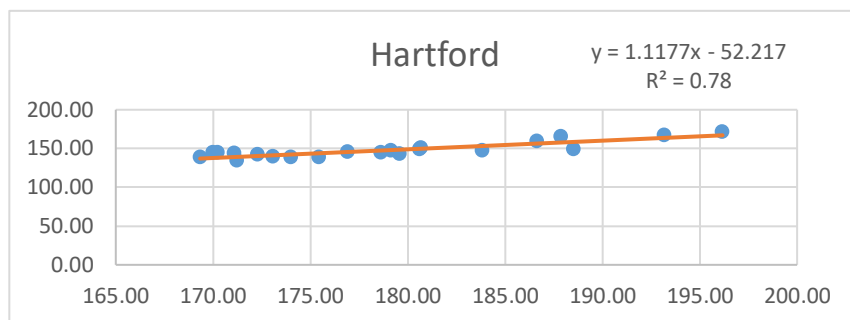


Figure 14 Hartford Regression Analysis

### Chico vs S&P Case Shiller Index

The correlation between Chico and the US Home index was 0.92 and the  $R^2$  was 0.853. As we expected Chico had a strong correlation and a high correlation coefficient.

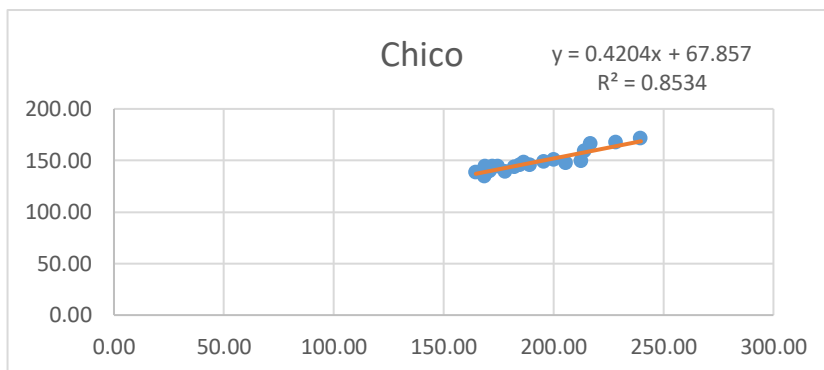


Figure 15 Chico Regression Analysis

### Bend vs S&P Case Shiller Index

The correlation between Bend and the US Home index was 0.93 and the  $R^2$  was 0.863. As we expected Bend had a strong correlation and a high correlation coefficient.

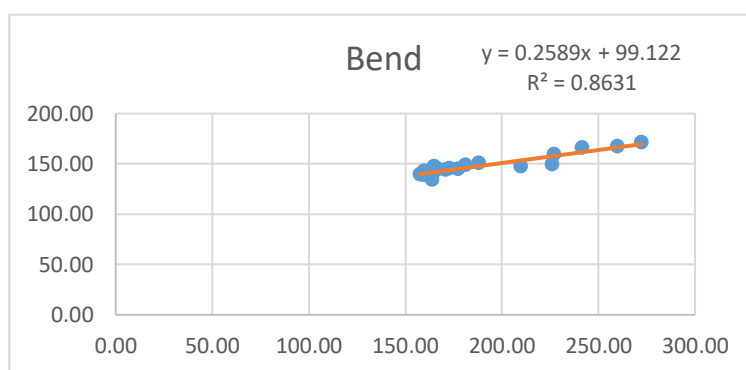


Figure 16 Bend Regression Analysis

### San Angelo vs S&P Case Shiller Index

The correlation between San Angelo and the US Home index was -0.52 and the  $R^2$  was 0.274. This was a very interesting outlier in our data. San Angelo was extremely negatively correlated matching State College and had an even lower  $R^2$  value but had very little university influence on the area. After looking into this outlier we found that several military bases are located throughout the area and made up a large sum of the population. This makes sense because military jobs are very stable. While comparing unemployment rates throughout time we found that the unemployment rate in San Angelo was much lower than the rest of the non-college town metros.

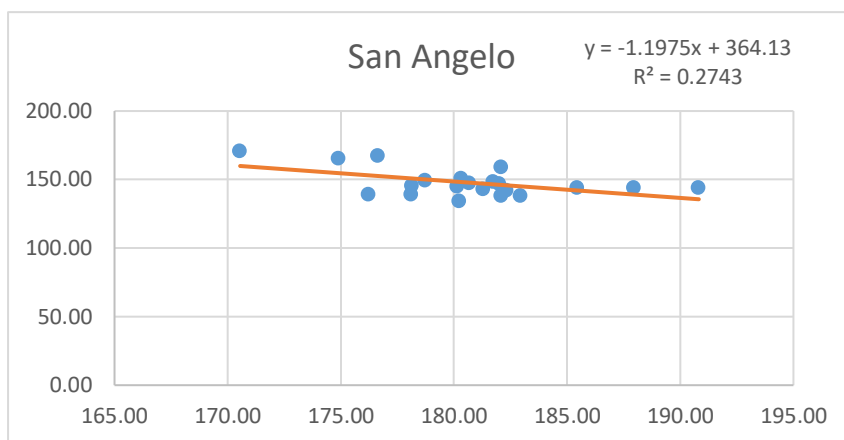


Figure 17 San Angelo Regression Analysis

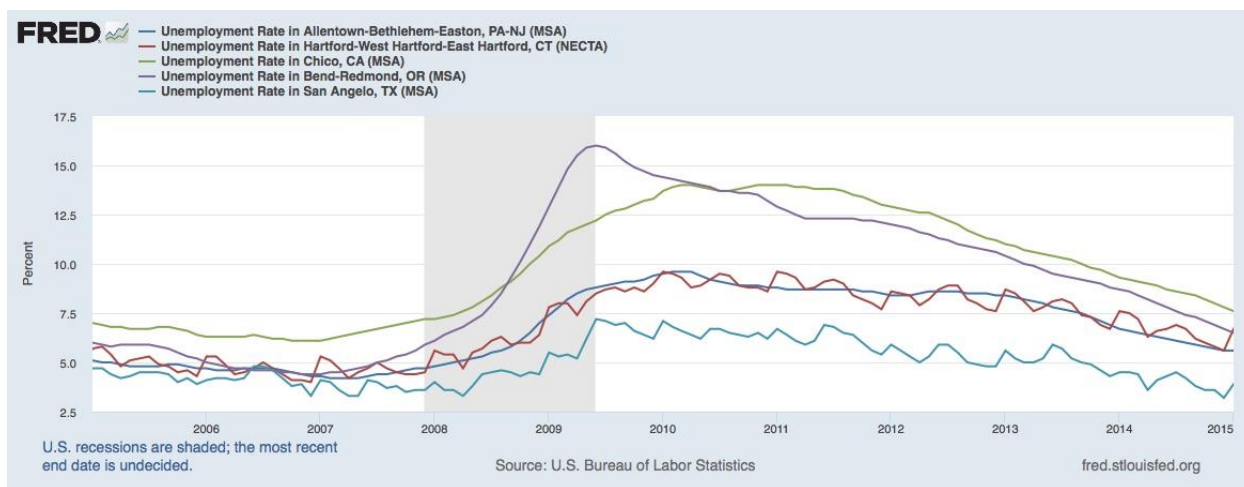


Figure 18 Non College Town Unemployment Rates

## **Chapter 6**

### **Limitation and Further Research**

#### **Areas of Limitation**

One limitation with the research was the size and quality of the sample. The United States consist of thousands of universities across the country that are all so different. It is very difficult to standardize any type of real estate property or market because every market is unique. Additionally, when pulling the data it was difficult to get them all from similar proximity to the university. For example the size of State College is much smaller than Ann Arbor. It would be more advantageous if you could pull housing data within so many miles of the university for each college town.

Another limitation was getting access to historical home pricing data. If we were able to pull historical home pricing data for each area throughout the same time period we could run a more accurate regression using multiple variables. Using a multiply variable regression would allow us to fully understand how much each variable plays into home values in each market.

Additionally, many of these locations have changed a lot since the Great Recession and will continue to change. For example the supply of housing in State College has increased dramatically in recent years and may have a huge effect on rental rates and property values in the future. It is important to break down each area and fully understand the individual market before making any investment.

#### **Areas of Further Research**

A potential area to look into further is the relationship each individual variable has with the index value or average home price within each college town. Using a multiple variable regression model would allow you to determine how each independent variable plays into the dependent variable. Independent variables to consider would be the percent of population that is made up of college students,

unemployment rates, proximity to other metros, and median income. After running a regression for each market you could fully understand how much each variable plays into the average home price in each market.

In addition a similar study could be done for areas with military bases and military influence as we discussed with San Angelo, Texas. Unemployment rates in military base towns are very low and stable across time due to the job stability. It would be interesting to understand how investments in these areas compare to college town real estate investments. Could they be a more recession proof market to invest in?

Another important consideration is the effect of Covid-19 and the direction universities are going to take with online and in person classes. If this trend continues we could see a massive shock to college town real estate. If students adapt and continue to take classes online then markets around universities could potentially crash. Students will no longer need student housing and would likely take classes from home. It will be important to watch where this trend is headed and only time will tell.

## **Chapter 7**

### **Conclusion**

After reviewing available literature and diving into an analysis of college town real estate investments and how they correlate to the overall housing index there are several conclusions to make about advantages to investing in college town real estate.

After reviewing the literature there are many variables to take into account before investing in college town real estate at both the macro and micro level. Before investing it is essential to determine what market to invest in by looking at variables such as supply and demand, university policies, proximity of college town to other metros and the economic health of those metros, unemployment, and how much of the local population is represented by college students.

After analyzing the data we are able to better understand what variables play an important role in these investments. It is just as important to understand the health of other metros near the college towns as it is to understand the health of the college town itself. It is most advantageous to find college town markets similar to State College and Morgantown. Both markets are very secluded and distances from the spillover effects of other metros. College town real estate investments can be very recession proof and provide great diversification to investor portfolios. It is important to take all factors into consideration and fully understand the market prior to investing in any location.

## Appendix A

### Condensed Data for Analysis

	State College	Morgantown	Ann Arbor	Athens	Boulder	Flagstaff	Allentown	Hartford	Chico	Bend	San Angelo	S&P Case Shiller
2008-01-01	181.72	178.27	164.66	189.17	201.04	251.96	198.35	196.17	239.73	272.16	170.55	171.07900000000000
2008-04-01	179.73	178.70	157.33	186.73	200.57	249.35	193.99	193.17	228.50	259.59	176.63	167.32500000000000
2008-07-01	180.96	177.62	150.40	183.29	199.92	238.60	188.22	187.88	216.96	241.41	174.90	165.71700000000000
2008-10-01	185.84	176.79	150.18	185.34	200.79	240.01	186.91	186.63	214.19	226.84	182.10	159.16200000000000
2009-01-01	182.66	180.40	151.91	185.80	202.34	233.87	187.08	188.53	212.68	226.08	178.72	149.36100000000000
2009-04-01	182.89	177.51	147.07	183.24	200.29	223.82	182.49	183.84	205.69	209.64	181.99	146.94400000000000
2009-07-01	182.62	178.45	143.50	178.11	197.81	216.01	178.51	180.67	200.15	187.84	180.32	150.74500000000000
2009-10-01	184.46	174.67	141.16	174.68	197.87	210.07	176.91	180.61	195.49	180.93	181.75	148.58100000000000
2010-01-01	182.69	178.37	140.36	177.12	196.32	199.56	174.44	178.63	189.31	172.60	180.16	145.00300000000000
2010-04-01	181.82	176.92	140.85	174.00	195.43	195.74	172.31	176.91	184.82	166.24	178.15	145.40200000000000
2010-07-01	184.40	178.09	140.44	172.32	197.79	196.02	174.86	179.14	186.45	164.91	180.68	147.56000000000000
2010-10-01	186.10	181.98	140.27	169.71	197.52	192.56	172.94	179.59	182.23	165.89	181.31	143.12500000000000
2011-01-01	184.33	181.00	139.18	161.94	192.45	183.41	170.05	175.44	178.12	158.33	178.12	139.04600000000000
2011-04-01	183.95	179.54	138.57	160.46	192.19	173.12	165.00	173.06	171.16	157.49	176.23	139.16000000000000
2011-07-01	183.34	179.36	138.74	158.54	193.85	177.71	164.34	172.29	169.73	159.56	182.33	142.33900000000000
2011-10-01	184.47	182.07	138.87	156.64	195.24	175.02	163.96	173.99	169.89	163.59	182.09	138.40900000000000
2012-01-01	186.12	179.57	136.52	154.79	195.67	171.75	161.05	171.22	168.65	163.88	180.24	134.16700000000000
2012-04-01	184.50	182.61	138.66	154.15	195.06	173.66	158.96	169.33	164.61	159.89	182.96	138.47500000000000
2012-07-01	187.55	183.43	140.71	154.90	198.27	175.50	159.83	170.22	168.94	165.10	185.44	144.28100000000000
2012-10-01	186.80	182.16	141.81	153.04	199.33	180.88	160.56	171.08	172.12	170.86	187.95	143.96900000000000
2013-01-01	190.66	182.22	145.32	153.07	201.42	181.96	160.26	169.99	174.72	177.30	190.82	144.31300000000000
	-0.524582451	-0.4643203	0.90960955	0.79430762	0.66218461	0.91322886	0.88099541	0.88315167	0.92378701	0.92905359	-0.5237598	



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# ACADEMIC VITA

## CAMERON PICA

### EDUCATION

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**The Pennsylvania State University** **University Park, PA**  
*Schreyer Honors College | Smeal College of Business* *May 2021*  
Bachelor of Science in Finance  
Certificate in Real Estate

### WORK EXPERIENCE

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**Eagle Pharmaceuticals, Inc.** **Woodcliff Lake, NJ**  
*Finance Intern* *May 2020 – July 2020*

- Interacted directly with leadership, including CFO and CEO on several M&A opportunities
- Conducted financial analysis, including Discounted Cash Flow, preliminary valuation model, stock analysis, and diluted share analysis to inform the firm's strategic direction and goals with minimal oversight
- Developed several leadership presentations to highlight strategic opportunities for the company based on financial analysis conducted
- Developed skills using the Microsoft Office programs, including Excel, PowerPoint, Teams, and Word

**CP iPhone Repair** **Hermitage, PA**  
*Founder* *January 2014 – Present*

- Founded business to repair broken iPhones and Apple devices
- Repaired 30+ iPhones over 10 models generating approximately \$600 in profit

**Private Landscaping** **State College, PA**  
*Business Manager and Laborer* *May 2019 – August 2019*

- Started private landscaping business and ran daily operations, including mulching, tree and root removal, raking, trimming bushes and rebuilding a garden

### LEADERSHIP & INVOLVEMENT

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**Penn State Varsity Football Team** **University Park, PA**  
*Member* *September 2018 – October 2020*

- Commit approximately 30 hours per week to training, meetings, film studies, travel, and competitions while maintaining a full course load

**Wall Street Boot Camp** **University Park, PA**  
*Graduate* *January 2018 – May 2018*

- Selected from hundreds of applicants to participate in the 45-member Wall Street training course
- Participated in weekly meetings to learn about careers in Investment Banking and Sales & Trading
- Networked with top Wall Street professionals through weekly interactive presentations

**Penn State Investment Association** **University Park, PA**  
*Member, Consumer Staples Sector* *September 2017 – May 2018*

- Attended weekly analyst meetings to learn various investing topics including cash flow models, company analysis, and trending stocks

**Real Estate Boot Camp** **University Park, PA**  
*Member* *September 2019 – Present*

- Network with top leaders in the real estate industry through panel discussions, mock interviews, and site visits
- Completed ARGUS training course

**Hershey Children's Hospital** **Hershey, PA**  
*Volunteer* *July 2019 – Present*

- Dedicated time to interact with pediatric cancer patients to enhance morale and enable a positive environment

**Feed the Hungry** **Hermitage, PA**  
*Volunteer* *July '15, '16, '18*

- Filled care packages with meals and loaded trucks for transportation to diverse communities in need

### HONORS/SKILLS/INTERESTS

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**Honors:** Schreyer Honors College Academic Excellence Scholarship ('17, '18, '19, '20), Big 10 Distinguished Scholar ('18, '19), Big 10 Academic All-Conference ('18, '19)

**Skills:** Proficient in Microsoft Excel, Learning ARGUS

**Interests:** Stock market, real estate, coding, fishing, archery, piano, travel, snowboarding, weightlifting, boating