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Temporal Market Subordination of Near Term Baby Boomer Retirees:
The Effects of Asset Price Volatility on Health and Retirement Satisfaction

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Planning, Policy, and Design

by

Mark Combs

Dissertation Committee:
Professor Daniel Stokols, Chair
Professor Nina Bandelj
Professor John Whiteley

2016

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ABSTRACT OF THE DISSERTATION

Temporal Market Subordination of Near Term Baby Boomer Retirees:

The Effects of Asset Price Volatility on Health and Retirement Satisfaction

By

Mark Combs

Doctor of Philosophy in Planning, Policy, and Design

University of California, Irvine, 2016

Professor Daniel Stokols, Chair

The United States is facing a socioeconomic crisis as the Baby Boomer generation reaches retirement age without adequate savings. This problem is not unique to the U.S., as many other large countries in the developed world, particularly in Western Europe, have recognized future budgetary constraints they will face created by an elderly population that will rise dramatically from 2010 to 2030 (Rechel et al., 2013).

In terms of retirement preparedness research and U.S. savings policy, the Baby Boomer generation is interesting for three reasons. One, Baby Boomers are members of a large demographic cohort represented by approximately 78 million people born in the United States between 1946 through 1964 (approximately 25 percent of the U.S. population). Two, a large percentage of the cohort can be identified by the type of retirement plan they have: defined benefit, defined contribution, or no plan at all. And finally, because Baby Boomer retirement outcomes became increasingly subordinate to the performance of financial markets throughout their lifecycle, the efficacy of their retirement in terms of satisfaction and solvency provides policy makers evidence of the deleterious effects of financialization.

The concept of financialization is based on evidence that during the latter half of the 20th century financial markets and financial institutions became increasingly integral to the overall economy as the United States transitioned away from manufacturing and other types of industrial production. One of the primary examples of financialization was a change in the type of retirement plan offered by corporations to their employees. Defined benefit pension plans were common when first wave Baby Boomers entered the work force in the early 1970s - a retirement benefit managed by a corporate employer that guarantees a fixed monthly payment in retirement for the balance of the employee's life. However, when late stage Boomers entered the work force in the early 1990s, defined benefit plans were being replaced by defined contribution pension plans, the success of which was dependent on stock market performance, and characterized by a transfer of responsibility for plan management and solvency to the individual - thereby removing pension liabilities from corporate balance sheets. Defined contribution plans were promoted as superior alternatives to defined benefit plans, supported by the fact that as Boomers aged, stocks, bonds, real estate, and other risk-based assets appreciated at historic levels. The growth in these types of assets engendered a growing variety of financial products that were designed to ensure an adequately funded retirement experience.

However, as the first wave of Boomers reached retirement age in 2011, 75 percent had less than \$30,000 and were faced with the prospect of an underfunded retirement. The aggregate state of Baby Boomer retirement preparedness helps to illustrate a clear incongruence when one considers the appreciation of various asset types throughout their lifecycle, the growth of wealth building products available to Boomers, and the aggregate level of wealth they achieved as a cohort. It was also clear as Boomers reached retirement age in 2011 that the odds of experiencing a satisfactory retirement outcome had become increasingly subordinate in a temporal context to

the appreciation of housing prices and other asset classes. The notion of increasing subordination is supported by the dramatic increase in asset price volatility experienced by first wave Boomers in 2011 during an economic crisis that wiped out in a single year 22 percent of accumulated U.S. wealth - an unprecedented level of wealth destruction that left nearly 66 percent of Boomers unprepared for retirement. Whereas the wealth destruction created by the financial crisis is well documented, the longer-term effects of asset price volatility on health and retirement satisfaction remains unexplored in the literature. Moreover, the financial crisis demonstrated that retirement outcomes can be subordinate to market performance in a temporal sense as well – indicating that when an individual retires is just as important as how much wealth has been accumulated.

It seems counterintuitive that so many Boomers would be unprepared for retirement when one considers the extent to which various assets appreciated during the Baby Boomer lifecycle, and the historically high level of home ownership that Boomers achieved. This dichotomy creates a central organizing question that informs the present study: how does retirement unpreparedness and market volatility impact the health and retirement satisfaction of Boomers?

This dissertation seeks to demonstrate the interaction effects between various periods of asset price volatility, the use of various types of financial products (including home equity loans), increasing levels of market subordination, and post-retirement satisfaction and health status. These interaction effects will be examined primarily by dividing Boomers into a three saver group typology: (1) those with a defined contribution pension plan, or IRA, that are dependent on asset price appreciation for retirement capital requirements, (2) those with a defined benefit pension plan that generates guaranteed monthly retirement income and do not rely on market performance for retirement income, and (3) those without a retirement plan.

The present study is based on a custom dataset comprised of multiple explanatory variables derived from the Health and Retirement Survey Database (hereafter, *HRS*), and historical price data for various types of assets. The *HRS* (Health and Retirement Study) is sponsored by the National Institute on Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan. This analysis (a) examines a portion of the research literature that compares the retirement preparedness of Boomers nearing retirement age with earlier same-aged cohorts at various times, and during different types of market conditions; (b) identifies the effects of growing market subordination on retirement outcomes and health; (c) estimates the impact of these effects on composite measures that reflect retirement satisfaction, mental health, and physical health; and (d), identifies individual level characteristics that may inhibit or promote vulnerability. The findings from this research will inform policymakers seeking to improve the retirement outcomes of individuals at varying SES levels. It will also provide evidence of the impact of financialization and finance culture on health and retirement satisfaction.

Some of the key findings of this study were: (1) a statistically significant increase of negative mental sentiment, and a decrease in retirement satisfaction in male *HRS* respondents after periods of market volatility, (2) the demonstration of reduced negative mental sentiment and higher levels of retirement satisfaction exhibited by retired individuals with monthly pension income, versus those individuals without monthly pension income, and (3) the demonstration of variation between SES groups in terms of their ability to recover lost capital after periods of market volatility.

INTRODUCTION

Global Retirement Crisis

The United States is facing a socioeconomic crisis as the Baby Boomer generation reaches retirement age without adequate savings. Boomers began to retire in 2011, a process that will continue for 18 years as approximately 10,000 Boomers retire everyday. Because of their large demographic footprint, they will create an historic economic imbalance illustrated by the dependency ratio, a measure of individuals not in the labor force (over 65) versus those in the labor force (18 to 64). This ratio that will grow by 67 percent from 2010 to 2030, thereby creating an imbalance that will have broad economic, social, and policy consequences (Myers & Ryu, 2008). Other countries in the developed world face a similar problem, particularly in Western Europe, where budgetary constraints and an increase in the percentage of the population represented by the elderly has forced several members of the European Union to raise the age when individuals become eligible for retirement benefits.

While other countries have recently increased the retirement age, the U.S. has made incremental changes to the Social Security Act of 1935: in 1956 it was amended such that women would be eligible for partial benefits at age 62 with full benefits at age 65. In 1961 the same age requirements were granted to men and in 1983 Social Security policy was amended again to raise the age requirement for full benefits to 67 for those born after 1959. By 2012, however, life expectancy in the U.S. had reached 78.74 years thereby creating a gap of 13.74 years between the age when individuals become eligible for social security and the mean life expectancy age (CDC, 2012)

The potential for a retirement crisis becomes clear when the gap of 13.74 years between

life expectancy in the U.S. and the current retirement age in the U.S. is contrasted with household savings of those individuals approaching retirement age. A recent report by the U.S. Government Accountability Office (GAO) paints a bleak picture as only 48 percent of households with individuals aged 55 or older had savings in a retirement plan. Only 23 percent had some type of defined benefit pension plan, leaving 29 percent of individuals 55 or older without a defined benefit pension plan and no retirement savings. In addition to a lack of retirement savings, a large percentage of households with individuals 55 or older would not be able to cover their savings shortfall with home equity, considering that 41 percent of individuals 55 or older do not own a home, 24 percent own a home but have some level of debt, leaving only 35 percent of households with a debt free home and equity that could be unlocked to cover retirement expenses (Government Accountability Office, [GAO], 2015)

Households with an individual 55 and older with retirement savings are by no means secure as the average amount of savings is just \$104,000 for near-term retirees (ages 55 through 64) and \$148,000 for individuals that have reached or passed retirement age (ages 65 through 74). These retirement balances would generate just \$310 to \$649 per month in typical inflation protected annuities. These households are comprised primarily of Boomers - a demographic cohort that will swamp the U.S. retirement system as the number of individuals 65 and older grows by 50 percent from 2015 through 2030.

Baby Boomer Demographics and Their Socioeconomic Impact

Boomers represent the largest demographic cohort in the history of the United States, a group comprised of approximately 78 million Americans born in the US between 1946 and 1964. Boomers are transforming the demographic structure of the United States, as one in five individuals in the U.S. will be 65 or older by 2030. When considering the demographic size of

the Baby Boomer generation, their historical socioeconomic impact, and the amount of wealth accrued for retirement, it seems logical to infer they will place enormous stress on policy makers, federal budgets, and various types of programs designed to assist the elderly.

From the birth of the first Boomers in 1946, this massive demographic cohort has shaped American society due to their large economic footprint, a demographic event described as a “pig passing through a python” (Myers & Ryu, 2008). As the leading edge of the cohort grew older, each subsequent decade was associated with rapid socioeconomic change--from crowded schools and universities in the 1950s and 1960s, flooded labor markets in the 1970s, and historic price levels in equity and housing markets in the 1990s and early 2000s. In addition, Boomers experienced a broad transition away from the security of defined benefit pension plans to defined contribution pension plans, a transition that created an entire new class of retirement investors. This conversion created a growth spurt in the financial industry that serviced Baby Boomer employee sponsored 401k plans, but it also left the final value of Baby Boomer retirement plans subordinate to asset appreciation growth rates.

As first wave Boomers advanced through each subsequent decade the housing and property markets in the U.S. were profoundly impacted. In the 1970s the age group of those 25 or older increased by 22.9 million, more than double the rate in the 1960s. Boomers from 25 to 34 during this period were responsible for creating huge demand for housing, resulting in new construction of single-family homes and apartment buildings, urban gentrification, and a dramatic increase in housing prices. As first wave Boomers sold their homes to late stage Boomers in the early 2000s, U.S. housing prices advanced by 49 percent (Myers & Ryu, 2008). Projections for future housing markets indicate a supply and demand picture that has been described as a “generational transition” driven in large measure by high levels of mortgage debt held by all members of the

Baby Boomer generation, huge inventories of single-family homes, and the reduction in home equity during the 2008-2010 financial crisis when U.S. housing prices declined on average by 25 percent (Duca & Kumar, 2014; Masnick, Di, & Belsky, 2006; Myers & Ryu, 2008; Rosnick & Baker, 2010).

In addition to housing, Boomers are projected to impact medical costs as well. Starting in 2011 when the first wave of Boomers begins to retire, federal spending on health care is expected to rise by 5.7 percent annually, and by 2021 overall spending on healthcare at federal, state, and local levels is projected to increase by 46 percent (Keehan et al., 2012).

The impact of the Boomer generation both past and present is well documented in the literature. The level of Boomer retirement preparedness has been the center for numerous policy debates (e.g., the call for partial privatization of Social Security funds by President George W. Bush), a perennial focus of financial marketing by Wall Street, analyzed by various think tanks (e.g., Brookings Institute, RAND Corporation, American Enterprise Institute, Cato Institute, and The Urban Institute), and covered by popular media extensively (e.g., there was 66 articles published in the *New York Times* covering Baby Boomer retirement between 2011 and 2014). Missing from these various strands of public discourse, including much of the academic literature is a historical contrast of the various types of positive and negative economic conditions (e.g., long term stock market growth, declining interest rates, depressed real estate prices, periods of extreme market volatility) that Boomers experienced, and how these contextual factors have translated into varying levels of retirement satisfaction and health. Also absent is a review of how the growth of finance culture, and the long term trend in the U.S. towards an economy that places an emphasis on financial markets and financial institutions (i.e., financialization) has translated into increased levels of retirement satisfaction.

Considering financialization and the growth of finance culture when analyzing the retirement preparedness of Boomers is important because the retirement savings process has been altered dramatically by these two socioecological trends. Saving for retirement prior to 1980 was by large measure covered by social security, an employer pension, and individual savings. These three areas of wealth are known as the “three-legged stool” of retirement planning and financialization has altered two of the three: employer pensions and individual savings.

The Baby Boomer Home: Behavioral Changes

Throughout the literature it has been demonstrated that the majority of wealth held by Boomers comes in the form of housing equity (Lusardi & Mitchell, 2007; Rosnick & Baker, 2010; Venti & Wise, 2001). But prior to first wave Boomers entering the housing market in earnest, research exploring various conceptualizations of the home by large measure did not include economic context. For example, Rybczynski (1986) argued that the home provides a sense of balance for the working class and had become a cultural mainstay. Relph (1976) demonstrated that the home serves as a source of human inspiration that improves the quality of existence. The personal experience in the home, and its evolutionary qualities have been advanced theoretically by Canter (1977) into a Theory of Place, and Tognoli (1987) argued that the home is comprised of five discernable characteristics that render it distinct from a house and include: “centrality, continuity, privacy, self expression, personal identity, and social relationship”. Clare Cooper Marcus (1974, 1995) argued that home has deeper meaning for most people, and that it serves as a mirror of self. Her work was heavily influenced by the sense of attachment that Carl Jung felt towards his home in Switzerland, a lakeside villa that he felt represented the “maternal hearth”.

Despite these conceptual themes however, the present study argues that the socioeconomic context of owning a home changed dramatically during the lifecycle of Boomers, an evolutionary process borne out of financialization that engendered novel economic behaviors with various unintended financial consequences. These new behaviors include taking on increased amounts of mortgage debt expressed as a ratio of debt versus income, extracting mortgage equity to finance home improvements and other living expenses, submitting false information on mortgage applications, and strategic foreclosures. The increase of these behaviors are all evidence of emerging and novel finance culture.

The capital requirements of owning a home increased throughout the lifecycle of the Baby Boomer generation. In 1960 the median cost of a home in the United States was \$11,900, which was 2.12 times the annual median income of \$5620. In 2006, at the height of the housing bubble, the median cost of a new home in the United States was \$246,500, equal to 4.2 times the annual median income of \$58,407, and several major metropolitan areas in the U.S. exceeded the national affordability average by large measure: Washington-Arlington-Alexandria (5.7), Boulder (5.9), Seattle-Tacoma (6.1), New York-Northern New Jersey-Long Island (7.1), Miami-Fort Lauderdale (7.2), San Francisco-Oakland (9.8), and Los Angeles-Long Beach-Santa Ana (10.0) (The Joint center for Housing Studies of Harvard University, 2010).

As housing costs increased, liquidity and access to home loans also expanded. The increased liquidity available to Boomers by large measure was a function of securitization which is a key feature of financialization. Securitization is a process whereby mortgages held by banks are sold to investors for their cash flow value. This method of lending allowed the bankers to increase the number of loans they processed, but it also transformed the relationship that Boomers had with their local bank by adding a link to global credit markets (Davis & Kim,

2015)

In the early 1980s when first wave Boomers entered the housing market for the first time, interest rates on a 30-year mortgage had reached 18.45 percent and the average cost of a home was \$82,500. Standard home loans required a 20 percent down payment precluding many Boomers from purchasing a home. But as interest rates dropped throughout the period from 1980 through 2010, and liquidity to home loans increased, lending standards were relaxed allowing borrowers to carry increasing amounts of housing debt. During the 1990s, and after adjusting for inflation, the amount of housing debt doubled in the U.S. from \$2.4 trillion to \$4.1 trillion (Masnick et al., 2006). This trend was characterized in part by the purchase of larger homes, and increasing amounts of mortgage debt held by individuals approaching retirement age. During this period there was a increase in home equity loans, and as a result the percentage of individuals without a mortgage free home increased from 43 percent in 1983 to 64 percent in 2004 (Masnick et al., 2006).

Because Boomers were willing to increase their mortgage debt, and use their home equity as a line of credit, they became increasingly reliant on their home for building retirement wealth and more subordinate to housing prices than previous same-aged cohorts. Lusardi and Mitchell (2007) demonstrated that housing wealth represented nearly 50 percent of Baby Boomer net worth as the savings rate of Boomers in the 2000s dropped to zero. When U.S. housing prices declined from approximately 30 to 50 percent from 2007 through 2010, millions of Boomers saw their entire net worth plunge and as a result of negative equity in their homes the strategic foreclosure emerged as a widely accepted behavior. These types of mortgages are characterized primarily by a borrower's willingness to enter into default and lose their home despite retaining the ability to make payments. According to a report issued by *Experian*, from 2007 to 2008 there

were 588,000 foreclosures of this type, and in 2009 approximately 25 percent of all foreclosures in the U.S. were strategic (approximately 705,000). This illustrates the importance of housing prices in terms of building wealth. It also informs policy makers debating retirement preparedness, because it demonstrates that homeownership, a cornerstone of building wealth in the U.S., can be heavily influenced by finance culture, creating herding effects that lead to poor economic decision making. Based on the partial rebound in house prices realized from 2014 through 2015, it seems logical to infer that many individuals regret allowing their home to be strategically foreclosed.

Change in Pension Structure

As Boomers entered the work force in the 1970s there were numerous policy changes related to pension plans that were implemented specifically to protect employees. The centerpiece of this legislation was the Employee Retirement Income Security Act (ERISA) of 1974. Prior to 1974 the majority of pension plans in the U.S. did not allow employees to become fully vested until meeting 100 percent of plan requirements, usually at an advanced age, making it harder for them to achieve retirement security. This process was referred to as “cliff vesting”, which was relaxed after the passing of ERISA, allowing employees to vest at an earlier age with partial benefits (Seburn, 1991). Throughout the 1950s and 1960s it was common for employees to work at a single firm for the majority of their working years, but by 1979 the majority of defined benefit pension plans in the U.S. allowed employees to partially vest after 10 years of service, and if an employee remained with the company until retirement age (between ages 61 and 65), they were entitled to full benefits for the balance of their life.

The percentage of participants in defined benefit pension plans grew markedly throughout the late 1970s and 1980s. By 1987 there was 232,00 defined benefit pension plans in the U.S.,

with \$900 billion in assets that covered 40 million employees as nearly one in three working Americans had a pension plan (Seburn, 1991). In large measure, these plans were funded entirely by the employer and by 1989, 96 percent of employees in medium and large companies in the U.S. participated in a defined benefit pension plan.

As pension plans grew in terms of asset value and number of participants, there were numerous policy amendments to ERISA that created additional costs for the employer. Pension plan insurance was required by ERISA and was the primary driver of these additional costs that were paid out as premiums to the U.S. Pension Benefit Guaranty Corp (a government organization that ensures plan participants are paid in full in the event of plan insolvency; e.g., underfunded pension plans). In addition, ERISA amendments continued to lower the age when employees could vest and by 1989 most plans allowed an employee to partially vest after 5 years.

As the cost of managing pension plans increased employers in the late 1980s began to transition employees towards defined contribution pension plans (401k). In 1975 when the first wave of Boomers entered the workforce, 74.1 percent of all pension plan participants in the U.S. were covered by a defined benefit plan but by 2012, this trend had completely reversed as 69.5 percent of all pension plan participants in the U.S. were covered by a defined contribution plan (U.S. Department of Labor, 2015)

The increase in equity prices in the 1990s was used as an example by corporations to support the notion that Boomers could increase their retirement capital to higher levels in a personally managed 401k plan versus a traditional defined benefit pension plan. Another potential benefit of defined contribution pension plans promulgated by employers was plan mobility--if the employee left the company the 401k could be transferred or "rolled over" to a

wealth management firm of the individual's choice. But the real hallmark of this transition was increased risk for the employee - risk that was shifted away from corporate balance sheets and placed on individuals (Hacker, 2008).

Defined contribution plans were outsourced to professional money management firms thereby removing the costs of managing funds, as well as reducing pension plan liabilities from corporate balance sheets. This economic evolution was met with little resistance in the 1990s as equity markets appreciated at historic rates. Research from this period comparing the economic well being of Boomers versus their parents or same-aged earlier cohorts demonstrated that Boomers had increased levels of wealth versus prior cohorts, and would reach retirement with even greater levels of wealth (Easterlin, Schaeffer, & Macunovich, 1993; Keister & Deeb-Sossa, 2001; Radner, 1998; Sabelhaus & Manchester, 1995). The conclusions from a significant amount of the retirement preparedness research conducted in the 1990s failed to anticipate the type of asset price depreciation and volatility that Boomers would experience, and failed to predict that Boomers would approach retirement in their current state of unpreparedness.

Changes in Socioeconomic Context: The Sociology of Saving for Retirement

The transition from defined benefit to defined contribution pension plans did much more than leave Boomers subordinate to market outcomes. This transition dramatically changed the socioeconomic process of saving and retiring. By definition, participants in a defined benefit plan were rewarded at no cost to the employee for longevity and length of employment, with a monthly stipend in retirement that was secure and immune to economic conditions. This created a culture of loyalty (i.e., "the company man") prevalent throughout the 1950s and 1960s, as it was common for individuals to work at the same company for the majority of their life. In defined contribution plans however, the salience of finance markets in the social life of Boomers

increased as financial culture became more prevalent across all socioeconomic classes (Fligstein & Goldstein, 2015). This was largely due to Boomers now having their pension plan contributions at risk and fluctuating on a daily basis as they began to monitor the stock market for the first time. Because these plans were employer sponsored, the connection between workers and employer changed dynamically as human resource departments partnered with wealth management firms to manage employee retirement funds. Heavy marketing by financial institutions created new types of cultural parameters and economic behaviors. Financial institutions routinely provided examples of abnormal historical returns that altered the expectations of what money would be worth in the future if invested in the stock market. It is logical to infer that these expectations were also affected by the long-term decrease in interest rates that made it difficult to grow money in a traditional way, via a bank certificate of deposit (CD) or a government bond and, thereby, cast a disparaging context on traditional saving methods. To maximize utility and reach retirement with adequate savings, new economic behaviors and strategies were promoted by the financial industry that not only altered the perception of how money should grow in the future, but also changed the lexicon of retirement saving as well (Davis & Kim, 2015; Fligstein & Goldstein, 2015). Growth of economic behaviors at the household level included an increase in the number of financial accounts, the number of households that sought advice from financial advisors, an increase in the number of households willing to make riskier investments, and an increase in the number of stock trades at the household level (Fligstein & Goldstein, 2015).

Whereas these new economic behaviors and strategies worked well in the 1990s; unintended consequences emerged in the 2000s that manifested as poor investment decision-making during periods of extreme market volatility. Having retirement funds exposed to market

fluctuations as an individual approaches retirement age is one of the key drivers of poor investment decision-making at the retail level. An individual close to retirement age is unable to withstand a loss of capital because they have limited time to recover losses and because they are close to retirement, they have more capital at risk so stressors created by financial loss are exaggerated. The literature has demonstrated conclusively that professional equity traders are error prone during periods of high market volatility (Daniel, Hirshleifer, & Subrahmanyam, 1998; Oliven & Rietz, 2004; Shefrin & Statman, 1985) So it seems logical to infer that retail investors would make mistakes during periods of high market volatility as well, and this is confirmed by information services that track the directional flow of retail investor capital, which demonstrated that the flow of capital in and out of equities is negative after several months of market declines (i.e., more money moves out of equities rather than in, when prices have declined over a long period of time), indicating that there is a relationship between share redemption and retail investors.

The emergence of increased volatility in the markets can help explain why millions of Boomers are unprepared for retirement. The large market declines, realized in 2000 through 2002 (48.93 percent) and in 2008 through 2009 (56.14 percent), both occurred when first wave Boomers were within 10 years of retirement. Moreover, these declines helped create a culture of winners and losers in terms of retiring. This dynamic is evident when we compare hypothetical individual investors saving for retirement; one investor that retired in 2006 when markets were near an all time high, and one that retired in 2009 when U.S. equity markets had declined by over 50 percent. The hypothetical individual investor in 2009 withdrew capital from the markets at depressed prices, and according to herd behavior theory, moved that capital into fixed income at historically low interest rates thereby permanently altering their retirement outcome (Li, Wang,

& Rhee, 2015). The reasoning of this example is supported by research conducted by Goldman Sachs that demonstrated that the tolerance for risk at the individual level was at the lowest point during the first quarter of 2009 when the U.S. stock market was bottoming out, and this risk aversion continued from 2009 through 2012 as the U.S. stock market increased by 77.3 percent during a 4-year period.

The reasoning behind the inference that market volatility is partially responsible for the aggregate state of Baby Boomer retirement unpreparedness is driven primarily by the incongruence between their post-recession loss of savings and the positive economic context they experienced throughout their life. When viewed as an aggregate, over 3 decades, Boomers should have accumulated higher amounts of capital for retirement. Consider that from 1980 through 2011 the S&P 500 grew 1056.55% percent overall, and 11.25 percent annually when dividends were reinvested (864.38 percent overall and 7.58 percent annually when adjusted for inflation). Wages increased throughout their lifecycle, and throughout the literature it is demonstrated that Boomers earned higher incomes than their parents (Keister & Deeb-Sossa, 2001; Sabelhaus & Manchester, 1995) Homeownership rates increased relative to previous same-aged cohorts see table (Lusardi & Mitchell, 2007). Interest rates declined dramatically throughout the period as liquidity increased and Boomers had access to an increasing amount of credit (Davis & Kim, 2015; Fligstein & Goldstein, 2015). There was also growth in the number of financial planners available to help Baby Boomer navigate the complexity of novel wealth building products, and throughout this period the number of Boomers that accessed the use of wealth management advice increased (Fligstein & Goldstein, 2015). Finally Boomers enjoyed favorable economic conditions throughout their lifecycle as the general direction of inflation and interest rates was lower for the better part of 30 years from 1980 through 2010.

Major Questions Guiding the Present Study

The present study is informed by the following organizing questions. With so many advantages to create wealth, why are millions of Boomers unprepared for retirement? Did the widespread acceptance of new financial products have an unintended consequence that resulted in individuals becoming less prepared for retirement? If so, why? What is the impact of home equity products on retirement satisfaction and health? What are the impacts of declining housing prices and declining equity prices on near-term retirees? Are there demonstrable variances between near-term retirees' subordinate to asset appreciation versus those individuals with a defined benefit pension plan?

Underlying Premise of the Study

The underlying premise of this study is that financialization of the U.S. economy has resulted in structural changes in the way that individuals save for retirement. Responsibility of building wealth was transferred from employer to the financial markets and thereby commodified pension security and left Boomers subordinate to market performance. These factors created unintended consequences that manifest in four ways. First, middle and lower class savers are disproportionately vulnerable to market outcomes compared to high net worth individuals. Because the majority of these saver types have less than one year of median income saved, it seems logical to assume the most salient economic factor in their life is their monthly expenses – most live month-to-month. Affluent individuals have wealth that needs protection, so it seems logical to assume the dominant economic concerns in their life are net worth and capital preservation. Middle class investors nearing retirement that experience a substantial reduction of their net worth are no longer able to retire and must continue to work, as compared to affluent individuals that may need to alter their lifestyle after a reduction of their wealth, but still retain

the ability to retire. Middle class individuals spend the majority of their life preoccupied with managing their monthly finances, so they may pay insufficient attention to longer-term concerns such as the amount of capital they will need for the balance of their life after retirement.

Second, individuals nearing retirement age without a defined benefit pension plan are increasingly subordinate to market conditions, economic cycles, interest rates, and residential real estate prices. Under the current system of saving for retirement individuals may realize a substantial amount of wealth destruction as they near retirement age, evidenced by declines in the U.S. equity markets in 2000 and 2008 and in housing prices in 2008. The major declines in the stock market in 2000 and 2008, both of which exceeded 50 percent, contributed to negating the validity of the 4 percent portfolio drawdown theory, a theory supported by the majority of financial planners and in the literature throughout the 1990s. This theory states that if an individual begins to withdraw 4 percent a year from their savings once they retire, their capital will last approximately 30 years (Bengen, 1994) . Recent research has begun to question this theory as inadequate--a direct result of past experience not mirroring the future, and increased volatility in equity markets (Pfau, 2010; Spitzer, Strieter, & Singh, 2007).

Third, a substantial portion of the Baby Boomer cohort is financially illiterate and does not understand equity markets or the financial products they were expected to manage (Burke & Mihaly, 2012; Duca & Kumar, 2014; Lusardi & Mitchell, 2007; Lusardi & Mitchell, 2007, 2008, 2011; van Rooij, Lusardi, & Alessie, 2011). Financial illiteracy leads to poor economic decision making, and research has demonstrated that many individual savers are severely illiterate and unable to calculate a simple 10 percent growth rate (Lusardi & Mitchell, 2007). Research has indicated that investment professionals and pension plan managers are error prone due to the emotive nature of investing and discount rate calculation errors (Chong & Tuckett,

2014; Daniel et al., 1998; Novy-Marx & Rauh, 2008; Pixley, 2012). This begs an obvious question: if investment professionals make mistakes, and pension plan managers become underfunded, how can financially illiterate individuals be expected to balance their current finances, their emotions, and be able to accurately predict their capital requirements in the future?

Fourth, because home equity is the primary source of wealth for the majority of median wage earners in the U.S., the decline of defined benefit pension plans has put a premium on the use of home equity to fund retirement costs. This has created two very different kinds of middle class individuals: one, an individual without a defined benefit pension plan, other than social security, who by large measure has to rely on asset appreciation in order to grow retirement capital. As already noted, research has demonstrated this is challenging due to the emotional and stressful pitfalls of the equity and residential real estate markets. The other type of individual has a defined benefit pension plan with monthly income they receive for the balance of their life after retirement. The value of this monthly stipend does not fluctuate and is not dependent on market outcomes. By definition then, after controlling for other variables, the latter should engender a retirement outcome with reduced amounts of stress, less fear of market declines, and thereby individuals with defined benefit pension plans should self report less stress, better health, and higher levels of retirement satisfaction.

Overview of the Present Study

In this dissertation I develop a typology of retirement saver types that offers a conceptual basis for understanding the relationships between individual levels of market subordination, market conditions at various periods in time, geographic location, self-reported health status, and retirement satisfaction. Chapter 2 presents a literature review focusing especially on how Baby

Boomer retirement preparedness has decreased over of time. Chapter 2 concludes with a review of the role of financial illiteracy and retirement planning, and the interplay between health and various types of economic variables. Chapter 3 offers a conceptual framework for the proposed study, identifying key gaps in the literature and the major hypotheses, and research questions. Chapter 4 describes the methods employed in this research, a description of a custom data set created with Health and Retirement Study data (HRS), RAND data set, U.S. Census housing price data, and Standard and Poors stock market data (S&P 500). Chapter 5 reports data analyses that shed light on the relationship between asset price volatility and retirement satisfaction using a model based on two composite variables constructed from the the Health and Retirement Survey Database (HRS) and Case Shiller housing price data. The first composite variable, an additive index, aggregates individual vulnerabilities by measuring their level of potential exposure to market fluctuations. This index fluctuates based on the structure of each individual's assets and how vulnerable those assets are to market fluctuations. The index is comprised of variables that exhibit multivariate relationships with each other. The second composite variable is a scale that measures individuals' self-reported health status. Finally, Chapter 6 presents discussion of the study's findings, its overall conclusions, and recommendations for future research.

Overall this study seeks to demonstrate the deleterious effects created by financialization on retirement satisfaction and health. I argue that these effects are caused primarily by the transfer of pension responsibility from employer to individual, and thus reliance on financial instruments introduces higher risk and dependence on financial knowledge that average workers lack. Unpacking these effects further however, the study introduces the concept of temporal market subordination which is based on the notion that the effects of financialization are

exaggerated during periods of high market volatility and can negate the value of being financially literate. The results of this study will hopefully provide policymakers with the analytical leverage to make decisions in the future that provide retirement security solutions for individuals not directly pegged to market outcomes.

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LITERATURE REVIEW

Introduction

This literature review begins with an analysis of how Karl Polanyi's critique of market liberalism relates to the current retirement preparedness crisis in the U.S. It includes a review of Karl Marx's notion of historical materialism and how it methodologically informs the present study. There is a section that loosely operationalizes some of Polanyi and Marx's concepts in a modern context by providing evidence from the literature of the effects of financialization and the growth of finance culture at the micro level.

Research that quantifies the retirement preparedness status of Boomers is ubiquitous throughout the literature. The goal of this literature review is not to review all this literature, but briefly summarize a sample of this work in temporal order in an effort to explore some of the reasons why Boomers are unprepared for retirement. Because this study is interested in the dynamic role between market volatility, mental and physical health, along with retirement satisfaction, literature that suggests a relationship between rapid economic change and health is presented.

Theoretical Framework

In his seminal work *The Great Transformation: The Political and Economic Origins of Our Time*, Karl Polanyi (2001) argues that an economy strongly influenced by market liberalism will eventually produce conditions where society needs to protect itself from the market. This is due primarily to a core idea that society be subordinated to the market; an economic condition that requires the transformation of nature and humans into commodities. Polanyi argues that when society is pushed to the brink of economic collapse perverse transformations can occur. Polanyi demonstrates these transformations by linking the growth of market liberalism in the 19th

century (the first “great transformation”), with the rise of fascism in Nazi Germany (the second “great transformation”).

A key to understanding Polanyi’s work is his concept of embeddedness which he argued was incongruent with modern economic thought. Neoliberal economists have argued that an economy should be composed of interdependent markets that rise and fall due to supply and demand characteristics. Polanyi demonstrated that prior to the 19th century economies by large measure were embedded in social life and mediated by state action, religion, and social relations. Polanyi described the concept of a totally self-regulated market as a “stark utopia” that would ultimately destroy the “human and natural substance of society”. This destruction occurs because in order for markets to disembed from society, nature and humans must be transformed into “fictitious commodities”.

According to Polanyi, fictitious commodities are characterized as things not meant to be sold on a market - primarily land, labor, and money. Modern economic theory is based on the presupposition that fictitious commodities will trade in similar fashion as real commodities (e.g., oil, cotton). The idea that fictitious commodities can be traded in similar fashion to real commodities is flawed for two reasons: (1) it is unethical to allow individuals and nature to be treated like a commodity, and (2) because they are fictitious, the state has an obligation to manage the credit, currency, property, and labor markets when they become volatile and become potentially harmful to society. Example of state interventions in these areas are common and include: central bank protection of their local currency, unemployment insurance for individuals, zoning and environmental protection of property, and the manipulation of interest rates by central banks to constrain or grow the economy and/or inflation.

So it has been demonstrated that the economy and state are linked and the notion of self-regulating markets is illusory. To unpack the role of the state further in terms of fictitious commodities, Bandelj & Sowers (2010) argue that because land, labor, and currencies are fictitious commodities, the state must also “constitute” and “constrain” them in order for them to become commodities on a market, but they must also provide protection in a variety of ways (i.e., protect the environment). Constituting and constraining usually comes in the form of regulation, or a state institution, that supervises various types of markets. So without economy-state embeddedness then, land, labor, and currency markets could not function.

However the level of economy-state embeddedness that Bandelj & Sowers (2010) describes is not static, and varies based on influences from a variety of social, economic, and ideological sources. Policy can be implemented that moves an economy closer towards becoming a welfare state, or towards an economy that is increasingly subordinate to market mechanisms – that latter of which has been the trend in the U.S. in the latter part of the 20th century. For instance, the percentage of unionized workers in the the U.S. declined from 33 percent to 10 percent during the lifecycle of Boomers. The implementation of the North American Free Trade Agreement (NAFTA) sent many manufacturing jobs to China and India. The repeal of the Glass Steagall act in 1999, allowed banks to merge investment banking with commercial interests and is considered a point in policy history that many use as the start of the financial crisis.

Kalleberg (2009) has operationalized Polanyi’s ideas about embeddedness with a typology that is defined by varying levels of flexibility or security that occurs during periods of uncertainty (i.e., when market mechanisms dominate society) or relative certainty (i.e., when a strong social contract empowers society). These periods can also be recognized by the level of

prosperity that individuals accrue. Kalleberg argues that there was a strong social contract from 1946 through 1975 – a prosperous age that he refers to as “the interregnum period”. The argument that prosperity increases when there is a strong social contract is supported by Pikety’s (2014) argument regarding the capital/income ratio, which was low during this period, meaning that wealth accumulated in more hands.

But from 1975 through the financial crisis in 2008, the U.S. entered a period of uncertainty, when individuals became increasingly subordinate to market mechanisms, and precarious work and feelings of economic insecurity increased (Hacker, 2008). Kalleberg’s work demonstrates how the ideological direction of economy-state embeddedness has been influenced by social and political forces over the lifecycle of Boomers, and how the direction of that influence has economically constrained or inhibited Boomer wealth creation.

Marx’s Historical Materialism

Kalleberg’s typology of various levels of financial security is methodologically significant because it traces the socioeconomic development of Boomers from a historical perspective. This type of analysis draws heavily from Karl Marx’s style of creating theory based on a “materialistic conception of history”, a methodological style known as historical materialism (Giddens, 1973).

Marx’s ideas about society and capitalism were borne out of this style of research as he traced socioeconomic developments over long periods of time. Marx’s ideas were a product of the dynamic interplay of society and the material world. Marxian thought is underpinned by the idea that man continually attempts to subordinate the material world to their benefit. So for Marx a historical perspective reveals an ongoing cycle of shaping the material world to meet the needs of various societies. Marx argues that by tracing socioeconomic history you are able to identify

generational continua that exploit the material world as they pass capital down to each subsequent generation. With each generation you see small but novel socioeconomic developments emerge that shape and determine social relations.

The stages of development that Marx identified included seminal socioeconomic changes in history: the increase in the division of labor, the influential role of property ownership for the growth of capitalism, separating European peasants from the traditional way they produced goods, and the ultimate destruction of the feudal system in Europe.

The plight of Boomers in terms of their retirement preparedness status can be explained when one layers Polanyi's notion of fictitious commodities on top of Marx's methodological style of historical materialism – it also helps explain the rise of financialization, and the growth of finance culture that Boomers experienced from 1975 through 2011.

Financialization and the Growth of Finance Culture

As Boomers aged and grew closer to retirement a substantial percentage of the cohort was forced into building retirement wealth as the salience of finance and markets increasingly became an important part of their daily lives. This trend, which began in earnest during the last part of the twentieth century, is referred to as financialization, and describes a trend whereby finance considerations became an increasingly integral part of the economy. The primary evidence of financialization at the macro level in the U.S. has been growth of the finance industry, which passed manufacturing as the leading sector in GDP terms. Evidence of financialization at the micro/household level comes in the form of rising finance culture which manifests as an increase in a variety of financial interactions (Davis & Kim, 2015; Fligstein & Goldstein, 2015).

Davis and Kim (2015) demonstrate evidence of financialization at three primary levels: industry, firm, and household. At the industry level the finance industry changed dramatically after commercial and investment banking concerns were allowed to merge. This became a key driver and explanation for the rise of financialization and the primary way it impacted Boomers was via securitization. When lenders were able to securitize home loans, it created an abundance of liquidity for borrowers which was created by foreign lenders and relaxed lending standards – both of which required U.S. government approval. This created a deceptive sense of wealth as Boomers were able to borrow more than they could afford for home loans, it also led to rapid growth of the finance sector (Krippner, 2012). Because Boomer home loans were securitized, and sold to investors, households with these types of loans made different types of financial decisions (Davis, 2009).

Evidence of financialization at the firm level that had a direct impact on Boomers has been the movement to maximize shareholder value (MSV) (Lazonick & O’Sullivan, 2000). This movement can be characterized primarily by corporate governance that places an emphasis on growing the share price, maximizing return on equity, and returning capital to shareholders. An obvious method for value creation, and to increase profit margins, was to reduce pension liabilities, and so corporations throughout the late part of the 20th century stopped offering employees defined benefit pension plans.

The novel type of financial decisions made at the household due to financialization is evidence of growing finance culture. Throughout the Boomer lifecycle finance culture has grown and become a central part of the majority of households in the U.S. The financial adaptation of Boomers can be measured by their consumption of financial products and include: increases in the amount and types of credit used, an increase in the number of bank and brokerage accounts,

an increase in the number of stock mutual funds, IRA and 401k accounts, the use of wealth advisor services, home equity loans, and payday loan services.

Fligstein & Goldstein (2015) have demonstrated growth of finance culture in the majority of these areas across all SES groups. All SES groups except for the top 2 percent from 1992 through 2007 opened a statistically significant amount of new finance accounts; the same finding was made concerning the number of new credit card accounts. During the stock market bubble of the late 1990s, all SES groups owned a statistically significant higher amount of stocks outside of a 401k or IRA account. This translated to attitudes about risk, as all SES groups during this period self reported higher levels of risk taking. During this period all SES groups that self reported income growth also self reported higher levels of willingness to use debt to fund their lifestyle. This later point is demonstrated by the percentage of homeowners that borrowed against the equity in their home. By 2007 at the climax of the stock and property market bubble, 33 percent of all homeowners in the U.S. had opened up some type of home equity account. Supporting this finding is work by Greenspan & Kennedy (2008) that demonstrated that U.S. homeowners extracted over US\$ 500 billion annually during the last 5 years of the U.S. based housing market bubble.

Davis (2009) argues that financialization and the prevalence of finance culture have negated the retirement security that corporations provided many workers throughout the 1950s and 1960s. Fligstein & Goldstein (2015) demonstrate that retirement security has been lost due to the inability of those in the lower income distribution to leverage their capital. This is due in part to an increase in market volatility. Polanyi argued that when market volatility increases; less fortunate individuals suffer the most in conditions that are able to impact large economies of scale. Some of the unintended consequences of financialization has been an increase of the

income inequality gap (Piketty, 2014). Many Baby Boomers have been whipsawed through extreme periods of asset price volatility from 2000 to 2011; and as a result have rejected the system and no longer trust equity markets (Sapienza, Paola & Zingales, Luigi, 2012). This lack of trust, along with economic illiteracy, hurts retail investors as the wealth inequality gap increased due to the lack of participation by small investors as the S&P 500 increased 220 percent between 2009 and 2015 (Fisch, Wilkinson Ryan, 2014; Panizza, 2015; van Rooij, Lusardi, & Alessie, 2011). Finally a substantial number of U.S. homeowners made catastrophic decisions by abandoning their homes via strategic foreclosure to high net worth buyers at time when residential real estate prices were severely depressed (Burke & Mihaly, 2012; Goodstein, Hanouna, Ramirez, & Stahel, 2013).

As the economic salience of owning a home increased along with the rise of finance culture, the value of an individual's home became a critical component of retirement planning, for many individuals their home represented their only source of wealth (Lusardi & Mitchell, 2007). In addition new types of irrational economic behaviors emerged in the housing market (i.e., the reduced documentation home loan "liar loan", strategic foreclosure) that demonstrates that many homeowners disconnected at various levels from traditional meanings of home (i.e., place attachment, home as a mediator of social capital, etc.) (Goodstein et al., 2013; LaCour-Little & Yang, 2013)

Baby Boomer Retirement Preparedness

Retirement Preparedness: 1990s

In the early 1990s as Boomers began to transition to stock based retirement plans the early perspective found throughout much of the literature posited that Boomers would enjoy a standard of living that exceeded their parents or earlier same-aged cohorts (Congressional

Budget Office, 1993; Easterlin, Macdonald, & Macunovich, 1990; Sabelhaus & Manchester, 1995). It was argued that reduced family size and women entering the workforce were contributing factors for their superior economic position (Easterlin et al., 1990). Research that explored their savings behavior and attitudes about risk-taking demonstrated they were comfortable taking higher levels of risk, for longer periods of investment time versus earlier cohorts, and this translated into higher levels of wealth and affluence that exceeded any previous demographic cohort (Warner & Cramer, 1995). This work demonstrated that over 20 percent of Boomers were willing to take above average risk, and 61 percent of Boomers would accept average or above amounts of risk. This was in stark contrast to the parents of Boomers whose early economic context was the depression resulting in a reduced amount of tolerance for investment risk (Keister & Deeb-Sossa, 2001; Sabelhaus & Manchester, 1995; *Wealth in America*, 2000). Boomer tolerance for risk was clearly evident by the mid 1990s as the value of IRA accounts, and other stock based products, surpassed housing wealth in the U.S. for the first time (Keister & Deeb-Sossa, 2001).

It should be noted that during the last half of the 1990s equity markets moved dramatically higher. The “dot.com” stock market bubble of the late 1990s created a false expectation of what normalized market returns should be. These unrealistic expectations were more than likely facilitated by marketing created by the financial services industry. Marketing during this period helped shape new meanings for retirement planning by using ads with several common themes. These themes included: printing historically large and unsustainable return percentages in headlines, individuals featured in the marketing were male, confident, and financially secure in a “emancipatory life stage of active leisure” that could be commonly

attained if one was willing to follow a financial path that was controlled by utilizing the financial products being sold (Ekerdt & Clark, 2001).

While the overall picture in the 1990s was optimistic there were several warnings about potential shortfalls in retirement. Boomers were projected to experience higher levels of retirement satisfaction versus earlier same-aged cohorts provided they do not spend their housing wealth prior to retirement. While Boomers experienced rising income, the gaps between low-income and affluent Boomers was growing, a factor that covaries with education levels (Warner & Cramer, 1995). It was demonstrated that female Boomers prepare less for retirement versus males, and are poorer in retirement as well (Glass, J. Conrad & Kilpatrick, Beverly B., 1998; J. Conrad Glass Jr & Beverly B. Kilpatrick, 1998).

Retirement Preparedness: 2000s

“Having enough money and financial security” was the number one answer provided by Boomers to an open-ended survey question in 2000 when asked about their retirement concerns (AARP, 1999). This point in time corresponds with a shift in the tone of retirement preparedness research that began to issue warnings that a substantial percentage of first-wave Boomers could reach retirement age with little or no wealth. These new projections were based on several different conclusions. It was demonstrated that the interplay of certain types of personality traits and knowledge of markets and finance were predictors of the types of characteristics common to individuals willing to plan for retirement (Hershey & Mowen, 2000). Once individuals have the income flexibility to begin a savings plan many find it challenging to balance the gratification of consumer consumption today with saving for the future (Selnow, 2003). Gender began to emerge as a strong predictor of willingness to plan for retirement (Jacobs-Lawson, J, Hershey, D, & Neukam, K, 2004). The issue of gender and retirement unpreparedness had become more

pronounced and contextually is referred to as the “feminization of poverty” in the literature (McLanahan & Kelly, 2006).

Throughout the 2000s the savings rate in the U.S. dropped and funds allocated for saving and retirement were directed towards residential real estate. By mid-decade residential real estate prices had appreciated beyond normal growth rates. Research prior to the financial crisis demonstrated that Boomers had higher levels of wealth versus previous same-aged cohorts and had reached these higher levels 12 years earlier (Lusardi & Mitchell, 2007). This rapid increase of wealth was represented in large measure by housing equity leaving Boomers vulnerable to the direction of residential real estate prices (Lusardi & Mitchell, 2007). Many first wave Boomers prior to the financial crisis had acquired no wealth outside of housing equity and it was projected that a 13.5 percent drop in housing prices would have a profound impact on all but the richest individuals (Lusardi & Mitchell, 2007).

In addition to lack of a retirement savings plan, gender, and an unwillingness to save outside of residential real estate, the other characteristic demonstrated in the literature that explains the lack of Boomer retirement preparedness is a lack of financial literacy. This issue appears to be widespread and systemic in terms of its impact. Research has demonstrated that a substantial portion of individuals earning median income are unable to predict the future value of their labor, income shortfalls, and the overall buying power that social security benefits will provide (Lusardi & Mitchell, 2007). Research conducted demonstrated that a substantial portion of individuals could not correctly answer basic question about interest rates, and could not perform a simple calculation that compounds money at 10 percent.

A lack of financial literacy has played a role in strategic mortgage defaults, mortgage withdrawals, and a lack of stock market participation. A large body of work has demonstrated

that herd behavior and a lack of economic literacy is responsible for strategic foreclosures - once individuals feel they can abandon a home without negative social stigma they do so without considering the economic consequences of the decision (Guiso, Sapienza, & Zingales, 2013; Seiler, Seiler, Lane, & Harrison, 2012; Towe & Lawley, 2010). Previous research found that financial literacy is related to a lack of equity market participation due to an inability to understand market dynamics, lacking the ability to differentiate between stocks and bonds, and understanding the notion of risk diversification (van Rooij et al., 2011).

The foreboding predictions found in much of the retirement preparedness research from the 2000s can be confirmed and quantified by family net worth values published by the U.S. Federal Reserve (2012). From 2001 through 2010 median family net worth declined 27 percent from \$106,100 to \$77,300. The financial crisis period from 2007 through 2010 was dramatic in terms of wealth destruction as family net worth net fell 38.8 percent from \$126,400 to \$77,300. During this same period individuals from 60 to 79.9 years of age experienced a 40.3 percent decline in net worth from \$215,700 to \$128,600. The two family groups closest to retirement age, 40 to 59.9 and 60 to 79.9, had \$65,900 and \$128,600 of median net worth in 2010. In terms of total dollar value declines, first wave Boomers experienced the largest decline from 2007 through 2009, realizing a dollar loss of family net worth of \$154,300 (Federal Reserve Board, Washington, D.C., 2011). The median family net worth of \$77,300 recorded in 2010 was a level not seen since 1992, indicating that at the median the financial crisis erased 18 years of family net worth.

Economic Change and Health

Currently there is not any research that directly examines the relationship between asset price volatility, health, and retirement satisfaction. There is however a large amount of research

that examines various types of economic change and health. These include: housing foreclosures and health, economic recession and drug use, economic crisis and mental health, employment insecurity and psychological well-being, the relationship between health and debt, and financial strain and health (Albert, n.d.; Ce, J, De, & C, 2009; Costa Storti, De Grauwe, & Reuter, 2011; Currie & Tekin, 2011; Deaton, 2012; Dehejia & Lleras-Muney, 2004; Drentea & Lavrakas, 2000; Feinstein, 1993; Ferraro & Su, 1999; Habib, Mahfoud, Fawaz, Basma, & Yeretizian, 2009; Kahn & Pearlin, 2006; Kaplan & Sommers, 2009; Lusardi, Schneider, & Tufano, 2010; Nettleton & Burrows, 2000; Osypuk, Caldwell, Platt, & Misra, 2012; Pollack, Griffin, & Lynch, 2010; Ruhm, 2000; Stuckler, Basu, Suhrcke, Coutts, & McKee, 2009; Szanton et al., 2008).

One area of research that is novel and a result of the recent financial crisis is the relationship between foreclosure and health. Initial studies in this area have demonstrated that individuals that experience a foreclosure have a higher probability of making a hospital emergency room visit due to a variety of physical and mental health issue (Currie & Tekin, 2011). Those individuals that experienced a foreclosure after securing a subprime loan are more likely to lose faith in the benefits of homeownership, experience increased levels of stress and anxiety, and internalize the foreclosure personally creating feelings of personal failure (Ross & Squires, 2011) However other research has found that nearly 20 percent of all foreclosures are related to some type of pre-existing health condition (Libman, Fields, & Saegert, 2012; Nettleton & Burrows, 1998; Pollack & Lynch, 2009). Foreclosure is considered a highly stressful life event and previous research has found that individuals going through this process are 1.4 times more likely to report having hypertension. In a broader context concentrations of residential foreclosure have been found to be harmful to the economic health of communities (Kaplan & Sommers, 2009). There appears to be a relationship between women, depression, and foreclosure

as recent research has demonstrated that women are 1.76 more likely to report being depressed when experiencing foreclosure.

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HYPOTHESES AND CONCEPTUAL FRAMEWORK

Introduction

Social researchers have always been fascinated with the relationship between rapid economic change and various kinds of macro and micro social pathologies (Durkheim, 1997; Marx, 2007; Marx & Engels, 2012; Polanyi, 2001). Foci of research include the links between economic change and a variety of psychological, behavioral, and health outcomes (Hacker, 2008; Kalleberg, 2009). Specific types of economic conditions related to social pathology include chronic economic deprivation, economic inequality, economic prosperity, and rapid change – all of which can be mediated by age, gender, social economic status, psychological and physical health (Horwitz, 1984). Research has demonstrated that financialization and the growth of finance culture at the household level have created unintended, adverse social consequences. The present study contributes to the existing literature by testing four hypotheses that explore the relationships between health, psychological distress, retirement satisfaction, market volatility, the mediating impact of subordinated assets, and guaranteed retirement pension plans.

Hypothesis 1: Health, Psychological Distress, and Retirement Satisfaction Measures After Periods of Market Volatility

Hypothesis 1: After periods of rapid price volatility in the equity and real estate markets, HRS Respondents with stock based retirement plans subordinate to market fluctuations have a higher probability of suffering psychological distress, poorer health outcomes, and lower levels of retirement satisfaction.

Hypothesis 2: Mental Health and Retirement Satisfaction – Retired Individuals with Pension Income Versus Individuals Without Pension Income

Hypothesis 2: Retired individuals without a defined benefit pension plan, and without guaranteed pension income, have a higher probability of suffering psychological distress, will self report lower retirement satisfaction, versus individuals with a defined benefit pension plan and guaranteed pension income.

This hypothesis is based on the notion that unless an individual has some type of guaranteed retirement income (excluding Social Security payments), all types of retirement capital are subordinate to market movement in some way (i.e., personal savings subordinate to interest rates, housing wealth subordinate to housing prices, stock and bond based retirement plans subordinate to stock and bond returns).

This hypothesis is based by the idea that the primary perception of wealth experienced by an individual occurs in one of two ways. The first perception is the relationship between an individual's monthly income and his/her monthly expenses. The second is the relationship between an individual's total net worth and the efficacy of the various methods utilized to grow that net worth. Typical middle class individuals, a group characterized by their primary focus on meeting monthly expenditures - represent the former. The latter, represented by wealthy individuals, is a group that focuses primarily on their total net worth, and has the financial wherewithal to withstand large capital losses. This hypothesis posits that since the majority of individuals focus on their monthly income, once retired, individuals with regular monthly income in retirement are less prone to psychological distress, and will self report higher levels of retirement satisfaction as compared to those that depend on market outcomes for retirement wealth, or those individuals with no pension income.

Hypothesis 3: Relationship between Age, Health, Psychological Distress, and Retirement Satisfaction Measures After Periods of Market Volatility

Hypothesis 3: After periods of rapid price volatility in the equity and real estate markets, individuals with stock based retirement plans, and owners of residential real estate, both of which are subordinate to market fluctuations, have a higher probability of suffering psychological distress, will self report lower health outcomes, and less retirement satisfaction, and these self report measures will vary with age.

Note that under prevailing style of saving for retirement (i.e., stock market returns, and housing wealth), market conditions during the last five years of an individual's peak earning years can irreparably damage future retirement outcomes. This is based on the notion that if two individual's have identical levels of retirement wealth five years prior to retiring, and both have their assets structured identically, then the final value of their wealth at retirement is completely subordinate to market outcomes. This hypothesis is underpinned by the notion that as individuals near retirement age, their vulnerability to market fluctuations becomes greater as the amount of time they have to recover from capital losses is reduced by their age and capacity to earn income.

Hypothesis 4: Ability to Recover Lost Capital After Periods of Market Volatility

Hypothesis 4: due to market volatility, stock based retirement accounts of HRS respondents will underperform stock market averages over short and extended periods of time, and higher SES households are more likely recover lost capital versus lower SES households.

This hypotheses is informed by Fligstein & Goldstein's (2015) argument that lower SES households are precluded from many of the benefits of stock ownership due to their inability to leverage their capital, and a lack of access to financial planners. A common marketing tactic of financial firms that manage retirement wealth is the comparison of the return of their financial products against that of the S&P 500. This has created two genres of investors: (1) "indexers", individuals that invest in a single mutual fund that seeks to replicate the performance of the S&P

500, and (2), investors that attempt to beat the market by investing in actively managed funds.

An organizing idea underpinning this hypothesis is that the notion of either genre is illusory, that over an extended periods of time, the mean values of individual stock based accounts badly underperform the markets for a variety of reasons.

Conceptual Framework

Figures 3.1, 3.2, and 3.3 are provided to visually illustrate retirement wealth building in a traditional, current, and conceptual framework. In these frameworks various types of assets, pension income, and if the asset is subordinate to market movement, are all independent variables that impact mental and physical health, retirement satisfaction, and the level of retirement preparedness. Figure 3.1 presents a traditional retirement wealth building framework that was common from the 1960s through the end of the 1970s. In the traditional wealth building framework individuals drew from a mixture of defined benefit pension income, housing wealth, cash savings, and social security. Under the traditional framework, 50 percent of the typical types of wealth for retirement came in the form of regular monthly income and was not subordinate to market movements or economic conditions. The other 50 percent, cash and housing wealth, was subordinate to interest rates and housing prices. However, because the age of financialization had not begun yet in earnest, and home equity loan products were not prevalent, individuals had an increased amount of housing wealth. For example, Table 5.1 illustrates that in 1994 the mean net home value represented 51.4 percent of the wealth held in property, cash, stocks and bonds. This is the highest percentage across all HRS cross-waves from 1994 through 2012.

Figure 3.2 presents the current retirement wealth building framework. In this framework it has become clear that the majority of retirement wealth is now subordinate to some type of

market mechanism. In this framework, stocks, cash, housing wealth, and the date that individuals select to retire are all subordinate to market outcomes. Figure 3.2 visually illustrates the relationship between each type of asset and the mediating factor that subordinates each asset. Figure 3.2 also gives visual context to the plight of Boomers, when all their assets were impacted dramatically by the financial crisis. This was due to all independent variables in the current framework being adversely affected by the financial crisis. The defined contribution plans of Boomers, along with their IRA stock based plans, all declined dramatically during the last 5 years of their peak earning years. Their cash savings earned very little interest as the U.S. Federal Reserve cut interest rates to zero, creating an economic situation whereby interest rates were actually lower than the rate of inflation. Housing wealth across the nation declined in step with the decline in other types of assets. Finally, because so many Boomers reached 65 at the same time, the financial crisis occurred just as millions of Boomers planned to retire – illustrating temporal subordination.

Figure 3.3 is presented as a conceptual framework to illustrate the importance of guaranteed monthly income in retirement. Figure 3.3 is identical to Figure 3.2, but the conceptual portion of this framework is based on the idea that guaranteed monthly income for individuals can potentially facilitate higher quality retirement outcomes by negating the potential of economic disasters. The basic goal of figure 3.3 is to illustrate the idea for policy makers, and financial planners, of the potential benefit of converting wealth subordinate to the market, into regular monthly income. By large measure figure 3.3 suggests that individuals can have better retirement outcomes if they focus on building monthly retirement income immune from market fluctuations, versus trying to project into the future the amount of total wealth they will need. This argument is based on the fact that income from government bonds, and the dividends paid

by certain types of companies, fluctuate very little over time, while the underlying value of stocks or bonds can fluctuate dramatically.

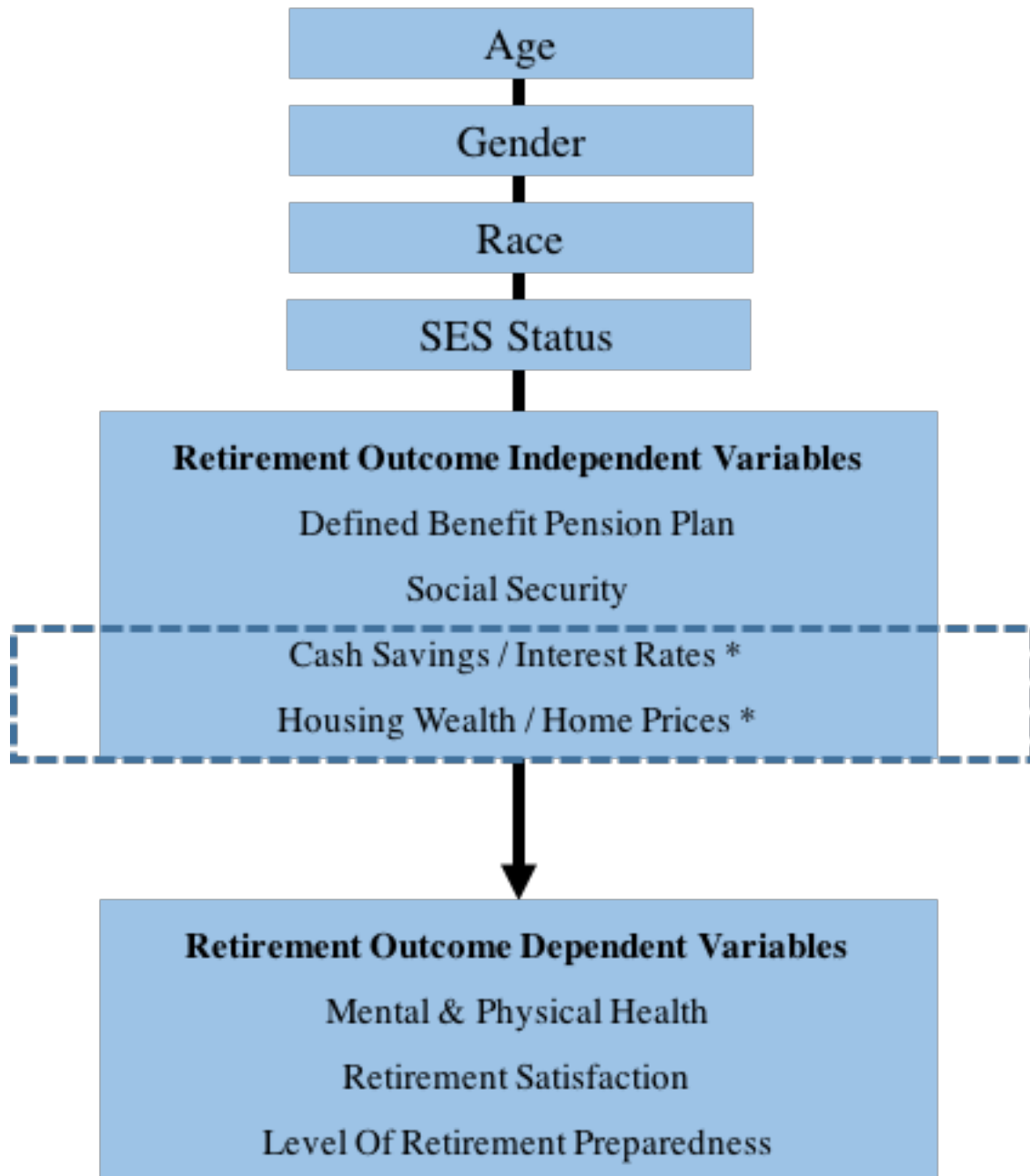


Figure 3.1: Traditional Retirement Wealth Building Framework

Notes:

1. * Assets subordinate to market or economic conditions

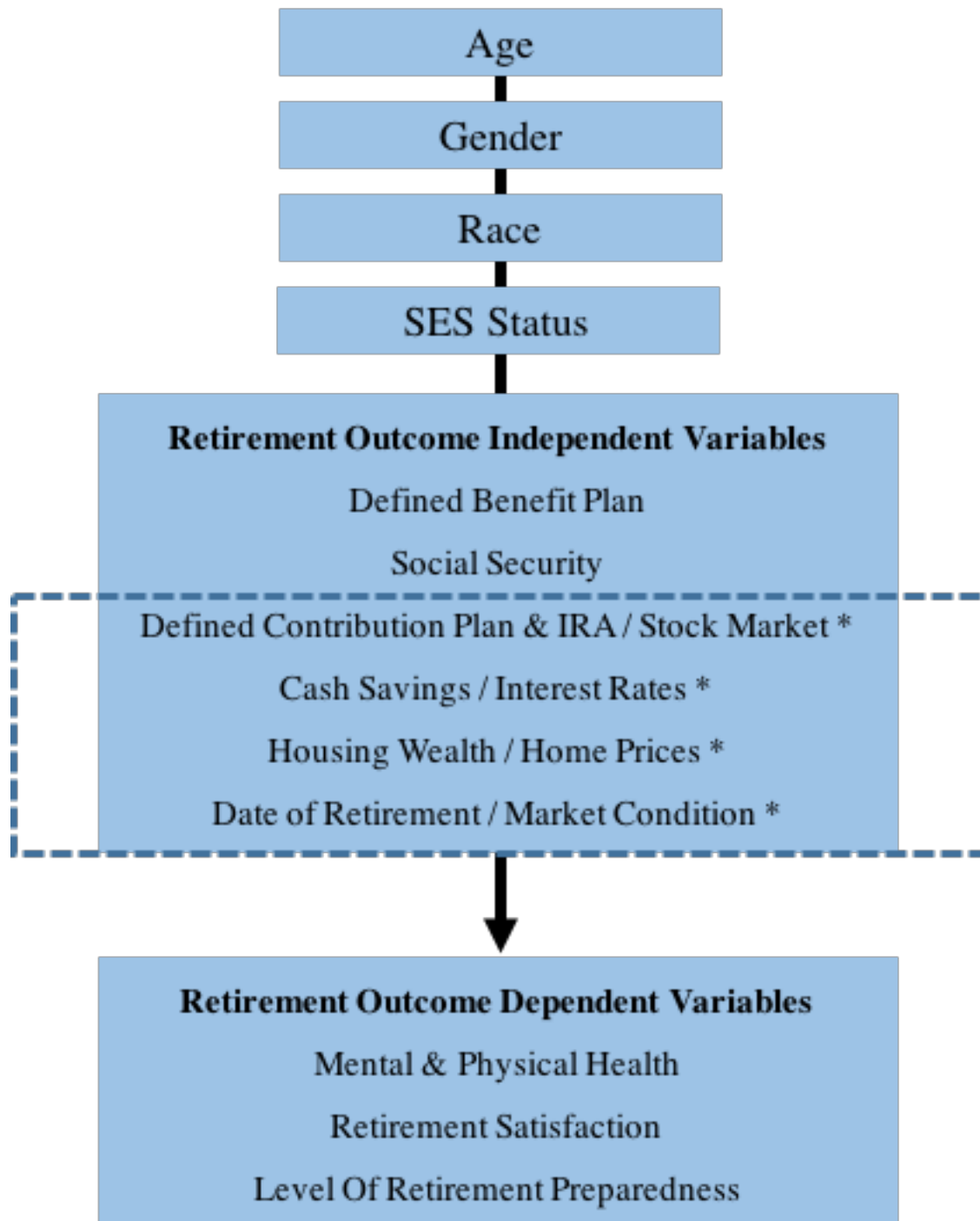


Figure 3.2: Current Retirement Wealth Building Framework

Notes:

1. * Assets subordinate to market or economic conditions

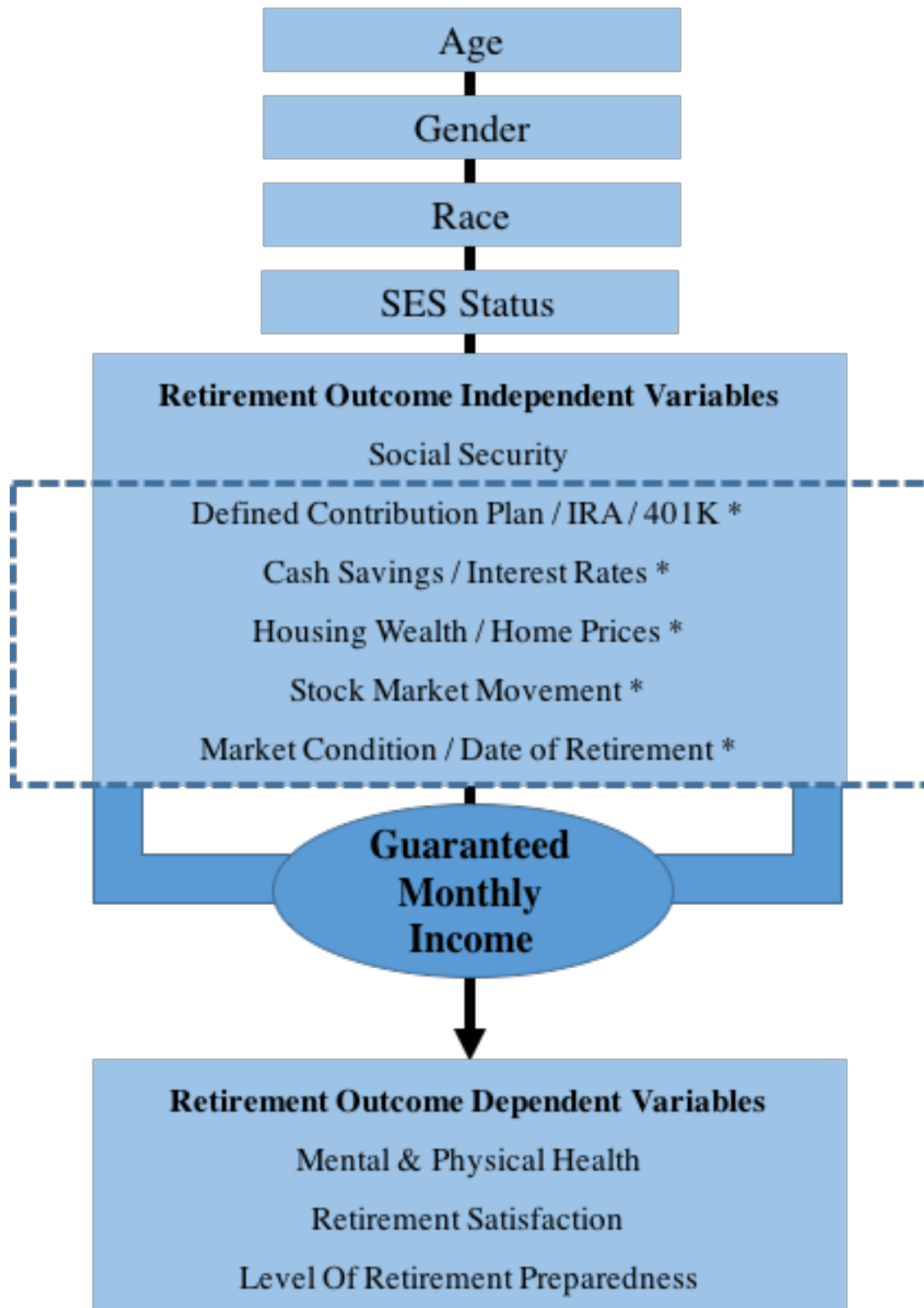


Figure 3.3: Conceptual Wealth Building Retirement Framework

1. * Assets subordinate to market or economic conditions

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METHOD

Study Design and Data Sources

The principal data analyses for this study are based on statistical significance testing between SES groups over various periods of time. These tests will determine if there are statistically significant relationships between asset price volatility, retirement satisfaction, and health during periods of asset price volatility. In addition, the study uses logistic regression calculations to estimate the relationships between market subordination, physical and mental health and retirement satisfaction. The study uses multiple logistic regression calculations based on binary predictor variables to estimate the links between market volatility and mental and physical health outcomes, and reduced retirement satisfaction. The study uses a custom dataset comprised of survey data from all longitudinal waves of the Health and Retirement Survey (HRS), historical equity market data (S&P 500), and historical housing price data.

Institutional Review Board

All HRS data used in this study were de-identified and made available to the public for download. The information found in HRS public data sets are not considered private, and institutional review board policy at the University of California Irvine states that analysis of these data sets do not require institutional approval.

Description of Secondary Data Sources

Health and Retirement Study (HRS)

The ongoing Health and Retirement Study began in 1992 and is being conducted at the University of Michigan. The survey is funded primarily by the National Institute on Aging. Participants in this longitudinal panel study are at least 50 years of age and are surveyed on a biennial basis. Starting in 1992, and every six years thereafter, new cohorts of approximately

20,000 participants are incorporated into the study. Survey responses from participants focus primarily on health, work and retirement, income and wealth, family structure, the transfer of wealth between family members, and the relationships among these various characteristics with future health and satisfaction. Since 1992 more than 200,000 hours of participant interviews have been conducted. The HRS has served as a source of data for a variety of multidisciplinary investigations. Utilized for both policy and scientific research, HRS data are rich, nationally representative, and include oversampling of Hispanic and Black populations. The oversampling of black and Hispanics is a response to the changing demographics in the US, a trend that started in the 1970s. By oversampling these populations, the HRS is attempting to ensure that HRS data can accurately present the consequences of an evolving minority population. HRS data have been the source for 270 dissertations and over 1200 peer-reviewed journal articles.

S&P/Case-Shiller Home Price Indices

The Case-Shiller home price indices were created by Robert Shiller and Karl E. Case for use in their seminal work on market volatility. Published by Standard and Poor's, the indices describe residential real estate values dating back to 1890. They are presented primarily through a 10-city, and 20-city composite, and both track growth the value of U.S. housing on a monthly basis within multiple metropolitan statistical areas (MSA). The two indices measure the growth rate of single-family home prices and capture nearly 75 percent of all residential real estate in the U.S. The Case-Shiller home price survey is unique and appropriate for this research for several reasons: it uses a repeat sales methodology that is considered highly precise; the prices for single family homes are categorized according to three price tiers and organized by MSA; and finally, Case-Shiller housing price data are weighted by value and time, thereby controlling for the negative price effects of housing structure depreciation.

U.S. Census Bureau

The U.S. Census Bureau collects data describing various housing characteristics including: home values, homeownership by demographic, gross rents, recent movers, and homeownership rates. When the 2010 census is included, these data will describe 70 years of housing in the United States at the national and state level. Data from the Census of Population and Housing are used in this study to describe the level of housing price volatility that HRS participants have been exposed to.

Standard and Poor's Index of 500 Stocks (S&P 500)

The S&P 500 is the largest and most widely held stock index in the world. This index tracks 500 of the largest company's in the world and captures approximately 80 percent of U.S. stock market capitalization. This index is used as a benchmark for indexing mutual funds and exchange traded funds (ETF) that attempt to provide identical returns in investors. Mutual funds and ETFs that mimic the performance of the S&P 500 are considered passive investments, meaning they do not require active management (i.e., a manager that picks stocks), they are designed to hold the same stocks in the S&P 500 and are able to provide identical returns to investors. These kinds of equity funds are considered appropriate for investors seeking a single investment approach to retirement planning, an investment style commonly employed by investors earning median income. There are nearly 7.8 trillion dollars indexed to the S&P 500, and the largest mutual fund by capitalization is the Vanguard 500 Index fund that has a market cap of nearly 220 billion dollars. The size and popularity of the S&P 500 makes it appropriate to use as a measure of the interplay between market volatility, retirement preparedness, and health.

Structure of Custom Data Set

Public access data from the HRS are available in two forms, a core file that captures each

initial biennial interview and an exit file that merges additional responses with the core file. There are separate files available for download from 1992 through 1996, and then every two years starting in 1998 through 2014. These files have been aggregated and cleaned by the Rand Corporation and made available as a single file that merges all waves. The benefit of using this file for analysis is that variables have been uniformly renamed allowing for cross-wave analysis. In addition to Rand and HRS wave data, data from Case-Shiller and geographic-specific housing price data were added to this custom data set. The variables and structure of the custom data set is presented in Figure 4.1 and Table 4.1.

Primary Dependent and Independent Variables

The present study focuses on four primary dependent variables: (1) retirement satisfaction, a self report measure from HRS participants that measures retirement satisfaction during the previous two years from the date of the current interview, (2) mental health (ordinal), a composite measure based on a score from the Center for Epidemiologic Studies Depression Scale (CESD) that reflects answers to seven questions in the HRS mental health interview (see Table 4.1), (3) a second composite variable that measures five stress-related health conditions including high blood pressure, cancer, lung disease, stroke, heart disease, and (4), the amount of wealth recovery that participants experience after periods of market volatility. Statistical variables used in this study are presented in Table 4.1

Statistical Analysis Notes

In addition to using descriptive statistics and *t*-tests for statistical significance, this study will employ logistic regression calculations to illustrate and estimate the relationships between market subordination, health, retirement satisfaction and health. Logistic regression is appropriate because the dependent variables used in this study are either categorical or

dichotomous. Logistic regression is nonparametric and thus is precluded from normative distributional assumptions. Logistic regression is also nonlinear which allows statistical predictions to be made from other continuous, categorical, or dichotomous variables (Hosmer, Lemeshow, & Sturdivant, 2013; Liu, 2016; Osborne, 2015).

Specific Methods for Hypotheses 1-4

Hypothesis 1: After periods of rapid price volatility in the equity and real estate markets, individuals with stock based retirement plans subordinate to market fluctuations have a higher probability of suffering psychological distress, poorer health outcomes, and lower levels of retirement satisfaction.

Survey data from financial respondents with stock based retirement plans from 2006 through 2010 will be used to measure the relationship between market volatility, market subordination, mental and physical health, and retirement satisfaction. This timeframe is used because it presents a period of extreme asset price volatility during the financial crisis. Survey respondents will be organized into SES quintiles to provide an additional level of analysis. The total value of retirement savings accounts at the household level will be used to determine SES status.

Descriptive statistics will be used to provide a picture of how physical and mental health, and retirement satisfaction, fluctuated during the financial crisis. The statistical test for this hypotheses will be a *t*-test for a significant relationship over time within and between SES groups and their association with mental, physical health, retirement satisfaction, and market volatility.

Hypothesis 2: Retired individuals without a defined benefit pension plan, and without guaranteed pension income, have a higher probability of suffering psychological distress, will

self report lower retirement satisfaction, versus individuals with a defined benefit pension plan and guaranteed pension income.

Survey data from retired HRS financial respondents from 2006 through 2012 will be used to measure the mediating role of pension income on negative mental and physical health ratings, along with retirement satisfaction. Respondents will be organized with a binary variable that divides survey participants by those with or without pension income. An estimation of the probability that pension is associated with reduced amounts of negative mental sentiment, poor physical health outcomes, and a reduction in retirement satisfaction, will be expressed as an odds ratio. This hypothesis will also be tested via a *t*-test for a significant relationship over time within and between pension groups for their association with negative mental sentiment, physical health, retirement satisfaction, and market volatility.

Hypothesis 3: After periods of rapid price volatility in the equity and real estate markets, individuals with stock based retirement plans, and owners of residential real estate, both of which are subordinate to market fluctuations, have a higher probability of suffering psychological distress, will self report lower health outcomes, and less retirement satisfaction, and these self report measures will vary with age.

Survey data from financial respondents with stock based retirement plans from 2006 through 2010 will be used to measure the relationship between market volatility, market subordination, and mental and physical health. This timeframe is used because it presents a period of extreme asset price volatility during the financial crisis. Survey respondents will be organized by gender, and then by age of those respondents 59 and younger, and respondents 60 and older.

Descriptive statistics will be used to provide a picture of how physical and mental health

fluctuated during the financial crisis by age and gender. The statistical test for this hypotheses will be a *t*-test for a significant relationship over time within and between age groups and their association with mental and physical health, and market volatility.

Hypothesis 4: due to market volatility, stock based retirement accounts of HRS respondents will underperform stock market averages over short and extended periods of time, and higher SES households are more likely recover lost capital versus lower SES households.

Survey data from HRS financial respondents from 2006 through 2012 will be used to measure the level of wealth recovery that each household was able to attain after periods of volatility. Survey respondents will be organized into SES quintiles based on the total value of retirement savings accounts at the household level. The value of each retirement account will be compared to the appreciation rate of the S&P 500. This comparison will be made every two years starting in 2006 and will continue through 2012. The bottom four SES households will be compared to the top SES household via a *t*-test for a statistical significance.

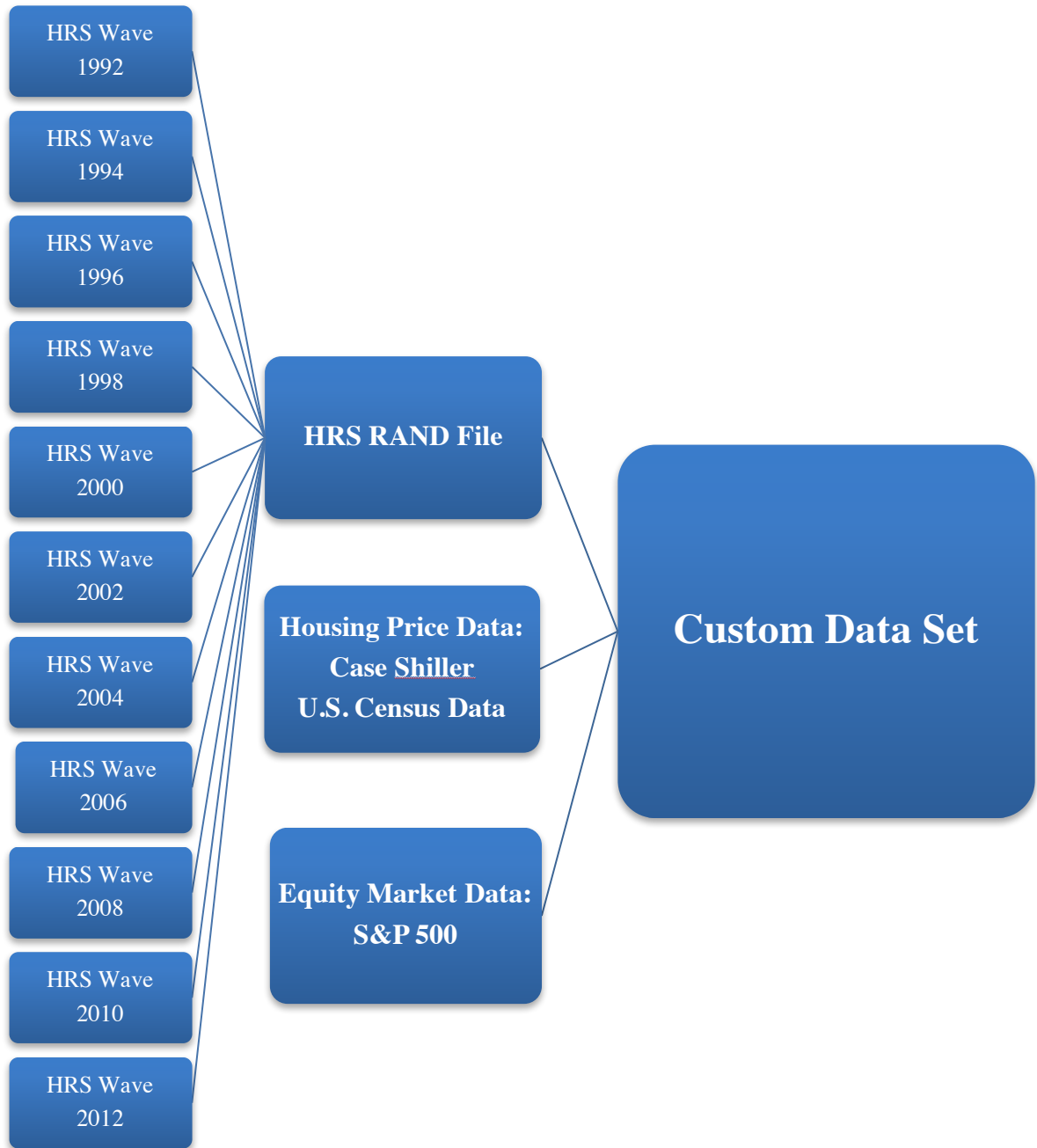


Figure 4.1: Structure of custom data set

Table 4.1: Relevant Variables / Data Documentation

Variable Description	Variable Name	Variable Source
Household and person identifier	HHIDPN	HRS / RAND variable
Wave Status and Interview Status	R1IWSTAT	HRS / RAND variable
Couple Household	H1CPL	HRS / RAND variable
Financial Respondent	R1FINR	HRS / RAND variable
Interview Start Date	R1IWBEG	HRS / RAND variable
Interview End Date	R1IWEND	HRS / RAND variable
Age Start Interview	R1AGEY_B	HRS / RAND variable
Age End Interview	R1AGEY_E	HRS / RAND variable
Gender	R1GENDER	HRS / RAND variable
Monthly pension		HRS / RAND variable
Mental Health Score	RwCESD	HRS / RAND variable
Physical Health Score	RwCONDE	HRS / RAND variable
Respondent Retired	RwSAYRET	HRS / RAND variable
Retirement Satisfaction	RwRETSAT	HRS / RAND variable
Total Wealth	HwATOTA	HRS / RAND variable
Net Value of Home	HwATOTH	HRS / RAND variable
Net Value of IRA	HwAIRA	HRS / RAND variable
Net Value of Stocks	HwASTCK	HRS / RAND variable
Net Value Cash	HwACHK	HRS / RAND variable
Pension Income	RwIPEN	HRS / RAND variable
Stock ownership % of net worth	n/a	Custom computed variable
Home ownership % of net worth	n/a	Custom computed variable
Cash % of net worth	n/a	Custom computed variable
S&P 500 Decline over last two years	n/a	Custom computed variable

Table 4.2: Center for Epidemiologic Studies Depression (CESD) Scale Example (higher score = increased amount of negative sentiment)

Question (answer range)	Maximum Score	Minimum Score
Depressed (0 – 1)	1	0
Everything is effort (0 – 1)	1	0
Sleep is restless (0 – 1)	1	0
Felt alone (0 – 1)	1	0
Felt sad (0 – 1)	1	0
Unable to get going	1	0
Not Happy (1 – 0)	1	0
Do Not Enjoy Life (1 – 0)	1	0
Total Score	8	0

References

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RESULTS

Results Overview

The four primary outcome measures in the present study are: (1) mental health, operationalized via the Center for Epidemiologic Studies Depression Scale (CESD); (2) a physical health composite score measuring five stress-related health conditions (high blood pressure, cancer, lung disease, stroke, and heart disease); (3) retirement satisfaction captured from HRS survey responses, and (4) the amount of net worth recovered after periods of sharp asset price decline and volatility.

Selected Wealth Characteristics of Custom Dataset

Selected wealth characteristics of the custom dataset are presented in Table 5.1. This table provides the mean value of core assets held by HRS financial respondents across 10 longitudinal waves from 1994 through 2012. The types of assets listed in this table can be considered typical, and represent the type of assets that the majority of HRS respondents hold. The types of assets are: net home value (property value minus mortgage and home equity debt), IRA value, stock holdings, bonds, cash, and pension income (pension income is the result of having a defined benefit pension plan). Table 5.1 provides what each of these assets represent in terms of the percentage of total. The shaded areas in 2002, 2008, and 2010 represent 2-year periods of extreme asset price volatility.

When reviewing all cross-waves in Table 5.1 from 1994 through 2012 several clear trends emerge. Starting in 1994 housing wealth increased in every cross-wave period through 2008. From 1994 through 2008 net home value grew from \$68,820 to \$160,468, but from 2008 through 2012 it declined dramatically during the financial crisis from \$160,468 to \$114,477.

The value of stocks, represented by IRA accounts and stock holdings in Table 5.1, increased every two years from 1994 through 2000 but dropped in 2002 during the dot.com stock market crash. IRA and stock holdings increased again from 2002 through 2006 but declined sharply from 2008 through 2010. In 2000 the mean IRA value was \$52,266, by 2010 the mean IRA values were just \$55,870, representing 6.9 percent of total growth over a 12-year period.

The amount of liquidity and cash flow at the household level, represented by cash and bonds in Table 5.1, has grown steadily throughout the ten cross-wave periods (spanning 1994-2010). However, monthly pension income however, the other component of household cash flow, grew during every cross-wave period from 1994 through 2004, growing 83.2 percent from \$2,327 to \$4,264. From 2004 through 2012 however, pension income fell by 42.98 percent, dropping from \$4,264 to \$1,833 in 2012.

The percentages featured on the bottom section of Table 5.1 support what has been demonstrated previously in the literature, primarily that residential real estate represents the majority of individual wealth at the household level. Across the 10 selected waves of data collection in the HRS survey, home equity has remained relatively constant from 37.9 to 51.4 percent. Stock holdings and IRA values together represent approximately 40 percent of household wealth across all cross-waves. When stock holdings and IRA values are combined with housing wealth they represent approximately 80 percent of wealth held by the majority of households across all cross-waves. This supports the primary assumption of this study, that under the current system of building wealth for retirement the majority of household wealth is subordinate to market fluctuation.

The present study is predicated on the assumption that the subordination of wealth has a temporal quality which is illustrated in Table 5.2 and Table 5.3. In Table 5.2 the percentage

change of mean net home value between 2006 and 2012 is presented. From 2006 through 2012 HRS financial respondents experienced a 27.40 percent drop at the mean of their net home value moving from \$157,673 in 2006 to \$114,477 in 2012. The percentage change of all respondents varied insignificantly for male or female financial respondents. Table 5.3 presents the change in value, expressed in percentage terms of the stock holdings and IRA account values of all HRS financial respondents. From 2006 through 2010 the mean loss was 28.69 percent. Male financial respondents experienced an average loss of 31.06 percent of their total stock holdings, while female respondents reported a 26.76 percent loss. The value of IRA accounts during this period experienced similar losses. From 2006 through 2010 Table 5.3 demonstrates that HRS respondents experienced a 16.79 percent loss of value in their IRA accounts. Similar to their non-IRA stock holdings, Male respondents experienced larger declines versus female respondents. Male respondents experienced a 19.82 percent decline in their retirement accounts versus a 14.22 percent loss for female respondents.

Selected Retirement Satisfaction, Physical and Mental Health Characteristics of Custom Dataset

The mean composite measures for retirement satisfaction, self-reported physical health, and mental health scores based on the Center for Epidemiologic Studies Depression (CESD) scale are presented in Table 5.4. Periods of extreme market volatility are presented in shaded columns that illustrate the relationship between asset prices and retirement satisfaction, mental, and physical health self report measures. Higher scores denote more negative self-appraisals of well-being. The two-year cross-wave periods with a large percentage change in negative sentiment are underlined.

The retirement satisfaction data demonstrate two periods of substantial change, 2004 and 2010, both of which were associated with steep stock market declines. In 2004, interviews from this period included self-reports of their feelings experienced at the end of the dot.com stock market crash, and in 2010 at the end of the financial crisis. During these two periods negative retirement satisfaction increased by 5.7 percent in 2004, and by 4.3 percent in 2008 - the two largest percentage increases over an 18 period. As with other measures included in this study, female financial respondents reported higher levels of negative retirement satisfaction versus men at every cross-wave period.

There was not a large amount of variance in the physical health composite scores over the 18 years of cross-wave data presented in Table 5.4. Of note however are 1998 and 2008, both years with extreme amounts of market volatility. In 1998 the S&P 500 had three different periods where the index fluctuated over 20 percent. This was due in large measure to the Russian currency crisis in August of that year. The highest level of negative health self reports was in 2008, corresponding with the start of the financial crisis. The mean physical health composite scores in Table 5.4 measure male and female financial respondents, and there is virtually no variation between the two.

The mean mental health composite scores, also presented in Table 5.4, illustrate the highest variation among male and female financial respondents, and this variation was demonstrated during the most volatile market periods. The highest measure was in 1998, a reading of 1.62 representing an increase in negative sentiment of 19.3 percent relative to the mental health measure from 1996. Mean mental health scores increased in negativity throughout the financial crisis starting in 2008. On average, across all waves from 1992 through 2012, male mental health composite scores averaged 1.26, while female financial respondents averaged 1.68

over the same period - a 32.5 percent difference in negative sentiment. It should be noted that while female financial respondents' self reported higher levels of negative mental sentiment at every cross-wave period versus men, there was very little variation among female financial respondents over the 18-year period from 1994 through 2012. The difference between males and females is statistically significant, however females have less variance when compared to other females across all cross-waves, and are impacted less by market volatility versus men.

Hypothesis 1 Results: Retirement Satisfaction, Physical, and Mental Health Self Report Measures After Periods of Market Volatility

Hypothesis 1: After periods of rapid price volatility in the equity and real estate markets, HRS financial respondents with stock based retirement plans subordinate to market fluctuations have a higher probability of suffering psychological distress, poorer health outcomes, and lower levels of retirement satisfaction.

The period used to measure market volatility was 2006 through 2010. During this period the S&P 500 fell over 50 percent as the majority of the volatility during the financial crisis occurred during this 5-year period. When comparing the value of stock holdings and IRA account values at the mean between 2008 and 2010, Table 5.5 demonstrates that all SES groups experienced a decrease in value. Moving from the top SES group (80 – 100 percent) down to the bottom SES group (0 – 19 percent) the percentage loss for each SES group increased. The top SES group experienced the smallest loss (5.13 percent) during this period, while the bottom SES group experienced the largest loss (25.71 percent). Males in the top SES group experienced larger losses versus females (7.52 for men versus 0.11 for women), otherwise the amount of lost wealth during this period did not vary between male and female respondents.

Similar to the finding that the association between IRA account value declines across SES groups, the negative mental health self-report scores were the lowest in the top SES groups and became increasingly negative moving down to the bottom SES groups. These scores, presented in Table 5.6, demonstrate that males experienced a statically significant increase of negative mental sentiment during the financial crisis. This increase was seen in the two bottom SES groups (0-19 percent, and 20-39 percent). Female respondents during this period self reported a decrease in negative mental sentiment of 3.81 percent (0 – 19 percent SES group) and 1.17 percent (20 – 39 percent SES group).

The statistically significant increase in negative mental sentiment self-reported by male respondents in the 0-19 SES group and 20-39 SES group is presented in Table 5.7 and Figure 5.1. When collapsing groups SES 0-19 and SES 20-39 into one group, and performing a one-tailed population proportion test that compares mental health scores from 2006 with 2010, the z-score is -1.729 with a p-value of 0.049, indicating a significant result at <0.05 . A similar test was performed for the bottom SES group for men comparing 2006 male mental health scores with 2010. This test generated a z-score of -1.965 with a p-value of 0.025, significant result at $p < 0.05$.

Hypothesis 2 Results: Mental Health and Retirement Satisfaction – Retired Individuals with Pension Income Versus Individuals Without Pension Income

Hypothesis 2: The second hypothesis was that retired individuals without a defined benefit pension plan, and without guaranteed pension income, have a higher probability of suffering psychological distress, will self report lower retirement satisfaction, versus individuals with a defined benefit pension plan and guaranteed pension income.

Statistical analyses testing this hypothesis examined whether pension income can inhibit negative mental sentiment and increase retirement satisfaction. Two logistic regression models using binary predictor (independent) variables were used to estimate the impact on two different dependent variables: negative mental sentiment and retirement satisfaction.

In both models pension income was collapsed into a binary variable indicating whether or not retired HRS respondents receive guaranteed monthly pension income. The two binary dependent variables represent: (1) HRS respondents with a score of four or lower on the Center for Epidemiologic Studies Depression Scale (CESD), and (2) HRS respondents that rate their retirement as unsatisfactory.

When pension income was logistically regressed with retirement satisfaction it resulted in a statistically significant ($p < .05$) odds ratio of 3.14. Specifically, those financial respondents that were retired in 2010 ($n=8251$), and were being paid a monthly pension, were 3.14 times more likely to report being moderately or very satisfied in retirement, versus those respondents with no monthly pension that reported being unsatisfied in retirement.

A two proportion Z-test was computed to compare two sample proportions: (1) respondents with pension income (who have a defined benefit plan, $n=2802$), and (2) respondents without pension income (those without a defined benefit plan, $n=5779$). The results of this test, featured in Table 5.12, demonstrates a statistically significant difference between respondents with pension income and retirement satisfaction. This test generated a Z-Score of -12.05. The p-value was 0.01 and is significant at $p < 0.01$. The proportion of those with pension income that reported being unsatisfied in retirement was 4.46 percent. The proportion of those without pension income that reported being unsatisfied in retirement was 12.82 percent.

When pension income was logistically regressed with mental health scores (CESD) it resulted in a statistically significant ($p < .05$) odds ratio of 1.92. Specifically, those financial respondents who were retired in 2010 ($n=8251$), and did not receive a monthly pension, were 1.92 times more likely to report a score of 4 or higher on the CESD scale (higher scores indicate an increase of negative sentiment).

A two proportion Z-test was computed to compare two sample proportions: (1) respondents with pension income (who have a defined benefit plan), and (2) respondents without pension income (those without a defined benefit plan). The results of this test, also featured in Table 5.12, demonstrates a significant difference between respondents with and without pension income and their negative mental sentiment respectively. This test generated a Z-Score of -9.48. The p-value was 0.01 and is significant at $p < 0.01$. The proportion of those with pension income that reported negative mental sentiment scores of four or lower was 10.67 percent. The proportion of those without pension income that reported scores of four or lower was 18.69 percent.

Hypothesis Results 3: Relationship between Age and Mental Health Scores After Periods of Market Volatility

Hypothesis 3 stated that after periods of rapid price volatility in the equity and real estate markets, individuals with assets reserved for retirement subordinate to market fluctuations would have a higher probability of suffering psychological distress, and report poorer mental health scores; and these self report measures were expected to be more negative among older rather than younger respondents.

Male and female HRS respondents who were under 59-years of age or lower reported higher levels of negative mental sentiment after a periods of market volatility. It was initially

hypothesized that older respondents would report higher levels of negative mental sentiment. The data and the associated statistical tests did not support this hypothesis.

From 2006 through 2012, males that were 59 or younger reported increased amounts of negative mental sentiment during each cross-wave period. In 2010 at the end of the financial crisis males reported a 34.39 percent increase in negative mental sentiment over HRS respondents that were 60 or older (see Table 5.13). Females in 2010 that were 59 or younger also reported an increase in negative sentiment females that were 60 or older (see Table 5.13). These two increases were both statistically significant.

A two proportion Z-test was computed to compare two sample proportions of those 59 or younger with those 60 or older. The results of two tests are reported in Table 5.14 and demonstrate a statistical significance between younger respondents versus older respondents. The two proportion Z-test for males generated a Z-Score of -4.70. The p-value was 0.01 and was significant at $p < 0.01$. The proportion of males 59 or younger from 2010 that reported a mental health score of four or lower was 10.34 percent versus respondents 60 or older of 6.08 percent (see Table 5.13). The two proportion Z-test for females generated a Z-Score of -1.99. This finding was significant at $p < 0.05$. The proportion of females 59 or younger from 2010 that reported a mental health score of four or lower was 10.91 percent versus respondents 60 or older of 9.13 percent (see Table 5.14).

Hypothesis 4 Results: Ability to Recover Lost Capital After Periods of Market Volatility

Hypothesis 4 stated that due to market volatility, stock based retirement accounts of HRS respondents will underperform stock market averages over short and extended periods of time, and higher SES households would be more likely recover lost capital versus lower SES households.

Table 5.5 tracks the percentage change of stock and IRA account values after short periods of market volatility. Table 5.15 tracks the IRA value of HRS respondents from a longer perspective from 1994 through 2012. Required for this analysis were respondents with an IRA account in 1994 that remained active and solvent through 2012. Table 5.15 demonstrates that both male and female respondents had IRA accounts that did not grow at the same pace of the S&P 500.

The average two-year return for males was 15.9 percent and 12.5 percent for females. The average 2-year return for the S&P 500 was 25.3 percent. During the financial crisis from 2006 through 2010 male IRA accounts experienced a 16.7 percent loss, while the IRA accounts of female respondents had an 11 percent loss, both of which underperformed the S&P 500, which lost just 2.6 percent over the same time period. From 2008 through 2012 male respondents had IRA accounts that grew by 1.6 percent, females during this period had accounts that grew by 11.1 percent, while the S&P 500 grew by 96.8 percent.

During extended periods from 2000 through 2012, male IRA account values grew on average by 30.4 percent, female accounts by 8.6 percent, while the S&P 500 grew by 35.9 percent. Overall for the entire period both male and female accounts dramatically underperformed the S&P 500. From 1994 through 2012 male respondents had IRA accounts that grew 221.9 percent from 75,492 to 242,981, female respondents had IRA accounts that grew on average 156.3 percent from 57,715 to 147,900, while the S&P 500 grew a total of 337 percent overall. Table 5.15 demonstrates that male and female respondents did not take advantage of long term trends by making additional investments when markets were oversold, and were hurt badly during the financial crisis evidenced by the period from 2008 through 2010. During this

period the S&P 500 advanced by 62.1 percent, while the IRA accounts of male respondents declined by 4.1 percent, and female accounts declined by 0.9 percent.

Table 5.1: Wealth Characteristics - Net Home Value, IRA Value, Stock Holdings, Bonds, Cash, and Pension Income – 1994 through 2012

	1994	1996	1998	2000	2002 (4)	2004	2006	2008	2010	2012
Net Home Value (1)	68,820	73,790	81,130	92,583	106,473	128,630	157,673	160,468	119,352	114,477
IRA Value	19,550	27,554	38,649	52,266	47,697	52,777	67,140	65,586	55,870	60,579
Stock Holdings	25,736	45,533	54,534	64,974	52,869	68,581	76,491	69,451	54,548	58,980
Bonds	4,671	8,568	7,818	7,910	10,134	11,004	10,079	10,805	8,245	10,139
Cash	12,745	16,865	20,944	22,692	21,087	27,019	26,021	26,439	27,616	29,170
Pension Income (2)	2,327	2,677	2,959	3,556	3,971	4,264	4,155	4,033	3,356	1,833
Total (3)	133,848	174,986	206,035	243,981	242,232	292,275	341,560	336,783	268,987	275,177
Net Home Value%	51.4%	42.2%	39.4%	37.9%	44.0%	44.0%	46.2%	47.6%	44.4%	41.6%
IRA Value%	14.6%	15.7%	18.8%	21.4%	19.7%	18.1%	19.7%	19.5%	20.8%	22.0%
Stock Holdings%	19.2%	26.0%	26.5%	26.6%	21.8%	23.5%	22.4%	20.6%	20.3%	21.4%
Bonds%	3.5%	4.9%	3.8%	3.2%	4.2%	3.8%	3.0%	3.2%	3.1%	3.7%
Cash%	9.5%	9.6%	10.2%	9.3%	8.7%	9.2%	7.6%	7.9%	10.3%	10.6%
Pension Income%	1.7%	1.5%	1.4%	1.5%	1.6%	1.5%	1.2%	1.2%	1.2%	0.7%

Notes:

1. Net home value is equal to the property value minus any outstanding mortgage or home equity loans
2. Pension income is a monthly value
3. Total does not include all forms of wealth (i.e., value of business, automobiles second home)
4. Shaded areas represent periods of extreme market volatility

Table 5.2: Percentage change of mean net home value between 2006 and 2012

	Respondent Type	2006	2008	2010	2012	2006 through 2012 change percentage
Mean Net	All Respondents	\$157,673	\$160,468	\$119,352	\$114,477	-27.40%
Home	Male	\$172,737	\$177,196	\$128,219	\$123,511	-28.50%
Value	Female	\$147,166	\$148,936	\$112,959	\$108,037	-26.59%

Notes: mean net home value is equal to property value minus mortgage balance and any outstanding home equity loans

Table 5.3: Percentage change of stock holdings and IRA values between 2006 and 2012

		2006 through 2010 change			
	Respondent Type	2006	2008	2010	percentage
Mean Stock Holdings	All Respondents	\$76,491	\$69,451	\$54,548	-28.69%
	Male	\$88,724	\$79,300	\$61,169	-31.06%
	Female	\$67,959	\$67,959	\$49,774	-26.76%

		2006 through 2010 change			
	Respondent Type	2006	2008	2010	percentage
Mean IRA Values	All Respondents	\$67,140	\$65,586	\$55,870	-16.79%
	Male	\$79,548	\$77,697	\$63,778	-19.82%
	Female	\$58,485	\$57,237	\$50,169	-14.22%

Table 5.4: Retirement satisfaction, physical health, and mental health self reports measures from HRS financial respondents 1994 through 2012

Retirement Satisfaction (1)	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012
All Financial	1.64	1.55	1.48	1.47	1.46	1.54	1.55	1.54	1.61	1.62
Male Financial	1.59	1.52	1.47	1.46	1.45	1.52	1.53	1.52	1.58	1.59
Female Financial	1.70	1.58	1.48	1.48	1.46	1.56	1.57	1.56	1.63	1.65
2-year cross-wave change %		-5.6%	-4.5%	-0.7%	-0.7%	<u>5.7%</u>	0.8%	-0.6%	<u>4.3%</u>	0.9%

Physical Health Ratings (1)	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012
All Financial	2.81	2.79	2.92	2.84	2.88	2.88	2.88	2.94	2.89	2.90
Male Financial	2.80	2.78	2.91	2.83	2.86	2.87	2.85	2.92	2.87	2.88
Female Financial	2.82	2.80	2.93	2.84	2.89	2.89	2.90	2.95	2.91	2.91
2-year cross-wave change %		-0.8%	<u>4.7%</u>	-2.9%	1.4%	0.2%	0.0%	1.8%	-1.5%	0.1%

Mental Health Ratings (1)	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012
All Financial	1.47	1.36	1.62	1.58	1.54	1.50	1.54	1.45	1.53	1.54
Male Financial	1.20	1.13	1.38	1.29	1.26	1.25	1.27	1.22	1.32	1.33
Female Financial	1.64	1.50	1.78	1.76	1.71	1.67	1.72	1.60	1.68	1.70
2-year cross-wave change %		-7.5%	<u>19.3%</u>	-2.4%	-2.7%	-2.2%	2.4%	-5.7%	<u>5.8%</u>	0.8%

Notes:

1. Higher ratings indicate higher levels of negative self report measures
2. Shaded areas represent periods of extreme market volatility (1998, 2002, 2010)
3. Underlined shaded areas represent cross-wave periods with a large increase in negative self report measures

Table 5.5: Percentage Change of Stock Holdings and IRA Account Values After Period of Market Volatility

						Volatility Period
All Respondents		2006	2008	2010	2012	2008-2010
SES Groups	80 - 100 %	\$1,049,677	\$973,551	\$923,568	\$1,076,227	-5.13%
	60 - 79 %	\$213,784	\$246,363	\$218,080	\$249,604	-11.48%
	40 - 59 %	\$88,387	\$101,858	\$86,086	\$100,644	-15.48%
	20 - 39 %	\$33,877	\$40,677	\$32,666	\$39,979	-19.69%
	0 - 19 %	\$7,419	\$9,115	\$6,771	\$8,819	-25.71%

						Volatility Period
Male		2006	2008	2010	2012	2008-2010
SES Groups	80 - 100 %	\$1,121,488	\$1,045,560	\$966,971	\$1,160,989	-7.52%
	60 - 79 %	\$215,379	\$247,066	\$219,698	\$251,675	-11.08%
	40 - 59 %	\$89,403	\$103,026	\$87,560	\$101,204	-15.01%
	20 - 39 %	\$33,442	\$41,111	\$32,352	\$39,779	-21.31%
	0 - 19 %	\$7,799	\$9,333	\$6,930	\$8,830	-25.75%

						Volatility Period
Female		2006	2008	2010	2012	2008-2010
SES Groups	80 - 100 %	\$930,392	\$859,536	\$858,554	\$949,899	-0.11%
	60 - 79 %	\$211,879	\$245,548	\$216,286	\$247,230	-11.92%
	40 - 59 %	\$87,436	\$100,849	\$84,819	\$100,133	-15.90%
	20 - 39 %	\$34,255	\$40,296	\$32,947	\$40,149	-18.24%
	0 - 19 %	\$7,166	\$8,957	\$6,645	\$8,810	-25.81%

Table 5.6: Percentage Change of Mean Mental Health Scores Based on the Center for Epidemiologic Studies Depression (CESD) During Period of Market Volatility

SES Groups	All	2006	2008	2010	2012	Mental Health Score	Mental Health Score
						Percentage Change 2006 - 2010	Percentage Change 2008 - 2010
	80 - 100 %	0.88	0.87	0.80	0.78	-9.85%	-8.78%
	60 - 79 %	0.98	0.99	0.89	0.95	-8.86%	-10.12%
	40 - 59 %	1.08	1.10	1.08	1.04	0.02%	-1.81%
	20 - 39 %	1.30	1.12	1.15	1.13	-12.14%	2.81%
	0 - 19 %	1.41	1.37	1.37	1.36	-2.49%	0.59%

SES Groups	Male	2006	2008	2010	2012	Mental Health Score	Mental Health Score
						Percentage Change 2006 - 2010	Percentage Change 2008 - 2010
	80 - 100 %	0.83	0.81	0.70	0.68	-15.81%	-13.77%
	60 - 79 %	0.70	0.81	0.74	0.76	5.01%	-9.50%
	40 - 59 %	0.88	0.91	0.84	0.87	-4.52%	-7.33%
	20 - 39 % *	0.94	0.92	1.01	0.97	7.52%	9.83%
	0 - 19 % *	1.09	1.18	1.29	1.18	18.51%	9.18%

SES Groups	Female	2006	2008	2010	2012	Mental Health Score	Mental Health Score
						Percentage Change 2006 - 2010	Percentage Change 2008 - 2010
	80 - 100 %	0.97	0.97	0.94	0.93	-2.86%	-3.15%
	60 - 79 %	1.30	1.19	1.06	1.17	-18.05%	-10.95%
	40 - 59 %	1.26	1.26	1.28	1.18	1.82%	1.49%
	20 - 39 %	1.62	1.28	1.27	1.26	-21.67%	-1.17%
	0 - 19 %	1.62	1.50	1.44	1.49	-10.92%	-3.81%

Notes:

* Statistically significant increase in mental health sentiment, higher scores indicate increase in negative mental sentiment

Table 5.7: Statistically Significant Mean Mental Health Scores Based on the Center for Epidemiologic Studies Depression (CESD) During Period of Market Volatility for SES Groups 0-19 Percent and 20-29 Percent (Males Only)

SES 1 and 2		Male 2006	Male 2010	Total
Mental Health Scores 0-8	0	398	548	946
	1	135	222	357
	2	63	114	177
	3	37	44	81
	4	27	32	59
	5	10	21	31
	6	11	19	30
	7	1	22	23
	8	5	13	18
Total		687	1,035	1,722
Scores Over => 4		54	107	
Percentage Over => 4		7.86%	10.34%	

Note:

The Z-Score is -1.729. The p-value is 0.049. The result is significant at <0.05

SES 1		Male 2006	Male 2010	Total
Mental Health Scores 0-8	0	229	254	483
	1	92	114	206
	2	45	57	102
	3	28	18	46
	4	13	19	32
	5	6	12	18
	6	14	12	26
	7	2	11	13
	8	3	11	14
Total		432	508	940
Scores Over => 4		38	65	
Percentage Over => 4		8.80%	12.80%	

Notes:

The Z-Score is -1.965. The p-value is 0.025. The result is significant at p <0.05.

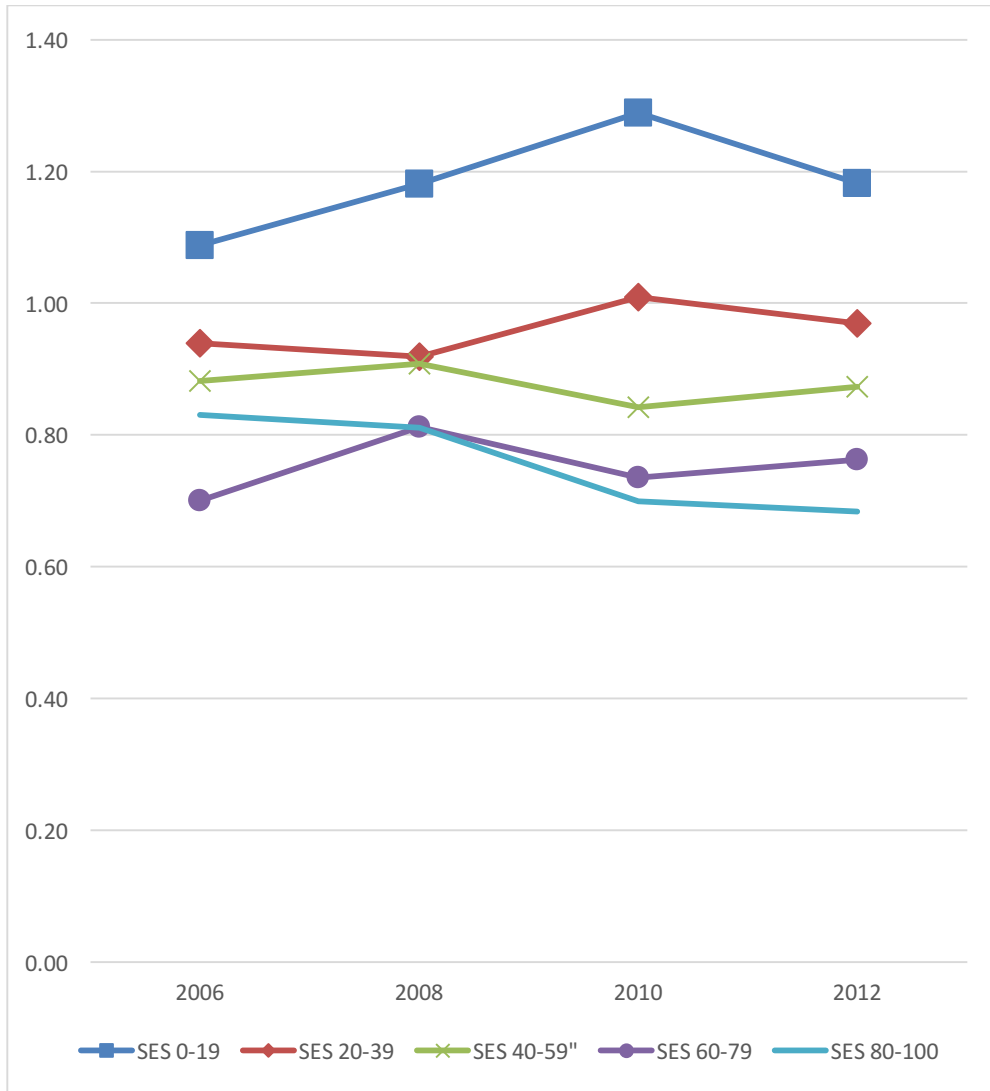


Figure 5.1: Mean Mental Health Scores Based on the Center for Epidemiologic Studies Depression (CESD) During Period of Market Volatility for all SES Groups (Males Only)

Notes:

1. Higher scores indicate increase in negative mental health scores
2. SES Group 0-19 and 20-39 is statistically significant when combined
3. SES Group 0-19 is statistically significant

Table 5.8: Percentage Change of Physical Health Scores During Period of Market Volatility

		2006	2008	2010	2012	Physical Health Score Percentage Change 2006 - 2010	Physical Health Score Percentage Change 2008 - 2010
SES Groups	All						
	80 - 100 %	2.44	2.44	2.49	2.51	1.96%	2.01%
	60 - 79 %	2.48	2.63	2.64	2.58	6.37%	0.19%
	40 - 59 %	2.69	2.70	2.74	2.79	1.82%	1.19%
	20 - 39 %	2.71	2.87	2.77	2.83	2.11%	-3.42%
	0 - 19 %	2.80	2.87	2.79	2.78	-0.34%	-2.79%
		Male					
SES Groups	80 - 100 %	2.34	2.39	2.41	2.43	2.94%	0.62%
	60 - 79 %*	2.33	2.50	2.55	2.47	9.17%	1.96%
	40 - 59 %	2.64	2.60	2.67	2.71	0.76%	2.58%
	20 - 39 %	2.65	2.78	2.77	2.78	4.49%	-0.65%
		0 - 19 %	2.71	2.76	2.76	2.75	1.99%
		Female					
SES Groups	80 - 100 %	2.67	2.55	2.66	2.81	-0.33%	4.22%
	60 - 79 %	2.70	2.85	2.78	2.89	3.04%	-2.42%
	40 - 59 %	2.74	2.82	2.81	2.90	2.70%	-0.28%
	20 - 39 %	2.78	2.96	2.77	2.89	-0.43%	-6.48%
		0 - 19 %	2.87	2.97	2.82	2.81	-1.89%

Notes:

* Statistically significant increase in negative physical health measure, higher scores indicate increase in poor health

Table 5.9: Statistically Significant Physical Health Scores During Period of Market Volatility for SES Group 60-79 Percent (Males Only)

SES 4		Male 2006	Male 2010	Total
Physical	1	88	79	167
Health	2	175	205	380
Scores	3	114	139	253
1-5	4	40	69	109
	5	10	29	39
Total		427	521	948
Scores Over => 3		10	29	
Percentage Over => 3		2.34%	5.57%	

Notes:

1. The Z-Score is -2.4869. The p-value is 0.006. The result is significant at <0.01
2. Higher scores indicate increase in poor health

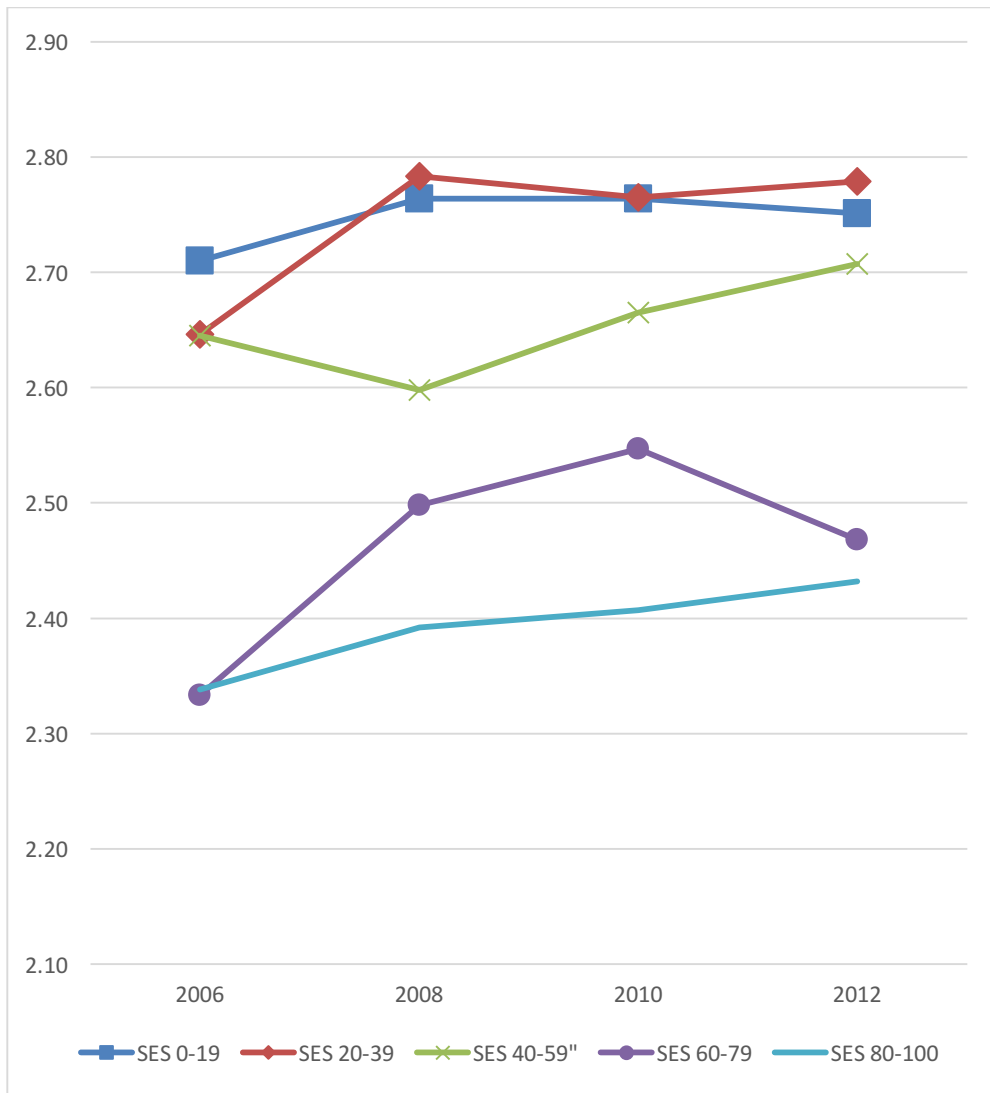


Figure 5.2: Mean Physical Health Scores During Period of Market Volatility for all SES Groups (Males Only)

Notes:

1. Higher scores indicate increase in negative mental health scores
2. SES Group 60-79 is statistically significant

Table 5.10: Percentage Change of Retirement Satisfaction Scores During Period of Market Volatility

		2006	2008	2010	2012	Retirement Satisfaction Percentage Change 2006 - 2010	Retirement Satisfaction Percentage Change 2008 - 2010
SES Groups	All						
	80 - 100 %	1.26	1.26	1.30	1.34	3.17%	3.09%
	60 - 79 %	1.30	1.35	1.34	1.38	2.77%	-0.89%
	40 - 59 %	1.39	1.36	1.44	1.45	4.04%	5.87%
	20 - 39 %	1.46	1.47	1.48	1.46	1.16%	0.89%
	0 - 19 %	1.55	1.52	1.56	1.55	0.71%	2.63%
<hr/>							
SES Groups	Male						
	80 - 100 %	1.24	1.25	1.28	1.34	2.90%	2.08%
	60 - 79 %	1.26	1.34	1.34	1.33	6.18%	0.07%
	40 - 59 %*	1.37	1.32	1.46	1.45	7.10%	10.58%
	20 - 39 %	1.41	1.45	1.43	1.42	1.56%	-1.65%
	0 - 19 %	1.52	1.50	1.49	1.51	-1.85%	-0.20%
<hr/>							
SES Groups	Female						
	80 - 100 %	1.30	1.29	1.34	1.34	2.93%	3.97%
	60 - 79 %	1.34	1.35	1.33	1.42	-0.82%	-1.33%
	40 - 59 %	1.41	1.40	1.43	1.44	1.35%	2.22%
	20 - 39 %	1.52	1.48	1.53	1.49	1.19%	3.52%
	0 - 19 %	1.57	1.54	1.61	1.58	2.62%	4.62%

Notes:

* Statistically significant decrease in retirement satisfaction, higher scores indicate lower amounts of retirement satisfaction

Table 5.11: Statistically Significant Retirement Satisfaction Scores During Period of Market Volatility for SES Group 40-59 Percent (Males Only)

SES 40-59		Male 2006	Male 2010	Total
Retirement	1	172	152	324
Satisfaction	2	70	91	161
Scores (1-3)	3	5	14	19
Total		247	257	504
Scores = 3		5	14	
Percentage = 3		2.02%	5.45%	

Notes:

The Z-Score is -2.017. The p-value is 0.021. The result is significant at <0.05

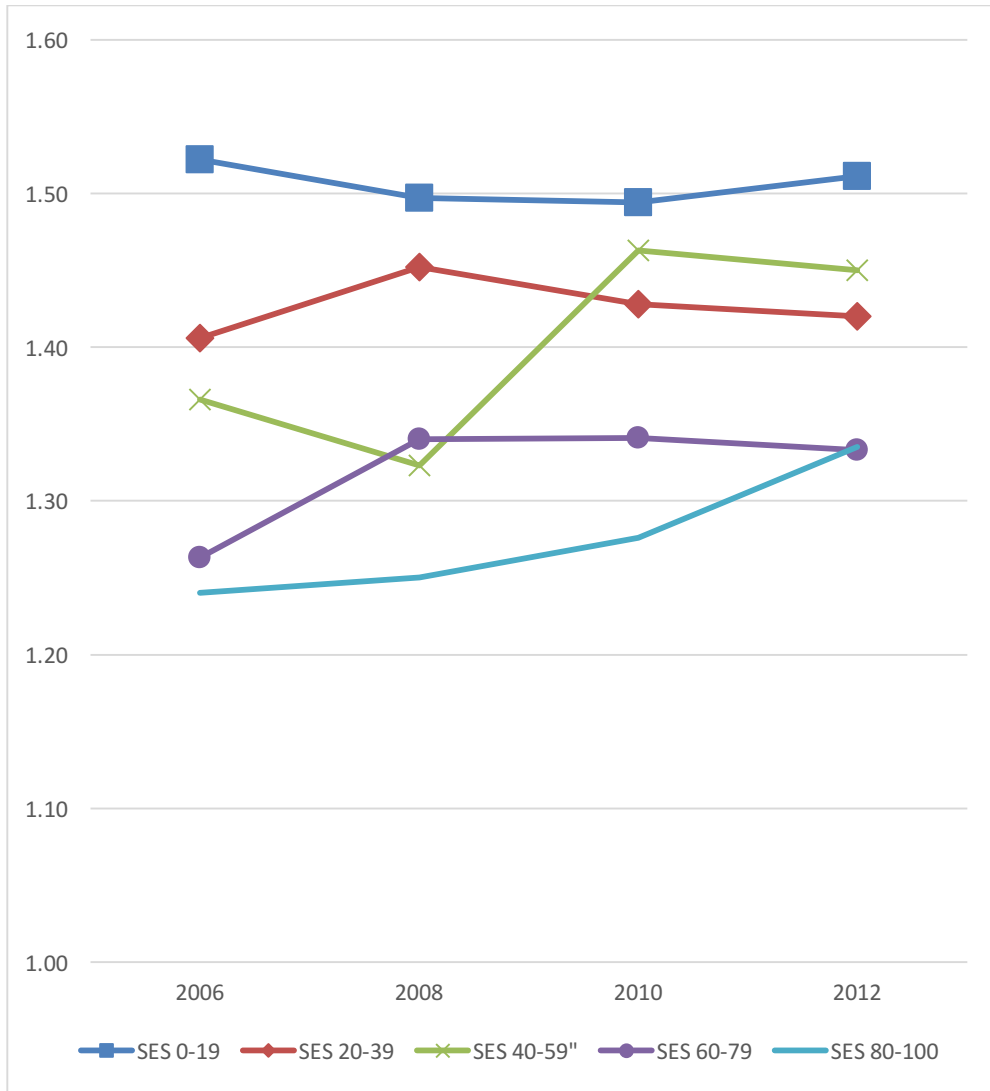


Figure 5.3: Mean Retirement Satisfaction Scores During Period of Market Volatility for all SES Groups (Males Only)

Notes:

3. Higher scores indicate increase in negative retirement satisfaction sentiment
4. SES Group 40-59 is statistically significant

Table 5.12: Statistically Significant Mental Health and Retirement Satisfaction Scores During Period of Market Volatility for Retired HRS Respondents. Pension Income Versus No Pension Income (2008 Through 2010)

Mental Health Scores (0-8)	Defined Benefit with Pension Income	No Defined Benefit No Pension Income
0	1,399	2218
1	584	1282
2	336	736
3	184	463
4	108	287
5	58	244
6	64	225
7	45	201
8	24	123
Total	2,802	5,779
Scores Over => 4	299	1080
Percentage Over => 4	10.67%	18.69%

Notes:

1. The Z-score is -9.483. The p-value is 0.00. The result is significant at $p < 0.01$
2. Higher scores indicate an increase in negative mental sentiment

Retirement Satisfaction Scores (1-3)	Defined Benefit Pension Income	No Defined Benefit No Pension Income
1	1,703	2624
2	974	2414
3	125	741
Total	2,802	5,779
Unsatisfied	125	741
Unsatisfied %	4.46%	12.82%

Notes:

1. The Z-score is -12.057. The p-value is 0.00. The result is significant at $p < 0.01$.
2. Higher scores indicate an increase in unsatisfactory retirement satisfaction

Table 5.13: Age Comparison of HRS Financial Respondents - Percentage Change of Mean Mental Health Scores Based on the Center for Epidemiologic Studies Depression (CESD) During Period of Market Volatility)

Mental Health Ratings (1)	2006	2008	2010 (2)	2012	Mental Health Score Percentage Change 2006 - 2010	Mental Health Score Percentage Change 2008 - 2010
60 and Older	1.07	1.05	0.97	1.01	-9.72%	-7.56%
60 and Older Male	0.86	0.88	0.82	0.88	-4.19%	-6.48%
60 and Older Female	1.25	1.18	1.08	1.12	-13.01%	-8.14%

Mental Health Ratings (1)	2006	2008	2010	2012	Mental Health Score Percentage Change 2006 - 2010	Mental Health Score Percentage Change 2008 - 2010
59 and Younger	1.16	1.08	1.15	1.10	-1.12%	6.57%
59 and Younger Male	1.01	0.95	1.11	1.01	9.18%	16.67%
59 and Younger Female	1.26	1.16	1.18	1.17	-5.81%	1.81%

Percentage Difference	2006	2008	2010	2012
Overall	8.79%	3.35%	19.15%	8.70%
Male	17.93%	7.73%	34.39%	15.30%
Female	0.88%	-1.44%	9.23%	4.46%

Notes:

1. Higher ratings indicate higher levels of negative self report measures
2. Shaded areas represent periods of extreme market volatility
3. Percentages in bold are statistically significant

Table 5.14: Statistically Significant Mental Health Scores Health Scores During Period of Market Volatility for HRS Respondents by Age

2010 Male		60 and Older	59 and Under	Total
Mental	0	1,660	654	2,314
Health	1	537	256	793
Scores	2	236	116	352
0-8	3	117	49	166
	4	59	33	92
	5	41	33	74
	6	34	22	56
	7	18	25	43
	8	13	11	24
Total		2,715	1,199	3,914
Scores Over => 4		165	124	
Percentage Over => 4		6.08%	10.34%	

Notes:

The z-score is -4.7031. The p-value is 0. The result is significant at $p < .01$

2010 Female		60 and Older	59 and Under	Total
Mental	0	1,760	835	2,595
Health	1	732	384	1,116
Scores	2	329	150	479
0-8	3	204	101	305
	4	116	65	181
	5	76	41	117
	6	50	35	85
	7	35	21	56
	8	27	18	45
Total		3,329	1,650	4,979
Scores Over => 4		304	180	
Percentage Over => 4		9.13%	10.91%	

Notes:

The z-score is -1.9926. The p-value is 0.023. The result is significant at $p < 0.05$

Table 5.15: Ability to Recover Lost Capital After Periods of Market Volatility – 1994 HRS Financial Respondents Followed Through 2012

Cross-Wave Period	Mean IRA Account Value (All)	Mean Male IRA Account Value	Mean Female IRA Account Value	S&P 500 Value
1994	67,564	75,492	57,715	32.27
1996	83,796	92,086	73,558	56.05
1998	122,653	139,616	101,874	93.87
2000	163,964	186,399	136,198	103.73
2002	149,238	175,514	117,069	66.50
2004	158,904	191,350	118,425	94.57
2006	218,621	275,575	148,190	119.25
2008	191,681	239,196	133,103	71.66
2010	186,271	229,491	131,936	116.15
2012	200,582	242,981	147,900	141.01

Cross-Wave Period	All Respondents Return	Male 2-Year Growth %	Female 2-Year Growth %	S&P 500 2-Year Growth %
1994-1996	24.0%	22.0%	27.5%	73.7%
1996-1998	46.4%	51.6%	38.5%	67.5%
1998-2000	33.7%	33.5%	33.7%	10.5%
2000-2002	-9.0%	-5.8%	-14.0%	-35.9%
2002-2004	6.5%	9.0%	1.2%	42.2%
2004-2006	37.6%	44.0%	25.1%	26.1%
2006-2008	-12.3%	-13.2%	-10.2%	-39.9%
2008-2010	-2.8%	-4.1%	-0.9%	62.1%
2010-2012	7.7%	5.9%	12.1%	21.4%
Average	14.6%	15.9%	12.5%	25.3%

Periods Of Note	All Respondents	Male	Female	S&P 500
2006-2010	-14.8%	-16.7%	-11.0%	-2.6%
2008-2012	4.6%	1.6%	11.1%	96.8%
2000-2012	22.3%	30.4%	8.6%	35.9%
All Periods	196.9%	221.9%	156.3%	337.0%
All Periods Versus S&P 500	-41.6%	-34.2%	-53.6%	

CONCLUSIONS

Summary

The overarching goal of the present study was to make an original contribution that operationalizes in a modern context some of Karl Polanyi's ideas about the subordination of society to various types of asset markets (Polanyi, 2001). Another primary goal was to demonstrate the deleterious effects created by financialization, and the prevalence of finance culture, and how the advent of these novel socioeconomic factors impact retirement outcomes. The final purpose of this study was to develop a conceptual framework that provides retirement saving solutions for individuals in the lower 50 percent of the SES stratification structure.

A fundamental assumption of this research was that financialization created unintended consequences as individuals saving for retirement became increasingly subordinate to market outcomes. This research addressed four specific research questions. First, during periods of asset price volatility, how do self report measures of mental and physical health, along with retirement satisfaction, vary between individuals with assets vulnerable to market fluctuations? Second, after periods of market volatility how do health status and psychological distress vary between individuals with differing levels of pension income. Third, if there is variability in these outcomes among individuals with different kinds of retirement plans, what are the moderating influences of age, gender and other personal characteristics as an individual nears retirement age? Finally, because market volatility increased dramatically from 2000 through 2015, a novel research strand has been informed by question four, which examined how typical retirement savers recover wealth after periods of extreme market volatility.

Key Statistical Findings

The key findings of this study were: (1) a statistically significant increase of negative mental sentiment, and a decrease in retirement satisfaction in male HRS respondents after periods of market volatility; (2) the demonstration of reduced negative mental sentiment and higher levels of retirement satisfaction reported by retired individuals with monthly pension income, versus those individuals without monthly pension income; (3) a statistically significant difference in negative mental sentiment between HRS financial respondents over 60-years old, versus those under 59-years of age; and (4) observation of marked variation between SES groups in terms of their ability to recover lost capital after periods of market volatility.

The finding related to pension income supports hypothesis two, which stated that pension income inhibits negative mental sentiment and increases retirement satisfaction. This is an important finding because prior research has demonstrated that depression is a problem in elderly communities and often remains untreated (Brown, McAvay, Raue, Moses, & Bruce, 2003; Cole & Dendukuri, 2003).

The third hypothesis stated that deteriorating market conditions during the last five years of an individual's peak earning years could irreparably damage future retirement outcomes. This was based on the notion that if two individual's have identical levels of retirement wealth five years prior to retiring, and both have their assets structured identically, then the final value of their wealth at retirement is completely subordinate to market outcomes and thereby would impact mental and physical health ratings. This hypothesis was not supported as financial respondents in the 60 and older age group reported lower levels of negative sentiment versus the 50 to 59 age group. In all cross-wave periods, and for both female and male financial respondents, the 50 to 59 age group reported higher levels of negative sentiment during periods of asset price volatility.

Key Long Term Socioeconomic Characteristics of HRS Respondents

Table 5.1 quantifies and confirms trends already discussed at length in the literature. Pension income is declining in the U.S. and Table 5.1 illustrates this dramatically. This trend will continue as the number of U.S. households with a guaranteed pension plan continue to drop. Reducing pension liabilities is a central component of financialization that will continue as long as there is an emphasis at the corporate level to maximize shareholder value.

Table 5.1, Table 5.2 and Table 5.3 demonstrates the level of household wealth destruction that occurs after periods of extreme market volatility. When comparing the values of their IRA account values, Table 5.5 illustrates extreme variation between the top and bottom SES groups. While all SES groups experienced wealth destruction during the financial crisis, the IRA account values of the top 20 percent declined by only 5.13 percent versus 25.71 percent for the bottom 20 percent group. This variation could be a result of the top SES group making additional investments when equity prices were depressed, or it could be due to higher SES groups having access to superior wealth management advice.

When considering the wealth destruction shown in Table 5.1, 5.2, and Table 5.3, along with top SES groups having increased flexibility to navigate turbulent markets during the financial crisis, it becomes clear that a large swath of HRS financial respondents have received no benefit from the “ownership society” that Fligstein & Goldstein (2015) describe.

Between 2006 and 2010 the average HRS financial respondent lost \$43,196 of home equity, and \$21,943 of value in their stock and IRA accounts. Table 5.5 demonstrates that in 2010 the bottom 40 percent of SES groups had IRA accounts with an average value of \$32,666, while the bottom 20 percent SES group had just \$8,819. Table 5.15 illustrates the plight of the bottom 40 percent further, showing the incongruence between the growth percentage of the S&P

500 from 2008 through 2012 of 96.8 percent while the average IRA account value grew by only 4.6 percent. This is confirmation that low SES households are unable to take advantage of depressed equity prices during periods of market volatility. It also confirms that a substantial portion of HRS households are unable to remain invested in the stock market when fear of declining stock prices becomes prevalent.

Key Long Term Physical, Mental Health, and Retirement Satisfaction Characteristics from HRS Respondents

Within their respective gender groups, levels of mental health sentiment for male respondents varied more during periods of market volatility. It seems logical to infer this is a function of males typically being less risk averse. Female financial respondents exhibited higher levels of negative mental health sentiment versus males at every cross-wave period. However, while the differences in mental health ratings between males and females were statistically significant, there was insignificant variation when comparing women with other women from different cross-wave periods. This is illustrated in Table 5.6 within two volatility periods, one from 2006 through 2010, and the other from 2008 through 2010. In both periods, when broken out by SES group, female financial respondents reported a decline in their negative mental sentiment. Males in the bottom 40 percent SES groups experienced a statistically significant increase in their negative mental sentiment scores. This contrasts logically with the fact that the IRA accounts of males from 2008 through 2012 grew by only 1.6 percent, while female accounts during the same period grew by 11.1 percent (see Table 15.5).

Throughout all cross-waves the only statistically significant increase in negative physical health was during the 2008 through 2012 period for the 60 to 79 percent SES group. Considering

that physical health was not shown to be impacted by market volatility throughout this study, it seems logical to infer that this negative physical health finding is a statistical outlier.

Key Conclusions

Boomers as a social group can be categorized in a variety of ways, but in terms of economic sociology and their financial situation, the historically constructed meaning behind many of the economic wealth building processes of Boomers was changed dramatically by financialization. Boomers in large measure stopped saving in a traditional way because of low interest rates. When viewed as a group through a prism as economic-actors-in-society one sees a striking divergence from their parents or previous same-aged cohorts. They were the first large-scale demographic cohort to have their retirement outcomes linked to stock market performance. Throughout the 1990s and early 2000s the value of IRA accounts in the U.S. grew while the savings rate dropped, which bottomed out in July of 2005 at 1.9, the lowest U.S. savings rate ever recorded by the St. Louis Federal Reserve.

The findings from this study suggest that building retirement wealth via stock market returns has been ineffectual for a substantial portion of Boomers. Based on the negative mental health composite scores reported during periods of asset price volatility, and the overall appreciation rates of the equity and property markets over the last 30 years, there has been a disconnect between Boomers and the norms and values that were promoted by various economic institutions and policy makers (e.g., risk taking as a function of superior long term returns, investing viewed as intellectually and fiscally superior to traditional savings accounts). This creates a problem because individuals are linked and influence each other, and if the prevailing system for saving for retirement lacks support or trust, then there are broad economic implications for the future that policy makers must consider.

By definition the hallmark of capitalism and markets in general is the practice of trading and speculating based on the assumption that various kinds of assets will appreciate over time. To maximize profit and utility in this situation individuals need to have a logical set of choices and then behave rationally. Economic sociologists consider rationality a variable and this study, along with previous research, indicates that behaving rationally during periods of market volatility has been challenging for a substantial portion of the Boomer cohort (see Table 5.15).

In classic economic models of wealth accumulation individuals are required to make decisions about current consumption rates in order to provide capital for consumption after retirement (Lusardi & Mitchell, 2011). The individual must be able to accurately discount the present value of various types of assets and then predict what these assets will be worth in the future. Based on the amount of wealth that first wave Boomers bring into retirement, a substantial portion of the cohort has been unable to make accurate decisions about the future value of capital.

To illustrate how complex this type of future discounting is, and as documented in the literature review, professional pension plan managers in the private and public sector have struggled with the ability to identify a discount rate that works in all market conditions (Novy-Marx & Rauh, 2009, 2010). This is demonstrated by the numerous underfunded pension plans throughout the U.S estimated to have over four trillion dollars of unfunded pension obligations (Novy-Marx & Rauh, 2014).

Throughout the 1990s and early 2000s financial planners considered William Bengen's (1984) four percent drawdown rule as a reliable method for spending accumulated wealth in retirement, a method for spending retirement capital that was highly promoted by professional wealth advisors. However, as documented in the literature review these models are now being

questioned due to large market declines and the inability of savers to generate income due to negative real interest rates (Finke, Pfau, & Blanchett, 2013). If professional pension fund managers and wealth advisors struggle to accurately navigate volatile markets, how can economically illiterate individuals be expected to make complex and accurate financial decisions about the future?

Limitations

The present study has four primary limitations. First, by definition research based on secondary data is limited by a lack of control by the researcher over how data are collected. Like many other secondary data sources, HRS data have missing information from various respondents that for a variety of reasons chose to ignore questions, or may not have understood certain lines of inquiry. For some of the key financial variables that may be missing, the RAND data sets include imputations that attempt to capture missing data. The HRS data set relies heavily on self-report measures attempting to capture health and financial characteristics and these responses can be biased, exaggerated, or respondents can have selective memories about certain events.

The second limitation is created by the amount of time between the core and exit interviews during each cross-wave period. For this study, market data have been matched with the interview date. This creates a custom variable that captures the performance of the equity market that each respondent was exposed to during the two years between each cross-wave period. The codebooks for the Rand and HRS datasets do not clarify what interview sections were answered in the core or exit interviews. Some respondents have up to a six-month gap between the two interviews. The RAND codebook recommends any variable based on an interview date should use the final or exit interview. The present study has adhered to this

recommendation but the primary variable in this study that measures the market performance that each respondent has been exposed to, in the occurrence of a long period between the core and exit interviews, may be inaccurate.

The third limitation relates to housing price data. HRS respondents self-reported the value of their home and this value may not be accurate. Each respondent also self-reported the amount owed on their home including home equity loans and second mortgages. For the purpose of this study it was logical to use the net value of each respondent's home, versus housing price data for each associated geographic census location. The RAND data set does not report the census tract location of HRS respondents, and the broader U.S. geographic location provided in the RAND data set would not provide enough detail. The net housing values of each respondent's home, when viewed as an aggregate, demonstrated a very large decline between 2008 and 2012. This correlates strongly with the decline in residential real estate prices reported by Case Shiller and the U.S. census.

The fourth and final limitation relates to the statistical analyses. The analyses for the present study were conducted primarily during periods of high asset price volatility in 1998, 2002, 2008, and 2010. To extend this research, the same set of HRS respondents should be analyzed in a longitudinal study over several cross-waves allowing an analysis at the group and individual level. This would extend the present study beyond single periods of extreme volatility.

Toward a Novel Conceptualization of Capital Utility: Recommendations for Future Research and Policy Makers

In 1950 as the first Boomers were born, the global population had reached approximately 2.5 billion people. By 2050 as the last of the Boomer cohort passes away the population will have grown grow to approximately 10 billion and a large percentage of the total population will

be comprised of elderly persons. The growing elderly population will create a demand for retirement solutions and will pose substantial social and economic challenges for policy makers.

The equity and residential real estate markets from 2000 through 2015 demonstrated that predicting the future value of an asset is difficult. This research has shown that under the present system of building retirement wealth, a substantial portion of individuals are unable to navigate volatile markets in rational fashion. More importantly, this research has demonstrated that typical median wage earners, who navigate their life governed by the salience of their monthly finances, are largely incapable of projecting an accurate level of wealth required for a satisfactory retirement outcome. A theoretical parallel for this notion can be drawn from Polanyi's argument that prior to the 19th Century, the economic interests of the individual were subordinate to the interests of the social group, (e.g., "social interest" > "economic interest"). The analogous inference in a modern context is that the socioeconomic aspects of building long term capital is subordinate to monthly capital requirements, which for many individuals has resulted in the rejection of a market-centered style of retirement planning.

Research has demonstrated that a large percentage of individual households are unable to grow adequate retirement wealth under the current system. The conceptual framework presented in Figure 3.3 that calls for the addition of guaranteed monthly income is presented in additional detail in Figure 6.1.

The present study demonstrated that pension income inhibits negative mental sentiment and increases retirement satisfaction. Therefore, it seems logical to infer that if individuals focused on the future income-producing utility of their assets, versus the value they may hold in the future, they could reach retirement age with assets that generate a stream of income equal to their monthly capital requirements. For example, stocks, bonds, and rental properties have the

ability to produce income streams. These income streams are highly predictable, have greater stability, and are similar to a defined benefit pension plan.

A practical example of how this conceptualization could be employed would be an individual who purchases a rental property that is cash positive or mortgage free, thereby creating a highly stable source of income. From 2005 through 2013 property values in the U.S. declined nationwide by approximately 29%, but median U.S. residential rent rates were stable, rising slightly from \$862 in 2005 to \$905 in 2013. Equities can also be used to create stable streams of income. For example, the “Dividend Aristocrats” is a widely followed group of companies that have paid, and raised the annual dividend that shareholders receive every year for over 25 years. The majority of these companies are mature global conglomerates that dominate their industries and provide basic consumer staples (e.g., toothpaste, soap, food, diapers). Promoting the perception of capital utility in this method could be one way for policy makers to challenge the current savings paradigm. Future retirement preparedness research should focus on demonstrating the various types of economic behaviors and perceptions that increase the amount of stable monthly income individuals bring into retirement, and how these behaviors translate into wellness, retirement satisfaction, and increased psychological hardiness during periods of asset price volatility.

Figure 6.1 presents how the goal of creating guaranteed income streams could be accomplished. At the core of this framework are households that hold the types of assets that produce income. Individuals need to understand that assets fluctuate over time and basic determinants of risk. However, by large measure the risk would impact the value of the asset, not the income stream. In order for individuals to implement this framework they would need to focus on income utility, versus asset value. This would require a major paradigm switch.

Suggestions for how can this be accomplished is presented in Figure 6.1. along with recommendations at individual, corporate, and state levels.

At the individual level, savers need to be able to save more, spend less, and borrow less by avoiding a reduction in the equity in their home before retirement. They also need to understand the difference between long and short-term risk, and have access to wealth management services. They require an income stream that is stable and does not fluctuate. If they are willing to save more, they should be able to increase their income in retirement over social security without fear of losing that income.

Coordination between firms, their employees, and the state is crucial. For example, two of the biggest destroyers of retirement capital are taxes and hidden financial fees. In the mobile economy employees change jobs frequently, each time they switch employers they have to transfer their old employee 401k plan to an IRA, there are fees involved each time and often employees just cash out their old 401k plans and pay large penalties for early withdrawals. A modern approach to this problem is for individuals to have a single IRA account that moves with them from job to job, and employers make contributions to each employee's plan. This would give the individual more control and reduce their fees.

For individuals that find the notion of investing in the stock market untenable, the U.S. government could create retirement bonds. These would be bonds that carry specific maturity dates. This would enable an individual to buy the bond and be able to count on a certain amount of income in the future. The buyer of the bond would not receive income until the maturity date, and the income would be paid for a specific amount of time. Under a system like this there would be no surprises. It would be beneficial if these bonds did not trade on an exchange, and were not available to large institutional clients. This would inhibit professional traders from

manipulating them via market movements, and they would remain price stable. They would be for individual households in lower SES groups and pay an interest rate that was higher by several hundred points above the federal funds rate.

Closing Comments

One of Polanyi's core arguments was that it was unethical to treat humans like commodities. Financialization has created an environment whereby retirement outcomes have become fictitious commodities because they are linked to the stock market. The large variance between SES groups and how they navigate turbulent markets demonstrate an uneven playing field confirmed by the substantial portion of Boomer households that have fared poorly under the current method of building retirement wealth. The findings from this research demonstrate that market volatility is associated with increased negative mental sentiment and decreased retirement satisfaction.

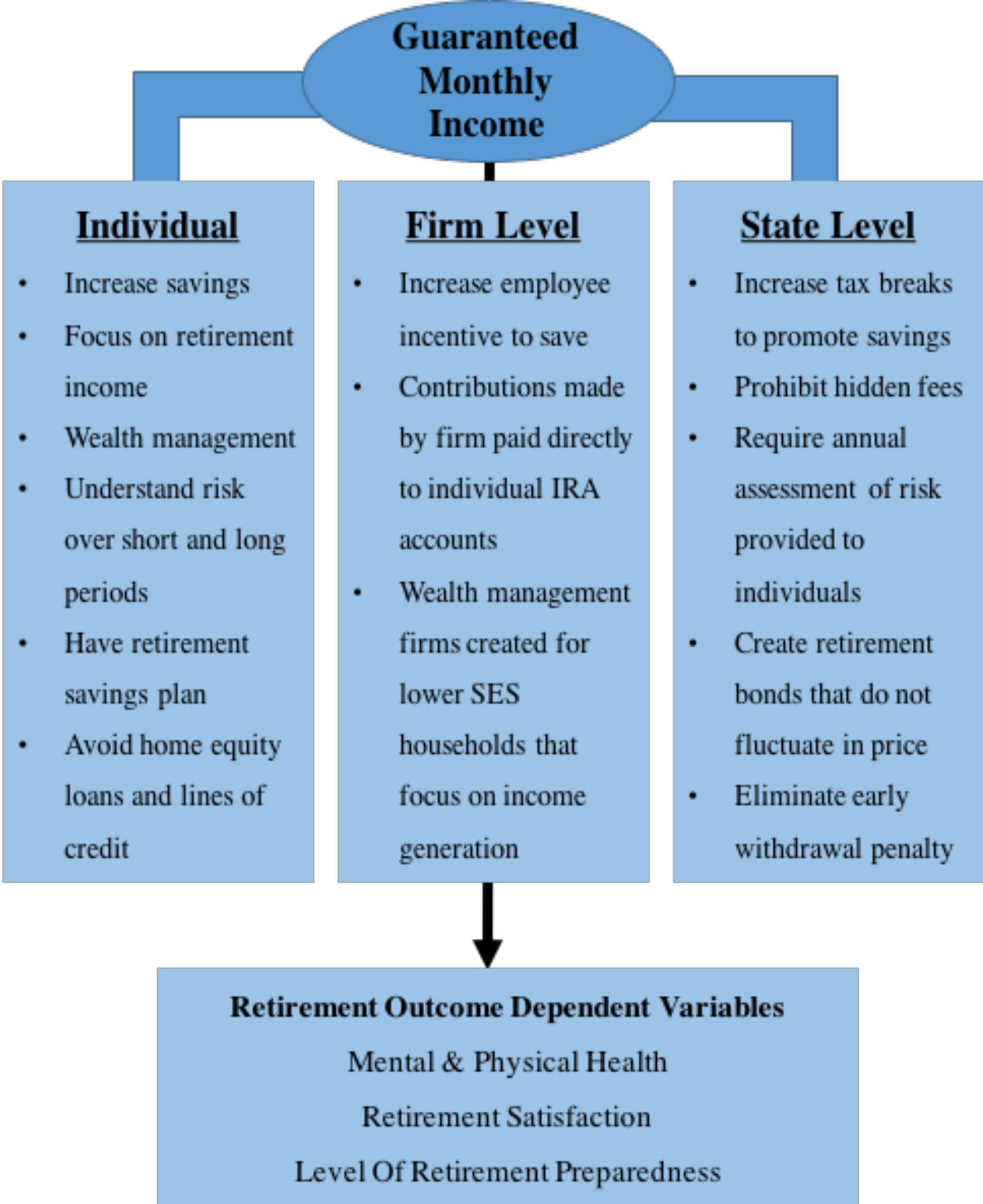


Figure 6.1: Guaranteed Monthly Income – Individual, Firm, and State Level Contributions

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