The Relationship between Household's Risk Preference and the Homeownership Decisions among Young Adults in Changing Housing Market Conditions

by

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B.B.A., Eastern New Mexico University, 2004
M.B.A., Eastern New Mexico University, 2008

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirement for the degree

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Abstract

For many decades, the American Dream of homeownership has been a source of pride and one of the traditional ways to improve financial and non-financial well-being for American households. However, during the recent housing crisis, millions of homeowners lost their homes or experienced negative home equity due to job loss, reductions in work hours, or a decline in home values. The recent housing crisis made many individuals and families rethink their American Dream. As with most investments, there are some risks associated with owning a home, especially when housing markets are volatile and the economy is uncertain. Understanding the relationship between household's risk preference and homeownership decisions may help households make better and more informed decisions regarding their housing tenure choice. This study investigates the relationship between household's risk preference and homeownership decisions among young adults made during the stability in the housing market, which occurred around 1993, and during the decline in the housing market, which occurred around 2010. This study also examined demographic and economic characteristics of homeowners during those periods.

Two separate datasets from the National Longitudinal Study of Youth 1979 and the National Longitudinal Study of Youth 1997 were utilized to address research questions and research hypotheses under the lens of the expected utility theory. The results showed shifts in household's rick preferences, homeownership rates, and demographic and economic characteristics between periods. Compared to households who preferred lowest risk level, households who preferred highest risk level were more likely to own a home in both periods. The relationships between household's risk preference and homeownership decisions did not change between periods. However, some relationships between household's demographic and economic characteristics and homeownership decisions changed between periods.

The findings of this study have several important implications for potential homebuyers, lenders, and personal financial planning practitioners. Household's risk preference, as well as demographic and economic characteristics, should be considered during the home purchase process. The findings also expand the literature on expected utility theory, household's risk preference, and homeownership research areas.

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Approved by:

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Martin C. Seay, Ph.D.

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List of Definitions

Risk Preference: The tendency to choose a risky or safe option given possible outcomes.

Homeownership: A form of residential housing tenure where the resident owns the home instead of renting.

Demographic Characteristics: Gender, race, marital status, presence of children, education, parent's education, geographic region, living area.

Economic Characteristics: Employment status, income, savings, investment, student loan.

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I would like to thank my major professor, Dr. Martin Seay, for his guidance in my Ph.D. pursuit, especial in my dissertation works. He is an outstanding researcher in the fields of personal financial planning and homeownership. I would like to thank my dissertation committee members, faculties, and staff of the Institute of Personal Financial Planning at Kansas State University. Most importantly, I want to thank my family for their support throughout the years of my American higher education dream.

Dedication

To my parents, who spent their entire lives to make the lives of their children better in difficult times.

To my wife and my children, who gave me love, motivation, and energy every day to work on this Ph. D. program.

Preface

Everything we do in life or everyday involves in some levels of risks. Risk and risk preference have been fascinating subjects in research. How risk preference affects homeownership decisions is even a more fascinating topic and is worth pursuing no matter how challenging it is.

Chapter 1 - Introduction

> *"We can put light where there's darkness, and hope where there's despondency in this country. And part of it is working together as a nation to encourage folks to own their own home."* President George W. Bush, June 17, 2002.

> *"One of the great successes of the United States in this century has been the partnership forged by the National Government and the private sector to steadily expand the dream of homeownership to all Americans."* President Bill J. Clinton, June 5, 1995.

Expanding homeownership in America has been the goal and a popular policy of several presidents, including former presidents Bill J. Clinton and George W. Bush (Shlay, 2006). For the first time in U.S. history, in 2004, homeownership rates exceeded 69% nationwide (U.S. Census Bureau, 2016). The government saw homeownership as a way to reduce housing discrimination, build an ownership society, and give everyone a stake in the American Dream (Norberg, 2012). The housing market was a major source of jobs, growing source of home equity, and significant channel for monetary policy of the economy (Case, Shiller, & Thompson, 2012). Figure 1.1 shows homeownership rates by type of family for the United States from 1982-2014. At the individual level, making homeownership decisions is often complex and involves a number of factors for most households (Cronqvist, Münkel, & Siegel, 2014; Haurin, Hendershott, & Hoesli, 2015). For young households in particular, making homeownership decisions is one of the most difficult and most important decisions that have long-term benefits and consequences on their financial and nonfinancial wealth. Clearly, homeownership is a major interest of the American society and worthy of study.

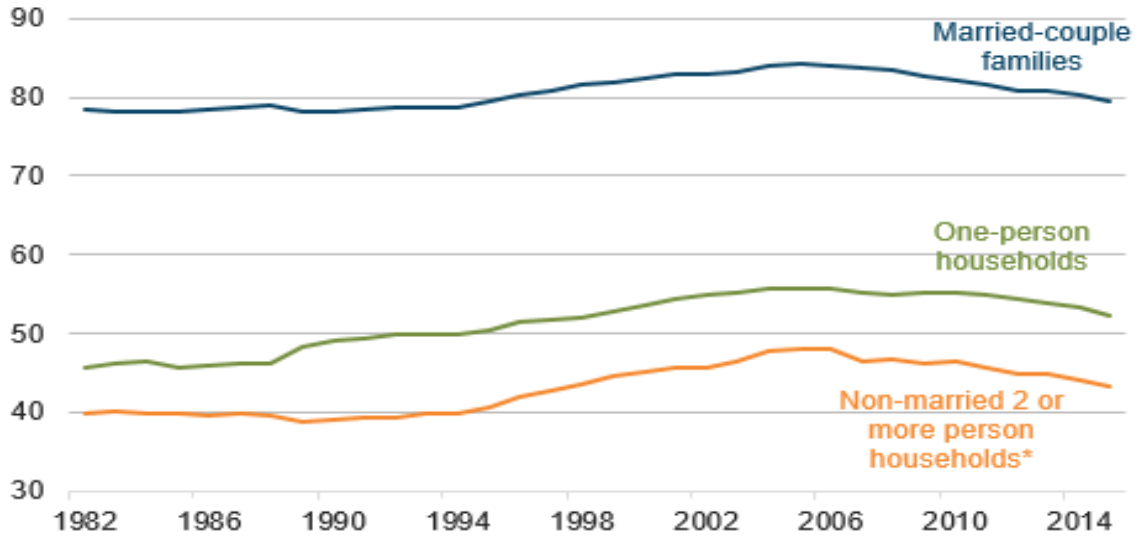

Figure 1.1. Homeownership Rates by Type of Family. Source: Housing Vacancy Survey/Current Population Survey. Https://www.census.gov/programs-surveys/ahs.html.

Statement of Problem

Traditionally, homeownership has been recognized as a primary indicator of a household's economic well-being. In the early 1990s, owner-occupied housing in America created the largest single source of financial wealth (DiPasquale & Wheaton, 1994). Home equity represented the largest share of the balance sheets for households of all income levels (Grinstein-Weiss, Key, Guo, & Holub, 2013). For young households, on average, the families' financial wealth was highly concentrated in housing despite the high level of debt burdens (Emmons & Noeth, 2013). Before the 2007 housing crisis, American households viewed owning a home as a good investment. At a modest level of risk, homebuyers typically had expectations that home prices would show double-digit annual price growth over the next decade (Case, Quigley, & Shiller, 2003). Homeownership has also been associated with many nonfinancial benefits such as life satisfaction, educational attainment of children, and community involvement (Dreier, 2006; DiPasquale & Glaeser, 1999; Gyourko, 2003; Haurin, Parcel, & Haurin, 2002;

Rohe, Van Zandt, & McCarthy, 2013; Rossi & Weber, 1996). However, the recent housing crisis might have changed the views and perceptions of homeownership. During the recent housing crisis, millions of homeowners lost their homes or experienced negative home equity due to job loss, reduction in work hours, or decline in home values. By 2008, foreclosure filings on owner-occupied homes in the United States surpassed record levels (Collins & Choi, 2010). The conventional wisdom that viewed homeownership as a great way to build wealth and improve social satisfaction might have been probably overrated (Rappaport, 2010). Following the recent housing crisis, homeownership was associated with increased levels of financial strain among homeowners while controlling for other factors (Bieker & Yuh, 2015). Debt burdens were extremely higher among young households who bought their homes prior to the recent housing crisis (Emmons & Noeth, 2013). Renters who lived in areas affected by high foreclosure rates, as well as minority and low-income renters, had more negative perceptions of homeownership after the recent housing crisis (Collins & Choi, 2010). This study aimed to understand how homeownership decisions have changed between the stable housing market, which occurred around 1993, and the downturned housing market, which occurred around 2010. Glaeser and Quigley (2009) referred stable housing markets as the markets with a growth at roughly the rate of inflation and the downturned housing market as the markets with more people experienced negative equity. The 1993 housing market had a stable growth as compared to the inflation rate, and the 2010 housing market was clearly at the downturn when mortgage credits and home sales stalled nationwide. The S&P/Case-Shiller National Home Price Index presented in Figure 1.2 signified the two different housing markets for the current study.

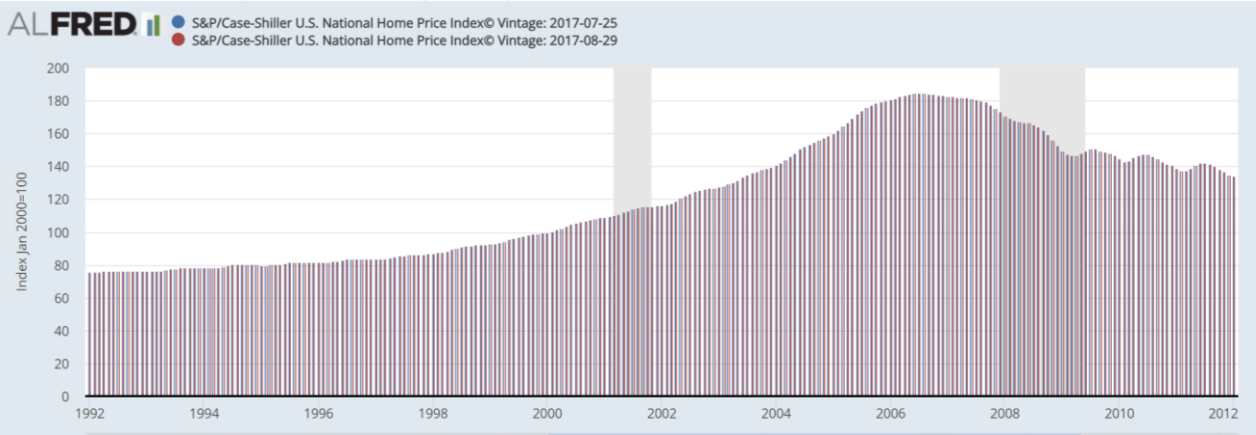

Figure 1.2. S&P/Case-Shiller U.S. National Home Price Index. Source: Archival Economic Data, St. Louis Fed. September 24, 2017. Https://alfred.stlouisfed.org/graph/?g=fbcA

Informed by mostly positive literature on homeownership, risk factors of homeownership decisions might have been overlooked until after the unprecedented housing crisis (Bostic & Lee, 2008; DiPasquale & Wheaton, 1994; Herbert & McCue, 2013; Hulse, Burke, & Stone, 2010). Additionally, prolonged low interest rates, predatory lending practices, and a housing price bubble bolstered the systematic risk of the housing market (Aalbers, 2008; Levitin, 2011; Schwarcz, 2008). Homeownership risk factors may include housing price volatility, mortgage interest rate movement, and lifetime income uncertainty (Ambrose & Pennington-Cross, 2000; Smith, Searle, & Cook, 2009). In late 2007, when interest rates rose, job losses increased, and the housing price bubble burst, millions of homeowners were unable to make monthly mortgage payments, and subsequently lost their homes (Hurd & Rohwedder, 2010). For those who could keep their homes, home prices were down on average as much as 32% nationwide. At the peak of the housing crisis, many cities housing prices were down by more than 50%, which eradicated nearly seven trillion dollars of housing equity (Case, Shiller, & Thompson, 2012). At the macro level, the housing crisis had shaken the American banking and financial systems to the core. The unprecedented number of mortgage defaults created a national credit crunch that blocked flows of borrowing and investments. At the individual level, homebuyers' household risk preference

may have influenced buyers' decisions when it came to buying a home as opposed to renting. Letkiewicz and Heckman (2017) found that young households who expressed a willingness to take general financial risks were more likely to buy a home. The relationship between risk preference and homeownership decision may have changed due to recent volatile housing market conditions.

Following the aftermath of the recent housing crisis, the views and the trends of homeownership during the downturned housing market are mixed. According to the University of Michigan's Survey of Consumer Attitudes, about 80% of American households believed that 2011 was a good time to buy a home (Bracha & Jamison, 2012). The positive sentiment was strong particularly among younger, educated, White, and Hispanic-originated households. These sentiments were attributed to low home prices and mortgage interest rates (Engelhardt, 2011). However, in reality, the share of younger households who owned homes decreased from 40% in 2007 to 34% in 2011 (Fry, 2013). Changing social demographic characteristics and economic statuses of young adults had an impact on homeownership trends in the downturned housing market. For example, singles and cohabiters have become more likely to be first-time homeowners than traditional married couples without children (Smits & Mulder, 2008). Thus, examining the effects these characteristics and statuses had on the different housing market conditions is included in this research.

Research Questions

This study investigated the relationship between household's risk preference and homeownership decisions under the lens of expected utility theory. Risk preference reflects what an individual does when faced with a risk option and a safer alternative (Hsee & Weber, 1997).

Therefore, the extent to which an individual is willing to take on risk constitutes his or her risk preferences (Charness, Gneezy, & Imas, 2012). For the current study, the following research questions were addressed:

RQ1: What are the demographic and economic characteristics and risk preferences of homeowners in the period of stable housing market and in the period of downturned housing market?

RQ2: What is the relationship between households' risk preference and homeownership decisions among young adults in the period of stable housing market and in the period of downturned housing market?

RQ3: If the relationship between households' risk preference and homeownership decisions among young adults has changed, what are the differences and the evidence in the relationship between risk preference and homeownership decisions across the two periods?

Purpose of Study

To better understand and compare the relationship in two periods, stable housing market and downturned housing market, two datasets from two different time periods were utilized. The first dataset comes from the 1993 survey of the National Longitudinal Survey of Youth 1979 (NLSY79). The second dataset comes from the 2010 survey of the National Longitudinal Survey of Youth 1997 (NLSY97). The main focus of this study was the effect of household risk preference on the likelihood of owning a home among young adults ages 27 to 33 years old. The second focus of this study was demographic and economic characteristics of homeowners in the two different housing market conditions. The results of the study sheds light on how household's risk preference plays a role in young adults' homeownership decisions as well as in the overall

housing market. Additionally, the results revealed demographic and economic indicators of young homeowners in different housing markets.

Prior research has used different theories and models to capture either consumption or investment aspects of homeownership. For most households, homeownership is a durable good—one that has both consumption and investment value. This study used expected utility theory (von Neumann & Morgenstern, 1944), as a theoretical framework to investigate the relationship between household risk preference and homeownership decisions. Expected utility theory was able to capture both aspects of homeownership, consumption, and investment with risk preference as the primary predictor and homeownership decision as the outcome variable. The potential is there for this study to pave the way for future research to use the theory in the risk and homeownership domain.

Finally, the study fills the gap in current literature by using household risk preference as a main predictor and determinant of homeownership decisions. There is evidence that loose credit and monetary policies, sales-driven lending practices, and housing price bubbles were the main causes of the recent housing crisis (Allen & Carletti, 2010; Mian & Sufi, 2008; Taylor, 2010). These systematic risks were inherent within housing markets and therefore home buying decisions. One of the causes of the housing crisis has been suggested to be risky borrowing behavior (Foote, Gerardi, & Willen, 2008). There is also an indication that households who were willing to take financial risks were likely to be homeowners (Letkiewicz & Heckman, 2017). This study expanded Letkiewicz and Heckman (2017) research by examining the effect of risk preference on homeownership decisions during both periods, the stable and the downturned housing markets. By doing so, this study provided evidence of the systematic risk, the observation of the individual risk preference, in homeownership decisions and the housing

market. As a result, this study provides empirical implications to personal financial planning professionals, potential homebuyers, lenders, and policymakers in the area of risk preferences, homeowner demographic and economic characteristics, as well as, homeownership decisions.

Summary

The recent housing crisis in the United States has highlighted the need to understand the vital relationship between household risk preference and homeownership decisions. By knowing that vital relationship and household demographic and economic characteristics, young households may be able to make more informed choices for their housing options; personal financial planning professionals can include risk preferences as part of their housing counseling recommendations; lenders can provide funding to affordable and appropriate consumers; and policy makers can balance between risks and homeownership goals. The next chapter of this dissertation reviews the related literature and theories.

Chapter 2 - Literature Review

Homeownership Decision: Benefits and Costs

Benefits of Homeownership

The two basic choices for permanent living arrangements of adults or families include owning or renting. Each choice has its benefits and costs for both short-term and long-term considerations. As compared to renting, research has shown positive economic benefits associated with homeownership. For example, household wealth accumulation has been found to be positively affected by homeownership (Boehm & Schlottmann, 2008; McCarthy, Van Zandt, & Rohe, 2001). For lower-income and minority households, housing wealth has been synonymous with total wealth (Boehm & Schlottmann, 2008). Even in the midst of the recent housing crisis, home equity continued to be the dominant component of the balance sheet for low-, moderate-, and high-wealth households (Grinstein-Weiss, Key, Guo, & Holub, 2013). In a comparison of households at the low- and moderate-incomes levels, homeowners experienced greater short-run increases in net worth, non-housing net worth, and assets than renters did (Grinstein-Weiss, Key, Guo, Yeo, & Holub, 2013). Homeownership lowered real monthly housing payments over time and provided the owners with a borrowing power, through home equity, to make purchases or investments financial markets (McCathy, Van Zandt, & Rohe, 2001). Other economic benefits of homeownership include the preferential tax treatment, additional housing collateralized credit, and insurance against rental price increases (Diaz & Luengo-Prado, 2010). During an eight-year period between 2003 and 2011, Riley, Ru, and Feng (2013) found homeownership to be less costly than renting a comparable property for low-income populations. Altogether, the economic benefits of homeownership depend on the

following: (a) the initial down payment, (b) house price appreciation rate, and (c) mortgage type used (Bostic & Lee, 2008). Other research has indicated the longer the homeownership, the better off the owners. For example, if the home occupancy was more than four years, the cost of owning a home was less than the cost of renting for comparable types of houses (Shelton, 1968).

In addition to economic benefits, there are non-economic benefits of homeownership. There is evidence that homeownership leads to higher overall life satisfaction of the owners and higher satisfaction in family relationships (Rohe & Basolo, 1997; Stillman & Liang, 2010). Rossi and Weber (1996) discovered similar results: homeowners were found to have higher life satisfaction, higher self-esteem, and were more likely to be members of community improvement groups than non-owners. Using the National Longitudinal Survey of Youth 1979, Haurin, Parcel, and Haurin (2002) found that owning a home was associated with higher quality home environments as well as higher reading and math achievement scores and fewer behavior problems for children. Consistent results indicated that homeownership is associated with children remaining in school and a reduction in teenage pregnancy (Green, Painter, & White, 2012).

Costs of Homeownership

Despite many economic and social benefits, there are also costs associated with homeownership. For homeowners who borrow to purchase their homes, especially for young borrowers, the monthly mortgage payment is a long-term commitment that is not flexible in the short-run. Owners are responsible for home maintenance, homeowner's insurance, property tax, closing expenses, and opportunity costs (Beracha & Johnson, 2012; McCarthy, Van Zandt, & Rohe, 2001). There is evidence on the negative relationship between holding a mortgage and

financial satisfaction among retirees (Seay, Asebo, Thompson, Stueve, & Russi, 2014). When homeowners are behind on their mortgage payments, there may be psychological costs as well. Nettleton and Burrows (1998) suggested that homeowners who fall behind on their mortgage payments suffered negative health consequences. Other homeowners, who were not behind on their mortgage payments also felt less protected from the threat of losing their home because of the potential risks of repossession (Hiscock, Kearns, MacIntyre, & Ellaway, 2001).

Homeownership Trends

Possession of a home has long been viewed as a contributing factor to occupational and geographical stability and good citizenship while providing a sense of economic security (Megbolugbe & Linneman, 1993). Homeownership among families in the U.S. increased from 63% in 1989 to 66.2% in 1998 for all racial, ethnic, and income groups (Bostic & Surette, 2001). The rise of family homeownership in this period could be the results of favorable economic climates, changes in mortgage and housing markets, and changes in the mortgage loan regulations (Bostic & Surette, 2001). At the individual level, homeownership has served dual purposes, consumption and investment. At the market level, homeownership has fueled economic growth by stimulating construction and other related employments.

During the stable housing market, the consensus among most Americans was that housing was a good investment due to the strong housing and financial markets (Belsky, 2013). This consensus came from the results of several surveys on homeownership attitudes, including the University of Michigan's Survey of Consumers, Fannie Mae's National Housing Survey, Pew Charitable Trusts, and New York Times-CBS survey. The overall homeownership rate in

America peaked at 69% in 2004, with the increases in homeownership rates among young households being larger than in older households (Emmons & Noeth, 2013).

During the recent housing crisis, American households lost over seven trillion dollars in home equity (Ellen & Dastrup, 2012). Many young households lost more relative wealth than middle-aged and older households (Emmons & Noeth, 2013). The risk inherent in homeownership has changed as the levels of wealth generating from owned housing has changed. Using cash flows and rent-to-price ratios as a framework, Rappaport (2010) concluded that the conventional wisdom of having a home as a way to build wealth was probably overrated. Witnessing the fallout and aftermath of the recent housing crisis, households' views and decisions on homeownership have changed (Rohe & Lindblad, 2013). This shift could be explained by the fact that after a decade of strong price appreciation, also known as "the housing bubble," the housing market fell into sharp decline during the crisis.

In a study of renters' attitudes toward buying versus renting a home, Bracha and Jamison (2010) found younger respondents were relatively less confident about homeownership after larger housing price declines. The housing experience during the crisis was very different for homeowners as well as renters (Kroll, 2013). While a large share of minority and unmarried households were pressing down homeownership rates, higher income and educated households were conversely boosting up the larger share in the homeownership market (Drew, 2015). Still, the extent to which people were willing to take on risk and their risk preferences may show a clearer picture as to the differences in homeownership rates.

Risk and Risk Preference

Risk is ubiquitous in decision-making and permeates any home-buying decision. The term risk, in general, has been defined as measurable uncertainty (Knight, 1921). However, Knight's definition of risk, according to Holton (2004) does not conform to common usage. To make the term *risk* more in accordance with common usage in the modern time, Holton (2004) defined risk as "exposure to a proposition of which one is uncertain" (p. 19). This newer definition of risk entailed two essential components: exposure and uncertainty. Holton (2004) further emphasized that risk was a condition of individuals who were self-aware. Organizations, companies, and local and federal governments were not self-aware like individuals, so they were incapable of being at risk (Holton, 2004). This emphasis of self-awareness is important to the current study since the target populations under this study are young, potential, or current homeowners and not entities. Risk has many risk-related constructs, such as risk tolerance, risk appetite, risk awareness, risk attitude, risk perception, and risk preference. However, to make it clear, focused, and consistent, only risk preference is discussed and used in this study. Risk preference of young households is the primary independent variable of this study.

Risk preference is defined as "the preference for an asset with a higher risk over another with a lower risk, given that the characteristics of their yield distributions are identical" (Handa, 1971, p. 1073). In simpler terms, Charness, Gneezy, and Imas (2013) redefined risk preference as the extent to which people were willing to take on risk. Prior research has shown that many individuals seem to have risk averse preferences (Hanna, Gutter, & Fan, 2001). Furthermore, risk has preference appeared to be domain specific (Weber, 2010). For example, risk preference in sport activity decisions is not the same as risk preference in durable good purchase decisions. The current study focuses on financial risk preferences only, since the measurement of risks

preferences in the study were based on three lifetime income gamble questions from both datasets, the NLSY79 and the NLSY97.

Risk preferences could be influenced by age, gender, education, family, and specific traits (Chaulk, Johnson, & Bulcroft, 2003; Dohmen, Falk, Huffman, Sunde, Schupp, & Wagner, 2011; Hanna & Lindamood, 2005; Paulsen, Platt, Heuttel, & Brannon, 2012; Sung & Hanna, 1996). In the context of financial decisions, risk preference was affected by income, market conditions, specific circumstances, and expected outcomes (Diaz-Serrano & O'Neill, 2004; Finke & Huston, 2003; Shiller, 2007). More specifically, by using a question asking people about their willingness to take risks in general, Dohmen et al., (2011) found that gender, age, height, and parent background had a significant impact on risk taking preferences on economic decisions. When using other questions about risk preference on very specific contexts, similar results were found (Dohmen et al., 2011). In a study focused on age only, findings supported the conventional wisdom that risk taking decreased with age and households would take less risk in response to decreasing financial security over time (Jianakoplos & Bernasek, 2006).

As individuals progress through different stages of life, their risk preferences change over time (Cordell, 2001). In an effort to combine concepts from the theoretical paradigms of family development theory (White, 1991) and prospect theory (Kahneman & Tversky, 1979), Chaulk, Johnson, and Bulcroft (2003) provided a theoretical basis for understanding how financial risk preference was affected by family transitions. The interaction effect for marital status and age in the sample showed that younger married respondents were less willing to take a risk to increase their yearly income than were their unmarried contemporaries. Older married respondents, however, were found to be more risk preferred than older single respondents. Having children in the household was associated with lower risk preferences; this pattern was reversed in the high-

income group, where respondents with children were more risk preferred (Chaulk et al., 2003). In this study, risk preference refers to the tendency to choose a risky or safe option given possible outcomes.

Risk Preference and Financial Decision-Making

Since risk preference is an important factor that can impact many personal financial decisions, there are a large number of studies on the relationship between financial risk preferences and general financial decisions (e.g., Case, Shiller, & Thompson, 2012; Jacobs-Lawson & Hershey, 2005; Prather, Liao, Zhao, & Sing, 2014; Voicu & Seiler, 2013). In practice, most financial advisors have agreed on the importance of financial risk preference assessments in relation to clients' investment decision-making (Diacon & Ennew, 2001; MacGregor, Slovic, Berry, & Evensky, 1999). However, the literature has not extended specifically to the domain of homeownership decisions.

In general, literature on risk preference and its relationship to financial decisions is based on two main theoretical perspectives (Grable, 2008). The first perspective comes from traditional financial theories (normative models) that predict how individuals make their decisions based on the expected utility of their choices (von Neuman & Morgenstern, 1944; Weber, Blais, & Betz, 2013). Traditional financial theories rely on an important assumption that consumers are rational when making decisions. The second theoretical perspective commonly used in risk preference and financial decision-making studies is grounded in behavioral finance theories (descriptive models) that show how decisions are made through the lens of behavioral change and behavioral finance (Ajzen, 1991; Kahneman & Tversky, 1979).

The conventional positive association between risk and return in consumer finance is based on modern portfolio theory (Markowitz, 1952) and has been tested and confirmed through prior research. Greater risk preference was positively associated with both higher household net worth and financial assets (Finke & Huston, 2003). The study also found the youngest age groups were willing to take risks at much greater frequency than those at nearing retirement age. Risk-seeking individuals have also been found to be more likely to invest a smaller proportion of the portfolio in risk-free securities (Hariharan, Chapman, & Domian, 2000). Risk-averse couples have been found to be less likely to invest in higher risk contribution funds (Yuh & DeVaney, 1996). Risk-averse households have been identified to be likely to have a lower risky asset ratio in their investment portfolio (Cardak & Wilkins, 2009).

When investigating the effects of student loan debt and behavior factors on homeownership among young Americans, Letkiewicz and Heckman (2017) found an association between the willingness to take risks in finances and homeownership. Conversely, one of the most related studies to the current topic, Diaz-Serrano (2004), indicated that households who were risk averse were more likely to plan for buying a home as compared to who were not risk averse. However, the study was conducted in the period before the Great Recession only. Another investigation, conducted by Cheung and Miu (2015), found that homeownership was attractive to conservative investors. However, these studies focused only on investor homebuyers when considering hypothetical homeownership decisions and did not indicate the actual actions of purchase. The current study focuses on actual homeownership decisions during the stable housing market and during the downturned housing market among owner-occupied buyers.

Determinants of Homeownership

Since homeownership is a long-term commitment in terms of financial responsibility, consumption enjoyment, and investment goals of the household, there are a number of determinants that influence the homeownership decision. In general, determinants of tenure choice include income and wealth, life-cycle status, family event, household demographic characteristics, price and market factors, previous living conditions, and location (Dieleman & Everaers, 1994; Gabriel & Painter, 2003). The determinants of homeownership can also be divided into three main categories: economic, household demographic, and psychological.

One apparent economic determinant of homeownership is income. Most young households purchase their homes with loans offered by banks, mortgage companies, financial companies, or other sources. Henderson and Ioannides (1983) showed that households who had income streams were more likely to own their homes. Clark, Duerloo, and Dieleman (1994) also showed that increases in income in a family triggered the move from renting to owning a home. Clark, Deurloo, and Dieleman (2003) found a close relationship between housing status and a household income and income growth. More specifically, the higher the household's income, the higher the status on the housing ladder. The larger the income growth, the sooner a household would settle in a better quality, higher priced home. Other economic determinants included the cost of owning relative to renting, borrowing constraints, and tax considerations (Haurin, Hendershott, & Wachter, 1996; Hendershott & White, 2000).

Household demographic attributes have become explanatory variables in a number of housing tenure choice studies. Long and Caudill (1992) indicated that when compared to Black households, White households were more likely to own homes; and therefore, White households had higher housing wealth. Wachter and Megbolugbe (1992) also indicated that homeownership

rates for White households were over 20% higher than for Black or Hispanic households. Gyourko and Linneman (1997) provided evidence that changing family structures in the United States, such as delayed marriage and childbearing, did not prevent households from obtaining homeownership in the last decade of the 20th century. Other household attributes that influenced homeownership decisions were explored in Painter, Gabriel, and Myers (2001), which included education and immigrant status. In particular, the study found that Asians were as likely to choose homeownership as were Whites, and that among Asians, an immigrant status did not predict lower homeownership rates.

Recent studies on housing tenure choice integrated psychological factors as a determinant of homeownership. Ben-Shahar (2007) found psychological factors to be more statistically significant when compared to economic factors in explaining the realized housing tenure choice. Letkiewicz and Heckman (2017) suggested that young households' decisions to buy homes might be influenced by more than just financial conditions. Other factors that influenced home purchase decisions might include psychological and behavioral. Cohen, Lindblad, Paik, and Quercia (2009) found that favorable attitudes, subjective norms, and greater perceptions of control were all associated with greater homeownership intentions, which, in turn, predicted actual home purchases the following year. Other psychological determinants of homeownership, such as understanding of mortgage loan underwriting standards and intrinsic taste for housing investments are difficult to observe and research (Gabriel & Rosenthal, 2011). Potential homebuyer behaviors toward home price and mortgage interest rate fluctuations as well as rent increase risks were also difficult to measure in a reliable way. The current study fills the literature gap in this area by utilizing lifetime income gamble questions as the measure of household risk preference.

Review of Theories and Models on Homeownership

Theoretical frameworks for prior studies on homeownership decisions were derived from either economic or social and behavioral theories. One of the popular economic models was a model of housing tenure choice developed by Henderson and Ioannides (1983) and focused on household consumption and investment demands for housing. The model assumes households are rational when making housing tenure choices, which maximizes utility in a housing market in equilibrium. In their model, housing stock was used for both purposes: to produce housing services, and as an investment good for households (Henderson & Ioannides, 1983). The model emphasized that if a household's investment demand for housing was greater than consumption demand, the household was likely to own instead of renting and vice versa (Henderson & Ioannides, 1983). With perfect certainty, housing tenure choice has been affected by an important externality associated with renting. Households tend to own homes if there are rental externalities and equilibrium in asset holding (Henderson & Ioannides, 1983). While focusing on the consumption and investment demand for housing, the model did not take individual risk preferences into consideration.

Another common economic theory of housing tenure choice is the neoclassical consumer theory of housing demand (Megbolugbe, Marks, & Schwartz, 1991). The theory concentrates on the demand and the consumption of housing with a housing demand equation as follows:

$$Q = q(Y, PhP_oT)$$

where Q is housing consumption, Y is housing income, Ph is the relative price of housing, P_o is the vector of prices of other goods and services, and T is a vector of taste factors (Megbolugbe et al., 1991).

The equation suggests that rational consumers attempt to maximize the utility of housing that they could purchase within their income and market price constraints (Megbolugbe et al., 1991). The neoclassical consumer theory of housing demand assumes that household decision-making parallels consumer decision-making; the object of consumer decision-making is an unobservable homogeneous commodity—housing services, and there is assumed a perfectly competitive market in housing services (Megbolugbe et al., 1991). This theory also overlooked the individual risk factors that might affect housing decisions.

While economic theories and models of housing consider homeownership as either consumption or investment, social and behavioral theories view homeownership as a transition to adulthood. Demographic variables such as age, race, education, culture, family size, marriage, and children complicate the homeownership decision. Morris and Winter (1975) presented the theory of family housing adjustment as a conceptual and theoretical framework for the study of the housing adjustment behavior of families. According to Morris and Winter (1975), when family housing did not meet the cultural and family norms, housing dissatisfaction and housing deficit occurred, which propelled residential mobility and adaptation as well as family adaption. Morris and Winter (1975) also recognized that their theory simplified the actual process that occurred in actual life. Additionally, the theory departs from financial and behavioral perspectives of homeownership such as cost and benefit analysis and the household's willingness to take risks on homeownership decisions. Figure 2.1 shows the flow diagram for the family housing adjustment process.

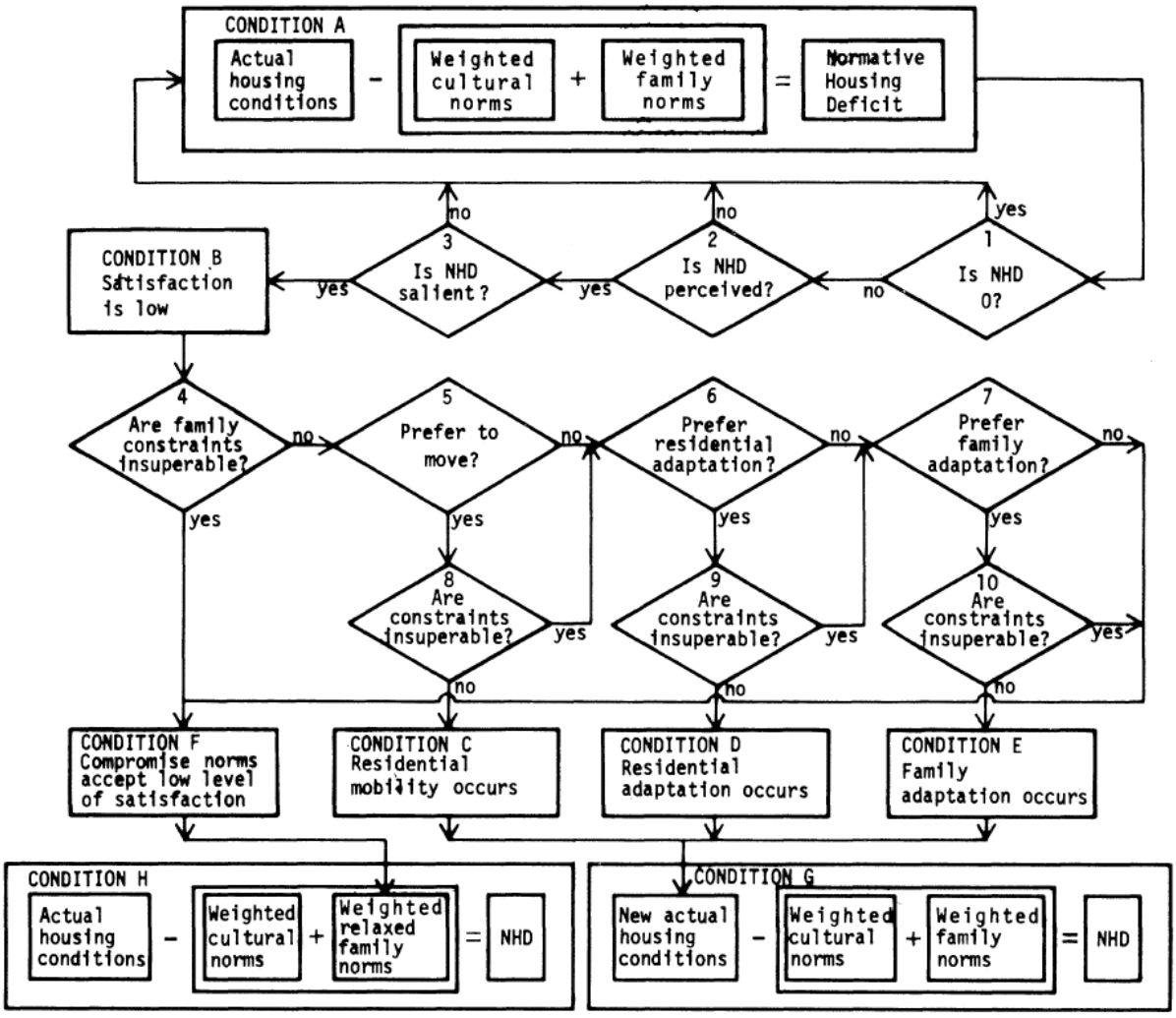

Figure 2.1. Flow Diagram for the Family Housing Adjustment Process. Source: Morris, E. W., & Winter, M. (1975). A theory of family housing adjustment. *Journal of Marriage and the Family*, 79-88. P. 85.

In an effort to understand the recent homeownership trends and housing prices, Shiller (2007) argued that there is a wide variety of considerations and emotions that impact the decision of whether or not to buy a home for the primary residence. Psychological factors, such as emotion, play a role in homeownership decisions due to vague expectations for the future of home values (Shiller, 2007). The psychological expectations also appear to be a major factor in explaining the extreme momentum of home price increases prior to the housing crisis (Shiller, 2007). When examining psychological and economic factors affecting housing choices, Ben-

Shahar (2007) found that psychological factors were more statistically significant in explaining tenure choice although psychological and economic factors involved in the tenure decision were highly correlated. These findings might suggest that psychological effects were a force for determining the economic tenure decision Ben-Shahar (2007). Most recently, Letkiewicz and Heckman (2017) found young adults who exhibit higher risk-taking willingness, a psychological and behavioral factor, were more likely to own a home.

Although several theories and models related to prior homeownership decision studies have been developed, these theories and models focus largely on demand for housing consumptions under either economic or social perspectives. Since the current study of the homeownership decision focuses on the risk preferences of the homebuyers, a risk-related theory was sought to frame, explain, and predict how household risk preference affected homeownership decisions. Expected utility theory would be the best to use as a theoretical framework for the current study.

Theoretical Framework

Homeownership serves two main purposes—a long-term investment for wealth accumulation and utility for housing consumption. These dual purposes make decisions on homeownership or renting difficult for most households. According to expected utility theory (von Neumann & Morgenstern, 1944), rational households compare the expected utility of owning a home with the expected utility of renting and then choose the higher expected utility option to maximize their expected utility and satisfaction. However, as the review of related literature pointed out, there are systematic as well as individual risks associated with homeownership and homeownership decisions. For instance, in September 2005, house prices

began to fall in city after city in the United States. By the time it was over, home prices were down on average as much as 32% nationwide, with many cities down by more than 50%. This decrease wiped nearly seven trillion dollars in equity off of household balance sheets (Case, Shiller, & Thompson, 2012). When buying a home is a risky investment and consumption decision, household risk preference becomes a factor that may affect decision-making. Due to risk preference potentially affecting the homeownership decision, this study adopted expected utility theory as the guiding framework. Household risk preference was the main independent variable of the study; homeownership was the dependent variable.

Expected Utility Theory

Perhaps, among economic theories on homeownership, expected utility theory has drawn the most attention and been mostly used in research. Expected utility theory by von Neumann and Morgenstern (1944) is a dominant decision-making under uncertainty theory (Chavas, 2004). Expected utility theory provides a basis for understanding how consumers make choices among possible outcomes presented to them (Smith & Seay, 2016). In expected utility theory, individuals care only about the utility they obtain from the outcomes with uncertainty and not about exact dollar amount from the outcomes (Bajtelsmit & Bernasek, 2001). This is what homeownership all about: it is not the exact dollar amount homeownership produces, but the utilities it provides. Expected utility theory states that decision-makers choose among uncertain prospects by comparing the expected utility values of the prospects (Mongin, 1997). Expected utility theory relies on a set of axioms of individual rational choice. The following illustration of expected utility theory axioms uses homeownership as the subject of interest.

According to the expected utility hypothesis assumptions, a household has risky preference represented by a utility function, U(h), and that household makes decisions to maximize the expected utility, EU(h), where h is a home and E is the expectation operator based on the subjective probability distribution. Based on expected utility hypothesis, a household's decision on buying or renting a home is always consistent with the maximization of expected utility, EU(h). More specifically, if there are two prospects of home, h_1 as owning and h_2 as renting, there exists a utility function U(h) such that h_1 is greater than h_2 if and only if $EU(h_1)$ is greater than $EU(h_2)$. In this case, the household will choose h_1 over h_2 to become a homeowner and also become a utility maximizer as long as the following assumptions are met:

(1) Household preferences are in order and transitive; that is, h_1 is greater than h_2, h_2 is greater than h_1, or h_1 is indifferent from h_2.

(2) Household preferences are independent; that is, preferences between h_1 and h_2 do not depend on other prospects.

(3) Household preferences are continuous; that is, for any prospect (h_1, h_2) where h_1 is less than h_2, there exist numbers of probabilities (from zero to one) such that a sufficiently small change in probabilities would not reverse a strict preference

(4) Household preferences are monotonic; that is, if h_1 is assigned with a higher probability to a better outcome will be preferred to the other prospect.

(5) Household preferences are substitutable; that is, if households are indifferent between two possible outcomes, then they would be indifferent between two prospects.

When making housing tenure decisions with uncertainty, households have three preferences among prospects: (a) h_1 is preferred to h_2; that is, owning is preferred, (b) h_2 is preferred to h_1; that is, renting is preferred, and (c) h_1 and h_2 are indifferent; that is, owning or

renting make no difference to the household. For the purpose of this study, the first two preferences are the preferences of interest for analysis. In theory, a household's preference depends on the expected utility from wealth generated from each prospect. A household's preference also depends on his or her personal risk preference since expected utility theory takes into account that households may be risk averse. The measures of risk aversion have been shown in Pratt (1964) and Arrow (1971).

For the current study, expected utility provides the framework for understanding the relationship between risk preferences and homeownership decisions. This relationship has been found to be positive in Letkiewicz and Heckman (2017). That is, the probability of homeownership increased as the willingness to take risks on finances increased among young Americans (Letkiewicz & Heckman, 2017). The current study uses Letkiewicz and Heckman (2017) research as a foundation to further explore the effects risk preferences have on homeownership decisions with a different measure. Letkiewicz and Heckman (2017) used a general financial risk scaled question to measure household risk preferences. The current study uses three lifetime income gamble questions to measure household risk preferences. In addition, the current study utilizes two separate datasets, the NLSY79 and the NLSY97 for the two different housing market periods.

Summary

The review of related literature and theories improves the understanding of homeownership benefits and costs, homeownership trends in different periods, risk, risk preference, the association between risk preference and financial decision-making, homeownership determinants, and previous frameworks on homeownership decision studies. At the same time, the review reveals the lack of studies on the relationship between household risk

preference and homeownership decisions. Expected utility theory has been chosen to guide the current study. The next chapter outlines the methodology for addressing the research questions and hypotheses.

Chapter 3 - Methodology

Data and Sample

To address the research questions, NLSY79 and the NLSY97 were the two datasets used. These datasets are the most appropriate for the current study for several reasons. First, NLSY79 respondents were young households at the time when the 1993 wave interview was conducted. Additionally, the NLSY97 respondents were young households when the 2010 wave interview was conducted. Both sample respondents made homeownership decisions during their transitions to adulthood. Secondly, the NLSY79 and the NLSY97 collected extensive information on household demographics, socioeconomics, geographic, risk preference, and housing status that were needed for the current study. Finally, as two separate datasets, the 1993 wave of the NLSY79 and the 2010 wave of the NLSY97 are able to provide insight on household risk preference and homeownership decisions in two different housing markets. More specifically, the NLSY79 dataset represents young household risk preference and homeownership decisions during the stable housing market around 1993. Conversely, the NLSY97 dataset represents young household risk preference and homeownership decisions during the downturned housing market around 2010.

The NLSY79 is a nationally representative sample of 12,686 young men and women who were 14-22 years old when they were first interviewed in 1979. Participants were interviewed annually through 1994 and were interviewed on a biennial basis (Bureau of Labor Statistics, 2016). The NLSY79 dataset is used to study the relationship between household risk preference and homeownership decisions during the stable housing market around 1993.

The NLSY97 consists of a nationally representative sample of approximately 9,000 youth who were first interviewed in 1997. The respondents in this dataset were 12-16 years old as of December 31, 1996. Youths continued to be interviewed on an annual basis (Bureau of Labor Statistics, 2016). The NLSY97 dataset is used to study the relationship between household risk preference and homeownership decisions during the downturn of the housing market around 2010.

Since risk taking is affected by age (Jianakoplos & Bernasek, 2006), the selection of sample years from both datasets has to be consistent in terms of respondent age. For the NLSY79, the 1993 sample was used; and for NLSY97, the 2010 sample was used. These sample waves captured respondents who were 26-33 years old at the time of interview.

Measurement of Variables

Dependent Variable

Homeownership decision, the dependent variable of the current study, is measured by identifying from NLSY79 and NLSY97 samples if respondents owned their homes. If the respondents owned the residence, the homeownership variable was coded as 1 (0 otherwise). It is worth noting that there is not a way to distinguish non-occupied homeowners from occupied homeowners. However, since the population of the samples is all young adults, it is reasonable to assume that most homeowners in the samples bought their home as their primary residence.

Independent Variable

Risk preference, the primary independent variable, was measured in the NLSY79 and NLSY97 by different, but comparable lifetime income gamble questions. The NLSY79 asked the following lifetime income gamble questions:

1. “Would respondent take a job that could either double family income or cut income by a third? ...that it will cut your (family) income by a third. Would you take the new job?”
2. “Suppose the chances were 50-50 that it would double your (family) income and 50-50 that it would cut it in half. Would you still take the new job?”
3. “Suppose the chances were 50-50 that it would double your (family) income and 50-50 that it would cut it by 20 percent. Would you take the new job?”

These questions were used by Light and Ann (2010) to investigate the relationship between risk tolerance and the decision to divorce.

For the current study using the NLSY79, respondents who answered “yes” to all three questions were assigned the *risk preference level 4* (highest level). Respondents who answered “yes” to question one but “no” to question two were assigned to the *risk preference level 3*. Respondents who answered “no” to question one but “yes” to question three were assigned to the *risk preference level 2*. Finally, respondents who answered “no” to all three questions were assigned to the *risk preference level 1* (lowest level). The NLSY79 lifetime income gamble questions mapping and risk preferences were presented in Figure 3.1.

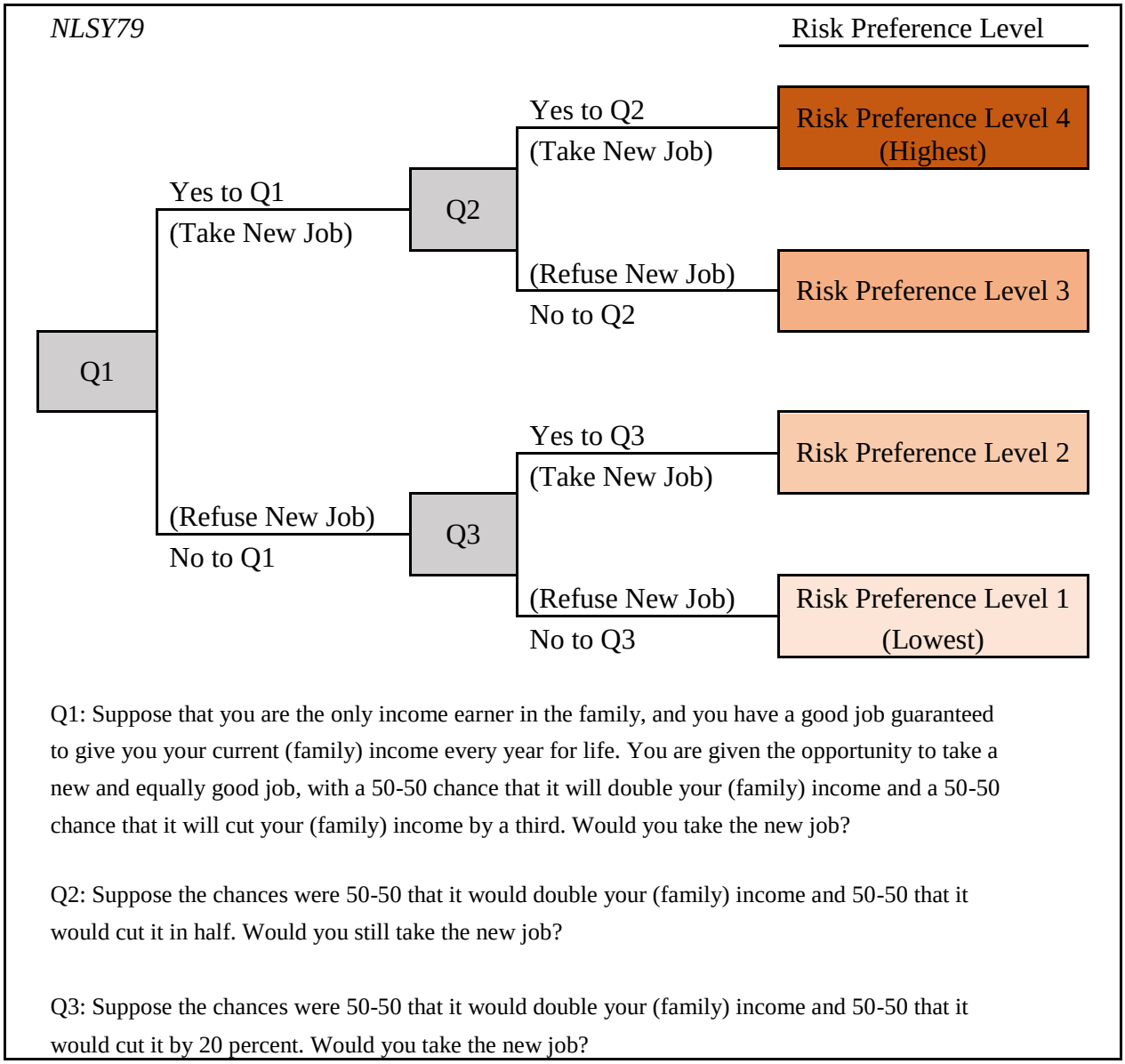

Figure 3.1. NLSY79 Income Gamble Question Mapping and Risk Preferences. Source: The Bureau of Labor Statistics, the National Longitudinal Surveys. https://www.nlsinfo.org/investigator/pages/search.jsp

In the NLSY97, the lifetime income gamble questions were not worded the same as they were in the NLSY79. However, these questions were aimed at the same purpose, which was to assess household risk preferences. Heckman and Montalto (2016) used lifetime income gamble

questions in NLSY97 to study consumer risk preferences and higher education enrollment decisions. The NLSY97 asked the following lifetime income gamble questions:

> "Now I have another kind of question. Suppose you are the only income earner in the family, but that your current job is ending. You have to choose between two new jobs. The first job would guarantee your current family income for life. The second job is also guaranteed for life and possibly better paying, but the income is less certain. There is a 50-50 chance that the second job will double your current family income for life and a 50-50 chance that it will cut your current family income by a third for life. Which job would you take: the first job or the second job?"

Respondents who answered "first job" were asked this follow-up question:

> "Suppose the chances were 50-50 that the second job would double your current family income and 50-50 that it would cut it in half. Would you take the first job or the second job?"

Respondents who answered "second job" were asked this follow-up question:

> "Suppose the chances were 50-50 that the second job would double your current family income and 50-50 that it would only cut it by 20 percent. Would you take the first job or the second job?"

For the NLSY97 analyses, similar mapping for lifetime income gamble questions as Heckman and Montalto (2016) was used. Respondents who took the first job in the initial question and also took the second job in the follow-up question were assigned to the *risk preference level 4* (highest level). Respondents who took the second job in the initial question but refused the second job in the follow-up question were assigned to the *risk preference level 3*. Respondents who refused the second job in the initial question but took the second job in the

follow-up question were assigned to the *risk preference level 2*. Finally, respondents who refused the second job in the initial question and also refused the second job in the follow up question were assigned to the *risk preference level 1* (lowest level). The NLSY97 lifetime income gamble questions mapping and risk preferences were presented in Figure 3.2.

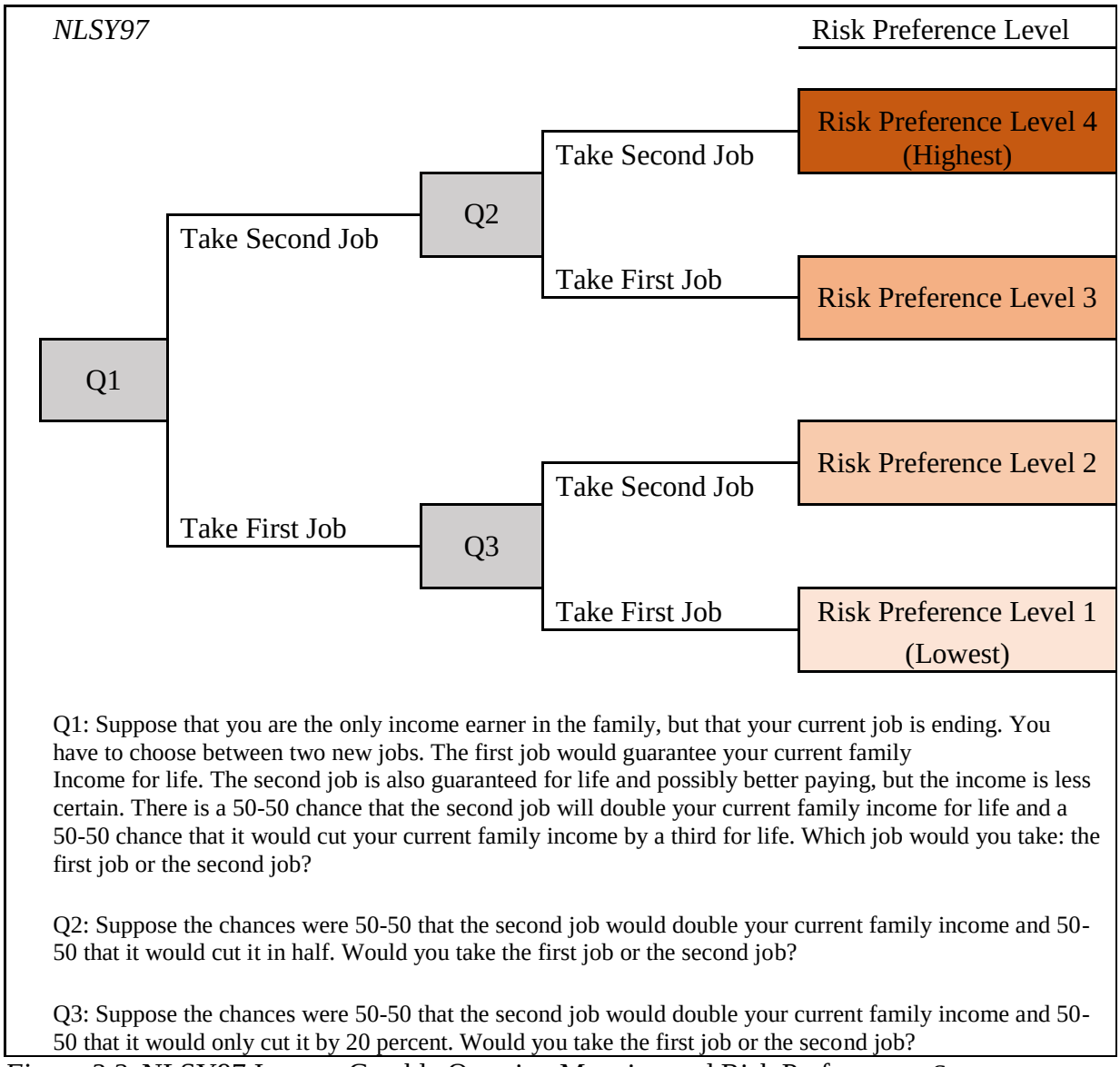

Figure 3.2. NLSY97 Income Gamble Question Mapping and Risk Preferences. Source: Heckman, S. J., & Montalto, C. P. (2016). Consumer risk preferences and higher education enrollment decisions. *Journal of Consumer Affairs*, p. 83. doi: 10.1111/joca.12139.

These lifetime income gamble questions were intended to measure risk preferences of the young adults in several rounds of the NLSY79 and NLSY97 surveys. When studied these

questions over a long period time, Cho, Orazem, and Rosenblat (2013) found that a household's risk aversion changes systematically in response to personal economic and financial circumstances. Under the lens of the expected utility, most households would prefer low risk outcomes since the theory suggested most individuals are risk averse. Therefore, it is expected that, by using lifetime income gamble questions as risk preference measurement, most young adults would prefer lower levels of risks. By using lifetime income gamble questions, the measurement of risk preference in the current study would be different from the measurement of risk preference in (Letkiewicz & Heckman, 2017) which used a single self-rating question on the willingness to take risk in finances.

Other Independent Variables

Prior research on homeownership has considered both demographic and economic characteristics of households as factors that influenced housing tenure choices (Letkiewicz & Heckman, 2017). The current study included these characteristics as independent variables and divided them into two groups. Demographic characteristics included race (Non-Hispanic/Non-Black, Hispanic, and Black), gender (male or female), education (less than high school, high school, college, and post-college levels), parent's (biological mother) education (less than high school, high school, college, and post-college levels), marital status (married, never married, and other marital status), presence of children (children in household or no children in household), parent's homeownership status (parents owned home or parents did not own home when reported on the first surveys), geographic region (South, Northeast, North Central, and West), and living area (urban or rural). Visual geographic regions are presented in Appendix A.

Economic characteristics included employment status (full-time, part-time, and unemployed), income (continuous variable), savings ownership (had accounts or did not have

savings), investment ownership (had investments or did not have investments), and student loan status (had any student loans or did not have any student loans at current attending college). According to Letkiewicz and Heckman (2017), almost all of the demographic characteristics were significant predictors of homeownership for the 2010 wave of the NLSY97. Economic characteristic also played important roles in the homeownership decision (Barakova, Bostic, Calem, & Wachter, 2003; Painter, Gabriel, & Myers, 2001).

After examining the NLSY79 and the NLSY97 selected samples, the following coding was used for the current study to enable statistical analyses. Race, marital status, and geographic region were coded as a categorical scale. Gender, presence of children, employment status, parent's homeownership status, savings ownership, investment ownership, student loan status, and living area were coded as separate dichotomous variables. Education and parent's education were coded separately as ordinal scales. Income was a continuous variable. The names and numbers of variables for the current study were identical for both the NLSY79 and the NLSY97 datasets. Details of variable categories and coding are presented in Table 3.1.

Table 3.1

Measurement of Variables and Coding of the NLSY79-1993 Survey and the NLSY97-2010 Survey

Variable	Coding
Dependent Variable	
Homeownership	=1 if respondent owned a home; 0 otherwise
Independent Variables	
Risk Preference	
Risk Preference Level 1 - Lowest	=1 if respondent preferred risk level 1; 0 otherwise

Variable	Coding
Risk Preference Level 2	=1 if respondent preferred risk level 2; 0 otherwise
Risk Preference Level 3	=1 if respondent preferred risk level 3; 0 otherwise
Risk Preference Level 4 - Highest	=1 if respondent preferred risk level 4; 0 otherwise
Gender-Male	=1 if respondent was male; 0 otherwise
Race	
Non-Hispanic/Non-Black	=1 if respondent was not Hispanic nor Black; 0 otherwise
Black	=1 if respondent was Black; 0 otherwise
Hispanic	=1 if respondent was Hispanic; 0 otherwise
Marital Status	
Married	=1 if respondent was married; 0 otherwise
Never Married	=1 if respondent was never married; 0 otherwise
Other Marital Status	=1 if respondent was divorced, separated, or widowed; 0 otherwise
Presence of Children	=1 if respondent had child in household; 0 otherwise
Education Level	
Less Than High School	=1 if respondent never completed high school; 0 otherwise
High School	=1 if respondent had high school education; 0 otherwise
College	=1 if respondent had college education; 0 otherwise
Post-College	=1 if respondent had post-college education; 0 otherwise
Parents Education[a]	
Less Than High School	=1 if parents never completed high school; 0 otherwise
High School	=1 if parents had high school education; 0 otherwise

Variable	Coding
College	=1 if parents had college education; 0 otherwise
Post-College	=1 if parents had post-college education; 0 otherwise
Parents Own Home[b]	=1 if parents owned a home; 0 otherwise
Geographic Region	
Northeast	=1 if respondent lived in Northeast; 0 otherwise
North Central	=1 if respondent lived in North Central; 0 otherwise
South	=1 if respondent lived in the South; 0 otherwise
West	=1 if respondent lived in the West; 0 otherwise
Living-Rural Area	=1 if respondent lived in rural area; 0 otherwise
Employment Status	
Full-time	=1 if respondent worked full-time; 0 otherwise
Part-time	=1 if respondent worked part-time; 0 otherwise
Unemployed	=1 if respondent was unemployed; 0 otherwise
Income	=Continuous variable
Savings	=1 if respondent had savings; 0 otherwise
Investments	=1 if respondent had investments; 0 otherwise
Student Loan	=1 if respondent had a student loan; 0 otherwise

[a] Parent's education are reported in 1979 for NLSY79 and in 1997 for NLSY79.

[b] Parent's homeownership are reported in 1979 for NLSY79 and in 1997 for NLSY97.

Research Questions and Hypotheses

For the current study, three research questions were addressed:

RQ1: What are the demographic and economic characteristics and risk preferences of homeowners in the period of stable housing market and in the period of downturned housing market?

RQ2: What is the relationship between household risk preference and homeownership decisions among young adults in the period of stable housing market and in the period of downturned housing market?

RQ3: If the relationship between household risk preference and homeownership decisions among young adults has changed, what are the differences and the evidence in the relationship between risk preference and homeownership decisions across the two periods?

There were two hypotheses for research question two:

H_1: Households who preferred higher risk levels are less likely to own a home in the period of stable housing market.

H_2: Households who preferred higher risk levels are more likely to own a home in the period of downturned housing market.

Analysis

Research question one was addressed with bivariate and univariate statistic procedures. Research question two was addressed with two identical logistic regression models for two housing market periods. Data used in these analyses were weighted to provide population representativeness. The following empirical model was utilized in each of the analyses:

$P_h = \beta_0+\beta_1*RP + \beta_2*DC + \beta_3*EC$, in which

P_h is the likelihoods of owning a home,

RP represents household's risk preference,

DC represents household's demographic characteristics, and

EC represents household's economic characteristics.

Research question three was addressed by using the method proposed in Allison (1999). The method, also known as Allison's method, was used in Seay (2012) to examine household investment behavior in rental real estate over a decade in 2000. The main goal of Allison's method is for comparing logit coefficients across groups while adjusting for possible differences in the disturbance variances (Allison, 1999) since simple comparisons of logit coefficients across groups can be invalid and misleading.

The first step in Allison's method was to identify δ, the difference in disturbance variation between the NLSY79 and the NLSY97. To perform this step in Allison's method, first, the NLSY79-1993 round and the NLSY97-2010 round data were combined into one dataset. Next, variables for the NLSY97 data were adjusted by a factor of $1 + \delta$. Finally, a series of logistic regression models were run at different values of δ. The logistic procedure continued until the value of δ that maximized the model's log likelihood was found. This δ then identified as the optimal difference in disturbance variation between the NLSY79 and the NLSY97.

The second step in Allison's method was using a chi-square test to find out if model coefficients were the same across the NLSY79 and the NLSY97. The chi-square test statistic was the difference between the -2 log likelihood of the optimized δ model and the sum of -2 log likelihood of the separate NLSY79, NLSY97 models. This chi-square test statistic was then subjected to a chi-square test. If the result was significant, there would be differences in model coefficients between periods, indicating the differences in variables across the two periods, 1993 and 2010.

To further investigate the relationship between household's risk preference and their homeownership decisions and the relationships between household's demographic and economic characteristics and homeownership decisions, interaction terms were added to the existing Allison's method model. Interaction terms were only included for variables that provided evidence of change between the NLSY79 and the NLSY97 and show statistical significance. Variables, which showed insignificance in both, the NLSY79 and the NLSY97, were excluded from interaction terms.

Before any analysis tests, frequency and univariate procedures were run on all variables to obtain statistical information and make decisions on missing data. As with many national large surveys, missing data is an important consideration that requires attentions when working with the NLSY79 and NLSY97. Missing data, or nonresponse, occurs for a number of reasons in the NLSY79 and NLSY97. First, a number of respondents may not participate at all that survey year, causing all information for those respondents in that particular survey year to be missing. A second reason missing data may have occurred is that respondents did not provide a valid answer to a question. When this happens, interviewers make a determination about whether to mark the answer as a "refusal" or a "don't know" value. A valid skip is another reason for missing data. Respondents are not asked every question of the survey. For instance, some questions might apply to only females or a certain age range. Missing data can also occur when there is an incorrect flow in the survey instrument.

Both data sets, the NLSY79-1993 survey and the NLSY97-2010 survey, had some missing responses on the dependent variable and most independent variables. For the NLSY79-1993 data set, student loans, savings, and risk preference variables had the most missing responses as compared to other variables. However, most missing responses were valid skips and

non-interviews. For the NLSY97-2010 survey data, student loans, incomes, and risk preference variables had the most missing responses as compared to other variables. Nonetheless, most missing responses were valid skips and non-interviews as well. For the current study, missing data were excluded from the analyses.

Summary

This chapter described datasets and samples used for statistical analyses of the current study to answer research questions. Measurements of independent and dependent variables for analyses were explained and illustrated. Each step in the intended analyses was explained and discussed to clarify the method choice for the current study. The next chapter presents the results of the study.

Chapter 4 - Results

This chapter presents the findings of the current study by answering each research question. Descriptive statistics were generated to answer question one. Two separate logistic regression models were performed to answered research question two. Logistic models with Allison's method (Allison, 1999) were utilized to answer research question three. Research question one and two were investigated utilizing two separate datasets from National Longitudinal of Youth, the NLSY79-1993 Survey and NLSY97-2010 Survey. Research question three was investigated using a pooled datasets containing the NLSY79-1993 Survey and NLSY97-2010 Survey. The results of each analysis are presented in tables along with comments, notes, and interpretations.

Research Question One

Descriptive Results of the Samples

Univariate analyses of the NLSY79-1993 Survey and the NLSY97-2010 Survey showed expected and unexpected results among the young adult population during the stable housing market around 1993 and during the downturned housing market around 2010. The results revealed shifts in homeownership rates, households' risk preferences, as well as demographic and economic characteristics between the two periods. Table 4.1 and Table 4.2 present descriptive statistics for the weighted NLSY79-1993 Survey sample and the weighted NLSY97-2010 Survey sample.

Table 4.1

Descriptive Statistics of the Weighted NLSY79-1993 Survey and NLSY97-2010 Survey Samples

	NLSY79-1993 Survey (*N = 6,854*)			NLSY97-2010 Survey (*N = 6,204*)		
Variable	Sample Statistics[a]	Own Home (*n=3,704*)	Do not Own (*n=3,150*)	Sample Statistics[a]	Own Home (*n=1,867*)	Do not Own (*n=4,337*)
Dependent Variable						
Homeownership-Yes		54.05			30.09	
Independent Variables						
Risk Preference						
Risk Preference Level 1	45.01	47.59	41.97	50.81	50.55	50.93
Risk Preference Level 2	12.93	14.92	10.58	22.16	24.26	21.25
Risk Preference Level 3	17.68	18.94	16.20	14.51	13.86	14.80
Risk Preference Level 4	24.24	18.51	30.98	11.53	10.66	11.91
Gender						
Male	54.27	52.22	56.68	51.42	48.47	52.73
Female	45.73	47.78	43.32	48.58	51.63	47.27
Race						
Non-Hispanic/ Non-Black	81.31	88.67	72.66	72.98	84.76	67.91
Black	12.45	6.54	19.40	14.35	5.84	18.02
Hispanic	6.24	4.79	7.94	12.67	9.40	14.07
Marital Status						
Married	61.86	82.74	37.30	38.92	69.19	25.90
Never Married	22.30	9.36	37.52	53.81	26.65	65.50
Other Marital Status	15.18	7.90	25.17	7.26	4.16	8.59
Presence of Children						

	NLSY79-1993 Survey (*N = 6,854*)			NLSY97-2010 Survey (*N = 6,204*)		
Variable	Sample Statistics[a]	Own Home (*n=3,704*)	Do not Own (*n=3,150*)	Sample Statistics[a]	Own Home (*n=1,867*)	Do not Own (*n=4,337*)
Yes	58.59	71.73	43.62	42.26	55.88	36.40
No	41.41	28.69	56.38	57.74	44.12	63.60
Education Level						
Less Than High School	9.05	6.03	12.61	7.59	2.90	9.61
High School	50.75	49.95	51.69	53.52	45.52	56.98
College	29.80	32.29	26.86	32.29	42.08	28.08
Post-College	10.40	11.72	8.84	6.04	9.23	4.67
Parents Education[b]						
Less Than High School	33.48	29.50	38.15	22.62	15.47	25.70
High School	49.23	51.92	46.08	42.28	45.21	41.02
College	14.76	15.58	13.57	27.95	30.99	26.65
Post-College	2.53	2.81	2.20	7.17	8.33	6.63
Parents Own Home[c]						
Yes	44.12	44.95	43.14	57.50	67.35	53.26
No	55.88	55.05	56.86	42.50	32.65	46.74
Geographic Region						
South	34.79	35.33	34.16	37.18	37.45	37.06
Northeast	18.65	18.29	19.07	15.47	11.65	17.11
North Central	28.07	30.66	25.02	24.50	31.84	21.34
West	17.83	15.38	20.70	22.12	18.59	23.63
Living Area						

	NLSY79-1993 Survey (*N = 6,854*)			NLSY97-2010 Survey (*N = 6,204*)		
Variable	Sample Statistics[a]	Own Home (*n=3,704*)	Do not Own (*n=3,150*)	Sample Statistics[a]	Own Home (*n=1,867*)	Do not Own (*n=4,337*)
Rural	20.63	24.39	16.20	23.16	31.94	19.37
Urban	79.37	75.61	83.80	76.84	68.06	80.63
Employment Status						
Full-time	69.58	76.59	61.34	58.57	71.59	52.97
Part-time	29.71	23.10	37.48	27.99	19.29	31.74
Unemployed	0.71	0.31	1.18	12.74	8.82	14.43
Savings						
Yes	75.35	84.03	65.15	32.20	50.43	24.36
No	24.65	15.97	34.85	67.80	49.57	75.64
Investments						
Yes	22.36	29.21	14.30	17.30	26.28	13.43
No	77.64	70.79	85.70	82.70	73.72	86.57
Student Loans						
Yes	1.36	0.81	2.00	7.06	10.76	5.47
No	98.64	99.19	98.00	92.94	89.24	94.53

[a] Sample proportions are reported in percentages.

[b] Parent's education is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[c] Parent's homeownership is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

Overall, Table 4.1 shows that the homeownership rates among young adults in the United States decreased significantly between 1993 and 2010. The majority of homeowners in both time

periods preferred the lowest risk level and had children, high school education, full-time job, and savings. Additionally, most homeowners were Non-Hispanic/Non-Black, married, and lived in the South and urban area. These findings are consistent with findings in Letkiewicz and Heckman (2017), which showed that most homeowners were married, Non-Hispanic/Non-Black, had children, and a high school education.

Table 4.2

Descriptive Statistics of the Weighted NLSY79-1993 Survey and NLSY97-2010 Survey Samples - Continuous Variable

	NLSY79-1993 Survey (*N = 6,854*)		NLSY97-2010 Survey (*N = 6,204*)	
Variable	Mean	Median	Mean	Median
Independent Variable				
Income	$25,131	$22,000	$66,981	$53,582

Analyses of Homeownerships by Selected Characteristics

A series of bivariate procedures was conducted on the NLSY79-1993 Survey to generate weighted descriptive statistics of homeownerships among each risk preference level and among each demographic or economic characteristic during the stable housing market. Similarly, a series of bivariate procedures was conducted on the NLSY97-2010 Survey to generate weighted descriptive statistics of homeownerships among each risk preference level and among each demographic or economic characteristic during the downturned housing market. These bivariate results are reported on Table 4.3.

Table 4.3

Homeownership by Selected Characteristics of the Weighted NLSY79-1993 Survey and NLSY97-2010 Survey Samples

	NLSY79-1993 Survey (*N = 6,854*)	NLSY97-2010 Survey (*N = 6,204*)
Variable[a]	Homeownership 54.05%	Homeownership 30.09%
Independent Variables		
Risk Preference		
Risk Preference Level 1	57.15	29.94
Risk Preference Level 2	62.39	32.95
Risk Preference Level 3	57.89	28.74
Risk Preference Level 4	41.26	27.81
Gender		
Male	52.01	28.31
Female	56.47	31.98
Race		
Non-Hispanic/Non-Black	58.94	34.95
Black	28.40	12.24
Hispanic	41.47	22.34
Marital Status		
Married	72.29	53.49
Never Married	22.69	14.91

	NLSY79-1993 Survey (*N = 6,854*)	NLSY97-2010 Survey (*N = 6,204*)
Variable[a]	Homeownership 54.05%	Homeownership 30.09%
Other Marital Status	26.95	17.25
Presence of Children		
Yes	65.79	39.79
No	37.44	23.00
Education Level		
Less Than High School	36.00	11.51
High School	53.20	25.59
College	58.58	39.22
Post-College	60.92	46.00
Parent's Education[b]		
Less Than High School	47.63	20.58
High School	56.94	32.18
College	57.73	33.36
Post-College	60.01	35.08
Parents Own Home[c]		
Yes	55.06	35.25
No	53.24	23.12
Geographic Region		
South	53.00	22.67
Northeast	59.03	39.11

	NLSY79-1993 Survey (*N = 6,854*)	NLSY97-2010 Survey (*N = 6,204*)
Variable[a]	Homeownership 54.05%	Homeownership 30.09%
North Central	54.88	30.31
West	46.64	25.29
Living Area		
Rural	63.90	41.52
Urban	51.48	26.65
Employment Status		
Full-time	59.49	36.78
Part-time	42.03	20.74
Unemployed	23.39	20.83
Savings		
Yes	60.27	47.12
No	35.02	22.01
Investments		
Yes	70.61	45.71
No	49.28	26.83
Student Loans		
Yes	32.32	45.84
No	54.34	28.90

[a] Sample proportions are reported in percentages.

[b] Parent's education is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

	NLSY79-1993 Survey (*N = 6,854*)	NLSY97-2010 Survey (*N = 6,204*)
Variable[a]	Homeownership 54.05%	Homeownership 30.09%

[c] Parent's homeownership is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

Findings reported in Table 4.3 vividly show the change in homeownership trends among young adults in America between 1993 and 2010. In the stable housing market around 1993, there were more than half of households in the sample that owned a home (54.05%). In the downturned housing market around 2010, less than a third of households in the sample owned a home (30.09%). This significant shift in the homeownership rates among the young adults might be explained by the economic realities. When compared to 2010, the economy in 1993 was stronger, with a higher employment rate, and therefore, it was likely more young adults could afford a home. Around 2010, the economy was still in the Great Recession, the employment rate had fallen, which may have made it difficult for young adults to buy a home.

The finding of the significant decline in homeownership rates between 1993 and 2010 is consistent with Engelhardt (2011), which indicated that the positive sentiment on the homeownerships and homeownership rates were strong particularly among younger households prior to the Great Recession. However, during and after the Great Recession, when the housing market was in the downturn, the share of younger households who owned homes decreased dramatically (Fry, 2013) due to changes in economic conditions. Furthermore, as discussed earlier in the theoretical framework section, homeownership serves two main purposes for most homeowners: consumption and investment. These two purposes of homeownership fit better to a stable housing market than a downturned housing market. The lower homeownership rates around 2010 may also be explained by the fact that more young adults might have moved during

the Great Recession for better job opportunities and prospects. When moving was a plan, young adults might have delayed homeownership decisions until a better time. Therefore, there would be more homeowners in 1993 than 2010.

The change in homeownership trends can be further examined by risk preferences, demographic and economic characteristics of the homebuyers in the 1993 and 2010 periods. While the majority of homeowners were households who preferred risk level two in both time periods, homeownership rates among all risk preference levels declined significantly between the time periods. However, the magnitude of the shifts in homeownership rates between the time periods were different among risk preference levels. For example, the decline in homeownership rates among households who preferred risk level one and three were steeper than the decline of the homeownership rates for the entire samples population.

Homeownership rates among male and female households also declined between the time periods. The decline was consistent by gender with female households continued to be the majority homeowners. Homeownership rates among male households declined from 52.01% in 1993 to 28.31% in 2010. Similarly, homeownership rates among female households declined from 56.47% in 1993 to 31.98% in 2010. Homeownership rates also declined among all ethnicities, Black, Hispanic, and Non-Hispanic/Non-Black, with Non-Hispanic/Non-Black as the majority between the time periods.

The change in the homeownership rates between the time periods were reflected in all marital statuses, with married households consistently the majority among homeowners. Homeownership rates among married households declined from 72.29% in 1993 to 53.49% in 2010. Homeownership rates among never married households declined from 22.69% in 1993 to 14.91% in 2010. Homeownership rates among other marital status households declined from

26.95% in 1993 to 17.25% in 2010. Homeownership rates among households with children had a sharp decline between time periods, from 65.79% in 1993 to 39.79% in 2010. Meanwhile, homeownership rates among households without children had a lesser decline between the time periods, from 37.44% in 1993 to 23.00% in 2010. This trend might indicate a change in the homeownership norms in America between the time periods that households who had children were less likely to buy a home in a downturned housing market due to the risk of a long-term investment and commitment such as a home.

The results showed a decline in the homeownership rates among all education levels between 1993 and 2010. However, the shift in the homeownership rates among households with a high school education was the largest with a 27.61% decrease between the time periods. Homeownership rates among households with post-college education continued to be the majority of homeowners between the time periods.

Homeownership rates among households with parents who had all levels of educations also declined between the time periods. Homeownership rates among households with parents who had post-college education continued to be the majority of homeowners between the time periods. This finding was consistent with Letkiewicz and Heckman's (2017) study, which reported that when compared to young adults whose parents did not own a home, young adults whose parents owned a home were about nine points more likely to own a home. The last two demographic characteristics of the households, geographic region and living area, also reported lower homeownership rates between 1993 and 2010 with households who live in the Northeast and rural area as the majorities homeowners.

According to the results, homeownership by employment status, an important economic variable in homeownership decisions, had a shift between the two periods. Especially,

homeownership rates among households who worked full-time decreased from 59.49% in 1993 to 36.78% in 2010. Homeownership rates among households who worked part-time decreased from 42.03% in 1993 to 20.74% in 2010. The only characteristic that had the least amount of decrease was unemployed status. Homeownership rates among household who were unemployed decreased from 23.39% in 1993 to 20.83% in 2010. This finding was not surprising as homeownerships are often very low among the unemployed.

Homeownership rates among households who had savings and investments also declined between 1993 and 2010. Homeownerships among households who had savings decreased from 60.27% in 1993 to 47.12% in 2010, and homeownerships among households who had investments decreased from 70.61% in 1993 to 45.71% in 2010. Homeownership rates by the last economic characteristic, student loans, showed an interesting trend. Unlike decreased trends of the homeownership rates by most demographic and economic characteristics, homeownership rates among households who had student loans increased from 32.32% in 1993 to 45.84% in 2010. This finding might indicate that the role student loans play in homeownership decisions might have changed between the time periods.

Overall, the bivariate results showed a significant decline in the homeownerships among young Americans between 1993 and 2010 by almost every characteristic of the households. The findings on the higher homeownership rates among young adults during 1993 period is consistent with Emmons and Noeth (2013), which also found that homeownership rates among the young were higher during stable housing markets. The finding on the lower homeownership rates during 2010 period may be explained by the change in young household's view on homeownerships after witnessing the recent housing crisis. Bracha and Jamison (2010) found

that younger households were relatively less confident about homeownership after witnessing large housing price declines during the recent housing crisis and the Great Recession.

The results from univariate and bivariate analyses of the current study provide an insight on the demographic characteristic, economic characteristics, and risk preferences of the young adults and homeowners in 1993 and 2010 periods. To understand the relationships between these characteristics, risk preferences, and homeownership decisions in the two periods, multivariate analyses are necessary. The results of the multivariate analyses aim to understand the relationships and answer research question two.

Research Question Two

The relationship between household's risk preference and homeownership decisions was explored by utilizing two separate logistic models for the NLSY79-1993 Survey and the NLSY97-2010 Survey. Both datasets were weighted for representativeness. Table 4.4 summarizes the results of two logistic regression models estimating the likelihood of owning a home among young adults. It is important to note that on Table 4.4 the shift in statistical significance alone or the inconsistency in the relationships between homeownership and other variables do not necessarily indicate the changes in homeownership decisions.

Table 4.4

Logistic Regression Results for Homeownership Decisions of the Weighted NLSY79-1993 Survey and NLSY97-2010 Survey Samples

	NLSY79-1993 Survey (*N=6,854*)	NLSY97-2010 Survey (*N=6,204*)

Variable[a]	b	SE b	Odds Ratio	b	SE b	Odds Ratio
Intercept	-2.369***	0.368	-5.428***		0.538	
Risk Preference						
(Risk Preference Level 1)						
Risk Preference Level 2	0.073	0.093	1.076	0.102	0.083	1.108
Risk Preference Level 3	0.119	0.082	1.127	-0.041	0.101	0.960
Risk Preference Level 4	-0.413***	0.074	0.662	-0.268*	0.111	0.765
Male (Female)	-0.179**	0.063	0.836	0.083	0.069	1.086
Race						
(Non-Hispanic/Non-Black)						
Black	-0.917***	0.099	0.400	-0.820***	0.125	0.440
Hispanic	-0.436***	0.124	0.646	-0.226*	0.111	0.798
Marital Status						
(Married)						
Never Married	-1.711***	0.085	0.181	-1.399***	0.076	0.247
Other Marital Status	-1.594***	0.084	0.203	-1.306***	0.141	0.271
Presence of Children (No Children)	0.604***	0.071	1.830	0.614***	0.078	1.847
Education Level						
(Less Than High School)						
High School	0.451***	0.111	1.570	0.589***	0.163	1.802
College	0.581***	0.125	1.787	0.950***	0.175	2.585

	NLSY79-1993 Survey (*N=6,854*)			NLSY97-2010 Survey (*N=6,204*)		
Variable[a]	b	SE b	Odds Ratio	b	SE b	Odds Ratio
Post-College	0.484**	0.150	1.622	1.207***	0.210	3.344
Parent's Education[b]						
(Less Than High School)						
High School	-0.005	0.071	0.995	0.264**	0.095	1.302
College	0.022	0.095	1.022	0.219*	0.104	1.245
Post-College	0.314	0.199	1.369	0.262	0.151	1.299
Parents Own Home[c] (Parents Do Not Own)	0.133*	0.060	1.142	0.138*	0.072	1.148
Geographic Region						
(South)						
Northeast	-0.268**	0.086	0.765	-0.496***	0.105	0.609
North Central	0.015	0.076	1.015	0.243**	0.084	1.276
West	-0.349***	0.087	0.705	-0.323***	0.092	0.724
Rural Area (Urban)	0.435***	0.077	1.544	0.468***	0.077	1.597
Employment Status						
(Full-time)						
Part-time	-0.383***	0.071	0.682	-0.600***	0.081	0.549
Unemployed	-0.682	0.406	0.506	-0.655***	0.114	0.519
Income[d]	0.231***	0.036	1.260	0.369***	0.047	1.446

	NLSY79-1993 Survey (*N=6,854*)			NLSY97-2010 Survey (*N=6,204*)		
Variable[a]	b	SE b	Odds Ratio	b	SE b	Odds Ratio
Savings (No Savings)	0.474***	0.074	1.606	0.548***	0.071	1.730
Investments (No Investments)	0.546***	0.075	1.726	0.300***	0.085	1.350
Student Loans (No Student Loans)	-0.416	0.259	0.660	0.280*	0.122	1.323
Pseudo R2	0.28			0.25		
Concordance Ratio	81.7			82.4		

[a] Reference categories are in parentheses.

[b] Parent's education is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[c] Parent's homeownership is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[d] Income was logged.

**p<.05; **p<.01; ***p=.001*

The results from two logistic regression models provide a picture of the relationship between household's risk preference and homeownership decisions and the relationships between household's demographic and economic characteristics and homeownership decisions among young adults within each time period. A summary of these relationships are shown in Table 4.5. The NLSY79-1993 Survey logistic results will be discussed first. The NLSY9-2010 Survey logistic results will be discussed next. Then both results are compared and discussed to provide the rationale for the next analysis to address the final research question.

The 1993 Period

Among risk preference levels in both models, Risk Preference Level Four is a statistically significant predictor of homeownership decisions. When compared to households who preferred the lowest risk level (level 1), those who reported the highest risk preference (level 4) were less likely to own a home in the 1993 period. The odds of owning a home were 33.8% lower for households who preferred risk level four as compared to households who preferred risk level one. This finding is consistent with Diaz-Serrano (2004) that indicated that, when compared to risk-seeking households, risk-averse households were more likely to plan for buying a home.

The results on the relationship between household's risk preference and the homeownership decisions in the 1993 period did not support H_1 of the research question two. The result is also different from that of Letkiewicz and Heckman (2017) which found the association between the willingness to take risk in finances and homeownership. However, Letkiewicz and Heckman (2017) used a single question on the willingness to take general finances as the measurement for risk tolerance. The current study used three lifetime income gamble questions as the measurement of the household's risk preference. The main difference of these two measurements was the complication of the survey questions. The single question on the willingness to take general finances is simpler and straight forward. Meanwhile, the combination of three lifetime income gamble questions is more complicated and focuses on longer life span of the respondents. Furthermore, Letkiewicz and Heckman (2017) used the NLSY97 survey. The current study used the NLSY79-1993 survey for the 1993 period analyses.

Almost all of the demographic and economic characteristics are also statistically significant predictors of homeownership decisions. These are important results as the relationships between these predictors and homeownership decisions will be analyzed for

possible shifts between the time periods. More importantly, these significant results confirm that the choice of the independent variables was relevant in the current study.

When compared to female households, male households were less likely to own a home. The odds of owning a home were 16.4% lower for male households when compared to female households. This finding might indicate the differences in household's perceptions on homeownerships between male and female in a stable housing market around 1993. Compared to Non-Hispanic/Non-Black households, Black households and Hispanic households were less likely to own a home. The odds of owning a home were 60% lower for Black households when compared to Non-Hispanic/Non-Black households. The odds of owning a home were 35.4% lower for Hispanic households when compared to Non-Hispanic/Non-Black households.

Never married households and other marital status households were less like to own a home in the 1993 period when compared to households that were married. The odds of owning a home were 81.9% lower for never married households when compared to married households. Similarly, the odds of owning a home were 79.9% lower for other marital status households when compared to married households. Compared to households without children, households with children were more likely to own a home. The odds of owning a home were 83% higher for households with children when compared to households without children.

When compared to households who did not complete high schools, households with high school, college, or post-college educations were more likely to own a home in the 1993 period. The odds of owning a home were 57% higher for households with a high school education when compared to households without a high school education. The odds of owning a home were 78.7% higher for households with a college education when compared to households without a high school education. The odds of owning a home were 62.2% higher for households with a

post-college education when compared to households without a high school education. These findings are expected since higher education normally leads to the higher income, which may make the home purchases easier.

Households with parents who owned a home were more likely to own a home in the 1993 period when compared to households with parents who did not own a home. The odds of owning a home were 14.2% higher for households with parents who owned a home when compared to households with parents who did not own a home. When compared to households who lived in the South, households who lived in the Northeast and the West were less likely to own a home. The odds of owning a home were 23.5% lower for households who lived in the Northeast when compared to households who lived in the South. The odds of owning a home were 29.5% lower for households who lived in the West when compared to households who lived in the South. When compared to households who lived in urban areas, households who lived in rural areas were more likely to own a home. The odds of owning a home were 54.4% higher for households who lived in rural areas when compared to households who lived in urban areas.

According to the results, households who worked part-time were less likely to own a home when compared to households who worked full-time in 1993. The odds of owning a home were 31.8% lower for households who worked part-time when compared to households who worked full-time. The results showed that income appeared to have a positive relationship with homeownership decisions. For each increase in income, the odds of owning a home increased by a factor of 1.26.

Households who had savings or investments were more likely to own a home when comparing to households who did not have savings or investments in the 1993 period. The odds of owning a home were 60.6% higher for households with savings when compared to households

without savings. The odds of owning a home were 72.6% higher for households with investments when compared to households without investments.

The same sort of logistic results are discussed for the 2010 period next. The findings will later be compared against each other to see what changes occurred, if any, between the stable housing market and the downturned housing market and homeownership decisions.

The 2010 Period

When compared to households who preferred the lowest risk level (level 1), those who preferred the highest risk level (level 4) were less likely to own a home in the 2010 period. The odds of owning a home were 23.5% lower for households who preferred risk level four when compared to households who preferred risk level one. The results on the relationship between household's risk preference and the homeownership decisions in the 2010 period supported H_2 of the research question two. The result is consistent with Letkiewicz and Heckman (2017) which found the association between the willingness to take risk in finances and homeownership. It is important to note that Letkiewicz and Heckman (2017) used a single question on general risk taking as risk tolerance measurement. The current study used three lifetime income gamble questions as household's risk preference measurement. However, both Letkiewicz and Heckman (2017) and the current study used the NLSY97 survey.

Almost all of the demographic and economic characteristics were statistically significant predictors of homeownership decisions. When compared to Non-Hispanic/Non-Black households, Black households and Hispanic households were less likely to own a home. The odds of owning a home were 56% lower for Black households when compared to Non-Hispanic/Non-Black households. The odds of owning a home were 20.2% lower for Hispanic households when compared to Non-Hispanic/Non-Black households.

Never married households and other marital status households were less likely to own a home in the 2010 period when compared to households who were married. More specifically, the odds of owning a home were 75.3% lower for never married households when compared to married households. The odds of owning a home were 72.9% lower for other marital status households when compared to married households. Furthermore, households with children were more likely to own a home when compared to households without children. The odds of owning a home were 84.7% higher for households with children when compared to households without children.

When compared to households who did not complete high schools, households with high school, college, or post-college educations were all more likely to own a home in the 2010 period. This finding is consistent with the finding in Letkiewicz and Heckman (2017) that education had a strong effect on the homeownerships among the young. The odds of owning a home were 80.2% higher for households with a high school education when compared to households without a high school education. The odds of owning a home were 158.5% higher for households with a college education when compared to households without a high school education. The odds of owning a home were 234.4% higher for households with a post-college education when compared to households without a high school education.

Households with parents who had high school or college educations were more like to own a home in the 2010 period when compared to households with parents who did not complete high school. The odds of owning a home were 30.2% higher for households with parents who had a high school education when compared to households with parents who did not complete high school. The odds of owning a home were 24.5% higher for households with parents who had a college education when compared to households with parents who did not complete high

school. Compared to households with parents who did not own a home, households with parents who owned a home were more likely to own a home. The odds of owning a home were 14.8% higher for households with parents who owned a home when compared to households with parents who did not own a home.

When compared to households who lived in the South, households who lived in the Northeast and the West were less likely to own a home in the 2010 period. The odds of owning a home were 39.1% lower for households who lived in the Northeast when compared to households who lived in the South. The odds of owning a home were 27.6% lower for households who lived in the West when compared to households who lived in the South. However, as compared to households who lived in the South, households who lived in the North Central were more likely to own a home. The odds of owning a home were 27.6% higher for households who lived in the North Central when compared to households who lived in the South. When compared to households who lived in urban area, households who lived in rural area were more likely to own a home. The odds of owning a home were 59.7% higher for households who lived in rural area when compared to households who lived in urban area.

According to the results, households who worked part-time or were unemployed were less likely to own a home when compared to households who worked full-time in the 2010 period. The odds of owning a home were 45.1% lower for households who worked part-time when compared to households who worked full-time. The odds of owning a home were 48.1% lower for households who were unemployed when compared to households who worked full-time. Income appeared to have a positive relationship with homeownership decisions, as the results showed. The odds of owning a home were 44.6% higher when income increases.

Households who had savings or investments were more likely to own a home when comparing to households who did not have savings or investments in the 2010 period. The odds of owning a home were 73% higher for households with savings when compared to households without savings. The odds of owning a home were 35% higher for households with investments when compared to households without investments. Finally, households who had student loans were more likely to own a home when compared to households who did not have student loans. The odds of owning a home were 32.3% higher for households with student loans when compared to households without student loans.

1993 vs 2010 Periods

When comparing the 1993 period and the 2010 period logistic results, several consistent patterns were noted. In both periods, holding all else equal, households who preferred risk level four were consistently less likely to own a home when compared to households who preferred risk level one. Also, Black and Hispanic households were more consistently less likely to own a home when compared to Non-Hispanic/Non-Black households in both periods. Never married and other marital status households were consistently less likely to own a home when compared to married households in both periods. Households with children were consistently more likely to own a home when compared to households without children in both periods. Households with high school, college, or post-college educations were also consistently more likely to own a home when compared to households without a high school education in both periods. In addition, households with parents who owned a home were consistently more likely to own a home when compared to households with parents who did not own a home in both periods. Households who lived in the Northeast and in the West were more consistently less likely to own a home when compared to households who lived in the South in both periods. Households who lived in rural

areas were consistently more likely to own a home when compared to households who lived in urban areas in both periods. Households who worked part-time were consistently less likely to own a home when compared to households that worked full-time in both periods. Income had a consistently positive association with likelihoods to own a home in both periods. Finally, households who had savings or investments were consistently more likely to own a home then compared to households who did not have savings or investments.

From the logistic results of the 1993 and 2010 periods, several differences in the relationships between household's demographic and economic characteristics and homeownership decisions were also noted between the two periods. Holding all else equal, male households were less likely to own a home than female households in 1993 period, whereas no significant differences were noted in the 2010 period. Households with parents who had high school or college educations were more likely to own a home than households with parents who did not complete high schools in the 2010 period, whereas no significant differences were noted in the 1993 period.

Households who lived in the North Central were less likely to own a home than households who lived in the South in the 2010 period, whereas no significant differences were noted in the 1993 period. Similarly, households who were unemployed were less likely to own a home than households who worked full-time in 2010, whereas no significant differences were noted in the 1993 period. Lastly, households with student loans were more likely to own a home than households without student loans in the 2010 period, whereas no significant differences were noted in the 1993 period.

Traditional logistic results above showed the snapshots of the relationships between household's risk preferences, household's demographic and economic characteristics, and

homeownership decisions in each time period. The results also provided evidence of possible shifts in these relationships between the time periods. Therefore, to determine if possible shifts occurred, the next analysis utilized Allison's method as described in the method chapter of this study. Variables included in the Allison's method were variables that showed significance in both the 1993 and 2010 periods and variables that showed significance in either period. Based on the NLSY79-1993 Survey and the NLSY97-2010 Survey logistic results, interpretations, and comparisons above, all independent variables will be included in the next analysis as interaction variables. The results of the next analysis will address research question three.

Table 4.5

Revealed Relationships between Characteristics and Risk Preference and Homeownership Decisions: The NLSY79-1993 Survey and the NLSY97-2010 Survey

	Relationship	
Variable	NLSY79-1993 Survey	NSLY1997-2010 Survey
Risk Preference		
Risk Preference Level 2	n/a	n/a
Risk Preference Level 3	n/a	n/a
Risk Preference Level 4	-	-
Male	-	n/a
Race		
Black	-	-
Hispanic	-	-
Marital Status		

	Relationship	
Variable	NLSY79-1993 Survey	NSLY1997-2010 Survey
Never Married	-	-
Other Marital Status	-	-
Presence of Children	+	+
Education Level		
High School	+	+
College	+	+
Post-College	+	+
Parent's Education[a]		
High School	n/a	+
College	n/a	+
Post-College	n/a	n/a
Parents Own Home[b]	+	+
Geographic Region		
Northeast	-	-
North Central	n/a	+
West	-	-
Rural Area	+	+
Employment Status		
Part-time	-	-
Unemployed	n/a	-
Income[c]	+	+

	Relationship	
Variable	NLSY79-1993 Survey	NSLY1997-2010 Survey
Savings	+	+
Investments	+	+
Student Loans	n/a	+

[a] Parent's education is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[b] Parent's homeownership is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[c] Income was logged.

Research Question Three

Given the results of the separate time period logistic regression models, the next set of statistical analyses seek to determine if the relationship between household's risk preferences and homeownership decisions and the relationship between demographic and economic characteristics and homeownership decisions have changed between 1993 and 2010. Allison's method (Allison, 1999) was used to investigate research question three. The NLSY79-1993 Survey data and the NLSY97-2010 Survey data were combined to create a pooled sample, called NLSY79-NLSY97. Within the NLSY79-NLSY97 data, the NLSY97 was adjusted by a factor of $1+\delta$. A series of logistic regression models utilizing different levels of δ were generated to obtain the results for -2 log likelihood comparisons. As noted in Allison's method, δ is optimal in the logistic models if the log likelihoods are maximized. Since the log likelihood reported in Table 4.6 below is in the form of -2 Log Likelihood, the model with minimum value represents the model with the optimal δ.

Table 4.6

Delta and Log Likelihoods for Delta Selection Algorithm

NLSY79-1993 Survey - NLSY97-2010 Survey	
Delta	-2 Log Likelihood
-0.1	12582.445
-0.05	12578.546
-0.04	12578.195
-0.03	12577.977
-0.02	**12577.890**
-0.01	12577.928
0.00	12578.088
0.01	12578.368
0.02	12578.763
0.03	12579.270
0.04	12579.886
0.05	12580.609
0.1	12585.706

Repeated logistic procedures with the NLSY79-NLSY97 sample indicated the difference in the disturbance variation was -0.02. This means the standard deviation of the disturbance variance for the NLSY97-2010 Survey is two percent less than that of the NLSY79-1993 Survey. Since delta of -0.02 provides the best model fit, this value was used for the chi-square testing and for the rest of the analyses to address research question three. Table 4.7 provides the full results

of the logistic regression analyses using Allison's method with delta value of -0.02. These analyses were generated only to perform the chi-square testing.

Table 4.7

Logistic Regression Results for Homeownership Decisions of the Weighted NLSY79-1993 Survey and NLSY97-2010 Survey Combined Sample, Adjusted for 1 + δ

	NLSY79-1993 Survey - NLSY97-2010 Survey	
Variable[a]	b	SE b
NLSY97	-0.878***	0.065
Risk Preference		
(Risk Preference Level 1)		
Risk Preference Level 2	0.038	0.064
Risk Preference Level 3	0.051	0.065
Risk Preference Level 4	-0.309***	0.063
Male (Female)	-0.102*	0.047
Race		
(Non-Hispanic/Non-Black)		
Black	-0.891***	0.062
Hispanic	-0.371***	0.065
Marital Status		
(Married)		
Never Married	-1.558***	0.057
Other Marital Status	-1.502***	0.073

	NLSY79-1993 Survey - NLSY97-2010 Survey	
Variable[a]	b	SE b
Presence of Children (No Children)	0.577***	0.054
Education Level		
(Less Than High School)		
High School	0.345***	0.085
College	0.586***	0.095
Post-College	0.652***	0.122
Parent's Education[b]		
(Less Than High School)		
High School	0.033	0.055
College	0.085	0.071
Post-College	0.226	0.127
Parents Own Home[c] (Parents Do Not Own)	0.149**	0.046
Geographic Region		
(South)		
Northeast	-0.440***	0.070
North Central	0.082	0.060
West	-0.287***	0.063
Rural Area (Urban)	0.501***	0.058
Employment Status		
(Full-time)		

	NLSY79-1993 Survey - NLSY97-2010 Survey	
Variable[a]	b	SE b
Part-time	-0.465***	0.054
Unemployed	-0.671***	0.113
Income[d]	0.254***	0.028
Savings (No Savings)	0.523***	0.051
Investments (No Investments)	0.486***	0.060
Student Loan (No Student Loan)	0.231	0.120
Pseudo R2	0.35	
Concordance Ratio	83.3	

[a] Reference categories are in parentheses.

[b] Parent's education is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[c] Parent's homeownership is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[d] Income was logged.

**p<.05; **p<.01; ***p=.001*

With the disturbance variation identified, a chi-square test was performed on the following hypotheses for the NLSY79-NLSY97 sample:

H_{o1}: There is no difference in the relationship between household's risk preferences and homeownership decisions and between demographic and economic characteristics and homeownership decisions across time periods.

H_{a1}: There are differences in the relationships between household's risk preferences and homeownership decisions and between demographic and economic characteristics and homeownership decisions across time periods.

Table 4.8 provides results of the chi-square test.

Table 4.8

Chi-Square Test Results for Model Differences

NLSY79-1993 Survey - NLSY97-2010 Survey	
Sample	-2 Log Likelihood
NLSY79	7184.199
NLSY97	5752.038
NLSY79–NLSY97	12,577.890
Test Statistic	358.347
P value	0.001

As shown above in Table 4.8, the sum of the -2 log likelihood of the separate time period models in Table 4.4 were computed. This summation was subtracted from the -2 log likelihood of the optimized logistic model, providing the chi-square test statistic. The value of this difference was subjected to a chi-square test with 4 degrees of freedom (equal to the sum of difference in the number of parameters between models). P-value of 0.001 was reported, which indicated that the null hypothesis was to be rejected and that there are differences between the two time periods. This result warranted further investigation of the differences in relationships between independent variables and the dependent variable, homeownership decisions.

The final analyses of this study were performed to determine the relational differences evident across time periods. Two logistic regression models with incorporated interaction terms

and δ included were performed. These interaction terms were included for variables based on evidence of possible changes in their relationship with homeownership decisions noted in the results to research question two. Table 4.9 shows results of the analyses. The left side column of Table 4.9 represents the standard model and the right side column represents results for the interaction variables created specifically for this analysis. The interpretations below are for the right side column of the Table 4.9. When interpreting these results, it is important to note that changes in the relationships can be driven by three possibilities: shifts in homeownership decisions of the specified category, shift in homeownership decisions of the reference category, or a combination of shifts in homeownership decisions of both.

Table 4.9

Logistic Regression Results from Interaction Model for Homeownership Decisions of the Weighted NLSY79-1993 Survey and NLSY97-2010 Survey Sample

Variable[a]	b	SE b	Odds Ratio	Variable[a]	b	SE b	Odds Ratio
Intercept	-2.322***	0.373		Interaction Variables (NLSY97)			
Cohort							
NLSY79							
NLSY97	-2.800***	0.671	0.061				
Risk Preference				Risk Preference			

Variable[a]	b	SE b	Odds Ratio	Variable[a]	b	SE b	Odds Ratio
(Risk Preference Level 1)				(Risk Preference Level 1)			
Risk Preference Level 2	-0.006	0.094	0.994	Risk Preference Level 2	0.053	0.129	1.054
Risk Preference Level 3	0.063	0.082	1.065	Risk Preference Level 3	-0.091	0.135	0.913
Risk Preference Level 4	-0.321***	0.074	0.726	Risk Preference Level 4	0.034	0.141	1.035
Male (Female)	-0.233***	0.063	0.792	Male (Female)	0.347***	0.097	1.415
Race (Non-Hispanic/Non-Black)				Race (Non-Hispanic/Non-Black)			
Black	-0.916***	0.079	0.400	Black	0.088	0.132	1.092
Hispanic	-0.450***	0.087	0.638	Hispanic	0.203	0.133	1.225
Marital Status (Married)				Marital Status (Married)			
Never Married	-1.691***	0.084	0.184	Never Married	0.303**	0.116	1.354
Other Marital Status	-1.574***	0.085	0.207	Other Marital Status	0.246	0.174	1.279
Presence of Children (No Children)	0.529***	0.072	1.698	Presence of Children (No Children)	0.112	0.110	1.118
Education Leve				Education Level			

Variable[a]	b	SE b	Odds Ratio	Variable[a]	b	SE b	Odds Ratio
(Less Than High School)				(Less Than High School)			
High School	0.292**	0.103	1.340	High School	0.199	0.191	1.220
College	0.440***	0.117	1.553	College	0.445*	0.210	1.560
Post-College	0.417**	0.150	1.518	Post-College	0.787**	0.264	2.196
Parent's Education[b]				Parent's Education[b]			
(Less Than High School)				(Less Than High School)			
High School	-0.037	0.070	0.964	High School	0.226	0.119	1.254
College	0.020	0.098	1.020	College	0.180	0.146	1.197
Post-College	0.251	0.216	1.286	Post-College	0.005	0.273	1.005
Parents Own Home[c]	0.097	0.060	1.102	Parents Own Home[c]	0.056	0.097	1.058
(Parents Do Not Own)				(Parents Do Not Own)			
Geographic Region				Geographic Region			
(South)				(South)			
Northeast	-0.398***	0.089	0.672	Northeast	-0.183	0.147	0.833
North Central	-0.011	0.080	0.989	North Central	0.231	0.122	1.260
West	-0.288***	0.084	0.750	West	-0.006	0.128	0.994
Rural Area (Urban)	0.450***	0.080	1.568	Rural Area (Urban)	0.100	0.116	1.105
Employment Status				Employment Status			
(Full-time)				(Full-time)			
Part-time	-0.382***	0.071	0.683	Part-time	-0.197	0.112	0.822

Variable[a]	b	SE b	Odds Ratio	Variable[a]	b	SE b	Odds Ratio
Unemployed	-0.441	0.395	0.644	Unemployed	-0.159	0.414	0.853
Income[d]	0.249***	0.037	1.283	Income[d]	0.099	0.061	1.104
Savings (No Savings)	0.485***	0.069	1.623	Savings (No Savings)	0.083	0.103	1.087
Investments (No Investments)	0.562***	0.079	1.754	Investments (No Investments)	-0.212	0.123	0.809
Student Loans (No Student Loans)	-0.314	0.273	0.730	Student Loans (No Student Loans)	0.628*	0.305	1.874
Pseudo R2	0.30						
Concordance Ratio	83.5						

[a] Reference categories are in parentheses.

[b] Parent's education is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[c] Parent's homeownership is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[d] Income was logged.

**p<.05; **p<.01; ***p=.001*

According to the results, household's risk preference was found to have no significant differences in its relationship with homeownership decisions among young adults between 1993 and 2010 time periods. One of the possible explanations for this finding might be that young adults' consistent view on the homeownership over time. Young adults might have viewed homeownership as a risky investment regardless of the housing market and economic conditions in any given time period. The consistency in the relationship between household's risk

preference and homeownership decisions over time might indicate that for young adults, consumption purposes of homeownership outweighed investment purposes.

Furthermore, young adults tend to move more often than the older populations due to job opportunities, social changes, and family structures. When moving is a plan, young adults might delay homeownership decisions regardless of their risk preferences. Thus, household mobility might be another possible explanation for consistency in the relationship between household's risk preference and homeownership decisions over time.

Some other variables were also found to have no significant differences in their relationships with homeownership decisions between time periods. These variables include race, other marital status, presence of children, household's high school education, parent's college education, parents homeownership, geographic region, living area, employment status, income, savings, and investments. However, significant differences were noted for male, never married, household's college and post-college education, parent's high school education, and student loan status. Table 4.10 summarizes these results.

Holding all else equal, males were significantly more likely to own a home in 2010 than 1993, when compared to females. Bivariate descriptive indicated that homeownership rates among males decreased from 52.01% in 1993 to 28.31% in 2010. During the same time period, homeownership rates among females also decreased from 56.47% in 1993 to 31.98% in 2010. This evidence suggests that the shift in the relationship between males and homeownership decisions was driven by a relatively aggressive increase in homeownership rate by males in 2010.

Holding all else equal, never married households were significantly more likely to own a home in 2010 than 1993, when compared to married households. Bivariate descriptive indicated

that homeownership rates among never married households decreased from 22.69% in 1993 to 14.91% in 2010. During the same time period, homeownership rates among married households decreased from 72.29% in 1993 to 53.49% in 2010. This evidence suggests that the shift in the relationship between never married status and homeownership decisions was driven by a relatively aggressive increase in homeownership rate by never married households in 2010.

Holding all else equal, households with a college education were significantly more likely to own a home in 2010 than 1993, when compared to households without a high school education. Bivariate descriptive indicated that homeownership rates among households with a college education decreased from 58.58% in 1993 to 39.22% in 2010. During the same time period, homeownership rates among households without a high school education decreased from 36.00% in 1993 to 11.51% in 2010. This evidence suggests that the shift in the relationship between college education and homeownership decisions was driven by a relatively aggressive increase in homeownership rate by households with college education in 2010.

Holding all else equal, households with a post-college education were significantly more likely to own a home in 2010 than 1993, when compared to households without a high school education. Bivariate descriptive indicated that homeownership rates among households with a post-college education decreased from 60.92% in 1993 to 46.00% in 2010. During the same time period, homeownership rate among households without a high school education decreased from 36.00% in 1993 to 11.51% in 2010. This evidence suggests that the shift in the relationship between post-college education and homeownership decisions was driven by a relatively aggressive increase in homeownership rate by households with post-college education in 2010.

Holding all else equal, households with student loans were significantly more likely to own a home in 2010 than 1993, when compared to households without student loans. Bivariate

descriptive indicated that homeownership rates among households with student loans increased from 32.32% in 1993 to 45.84% in 2010. During the same time period, homeownership rate among households without student loans decreased from 54.34% in 1993 to 28.90% in 2010. This evidence suggests that the shift in the relationship between households with student loans status and homeownership decisions was driven by both increased homeownership rate by households with student loans and decreased homeownership rate by households without student loans in 2010.

Overall, Allison's method analysis results showed the shifts in the relationships between gender (male), marital status (never married), education (college and post-college), and student loan status (have student loans) and homeownership decisions between 1993 and 2010. Table 4.10 illustrates the changes in these relationships between the time periods.

Table 4.10

Revealed Shifts in the Relationship between Risk Preference, Demographic and Economic Characteristics and Homeownership Decisions: NLSY79-1993 Survey and NLSY97-2010 Survey

Variable	NLSY79-1993 Survey and NLSY97-2010 Survey
Risk Preference	
Risk Preference Level 2	n/a
Risk Preference Level 3	n/a
Risk Preference Level 4	n/a
Male	+
Race	
Black	n/a

Variable	NLSY79-1993 Survey and NLSY97-2010 Survey
Hispanic	n/a
Marital Status	
Never Married	+
Other Marital Status	n/a
Presence of Children	n/a
Education Level	
High School	n/a
College	+
Post-College	+
Parent's Education[a]	
High School	n/a
College	n/a
Post-College	n/a
Parents Own Home[b]	n/a
Geographic Region	
Northeast	n/a
North Central	n/a
West	n/a
Rural Area	n/a
Employment Status	
Part-time	n/a
Unemployed	n/a

Variable	NLSY79-1993 Survey and NLSY97-2010 Survey
Income[c]	n/a
Savings	n/a
Investments	n/a
Student Loans	+

[a] Parent's education is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[b] Parent's homeownership is reported in 1979 for the NLSY79 and in 1997 for the NLSY97.

[c] Income was logged.

Summary

This chapter described all statistical analyses and procedures needed to answer all three research questions of the current study. The univariate and bivariate analyses results provided the sample descriptive. Multivariate analyses results provided information on the relationship between household's risk preference and the homeownership decisions and the relationships between household's characteristics and the homeownership decisions. All results of the analyses were reported on tables throughout the chapter with discussions, remarks, explanations, and interpretations. The next chapter provides a discussion regarding the findings presented in chapter four, the limitations, the implications, and a conclusion for the current study.

Chapter 5 - Discussion

This final chapter discusses the findings in the study and their implications. The chapter also details the contribution to the literature on household's risk preference and homeownership decisions research fields. Strengths and limitations of the study are also noted to provide suggestions and directions for future research. The main focus of this study is to examine the relationship between household's risk preference and homeownership decisions among young adults ages 27 to 33 years old over two housing market conditions: the stable housing market around 1993 and the downturned housing market around 2010. At the same time, the study explores the relationships between household's demographic and economic characteristics and homeownership decisions.

Discussion of the Findings

Univariate and bivariate analyses were used to generate descriptive statistics on the NLSY79-1993 Sample and NLSY97-2010 Sample. Separate binary logistic regression models were used to investigate the relationships between household's risk preference and homeownership decisions and the relationships between household's demographic and economic characteristics and homeownership decisions in 1993 and 2010. Finally, Allison's method was utilized to detect the effects of shifting risk preference and demographic and economic characteristics over the two time periods and to identify variables associated with the shifts in homeownership decisions.

According to the findings, there was a significant number of households who owned a home in NLSY79-1993 Survey (54.05%), and there were 30.09% of households who owned a

home in the NLSY-97-2010 Survey. This shift in the homeownership rates among young adults signifies the magnitude of the 2008 housing crisis that led to the Great Recession. There might be negative psychological effects of the Great Recession on young adult's on future job prospects and therefore on their decisions to buy a home. Unlike the stable housing market around 1993, during the downturned housing market around 2010, millions of homeowners lost their homes or experienced negative home equity due to job loss, reduction in work hours, or a decline in home values (Collins & Choi, 2010). The finding in the decline of the homeownerships between the two periods is consistent with the findings in Drew (2015) that indicated that regardless of housing market conditions over the last two decades homeownership rates by young adults would likely have lowered.

The Relationship between Household's Risk Preference and Homeownership Decisions

At the univariate level, household's risk preference level one (the most risk averse level) was found to be the majority group in both 1993 and 2010. This finding was consistent with prior research that showed that many individuals seemed to have risk averse preferences (Hanna, Gutter, & Fan, 2001). Furthermore, at the bivariate level, household's risk preference level two consistently reported the highest homeownership rates in 1993 and 2010 when comparing to each of the other household's risk preference level. One possible explanation for these findings is that young adults were sensitive to the risk factors of homeownerships described in Ambrose and Pennington-Cross (2000) and Smith, Searle and Cook (2009).

Logistic regression results indicated that households who preferred the highest risk level (level four) were less likely to own a home than households who preferred the lowest risk level (level one) in both time periods, 1993 and 2010. The result of the 1993 period analysis is different from that of Letkiewicz and Heckman (2017) which found the association between the

willingness to take risk in finances and homeownership. One of the possible reasons for the difference comes from the different measurement of risk preference between the two studies. Letkiewicz and Heckman (2017) measure risk tolerance by a single question on the respondent's willing to take on general finances. The current study used three lifetime income gamble questions as measurement of household's risk preference. Furthermore, Letkiewicz and Heckman (2017) used the NLSY97 survey while the current study used the NSLY79 survey for the 1993 period.

Allison's method results showed no changes in the relationship between household's risk preference and homeownership decisions between the time periods. The consistency in the relationship between household's risk preference and homeownership decisions may imply the consistency in the individual's perception of expected utility that homeownership provides.

According to expected utility theory (von Neumann & Morgenstern, 1944), when making decisions on homeownership, households chose to own or to rent by comparing expected utility values of each option and its uncertainty. Under the lens of expected utility theory, risk averse households recognized the homeownership expected utilities and chose to own a home instead of renting. Especially, when a home was bought for a consumption purpose, it was not the exact dollar amount the homeownership returned from the market, but the utilities it provided to everyone in the household.

The finding in the relationship between household's risk preference and homeownership decisions is consistent with Diaz-Serrano's (2004) findings, which indicated that households who were risk averse were more likely to plan for buying a home when compared to those who were not risk averse. The finding was also consistent with Cheung and Miu (2015), which found that homeownership was attractive to conservation investors. Since most of the NLSY79 and

NLSY97 cohorts are not investors, comparisons between the findings of the current study and the findings in Cheung and Miu (2015) must be done with trepidation.

Prior research showed homeownership has become more risky after the stable housing market period (Chetty & Szeidl, 2007; Hoffmann, Post, & Pennings, 2013; Prather, Lin, & Chu, 2013; Voicu & Seiler, 2013). Meanwhile, the relationship between risk preference and homeownership decisions has not changed between the stable housing market period and the downturned housing market period. One possible reason for the consistency of this relationship is that young and first-time homebuyer's views on homeownerships were influenced by the benefits of homeownerships for everyone in the households. The economic benefits of homeownership include the preferential tax treatment, additional housing collateralized credit, and insurance against rental price increases (Diaz & Luengo-Prado, 2010). Other benefits of homeownership include higher overall life satisfaction of the owners and higher satisfaction in family relationships (Rohe & Basolo, 1997; Stillman & Liang, 2010). Haurin, Parcel, and Haurin (2002) indicated that owning a home was associated with higher quality home environments as well as higher school achievement scores and fewer behavior problems in children. Therefore, when making decisions on housing tenure choice, household's assessment of homeownership benefits and households' commitment to buy might have dominated the risk preference.

Another possible reason could be that many households in the transition phases to adulthood and/or the process of family structure changes; thus, buying a home might be more than just the willingness or the unwillingness to take risks. There are economic factors that influence a homeownerships decision, such as long-term mortgage interest rates, the prospect of permanent jobs, and future home prices. There are also other factors, such as credit scores, down

payments, location preferences, peer pressures, and family norms, all of which can influence homeownership decisions.

The finding that the relationship between household's risk preference and the homeownership decisions did not change over the two time periods, representing two different housing market conditions provide an important implication to our macro policymakers. Housing market was perceived by households as a safe investment during 1993 period (DiPasquale & Wheaton, 1994; DiPasquale & Glaeser, 1999; Haurin, Parcel, & Haurin, 2002; Rossi & Weber, 1996) as housing market was stable. During 2010, the later period, the housing market was perceived as a risky investment when the 2007 housing crisis unfolded (Allen & Carletti, 2010; Mian & Sufi, 2008; Taylor, 2010). However, young adult's on the home purchasing behavior and pattern in relation to their risk preference did not change. This finding highlights the magnitude of the systematic risks on the housing markets that policymakers should pay their attentions to.

Young adults may lack specific financial knowledge or resources to understand or anticipate the systematic risks of the housing markets, leading to their uninformed homeownership decisions. Policymakers can provide guidelines and forecasts to help young households to foresee the fluctuation of mortgage interest rates, home prices, job markets, and economic conditions. It is also benefits young and first time homebuyers if educations on these areas are provided.

The Relationship between Household's Demographic and Economic Characteristics and Homeownership Decisions

Results from Allison's method show a shift in the relationship between male and homeownership decisions between 1993 and 2010. The shift was driven by an increase in the homeownership rate by males in the NLSY97-2010 sample. This finding may suggest a new role

that gender plays in homeownership decisions among young adults between the two periods. One possible explanation for the increase in homeownership rate among males is perception on male's income. Blaauboer (2010) found earning potential for males, indicated by the level of education, was much more important to housing tenure and choice when compared to those for females, and single males were more likely to own a home than single females.

The relationship between ethnicities and homeownership decisions did not change between the two periods. However, both Black and Hispanic households were less like to own a home when comparing to Non-Hispanic/Non-Black households in both periods. This finding is consistent with Long and Caudill's (1992) findings, which indicated that White households were more likely to own homes when comparing to Black households.

According to the Allison's method results, there was a shift in the relationship between never married households and homeownership decisions between the two periods. The shift was driven by an increase in the homeownership rate by never married households in 2010. This shift may indicate a change in the family structure between the two time periods: young adults might have delayed their marriage or perspectives on marriage might have changed over time. When exploring the likelihoods of owning a home among all marital status, logistic results showed that never married households and other marital status households were less likely to own a home, when compared to married households. This finding alone was consistent with Grinstein-Weiss, Charles, Guo, Manturuk, and Key (2011), which indicated that married couples buy homes more often and quicker than unmarried individuals.

There was no change in the relationship between the presence of children and homeownership decisions. However, logistic results showed that households who had children in the family were more likely to buy a home, when compared to households who did not have

children in the family. This finding was consistent with findings in Letkiewicz and Heckman (2017), which also found that households with children were more like to own a home than households without children. Prior research showed a positive association between homeownerships and children's well-being and children's school performance (Green, Painter, & White, 2012; Haurin, Parcel, & Haurin, 2002). This relationship might be a possible explanation for why young adults with children are more likely to own a home and take advantage of social expected utilities of homeownership.

Both college education and post-college education and their relationships with homeownership decisions changed between the two periods. The changes might have driven by the increases in homeownership rates by households with college education and households with post-college education. Findings from the logistic analyses also showed that households with high school, college, or post-college educations were more likely to own a home when compared to households who did not complete high schools. The finding is consistent with Letkiewicz and Heckman (2017) research, which found strong effects of higher education on homeownership. It is possible that households with higher educations are likely to earn higher incomes, and, therefore, likely to obtain a mortgage loan for the house purchase.

One of the parent background variables that was included in the current study is parent's homeownership. Households whose parents owned a home as reported in 1979 or 1997 were more likely to own a home when compared to households whose parents did not own of home. This finding was consistent with Letkiewicz and Heckman (2017), which reported that households whose parents owned a home were about nine percentage points more likely to own a home when compared to households whose parents did not own a home. The finding was also

consistent with Boehm and Schlottmann's (1999) finding that parent's housing tenure played a key role in determining whether or not the children become homeowners.

Homeownership rates among households who worked full-time or part-time significantly decreased between 1993 and 2010. This shift could be explained by the decrease in the numbers of households who worked full-time or part-time in 2010, when the Great Recession started. Employment status, an important economic input when young adults make decisions on the home purchase, was affected by the 2008 Great Recession when millions of households lost their jobs or had their work hours reduced. Logistic results showed households who worked part-time were less likely to own a home in 1993, and households who worked part-time or were unemployed were less likely to own a home in 2010. These findings were expected as the employment status is a key determining factor that indicates if a homebuyer has enough income to pay for the mortgage on a house.

Income, another economic characteristic, had a positive association with homeownership decisions in both periods. Similar to employment status, income is an important consideration for both homebuyers and lenders during the home purchasing process. This finding is consistent with Letkiewicz and Heckman's (2017) findings, which confirmed income was a significant predictor of homeownership, and Clark, Duerlo, and Dieleman's (1994) findings, which showed that increases in income triggered the move from renting to owning a home.

In an effort to expand Letkiewicz and Heckman's (2017) study, household's savings and investments were included in the current study as economic predictors of homeownership decisions among young adults. The findings showed households who had savings or investments were more likely to own a home than households who did not have savings or investments in both time periods. This finding may suggest a possible association between savings, risk

aversion, and homeownership. More specifically, it is possible that households who prefer low risks are likely to have savings and are also likely to own a home. Future research should look at this association to understand risk preferences and different economic decisions beyond the homeownership decision. Traditionally, investments and savings are the two main sources of down payments when households decide to buy a home. The relationship between investments and homeownership decisions is also worthy of future research.

Finally, student loans appeared to be a non-significant predictor of homeownership decisions in 1993. However, student loans became a significant predictor of homeownership decisions in 2010 with a positive relationship. The findings indicated that households with student loans were more likely to own a home in 2010 when comparing to households without student loans. Changes in the relationship between student loan status and homeownership decisions were noted in 2010. One possible explanation for the changes might be the limitation and the unpopularity of student loans around 1993. However, student loans became more popular and available to the young adults around 2010. The finding may suggest that student loan debt should not prevent young adults from buying a home, when holding all other things constant. The findings on the relationship between student loan status and the homeownership decision in 2010 were consistent with Letkiewicz and Heckman (2017), which found virtually no effect of student loans on homeownership.

Implications and Contributions to Literature

The findings of this study have several important implications for potential homebuyers, personal financial practitioners, mortgage lenders, and educators. For potential homebuyers on a certain housing market, especially for young adult homebuyers and first-time homebuyers,

household's risk preference should be considered when making homeownership decisions. The findings indicated that household's risk preference had an effect on the homeownership among young adults for both the NLSY79-1993 cohorts and NLSY97-2010 cohorts. Buying a home is a long-term commitment that requires informed decisions and preparations. By understanding the relationship between household's risk preference and homeownership decisions, young homebuyers are able to make housing tenure choices that maximize the expected utilities at certain amounts of risks.

For personal financial practitioners, the findings can be used as a reference for the analyses of their clients' risk preferences in relation to homeownership decisions. Some households buy homes to live in. Others buy homes to live and invest in at the same time. Knowing household's risk preference and demographic and economic characteristics of the households can help personal financial practitioners make optimal recommendations on housing choices to their clients.

For mortgage lenders, the findings of the current study expand their understanding of homebuyer's risk preferences, demographic and economic characteristics, as well as the relationship between these characteristics and homeownership decisions among young adults. If home mortgage lenders are able to assess potential homebuyer's risk preferences, the underwriting could be improved to prevent future mortgage payment defaults or home foreclosures. As family structures and economic characteristics of young adults shifted from one period to the next as shown in the findings, a new lending policy can be made and carried out to meet the changing demand of homeownerships among the younger and diverse populations.

For educators in the personal financial fields, the findings call for education campaigns on homeownership decisions as well as homeownership costs, benefits, and risks. Education on

household's risk preference and its effects on housing tenure choices in different housing markets and economic conditions can also benefit homebuyers, especially, the young and first-time homebuyers. The aftermath of the recent housing crisis and the Great Recession highlights a need for potential homebuyers to understand and learn the systematic risk of homeownership. This need is particularly more important when young adults buy homes for investment purposes.

The current study contributes to the research literature by filling the gap in risk and homeownership study fields. By using expected utility theory as a framework, this study uniquely examined the relationship between household's risk preference and homeownership decisions during a stable housing market period around 1993 and during a downturned housing market period around 2010. The study also explored the relationships between household's demographic and economic characteristics and homeownership decisions over the two periods. The findings of the current study call special attention to the important role risk preference plays in household's decision to buy a home either for consumption or investment purposes.

Strengths and Limitations

The current study was one the first to combine the two NLSY cohorts into one pooling dataset to investigate the relationship between household's risk preference and homeownership decisions among young adults ages from 27 to 33 years old. By doing so, the study was able provide the big picture of the relationship over the two time periods. This study was also one of the first to use Allison's method to detect the effects of shifting risk preference and demographic and economic characteristics between time periods and to identify variables associated with the shifts in homeownership decisions. By using Allison's method, the comparisons across groups were reliable and more effective. Another strength of the current study was the inclusion of

relevant economic characteristics, such as household's savings and investments, into the analyses. These economic characteristics were significant predictors of homeownership decisions, as shown in the findings.

Despite the strengths of this study, there are several limitations that occurred. First, there is a lack of consistency in identical variables in both datasets, the NLSY79 and NLSY97. For example, some psychological characteristics of young adults, such as Rosenberg self-esteem, Pearlin mastery score, Rotter locus of control, attitudes, and non-cognitive ability, were available in the NLSY79 surveys, but were not available in the NLSY97 surveys or vice versa. Future research should consider different data sources to add these useful variables as predictors for homeownership decisions to have a bigger picture of homeownership decisions among young adults in different housing markets and economic conditions. Second, the lifetime income gamble questions, the measurements of the main independent variable, were not available on every survey round. This discrepancy makes the choice of survey year more difficult. Finally, this study does not distinguish first-time homebuyers from repeat homebuyers. Future research should look at the relationship between household's risk preference and homeownership decisions for each type of homebuyers: first-time and repeat. With experiences and knowledge from previous homeownerships, repeat homebuyers may view homeownership risks differently than first-time homebuyers. Despite the limitations, this study has served its purpose, achieved the goals, and provided important findings and implications to the growing personal financial planning field.

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Appendix A

Transformed GSS Regions into Four U.S. Regions