

Buying vs. Renting a Home: A Financial Analysis

Andrew Fraser

Markus Linke

Russ Reilly

Justin Rosales

Daniel Rossman

Abbey Staffnik

Mohammed Tarin

Berman Tijerino

Robert Wellman

Prepared in partial fulfillment requirements in CEE 300 – Engineering Business Practices

Dr. Thomas Seager, Instructor

Arizona State University

13 August, 2012

Executive Summary

Salman Khan said, “The single most important video [series] anyone can watch” is his presentation on renting vs. buying a home. Khan explains that, for a given year, it may be better to rent than it is to buy, assuming the houses are similar. However, Khan further explains how the decision to buy or rent could be dominated by the appreciation and depreciation in the value of a house. The housing market is unpredictable without making a few assumptions. The methods used to analyze buying vs. renting were to study a few key data sources. The US Census Bureau publishes median home asking prices for four regions of the US at www.census.gov. The S&P/Case-Shiller Home Price Index presents data on twenty different metro home areas, including Phoenix, AZ. Lastly, www.zillow.com publishes sales data and market estimates for individual houses. This study compares house prices in four different areas in metropolitan Phoenix: central Phoenix, Tempe, Scottsdale, and West Phoenix/Glendale. Using a spreadsheet downloadable from KhanAcademy.org to reduce expected cash flow forecasts to net present value, this analysis recommends buying rather than renting, given an assumed forecast of little to no price appreciation expected in the Phoenix housing market.

Introduction.....	1
Problem Statement.....	2
Assumptions.....	3
Methods.....	6
Discussion and Analysis.....	14
Recommendation.....	18
References.....	19
Appendix.....	20

List of figures

Figure 1.0 – Cash flow diagram for buying a home.....	2
Figure 1.1 – Cash flow diagram for renting a home	3
Figure 2.0 – Median asking rents and sales prices.....	5
Figure 3.0 – Trend of US home prices.....	6
Figure 4.0 – Median sales price of new US homes.....	7
Figure 5.0 – Phoenix S&P/Case-Shiller Home Price Index.....	7
Figure 6.0 – Average home value.	8
Figure 6.1 – Average area of homes in studied areas.....	9
Figure 6.2 – Average payments.....	9
Figure 7.0 – Khan’s modified Excel spreadsheet.....	13
Figure 8.0 – Buy vs. Rent in central Phoenix, 30 year mortgage.....	15
Figure 8.1 – Buy vs. Rent in Scottsdale, 5/1 ARM.....	16
Figure 9.0 – Decision chart.....	17

List of tables

Table 1.0 – Average mortgage rates.....	4
Table 2.0 – Home types and amount of homes studied.....	8
Table 3.0 – Variable list for sample calculations.....	11
Table A.CP – Central Phoenix homes.....	20
Table A.T – Tempe homes.....	20
Table A.S – Scottsdale homes.....	21
Table A.WP – West Phoenix/Glendale homes.....	21

Introduction

The question asked for this report was “Which is cheaper—renting or buying?” Taking into account the current market conditions of real estate in 2012 an in depth analysis was made comparing rental properties to homes for sale in four metropolitan areas of Phoenix, Arizona. The areas were as follows: central Phoenix, Tempe, Scottsdale and West Phoenix/Glendale.

Renters have landlords who charge a monthly fee for staying in their home. The rental agreement is a binding contract between the renter and the landlord, so renters must make periodic payments under the agreement to occupy the home. When renting, the landlord usually carries the cost of maintenance and repair to the building and property, which can be substantial when considering how much it would cost to replace an air conditioner. This is a great benefit to the renter since it is unnecessary to set money aside for maintenance and repair. It is advisable to carry renters insurance on the valuables in the home. Price of rent can fluctuate over time—they can go up and down. Renters have no control over the rent or how much it can change over time. Often times, rental agreements limit on how many changes or improvements are allowed to the home. Usually a security deposit is required to rent a home to protect the landlord from having to make improvements or repairs from damages the renter caused. This security deposit will be returned to the renter upon leaving the home in acceptable shape. An advantage of renting vs. buying is the flexibility of movement. If for whatever reason renters have to move, then renters can simply pack up their belongings and move out without having to sell the home. Another advantage is that renters do not have to worry about depreciation of the house.

If homeowners cannot buy the house outright, then they will most likely have a mortgage. The mortgage is a loan secured by property that requires the borrower to make payments to whoever holds the title of the home. This payment is most likely made up of four parts: the interest on the outstanding loan, principal to pay down the balance of the loan, property taxes, and homeowners insurance. Property taxes are what the responsible municipality charges based on the assessed value of the property and dwelling. Homeowners insurance is required as part of the loan agreement to ensure there is money to pay for replacement or repair in the case of loss. The mortgage can be in the form of a fixed interest rate with payments spread over 15 to 40 years, depending on the signed agreement. Fixed rate loans are also known as conventional loans. Another option is the Adjustable-Rate Mortgage (ARM), which was very popular during the last housing boom. An ARM will start homeowners out with a lower initial interest rate than a conventional loan but can be adjusted periodically depending if it is tied to the London Interbank offered Rate, or LIBOR (“Definitions”). A Federal Housing Administration (FHA) loan does not require as stringent credit qualification or as large a down payment when compared to a conventional loan. As a homeowner with a fixed mortgage, the payments of principal and interest will remain the same for the term of the loan; however the portion

consisting of property taxes and homeowners insurance can fluctuate with time (“What’s in a Mortgage Payment?”).

A benefit of having a mortgage payment is that the paid interest is tax deductible (“Renting vs. Buying a home”). This should only be small factor when deciding to buy a home. The biggest benefit of homeownership is the possibility of the home’s appreciation, which means the home is most likely worth more than the original purchase when homeowners decide to sell. With the appreciation and the paying down of the principal, there should be a net gain over the purchase price. The downfall is when the home’s value depreciates, which means the home is worth less than what the original purchase. Homeowners are responsible for maintaining and repairing the building and property, so important to have money in savings for unexpected repairs.

Problem Statement: Is it more economical to buy or rent a house during the 2012 Third Quarter?

The following figures show cash flow diagrams for buying and renting a home.

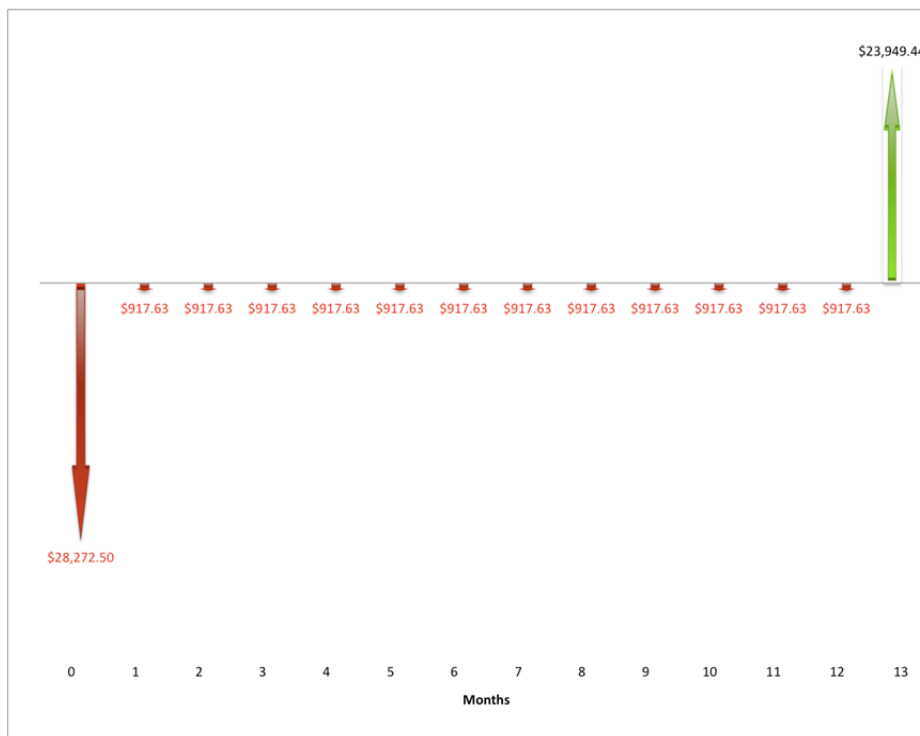


Figure 1.0 – Simple cash flow diagram for buying a home.

Figure 1.0 reflects a one year ownership of a house with a purchase price of \$131,500, 20% down payment, 15 year fixed mortgage rate at 3.09%, 0% appreciation, and assumes the home is sold at the end of the year with a 6% of the sale going to the realtor.

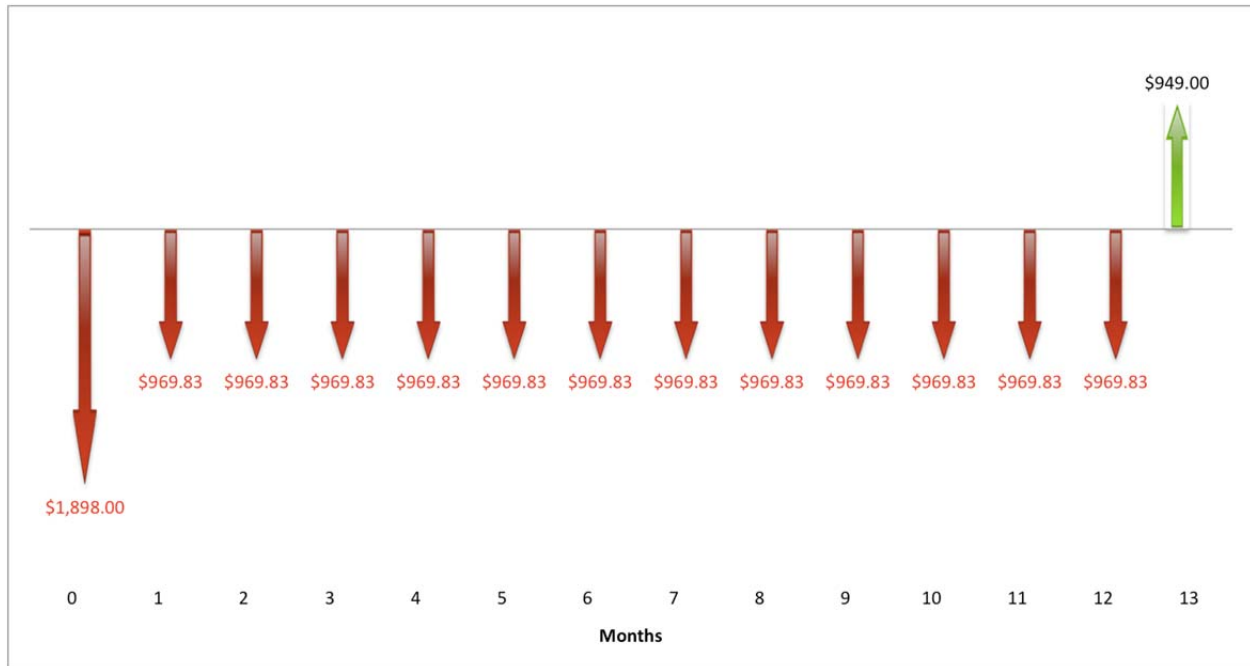


Figure 1.1 – Simple cash flow diagram for renting a home.

Figure 1.1 reflects a one year rental agreement with a monthly rent cost, which includes renters insurance, of \$949, a security deposit of \$949, and assumes a full refund of the security deposit at the end of the rental agreement.

Assumptions

In order to compare buying vs. renting a home a few assumptions must first be made about the prospective buyer/renter. First and foremost, the client is looking for a place to live and intends to live there for at least 5 years. This excludes any client looking at buying a house as an investment rental property. Secondly, it is assumed that the client is in a position to buy a home. That is to say, they have enough cash on hand for a 20% down payment and have a credit score and debt situation that guarantees them a home loan. This client also has a steady stream of income that would qualify them for a first mortgage. This analysis considers a client with secure income, rather than a client that has reason to expect they may lost their job and face home foreclosure due to an inability to make regular mortgage payments..

The report will only look at single-family detached homes. Apartments, duplexes, condominiums, mobile homes, and loft spaces have all been excluded. The analysis will only compare homes that are in move-in ready condition. For the sake of this report, move-in ready is defined as a home that does not require any additional work for prospective buyer/renter. The house does not have any structural deficiencies, does not require painting inside or out, the floors and/or carpet are in good shape and do not need replacement, the appliances and plumbing are in good working order, and the yard has been maintained. There are a number of homes on the

market that are available at a substantial discount but require additional improvements to make the house livable. These have excluded because it is difficult to find rental equivalence and/or estimate the cost of future renovations on these houses.

The report is specific to the greater Phoenix area, focusing on four areas: central Phoenix, West Phoenix and Glendale, Scottsdale, and Tempe. In order to get a representation of each of these areas, sale and rental properties have been analyzed using two, three and four bedroom homes as the base categories provided they meet the move-in ready criteria listed above.

There are additional costs associated with buying a home and those will be defined using the following rates. Mortgage interest rate, maintenance, closing costs, property tax, homeowners insurance, security deposits, renters insurance, appreciation, and depreciation.

While mortgage rates vary from place to place, however this report will use the average rates posted by the Mortgage Bankers Association for August 2012, which is shown in Table 1.0. Maintenance costs range from 1-2% of the home's value, and this report will use an average maintenance cost of 1.5% of the home's value ("Budgeting for Home Maintenance and Repair Costs").

Table 1.0 – Average mortgage rates for August 2012
(http://www.mortgagenewsdaily.com/mortgage_rates/charts.asp?Y=2012&M=8)

30 Year Fixed	3.75%
15 Year Fixed	3.09%
5/1 ARM	2.73%

Closing costs also represent additional expenses typically paid by the purchaser. These costs include "loan origination fees, discount points, appraisal fees, title searches, title insurance, surveys, taxes, deed-recording fees, and credit report charges" among others ("Closing Costs").

Based on research conducted in 2010, closing costs in Arizona average 1.5% of the homes selling price. This number will be used for all calculations in this report and is paid at the same time as the purchase of the home ("Closing costs averages comparison: Arizona").

Property tax rates vary greatly depending on location. The tax rate used in this report is based on the average rate for Maricopa County for a home's estimated fair market value, which is 0.55%. For this report, property taxes are paid at the end of the year ("Maricopa County Average Property Tax").

As of March 2012, the average Arizona homeowners insurance is \$617.00 per year, or \$51.42 per month ("Arizona Homeowners Insurance Quotes"). The main components of homeowners insurance are the dwelling, contents or personal property, and loss of use. Some

other components of homeowners insurance are other structures, such as garages or sheds, and medical payments. The \$51.42 per month cost is assumed throughout the analysis.

Security deposit is a refundable deposit paid by a renter up front to cover any potential damage to the home. These can vary depending on the house and landlord, but for this report security deposits will be equal to one month's rent, and the renter receives the entire security deposit at the end of the agreement.

The average Arizona renters insurance is about \$200.00 per year, or \$16.67 per month ("Arizona Renters Insurance"). Renters insurance can compensate for the replacement cost of damaged personal property. The \$16.67 per month cost is assumed throughout the analysis.

It is assumed that the prospective renters would be required to pay for all utilities on their own. Therefore, monthly utility costs are the same for a renter or buyer, and thus have been excluded from this report. Additionally, only 20% of homes in the United States belong to homeowners associations and their fees vary greatly, so they have been excluded from this report ("The Horror of Homeowners' Associations").

Another assumption made throughout this analysis is the homeowner sells the home after a certain time. The time horizons assumed throughout ownership are one, three, five, ten, fifteen, twenty, twenty-five, and thirty years. Unlike when the renter receives the entire security deposit at the end of the agreement, the seller does not receive the entire down payment when the home is sold because the realtor collects 6% commission ("3 ways to pay lower real-estate commissions").

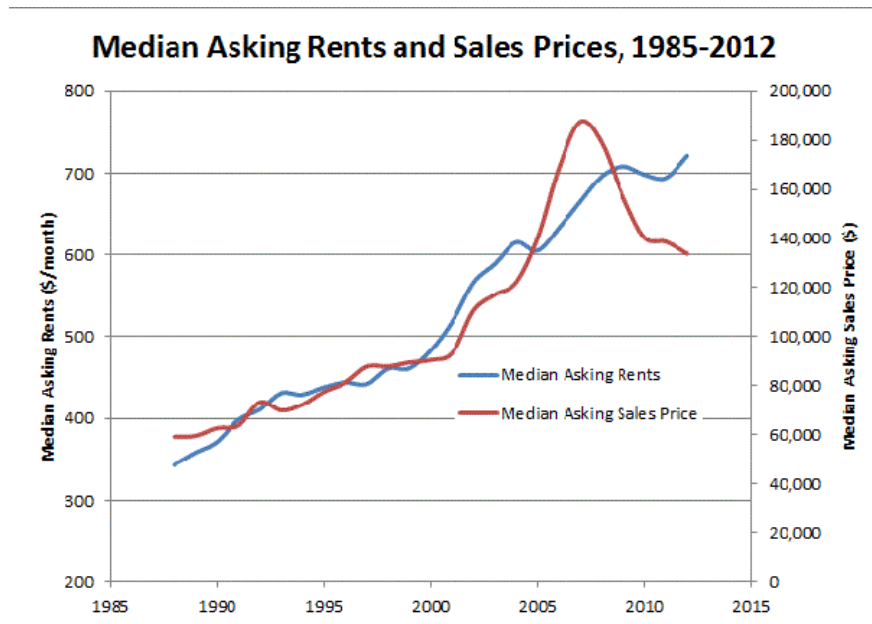


Figure 2.0 – Median asking rents and sales prices
(<http://sustainableengineeringsystems.com/2012/07/24/renting-vs-buying-a-home/>).

Figure 2.0 compares median renting price and median sales price of homes. The figure shows a steady increase of renting price and a drop of home price in recent years. Since renting and buying prices have been trending in opposite directions, the “Assumed rental inflation” will be different from “Assumed annual appreciation” in the modified Khan spreadsheet. The “Assumed rental inflation” will remain positive, while the “Assumed annual appreciation” will fluctuate between positive and negative values, which represent appreciation and depreciation in the housing market. Further detail of the modified Khan spreadsheet is given in the Methods section.

The crux of this study is the appreciation or depreciation of a home’s value. Figure 3.0 shows the trend of home prices in the United States. The positive trend lines indicate there is an overall upward trend in home asking prices.

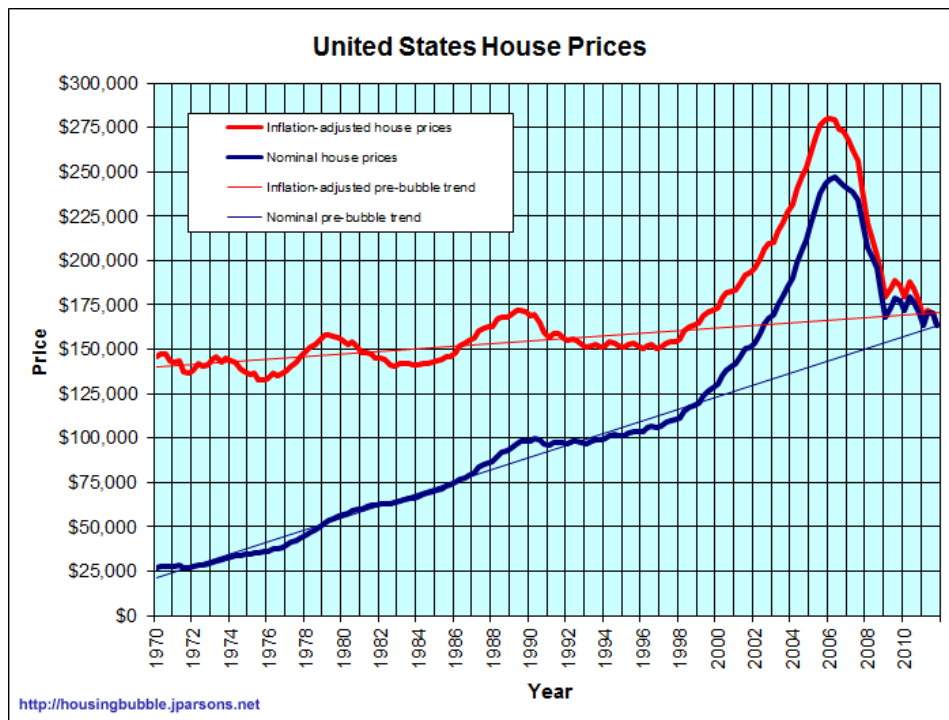


Figure 3.0 – Trend of United States house prices from 1970 to 2012 (<http://jparsons.net/housingbubble/>).

Methods

There were a few key data sources used throughout this study. The first key data source was the United States Census Bureau (www.census.gov), which focuses on four regions—West, Midwest, Northeast, and South. This analysis uses the US Census Bureau’s collected data on the median price of new homes sold in the four regions. The median price was used to avoid studying homes that were underpriced or overpriced. Figure 4.0 shows the median sale prices of new homes from 1963 to 2010.

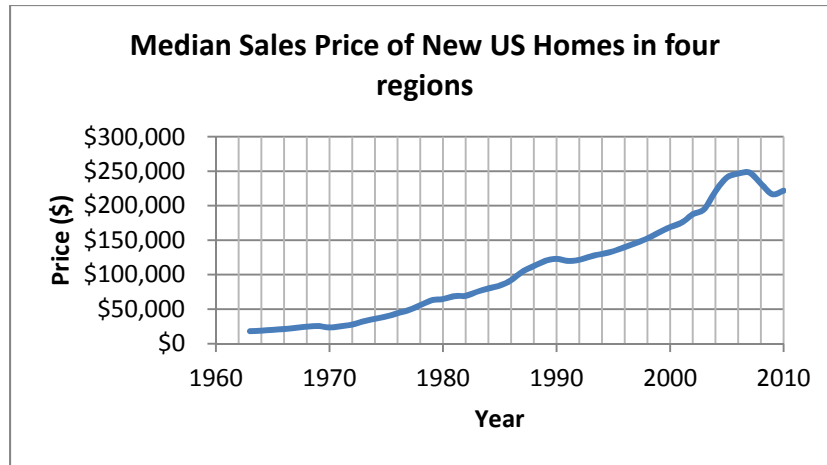


Figure 4.0 – The median sales price of new US homes in four regions (“Median and Average Sales Prices of New Homes Sold in United States”).

Another website used was the S&P/Case-Shiller Home Price Index (<http://www.standardandpoors.com/indices/sp-case-shiller-home-price-indices/en/us/?indexId=spusa-cashpidff--p-us---->). The S&P/Case-Shiller Home Price Index focused on twenty metro areas, which shrunk the housing market. Phoenix is one of the metro areas, and Figure 5.0 shows the Home Price Index trend from 1989 to 2012. Higher Home Price Indices suggest the affordability of homes. Homes are easier to purchase when the Home Price Index is low and harder to purchase when the Home Price Index is high. From Figure 5.0, homes are more affordable in the past few years, but were not as affordable during 2005 – 2007.

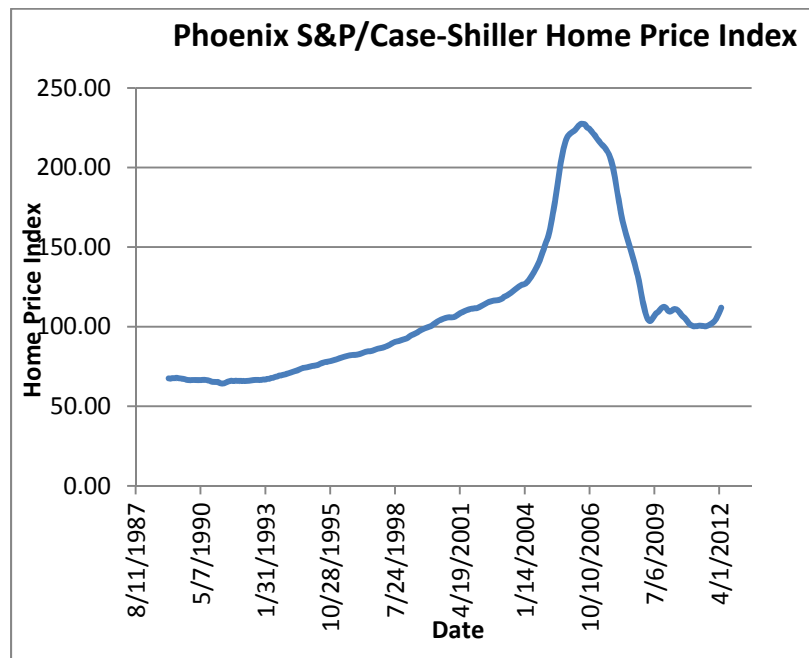


Figure 5.0 – The S&P/Case-Shiller Home Price Index from January 1989 to May 2012.

The final website was www.zillow.com, which allows anyone to look up the value of any home in the United States. This website focused on individual homes in four different areas—central Phoenix, Tempe, Scottsdale, and West Phoenix/Glendale. A range of home types determined the search criteria in Zillow and information was gathered for three of each home type. Table 2.0 shows the range of home types studied using Zillow. Figures 6.0 – 6.2 show the information obtained from www.zillow.com in all four areas.

Table 2.0 – The home types and amount of homes studied in Zillow

Home Type	Number of homes studied in area			
	Central Phoenix	Tempe	Scottsdale	West Phoenix/Glendale
2 bed, 1 bath	3	3	0	3
2 bed, 2 bath	0	0	2	0
2 bed, 2.5 bath	0	0	1	0
3 bed, 2 bath	3	3	3	3
4 bed, 2 bath	0	2	0	1
4 bed, 2.5 bath	3	1	0	2
4 bed, 3 bath	0	0	2	0
4 bed, 3.5 bath	0	0	1	0

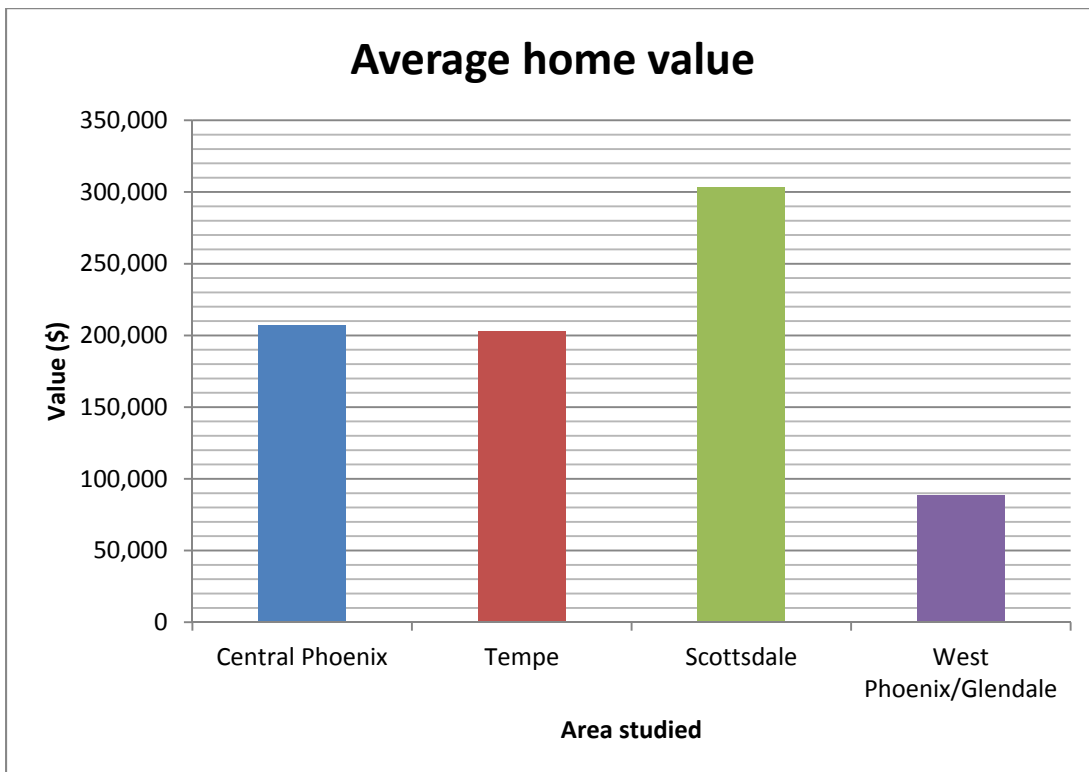


Figure 6.0 – Average home value

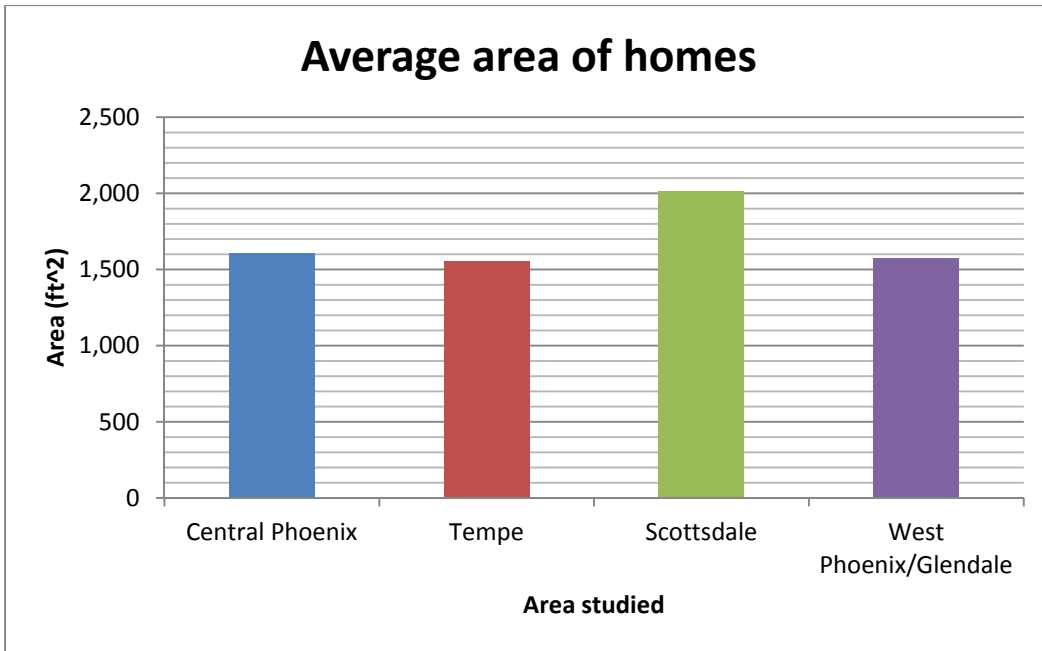


Figure 6.1 – Average area (ft²) of homes

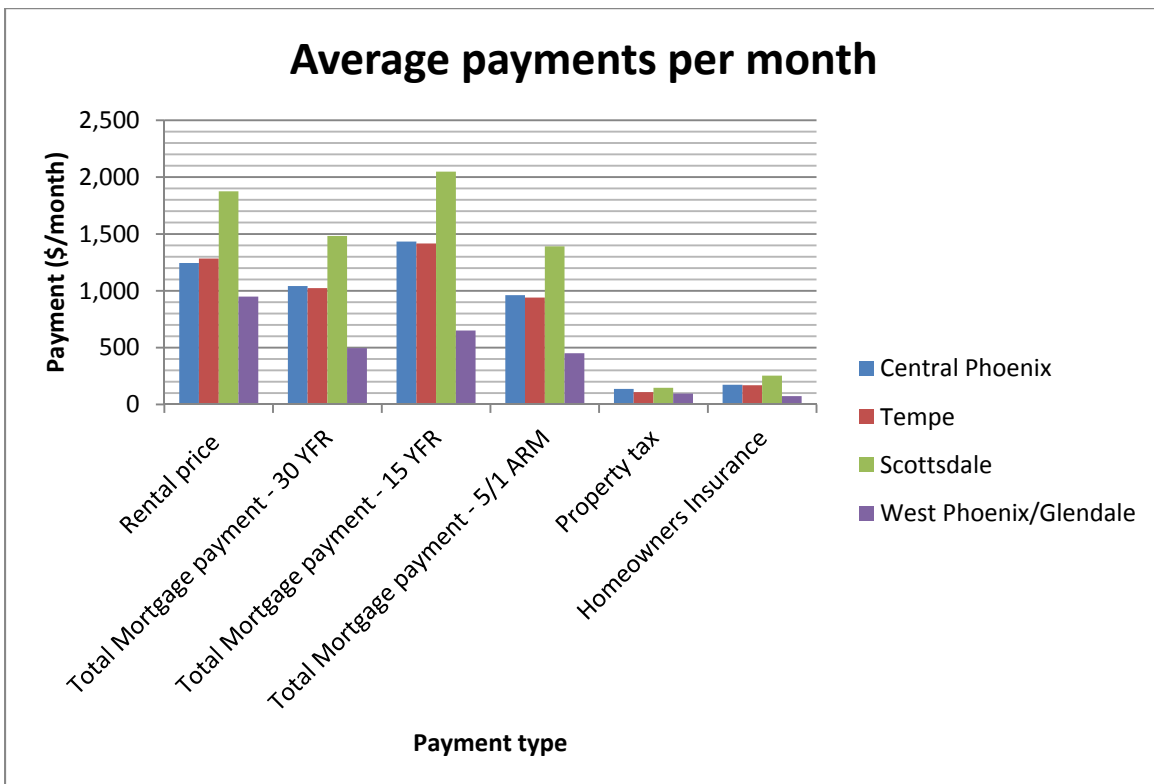


Figure 6.2 – Average payments of homes

Salman Khan's video series, "[Renting vs. Buying a home.](#)" includes an extremely useful Excel spreadsheet that was used in this analysis. Figure 7.0 shows a screenshot of the modified version of Khan's "buyrent" spreadsheet with the calculated averages and assumptions taken from Table A.CP – Central Phoenix homes, which is found in the Appendix section. The highlighted values are the important ones in the spreadsheet, and these values were manipulated to test different scenarios. In Figure 7.0, a 30 year fixed mortgage rate of 3.75% was used per Table 1.0. The assumed property tax rate of 0.55%, annual homeowners and renters insurance, annual maintenance costs of 1.5% of the home's value, marginal income tax rate, annual cash return due to money saved by renting, and negligible homeowners association fee were also assumed from online research. In Khan's video, he assumes a general inflation rate of 2%, which is what Figure 7.0 shows.

The "Assumed annual appreciation" and "Assumed rental price inflation" are theoretical values because it is impossible to predict whether homes will appreciate or depreciate. As mentioned in the Assumptions section, these two values will be different based on Figure 2.0. Negative values in those cells indicate depreciation, and positive values indicate appreciation. Figure 7.0 shows negative values to indicate buying can still be better than renting even though the home depreciates. The time horizon and mortgage rate are important factors that determine when buying is no longer better than renting. Khan's "buyrent" spreadsheet is available to download at <http://www.khanacademy.org/downloads/buyrent.xls>, and individuals can follow the same process outlined in Figure 7.0.

As was previously stated, there was a wide range of assumed housing and finance variables that were used to complete the report. Assumptions that are in the form of numerical values (i.e. interest rates, property taxes, inflation) are used to calculate important components that help shape an answer to the rent versus buy question. Khan's "buyrent" spreadsheet stores and calculates these values so that they could be easily compared and analyzed. The following analysis shows the equations and variables that were used to calculate a several components after 120 months for the \$ 131,500 home located in central Phoenix, assuming a 30 year fixed mortgage. The rest of the sample calculations can be found in the Appendix section.

Table 3.0 – Variable list for sample calculations.

Variable	Description	Units	Assumed/Calculated/Given
P	purchase price	\$ - US dollars	given
P _{down}	down payment	\$ - US dollars	calculated
P _{maint.}	annual maintenance payment	\$/year - US dollars per year	assumed
P _{insurance1}	initial monthly insurance payment	\$/year - US dollars per year	assumed
P _{insurance2}	current insurance payment, adjusted for inflation	\$ - US dollars	calculated
P _{mortgage1}	initial monthly mortgage payment	\$/month - US dollars per month	assumed
P _{mortgage2}	current mortgage payment, adjusted for inflation	\$ - US dollars	calculated
P _{property}	monthly property tax payment	\$/month - US dollars per month	calculated
r _{down}	required min. down payment rate	% - percent	assumed
r _{property}	property tax rate	% - percent	assumed
r _{app./dep.}	annual appreciation/depreciation rate	% - percent	assumed
r _{income}	marginal income tax rate	% - percent	assumed
r _{inflation}	inflation rate	% - percent	assumed
r _{rent}	rate of rental price appreciation or depreciation	% - percent	assumed
r _{return}	rate of return on cash (renting)	% - percent	assumed
V _{home}	value of home at time t	\$ - US dollars	calculated
i	interest rate	% - percent	assumed
t	time	years	assumed
m	number of compounding subperiods	months	given
Debt	amount of debt in current month	\$ - US dollars	calculated
D _{previous}	amount of debt in previous month	\$ - US dollars	calculated
D _{interest}	portion of mortgage paid to interest on debt	\$ - US dollars	calculated
S _{income}	savings on income tax	\$ - US dollars	calculated
C _{inflow}	renter cash inflow that can be used on home expenses	\$ - US dollars	calculated
P _{rent1}	initial amount of rent payment	\$/month - US dollars per month	assumed
P _{rent2}	current rent payment adjusted for appreciation or depreciation	\$ - US dollars	calculated
S _{rent}	savings when renting	\$ - US dollars	calculated
PV	present value	\$ - US dollars	calculated

Down Payment

$$P_{down} = r_{down} \times P$$

$$P_{down} = 0.2 \times 131,500$$

$$P_{down} = \$26,300$$

Monthly Mortgage Payment

$$P_{mortgage} = (P - P_{down}) \times \frac{\frac{i}{m} \left(1 + \frac{i}{m}\right)^{mt}}{\left(1 + \frac{i}{m}\right)^{mt} - 1}$$

$$P_{mortgage} = (131,500 - 26,300) \times \frac{\frac{0.0375}{12} \left(1 + \frac{0.0375}{12}\right)^{12 \times 30}}{\left(1 + \frac{0.0375}{12}\right)^{12 \times 30} - 1}$$

$$P_{mortgage} = \$487.20$$

Home Value

$$V_{home} = P \left(1 - \frac{r_{dep.}}{m}\right)^{mt}$$

$$V_{home} = 131,500 \left(1 - \frac{0.0298}{12}\right)^{12 \times 10}$$

$$V_{home} = \$97,576$$

Debt

$$Debt = D_{previous} \left(1 + \frac{i}{m}\right) - 485$$

$$Debt = 82,726 \left(1 + \frac{0.0375}{12}\right) - 485$$

$$Debt = \$82,500$$

Equity in Home

$$Equity\ in\ Home = V_{home} - Debt$$

$$Equity\ in\ Home = 97,576 - 82,500$$

$$Equity\ in\ Home = \$15,076$$

Interest on Debt

$$D_{interest} = D_{previous} \left(\frac{i}{m}\right)$$

$$D_{interest} = 82,726 \left(\frac{0.0375}{12}\right)$$

$$D_{interest} = \$258.52$$

Paid Principal

$$Paid\ Principal = P_{mortgage} - D_{interest}$$

$$Paid\ Principal = 485 - 258.52$$

$$Paid\ Principal = \$226.48$$

parenthesis, and negative values favor renting a home. Another key assumption in Khan's "buyrent" spreadsheet is that the home is sold after a certain number of years. In Figure 7.0, the home is sold after ten years of ownership.

Discussion and Analysis

From Figure 6.0, the home value will vary greatly depending on the area. Central Phoenix and Tempe homes are comparable at \$200,000.00, but Scottsdale homes are nearly \$100,000.00 more expensive and West Phoenix/Glendale homes are more than \$100,000.00 cheaper than central Phoenix and Tempe homes. Similarly, renting central Phoenix and Tempe homes are comparable at \$1,200.00 per month, but Scottsdale homes are nearly \$600.00 more expensive per month and West Phoenix/Glendale homes are about \$300.00 cheaper per month than central Phoenix and Tempe homes.

After modifying Khan's "buyrent" spreadsheet to fit the assumptions and averages calculated throughout the report, buying a home in any of the four studied is better than renting a home at a 30 year 3.75% fixed rate through fifteen years of ownership as long as there is little to no appreciation. Even if there is some depreciation, buying a home in most of the areas is still the cheaper option.

Home purchase model	
Purchase price	206822.22
Downpayment	41364.444
Interest rate	3.75%
Principal amortization (years)	30
Property tax rate	0.55%
Annual maintainance	3102.3333
Housing association dues (annual)	0
Annual insurance	617
Assumed annual appreciation	-2.03%
Assumed marginal income tax rate	33%
General inflation	2%
Monthly mortgage payment	762.73
Cost of renting similar home	1261.67
Assumed rental price inflation	3.00%
Assumed annual (after tax) return on cash	1%
Month	0
Savings when renting	41,364
Home value after 15 years	152,490
Debt after 15 years	106,220
Home Equity after 15 years	46,271
Transaction costs of selling in year 15	9,149
Net cash if home sold in 15 years (assuming no capital gains)	37,121
Savings after 15 years if renting	20,365
Present value benefit of owning vs. renting for 15 years	12,450

Figure 8.0 – Buy vs. rent in central Phoenix with 30 year fixed mortgage

Figure 8.0 shows the results of modifying Khan’s “buyrent” spreadsheet to show buying a home in central Phoenix is better than renting after fifteen years of ownership, provided that the home is sold at the end of the fifteenth year. Figure 8.0 also shows that the home depreciations at a rate of 2.03%, but buying is still better than renting.

Home purchase model	
Purchase price	303166.67
Downpayment	60633.334
Interest rate	2.73%
Principal amortization (years)	5
Property tax rate	0.55%
Annual maintainance	4547.5001
Housing association dues (annual)	0
Annual insurance	617
Assumed annual appreciation	-2.28%
Assumed marginal income tax rate	33%
General inflation	2%
Monthly mortgage payment	4253.05
Cost of renting similar home	1891.23
Assumed rental price inflation	3.00%
Assumed annual (after tax) return on cash	1%
Month	0
Savings when renting	60,633
Home value after 5 years	270,474
Debt after 5 years	4,874
Home Equity after 5 years	265,599
Transaction costs of selling in year 5	16,228
Net cash if home sold in 5 years (assuming no capital gains)	249,371
Savings after 5 years if renting	226,994
Present value benefit of owning vs. renting for 5 years	20,267

Figure 8.1 – Buy vs. rent in Scottsdale with 5/1 ARM

Figure 8.1 shows the results of modifying Khan’s “buyrent” spreadsheet to show buying a home in Scottsdale at a 5/1 ARM is better than renting after five years of ownership, provided that the home is sold at the end of the fifth year. The lightly blue highlighted cell indicates a net present value of about +\$20,267 when buying a home instead of renting. The home depreciates at 2.28%, yet buying is still better.

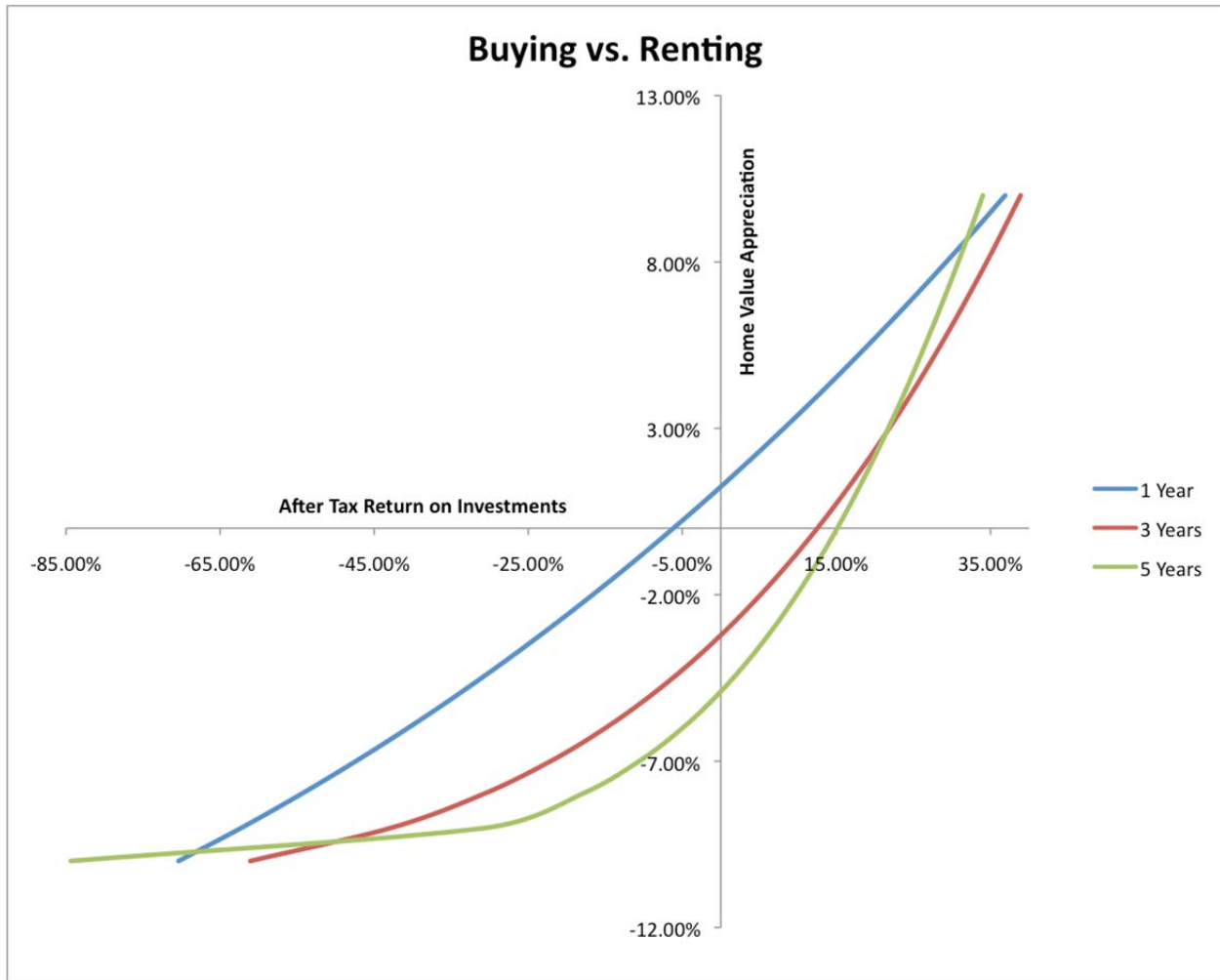


Figure 9.0 – Buy vs. rent decision chart

Figure 9.0 shows three lines representing prospective buying vs. renting years—one, three, and five. If more prospective years, such as ten, fifteen, or thirty, were added then the lines would continue to move right. The rates represented on the x and y axes are annual rates. Any point above a line represents a buy scenario, and any point below represents a rent scenario. Any point on the line is an even choice—either buy or rent and receive the same amount of money when selling or moving out. For example, if an individual is considering buying a home for five years, and the housing market is appreciating at 1%, then the individual should feel confident in buying the home instead of renting because the point is above the five year line. The large discrepancy between rental price and monthly mortgage payment accounts for the good buying market.

Recommendation

Khan's "buyrent" spreadsheet can be modified infinitely many times to fit infinite situations, but ultimately individuals should feel confident about buying than renting a home, provided the home is sold in after ownership and there is little to no appreciation. Figure 9.0 suggests buying is a much better option because if there is no after tax return on investments, then owning a home that is depreciating at ~5% is more cost efficient than renting the same home.

References

- “3 ways to pay lower real-estate commissions.” MSN Real Estate, 2012. Web. 10 Aug. 2012. <<http://realestate.msn.com/article.aspx?cp-documentid=13108435>>.
- “Arizona Homeowners Insurance Quotes.” HomeInsurance.com, LLC., 2012. Web. 7 Aug. 2012. <<http://homeinsurance.com/Arizona/homeowners-insurance.php>>.
- “Arizona Renters Insurance.” InsureMyHouse.com, 2012. Web. 7 Aug. 2012. <<http://www.insuremyhouse.com/renters-insurance-arizona.html>>.
- “Best Savings Accounts.” MoneyRates.com, 2012. Web. 7 Aug. 2012. <<http://www.money-rates.com/savings.htm>>.
- “Budgeting for Home Maintenance and Repair Costs.” Intuit, Inc., 2012. Web. 6 Aug. 2012. <<http://www.mint.com/blog/goals/home-repair-02022011/>>.
- “Closing Costs.” Investopedia US, Inc., 2012. Web. 4 Aug. 2012. <<http://www.investopedia.com/terms/c/closingcosts.asp#axzz22jTBmOwo>>.
- “Closing costs comparison: Arizona.” Bankrate, Inc., 2012. Web. 4 Aug. 2012. <<http://www.bankrate.com/brm/news/mortgages/ccArizona.asp>>.
- “Definitions.” BBA Enterprises Ltd. and BBA LIBOR Ltd., 2012. Web. 7 Aug. 2012. <<http://www.bbalibor.com/bbalibor-explained/definitions>>.
- “Federal Tax Brackets.” Money Chimp, 2012. Web. 7 Aug. 2012. <http://www.moneychimp.com/features/tax_brackets.htm>.
- “Inflation-adjusted house prices.” JP’s Real Estate Charts, 2012. Web. 6 Aug. 2012. <<http://jparsons.net/housingbubble/>>.
- “Maricopa County Average Property Tax.” Tax-Rates.org, 2012. Web. 4 Aug. 2012. <http://www.tax-rates.org/arizona/maricopa_county_property_tax>.
- “Renting vs. Buying a home.” Khan Academy, 2012. Web. 1 Aug. 2012. <<http://www.khanacademy.org/finance-economics/core-finance/v/renting-vs--buying-a-home>>.
- “The Horror of Homeowners’ Associations.” Gawker Media, 2011. Web. 4 Aug. 2012. <<http://gawker.com/5830257/the-horror-of-homeowners-associations>>.
- “What’s in a Mortgage Payment?” Mortgage Bankers, Assn., 2012. Web. 7 Aug. 2012. <<http://www.homeloanlearningcenter.com/MortgageBasics/WhatsinaMortgagePayment.htm>>.

Appendix

Table A.CP – Central Phoenix homes

Home type	Area (ft ²)	Home value (\$)	Rental price (\$/month)	Total Mortgage payment (\$/month)	30 Year* (\$/month)	15 Year* (\$/month)	5/1 ARM* (\$/month)	Property tax (\$/month)	Homeowners Insurance (\$/month)
2 bed, 1 bath	796	131500	949	703	466	715	415	128	110
2 bed, 1 bath	847	139900	954	741	496	761	442	128	117
2 bed, 1 bath	948	125000	874	614	443	680	395	67	104
3 bed, 2 bath	1440	170000	1222	887	603	925	537	142	142
3 bed, 2 bath	1458	142000	1167	743	504	773	449	121	118
3 bed, 2 bath	1815	249000	1169	1207	883	1355	786	117	208
4 bed, 2.5 bath	2274	385000	1983	1934	1365	2095	1216	248	321
4 bed, 2.5 bath	2070	240000	1454	1199	851	1306	758	148	200
4 bed, 2.5 bath	2800	279000	1433	1348	990	1519	883	126	233
Averages:	1605	206822	1245	1042	733	1125	653	136	172

* Based on 20% down, excludes taxes and ins

Total Mortgage Payment (30 Year) = Loan+Property Taxes+Homeowners Insurance

Homeowners insurance 1% of value

Table A.T – Tempe homes

Home type	Area (ft ²)	Home value (\$)	Rental price (\$/month)	Total Mortgage payment (\$/month)	30 Year* (\$/month)	15 Year* (\$/month)	5/1 ARM* (\$/month)	Property tax (\$/month)	Homeowners Insurance (\$/month)
2 bed, 1 bath	1,050	106,582	930	515	380	581	339	46	89
2 bed, 1 bath	1,201	85,000	986	456	305	463	271	81	71
2 bed, 1 bath	792	70,000	821	563	443	680	395	61	58
3 bed, 2 bath	1,862	179,000	1,406	915	642	976	571	124	149
3 bed, 2 bath	1,098	116,400	1,159	564	417	635	371	50	97
3 bed, 2 bath	1,650	225,000	1,254	2,432	804	1,227	714	1,440	188
4 bed, 2 bath	2,118	245,000	1,477	1,231	878	1,336	781	148	204
4 bed, 2 bath	1,536	148,000	1,154	1,422	531	808	472	768	123
4 bed, 2.5 bath	2,659	649,900	2,373	3,141	2,322	3,544	2,061	278	542
Averages:	1,552	202,765	1,284	1,024	747	1,139	664	108	169

* Based on 20% down, excludes taxes and

Total Mortgage Payment (30 Year) = Loan+Property Taxes+Homeowners Insurance

Homeowners insurance 1% of value

Table A.S – Scottsdale homes

Home type	Area (ft ²)	Home value (\$)	Rental price (\$/month)	Total Mortgage payment (\$/month)	30 Year* (\$/month)	15 Year* (\$/month)	5/1 ARM* (\$/month)	Property tax (\$/month)	Homeowners Insurance (\$/month)
2 bed, 2 bath	1,026	80,800	993	427	289	440	225	71	67
2 bed, 2 bath	1,335	154,900	1,351	794	554	844	849	111	129
2 bed, 2.5 bath	1,178	219,900	1,324	1,067	786	1,199	694	98	183
3 bed, 2 bath	1,898	235,000	1,386	1,129	840	1,281	742	93	196
3 bed, 2 bath	2,331	410,000	2,320	1,916	1,466	2,235	1,294	108	342
3 bed, 2 bath	2,094	289,000	1,863	1,417	1,033	1,575	912	143	241
4 bed, 3 bath	3,106	524,000	2,863	2,550	1,873	2,857	1,650	240	437
4 bed, 3.5 bath	2,242	364,900	1,991	1,774	1,304	1,989	1,149	166	304
4 bed, 3 bath	2,928	450,000	2,780	5,353	1,608	2,435	1,417	3,370	375
Averages:	2,015	303,167	1,875	1,482	1,084	1,651	992	146	253

* Based on 20% down, excludes taxes and ins

Total Mortgage Payment (30 Year) = Loan+Property Taxes+Homeowners Insurance

Homeowners insurance 1% of value

Table A.WP – West Phoenix/Glendale homes

Home type	Area (ft ²)	Home value (\$)	Rental price (\$/month)	Total Mortgage payment (\$/month)	30 Year* (\$/month)	15 Year* (\$/month)	5/1 ARM* (\$/month)	Property tax (\$/month)	Homeowners Insurance (\$/month)
2 bed, 1 bath	1,188	80,000	831	440	286	436	255	87	67
2 bed, 1 bath	520	40,000	759	246	143	218	127	70	33
2 bed, 1 bath	1,019	84,000	778	498	301	458	268	127	70
3 bed, 2 bath	1,710	124,900	988	658	447	680	399	107	104
3 bed, 2 bath	1,925	97,000	1,094	1,568	347	528	310	1,140	81
3 bed, 2 bath	1,882	144,900	1,071	754	518	789	462	115	121
4 bed, 2.5 bath	2,099	70,000	1,026	391	250	381	223	83	58
4 bed, 2 bath	1,892	89,900	995	487	321	490	287	91	75
4 bed, 2.5 bath	1,913	64,900	997	458	323	354	207	81	54
Averages:	1,572	88,400	949	495	326	482	282	95	74

* Based on 20% down, excludes taxes and ins

Total Mortgage Payment (30 Year) = Loan+Property Taxes+Homeowners Insurance

Homeowners insurance 1% of value

Insurance Payment

$$P_{insurance2} = \frac{P_{insurance1}}{m} \left(1 + \frac{r_{inflation}}{m}\right)^{mt}$$
$$P_{insurance2} = \frac{617}{12} \left(1 + \frac{0.02}{12}\right)^{12 \times 10}$$
$$P_{insurance2} = \$62.79$$

Maintenance Payment

$$P_{maintenance2} = \frac{P_{maintenance1}}{m} \left(1 + \frac{r_{inflation}}{m}\right)^{mt}$$
$$P_{maintenance2} = \frac{1972.5}{12} \left(1 + \frac{0.02}{12}\right)^{12 \times 10}$$
$$P_{maintenance2} = \$200.73$$

Property Tax Payment

$$P_{property} = V_{home} \times \frac{r_{property}}{m}$$
$$P_{property} = 97,576 \times \frac{0.0055}{12}$$
$$P_{property} = \$44.72$$

Income Tax Savings

$$S_{income} = r_{income} (P_{property} + D_{interest})$$
$$S_{income} = 0.28(44.72 + 258.52)$$
$$S_{income} = \$84.91$$

Total Cash Outflow (Buying)

$$Total\ Cash\ Outflow = P_{mortgage} + P_{insurance2} + P_{maintenance2} + P_{property} - S_{income}$$

$$Total\ Cash\ Outflow = 485 + 62.79 + 200.73 + 44.72 - 84.91$$

$$Total\ Cash\ Outflow = 708.33$$

Renter Cash Inflow

$$C_{inflow} = \text{Total Cash Outflow}$$

$$C_{inflow} = \$708.33$$

Rent

$$P_{rent2} = P_{rent1} \left(1 + \frac{r_{rent}}{m}\right)^{mt}$$

$$P_{rent2} = 965 \left(1 - \frac{0.0298}{12}\right)^{12 \times 10}$$

$$P_{rent2} = \$716.06$$

Savings When Renting

$$S_{rent} = S_{previous} \left(1 + \frac{r_{rent}}{m}\right)^{mt} + (C_{inflow} - P_{rent2})$$

$$S_{rent} = 9,199 \left(1 + \frac{0.01}{12}\right)^{12 \times 10} + (708.33 - 716.06)$$

$$S_{rent} = \$9,198$$

Net Cash if Home is Sold in 10 Years

$$\text{Net Cash} = \text{Home equity} - \text{Transaction Cost}$$

$$\text{Net Cash} = 15,076 - 6,797$$

$$\text{Net Cash} = 8,279$$

Present Value

$$PV = S_{rent} - \text{Net Cash}$$

$$PV = 9,198 - 8,279$$

$$PV = \$919$$