A Yen Saved is a Yen Earned: Deconstructing the Japanese Savings Rate

By: James L. Smith

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Approved:

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Adviser: Dr. Noell Wilson

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Reader: Dr. Kees Gispen

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Reader: Dr. Mark Van Boening

Acknowledgments and Dedication

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ABSTRACT
A Yen Saved is a Yen Earned: Deconstructing the Japanese Savings Rate

Since the 1990s, Japan's savings rate has been in decline. In this thesis, I posit two theories to explain this phenomenon. The first, the Demographics Theory, states that the savings rate is declining due to Japan's aging population, but that this effect is less than in countries with similar demographics. The second, the Employment Theory, states that the savings rate is declining due to a decrease in the number of permanent employees in the Japanese economy. To test these theories, multiple regressions are run using data obtained from governmental agencies and the World Bank. The results for the Demographics Theory gave strong statistical evidence that the aging population has caused a decline in the savings rate, as well as some evidence to suggest that this effect is weaker in Japan than in demographically similar countries. The results for the Employment Theory also showed that the number of permanent employees in the economy is statistically related to the savings rate; however, the relationship was found to be the opposite of the theorized relationship. Instead of the decrease in permanent employees causing the savings rate to decline, it has lessened its decline.

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Chapter 1: Introduction

The Japanese have always had a talent for devoting themselves to a cause. During the Samurai period in history, a warrior's commitment to his leader was so powerful he would sacrifice his life at a command. The Japanese people showed a similar level of fervor for their nation during World War Two, when they became renowned across the globe for their willingness to sacrifice everything for victory. In the modern era, the Japanese have found a new cause to devote themselves to—economic superiority. Rising from the ashes of World War Two, Japan remained the second largest economy in the world from the late 1970s until 2005, when it fell to number three behind China and the US. However, growth throughout this period was not always constant. Since the early 1990s the Japanese economy has been in decline. Although the exact reasons behind this decline remain contested, many economists have pointed to the savings rate as an accurate indicator of the status of the Japanese economy. Changes in the savings rate mirror the growth and contraction Japan's economic evolution, increasing during Japan's meteoric rise to economic power and falling since the protracted recession of the early 1990s. This trend raises the question: Why is Japan's savings rate falling?

In this thesis, I explore two possible reasons for Japan's falling savings rate. The first is the opinion espoused by most economists who study this question: the shift in Japan's demographics towards a more elderly population has caused a decline in Japan's savings rate. The second is a more novel approach. While studying abroad during the spring of 2013, I made

many Japanese friends who were also university students. Not surprisingly, the majority of them were making plans for after graduation. What was surprising was the attitude with which they approached this process. As a student of Japanese culture, I had been taught that the Japanese job application procedure was an arduous task. Students are required to meticulously hand-write dozens of applications. Those who are lucky enough to receive a positive response from a company are put through intensive rounds of interviews and tests. The reward for all this stress and hard work is a lifetime of near complete job security. My friends, however, told me they did not want to follow this model. They had seen the stress filled lives of their parents, and they desired a different lifestyle for themselves. Instead, they were seeking more flexibility in their work schedule and control over their personal lives. I believe this shift in attitude away from traditional employment roles has also negatively affected the savings rate, due an inability to plan savings over the long term. It is the purpose of this thesis to quantify the effects of both theories, and use them to describe the decline in the savings rate. It is my belief that both of these effects will be negative, but that the new theory of shift in employment roles will prove to be more closely related to the savings rate than the shift in demographics.

A. Explaining the Savings Rate:

The savings rate is an important measure in a modern economy. Overall, the savings rate is defined as the amount of income deferred from consumption, i.e. how much of a person's income he/she saves for future consumption. In economics, the national savings rate is broken down into two parts. On a macroeconomic level, the public savings rate is defined as the difference between the revenue the government collects and the amount it spends. On the microeconomic level, the private savings rate is defined as the amount deferred from consumption over a period of time by individuals within an economy.

The savings rate itself is important because of its indirect effect on Gross Domestic Product (GDP), or the income of a country. At a higher savings rate, there is a larger amount of capital (resources) in a country. Like many other goods, a larger supply of capital creates a lower price. Because of this lower price firms are able to borrow capital more easily, allowing existing firms to expand and new firms to obtain necessary start-up capital. As these firms grow in size and number, their country's GDP increases. A higher GDP, in turn, leads to a higher standard of living. When the savings rate decreases, the same trend can be seen in reverse. This close relationship between savings and GDP makes the savings rate an important tool in manipulating the economy. Thus, understanding what factors have caused the Japanese savings rate to decline is an important step in growing the Japanese economy.

B. Background on the Japanese Savings rate from 1975-1989

To understand the fall of the Japanese savings rate, one must first understand its rise. From the end of World War Two until the 1990s, Japan experienced what many call an "economic miracle." During this period, Japan enjoyed large growth rates that increased the standard of living throughout the nation. The savings rate, which grew to unprecedented heights during the economic miracle, can be seen as one of the primary engines behind this growth. Two key factors led to the elevation of the savings rate. These were cultural and governmental.

Japan's culture was uniquely positioned to increase the savings rate. Specifically, the social cohesion of the Japanese allowed them to combine their efforts to save (Roubini 3). In the past, the social unity of the Japanese people has led them to value the good of society over the good of the individual. In the case of Japan, this tendency has translated into economic progress through an extremely high savings rate. The Japanese people's willingness to forgo personal

consumption in order to further society's progress was a key social element of Japan's success. Other social factors that contributed to growth include aversion to aggressive risk and a strong social tradition of adopting and improving existing technologies over more radical forms of innovation (Roubini 3).

The Government of Japan also played a strong role in the rise of the savings rate. Unlike the United States during this period, where government regulation decreased, the Japanese government was extremely involved with the economy. For example, the Japanese government specifically taxed consumption in order to incentivize savings. Furthermore, the Japanese government played a key role in allowing companies to collude in groups known as Keiretsu. Keiretsu are a form of collusion unique to Japan, in which a large number of companies interlock with one another through mutual shareholdings. This practice diffuses risk for each company by allowing them to offset their potential loses with other company's potential gains. This decreased risk made Japanese more willing to invest in businesses, causing the savings rate to raise higher (Roubini 3).

C: Background for Demographics Theory

Japan's shifting demographics are an important element in its changing savings rate. Globally, the world's population is getting older. When the United Nations convened the Second World Assembly on Ageing in 2002, they set out to determine the nature of this modern problem. Their final report underscored the following four conclusions about the world's population: population aging is unprecedented, population aging is pervasive, population aging is profound, and population aging is enduring (Department of Economic and Social Affairs Population Division). They state that, by 2050, for the first time in history, the elderly will outnumber the

young, completely reshaping the global economy. With an estimated twenty-three percent of its population over the age of sixty-five, Japan is at the forefront of this global phenomenon. Japan is not only the "oldest" country in the world, but is also the country that is continuing to age the fastest. Several factors have contributed to this trend. The most important of these are fertility rates, life expectancy, and immigration.

One of the key factors leading to Japan's aging population is the fertility rate. Japan's fertility rate, about 1.27, is one of the lowest in the world. Although the fertility rate of all age groups has dropped over the past fifty years, the most significant drop is in the age group of females between the ages of twenty to twenty-four. These women, generally the most reproductive age group, have seen their fertility rate fall by roughly 75% since the 1930s (Horlacher 3). This development is thought to be due to two primary reasons. The first is birth control. The availably of contraceptives and abortions has greatly expanded in the past eighty years, giving women greater control over the number of children they give birth to. The second reason deals with marriage. The mean age of marriage in Japan has greatly increased over the past fifty years, leading women to wait until later in life to begin having children. This shift gives women less time to have children during their reproductive years, leading to fewer children overall. These two factors have combined to greatly reduce the number of new members entering the Japanese population each year.

A second factor influencing the age of the Japanese population is the mortality rate. Much like the fertility rate, Japan's mortality rate has fallen over the past fifty years. This decrease is primarily due to the advancement of medical knowledge. While all age groups have been affected by these advances, the groups most affected by it have been the middle aged and elderly (Horlacher 3). Because of this change, the average Japanese life expectancy has sky

rocketed. Japanese citizens currently have the highest life expectancies in the world, with the men living an average of seventy-nine years and the women living an average of eighty-six. Furthermore, this trend shows little sign of slowing down. By the year 2020, the average life expectancy of a female Japanese citizen has been calculated to be ninety (Horlacher 3). While this longer lifespan may seem desirable to the individual Japanese person, it is less positive for the country as a whole. With fewer people leaving the population at the top age groups, the overall population continues to age at a dangerously unsustainable rate.

The final factor that has contributed to the aging of Japan's population is immigration. As stated above, almost all developed countries are experiencing this phenomenon. Most countries have counteracted the negative side effects of an aging population through increased immigration. By bringing in younger workers, a domestic population is able to remain artificially young. Japan has also succeeded in accelerating its immigration flows, increasing the number of immigrants working in Japan to two-million in 2005; however, this figure, which is only one percent of the population, is not growing fast enough to balance the factors increasing the population's age (Kim 4). Due to the social cohesion of Japanese people, many immigrants find it difficult to fully integrate into Japanese society. In addition to this obstacle, policies of the Japanese government limit immigrants' access to basic public services, such as education and healthcare. These two factors have discouraged foreign workers from immigrating to Japan, leading to Japan's low immigration rate. This limited access to a revitalizing source has significantly contributed to Japan's aging population.

D. Background for Employment Theory

The second causal explanation explored by this thesis is a shift in Japanese employment structure. The thought process that brought me to this theory is a combination of my academic and personal experiences. The first impetus was the fact that Japan's savings rate is declining. In the majority of the readings I did on the subject, the aging population explanation was the prevailing theory. My classes on culture, however, seemed to conclude the opposite by portraying the elderly Japanese as exceptionally savings-conscious. Thus, I was left wondering what a more plausible explanation could be. I found my answer while studying abroad in Japan. Japan's culture is changing, leading to a possible break in its traditional modes of employment. The system of lifetime employment has long been a backbone of the Japanese economy. A change in this central structure could easily have far reaching ramifications. This led me to believe that Japan's savings rate is not falling solely because of an aging population, but that the way Japanese companies employ workers is also playing a major, if not primary, role. As will be shown in the following paragraphs, scholarly work on the subject seems to support this conclusion.

The practice of providing Japanese employees with high job security is known as the lifetime employment system. For years lifetime employment has been considered a pillar of the Japanese economy. Under this system, Japanese employees are given a high level of job security in return for extreme company loyalty. Once hired by a Japanese firm, these lifetime employees are expected to follow every directive the company gives them. For example, lifetime employees are expected to perform whatever job they are assigned to, despite their original training; work long, unpaid overtime hours; and accept whatever transfers the company assigns them.

The permanent employment system was first used in the 1950's post war period, and became increasingly popular throughout the era of high growth that followed. The system became entrenched in Japanese society through workers' unions and case law, which made it extremely difficult for management to dismiss workers without well-documented cause (Moriguchi 14). When a firm needed to make adjustments to its employee structure, management would typically move workers around within branches and subsidiaries of the company, only resorting to dismissal during extreme circumstances. The result was a high level of job security. Recently, however, this system has begun to change. Both firms and employees are moving away from lifetime employment, a phenomenon that is affecting the youth of Japan at a faster rate than other age groups (Ono 22).

The first group changing the relationship between employer and employee in Japan is the firms. Japanese firms have steadily decreased their demand for permanent employees over the past two decades. Although firms have long benefited from the high level of dedication lifetime employees have given them, changing factors within the Japanese economy and society have made the practice less profitable. The strongest of these factors are the economic recession and the aging society.

The economic recession Japan has faced over the past twenty years has forced firms to reconsider their workforce structure. For example, because firms now need more liquidity in their cost structure, firms are now hiring and firing employees more regularly. This contrasts sharply with the traditional solutions of transfers between divisions and partner companies, which allowed individuals to remain employed. Case law, however, has not yet changed to reflect the economic climate, making it still difficult to dismiss an employee who has a long history with the firm. Thus, firms generally tend to make these adjustments in their young

employees, both by limiting new recruits and more easily dismissing young workers (Genda 11). With a lower sense of job security and a higher rate of unemployment, it is not likely that these younger employees will save at the same level as their counterparts from previous generations.

The aging society has also affected the way that Japanese firms have treated their employees. One of the key components of the lifetime employment system is seniority-based wages. Traditionally, the longer an employee worked within a company, the more he was paid. These wage increases usually occurred automatically, and were completely independent of job performance and actual age. Thus, they incentivize workers to remain employed in a single firm throughout their career. As the society has aged, however, the length of time employees have worked at these firms has also increased. Because of the seniority-based wage system, firms are forced to pay these workers an amount which typically exceeds their productivity. Furthermore, the number of these workers has increased, compounding the problem. To solve this problem firms have decided to limit seniority-based wages by reducing the number of permanently employed workers (Genda 12).

While firms are decreasing the supply of these lifetime jobs, the priorities of youth are simultaneously decreasing the demand for them. Many Japanese youth are forgoing the path their parents took in life, moving away from the traditional model of permanent employment. Older Japanese often assume that this is because the youth are growing lazy. They accuse the youth of shirking away from the long work hours and high level of responsibility associated with a permanent position. However, in 2009, Zhou Yanfei of the Japanese Institute for Labor Policy and Training published a paper which refutes these notions. Yanfei found that the reasons stated above have been steadily declining since 1994. Instead, the percentage of youth engaging in

non-permanent work has been driven by three main groups: those who seek higher salaries, those who seek to utilize special skills, and women.

The first group seeking non-permanent employment are those seeking higher salaries. This group is closely related to the current state of firms in Japan. As stated above, one of the ways Japanese firms are responding to the current economy is by cutting benefits to employees. As one would expect, lowering the reward for lifetime employment has caused fewer people to choose to take these arduous jobs. For example, because salaries are becoming untied to tenure within a company, many youth in Japan are questioning the benefits of staying with one company for their entire life. This has caused the number of youth choosing to engage in non-permanent for salary-related reasons work to steadily increase since 1994 (Yanfei 109).

Another group of youth who are choosing to not hold permanent employment are those who wish to exercise their own expertise. When one enters a firm as a permanent employee, one does not typically enter for a specific position. Instead, a permanent employee is expected to perform whatever job the company requires of them, regardless of their previous education and training. Thus, those who wish to utilize personal skills choose to become contracted, non-permanent employees. For example, students who had graduated from skill-based institutions, such as advanced vocational schools, were shown to make up the largest percentage of non-permanent employees. . This group has continuously grown since 1994, leading to fewer permanent employees (Yanfei 109).

The final group affecting the ratio of nonpermanent to permanent employees is women. In Yanfei's analysis on the breakdown of youth nonpermanent employment, he found that women were statistically more likely to hold nonpermanent positions. This is most likely due to

preexisting social elements in Japan, as well as preferences for more flexibility in family life. Since 1994, the participation rate of women in the Japanese labor force has steadily increased. This increase in the number of people predisposed towards nonpermanent employment has led to an increase in ratio between permanent and nonpermanent employees.

E. Structure of Thesis

Three chapters follow this introductory chapter. The Chapter 2 will explain the rationale behind the two theories hypothesized to explain the decline in Japan's savings rate. As stated above, these theories are, respectively, that the aging population has caused a decline in the savings rate, and that a change in the rate of traditional employment status has led to a lower savings rate. First, a detailed explanation of the aging population theory will be presented. This will include the rationale for and mechanics by which an aging population affects the savings rate. The following section will critique the traditional view of the first theory, finally leading into an explication of the second theory.

The third chapter will deal with the quantitative analysis of the two theories. In order to determine the individual effects of the aging population and the change in youth culture, I will estimate two regressions. The first estimation will regress Japan's dependency ratio, or the population over the age of sixty-five as a percent of the work force, on the Japanese aggregate savings rate. This will reveal the relationship between the dependency ratio and the savings rate. Identical regression will then be estimated using data from Italy, German and Spain, and compared to the Japanese regression. These countries were chosen for their demographic similarity to Japan. This comparison will show the effectiveness of the demographics explanation for Japan relative to other countries in similar situations. The final section will

introduce a regression which includes the number of permanent workers as a percentage of total employees and the dependency ratio as explanatory variables. By including both in the regression, their estimated relationships can be compared, and the more effective explanation can be determined.

Chapter 4 will explore the implications for the results found in the Chapter 3. I will reevaluate each of the theories in light of the estimates obtained from the regressions, and explain what the results imply. I will also include a section discussing the implications for policy in Japan. In this section, I will make recommendations based on the results of regression and the Japanese government's economic agenda. Finally, I will conclude by offering possible future areas of research using the theories and methodology included in this thesis.

Chapter 2: Causal Theories

The naturally occurring world is filled with complex problems which defy a simple, single-variable explanation. Instead, it is necessary to take multiple factors into consideration. Japan's declining savings rate is an exceptionally multifaceted problem, stemming from numerous potential economic causes, which, to the extent possible, need to be taken into account. In this thesis, two such theories are used to explore the change in Japan's savings rate. The first, which will be referred to as the Demographics Theory, is that the savings rate is falling due to an increased proportion of elderly people. The second, which will be referred to as the Employment Theory, is that it is falling due to a change in employment structure. The rationale behind choosing these theories is presented in this chapter

A. Demographics Theory's Effect on Savings

The most common explanation for Japan's declining savings rate posits that it is due to the increased proportion of elderly people in the population. As stated in the preceding chapter, Japan's economy is aging at a fast pace. Although most developed countries are experiencing this phenomenon, none are as far along in the process as Japan. Because no other country has ever experienced such a high percentage of the population being elderly, Japan is often seen as an early example of the effects this phenomenon may have on a developed country. Because

economists are eager to observe the effects of this evolving global phenomenon, it is often the first lens through which current Japanese economic issues are viewed. In this case, it seems to be an effective explanation for why the savings rate is declining. Many theoretical reasons to believe that the aging population has caused the Japanese savings rate to decline exist. A summary of these arguments are given below.

According to the life-cycle hypothesis, the number of elderly in a society is directly linked to the public savings rate. The life-cycle hypothesis states that as the percentage of elderly increases in a country, that country's savings rate will decrease. This is due to the natural progression of the average citizen's life. After a person retires, they do not stop consuming. At the very least they continue to consume the basic necessities, such as food, water, and clothing. Instead of using income to purchase these things, however, they use their accumulated savings. This gives retired individuals a negative savings rate. Thus, a higher percentage of elderly will naturally lead to a lower savings rate (Horioka). Many scholars believe that Japan is currently feeling the effects of this phenomenon.

A related phenomenon affects Japan's private savings rate. One of the most apparent ways that the private savings rate can be influenced by the increasing number of elderly is the dependency ratio. The dependency ratio is defined as the number of people over the age of sixty as a percentage of the working population. The savings rate falls when the number of people who are able to support themselves falls in comparison to the number of people who can no longer support themselves (Jones, Randall). The reasoning behind this is similar to the reasoning behind the life-cycle hypothesis. In Japanese society, it is common for elderly family members to live with their extended family. This additional family member, who must be fed, housed, and cared for, then becomes an added drain on the family's financial resources. With more money

being used for consumption, the family's personal savings rate will inevitably fall. Because of its aging population, Japan is currently experiencing this phenomenon on a mass scale (World Bank Dependency Ratio Figures). The decline of the savings rate is often attributed to this increase in the dependency ratio.

A third theory often mentioned when discussing demographics' effects on the savings rate is the welfare system. Although Japan has historically had a very limited welfare system compared to other developed nations, the amount spent on these programs is drastically increasing as the population continues to age (Ezrati, Milton). Because the elderly are the primary beneficiaries of social security and welfare programs, when the number of elderly in a nation rises so too does that nation's expenditures on these programs. In the past, the Japanese government has spent very little on welfare; however, with more people drawing resources from the government, and fewer people producing taxable income for the government to tax, the Japanese government's debt will grow. As the Japanese debt grows, public savings declines, driving down the overall savings rate.

Because many developed nations are facing the effects of an aging demographic, economists have produced a number of studies that have gone beyond the realm of theory by quantifying the problem. Take, for example, Maiko Koga's study entitled "The Decline of the Japanese Savings Rate and Demographic Effects," published by the Bank of Japan. In that study, Koga used a specific economic model to observe the effects of both income and demographics on the savings rate over time. By dividing households into groups by the age of the household head, Koga was able to estimate the savings rate of Japanese individuals by age. Her results confirmed the life-cycle theory. She concluded that each age group's impact on the economy can be described as a hump shape, meaning that, as a general rule, the young save more

than the elderly, and, therefore, the increasing percentage of elderly has contributed to the sharp decline of the savings rate. While Koga's study does not numerically reveal the extent to which the demographic shifts have affected the savings rate, similar studies have shown that it accounts for roughly two to three percent of the nine percent decline in savings since the 1980s (Braun). This shows that, while the aging population has surely had an appreciable effect on the savings rate, other factors are also at work.

These theories strongly support the elderly population as an explanation for the declining savings rate. By carrying out a number of quantitative studies, economists have proven that a causal relationship between these two phenomena does exist. To deny this relationship would be to reject not only their work, but also some fundamental theories of economics. However, it does not necessarily mean that it is the only explanation.

B. Qualifying the Demographics Theory

As the previous section shows, there is a strong argument for believing that the aging population explains the decline in Japan's savings rate. Because economists are often more interested in making projections about the savings rate of the rest of the developed world using these findings, they often end their investigation here. However, an examination of Japan's unique social and historical perspective puts the efficiency of this explanation at least partly into question. Japan's history has given rise to a number of conditions which potentially cause the Demographics Theory to become less applicable for Japan. The reminder of this section explains these mitigating circumstances.

One of the most important factors that questions the effectiveness of the Demographics Theory is Japan's historical savings rate. As mentioned in the previous chapter, Japan's savings rate grew to a globally unprecedented high during the economic miracle in the 1970s and 1980s. By predisposing their citizens towards savings, the Japanese government was able to achieve this unusually high rate. Led by Yoshida Shigeru in the years 1946 – 1954, the Liberal Democratic Party incentivized savings through taxing consumption, causing people to save a higher percentage of their salaries. They were also able to take advantage of certain cultural factors, such as the Japanese people's willingness to sacrifice personal desires for the good of the public. As shown by the resulting savings rate, the Japanese government was clearly successful in influencing its citizens. Why, then, would the mindset suddenly change? These elderly are the same individuals whose actions led to the historically high savings rate of the 1970s and 1980s. Because this group has already proven itself to be composed of unusually high savers, there is reason to believe that the Demographics Theory may not be fully applicable. While the life-cycle theory states that the elderly will still decrease their amount of savings, their savings-conscious mindset would cause them to engage in consumption at a reduced rate.

A second factor undercutting the effectiveness of the Demographics Theory is the working habits of elderly Japanese. Work has a unique importance in Japanese society. A person's career and employer plays a large role in defining his social identity. Men in particular spend the vast majority of their days at work, not returning home until late into the night. Furthermore, social circles form within companies, making one's social life largely dependent on one's job. This has led to an extreme resistance to retirement in Japan. Unlike the citizens of most other developed countries, Japanese people typically work until they reach mandatory retirement. Those who do retire due to company policies tend to find other ways to earn income,

whether it be through taking on a part time job or a productive hobby. This means that Japan's elderly population is not as adverse to savings as a similarly sized population with a different work culture would be.

A recent study carried out by Janika Bachmann at Tallinn University corroborates the points made in the preceding paragraph. In her study, Bachmann observed the effect of non-standard work options on the participation rate of elderly Japanese in the labor force. While she did not find that elderly-targeted jobs (created by industry to lower costs) helped to increase participation rates of elderly, she did observe an increase in participation of the 65 plus cohort when these jobs were demand driven. This means that, when given the opportunity to freely choose their supplementary occupation, elderly workers readily fill jobs. This further illustrates how the rise in the proportion of elderly people in the Japanese population does not necessarily imply an equivalent rise in the number of unproductive members of society, as elderly Japanese are less likely to be unproductive.

C. Employment Theory's Effect on Savings

One of the main drivers behind the Japanese savings rate has been its high level of job security. To many people, this may seem counterintuitive. In a typical situation, one would probably assume that lower job security would incentivize people to save more for the future. Japan, however, is far from typical. Because Japan experienced both a high rate of savings and an unprecedented ratio of permanent employment, I theorize that this typical mode of thinking does not apply to Japan. Instead, Japan's unusually high level of job security has allowed the Japanese to effectively plan their entire economic lifetimes. Recently job security has fallen in Japan, reducing the ability to make such long-term decisions. Faced with this new economic

reality Japanese employees are forced to adopt a new savings strategy. How this will affect the savings rate is not yet known; however, similar studies have shown that rational actors may choose to decrease their rate of saving (Klemm).

The first reason to believe job security is positively related to savings deals with the ability to plan. Empirical studies show that individuals plan savings based on subjective time frames, and that longer time-frames have a positive relationship with savings (Fisher 66). Because permanent employees do not have to worry about unemployment, their time-frames are assumed to be longer that non-permanent employees. Thus, they are able to smooth out their consumption and savings pattern over an exceptionally long time-horizon, making their savings rate higher than non-permanent employees (Moriguchi 16).

Uncertainty also plays a role in the relationship between permanent employment and the savings rate. In the traditional understanding of savings, those with higher levels of uncertainty are thought to save more, as they are worried about their financial future. However, research has begun to change this traditional mode of thinking. For example, in his paper "Household Savings: Micro Theories and Micro Facts," Martin Browning found that those with less uncertainty in their future were more willing to place their money in long term savings. This is because those with a high level of job security, such as permanent employees, are not worried about needing their money in the immediate future. This propensity to engage in long term savings drives the positive relationship between savings and permanent employment.

Regularity of savings also affects the relationship between savings and job security. Those that have a long-term saving horizon are proven to save more regularly than those with little job security (Fisher 69). This is because they are better able to smooth their saving and

consumption behaviors over a long period of time. While this could lead to a lower savings rate in the short term, its consistency drives up savings over the long run. Thus, when there are a higher number of people in a society saving consistently, the overall savings rate should rise.

Chapter 3: Quantification of Theories

In Chapters 1 and 2, I explained the two central theories of my thesis. I stated the rationale for using each theory as a causal mechanism to explain the decline in the savings rate, and I discussed the relative merits and flaws of each approach. In this chapter, I will empirically evaluate the relative strengths of each theory as an explanation for the declining savings rate.

Each theory is tested in the order in which they appeared in Chapter 2. Thus, the first hypothesis I will test will be that the Demographics Theory is a cause of the decline in the savings rate. I estimate a multivariate regression using World Bank data. Following this, I estimate a series of analogous regressions for Spain, Italy, and Germany. A comparison of these results reveals the validity of the assertion that the Demographics Theory is a less effective explanation for Japan. Finally, I run similar multivariate regression using the Employment Theory and the Demographics Theory as the explanatory variables. The results from this regression estimate the relationship between each theory and the savings rate. Importantly, because both theories are included in the model, I can compare the relative strength of each theory in explaining the decline in the Japanese savings rate.

A. Quantifying the Demographics Theory

As I described in Chapters 1 and 2, the theory typically used to explain Japan's declining savings rate is its aging population. A number of economic studies have examined the relationship between the percentage of elderly people in a country and its savings rate. I want to expand on these explanations by including my novel Employment Theory in the analysis. Furthermore, I will compare the specific strength of each theory's relationship with the savings rate in order to determine if one has more explanatory power. To be informative, this comparative analysis requires that the data come from similar data sources, and that the additional control variables included in the model remain consistent across regressions. Thus, I am performing my own analysis using annual data obtained from the World Bank database of Developmental Indicators.

My dependent variable is the Japanese Savings rate, which has been in a sharp decline since the 1990s (See Figure A1 in Appendix A). Savings was calculated by subtracting annual final consumption expenditures for both the government and individuals from annual GDP. This figure was then divided by GDP to get what percentage of GDP was saved for each year. The data set used for this regression includes the years 1970 through 2012.

The explanatory variable is Japan dependency ratio. These data are the number of people over the age of sixty expressed as a percentage of the working population (See Appendix B). Although at first this measure may seem somewhat inconsistent with the dependency ratio described in Chapter 2, given my data set, it is the only feasible approximation of the cost (productivity loss) imposed on society by an aging population. The numerator approximates the number of unproductive citizens due to age, and the denominator approximates the number of

productive citizens. Comparing this figure with the savings rate should prove a reasonably accurate empirical evaluation of the Demographics Theory described in Chapter 2. As Figure B1 and Table B1 of the Appendix show, the Japanese dependency ratio has been rising steeply since 1990.

Three control variables are included in the model. These variables account for other factors that are affecting the savings rate, so that the relationship between the dependency ratio and the savings rate is more accurately estimated and evaluated.

The first control variable is the annual unemployment rate. It is included to control for variation in the savings rate due to economic fluctuations independent of the Demographics Theory. Fluctuations in the unemployment rate affect savings because persons without income are unable to save. They are forced to either use their own savings to support themselves, or rely on family and/or society to support them. Because of this, unemployed members of society are, like elderly people, dissavers. When the employment rate is high, there are more dissavers in the economy, and the savings rate is lower. Thus, the unemployment rate and the savings rate should have a negative relationship.

The second control variable is the previous year's interest rate. It controls for pecuniary incentives that occur independent of the Demographics Theory. The interest rate represents the intertemporal cost of present versus future consumption. When interest rates are high, people have a higher incentive to save, because their savings will engender greater returns. Similarly, when interest rates are low, people are more comfortable with spending in the present, because there is there is less to be gained by savings. Lagged annual interest rates are used as a proxy for the current interest rate. The assumption is that savers observe interest rate and subsequently

make savings decisions. Thus, if last year's interest rate were high, then one would expect individuals to expect this year's interest rate to also be high and for them to save more. This makes the expected relationship between last year's interest rate and the saving rate positive.

The final control variable included in the model is the lagged annual saving rate of Japan. Because these are time-series data, there is a danger of autocorrelation, i.e. there is a relationship between the differences of the predicted values of the dependent variable and the actual values. This can lead to inaccuracies in the statistical estimation of the model. To account for this relation, a lagged version of the dependent variable is included as an independent variable.

Using these five variables, I ran a regression to determine the relationship between Japan's savings rate and its dependency ratio. Table 1 presents the results below.

Table 1

Results of Regression: Japan's Dependency Ratio	
Dependency Ratio	Beta- coefficient: **-.162**
	t-statistic : -2.526 (p-value) (.017)
Unemployment Rate	beta-coefficient: **-.538**
	t-statistic: -1.88 (p-value) (.071)
Lagged Interest Rate	coefficient: **-0.111**
	t-statistic: -.539 (p-value) (.594)
Lagged Saving Rate	beta-coefficient: **.651**
	t-statistic: 5.341 (p-value) (.000)
F-Test (p-value)	180.608 (.000)
Adjusted R^2	.957
Observations	36
Durbin-Watson Statistic	1.741

The table summarizes both the results for the model as a whole, and the results for each individual variable. The first column lists each independent variable and the names of summary statistics. These are, in the order they appear in the table: dependency ratio, unemployment rate, previous year's interest rate, and the previous year's savings rate. In the second column appear several statistics that describe the relationship between each variable and the savings rate. The statistics in the lower part of the table evaluate the overall fit of the model. In In the following paragraphs I will explain the importance of each.

The beta-coefficient, the first value presented in each row, directly quantifies the relationship between the given variable and the savings rate. For those who are unfamiliar with statistics, it is useful to imagine the beta-coefficient in terms of a line. If the two variables were to be charted against each other on a graph, then the beta-coefficient would be the slope of the line they form. For example, if the beta-coefficient between two variables were equal to one, there would be a one-to-one trade-off between the two variables. In this case, the specific values for beta-coefficients tell what percentage of change in the independent variables led to a one-percent change in the savings rate. For the dependency ratio, interest rate, and unemployment rate, the beta-coefficients are negative, meaning that there is an inverse relationship between each of these variables and the savings rate. For lagged savings rate, the coefficient is positive. This is consistent with the theory laid out in Chapter 2, that an increase in the dependency ratio leads to a decrease in the savings rate. Specifically, for every one percent change in the dependency ratio, the savings rate is predicted to fall .157%.

The second sets of values contained in each row are the t-tests and the p-values. These describe how confidently we can determine that the relationship described by the beta-coefficient accurately describes reality. Specifically, the test-statistic is used to test the hypothesis that there

is no statistically significant relationship between the dependent and the given independent variable. The easiest way to interpret the level of significance is to view it as the probability that the relationship would occur at random. For example, if a p-value of .01 would indicate that there is a 1% chance that the relationship would occur at random. Perhaps more importantly, it implies that there is a 99% probability than the hypothesis that there is no relationship is false. Typically, a p-value less than .05 is interpreted as strong evidence that a relationship exists, and a p-value between .1 and .05 is considered to be marginal evidence. Thus, there is very strong evidence that a relationship exists between both the dependency ratio and the savings rate, and weak evidence for a relationship between unemployment and savings. The interest rate, however, has a significance of .594, meaning that there is a 59.4% chance that this relationship would be observed at random. I believe that this is a product of multicollinearity between the independent variables, which I will address later. Of primary interest is the dependency ratio's coefficient, which is negative and statistically significant. Its p-value of .017 implies that there is only a 1.7% chance that there is no relationship between the dependency ratio and the saving rate. I conclude that there is an inverse relationship between the dependency ratio and the savings rate, which supports the Demographics Theory.

The remaining values in Table 1 each describe the model as a whole. In other words, they describe how all of the variables together explain the variation in the savings rate. The F-Test and its associated p-value plays the same role as the p-value in the t-test discussed in the preceding paragraph. The p-value is .000, so it can be inferred that there is an insignificantly small chance that the relationship between the independent variables and the savings rate would be observed at random. The adjusted R^2 value describes how much variance in the dependent variable was explained by a change in the independent variables. In this case, an adjusted R^2

value of .957 indicates that 95.7% of the change in the savings rate is described by the change in the independent variables, adjusted for the number of independent variables included in the model. The number of observations merely denotes the number of years available for analysis. The final statistic, the Durbin-Watson Statistic, helps determine if an autocorrelation problem is present. As stated above, an issue with time series data is its inherent tendency to have a relation with itself. The Durbin-Watson test reveals to what extent this problem is interfering with the results of the regression. For 36 observations and 4 independent variables, the upper boundary of the Durbin-Watson test is 1.513. Because the value for this model is 1.741, we can be reasonably certain that there is no evidence of autocorrelation in this model. The lagged savings rate has done its job, as it was included as an autocorrelation counter.

Because several of these independent variables are potentially related to each other, multicollinearity is an issue that needs to be addressed in this model. Multicollinearity can lead to inflated p-values, making statistically significant factors appear to be insignificant. For example, if multicollinearity is present, a p-value of .04 may imply statistical significance, but the true unobserved p-value might be .12. To test for this, I ran additional regressions using each independent variable as the dependent variable, and recorded the variance inflation factor (VIF) for each independent variable in the individual regression. If the VIF statistic, which measures the collinearity between the two variables, is above 5, collinearity is considered to be potentially problematic; however it is not until a VIF exceeds 10 that collinearity becomes decidedly problematic. Table 2 below summarizes the VIF statistic for each variable.

Table 2

Test for Collinearity				
Dependent Variable	Dependency Ratio	Unemployment	Last Year's Interest Rate	Last Year's Saving Rate
Dependency Ratio	N/A	4.071	1.507	3.651
Unemployment	8.734	N/A	1.556	7.710
Lagged Interest Rate	7.718	3.715	N/A	9.235
Lagged Saving Rate	3.238	3.187	1.599	N/A

On the left is the dependent variable for each regression, and above is the independent variable. Reading each row from left to right, one can see how closely each variable is related to the others. The table shows that the collinearity between the unemployment rate and last year's interest rate is well above five, but below the critical value of 10. Thus, while there is some evidence of multicollinearity in the model, there is little evidence to suggest it is affecting the p-values for each variable. However, the high values of unemployment and lagged interest rate do show that running the test was a necessary step in verifying the validity of the model.

Collectively, the test for collinearity and autocorrelation help validate the inferences based on Table 1. Without them, it would be unclear if the results were a product of an actual relationship or an unobserved statistical anomaly. Given the results of these two tests, there does not appear to be statistical issues with the model. The observed negative relationship between

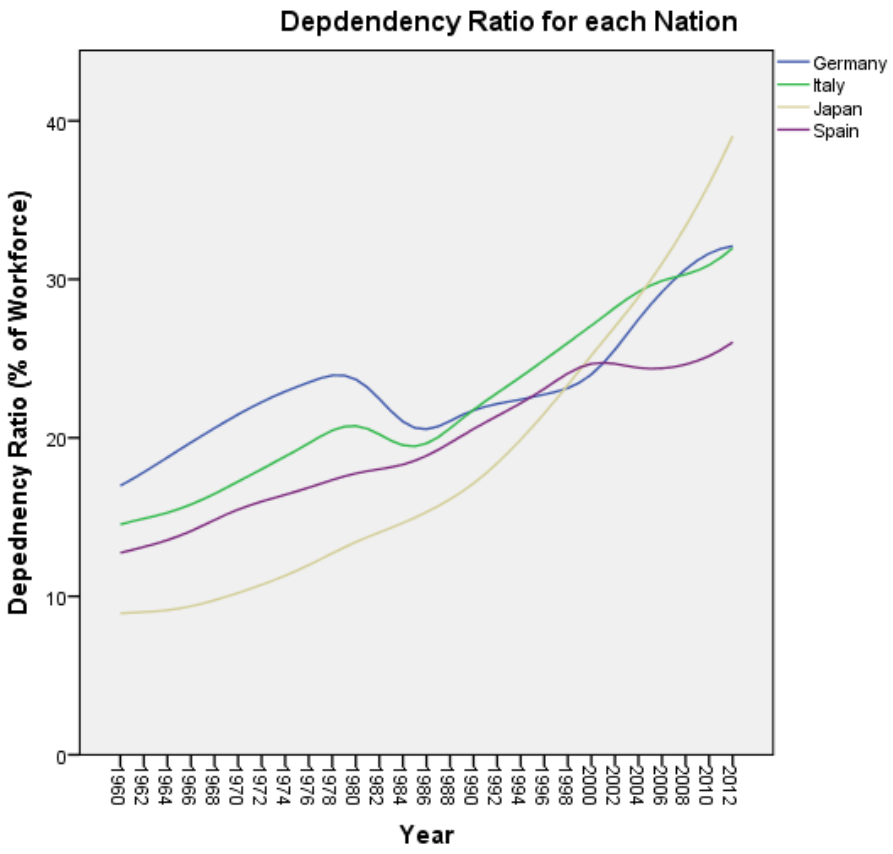
the dependency ratio and the savings rate seems to be strong support for the Demographics Theory.

B. Comparing the Effect of Japan's Dependency Ratio to other Nations

As stated in Chapter 2, one of the primary impetuses behind this thesis was the idea that certain cultural factors unique to Japan diminish the effectiveness of the Demographics Theory. Japan's unusually high historical savings rate and the working habits of the elderly imply that the savings rate should not decline as much as would be expected in other countries. In this section, I will test this assertion by comparing the regression estimates from the last section with similar regressions for other countries. Specifically, the dependency ratio's beta coefficient which describes the relationship between the savings rate and the dependency ratios from the different regressions will be used to see if Japan's relationship is relatively weaker than other countries.

The countries I chose to compare to Japan are Germany, Italy, and Spain. These three countries were chosen because their dependency ratios are the most similar to Japan. Because the effects of the dependency ratio are only expected to appear when the ratio is high, it was necessary to select countries in which the ratio was large enough for an effect to become apparent. Each of these countries has a demographic makeup that is similar to Japan's, as shown in Figure 1 below.

Figure 1



As in the last section, each regression's dependent variable is the savings rate from the respective country, and the independent variables are that country's dependency ratio, lagged interest rate, unemployment rate, and previous lagged savings rate. All of this data came from the World Bank, save for Germany's unemployment data. Employment data for Germany only started in 1990, assumedly due to reunification. Instead, unemployment figures were obtained from the Federal

Statistics Office of Germany. The results are summarized in Table 3, including the previous regression for Japan.

Table 3

Cross-Country Dependency Ratio Regressions				
	Japan	Germany	Spain	Italy
Dependency Ratio	coefficient: **-.157**	coefficient: **-.216**	coefficient: **.142**	coefficient: **-.235**
	t-statistic : -2.6 (p-value) (.016)	t-statistic -1.985 (p-value) (.061)	t-statistic: 1.902 (p-value) (.072)	t-statistic: -4.889 (p-value) (.000)
Unemployment Rate	coefficient: **-0.111**	coefficient: **.191**	beta-coefficient: **.055**	beta-coefficient: **.095**
	t-statistic: -.539 (p-value) (.594)	t-statistic .943 (p-value) (.357)	t-statistic: .876 (p-value) (.392)	t-statistic: 1.132 (p-value) (.267)
Lagged Interest Rate	beta-coefficient: **.000**	beta-coefficient: **.026**	beta-coefficient: **-.036**	beta-coefficient: **.057**
	t-statistic: 1.385 (p-value) (.177)	t-statistic: .198 (p-value) (.845)	t-statistic: -5.13 (p-value) (.011)	t-statistic: 1.182 (p-value) (.247)
Lagged Savings Rate	beta-coefficient: **.643**	beta-coefficient: **.920**	beta-coefficient: **.809**	beta-coefficient: **.715**
	t-statistic: 5.672 (p-value) (.000)	t-statistic: 7.778 (p-value) (.000)	t-statistic: 4.229 (p-value) (.000)	t-statistic: 6.597 (p-value) (.000)
F-Test (p-value)	33.335 (.000)	22.142 (.000)	180.608 (.000)	32.654 (.000)
Adjusted R^2	.802	.779	.645	.798
Observations	32	24	32	32
Durbin-Watson Statistic	1.608	2.007	1.520	1.615

The analysis of this table is the same as the one describing the first regression. The first set of values from each country is the data for each individual variable. Because the relative effects of the relationships between the dependency ratio and the savings rate are the only things

of interest here, the dependency ratio row is the only one I will analyze. The summary statistics at the bottom of the table describe the model's fit for each country. Each model's p-value for the F-test is .000, and all four adjusted R^2's are reasonably high, indicating the models have good fit.

Each country's dependency ratio is statistically significant at the 90% confidence interval. That is, all of the p-values are less than .10. For Germany, the relationship was estimated to be -.216, meaning that for every one percent change in the dependency ratio there is a .218 decrease in the savings rate. The likelihood that this relationship would be found at random is 5.7%, which I interpret as statistical evidence for a systematic relationship. The relationship in Italy between the dependency ratio and the savings rate was found to be -.195, and the probability of this relationship occurring at random is 6.9%. The most surprising result from these regressions is Spain's dependency ratio coefficient, which is .142**.** A positive relationship implies that as the dependency ratio in Spain rises, so does the savings rate. A possible explanation is the extreme economic circumstances in Spain over the past few years. Further investigation is beyond the scope of this paper.

The results of the cross-country regressions confirm my hypothesis concerning the cultural effects on Japan's dependency ratio. The following Table 4 includes the coefficients from Table 3, as well as the 95% confidence interval for each of the coefficients.

Table 4

Dependency Ratio Coefficients			
Country	Coefficient	Lower Confidence Bound	Upper Confidence Bound
Japan	-.157	-.284	-.031
Germany	-.218	-.402	-.03
Italy	-.195	-.333	-.136
Spain	.142	-.014	.298

136.646

.000

R^2

.426

β Coefficient

-.655

The results summarized in this Table 4 are encouraging. Excluding Spain, whose positive relationship is an anomaly, the relationship between the dependency ratio and savings rate seems to be weakest in Japan, i.e. Japan's coefficient is closer to zero than Germany's or Italy's. However, the confidence intervals preclude any definite conclusions from being drawn. The 95% confidence interval is a range within which there is a 95% chance that the true, unobserved value of the coefficient exists. Because portions of the intervals for Germany and Italy overlap the confidence interval for Japan, it cannot be definitively determined that the relationship in Japan is weakest. Nevertheless, the larger (in absolute value) coefficients generated for Germany and Italy provide preliminary evidence that the effect is weakest in Japan. Further investigation might conclusively determine whether or not this is true.

C. Quantifying the Effects of the Employment Theory

I now turn to the analysis of the Employment Theory. In the preceding section, I found some evidence that the effect of Japan's aging demographic does not have as much of an effect on the savings rate as it does in Germany or Italy. Thus, another explanation is needed to fully

explain the decline. In Chapter 2, I argued that the most important explanation is a change in Japan's Employment Structure. I again use regression analysis to test my hypothesis.

As in the last set of regressions, the dependent variable is the Japanese savings rate. In order to maintain parallelism between the models, the World Bank data are used. Specifically, the amount of GDP deferred from consumption as a percentage of overall GDP from the years 1970 through 2012 is used. The explanatory variables are discussed below.

The explanatory variables are also similar to the last set of regressions. The main difference here is that there are two explanatory variable of interest. The first is the dependency ratio, which is the same variable that appeared in the last set of regressions. The second is the ratio of permanent employees to non-permanent employees. These data were derived from information provided by the Japanese Statistic Bureau on employment status. From the years 1953 through 2012, the information on the total number of employees was reported, as well as the number of those employees who were designated as permanent employees. The rate of permanent employment was then found by dividing the number of regular employees by the number of total employees. This was done for each year. Since the mid-1970s, there has been a slight, yet steady decline in the rate of permanent employee; however in the two decades prior, there as a steady mostly steady increase. This is shown in the Figure C2 in Appendix C.

Both the ratio of employment and the dependency ratio are included in the regression for the purpose of comparison. In order to maintain parallelism with the previous regressions, the other explanatory variables are the same as the previous set: the unemployment rate of Japan, the lagged interest rate, and the lagged savings rate. Again, these three act as control variables, helping to isolate the effects of the primary explanatory variables on the dependent variable.

Table 5

Permanent Employment Ratio and Dependency Ratio Regression Results	
Permanent Employment Ratio	Standardized beta-coefficient: **-.223**
	t-statistic : -2.095 (p-value) (.046)
Japan's Dependency Ratio	Standardized beta-coefficient **-.436**
	t-statistic: -3.420 (p-value) (.002)
Unemployment Rate	beta-coefficient: **-.667**
	t-statistic: -2.341 (p-value) (.027)
Previous Year's Interest Rate	beta- coefficient: **-.140**
	t-statistic: -.720 (p-value) (.478)
Previous Year's Savings Rate	beta- coefficient: **.686**
	t-statistic: 5.896 (p-value) (.000)
F-Test (p-value)	162.844 (.000)
Adjusted R^2	.962
Observations	32
Durbin-Watson Statistic	1.975

136.646

Significant

.000

R^2

.426

β Coefficient

-.655

The first set of rows contains the values for each independent variable. These numbers are the most important figures, as they quantify the relationship between the savings rate and each independent variable. The t-statistics and the p-values show how confidently it one can conclude that a relationship exists between the given dependent and independent variables. Much like the last set of regressions, each variable in this model is statistically related to the

savings rate within a 95% certainty, except for the lagged interest rate. Again, this lack of significance is most likely a product of multicollinearity, as the interest rate is correlated with multiple other variables. All of the other variables display strong evidence that a relationship exists.

The lower rows describe the statistics for the model as a whole. The F-test shows that the model is statistically significant. Given 26 degrees of freedom, the critical value necessary for proving that there is a .1% chance that this relationship would happen at random is well below 446.454. This means that the probability that there is no relationship between the independent variables and the dependent variable is less than 99.9%. The adjusted R^2value shows how much of a change in independent variables explains a change in the dependent variable adjusted for the number of independent variables. In this regression adjusted R^2 is equal to .962, meaning that 96.2% of the change in the savings rate is explained by this model.

The most important of these variables is the relationship between the ratio of permanent employment ratio and the savings rate. Because the p-value for the ratio of permanent employment is below .05, there is strong evidence that a relationship exists between it and the savings rate. The standardized beta-coefficient, which quantifies the relationship between the two in terms of standard deviations from their respective means, is -.223. Unfortunately the sign of this figure is negative, meaning that the effect is the opposite of that which was posited in Chapter 2. Instead of causing the savings rate to fall, it seems that the decline in the permanent employment ratio has a positive effect on the savings rate.

The other variable of interest is the dependency ratio. In order to simultaneously compare the individual relationships the dependency ratio and the permanent employment ratio

have on the savings rate, both needed to be included in one regression. Furthermore, the standardized beta-coefficient is the appropriate medium of comparison, as the ratios were reported in different units of measurement. In this regression, the standardized beta-coefficient for the dependency ratio is -.436 and the p-value is .002.

D. Summary of Analysis

The first theory can confidently be concluded as true. The relationship between the dependency ratio and the savings rate was found to be negative and statistically significant. This reaffirms what the majority of economists have already concluded. What is unique to my analysis of this theory, however, is the cross country comparison. I provide some evidence that the effect is weaker in Japan than in Germany or Italy; a more definitive study is needed to provide conclusive evidence. Here, the beta coefficients for Italy and Germany were larger in absolute value than that of Japan. Thus, although the dependency ratio's relationship with the savings rate in Japan is certainly strong, there is room for further explanatory theories, such as the Employment Theory.

The Employment Theory's analysis provided interesting results concerning the ratio of permanent employment. The beta-coefficient between permanent employment and the savings rate was proven to be statistically significant, giving strong evidence that a relationship between the two does exists. However, the direction of the relationship was found to be negative, meaning that as permanent jobs decrease, the savings rate increases. This is the opposite of the theory laid out in Chapter 2, which stated that as the savings rate decreases as job security decreases.

The final assertion made in this thesis was that the effect on the savings rate of the ratio of permanent employment would out-weigh that of the dependency ratio. In order to test this assertion, the relative magnitudes of each beta-coefficient and its confidence interval must be compared. The Table below summarizes these figures from previous charts.

Table 6

Summary of Results	
	Standardized β Coefficient
Japan's Dependency Ratio	-.463
Japan's Employment Ratio	-.223

Because the beta-coefficients are reported in standardized units, they can be directly compared. The results indicate that the effect of the dependency ratio is twice as strong as that of the employment ratio. This means that, while the two do work together to determine the savings rate, the dependency ratio's effect is larger.

Chapter 4: Implication of Results

In Chapter 3, I ran several regressions which provided results for the theories laid out in Chapters 1 and 2. Although these results did not fully support the theories, they still hold important implications. In this chapter I discuss these implications as they pertain to Chapters 1 and 2, as well as their implications for current Japanese policy. Finally, I will conclude this thesis by detailing the implications of the results on possible future areas of research.

A. Implication of Results on Theories

This section will connect Chapter 2 and Chapter 3, explaining the implications of the results on each theory. In Chapters 1 and 2, I theorized that Japan was declining due to two primarily factors. The results revealed varied levels of success for each factor, so their implications will be described separately in the following paragraphs.

The first factor investigated was the Demographics Theory. In Chapter 2, I stated that the increasing percentage of elderly in Japan was driving down the savings rate. The regression results found in Chapter 3 affirm that assertion. The effect of the elderly engaging in dissaving does have a tangible, negative effect on the savings rate. However, I also asserted that this effect would be weaker in Japan than in demographically similar countries, leaving greater room for further explanation. This thesis does give some evidence to believe that the Demographics

Theory is a less effective explanation for the decline of the savings rate in Japan; however, before any conclusions between the effect on Japan's savings rate and the effects in demographically similar countries can be drawn, more research needs to be done.

The results for the Employment Theory were less ambiguous. A statistically significant relationship was found between the permanent employment ratio and the savings rate; however, the relationship was found to be the opposite of what was theorized in the Employment Theory. Instead of the savings rate declining due to a decrease in the permanent employment ratio, I found that the fall in the employment ratio has had a positive effect on the savings rate. Thus, while the Employment Theory itself was disproven, I discovered a valuable insight into the determinants of the Japanese savings rate.

B. Implication for Policy

The Japanese government is currently trying to pull its economy out a recession which has now lasted over twenty years. To do this, they are implementing a plan known as "Abenomics" (named after Prime Minster Shinzo Abe). The chief aim of Abenomics is to use monetary easing, fiscal stimulus, and structural reform to increase domestic consumption (Koo 2). By increasing domestic consumption, the government will further drive down the Japanese savings rate. Thus, this goal is antithetical to one of my primary assumptions, which is that raising the savings rate has a positive influence on the Japanese economy. Despite this philosophical difference, the results of this thesis can be used by the Japanese government to inform their policies.

The results for the Demographics Theory are somewhat misleading in terms of policy implications. Although the Demographics Theory was shown to decrease the savings rate, and a

decrease in the savings rate implies an increase in consumption, this is not the sort of consumption the Japanese government is looking for. When elderly people retire, they stop saving and continue to consume, driving down the savings rate; however, they do not necessarily consume at a greater rate than before they retired. The Japanese government wants their people to consume more in absolute magnitude, not just in terms of the percent of their income they use towards consumption. It is important to keep this goal in mind when evaluating the implications of the Demographics Theory on policy.

The Demographics Theory can help the Japanese government meet their goal of raising consumption by differentiating between types of elderly. Elderly retirees can be divided into two types: those who support themselves and those who are supported by families. The first type is detrimental to the Japanese government's goal, while the second type can be beneficial.

Elderly who support themselves through government pensions and personal savings do not automatically increase consumption. These elderly are using their accumulated savings to replace their income. Thus, while they are engaging in dissaving, they are not necessarily consuming any differently than before retirement. In fact, it is likely that they are consuming less, because they are now on a limited, fixed income. This means that they are not contributing towards the Japanese government's goal of increasing the rate of consumption in the economy.

The second groups of elderly, those who are supported by families, can be beneficial to the Japanese government's goal. Because these elderly are now being supported by a productive worker, they are diverting part of that workers income away from savings. Instead of savings money for the future, these families are forced to buy additional food, clothing, and other necessities for their dependent, increasing their present rate of consumption. Thus, it is my belief

that incentivizing this response to the aging population problem is the best course of action for the Japanese government.

The Japanese government can incentives this response to the aging population by restructuring the social security system to disincentive elderly supporting themselves through government assistance. For example, the government can decrease the amount of pension Japanese elderly receive after retirement and instead offer a tax break to those families with elderly dependents. This would allow the government to mitigate the side-effects of the aging population problem by using it to further their policy goals.

The implications of the Employment Theory on Japan's policy goals are less ambiguous. The results of Chapter 3 imply that those with permanent jobs tend to save less. Thus, if the Japanese government wants to increase consumption, they should incentivize permanent employment. Holding income constant, this should increase the overall amount of consumption in Japanese society. However, Prime Minster Abe has stated that he intends to loosen lay-off requirements, making it easier for Japanese firms to dismiss workers. This, he believes, will allow companies to streamline their workforce and become more effective in the global economy (Tabuchi). While this may be true, the decrease in the ratio of permanent employment would result in a lower consumption rate, working against the government's primary goal. Any policy aimed at affecting permanent employment should keep these results in mind.

C. Implications for Future Research

As shown above, the results for this thesis have important real world application. Nevertheless, research into this topic is far from exhausted. I believe that future studies can build on the framework provided here to draw further conclusions about the Demographics

Theory and Employment Theory's effect on the savings rate. Because these implications lie beyond the original scope of this thesis, they cannot be incorporated in the body chapters above. However, listed below are several possible avenues of future research which I believe would add to the depth of conversation around this topic.

The bulk of the Demographics Theory was proven correct. This is not surprising, considering it was built on the proven previous work of many economists. The results for the qualification of the Demographics Theory, however, leave room for further research. By comparing the results of these countries regressions, I found some evidence to suggest that the Demographics Theory will have a larger effect on the savings rate in Italy and Germany than in Japan. If this is true, it has important implications for Germany and Italy, as their own economies could be more negatively affected by their aging populations than Japan's. For now such a conclusion is impossible to affirm with one-hundred percent certainty. I believe this is due to the lower dependency ratio in Italy and Germany. Because the problem has not yet progressed as far in these countries, its effect on the economy is less apparent than that of Japan's. As the problem progresses, the effect will become more prominent, and it will be easier for economist to quantify. This will allow definite conclusion to be drawn about the relative strength of the Demographics Theory in each country. For now, it is important for Germany and Italy to study Japan's economy, as it most likely holds key insights into the way their own economy will respond to an increase in the dependency ratio.

The results for the Employment Theory also leave room to further research. Despite the results derived in Chapter 3, I still believe that the Employment Theory can help to explain the decline in the Japanese savings rate. Instead of viewing the decline in the ratio of permanent employment as an isolated phenomenon, it can be viewed as a part of a larger movement towards

"Americanization" in the Japanese economy. As Japan's economy globalizes, its firms are pressured to standardize their practices with American firms (Fliaster 2). Japanese firms have already begun to alter their corporate governance structures, wage rates, and employment systems in response to these pressures. This movement towards "Americanizing" firms could contribute towards Japan's savings rate also "Americanizing" by decreasing. A study which quantifies this effect and uses it to in a regression with the savings rate could find that "Americanization" is the true driver behind the decline in the savings rate. This would partially vindicate the Employment Theory, as the ratio of permanent employment is a critical part of "Americanization"

Appendix A: Savings Rate Data

Figure A1

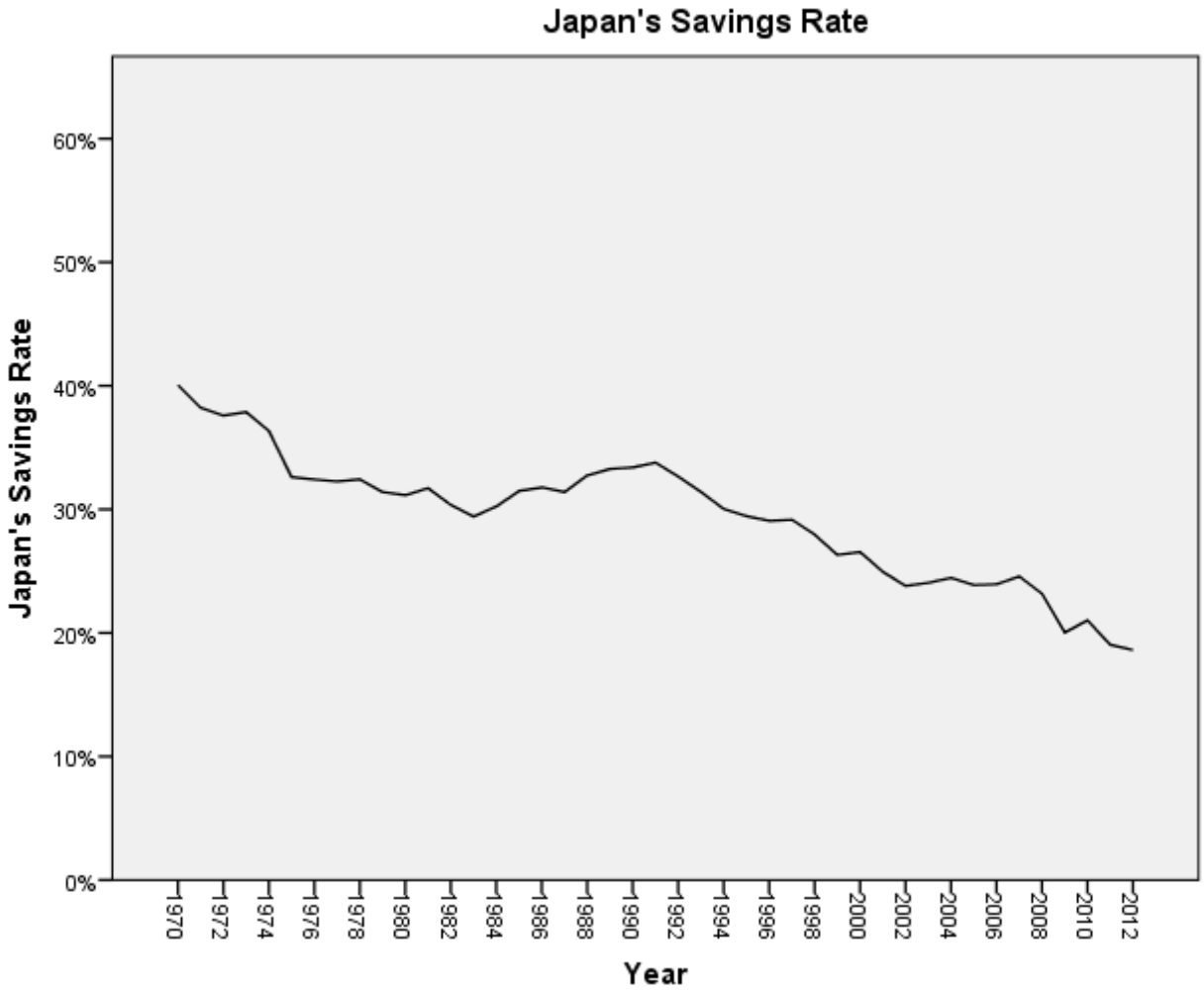


Table A1

Japan's savings Rate			
Year	Saving Rate	Year	Saving Rate
1970	40.054879	1992	32.660428
1971	38.219623	1993	31.407477
1972	37.591515	1994	30.037011
1973	37.875557	1995	29.453372
1974	36.348496	1996	29.076085
1975	32.607464	1997	29.161448
1976	32.422787	1998	27.966316
1977	32.262194	1999	26.321739
1978	32.428784	2000	26.553368
1979	31.401424	2001	24.943605
1980	31.149046	2002	23.801125
1981	31.713914	2003	24.054535
1982	30.359744	2004	24.461090
1983	29.420351	2005	23.874079
1984	30.234510	2006	23.937362
1985	31.496249	2007	24.574346
1986	31.776934	2008	23.170859
1987	31.394747	2009	20.031766
1988	32.749390	2010	21.018238
1989	33.274054	2011	19.046171
1990	33.395760	2012	18.618427
1991	33.785826		

Appendix B: Dependency Ratio Data

Figure B1

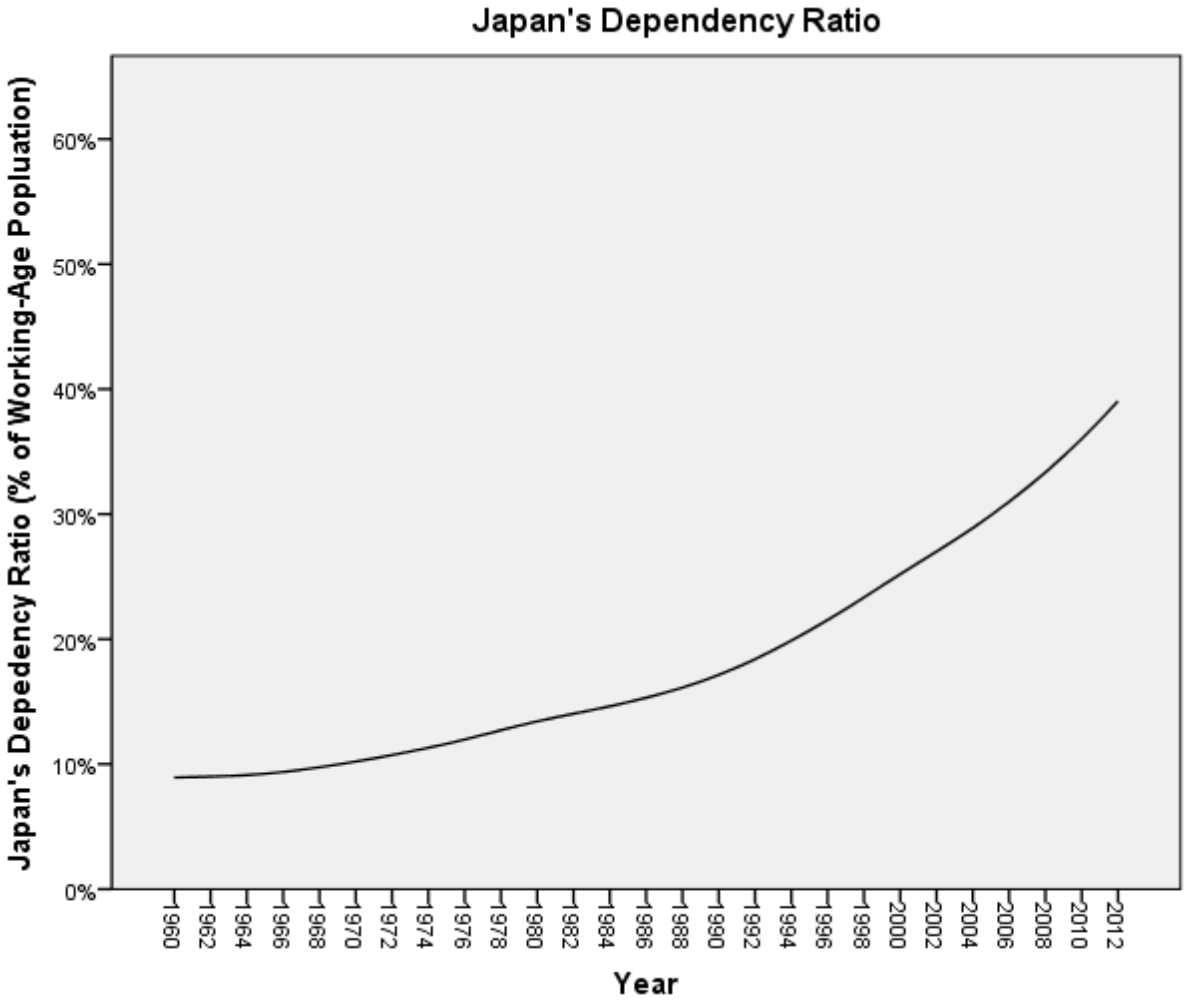


Table B1

Japan's Dependency Ratio			
Year	Saving Rate	Year	Saving Rate
1960	8.930724	1987	15.699480
1961	8.968427	1988	16.122584
1962	9.005972	1989	16.597442
1963	9.054363	1990	17.133119
1964	9.127094	1991	17.734180
1965	9.233031	1992	18.398277
1966	9.375282	1993	19.118877
1967	9.550667	1994	19.885712
1968	9.753900	1995	20.690553
1969	9.977066	1996	21.536275
1970	10.214533	1997	22.423974
1971	10.464052	1998	23.340699
1972	10.727287	1999	24.268115
1973	11.006854	2000	25.192902
1974	11.306609	2001	26.106150
1975	11.628120	2002	27.013062
1976	11.974432	2003	27.931888
1977	12.341699	2004	28.890872
1978	12.716457	2005	29.912371
1979	13.080666	2006	30.996910
1980	13.422509	2007	32.139411
1981	13.738429	2008	33.350421
1982	14.035705	2009	34.641889
1983	14.326960	2010	36.018267
1984	14.629963	2011	37.489960
1985	14.958807	2012	39.043289
1986	15.315189		

Appendix C: Permanent Employment Ratio Data

Figure C1

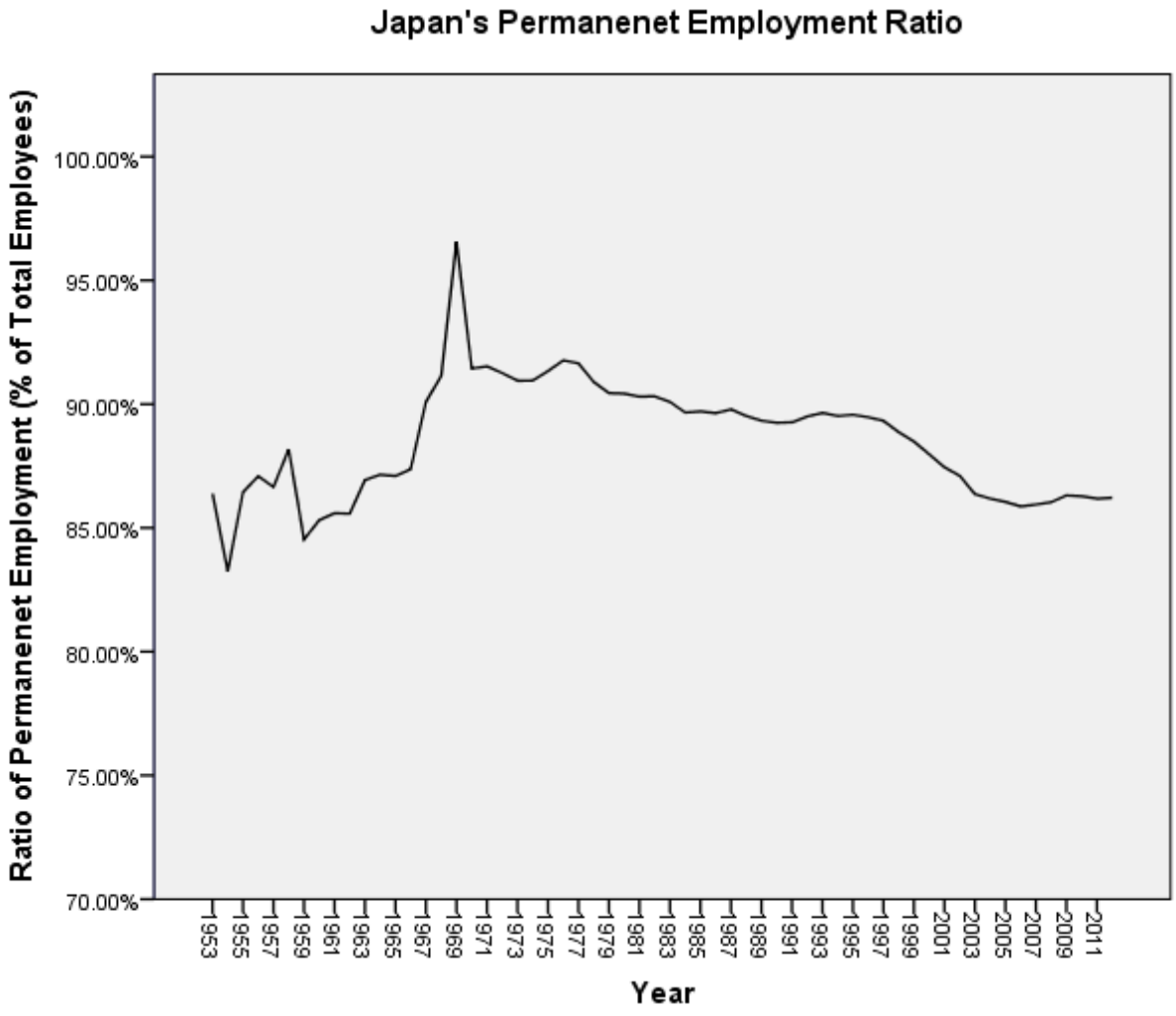


Table C1

Japan's Permanent Employment Ratio Figures			
Year	Employment Ratio	Year	Employment Ratio
1953	.863855	1983	.900927
1954	.832396	1984	.896625
1955	.864454	1985	.897069
1956	.870883	1986	.896360
1957	.866537	1987	.897922
1958	.881720	1988	.895212
1959	.845333	1989	.893345
1960	.853165	1990	.892498
1961	.855932	1991	.892658
1962	.855766	1992	.895042
1963	.869386	1993	.896464
1964	.871516	1994	.895233
1965	.871001	1995	.895722
1966	.873747	1996	.894737
1967	.901009	1997	.893273
1968	.911372	1998	.888703
1969	.965597	1999	.884873
1970	.914398	2000	.879760
1971	.915299	2001	.874533
1972	.912554	2002	.871112
1973	.909496	2003	.863628
1974	.909544	2004	.861856
1975	.913390	2005	.860504
1976	.917718	2006	.858706
1977	.916487	2007	.859438
1978	.908994	2008	.860394
1979	.904449	2009	.863145
1980	.904283	2010	.862817
1981	.903047	2011	.861818
1982	.903146	2012	.862200

Bibliography

Bachmann, J. "Supply-Side Effect Of Non-Standard Work Options On Elderly People Employment In Japan." *Equal Opportunities International* 28.8 (2009): 660-670. *Inspec*. Web. 27 Feb. 2014.

Browning, Martin and Annamaria Lusardi. "Household Saving: Micro Theories and Micro facts." *Journal of Economic Literature*, Vol. 34, No. 4 pp. 1797-1855. Dec. 1996.
Department of Economic and Social Affairs Population Division. World Population Aging 1950-2050. United Nations, New York. 2001

Fisher, Patti J., and Sophia T. Anong. "Relationship Of Saving Motives To Saving Habits." *Journal Of Financial Counseling And Planning* 23.1 (2012): 63-79. *EconLit*. Web. 11 Apr. 2014.

Fliaster, Alexander, and Rainer Marr. "Change Of The Insider-Oriented Corporate Governance In Japan And Germany: Between Americanisation And Tradition." *Journal Of Change Management* 1.3 (2001): 242. *Business Source Complete*. Web. 19 Apr. 2014.

Genda, Yuji. "Who Really Lost Jobs in Japan? Youth Employment in an Aging Japanese Society." University of Chicago Press. January 2003.

Hamaaki, Junya, et al. "Changes in The Japanese Employment System In The Two Lost Decades." *Industrial & Labor Relations Review* 65.4 (2012): 810. *Publisher Provided Full Text Searching File*. Web. 24 Jan. 2014.

Horlacher, David, and Landis MacKellar. "Population Ageing in Japan: A Brief Survey." *Innovation* 13.4 (2000): 413-30. Print.

Kim, Bum Jung and Fernando Torres-Gil. "Aging and Immigration: The Case of South Korea(with a Look at Italy and Japan)." *Generations (San Francisco, California)* 32.4 (2008): 80. Print.

Klemm, Marcus. "Job Security Perceptions and the Saving Behavior of German Households." Ruhr Economic Papers. 2012.

Koo, Bon-Kwan. "Abenomics, Finally A Solution To Revive Japan?." *SERI Quarterly* 6.3 (2013): 29-37. *Business Source Complete*. Web. 19 Apr. 2014.

Moriguchi, Chiaki and Hiroshi Ono. "Institutional Change in Japan: Japanese Lifetime Employment: A Century's Perspective." Stockholm School of Economics. September 2004.

Ono, H. "Lifetime Employment In Japan: Concepts And Measurements." *Journal Of The Japanese And International Economies* 24.1 (2010): 1-27. *Scopus®*. Web. 24 Jan. 2014.

Roubini, Nouriel. “Japan’s Economic Crisis”. New York University. New York, New York. 1996.

Tabuchi, Hiroko. “Layoffs Taboo, Japan Workers Are Sent to the Boredom Room.” New York Times. 16 Aug. 2014.

Yanfei, Zhou. "The Trend Toward Nonregular Employment Among Young Workers, 1994-2003." *Japanese Economy* 36.4 (2009): 105-134. *Business Source Complete*. Web. 24 Mar. 2014.