Boston College

The Graduate School of Arts and Sciences

Department of Sociology

THE IMPACT OF PENSION POLICY ON OLDER ADULTS' LIFE SATISFACTION: AN ANALYSIS OF LONGITUDINAL MULTILEVEL DATA

a dissertation

by

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submitted in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

August, 2009

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ABSTRACT

This study assesses the influence of old-age pension policy on older adults' life satisfaction, and examines factors that shape this relationship. It theorizes that two distinct dimensions capture variation in the type of pension policy: individualization of risk (as opposed to socialization, or pooling, of risk) and redistribution of resources (that is, poverty prevention through income redistribution mechanisms such as non-contributory pensions). To empirically evaluate the presence of these two dimensions and to assess their influence of life satisfaction among older adults, this study analyzes data for 126,560 adults age 45 and over living in 91 countries over the period 1981-2008. Using principal component factor analysis, it finds support for the two-dimensional model of pension policy. Next, using three-level hierarchical linear regression, this study assesses the effects of pension policy individualization and redistribution on life satisfaction, generating three additional major findings. First, redistribution increases life satisfaction, but individualization—on average—has no significant effect on life satisfaction. Thus, the potential impact of individualization (whether positive or negative), and of the associated increased risk, choice, and opportunities for return, has been clearly overstated in theoretical debates on pension policy privatization. Second, the relationship between pension policy and life satisfaction is contingent on the macro-social context. Specifically, individualization that takes place in more affluent societies has beneficial impact on life satisfaction, while individualization unfolding in contexts of material scarcity has detrimental impact on life satisfaction. Further, the overall beneficial effects of redistribution on life satisfaction are substantially higher in the context of traditional cultures and lower in the context of secular-rational cultures. A third finding is that governmental commitment to social security (i.e., government expenditures on social security as a percentage of total government expenditures) also shapes the relationship between the type of pension policy and life satisfaction: Higher government commitment to social security substantially improves the life satisfaction outcomes of individualization. Findings from this study are used to integrate and advance theory on comparative public policy and the larger macro-social context shaping subjective well-being. Policy implications for pension reform are discussed, highlighting redistribution of resources and alleviation of need as more efficient avenues to increase older adults' life satisfaction than privatization or pooling of risk.

Keywords: pension policy, aging, subjective well-being, life satisfaction, individualization, redistribution, hierarchical linear modeling.

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ACKNOWLEDGEMENTS

I want to express my gratitude to Professors Alicia H. Munnell, Natalia Sarkisian, and John B. Williamson for their invaluable guidance and support throughout the past four years. I would also like to thank Professor James E. Lubben for serving as a reader of my dissertation. This study would not have been possible without the input and help in creating the dataset that I received from: Paula Errázuriz, Jessica Johnson, Christine Mair, and Jonathan Pike. I am grateful as well to many other persons who helped me in this endeavor: Armando Barrientos, Shary Grove, John Jankowski, Barbara Kritzer, Concepcion McNeace, and Patrick Mueller. My thanks go also to my family and friends for giving me emotional support and nurturing my intellectual interests. I owe a very special debt of gratitude to Camilo Libedinsky, whose friendship has been constant source of recreation. Finally, I would like to thank the Center for Retirement Research at Boston College for supporting this study through a generous dissertation fellowship. However, I should be held responsible for any remaining errors or inaccuracies.

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CHAPTER 1: INTRODUCTION

As the world population continues to age into the 21st century, there is a growing need for research on the impact of old-age pension policy on well-being. Pension policies aim to secure older adults' well-being by providing retirement income and preventing poverty (Holzmann and Hinz 2005). Replacement rates, contribution rates, and coverage are typically considered important criteria by which pension systems are evaluated. In addition, the solvency of public pension systems and the risk of private pension systems have dominated policy debates during times of financial turmoil. Although financial and coverage indicators are very informative about the well-being of older adults (e.g., Bosworth, Burtless, and Steuerle 1999; Munnell and Soto 2005), we cannot say that older adults live well if they deem the overall quality of their lives as unsatisfactory. Therefore, a fundamentally important question for research communities, policy makers, and public authorities is: What is the impact of old-age pension policy on the life satisfaction of older adults?

Just as with financial indicators and other objective life conditions, subjective perceptions of well-being are increasingly adopted as useful social indicators to assess quality of life in the population (George 2006; Hughes 2006; Yang 2008). Life satisfaction (or overall happiness) is a widely accepted measure of the enduring and global aspects of subjective well-being and is frequently used to assess the degree to which people evaluate the overall quality of their present lives favorably (Diener, Suh, Lucas, and Smith 1999; George 2006). When assessing pension policy performance, measurements of life satisfaction of older adults have an important advantage over other common evaluative criteria; they are indicators of “realized” quality of life, whereas measures of solvency, replacement rates, contribution rates, and coverage are indicators of “potential” quality of life (Frey and Stutzer 2002; Veenhoven 2009). The more satisfied the older adults are on average, presumably the better pension systems are performing (Calvo, Haverstick, and Sass 2009). Measurements of quality of life in terms of life satisfaction are also useful to assess the degree to which countries meet the needs of their citizens and the extent to which their members can flourish in that environment (Veenhoven 2009).

What do we know about the impact of old-age pension policy on the life satisfaction of older adults? Research on pension policy is abundant as is research on subjective well-being. However, for the most part these literatures are separate, with policy studies done within comparative-historical sociology largely restricted to OECD countries, studies within the framework of sociology of emotions and mental health biased towards microsocial scale studies of younger age groups, and studies done by sociologists of aging and the life course focusing primarily on the United States in its attempts to understand the relationship between policy and subjective well-being.

If anything, however, previous research suggests that the type of pension shapes life satisfaction. For example, retirees with defined benefit pension plans are happier and more satisfied with their retirement than those with either defined contribution plans or no pension coverage (Bender 2004; Panis 2003). Because having a defined benefit pension means that retirees receive a known flow of income, whereas having individual accounts means having a sum of money that retirees need to invest in order to finance their entire retirement, it has been argued that retirees who do not have the certainty of a defined benefit may experience a decline in happiness as they progress through retirement and see their funds decreasing. This strand of research, however, is mostly based on cross-sectional individual-level data for the United States and faces important methodological challenges (for a discussion, see Calvo and Sarkisian 2009; Calvo, Tamborini, and Sarkisian 2009). We know very little about the influence of pension policy on life satisfaction across nations and over time. Due to the lack of reliable cross-national longitudinal data, researchers have not been able to observe significant variation in pension policy and the structural and cultural contexts in which policy is embedded. Furthermore, researchers studying mental health and emotions have focused on age groups other than older adults and outcomes other than life satisfaction.

Previous cross-national research on non-monetary well-being outcomes emphasizes the influence of economic equality, global trade, class, and politics and primarily focuses on the status of children and women in different countries. Some of this literature has focused on predictors of infant and child mortality (Shandra, Nobles, London, and Williamson 2004; Shen, Sarkisian, and Tran 2008; Shen and Williamson 2001, 1997; Wimberley 1990). Other cross-national studies have explored the correlates of maternal mortality (Shen and Williamson 1999). A third group of quantitative, cross-national studies of mortality has focused on the determinants of life expectancy at birth (Crepaz and Crepaz 2004; Williamson and Boehmer 1997). A few studies have explored the cross-national predictors of health among the aged (e.g., Shaw, Horrace, and Vogel

2005). Also, several studies have explored the cross-national predictors of subjective well-being (Diener, Diener, and Diener 1995; O'Connell 2004; Ouweneel 2002; Radcliff 2001, 2005; Stevenson and Wolfers 2008; Veenhoven 2009). However, none of these studies focus on older adults. Those studies that actually focus on subjective well-being among older adults do not use cross-national data (Arendt 2005; Bender 2004; Butrica and Schaner 2005; Charles 2004; Cheng and Chan 2006; Elder and Rudolph 1999; Fouquereau et al. 2005; Kim and Moen 2002; Panis 2003; Silverstein and Parker 2002; Westerhof and Barret 2005). A few studies investigate the impact of social security on non-monetary well-being, but they focus on social security expenditures rather than the type of pension policy, and analyze populations other than older adults (Di Tella, MacCulloch, and Oswald 2003; Ouweneel 2002; Ouweneel and Veenhoven 1995; Radcliff 2001; Veenhoven 2000; Williamson 1987). Despite popular wisdom assuming that quality of life is better for citizens of countries with a strong welfare state, these studies find small or no relationship between a variety of measures of social security expenditures and well-being.

In sum, the lack of data and distinct focus of previous research on other outcomes than life satisfaction and younger age groups has resulted in fragmented findings and minimal sociological understanding of the effects that pension policy has on older adults' life satisfaction.

This study aims to address these limitations by integrating separate bodies of the literature such as comparative-historical policy analysis, sociology of aging and the life course, and sociology of emotions and mental health, assembling and utilizing a multilevel longitudinal dataset, and using cutting edge methodology of three-level hierarchical modeling (Raudenbush and Bryk 2002). This study presents the first multilevel longitudinal analysis of the impact that old-age pension policy has on life satisfaction throughout the world. The analysis is based on a newly created dataset, including repeated cross-sections for a total of 126,560 individuals age 45 and over, nested within 91 high-, middle-, and low-income countries (the nested structure of these data is illustrated in Figure 1 and discussed in Chapter 3), observed between 1981 and 2008. These data capture tremendous variations in pension policy as well as in the national contexts in which policies are developed.

In order to understand the influence of pension policy on life satisfaction, this study poses its first fundamental question: What are the main dimensions in pension policy variation? Existing research has predominantly focused on social security expenditures as opposed to the type of pension policy, finding little if any effects of such expenditures on life satisfaction (Di Tella, MacCulloch, and Oswald 2003; Ouweneel 2002; Ouweneel and Veenhoven 1995; Radcliff 2001; Veenhoven 2000). In this study I take a different approach and focus on the type or structure of pension policy. I theorize that two distinct dimensions capture variation in the type of pension policy: The first dimension describes a polarization between individualization of risk, on the one side, and socialization (or pooling) of risk on the other side. The second dimension relates to poverty prevention through income redistribution mechanisms such as non-contributory universal or targeted pensions funded and managed by public institutions. This second dimension captures variation in pension policy between high and low levels of redistribution of resources and alleviation of need.

A similar two-dimensional policy model has been recently formulated by Mares and Carnes (2009) to theorize about social policy in developing countries, yet it has been neither statistically tested nor generalized to other countries. Two-dimensional policy models are also implicit, but neither formally developed nor tested, in previous comparative-historical research deconstructing the meaning of privatizing social security in the United States (Béland 2005b). Accounts of recent privatizing reforms in Latin America also touch upon the dimensionality of pension policy, as they show that the region has combined improvement of individual retirement accounts (IRAs) with a significant comeback of public components in old-age income support (Calvo, Bertranou, and Bertranou forthcoming; Kay and Sinha 2008). For the most part, previous research has a narrow focus on the individualization of risk that parallels the expansion of the private component of the pension system. With few exceptions (Barrientos 2005; Barrientos and Hulme 2008; Bertranou, Solorio, and Ginneken 2002), variations in the redistribution and poverty prevention dimension have been widely overlooked or simply confounded with variations in individualization. However, results from this study statistically demonstrate that pension policy variation in the recent decades has two main dimensions: individualization and redistribution.

After empirically confirming that pension policy has two dimensions of variation in institutional design, I ask: How do pension policies that promote greater individual responsibility and privatization of pensions influence life satisfaction of older adults?

How do pension policies that promote redistribution of resources and prevent poverty through strong public safety nets influence life satisfaction of older adults?

Despite the lack of empirical research that directly investigates these questions, theoretical literature suggests a strong relationship between pension policy and life satisfaction. Overall, the theoretical literature suggests a negative influence of individualization on subjective well-being, but there is an ample range of predictions. Scholars that associate individualization with risk tend to be pessimistic (Beck 1992; Giddens 1990, 1999; Habermas 2001; Luhmann 1993), while scholars that focus on increased choice and opportunities for return typically take an optimistic outlook (see Boudon 2003 for a review; Baker and Simon 2002; World Bank 1994).

The second dimension of pension policy, redistribution, is seldom discussed in connection to subjective well-being, but previous research unambiguously highlights beneficial (economic, health, and social) outcomes of non-contributory social assistance pensions (Bertranou et al. 2002; Heikkilä and Kuivalainen 2002; Help Age International 2006; Johnson and Williamson 2008).

Taking advantage of the longitudinal nature of the country-level data of the newly created dataset, I estimate within country effects of pension policy individualization and redistribution on life satisfaction. I find a significant effect of redistribution of resources and alleviation of need on life satisfaction but—on average—no evidence of significant effects for individualization of risk. The key challenge that pension systems pose for life satisfaction stems not from a high degree of risk but rather from eroded or dismantled public safety nets. Thus, policymakers have to take poverty prevention and redistribution of income as the main objective of pension reform and not a side issue.

Next, this study poses a fourth question: Do the effects of pension policy vary depending on the cultural and economic context in which individuals live? That is, does pension policy operate similarly in traditional and secular cultures, rich and poor countries? The broader empirical scope of the newly created dataset enables me to consider cultural and economic conditions under which subjective well-being flourishes. Drawing from separate bodies in the literature, I theorize that effects of pension systems on life satisfaction are regulated by culture and shaped by structure. Specifically, I argue that the congruence/discrepancy between pension policy and the cultural and economic context may exacerbate or weaken the effect of individualization and redistribution on life satisfaction. Results from this study support this theory and suggest that the effects of pension policy on life satisfaction are context specific.

The last question that this study aims to answer is: Does the relationship between the type of pension policy and life satisfaction vary depending on social security expenditures? Previous research suggests that the main effect of social security expenditures on subjective well-being outcomes is weak or non-existent (Di Tella, MacCulloch, and Oswald 2003; Ouweneel 2002; Ouweneel and Veenhoven 1995; Radcliff 2001; Veenhoven 2000; Williamson 1987). However, these studies do not explore the way in which these expenditures may change the relationship between the type of pension policy and life satisfaction. Popular wisdom also assumes that a large fraction of governmental resources being dedicated to social security as well as generous social security benefits improve the effects of pension policy individualization and redistribution on life satisfaction. Findings from this study suggest that government commitment to social security—measured as government expenditures on social security as a percentage of total government expenditures— may help individualization to have significant beneficial effects on life satisfaction. From the policy perspective, individualization appears to be a resource-demanding alternative for both the government and the overall economy.

In the next chapter, I review the historical, theoretical, and empirical literatures that inform my study. This is followed by Chapter 3, where I describe data and methods. I report results in Chapter 4. In the final chapter I discuss the findings and conclusions from this study, consider theory and policy implications, and propose directions for future research.

CHAPTER 2: LITERATURE REVIEW

A plethora of studies has been conducted on old-age pension policy, on one side, and subjective well-being, on the other side. Contributors hail from various fields, including comparative-historical policy analysis, sociology of aging and the life course, and sociology of emotions and mental health. This body of work, however, lacks the coherence needed for further accumulation of knowledge on this issue. Thus, the aim of this review is not only to summarize previous research and identify gaps, but also to present an overview of the impact of pension policy on the life satisfaction of older adults from a sociological perspective that can be helpful for moving forward research in this area.

This chapter is organized into three sections. In the first section I theorize that two distinct dimensions capture variation in the institutional design of pension policy: individualization and redistribution. I review accounts of old-age pension systems and reform during the last three decades. This review provides historical grounds for a two-dimensional pension policy model. The second section addresses theoretical controversies and supporting evidence about the effects of pension systems on subjective well-being. It touches upon topics of risk, choice, poverty prevention, and income redistribution. I end this section by addressing how the relationship between pension policy and life satisfaction is embedded in a larger cultural and structural contexts. The third and final section of this chapter summarizes my research hypotheses.

2.1. Historical Trends and Variations in Pension Policy

In this study I argue that at any given point during the last three decades, institutional design of pension policy can be characterized using at least two distinct dimensions. The first dimension captures variation between systems that hold the individual responsible for the risk of aging and systems that socialize or pool the risk. The second dimension captures variation in the degree to which the systems redistribute income from high- to low-income groups and alleviate poverty through mechanisms such as non-contributory universal or targeted pensions. Recent theoretical literature proposes that individualization and redistribution can be considered two separate dimensions when analyzing pension policy in developing countries (Mares and Carnes 2009). The reliability and empirical generalizability of this two-dimensional pension policy model remains to be statistically explored.

Existing research has predominantly focused on the differentials in individualization and socialization (or pooling) of risk (Waine 2006; Whiteside 2005). This narrow focus is in part the result of the conceptual framework proposed by the World Bank (1994) to analyze pension systems and design reforms. This framework focuses disproportionally on the difference between social insurance and individual retirement accounts (IRAs) in addressing and managing the risks associated with aging. The dominant policy prescriptions during the last decades have either draw upon or criticized this conceptual and ideological repertory, for the most part relegating discussions about poverty alleviation and redistribution of resources to a subsidiary issue. The overarching emphasis on individualization is also partly the natural reaction towards historical trends in pension policy change since the 1980s, which can be broadly characterized as a process of individualization or privatization. However, comparative-historical accounts of pension policy development during the last three decades also identify an expansion of non-contributory public pensions, suggesting that pension systems have two distinct sources of variation. Although in this study I do not aim to model and explain pension policy trends, but to characterize variations in pension policy at any given point in time, reviewing historical developments in pension policy during the last three decades sheds light on the plausibility of the two-dimensional pension policy model of individualization and redistribution.

Among the most important social changes over the 20th century are the establishment, expansion, and contraction of social policies that protect the individual against life course risks such as the loss of earning power resulting from old age or retirement (Brown 2005; Gillion et al. 2000). Historically, the main source of old-age income support was the family. During the late 19th and most part of the 20th century, the state and the employers came to play a larger role. Since the 1980s, however, some countries experienced a trend towards greater reliance on personal individualized savings.

As illustrated in Table 1, the pension policy changes during the 1980s and 1990s have been characterized as a full or partial shift from pay-as-you-go (PAYG) to mandatory funded individual retirement accounts (IRAs) schemes. This involved shifts from contributions and taxes to contributions and savings as financing mechanisms, from variable to defined contributions, from defined to variable benefits, from social insurance to personal savings, from public to private management, and from state to individuals assuming the risk (Calvo, Bertranou, and Bertranou forthcoming; Gillion et al. 2000; Munnell 2005). The magnitude and speed of these policy changes varied substantially across countries (Mesa-Lago 2004; U.S. Social Security Administration 1979-2008). For example, countries such as Kazakhstan, Mexico, and Nigeria substituted pre-existing PAYG schemes with IRAs, while others such as Denmark and Sweden kept both systems open, financing benefits by a mix of public and private systems. Still other countries such as Colombia and Peru have introduced IRAs giving workers the options to choose either the public or the private component. IRAs have also grown in importance as voluntary schemes in countries such as Canada and the United States. Differences acknowledged, what is common to all of these reforms is the individualization of risks.

Table 1. Characterization of Pension Policy Changes During the 1980s and 1990s

Characteristic	**Pension Policy**	
Scheme	PAYG	IRA
Financing	Taxes	Savings
Contributions	Variable	Defined
Benefits	Defined	Variable
Form	Social insurance	Personal savings
Management	Public	Private
Risks	State	Individuals

Source: Adapted from Calvo, Bertranou, and Bertranou (forthcoming).

In explaining the adoption of these individualized policies, previous studies have emphasized a number of factors. The individualization of pension policies was precipitated by the outbreak of the debt crisis in the less developed countries in 1982 and the structural adjustment policies promoted by the World Bank, the International Monetary Fund, and other multilateral lenders (Babb 2005). Privatization was appealing because it pleased international lending organizations and provided much-needed revenues for governments facing large fiscal imbalances. Furthermore, IRAs constituted an alternative for mismanaged PAYG pension schemes strained by a rapidly aging population. They provided hopes to increase coverage and compliance through a strengthened linkage between contributions and pension benefits—workers would view their contributions as investments or savings rather than as a tax, and thus have more incentive for participating and contributing to the system. IRAs also were seen as an opportunity to stimulate savings and economic growth (World Bank 1994). Finally, global diffusion of neoliberal ideas also fostered the individualization of pension systems (Dobbin, Simmons, and Garrett 2007; Madrid 2003). IRAs were officially promoted by the World Bank (1994) and other international organizations, and numerous governments increasingly began to rely on the advice of economists who were trained in the United States and tended to advocate for market-oriented reforms (Markoff and Montecinos 1993).

The overall direction of the policy changes during the late 20th century is usually referred to as to individualization, privatization, or welfare retrenchment in the social science literature (Esping-Anderson 1999; Huber and Stephens 2001). However, during the same period, comparative-historical research has also documented the expansion of public social protection mechanisms that have enhanced the access of low-income groups to retirement income in many nations (Barrientos and Holmes 2007; Bertranou et al. 2002; Gill, Packard, and Yermo 2005; Holzmann and Hinz 2005; Mesa-Lago 2005). These mechanisms include non-contributory universal and targeted pensions. Although means-testing limits the scope of beneficiaries covered, these policies clearly have a redistributive function (Mares and Carnes 2009).

Chile constitutes a useful case study to illustrate this argument (Calvo, Bertranou, and Bertranou forthcoming). In 1981, Chile became the first country in what later became a worldwide wave of old-age pension reforms when it introduced mandatory funded IRAs and moved away from PAYG schemes. In recent years, without moving away from an individualized pension system, Chile initiated another major pension reform intended to address the problems created by IRAs, such as low coverage and replacement rates for low-income workers and women. One of the most interesting changes was the creation of a public institution that manages two types of benefits: a minimum non-contributory benefit that is paid to the poorest 60 percent of the older adults, and a supplementary benefit for those workers with low IRA balances. This new system is expected to reduce poverty and income inequalities as well as to increase coverage.

A number of factors explain variations in redistribution during the recent decades. Political coalitions between wage earners and lower-income groups result in highly redistributive policies, while the opposite happens when wage earners create coalitions with higher-income classes (Mares and Carnes 2009). The World Bank and other organizations that promoted IRAs have changed their policy prescriptions to pay more attention to poverty reduction, coverage and equity, and to protect participants from market risks (Gill et al. 2005; Holzmann and Hinz 2005; Mesa-Lago 2005). Furthermore, recent volatility in global financial markets exposed private insurance beneficiaries to the full force of market risks previously assumed by the state or employers and placed many of them in the need of poverty prevention and social assistance pensions (Clark, Munnell, and Orszag 2005). This, in turn, has raised concerns regarding the individualization of pensions across the world and persuaded many scholars and policymakers to consider a whole new spectrum of pension reforms beyond socialization of risk.

For many countries, the expansion of the redistribution dimension in pension policy has taken place in light of recognition of the problems created by IRAs. However, these policy changes cannot adequately be described as the end of the individualization era (Béland 2005b; Calvo, Bertranou, and Berranou forthcoming; Kay and Sinha 2008; Mares and Carnes 2009). While many countries have individualized their old-age insurance policies, which may have a regressive structure of benefits that preserves (and sometimes increases) market-based inequalities, some of the same countries have also introduced redistributive policies that explicitly provide benefits to the poor (Barrientos and Hulme 2008).

In sum, historical trends in pension policy change have been largely characterized as individualization, though changes in redistribution and poverty prevention mechanisms have also been documented. Comparative-historical research makes conceptual distinctions that resemble the categories of individualization and redistribution, but a two-dimensional policy model has only been formally proposed in theoretical research about social policy in developing nations (Mares and Carnes 2009). In this study, I empirically assess the reliability of a two-dimensional pension policy model applied to a broader range of countries. My focus is on variation in the institutional design of pension policy at any given point in time, not on exploring historical developments in pension policy. What are the consequences of pension policy individualization and redistribution for the subjective well-being of older adults? The next section reviews theoretical contributions and debates that address this question.

2.2. Theoretical Links between Pension Policy and Life Satisfaction

Lay conceptions typically agree that quality of life is better in countries with a strong social security system, capable of pooling risks, preventing poverty, redistributing income, and providing generous benefits. It is certainly plausible for social security and more specifically old-age pension policy to have an impact on subjective assessments of quality on life, particularly for older adults. Unlike most other social security programs, old-age pensions benefit a large and easily identifiable population (Pampel and Williamson 1985). In addition, older adults are typically entitled to pension benefits after reaching a number of years of work (and contributions), and for most of them, the retirement income that they receive is crucial to maintaining their previous standards of living. However, previous literature has not tested whether individualization and redistribution in pension policy boost or harm life satisfaction.

The impact of pension policy on life satisfaction remains a controversy in scholarly and policy debates. Individualization shifts risk and uncertainty to the individual, but it also increases choice. Although poverty prevention and income redistribution can offset risks and unequal outcomes of power struggles, non-contributory public safety nets have eroded in many countries and spurred in others and this may have substantial impact on subjective well-being. In addition, the outcomes of individualization and redistribution may be context specific. Pension policy may operate differently in traditional and secular cultures, poor and rich countries. Finally, welfare spending has been found to have little if any significant effect on subjective indicators of quality of life (Di Tella, MacCulloch, and Oswald 2003; Ouweneel 2002; Ouweneel and Veenhoven 1995; Radcliff 2001; Veenhoven 2000).

Despite the significance of the intellectual and political traditions that I review in this section, a striking lack of theoretical clarity and empirical evidence marks these debates: socialization of risks is confounded with poverty prevention and redistribution of income, individualization of risks is equated with poverty and inequality, cultural and structural factors are rarely discussed, and the attention is largely limited to welfare expenditures rather than to the type of programs and institutional design of pension policy. Therefore, this section attempts to develop greater theoretical clarity by proposing the two-dimensional theory of policy variation that separates individualization and redistribution as well as by synthesizing diverse literature and specifying potential causal relationships between pension policies, the contexts in which they are embedded, and life satisfaction.

2.2.1. Risk, Choice, and Returns

The most hotly debated issue in the literature on individualization of pensions is whether it has resulted in greater risk that reduces well-being or greater choice and returns that enhance well-being. This section attempts to sort through some of the literature on the risk versus choice and returns controversy as they relate to life satisfaction and subjective well-being outcomes.

Pension schemes are subject to a variety of risks (Gillion et al. 2000; Shuey and O'rand 2004): economic (e.g., financial crises), demographic (e.g., global changes in birth and mortality rates), political (e.g., privatization and re-nationalization reforms in Argentina or benefits reductions in numerous countries), institutional (e.g., bankruptcy of financial institutions), and individual (e.g., uncertainty about future spells of unemployment and extreme longevity). Each of these possibilities introduces risk that anticipated pension benefits may be reduced or not received. Because individualization shifts risk to the individual, “risk society” theory is typically pessimistic about subjective well-being outcomes and highlights increases in anxiety and negative emotions (Beck 1992; Giddens 1990, 1999; Habermas 2001; Luhmann 1993). This literature suggests that the effect of pension policies on life satisfaction is inversely related to the amount of risk that individuals bear.

“Rational choice” theory takes a different position, suggesting that at the same time as individualization of pensions increases risk, it enhances choice and opportunities for greater returns (Baker and Simon 2002; World Bank 1994). For this school of thought, choice is a fundamentally desirable condition that maximizes utility and satisfaction (see Boudon 2003 for a review). However, recent literature criticizes the greater return argument as an undelivered promise and highlights the dark side of greater choice. After a quarter of a century of pension individualization reforms, the initial promise of higher rates of returns is deemed disappointing and extremely vulnerable to shifts in the financial market (Babb 2005; Mesa-Lago 2005; Williamson 1994). Research on financial illiteracy has lowered the expectations about individuals making the right decisions in an individualized pension system (Clark, Munnell, and Orszag 2005; Munnell 2005). Furthermore, psychological and economic research has identified numerous unforeseen undesirable effects of choice: people are hesitant about their decisions, get paralyzed, set unrealistically high expectations, make poor decisions, end up dissatisfied, and feel more guilt and shame when facing failures (Gilbert 2005; Schuartz 2004). Interestingly, all of these detrimental effects happen even in circumstances where choices are few and not overwhelming (Botty and Iyengar 2006).

Summing up, scholars emphasizing the increase in risk argue that individualization decreases life satisfaction, while scholars that focus on choice and returns have mixed opinions about the difficulties and opportunities that arise with individualization. Overall, the balance suggests that scholars are inclined to see individualization as detrimental for life satisfaction. Not only there are more decisions to make and profits to gain, but these decisions and gains happen in the context of higher (perceived and consequential) risk. The lack of empirical research qualifying and assessing the positions in this theoretical debate is striking.

However, because most of the studies discussed in this section focus on individualization without considering independent variations in redistribution, the expected (positive or negative) impact of individualization on life satisfaction is likely to be overestimated. The next section specifically addresses variations in redistribution through a discussion of the potential relationship between poverty, inequality, and life satisfaction.

2.2.2. Poverty and Inequality

Poverty prevention and income redistribution have not received the attention they deserve in previous literature and debates on pension policy, which have largely focused on contributory pensions and the endorsement or critique of individualization. Recent publications by the Asian Development Bank (2001), Inter-American Development Bank (2000), International Labour Organization (2001), World Bank (2001), and numerous other international organizations acknowledge this gap and suggest an emerging consensus about the effectiveness of social assistance as a response to poverty, inequality, and vulnerability (Barrientos and Hulme 2008). The World Bank, one of the major advocates for individualization during the 1980s and 1990s (World Bank 1994), has specifically argued that excessive attention has been paid to mandatory and voluntary IRAs, and that pension reform has not paid enough attention to non-contributory pensions that prevent or alleviate poverty in old age (Gill et al. 2005).

Previous research highlights the economic, social, and health benefits arising from non-contributory universal and targeted pensions (Bertranou et al. 2002; Heikkilä and

Kuivalainen 2002; Help Age International 2006; Johnson and Williamson 2008). Economically, they reduce individual poverty, redistribute wealth, contribute to reduce household and overall poverty, and can stimulate the local economy. Socially, children benefit when grandparents have pensions, family cohesion increases, the status of older adults improves, and they feel both independent and socially integrated. Health benefits include access to food, medical care, and medication. In many countries, the effects are striking. For example, the social pension in South Africa has reduced the scale of old-age poverty by 94 percent and overall poverty by 12.5 percent (Case and Deaton 1998; Help Age International 2004). Because older people care for children in one out of every four South African households, the whole family has benefited from the non-contributory pensions. For many older adults, the pension means that they can afford to eat. To my knowledge, no study to date directly explores the relationship between redistribution and life satisfaction or subjective well-being more in general.

The strength of these mechanisms suggests that pension policies that prevent poverty and redistribute income can make a real difference for life satisfaction of older adults. The subjective threat posed by individualization seems very minor or irrelevant when taking into account that for many older adults, non-contributory pensions can literally mean the difference between life and death.

Do the effects of individualization and redistribution on life satisfaction vary depending on the context? In the next section I explore the cultural and structural contexts under which the relationship between pension policy and life satisfaction may exacerbate or dwindle.

2.2.3. Cultural and Economic Context

Pension policies are embedded in cultural and structural contexts that may help to explain how people react emotionally to these policies. Theory and research on subjective well-being, policy change, culture, and economy have been the substantial focus of a number of subfields in sociological research, but for the most part these literatures are separate. A call for integrative research in this area has been repeated across disciplines (Berkman et al. 2000; George 2006; Massey 2002; Turner and Stets 2006). In this subsection, I attempt to integrate different contributions to delineate a macro-social theory of subjective well-being emphasizing the cultural and structural conditions under which pension policies are more likely to increase or decrease subjective well-being.

There is no doubt that culture and structure play a major role in shaping our reaction to pension policy, creating and limiting possibilities, stimulating some reactions and discouraging others, and dictating the script that we dramatize as actors in a theater (Stets and Turner 2007). However, with a few exceptions (e.g., Collins 2004), sociological theories of subjective well-being have focused on microstructural factors—power, status, and density of networks—without analyzing macrostructural forces that may impact life satisfaction and interact with pension policy in shaping subjective well-being (Turner and Stets 2006). Among the exceptions is research on economic prosperity and subjective well-being, which for many years tried to explain the weak link between the two and finally concluded that wealth has a positive influence on subjective well-being, though these benefits are marginally decreasing (Arendt 2005; Bonini 2008; Kahneman 2006).

What is true of theories emphasizing structural factors also holds for theories emphasizing cultural factors. Despite the cultural and constructivist bias in most sociological research, the few studies that elaborate theoretical connections between subjective well-being and broader cultural values are by and large done by psychologists (Arrindell and Veenhoven 2002; Clark 1997; Diener, Diener, and Diener 1995; Diener and Suh 2000; Peterson 2007; Suh and Oishi 2004; Veenhoven 2009). This lack of sociological theories and research is surprising given the widespread belief among sociologists that life satisfaction is heavily determined by cultural and structural factors (Veenhoven 2009).

The role of culture and economy has also been largely overlooked in the literature on pension reform, which tends to focus on political factors, such as the welfare state and the role of international organizations (e.g., Esping-Andersen 1996; Myles and Pierson 2001). Historic institutionalism theories of policy development have gained in popularity and to some extent displaced cultural and economic arguments about both policy development and policy outcomes (Immergut 1998; Orloff 1993; Pierson 1994, Skocpol 1992). Institutional approaches emphasize the impact of pre-existing political structures and policy legacies on policy development. They attribute moderate explanatory power to economic arguments (e.g., Wilensky 1975) and criticize cultural arguments (e.g., Levine 1988; Lipset 1990) for being vague and essentialist (see the critiques by Pierson 2001 and Skocpol 1990).

Despite criticisms, comparative-historical studies that emphasize cultural and economic factors suggest that specific challenges for the success of pension reform arise in the context of a traditional culture and low-income economy. For example, recent studies characterize numerous societies in Latin America and Asia as organized around the principles of family, reciprocity, loyalty, and poverty (i.e., traditional culture and low-income economy), and find that each of these factors shapes the unfolding of pension reform with respect to coverage, compliance, transparency, and fiscal stability (Calvo and Williamson 2008; Zheng, Williamson, and Calvo 2009).

Because the present study looks at a greater variety of countries, a model to classify cultures and economies is needed. The sociologist Roland Inglehart and his colleagues developed what now is probably the most widely accepted system of cultural classification (Inglehart 2008, 2003; Inglehart and Baker 2000; Inglehart and Klingemann 2000; Inglehart and Welzel 2005). In this study, I focus on the dimension of cross-national cultural variation that these scholars refer as to traditional versus secular-rational values. (Note that the separation of traditional and secular-rational does not imply that traditional cultures are irrational.) Cultures with traditional values place strong emphasis on religion, deference to authority, have a nationalistic outlook, and low levels tolerance for abortion, euthanasia, and divorce. Cultures with secular-rational values have the opposite preferences on all of these topics.

To classify the economic context, I focus on economic prosperity and more specifically on GDP per capita. Considering the economic context is of crucial importance when designing a pension system and is likely to be as important to understand its performance and outcomes. By focusing on economic prosperity, I will also capture variation in a second dimension for cross-national cultural variation proposed by Inglehart and his colleagues: survival versus self-expression values. Cultures near to the self-expression pole give priority to self-realization and quality of life over economic and physical security, demand popular participation in decision-making in economic and political life, emphasize tolerance of diversity, have high levels of interpersonal trust and sense of control, prefer to teach imagination and tolerance to children rather than hard work and thrift, and believe in technological and scientific progress. Cultures emphasizing survival values have the opposite characteristics.

The decision to focus on economic prosperity and more specifically on GDP per capita over survival or self-expression values is controversial in that sociologists disagree about the priority of structure over culture (or vice versa). The roots of this controversy are usually traced back to a Marxist (Marx and Engels [1845] 1970) emphasis on "needs" and a Weberian (Weber [1905] 2002) emphasis on "ideas." This issue continues to be matter of vivid debates in the discipline (e.g., Herrera 2007; Hitlin and Piliavin 2004; Kohn, Naoi, Schoenbach, Schooler, and Slomczynski 1990; Inglehart and Baker 2000). Although giving priority to structure (scarcity/affluence) over culture (survival/self-expression) can be considered a matter of theoretical preference, in this case it is mostly an empirically driven decision.

First, this scale has always been calculated including an indicator of happiness that I must drop given that the outcome is life satisfaction. Second, when I included the scale (excluding happiness) in the same model with GDP per capita I created substantial problems of multicollinearity. As can be expected, survival values and GDP per capita have a strong statistically significant inverse correlation of $r = -.82$ ($p<.001$). (Appendix Figure A1 illustrates the bivariate relationship between survival values and the logarithmic transformation of GDP per capita). The shift from survival to self-expression values is largely explained by the unprecedented wealth that many societies have accumulated during the last century, which resulted in an increasing proportion of recent cohorts taking survival for granted and shifting priorities from an emphasis on economic and physical security toward an increasing emphasis on subjective well-being and self-realization (Inglehart 2008).

Given these primarily empirical constraints, I propose a model that characterizes the context in which pension policy is embedded according to two dimensions: (1) cultural values ranging from traditional to secular-rational, and (2) structural economic conditions ranging from scarcity to affluence. In this study, I neither test competing theoretical arguments about the primacy of structure or culture, nor include other structural variables, such as income inequality. I start with a broad characterization of the cultural and economic context in which pension policies operate and leave these areas for future development of this research.

The main effect of traditional cultural values on life satisfaction is unclear from previous research, but the effect of economic prosperity today is widely agreed to be positive (Stevenson and Wolfers 2008; Veenhoven 2009). But how do culture and structure moderate the effect of pension policy on life satisfaction?

I argue that when pension policies are in conflict with the cultural and structural context, they tend to dampen life satisfaction and to arouse negative emotions. Conversely, tight coupling between pension policy and the cultural and structural context will increase life satisfaction and generate positive emotions. Henceforth I refer to these expected relationships as the policy/context congruence (or discrepancy) theory.

Table 2 illustrates the interaction between the two dimensions of pension policy identified in the previous section—individualization and redistribution—and the cultural and economic context in which pension policy is embedded. Although there are four possible interactions and eight possible types of effects, I only have strong theoretical reasons to argue for two situations in which the effect of pension policy may significantly vary across cultural (cell 2) and structural-economic context (cell 3).

Table 2. Interaction Between Pension Policy and the Cultural-Economic Context

	Individualization	Redistribution
Culture	(1)	(2) Policy-culture
Economy	(3) Policy-economy	(4)

In the previous section I argued that the redistribution component of pension policy is likely to have a beneficial effect on life satisfaction. Drawing from the congruence/discrepancy theory outlined above, I expect the beneficial effect of redistribution to be stronger for traditional than for secular-rational cultures (cell 2). First, redistribution involves non-contributory pensions typically provided and funded by the state, and traditional cultures are more inclined to rely on this type of institution than secular-rational cultures, which tend to shift away from traditional institutions (including the state, family, and church). Second, previous research suggests that, compared to secular-rational cultures, traditional cultures are more likely to place God, nature, or the collectivity rather than individual labor as the ultimate origin of wealth (e.g., Bataille 1998; Cousiño 1990; Cousiño and Valenzuela 1994; Mauss 1967; Morandé 1984). This, in turn, makes them more prone to engage in rituals of wealth circulation and expenditures that are easily extended to the welfare state. In such context, welfare assistance may be experienced as a legitimate transfer to which low-income groups are entitled. In contrast, for people living in secular-rational cultures, redistribution may be associated with stigma (Barr 1992; Estes 2001; Quadagno 2005). Along the same lines, it is plausible to argue that traditional cultures have a stronger moral conception about social justice that may help beneficiaries (and the collectivity) to frame social assistance benefits as an entitlement. Secular-rational cultures have less absolute moral conceptions about social justice and are more likely to engage in a discussion about rights and conditions of redistribution.

The congruence/discrepancy theory also suggests that the effect of individualization on life satisfaction may show significant variation across economic contexts (cell 3). In the previous section, I argued that holding redistribution constant, the effect of individualization on life satisfaction may be negligible, as it brings both choice and risk to the individual. However, I expect the effects of individualization on life satisfaction to be significant and negative for low-income economies and significant and positive for high-income societies. The main reason to expect this outcome is that individuals living in a context of scarcity have a structural disadvantage to bear risk. It may be hard to bear the risk of having enough retirement income in the United States, but in the poorest countries of the world, older people live in absolute and complete poverty and thus have almost no capacity to bear this risk on their own. Individuals living in low-income countries face greater risks and will therefore obtain more benefits from socialization as opposed to individualization of risk. In contrast, an affluent economy may operate as a shield that protects individuals from increased risk and enables them to enjoy their choices and to obtain more returns on their investments. For example, it is easier to make and delegate investment decisions in wealthier societies, where the government has more resources to improve the default options in the system and promote financial literacy, and individuals have more resources and opportunities to seek expert support and have more confidence on the state to insure against market risks in situations of crisis (Botty and Iyengar 2006; Dion and Roberts 2009).

The two empty cells in Table 2 indicate interactions that have weaker theoretical grounds. There is no strong reason to expect the effects of individualization to vary significantly across cultures (cell 1). It is not clear how the experience of the balance of risk, choice, and return will change from a traditional to a secular-rational culture. An interaction between redistribution and the economic context is also unclear (cell 4). It may be argued that redistribution has less impact on life satisfaction in affluent societies where the overall standard of living is higher. However, there are at least two caveats for this reasoning. First, poverty and inequality are hard subjective experiences everywhere in the world. Second, it may be even harder to cope with poverty and inequality for individuals living in affluent societies full of opportunities that appear impossible to reach.

Are the policy-culture and policy-economy discrepancies possible? Because policy change is shaped by numerous factors other than culture and economy (Brown 2005), it is certainly possible for pension policy to develop in conflict with cultural values and economic needs. Policy change is also the result of class struggle and political organization (Esping-Andersen 1999; Quadagno 2005; Pampel and Williamson 1989), as well as institutional constraints stemming from previously enacted and current policies (Immergut 1998; Orloff 1993; Pierson 1994, Skocpol 1992), and ideas (Béland 2005; Campbell 2002). The fact that pension policy is embedded in a culture and economy does not mean that policy change is the unavoidable result of the cultural and economic context.

As individualization and redistribution in pension policy interact with cultural values and economic prosperity, they may also interact with government generosity in providing benefits. The next section summarizes current knowledge in this area.

2.2.4. Welfare Expenditures on Social Security

Lay conceptions assume that life is better in countries with higher levels of social security. Yet previous research has found that countries with considerable welfare effort fare slightly better than—or as good as—countries that spend less in social security (Di Tella, MacCulloch, and Oswald 2003; Ouweneel 2002; Ouweneel and Veenhoven 1995; Pampel and Williamson 1989; Radcliff 2001; Veenhoven 2000). This body of research is very informative and encompasses a broad range of measures of welfare expenditures (e.g., expenditures on social security, total welfare expenditures, and others, in constant dollars and as a percentage of GDP).

In order to build cumulative knowledge, in this study I take a different approach to explore the relationship between the welfare state and well-being. Instead of emphasizing social security expenditures, my focus is on variations in the type of pension policy—more or less individualization and redistribution. However, I do take welfare expenditures into account. Specifically, I explore if the effects of pension policy vary depending on government commitment to social security—expenditures on social security as a percentage of total government expenditures—and social security generosity—expenditures on social security as a percentage of total government expenditures, divided by the number of people age 60 and over.

Does government commitment to social security affect the relationship between the type of pension policy and life satisfaction? Policy debates show divided opinions (Bjørnskov, Dreher, and Fischer 2007). On the one side, neoclassic theory argues that governments have unambiguously beneficial impact on the well-being of their citizens. For example, government commitment to social security may buffer the detrimental effect of increased risk that individuals bear in highly individualized pension systems. On the other side, public choice theory claims that governments have numerous perverse effects that may harm life satisfaction. For example, poverty prevention and redistribution can be taxing to the government. Therefore, a pension policy strong in the redistribution dimension coupled with a government allocating a large fraction of its resources to social security may result in overall inefficiency and inability to provide other very much needed services. No empirical research has assessed these possibilities, however.

2.3. Research Hypotheses

Based on these theoretical propositions and literature discussed in this chapter, I generate four major hypotheses to test in this study:

1. Pension policy is a two-dimensional phenomenon (i.e., individualization and redistribution are distinct dimensions).
2. Higher levels of individualization will be associated with lower life satisfaction, while higher levels of redistribution will be associated with higher life satisfaction.
3. The effects of pension policy on life satisfaction will be more beneficial when policies are congruent to the macro-social context (e.g., individualization will have better outcomes in more prosperous economies and redistribution will have better outcomes in traditional than in secular rational cultures).

4. The effects of pension policy on life satisfaction will vary depending on government commitment to social security (e.g., individualization and redistribution will have better outcomes when the government commits a larger fraction of its resources to social security, and when social security generosity is higher).

CHAPTER 3: METHODOLOGY

This chapter explains the methods used in carrying out the study. I begin by describing the data sources, explaining the multilevel and longitudinal structure of the combined dataset, and discussing the sample. Next, I discuss the operationalization of life satisfaction, pension policy, and other variables included in the analysis. In the final section of this chapter I explain my analytic strategy.

3.1. Data and Sample

Numerous individual-level differences in life satisfaction can be observed: For example, at a given point in time, older people seem to be more satisfied with their lives than younger people; individuals are also more satisfied if they are married, educated, employed, and wealthier (Diener, et al. 1999). These effects can be estimated with micro-level data. However, we need aggregated data to test for the impact of pension policy on life satisfaction and examine the factors that may impact this relationship. In this study, I am using both type of data and combine them into a multilevel longitudinal dataset.

The raw data for this study are drawn from several sources, including a number of databases that are publicly available through the internet and reports that provide information on the public pension systems in printed format. The most important sources of data are: the *World Values Survey* (2009) database and the *Social Security Programs throughout the World* reports (U.S. Social Security Administration 1981-2008).

The *World Values Survey* includes data collected from representative national samples in 97 countries, collecting information on life satisfaction and values for more than of 350,000 individuals at five time points since 1981. Different individuals are surveyed over time using face-to-face interviews. The sampling methodology varies from country to country. The countries surveyed contain about 90 percent of the world's population, covering all major cultural zones and a broad range in terms of income, from very poor to very rich. However, high-income countries tend to have more time points than low-income countries. For the purpose of this study, I restricted the sample to 91 countries with information available on both life satisfaction and pension policy, and to 126,560 individuals age 45 and over. I used this age limit because the mechanisms through which pension policy may affect younger individuals' life satisfaction may be entirely different (e.g., intergenerational transfers). Age 45 was the highest possible cut-off point that resulted in all the countries having sufficient individual-level observations at each time point. Because some of these individuals are more than 20 years away from retirement, this study may underestimate the influence of pension policy on life satisfaction.

The *Social Security Programs throughout the World* reports provide extremely rich information on pension systems, but a large portion of the data available in these reports was only available in textual form and not as a usable database for statistical processing. Therefore, an extensive and systematic interpretation and coding was carried out over the period of 2007 to 2009 to create a database that would include data comparable across countries and over time. I worked with research assistants and colleagues to code the printed reports and enter the data by hand into an electronic database. Each data entry was verified by two independent coders. Coding criteria were validated by a third party. When pension policy data for a specific country was inexistent, incomplete, or ambiguous, we used data from three additional sources: *Social Security Observatory* (International Labour Organization 2009a), *Social Security Statistics* (International Labour Organization 2009b), and *Social Security Worldwide* (International Social Security Association 2009).

I also pulled data on gross domestic product from the *World Development Indicators* (World Bank 2009) and data on government expenditures from *UNdata* (United Nations 2009). I combined all data sources using a previously created dataset including country names and identification variables as used in each data source, as well as a newly created unique identification variable for each country and year of observation. I followed the conventional recommendations formulated in previous literature on cross-national data use and harmonization (e.g., Burkhauser and Lillard 2005; Inglehart and Welzel 2004). Three issues in cleaning, harmonizing, and combining the data sources deserve some discussion.

First, a few societies merged (e.g., Democratic Republic of Germany and Federal Republic of Germany), split up (e.g., Union of Soviet Socialist Republics and Yugoslavia), or had a special administrative relationship (e.g., China and Hong Kong) during the period covered in this study. I kept these countries separated (e.g., Armenia, Azerbaijan, and other countries of the former Soviet Union) unless this would have introduced a serious violation to the independence of observations assumption (e.g., because Democratic Republic of Germany and Federal Republic of Germany merged in the second out of five time points in which they were observed, I recoded data only for the unified country—Germany—and gave priority to the pension system that largely remained in place—Federal Republic of Germany).

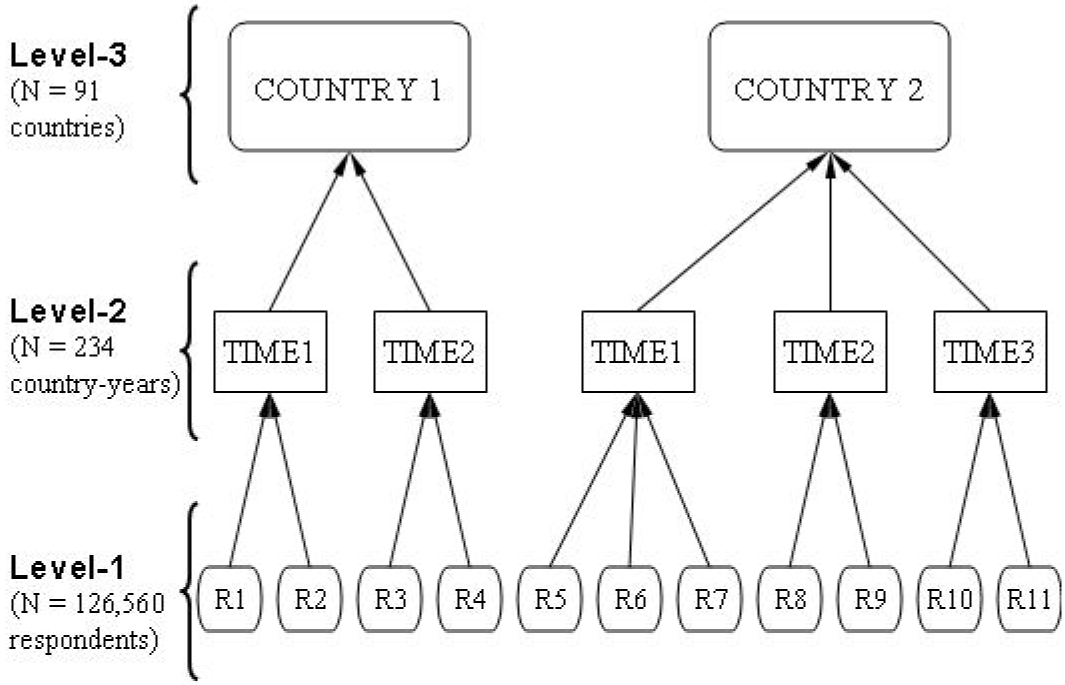
A second issue in combining the data sources is the treatment of unequal time points. Because the *Social Security Programs throughout the World* reports are typically published every other year (e.g., 1995 and 1997), when the *World Values Survey* data for a given country falls in between reports (e.g., 1996), information on pension policy is taken from the following report (e.g., 1997) and corrected if changes occurred after the *World Values Survey* year (e.g., individual retirement accounts introduced in 1997 are not recorded for a country that collected *World Values Survey* data in 1996).

A third issue in creating the combined dataset is that UNdata on national accounts were compiled according to different methodologies. Therefore, I first make the time series comparable. Take the case of a country that has two different series, an old series covering the years from 1980 to 1990, and a second one that covers the years 1989 to 2008 using more sophisticated accounting methods. The values for the two overlapping years can look substantially different. However, the rate of change from 1989 to 1990 is typically similar. I know that the second series is a better estimation of the true absolute value for 1989. Therefore, I start by taking the value of the second series (i.e., most updated accounting method) for 1989 as the reference year to derive earlier yeas. Next, I calculate the rate of change for every year in the first series. Using the rate of change of the first series for the period between 1988 and 1989, I derive the value that the first series would assign to the year 1988. I repeat the procedure for the previous years. I take the last available year in the past for the highest (i.e., most updated accounting method) as a reference year, calculate the rate of growth for the next lower series, and apply this rate to the first available year of the most recent series version to derive backward values of previous years.

The resulting database has a multilevel scope and longitudinal dimension. Figure 1 illustrates the nested structure of these data and the sample size at each level. Level 1 includes observations for 126,560 individuals over time. Because these are not the same individuals over time (i.e., repeated cross-sections), level 1 data capture variation between individuals. Individuals are clustered within 234 country-year observations at level 2. Because these are the same countries observed over time, level 2 captures within country variation. Country-years are clustered within 91 countries at level 3. At this level, the data capture between country variation.

An alternative way to conceptualize the difference between levels is to think about level 1 as personal characteristics of the respondent, level 2 as time variant or dynamic characteristics of countries, and level 3 as time invariant or static characteristics of countries.

Figure 1. Nested Structure of the Data



Appendix Table A1 provides information on the mean and total individual-level sample size for every country by time point. At the country-level, the data have an unbalanced panel structure (i.e., countries are observed at different time points) with a few countries observed a single time and most countries observed at multiple times. The hierarchical linear model used in this study allows for the use of data available at several uneven time points and takes advantage of the full information available. After the next section, describing the variables used in the analysis, I dedicate a section to explaining hierarchical linear models and the general analytic strategy used in this study more in detail.

3.2. Variables

3.2.1. Life Satisfaction

Life satisfaction is defined as an enduring subjective enjoyment of life as a whole and measured with a single question in the *World Values Survey* (2009) posed to every respondent: "All things considered, how satisfied are you with your life as a whole these days?" Answers are on a scale ranging from 0 to 10 (0 meaning "dissatisfied" and 10 "satisfied"). Despite the simplicity of this measure and a number of measurement issues (e.g., positioning of the question in the survey), there is considerable evidence of its adequacy. In fact, life satisfaction is a core variable in surveys about quality of life, and has been used in numerous nations for the last four decades (Veenhoven 2009). A large literature assesses the validity and reliability of self-reported measures of subjective well-being in general and life satisfaction in particular (e.g., Bradburn and Noll 1969; Diener at al. 1999; Frey and Sutzer 2002; George 2006). Appendix Table A2 summarizes national life satisfaction averages at each time point. The distribution is consistent to what has been reported in previous research including other age groups in the sample (e.g., Inglehart and Klingemann 2000).

3.2.2. Individualization and Redistribution in Pension Policy

To measure old-age public pension policy type, I use six dichotomous measures drawn primarily from the *Social Security Programs throughout the World* reports (U.S.

Social Security Administration 1979-2008). This includes: (1) presence of individual retirement accounts; (2) closure or phasing out of the social insurance system (as pointed out by Mesa-Lago 2004, closure or phasing out takes place when countries introduce individual retirement accounts as a replacement of the previous social insurance system rather than as an alternative or complement); (3) insured person contributes more than a third of total contributions; (4) presence of means-tested or universal pensions (because a small number of countries have universal pension, this variable indicates either means-tested or universal); (5) government covers the whole cost of non-contributory pensions; and (6) government systematically subsidizes the system regardless of deficits. I hypothesize that the first three variables are indicators for individualization of pension policy (i.e., low pooling of risk), while the last three indicate a different dimension of pension policy that relates to income redistribution and poverty prevention. To evaluate the presence of these two dimensions, I use principal component factor analysis, a statistical technique that extracts as much common variance as possible from a set of indicators through the successive creation of components or factors. In addition to the theoretical interest of this analysis, using factor scales prevents potential problems of multicollinearity that will result from including all six variables in the same model, as they are moderately to strongly correlated. Appendix Table A3 reports the tetrachoric correlations among the six dichotomies, adjusting the frequencies for cells that have a zero count, and modifying the matrix to be positive (semi)definite. High correlations in the upper left and the bottom right of the matrix suggest that these variables tend to group together in the two theorized dimensions. I discuss the findings of the principal component factor analysis in the Results chapter.

3.2.3. Traditional Versus Secular-Rational Culture

Traditional versus secular-rational culture variable is a weighted scale designed to have a mean of 0 and a standard deviation of 1, and ranging from -1.94 to 1.82. I calculated the scale using principal component factor analysis on the following eight items included in the *World Values Survey* (2009): (1) God is important in respondent's life (1 = "not at all important" and 10 = "very important"); (2) frequency of church attendance (in days per year); (3) respondent has confidence in the country's churches (1= "quite a lot to great deal" and 0 = "none at all to not very much"); (4) it is more important for a child to learn obedience and religious faith than independence and determination (1 = yes, and 0 = no); (5) respondent favors more respect for authority (1 meaning that "greater respect for authority is a good thing", and 0 meaning "bad thing" or "don't mind"); (6) respondent has strong sense of national pride (1 meaning "not proud at all proud", 2 "not very proud", 3 "quite proud", and 4 "very proud"); (7) abortion is never justifiable (1 meaning "always justifiable" and 10 "never justifiable"); (8) euthanasia is never justifiable (1 meaning "always justifiable", and 10 "never justifiable"). I choose these indicators based on previous work by Inglehart and his colleagues (Inglehart 2008, 2003; Inglehart and Baker 2000; Inglehart and Klingemann 2000; Inglehart and Welzel 2005).

I calculate the country average and then standardize each indicator to adjust for different distributions. Appendix Table A4 reports the correlations between these eight indicators. Principal component factor analysis is a useful technique to reduce this large number of variables to a single scale. Table 3 summarizes the results of this analysis. The coefficients used to calculate the scores are presented in the first column. The second and third columns provide information on the item-rest correlations and the unexplained item variance. The numbers obtained suggest homogeneity and high percentage of variance explained for each indicator. The resulting scale explained 74 percent of the variance in the eight items included in the calculation and has a very high reliability coefficient (alpha=.95). Countries scoring high on this scale emphasize religion and deference to authority, show high levels of national pride, and reject abortion and euthanasia. Countries scoring low in this scale emphasize secular autonomy and self-determination, and have less absolute standards regarding abortion and euthanasia. Overall, these loadings correspond to those identified in previous research.

Table 3. Loadings, Variance, and Reliability of the Traditional Versus Secular-Rational Culture Scale

Item	Loading	Item-rest Corr.	Unexplained Item Variance
God is very important in respondent's life	.94	.91	.12
Respondent attends church regularly in a calendar year	.85	.79	.29
Respondent has quite a lot to a great deal of confidence in the country's churches	.86	.82	.26
It is more important for a child to learn obedience and religious faith than independence and determination	.89	.85	.21
Respondent favors more respect for authority	.73	.66	.46
Respondent has strong sense of national pride	.78	.73	.38
Abortion is never justifiable	.89	.86	.20
Euthanasia is never justifiable	.91	.88	.17
Total Variance Explained (Rho) = .74			
Cronbach's Alpha Reliability Coefficient = .95			

Notes: Loadings calculated using principal component factor analysis. Items were averaged at the country-level and standardized before the analysis.

3.2.4. Affluent Economic Structure

Economic prosperity is measured drawing data from the *World Development Indicators* database (World Bank 2009) on GDP per capita in thousands of constant (year 2000) United States dollars. The raw variable ranged from $200 to $40,000. However, this variable was logarithmically transformed and top-coded at the equivalent of $40,000.

3.2.5. Government Expenditure on Social Security

Government expenditure on social security is measured using *UNdata* (United Nations 2009) information on government final consumption expenditure by function at current prices. Specifically, I create two measures: government commitment to social security and social security generosity. Government commitment to social security is government final consumption expenditure on social security as a percentage of government total final consumption. Social security generosity is government final consumption expenditure on social security as a percentage of GDP, divided by the number of people age 60 and over. The latter can be considered an age adjusted measure of generosity.

Because national accounts data were compiled according to different methodologies, I first make the time series comparable, as explained in the Data section at the beginning of this chapter. After making the series compatible, I calculate both government commitment to social security and social security generosity. I used a logarithmic transformation of government commitment to social security and top-coded this variable at the equivalent of 50 percent.

3.2.6. Control Variables

In order to identify the effect of pension policy on life satisfaction, and the contexts that strengthen or weaken this effect, I control for a number of personal characteristics of the respondent that may be affecting life satisfaction. Gender is a dichotomy coded 1 for men and 0 for women. Age is measured in years and top-coded at 105. (Top-coding age lower, at 100, created problems of non-normal distribution for this variable.) Marital status is measured using two dichotomies indicating (1) divorced, separated, or widowed, and (2) never married, the omitted category being married or partnered. Education consists of three dichotomies: (1) primary completed but less than high school, (2) high school, and (3) more than high school, the mitted category being no education or incomplete primary school. Employment is measured using two dichotomies indicating (1) retired and (2) not working other than retired (e.g., unemployed, students, and homemakers), the omitted category being working. Income is a scale ranging from 1 ("lowest decile") to 10 ("highest decile"). I draw data for all these control variables from the *World Values Survey* database.

At level 2, where I have repeated observations of the same countries across time, I include a time control variable, measured in years, ranging from 1981 to 2008. I include this variable in the model divided by five (so that one unit is five years) to obtain coefficients of a reasonable magnitude. In addition to age, income, and time, I include a squared term of each of these variables to test for curvilinear effects. Graphical exploration of bivariate relationships in the data suggested a slightly quadratic age and income effects and a clear quadratic time effect. The quadratic term for age was not significant and I dropped it from the model.

I tried additional control variables at the three levels, but dropped them from the models for a number of reasons. Because pension income can be complemented by informal family support, I tried measures of coresidence and number of children, but they did not have significant effects and did not change the results. I tried measures of government expenditures on health and country-level demographics to control for other characteristics of welfare states that may influence life satisfaction and country characteristics that may moderate the relationship between pension policy and life satisfaction, but dropped them because they introduced severe problems of non-normality, multicollinearity, and heterocedasticity that could not be remedied. I also tried measures of balance of payments and external debt, as they may be considered a rough proxy for the solvency of public pension systems and the trust people have on their continuity. However, the validity of these proxies is arguable and including them substantially increased the number of missing values, making imputation a controversial solution at least for these specific variables. Finally, controlling for country-level composition in terms of the respondents characteristics would have resulted in little power of analysis given the limited number of countries.

Table 4 summarizes the measures used in this study, the corresponding sources of information, and the levels on which they are included in the analysis. In the next section I explain my analytical strategy and justify why cultural values, economic affluence, government commitment to social security, and social security generosity are included as enduring (level 3) rather than dynamic (level 2) country characteristics.

Table 4. Measures and Sources at Each Level

Measure	Source
Individual Characteristics (Level 1)	
Life Satisfaction	WVS
Male	WVS
Age	WVS
Married	WVS
Divorced, Separated, or Widowed	WVS
Never Married	WVS
No Education or less than Primary School	WVS
Primary Completed but less than High School	WVS
High School	WVS
More Than High School	WVS
Working	WVS
Retired	WVS
Not Working Other Than Retired	WVS
Income Decile	WVS
Dynamic Country Characteristics (Level 2)	
Individual Retirement Accounts	SSPTW, SSO, SSS, and SSW
Social Insurance System Closed	SSPTW, SSO, SSS, and SSW
Insured Contributions > Third of Total	SSPTW, SSO, SSS, and SSW
Non-contributory Pensions	SSPTW, SSO, SSS, and SSW
Government Funds Non-cont. Pensions	SSPTW, SSO, SSS, and SSW
Government Subsidizes System	SSPTW, SSO, SSS, and SSW
Time	WVS
Enduring Country Characteristics (Level 3)	
Traditional Values	WVS
GDP Per Capita (U.S. $1000)	WDI
Government Commitment to Social Security	UND
Social Security Generosity	UND

Notes: WVS = World Values Survey; SSPTW = Social Security Programs throughout the World; SSO = Social Security Observatory; SSS = Social Security Statistics; SSW = Social Security Worldwide; WDI = World Development Indicators; UND = UNdata.

3.3. Analytic Strategy

I start by exploring the dimensionality of pension policy using principal component factor analysis. This technique is helpful to uncover the underlying structure (dimensions) of the indicators I use to characterize the type of pension policy and to reduce these six variables into a smaller number of scales. After confirming that pension policy has two dimensions, I create two scales: individualization and redistribution. I calculate the scales using oblique oblimin rotation. This rotation method does not constrain the scales to be uncorrelated, which is a strong theoretical assumption in the case of individualization and redistribution. Next, I proceed to analyze the effect of both individualization and redistribution on life satisfaction, as well as the factors moderating this relationship.

I handle the nested structure of the data (i.e., individual observations clustered within country observations for each time point, then clustered within countries; see Figure 1) using three-level hierarchical linear modeling technique, also known as longitudinal multilevel modeling or mixed (fixed and random) effects modeling (Raudenbush and Bryk 2002). In very simple terms, hierarchical linear modeling is "a statistical technique applied to data collected at more than one level in order to elucidate relationships at more than one level" (Luke 2004:7-8).

Hierarchical (i.e., nested or multilevel) data structures are very common in the social sciences. For example, citizens are grouped in countries, workers in firms, residents in neighborhoods, companies in states, and individuals in households. Perhaps the leading example of hierarchical data comes from the field of education because students are grouped in classes, classes in schools, schools in districts, and so on (Raudenbush and Bryk 2002). Similarly, when countries are observed over time, then the repeated measurements for a specific country are grouped in countries. For example, in this study Japan is a level 3 unit that was observed in the years 1981, 1990, 1995, 2000, and 2005 (see Appendix Table A1). These repeated measures over time are lower level units (level 2). The individuals surveyed in each country at a specific time point are the lowest-level unit (level 1) in this study.

One of the main methodological challenges in this study is to relate properties of individuals and properties of countries over time. Disaggregating country-level variables to the individual-level (e.g., assigning pension policy type to the respondents) and using Ordinary Least Squares (OLS) regression will violate the assumption of independence of observations and uncorrelated errors. Specifically, the problem is that all individuals that live in the same country will have the same values on the country-level variables. For example, individuals living in the same country will have the same values for pension policy individualization. They will also share unobserved country-level characteristics, for example, simplicity/difficulty in the pension system rules. Because there are no available measures to control for these unobserved variables, they will become part of the error term in an OLS regression, causing correlation between these disturbances. Aggregating individual-level variables to the country-level and doing the OLS analysis at the country-level will result in the loss of information. Because most of the variation in life satisfaction happens between individuals (i.e., within countries), doing the analysis at the country level will likely result in an overestimation of the relationship between aggregated variables. Therefore, using OLS regressions with aggregated and disaggregated data will yield biased results (Luke 2004). Using alternative methods (e.g., analysis of variance or covariance) to adjust for the grouping of individuals is still problematic. First, it is not possible to include a dummy variable for each country and at the same time include country-level variables. Second, including a dummy variable for each country will substantially reduce power of analysis and parsimony. Third, these country-effects will be considered as fixed, ignoring that they may randomly vary depending on other country-level characteristics. Finally, OLS regressions and other alternative methods to hierarchical linear modeling are not flexible in handling data available at several uneven time points, as is the case in this study (see Appendix Table A1). Hierarchical linear modeling resolves all these problems.

Using hierarchical linear modeling techniques is particularly helpful for this study for a number of reasons. First, they can reveal social processes by which individuals' life satisfaction is shaped by their social context. Hierarchical linear modeling can do this through the simultaneous analysis of individual-level data in the form of repeated cross-section sample surveys (such as the World Values Survey) and cross-national data. Second, this technique allows for the use of unbalanced panel data (i.e., data available at several uneven time periods). As illustrated in Appendix Table A1, countries included in this study were observed at different years from 1981 to 2008. Third, hierarchical linear modeling allows use of repeated observations which increases the degrees of freedom and this is crucial in cross-national analysis because the number of countries is limited. Repeated observations over time increase the power of statistical tests and allow for the inclusion of a larger number of variables into the models. Finally, hierarchical linear modeling allows for estimates of within country effects (e.g., the impact of pension policy on life satisfaction) and cross-level interactions (e.g., variations in the impact of pension policy on life satisfaction across cultural and economic context), controlling for both individual-level characteristics and unobserved country characteristics.

As illustrated in the bottom rows of Table 4, I include a number of time-invariant variables (level 3) in the analysis. I include cultural values and economic structure as time-invariant (level 3) predictors because I am interested in explaining between country variations in the effect of pension policy on life satisfaction (i.e., cross-level pension/context interactions). Although it may sound controversial to treat culture and economy as enduring country characteristics, both variables show great stability for the countries and years observed in these data. Specifically, about 95 percent of the variance in cultural values is between countries and only 5 percent within countries (i.e., across time). For GDP, 93 percent of the variance is between countries and 7 percent within countries. In contrast, for pension policy about 62 percent of the variance is between countries and 38 percent is dynamic. These numbers suggests that—at least in this dataset—policy changes are embedded in cultural and economic contexts that change at a much slower rate. Finally, I include government commitment to social security and social security generosity as time-invariant variables (level 3) because otherwise the number of missing observations would have increased substantially. Figure 1 illustrates that only a country average is needed at level 3, while multiple time points are needed for each country at level 2.

To help clarify my analytic strategy, the following equations display the relationships that I included in the final model at each level:

Level 1: $LSAT_{ijk} = \pi_{0jk} + \sum\pi_{1jk}*RESP_{ijk} + e_{ijk}$ (1)

Level 2: $\pi_{0jk} = \beta_{00k} + \beta_{01k}*IND_{jk} + \beta_{02k}*RED_{jk} + \beta_{03k}*IND_{jk}*RED_{jk} + \beta_{04k}*TIME_{jk} + \beta_{05k}*SQTIME_{jk} + r_{0jk}$ (2)

$\pi_{1jk} = \beta_{10k}$ (3)

Level 3: $\beta_{00k} = \gamma_{000} + \gamma_{001}*TRAD_k + \gamma_{002}*GDP_k + \gamma_{003}*GOV_k + \gamma_{004}*GEN_k + u_{00k}$ (4)

$\beta_{01k} = \gamma_{010} + \gamma_{011}*GDP_k + \gamma_{012}GOV_k$ (5)

$\beta_{02k} = \gamma_{020} + \gamma_{021}*TRAD_k$ (6)

$\beta_{03k} = \gamma_{030}$ (7)

$\beta_{04k} = \gamma_{040}$ (8)

$\beta_{05k} = \gamma_{050} + u_{05k}$ (9)

$\beta_{10k} = \gamma_{100}$ (10)

This set of equations clearly illustrates the multilevel nature of the model. Here, the subscripts *i*, *j*, and *k* denote individuals, country-year observations, and countries, respectively. In Equation 1, $LSAT_{ijk}$ is the life satisfaction of individual *i* in year *j* and country *k*; π_{0jk} is the average life satisfaction in year *j* and country *k*; $RESP_{ijk}$ is a vector of individual characteristics of the respondent that predict life satisfaction (including gender, age, marital status, education, employment status, income decile, and squared income decile) and π_{1jk} is the corresponding vector of regression coefficients; and e_{ijk} is the residual effect for individual *i* in year *j* and country *k*. Although this level 1 equation resembles an OLS regression, the subscripts are indicating an important difference: Hierarchical linear modeling estimates a different level 1 model for each year *j* and country *k*. Specifically, average life satisfaction (level 1 intercept π_{0jk}) is allowed to be different in each year *j* (π_{0jk} in Equation 2) and country *k* (β_{00k} in Equation 4).

The multilevel nature of this model becomes evident in Equations 2 and 3, where I treat the level 1 intercept (π_{0jk}) as outcome of level 2 predictors and variability. I treat level 1 slopes as fixed because I am only interested in controlling for these effects, but not in identifying cross-level interactions with individual-level variables that will result in decreased power of analysis and parsimony. In Equation 2, β_{00k} is average life satisfaction in country *k*, controlling for level 2 predictors; β_{01k} and β_{02k} are the effects (slopes) of pension policy individualization (IND_{jk}) and redistribution (RED_{jk}) in year *j* and country *k*; β_{03k} is the interaction between individualization and redistribution in year *j* and country *k*; β_{04k} and β_{05k} indicate the linear ($TIME_{jk}$) and quadratic ($SQTIME_{jk}$) effect of time in year *j* and country *k*; and r_{0jk} is a random coefficient indicating the error or unexplained variance for year *j* in country *k*. This random coefficient captures unmodeled within country (level 2) variance in life satisfaction.

In Equation 3, β_{10k} is the average within country effect of respondent characteristics. I do not include random coefficients for these characteristics because in this study I am only interested in controlling for individual-level characteristics and not in understanding if these effects vary across countries over time. Furthermore, including random effects for gender, age, and the other nine level 1 variables included in the model will reduce power of analysis and parsimony at higher levels.

In Equations 4 to 10, I treat the level 2 intercepts (β_{00k} and β_{10k}) and slopes (β_{01k}, β_{02k}, β_{03k}, and β_{04k}) as outcomes of level 3 predictors and variability. The first γ coefficient in each equation is an intercept: γ_{000} is the adjusted grand mean of life satisfaction (Equation 4); γ_{010} is the adjusted average effect of individualization across countries (Equation 5); γ_{020} is the adjusted average effect of redistribution across countries (Equation 6) ; γ_{030} is the average interaction between individualization and redistribution (Equation 7); γ_{040} is the average linear time trend across countries (Equation 8); γ_{050} is the average quadratic time trend across countries (Equation 9); and γ_{100} is the average effect of respondent characteristics across countries (Equation 10). Equations 4 to 6 also include slopes (γ after the intercept), but they represent different types of effects. In Equation 4, $TRAD_k$ is the average score in the traditional versus secular culture scale of country *k*; GDP_k is the average GDP per capita (in year 2000 constant U.S. dollars) of country *k*; GOV_k is the average government commitment to social security of country *k*; GEN_k is the average social security generosity of country *k*; and γ_{001}, γ_{002}, γ_{003}, and γ_{004} indicate the main effect of these level 3 variables on life satisfaction. In Equations 5 and 6, the slopes (γ after the intercept) indicate cross-level interactions rather than main effects on life satisfaction. For example, in Equation 5, γ_{011} and γ_{012} indicate that the level 2 effect of individualization (β_{01k}) on life satisfaction can vary depending on the country-level context (level 3). In other words, the effects of individualization can be exacerbated or lowered by economic prosperity (GDP_k) and government commitment to social security (GOV_k). The interpretation of the other cross-level interaction terms (γ_{021}) is similar, but in this case the main level 2 effect is redistribution (RED_{jk}) and the level 3 moderator is traditional cultural values ($TRAD_k$). I tested for other potential cross-level interactions between pension policy and level 3 variables, but none of them were significant and I dropped them from the model. Including u_{00k} in Equation 4, and u_{05k} in Equation 9, means that life satisfaction and the quadratic time trend are estimated as random. That is, the average life satisfaction and the quadratic time trend vary across countries (i.e., are country specific). I included random effects in all other level 3 equations, but none of them was significant.

In sum, Equations 1 to 10 clearly illustrate that there are three levels in the model. Level 1 predictors include 11 characteristics of the respondent ($RESP_{ijk}$). Level 2 predictors include two pension policy variables (IND_{jk} and RED_{jk}), and interaction term between them, and control variables for time ($TIME_{jk}$) and squared time ($SQTIME_{jk}$). Level 3 predictors include four main effects of country stable characteristics—traditional versus rational secular values ($TRAD_k$), GDP per capita (GDP_k), government commitment to social security (GOV_k), and social security generosity (GEN_k)—and three cross-level interactions between these characteristics and the effects of pension policy at level 2. Equations 1 to 10 also illustrate that unexplained variance is divided into different components (u_{00k} and u_{05k} at level 3, r_{0jk} at level 2, and e_{ijk} at level 1), allowing correct estimates of standard errors at each level.

Instead of using a set of ten equations, I can substitute the level 3 parts of the model into the level 2 equations, and then into the level 1 equations. The combined mixed equation for the three-level hierarchical linear model looks as follows:

$$\begin{aligned} LSAT_{ijk} = {} & \gamma_{000} + \sum\gamma_{100}*RESP_{ijk} + \gamma_{010}*IND_{jk} + \gamma_{020}*RED_{jk} + \gamma_{030}*IND_{jk}*RED_{jk} + \\ & \gamma_{040}*TIME_{jk} + \gamma_{050}*SQTIME_{jk} + \gamma_{001}*TRAD_{k} + \gamma_{002}*GDP_{k} + \gamma_{003}*GOV_{k} \\ & + \gamma_{004}*GEN_{k} + \gamma_{011}*IND_{jk}*GDP_{k} + \gamma_{012}*IND_{jk}*GOV_{k} + \\ & \gamma_{021}*RED_{jk}*TRAD_{k} + e_{ijk} + r_{0jk} + u_{00k} + u_{05k}*SQTIME_{k} \end{aligned} \tag{11}$$

where the subscripts *i*, *j*, and *k* denote individuals, country-year observations, and countries; $LSAT_{ijk}$ is the life satisfaction of individual *i* in year *j* and country *k*; γ_{000} is the adjusted grand mean of life satisfaction; other γ are the coefficients that indicate the direction and strength of association between independent variables and life satisfaction. Visually, it is easier to identify cross-level interactions in Equation 11 than in previous equations. For example, the last line in the formula starts with the coefficient γ_{022} indicating the strength and direction of the interaction between redistribution in year *j* and country *k* (RED_{jk}) and traditional cultural values of country *k* ($TRAD_{k}$). Equation 11 is also useful to separate fixed effects (γ) and the four random effects at the end of the equation: a random individual effect indicating the deviation of individual *ijk*'s life satisfaction from the country-year mean (e_{ijk}); random country-year effect indicating the deviation of country-year *jk*'s mean life satisfaction from the country mean (r_{0jk}); a random country effect indicating the deviation of country *k*'s mean life satisfaction from the grand mean (u_{00k}); and a random country effect for the quadratic time trend (u_{05k}), that is, a random effect indicating the deviation of country *k*'s quadratic effect of time from the mean effect.

In this study, if continuous variables do not have a meaningful zero, I center them around the grand mean of all countries in order to obtain an interpretable intercept in the hierarchical linear model. Because hierarchical linear modeling calculates the intercept and variations around the intercept holding independent variables at zero, when zero is not meaningful the estimate for the intercept is arbitrary and unreliable. At level 1, I also grand-mean center dichotomous variable because I am not interesting in making comparisons, but in adjusting the intercept for individual characteristics.

I handle missing data problems using a two-stage single stochastic imputation for less than 5 percent of the observations that had missing data. A single stochastic imputation has clear advantages compared to a single deterministic imputation, as it reduces underestimation of standard errors and prevents inflated correlations between variables by including a random component (Allison 2002). Although a multiple imputation by chained equations (MICE) introduce more rigorous adjustments to standard errors, as each model is estimated over multiple (at least 5, but ideally 20 or more) imputed datasets, the large number of individual-level observations slows down the process to an average of one imputed dataset per two days (Royston 2004). Because of the slow imputation speed I used single rather than multiple imputation.

Given that the *World Values Survey* dataset has missing values, I first imputed these missing values in the individual-level variables. To calculate cultural values scale using full information and obtain more precise imputed values, I used information available for the entire sample and not only for individuals aged 45 and over. Using the imputed individual-level variables, I then calculated the country-level averages of all indicators included in the traditional versus secular-rational values scale. Next, I restricted the sample to individuals aged 45 and over and dropped imputed values of the dependent variable from the database. At the second imputation stage, I performed the imputation for the country-level variables. After calculating the cultural values scale, I included all country-level variables incorporated in the analysis and supplementary variables, such as other characteristics of pension systems, government expenditures on health and education, aggregated demographics, and energy use, to assist the imputation.

CHAPTER 4: RESULTS

This chapter presents the results of the study. The first section summarizes descriptive statistics. The next section presents the results of the principal component factor analysis used to empirically evaluate the theoretical argument about the two dimensions—individualization and redistribution—underlying pension policy variation. The final section discusses results of the three-level hierarchical linear modeling of the influence of pension policy individualization and redistribution on life satisfaction.

4.1. Descriptive Results

Table 6 reports descriptive statistics for the individual characteristics, dynamic country characteristics, and enduring country characteristics. Average life satisfaction is relatively high. The sample of individuals is evenly distributed across gender, with slightly more females, has an average age of 59, and the most common characteristics are being married, educated, working and receiving average income. At level 2, the most frequent characteristic of pension policy is a government subsidizing the system regardless of deficits, followed by the presence of non-contributory pensions, and then by an indicator of government funded non-contributory pensions. Individual retirement accounts have been introduced in numerous countries, but only a few have closed or starting to phase out the social insurance system, and a little more require the insured person to pay for more than a third of total contributions. The average time point is the year 1997. At level 3, the cultural values scale has a mean around zero (by design, as it was created as a factor score), average GDP per capita is $8,630 dollars, and the average government expenditures on social security as a percentage of total expenditures is about 10 percent. The average age adjusted measure of government generosity is .05.

Table 5. Descriptive Statistics

Variable	Mean	SD	Min.	Max.
Individual Characteristics (Level 1)				
Life Satisfaction	6.58	2.53	1.00	10.00
Male	.48	.50	.00	1.00
Age	58.67	10.04	45.00	105.00
Married	.73	.44	.00	1.00
Divorced, Separated, or Widowed	.22	.42	.00	1.00
Never Married	.05	.22	.00	1.00
No Education or < Primary School	.24	.43	.00	1.00
Primary Completed but < High School	.37	.48	.00	1.00
High School	.26	.44	.00	1.00
More Than High School	.17	.37	.00	1.00
Working	.44	.50	.00	1.00
Retired	.34	.47	.00	1.00
Not Working Other Than Retired	.22	.42	.00	1.00
Income Decile	4.39	2.44	1.00	10.00
Dynamic Country Characteristics (Level 2)				
Individual Retirement Accounts	.12	.330	.00	1.00
Social Insurance System Closed	.05	.212	.00	1.00
Insured Contributions > Third of Total	.07	.253	.00	1.00
Non-contributory Pensions	.44	.498	.00	1.00
Government Funds Non-cont. Pensions	.32	.466	.00	1.00
Government Subsidizes System	.67	.471	.00	1.00
Time	1997.13	7.14	1981.00	2008.00
Enduring Country Characteristics (Level 3)				
Traditional Values	.01	1.00	-1.94	1.82
GDP Per Capita (U.S. $1000)	8.63	10.00	.20	40.00
Government Commitment to Soc. Sec.	10.36	9.35	.00	50.00
Social Security Generosity	.05	.170	.00	1.50

Notes: Sample size varies across levels: level 1 = 126,560 individuals; level 2 = 234 country-year observations; level 3 = 91 countries.

4.2. Two-Dimensional Pension Policy Space

To determine the underlying dimensionality of pension policy, I used principal component factor analysis on six dichotomies: (1) presence of individual retirement accounts; (2) closure or phasing out of the social insurance system; (3) insured person contributes more than a third of total contributions; (4) presence of means-tested or universal pensions; (5) government covers the whole cost of non-contributory pensions; and (6) government systematically subsidizes the system regardless of deficits. The results of this analysis suggest that the six indicators tend to group together to form two major dimensions, which I call individualization and redistribution. In this section, I discuss the structure, reliability, and conceptual meaning of these scales.

Appendix Table A3 reports the tetrachoric correlations among the six dichotomies, adjusting the frequencies for cells that have a zero count, and modifying the matrix to be positive (semi)definite. Table 6 summarizes the results of the oblique oblimin rotated solution and presents (in the first two columns) the factor loadings used to identify the dimensions underlying pension policy variation. The first three dichotomies load high on individualization, while the last three load high on redistribution. The high item-rest point-biserial correlations (i.e., higher than .20) reported in the third column indicate that the items discriminate between high-scoring and low-scoring countries. The low unexplained item variance for IRAs and GNC indicate that only 1 percent of each item variance is unique variance, a result that is not unusual when analyzing dichotomous variables. The Kuder-Richarson (KR-20) coefficients, used to compute the reliability for dichotomous variables, suggest that both factors have moderate to high internal consistency (i.e., higher than .60). Individualization explains 42 percent and redistribution explains 38 percent of the total variance in the six indicators. Together, these factors accounted for 80 percent of the variance in the six items included in the calculation.

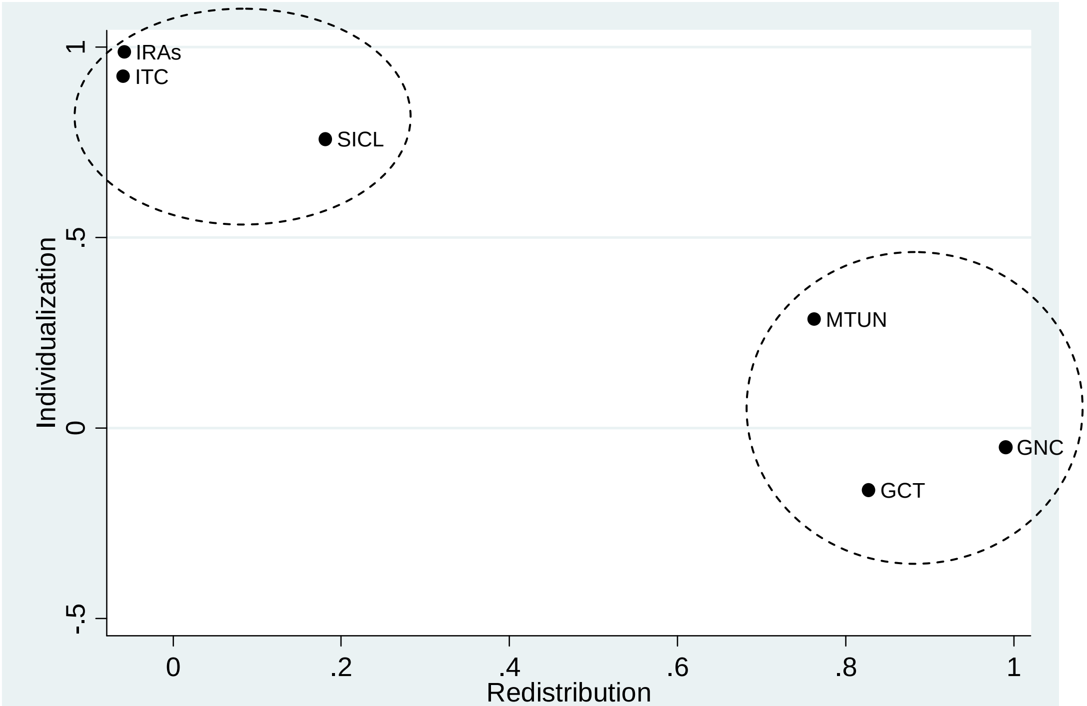
Table 6. Loadings and Reliability of the Individualization and Redistribution Scales

Item	Loading Indiv.	Loading Redist.	Item-rest Corr.	Unexplained Item Variance
Items Loading High on Individualization (KR-20 reliability = .69)				
Presence of Individual Retirement Accounts (IRAs)	**.99**	-.06	.76	.01
Old Social Insurance System was Closed or is Phasing Out (SICL)	**.76**	.18	.35	.42
Insured Person Contributes More than a Third of Total Contributions (ITC)	**.92**	-.06	.61	.13
Items Loading High on Redistribution (KR-20 reliability = .71)				
Presence of Means-tested or Universal Non-contributory Pensions (MTUN)	.29	**.76**	.47	.38
Government Covers the Whole Cost of Non-contributory Pensions (GNC)	-.05	**.99**	.73	.01
Government Systematically Subsidizes the System, Regardless of Deficits (GCT)	-.16	**.82**	.35	.26
Each Scale	.42	.38		
Total (Rho) = .80				

Notes: Loadings calculated using principal component factor analysis and oblique oblimin rotation, based on a tetrachoric correlation matrix (see Appendix Table A3). Item-rest point-biserial correlations and Kuder-Richarson (KR-20) reliability coefficient reported for each component.

These results provide support to my first hypotheses and clearly illustrate that pension policy is not one-dimensional in the way that a large fraction of previous literature might suggest. A model that is forced to extract a single dimension from the six variables will account for 38 percent points less than this two-dimensional pension policy model. Figure 2 provides a graphical representation of the two-dimensional pension policy space. The vertical axis measures individualization of risks. Policies taking high values along this axis are characterized by low levels of risk pooling and high contributions from the insured person. These are private type policies where individuals bare the risk and the level of benefits is linked to the returns made by investments in IRAs. Policies taking low values on this axis are characterized by a high socialization or pooling of risk. The horizontal axis captures variation in redistribution. Policies taking high values along this axis involve the presence of government funded non-contributory pensions. These are the public type of policies that aim to prevent poverty and redistribute income from high-income to low-income groups. By contrast, policies taking low values along this axis provide little or no poverty alleviation and redistribution from the rich to the poor.

Figure 2. Loadings of the Individualization and Redistribution Scales



Notes: Method = principal components factor analysis. Rotation = oblique oblimin. Rho = .80.

Based on the results of the principal component analysis, I predicted factor scores to create two scales designed to have a mean of 0 and a standard deviation of 1. Individualization ranges from -.50 to 2.81 and redistribution from -1.64 to 1.12. In the next section, I assess the effect of both individualization and redistribution on the life satisfaction of older adults.

4.3. Three-level Hierarchical Linear Modeling Results

In this section, I turn to the analysis of the influence of pension policy individualization and redistribution on life satisfaction. The results of the three-level hierarchical linear model for life satisfaction are reported in Table 7. In order to estimate the effects of individualization and redistribution on older adults' life satisfaction, I start by controlling for personal characteristics of the respondents. These results are presented at the top of the table and show clear patterns in the life satisfaction levels of 126,560 adults age 45 and over living in 91 countries, over the period 1981-2008. Holding all variables in the model at their mean, average life satisfaction is 6.45. Males fare slightly worse than females, having an average life satisfaction .12 units lower. One year increase in age is linearly associated with .19 unit increase in life satisfaction. Individuals who are divorced, separated, or widowed, as well as those who have never been married, show considerable lower levels of life satisfaction than the married (-.43 and -.35 units respectively). Education is associated with higher levels of life satisfaction. The higher the educational level achieved, the bigger the difference in life satisfaction compared to the group with no education or primary education incomplete. However, based on the significance level, the difference appears to be more systematic as educational attainment increases ($p<.01$ for primary completed but less than high school, and $p<.001$ for high school). Retirees and other individuals that are not working fare worse than the group of individuals working, but the effects are smaller compared to the effects of marital status. Climbing up the income ladder is associated with increases of .18 units in life satisfaction, but the returns are decreasing by .02 as people get closer to the top.

These results are not surprising in light of previous studies and given the large sample of individuals included in the analysis; however, they do suggest some new findings. One is that the individual-level effects hold when levels 2 and 3 heterogeneity are taken into account. Another is that average life satisfaction shows significant random variation across countries. The random effect component at level 3 presented in Table 7 is capturing the effect of unobserved stable characteristics of countries. Time squared is the only variable that has a significant random effect at level 3. The random effect coefficient for this variable suggests that there are country-specific quadratic time trends in the data. This U-shaped relationship was evident in bivariate analysis of the data.

One of main advantages of hierarchical linear models is that they allow identifying within country effects, adjusting for inter-individual differences. Controlling for individual-level characteristics, unobserved characteristics of countries, and country-specific quadratic time trends, is there evidence for significant effects of pension policy on life satisfaction?

As Table 7 shows, within countries, individualization is not significantly associated with life satisfaction. In contrast, one unit increase in the redistribution scale is associated with .14 units increase in life satisfaction. My second hypothesis is partly confirmed by this analysis. Results also show that there is no significant interaction between individualization and redistribution.

Another important result is that the effects of individualization do not have significant random variation across countries beyond what is explained by the cultural and economic context as well as governmental commitment to social security. Confirming my third hypothesis about the policy/context congruence, I find that the effects of pension policy on life satisfaction are significantly moderated by the cultural and structural context (these coefficients are reported under the heading "Cross-level Interactions"). Individualization interacts with the economic or structural context and redistribution interacts with the cultural context. Specifically, individualization that takes place in more affluent societies can have a beneficial impact on life satisfaction, while individualization unfolding in contexts of material scarcity can have a detrimental impact on life satisfaction. For redistribution, the overall beneficial effects on life satisfaction are substantially increased in the context of traditional cultures and decreased in the context of secular-rational cultures.

In partial confirmation of the fourth hypothesis, I find that government commitment to social security is another significant moderator of the effect of individualization and redistribution on life satisfaction. Higher government commitment to social security substantially improves the life satisfaction outcomes of individualization. However, I found no evidence for an interaction between social security generosity and any of the pension policy variables. Non significant cross-level interactions were dropped from the model to increase parsimony and increase power of analysis and are not reported in the table.

Finally, the analysis controls for the main effect of cultural values, economic prosperity, government commitment to social security, and social security generosity on life satisfaction. First, I find that individuals living in affluent economies report higher levels of life satisfaction, though extra dollars buy less life satisfaction at high levels of affluence (i.e., GDP per capita is logarithmically transformed). This is consistent with previous literature, as wealth and subjective well-being are now widely agreed to have a positive and significant relationship, though with marginally decreasing returns (Stevenson and Wolfers 2008; Veenhoven 2009). Second, traditional values have a positive influence on life satisfaction. This main effect of culture on life satisfaction should be explored in further research, as there are no obvious reasons to expect such relationship. Third, although it is generally believed that societies with a high level of social security also enjoy higher levels of subjective well-being, I find no main effect of government commitment or social security generosity on well-being. Previous research has found similar results and addressed this counterintuitive finding arguing that societies compensate for the lack of governmental assistance using other means of support such as family, friendship, or community (Di Tella, MacCulloch, and Oswald 2003; Ouweneel 2002; Ouweneel and Veenhoven 1995; Radcliff 2001; Veenhoven 2000).

Overall, this model explains 59 percent of the variance in life satisfaction between countries, 33 percent of the variance within countries, and only 4 percent of the variance among individuals. This is expected, because most of the variance in life satisfaction takes place on the level of individuals, but in this model, the focus was on country-level variables.

Table 7. Three-Level Model of the Pension System Effects on Life Satisfaction

Fixed Effect	Coefficient	SE
Intercept		
Average Life Satisfaction, γ_{000}	6.45***	.091
Individual Characteristics (Level 1)		
Male, γ_{100}	-.12***	.022
Age, γ_{200}	.19***	.002
Divorced, Separated, or Widowed, γ_{300}	-.43***	.031
Never Married, γ_{400}	-.35***	.042
Primary Completed but Less than High School, γ_{500}	.09**	.032
High School, γ_{600}	.11*	.042
More Than High School, γ_{700}	.16***	.039
Retired, γ_{800}	-.07*	.030
Not Working Other Than Retired, γ_{900}	-.20***	.030
Income Decile, γ_{1000}	.18***	.013
Squared Income, γ_{11000}	-.02***	.003
Dynamic Country Characteristics (Level 2)		
Individualization, γ_{010}	-.01	.050
Redistribution, γ_{020}	.14**	.043
Individualization*Redistribution, γ_{030}	.06	.036
Time, γ_{040}	-.01	.025
Squared time, γ_{050}	.05**	.017
Enduring Country Characteristics (Level 3)		
Traditional Values, γ_{001}	.35**	.107
GDP Per Capita (U.S. $1000), γ_{002}	.53***	.073
Government Commitment to Social Security, γ_{003}	.05	.089
Social Security Generosity, γ_{004}	.24	.361

Notes: Estimation of fixed effects using robust standard errors.

* $p < .05$; ** $p < .01$; *** $p < .001$ (two tailed tests for all variables)

(continued on next page)

Table 7. *(Continued)*

Fixed Effect	**Coeff.**	**SE**
*Cross-level Interactions (Level 2*Level 3)*		
Individualization*GDP per capita (U.S. $1000), γ_{011}	.100*	.040
Individualization*Gov. Commitment to Soc. Sec., γ_{012}	.26**	.074
Redistribution*Traditional-Secular Values, γ_{021}	.19***	.042

Random Effect	**Variance Component**	**Std. Dev.**
Between Individuals Variance (Level 1)		
Individual Life Satisfaction Variation, e	4.77	2.184
Within Countries Variance (Level 2)		
Country-Year Mean Life Satisfaction Variation, r_0	.12***	.350
Between Countries Variance (Level 3)		
Country Mean Life Satisfaction Variation, u_{00}	.52***	.718
Squared Time Effect Variation, u_{05}	.01**	.084

Fit Statistics

Explained Variance (Base = Null Model Variance Component)

Between Individuals (Level 1)	= 4%	(4.99)
Within Countries (Level 2)	= 33%	(.18)
Between Countries (Level 3)	= 59%	(1.28)

Deviance = 557663.224

Number of estimated parameters = 29

Notes: Estimation of fixed effects using robust standard errors. Chi-square significance tests for random effects are based on a smaller sample of units that had sufficient data for computation: 220 of 234 units for level 2, and 77 of 91 for level 3. Variance components estimates are based on all the data.

* p < .05; ** p < .01; *** p < .001 (two tailed tests for all variables)

CHAPTER 5: DISCUSSION AND CONCLUSION

Research on old-age pension policy and subjective well-being has made remarkable progress over the past decades. However, the vast majority of this research runs on separate avenues, with comparative-historical sociology studying policy development mainly in Western Europe and OECD countries, sociology of aging and the life course looking at the intersection between policy and well-being mostly within the United States, and sociology of emotions and mental health largely focused on micro-social processes and younger populations. Bridging theoretical perspectives and integrating empirical work across fields has been particularly difficult due to the lack of reliable multilevel longitudinal data. In this study, I address these limitations and explore avenues for cumulative theorizing by using a newly created dataset and three-level hierarchical linear models to understand the effects of pension policy on life satisfaction, as well as the factors that may moderate this relationship. The data analyzed include 126,560 older adults over the period 1981-2008 in 91 countries. The inclusion of a large number of low- and middle-income countries over time provides a unique opportunity to answer the call for research on pension policy and subjective well-being to be more cross-national and dynamic in its orientation (e.g., Berkman et al. 2000; George 2006; Mares and Carnes 2009; Peterson 2007; Turner and Stets 2006; Yang 2008). Four major findings emerged from this study.

First, the results show that pension policy in recent decades has two main dimensions. The first and most frequently studied dimension of variation in pension policy is individualization, which taps variation in pooling of risk across countries with or without mandatory funded IRAs. The emphasis of previous literature on the individualization or privatization of pensions has obscured the importance of redistribution, which is the second source of variation in pension policy. This second dimension is related to poverty prevention and income redistribution performed through non-contributory universal or targeted pensions funded and managed by public institutions. Although the two-dimensional theory of pension policy has been formulated in previous theoretical research (Mares and Carnes 2009) and implied in previous comparative-historical research (e.g., Béland 2005b; Calvo, Bertranou, and Bertranou forthcoming; Kay and Sinha 2008), this is the first study that statistically demonstrates that individualization and redistribution are not in direct and unequivocal opposition. Future research on pension policy should conceptualize individualization and redistribution as separate dimensions. Although it is true that on numerous occasions privatizing trends have been accompanied by a retrenchment of the welfare state from pension provision, treating individualization and redistribution as antithetical would be theoretically and empirically inaccurate.

Second, the key challenge that pension reform poses to older adults' life satisfaction is not that of living with a high degree of risk, but living in a world where strong public safety nets are weak, eroded, or dismantled. Given the longstanding contention of risk society theory (e.g., Beck 1992; Giddens 1990, 1999; Habermas 2001; Luhmann 1993) that the process of individualization reduces well-being, it certainly seems plausible that individualized pension systems could decrease life satisfaction as well. In the context of planning and making choices about an uncertain retirement future, risk may become a subjectively experienced threat to life satisfaction and overall well-being. Yet evidence from this study does not support risk society theory of increasing uncertainty, anxiety, ambivalence, and ill-being associated with individualization of pension policy. Rational choice theory is right in pointing out that individualization is not wholly about risk but also about an expansion of choice and opportunities for return (e.g., World Bank 1994). However, as risk society theory is too pessimistic in predicting life satisfaction, rational choice theory is too optimistic in predicting the positive effect of pension individualization on life satisfaction. I argue that the (positive or negative) impact of individualization on life satisfaction has been overstated because previous literature does not differentiate between individualization and redistribution. Results from this study suggest that individualization neither boosts nor dampens life satisfaction when redistribution is held constant. Variation in redistribution is what makes a difference for older adults' life satisfaction. This result is consistent with previous research that found a number of economic, health, and social benefits arising from non-contributory pensions (e.g., Barrientos and Hulme 2008; Bertranou et al. 2002; Heikkilä and Kuivalainen 2002; Johnson and Williamson 2008).

The third finding of this study is that the relationship between pension policy and life satisfaction is contingent on the macro-social context. Pension policies are embedded in cultural and structural contexts that help explain how people react subjectively to these policies. Results from this study provide support to my congruence/discrepancy theory about the interaction between pension policy and the cultural and economic context. This theory postulates that when pension policy is in conflict with the cultural and structural context, it tends to lower life satisfaction and to arouse negative emotions. On the contrary, tight coupling between pension policy and the cultural and structural context increases life satisfaction and subjective well-being more generally. Policy-culture and policy-economy discrepancies can happen when factors other than cultural values or economic need shape policy development. For example, policy change is heavily influenced by institutional constraints stemming from previously enacted and current policies (Pierson 1994). Class struggle and political organization is another important factor shaping policy development (Quadagno 2005)).

Specifically, I find evidence for two situations in which the effect of pension policy significantly varies across cultural and structural-economic contexts. First, the beneficial effect of redistribution on life satisfaction is stronger in traditional than in secular rational cultures. These results are consistent with previous findings suggesting non-contributory (especially means-tested) pensions may be associated with stigma in secular-rational cultures (e.g., Barr 1992; Estes 2001; Quadagno 2005). These results are theoretically sound, because secular-rational cultures are also characterized by a shift away from traditional institutions, including the state, which is in this case the primary provider of redistribution (Inglehart 2008). In contrast, traditional cultures may have a more favorable attitude towards reliance on government funded pensions as well as on family support. Furthermore, previous research suggests that traditional cultures tend to place God, nature, or the collectivity, rather than individual labor, as the ultimate origin of wealth (e.g., Bataille 1998; Calvo and Williamson 2008; Cousiño 1990; Cousiño and

Valenzuela 1994; Mauss 1967; Morandé 1984). This, in turn, makes them more prone to engage in ritual exchanges of wealth that are extended to the welfare state in the form of circulation of a variety of goods and services, including old-age pensions. In this context, welfare redistribution may be experienced as a legitimate transfer to which low-income groups are entitled.

A second case for which the congruence/discrepancy theory holds true is represented by the interaction between individualization and the structural-economic context. Results from this study suggest that the main challenge that individualization of pension policy poses for life satisfaction is not that of living with a high degree of risk, but living with a high degree of risk in a world where basic material needs have not been met. Specifically, I find that the effects of individualization on life satisfaction are significant and negative for lower-income economies and significant and positive for more affluent economies. On one hand, individuals living in a context of material scarcity have a structural disadvantage to bear risk. On the other hand, an affluent context protects individuals from risk and gives them more opportunities to enjoy choices and obtain returns. For example, individuals living in wealthier economies may have greater exposure to financial education and literacy campaigns, and probably have more opportunities to delegate investment decisions to experts (Botty and Iyengar 2006). The very existence of the structural disadvantage and affluence-related advantages puts into question the categorical claim of negative well-being outcomes of individualization made by risk theorists (e.g., Beck 1992; Giddens 1990, 1999). It is clear that risk theory does not appreciate the full significance of structural, cultural, and other factors as they influence and shape the subjective experience of risk in contemporary societies (Elliot 2002).

Last, but not least, government commitment to social security moderates the effects of pension policy on life satisfaction. For the most part, in this study I explore the relationship between the welfare state and well-being by focusing on variations in the type of pension policy—more or less individualization and redistribution—and thus depart from previous research emphasizing overall social security expenditures (e.g., Di Tella, MacCulloch, and Oswald 2003; Ouweneel 2002; Pampel and Williamson 1989; Radcliff 2001; Veenhoven 2000). However, I do take social security expenditures into account in the form of government commitment to social security (i.e., government expenditures on social security as a percentage of total government expenditures) and social security generosity (i.e., government expenditures on social security as a percentage, divided by the number of people age 60 and over). Corroborating findings from previous studies and challenging lay conceptions, I find that—on average—life satisfaction is not higher in countries with governments strongly committed to social security and where social security benefits are more generous. However, I find significant interactions between government commitment to social security and individualization. Specifically, my results suggest that government commitment to social security buffers the detrimental effect of increased risk that individuals bear in highly individualized pension systems. These results provide moderate support for a neoclassic view where governments have unambiguously beneficial impact on the well-being of their citizens (see Bjørnskov, Dreher, and Fischer 2007).

5.1. Theoretical Implications

This study is a first step in the direction of integrating literature on comparative-historical policy analysis, sociology of aging and the life course, and sociology of emotions and mental health. The theories and empirical findings discussed here may serve as a unifying force for the study of the impact of pension policy on the subjective well-being of older adults from a sociological perspective. However, the implications of this study are beyond the substantive results on the controversy about the impact of pension policy on life satisfaction and the moderators of this relationship.

Findings from this study advance theory in the field of comparative public policy and policy analysis. Four theoretical postulates emerge in this domain. First, social policy can be best characterized if one takes into account both institutional design and expenditures. Second, the type of pension policy has two distinct sources of variation: individualization and redistribution. Third, the outcomes of the type of pension policy are not independent from expenditures. Fourth, the outcomes of the type of pension policy are shaped and constrained by culture and structure. The emphasis of previous research on privatization, welfare expenditures, and institutional factors shaping policy development has resulted in little attention to redistribution, type of pension policy, and cultural and economic factors, respectively. Future research will greatly benefit from an integrative approach.

By modeling the interaction between pension policy and the cultural and structural context in shaping life satisfaction, the theory sketched here provides more explicit macro-foundations for micro-level outcomes. Three major theoretical postulates about the larger macro-social context in which subjective well-being forms and is sustained emerge from my findings. First, when variations occur in public policies, individuals react emotionally to their new circumstances, especially to the distribution of needed resources, such as non-contributory pensions. Second, the redistribution of risk has less subjective emotional impact than the redistribution of need. Third, policy/context congruence is associated with improved subjective well-being and positive emotional arousal, while policy/context discrepancy has the reverse effect. Future studies may consider other subjective well-being outcomes, policies, and age groups to test the generalizability of these postulates.

5.2. Policy Implications

The general study of pension policy and life satisfaction has intrinsic importance, as it affects the well-being of people and countries. Most of us will face a period of life in which we will need to consume but will be unable to work, and the countries we live in will have to find a solution to provide us with enough retirement income, either to maintain previous standards of life or to prevent poverty. Finding the right balance of public-private provision is a complicated task with great consequences for a larger fraction of the population, and should not be entirely abandoned to ideological preferences. Findings from this study can help determine the right balance of public and private support systems for elderly populations in different economic and cultural contexts.

The current financial crisis proves that privatizing pension reforms have exposed individuals to too much risk. Many individuals have seen their retirement income security severely affected as a result of the imperfect choices they made in this time of financial turmoil. But what happens to their subjective well-being? With most of my sample observed before the onset of this crisis, my findings may be underestimating the detrimental effects of individualization on life satisfaction. However, I can make policy-relevant generalizations for situations less extreme than a financial crisis. Somewhat surprising, I find that individualization of risks—on average—does not have an impact on life satisfaction. With pension reform on top of the policy agenda in many nations, a key finding of this study is that life satisfaction comes with sufficient level of redistribution and not with more or less individualization.

The finding that with redistribution comes life satisfaction, the experience and challenges faced by countries that introduced IRAs, the changes in policies by international financing institutions, and the recent financial volatility and heavy losses experienced in financial markets may all serve as an incentive for countries to strengthen the poverty prevention and income redistribution component of their public pension systems. However, it would be a mistake to assume that "one size fits all" in pension policy reform. Although population aging and the associated problems of reforming the old-age pension systems are found around the world, results from this study suggest that the challenge of pension policy reform is context-specific.

Analyzing all the possible contextual variations of pension policy reform influences on life satisfaction could be the focus of an entire new study. However, a few policy-relevant observations can be made. Overall, the (positive or negative) impact of individualization on life satisfaction has been overestimated. The choice and opportunities for returns that individualization brings are for the most part inseparable from increased risk. However, there are important contextual variations. On one side, individualization without redistribution can have disastrous consequences when taking place in low-income countries where governments are spending most of their resources in programs other than social security. On the other side, individualization appears to be less of a problem when public pension redistribution is provided in parallel, affluence shields against the increased risks, and governments dedicate substantial efforts to provide social security. From a policy perspective, individualization appears to be a resource-demanding alternative for pension reform. In contrast, pension systems strong in the public safety net tend to boost life satisfaction, can have even more beneficial results in traditional cultures, and work better without demanding excessive commitment from the government.

Evidence presented in this study suggests that pension policy redistribution is a better avenue than individualization to increase older adults' life satisfaction. This evidence is consistent with recent literature showing an emerging consensus about the effectiveness of social redistribution as a response to poverty, inequality, and vulnerability (e.g., Barrientos and Hulme 2008; Heikkilä and Kuivalainen 2002; Johnson and Williamson 2008). Policymakers would benefit from looking closely at the social pensions introduced in countries such as South Africa and Chile. In South Africa, the social pension reduced the scale of poverty among older people by 94 percent (Case and

Deaton 1998; Help Age International 2004; Help Age International 2006). In Chile, almost half of the older adult population moved out of poverty when the government introduced the social pension (Bertranou et al 2002). Of course, the decision to develop strong redistribution pensions should be weighted against creating other poverty prevention and income redistribution policies.

5.3. Limitations and Future Research

This project entailed the creation of a new dataset and the coding of many variables was not without difficulties. Because most of the information for pension policy was only available in the form of qualitative description in printed reports, there was space for interpretation. More than five people were involved in checking the quality of the data, but ambiguities and contradictions in the reports were frequent. For example, the reports sometimes had sections indicating that the government was covering the whole cost of a means-tested pension, but these pensions were not mentioned anywhere else in the report, giving the impression that they did not existed or at least that no additional information was recorded on them. I approached problems on a case by case basis, reviewing the history of each country, revising the coding criteria, and validating the decisions with a third person. Although we came to an agreement in every single case, it is likely that a different group of researchers would have arrived to different conclusions in a number of cases. Further data limitations include the insufficient number of people age 50 and over. Because I used an age cut-off of 45 years, I included in the analysis people that may be 20 or more years away from retirement, and thus it is likely that the results of this study are underestimating the effect of pension policy on life satisfaction.

Limitations acknowledged, the data used in this study are unique in their size, scope, and longitudinal dimension, and provide exceptional opportunities for future research in a broad range of topics that were not addressed in this study. First, future studies may explore if the effects of pension policy vary depending on the respondent individual characteristics. As I argued that an affluent context provides opportunities to get benefits from individualization, an analogous mechanism may be operating at the individual level, where power and resources of various types are structured by age, class, gender, and other social categories. Second, future studies may include a broader range of outcomes, including subjective health, happiness, morbidity, mortality, and functional health. Looking at the dispersion or inequality in the distribution of these outcomes and life satisfaction could also be of interest. Third, future studies may model lagged effects of pension policy to explore if people adjust to the changes or react more strongly later on. Does pension policy have a permanent or delayed effect on life satisfaction? Fourth, after new waves of data are collected, it will be possible to observe more variation in cultural and material contexts within nations and thus ask how cultural changes and economic growth moderate the relationship between pension policy and life satisfaction. Fifth, future studies might explore competing cultural and structural explanations for the policy/context discrepancy theory. Sixth, future studies may focus their attention on other welfare policies, including education, health, unemployment, and other areas.

Seventh, future studies may explore pension reform including a broader range of explanatory variables (e.g., financial dependency and religious values) and outcomes (e.g., corruption and economic growth). Eighth, studies could explore pension policy trends across time.

The three-level hierarchical linear modeling approach used in this study to analyze repeated cross-sections of multilevel data can be extended to addressing other questions that bear theoretical importance to sociological studies of public policy, macro-social determinants of subjective well-being and emotions, and other multilevel phenomena. Because we know disproportionally more about the determinants and outcomes of different public pension policies—as well as of the reform of these policies—in high-income countries, future studies should increasingly include low-income countries. This study is a first step in that direction.

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APPENDIX

Appendix Table A1. Sample Summary

	Time Point[1]							Number of Individuals	
Country	**1**	**2**	**3**	**4**	**5**	**6**	**Total**	**Mean**	**Total**
Albania	1998	2002					2	360	719
Algeria	2002						1	304	304
Andorra	2005						1	363	363
Argentina	1984	1991	1995	1999	2006		5	448	2,240
Armenia	1997						1	651	651
Australia	1981	1995	2005				3	716	2,147
Austria	1990	1999					2	804	1,607
Azerbaijan	1997						1	505	505
Bangladesh	1996	2002					2	290	580
Belarus	1996	1990	2000				3	570	1,709
Belgium	1981	1990	1999				3	910	2,730
Brazil	1991	1997	2006				3	500	1,501
Bulgaria	1997	1990	1999	2006			4	522	2,089
Burkina Faso	2007						1	327	327
Canada	1982	1990	2000				3	691	2,073
Chile	1990	1996	2000	2005			4	420	1,680
China - The People's Republic	1990	1995	2001	2007			4	540	2,160
Colombia	1997	1998	2005				3	761	2,283
Croatia	1996	1999					2	445	889
Cyprus	2006						1	453	453

Notes: [1] The numbers reported below the time period columns correspond to the calendar year of observation for each country.

(continued on next page)

Appendix Table A1. *(Continued)*

Country	Time Point[1] 1	2	3	4	5	6	Total	Number of Individuals Mean	Total
Czechoslovakia	1998	1990	1991	1999			4	769	3,074
Denmark	1981	1990	1999				3	461	1,383
Dominican Republic	1996						1	38	38
Egypt	2000	2008					2	1,035	2,069
El Salvador	1999						1	391	391
Estonia	1990	1996	1999				3	431	1,293
Ethiopia	2007						1	148	148
Finland	1990	1996	2000	2005			4	392	1,568
France	1981	1990	1999	2006			4	525	2,100
Georgia	1996						1	795	795
Germany	1981	1990	1997	1999	2006		5	1,081	5,407
Ghana	2007						1	337	337
Greece	1999						1	305	305
Hong Kong - China	2005						1	571	571
Hungary	1982	1991	1998	1999			4	517	2,069
Iceland	1984	1990	1999				3	304	912
India	1990	1995	2001	2006			4	608	2,433
Indonesia	2001	2006					2	518	1,036
Iran - Islamic Republic of	2000	2007					2	545	1,090
Iraq	2004	2006					2	660	1,320

Notes: [1] The numbers reported below the time period columns correspond to the calendar year of observation for each country.

(continued on next page)

Appendix Table A1. *(Continued)*

	Time Point[1]							Number of Individuals	
Country	**1**	**2**	**3**	**4**	**5**	**6**	**Total**	**Mean**	**Total**
Ireland	1981	1990	1999				3	484	1,452
Israel	2001						1	460	460
Italy	1981	1990	1999	2005			4	701	2,805
Japan	1981	1990	1995	2000	2005		5	534	2,670
Jordan	2001	2007					2	313	626
Korea - Republic of	1982	1990	2001	2005			4	396	1,582
Kyrgyzstan	2003						1	276	276
Latvia	1990	1996	1999				3	452	1,356
Lithuania	1990	1997	1999				3	432	1,297
Luxembourg	1999						1	441	441
Macedonia	1998	2001					2	390	779
Malaysia	2006						1	214	214
Mali	2007						1	438	438
Malta	1983	1991	1999				3	296	887
Mexico	1990	1996	2000	2005			4	463	1,850
Moldova - Republic of	1996	2002	2006				3	430	1,290
Morocco	2001	2007					2	366	731
Netherlands	1981	1990	1999	2006			4	442	1,767
New Zealand	1998	2004					2	574	1,147
Nigeria	1990	1995	2000				3	217	652

Notes: [1] The numbers reported below the time period columns correspond to the calendar year of observation for each country.

(continued on next page)

Appendix Table A1. *(Continued)*

Country	Time Point[1]							Number of Individuals	
	1	2	3	4	5	6	Total	Mean	Total
Norway	1982	1990	1996				3	508	1,525
Pakistan	2001						1	388	388
Peru	1996	2001	2008				3	377	1,130
Philippines	1996	2001					2	344	688
Poland	1989	1990	1997	1999	2005		5	520	2,601
Portugal	1990	1999					2	530	1,059
Romania	1993	1998	1999	2005			4	644	2,577
Russian Federation	1990	1995	1999	2006			4	974	3,896
Rwanda	2007						1	337	337
Saudi Arabia	2003						1	226	226
Serbia	1996	2001	2006				3	593	1,780
Singapore	2002						1	349	349
Slovak Republic	1991	1990	1998	1999			4	444	1,776
Slovenia	1992	1995	1999	2005			4	472	1,888
South Africa	1990	1996	2001	2007			4	915	3,660
Spain	1981	1990	1995	1999	2000	2007	6	842	5,050
Sweden	1982	1990	1996	1999	2006		5	488	2,442
Switzerland	1989	1996	2007				3	677	2,032
Tanzania - United Republic of	2001						1	340	340
Thailand	2007						1	738	738

Notes: [1] The numbers reported below the time period columns correspond to the calendar year of observation for each country.

(continued on next page)

Appendix Table A1. *(Continued)*

	Time Point[1]							Number of Individuals	
Country	**1**	**2**	**3**	**4**	**5**	**6**	**Total**	**Mean**	**Total**
Trinidad and Tobago	2006						1	424	424
Turkey	1990	1996	2001	2007			4	573	2,290
Uganda	2001						1	98	98
Ukraine	1996	1999	2006				3	771	2,313
United Kingdom	1981	1990	1998	1999	2006		5	519	2,597
United States	1982	1990	1995	1999	2006		5	750	3,750
Uruguay	1996						1	514	514
Venezuela	1996	2000					2	324	647
Viet Nam	2001	2006					2	478	956
Zambia	2007						1	182	182
Zimbabwe	2001						1	238	238
Total	**91**[a]	62	46	26	8	1	**234**[b]	493[c]	**126,560**[d]

Notes: [1] The numbers reported below the time period columns correspond to the calendar year of observation for each country.

[a] Total country level observations.

[b] Total country-year level observations.

[c] The number reported is the average individual sample size.

[d] Total individual level observations.

Appendix Table A2. Country Average Life Satisfaction by Time Point

Country	**1**	**2**	**3**	**4**	**5**	**6**	**Mean**	**SD**
Albania	4.77	5.16					4.97	.28
Algeria	5.69						5.69	.00
Andorra	7.14						7.14	.00
Argentina	6.74	7.24	6.93	7.30	7.70		7.18	.37
Armenia	4.33						4.33	.00
Australia	7.89	7.58	7.31				7.59	.29
Austria	7.87	8.03					7.95	.11
Azerbaijan	5.39						5.39	.00
Bangladesh	6.40	5.77					6.09	.45
Belarus	5.51	4.35	4.84				4.90	.58
Belgium	7.37	7.59	7.42				7.46	.12
Brazil	7.37	7.15	7.65				7.39	.25
Bulgaria	5.02	4.67	5.48	5.21			5.10	.34
Burkina Faso	5.59						5.59	.00
Canada	7.82	7.89	7.85				7.85	.04
Chile	7.55	6.92	7.12	7.23			7.21	.26
China - TPR	7.29	6.83	6.54	6.76			6.86	.32
Colombia	8.18	8.42	8.30				8.30	.12
Croatia	6.18	6.68					6.43	.35
Cyprus	7.35						7.35	.00
Czechoslovakia	6.37	6.84	6.40	7.07			6.67	.34
Denmark	8.21	8.16	8.23				8.20	.04
Dominican Republic	7.09						7.09	.00
Egypt	5.36	5.78					5.57	.30
El Salvador	7.48						7.48	.00
Estonia	5.99	4.99	5.95				5.64	.57
Ethiopia	5.00						5.00	.00
Finland	7.68	7.78	7.86	7.84			7.79	.08
France	6.71	6.78	7.01	6.86			6.84	.13
Georgia	4.68						4.68	.00
Germany	7.22	7.02	6.93	7.42	6.93		7.10	.21
Ghana	6.12						6.12	.00
Greece	6.68						6.68	.00

Notes: Time points correspond to different years across countries.

(continued on next page)

Appendix Table A2. *(Continued)*

Country	1	2	3	4	5	6	Mean	SD
Hong Kong - China	6.41						6.41	.00
Hungary	6.90	6.02	5.85	5.80			6.14	.51
Iceland	8.05	8.02	8.05				8.04	.02
India	6.70	6.50	5.15	5.80			6.04	.71
Indonesia	6.96	6.87					6.92	.06
Iran - Islamic Republic of	6.38	6.43					6.41	.04
Iraq	5.23	4.48					4.86	.53
Ireland	7.81	7.88	8.21				7.97	.21
Israel	7.03						7.03	.00
Italy	6.65	7.30	7.16	6.88			7.00	.29
Japan	6.54	6.49	6.61	6.47	6.99		6.62	.21
Jordan	5.60	7.21					6.41	1.14
Korea - Republic of	5.33	6.69	6.19	6.39			6.15	.58
Kyrgyzstan	6.48						6.48	.00
Latvia	5.70	4.91	5.27				5.29	.40
Lithuania	6.02	5.00	5.21				5.41	.54
Luxembourg	7.79						7.79	.00
Macedonia	5.72	5.13					5.43	.42
Malaysia	6.84						6.84	.00
Mali	6.09						6.09	.00
Malta	7.94	8.26	8.21				8.14	.17
Mexico	7.41	7.52	8.11	8.20			7.81	.40
Moldova - Republic of	3.72	4.58	5.45				4.58	.87
Morocco	6.06	5.25					5.66	.57
Netherlands	7.72	7.77	7.85	7.72			7.77	.06
New Zealand	7.70	7.88					7.79	.13
Nigeria	6.59	6.59	6.87				6.68	.16
Norway	7.89	7.68	7.65				7.74	.13
Pakistan	4.99						4.99	.00
Peru	6.35	6.44	7.02				6.60	.36
Philippines	6.84	6.65					6.75	.13
Poland	6.63	6.52	6.42	6.20	7.01		6.56	.30
Portugal	7.06	7.03					7.05	.02

Notes: Time points correspond to different years across countries.

(continued on next page)

Appendix Table A2. *(Continued)*

Country	**1**	**2**	**3**	**4**	**5**	**6**	**Mean**	**SD**
Romania	5.88	4.86	5.24	5.75			5.43	.47
Russian Federation	5.37	4.46	4.65	6.14			5.16	.76
Rwanda	4.97						4.97	.00
Saudi Arabia	7.28						7.28	.00
Serbia	5.56	5.62	6.00				5.73	.24
Singapore	7.24						7.24	.00
Slovak Republic	6.14	6.80	6.07	6.03			6.26	.36
Slovenia	6.28	6.45	7.24	7.24			6.80	.51
South Africa	6.73	6.09	6.31	7.19			6.58	.49
Spain	6.59	7.14	6.62	7.08	6.98	7.31	6.95	.29
Sweden	8.01	7.97	7.77	7.64	7.72		7.82	.16
Switzerland	8.36	8.01	7.90				8.09	.24
Tanzania - UR of	3.93						3.93	.00
Thailand	7.22						7.22	.00
Trinidad and Tobago	7.26						7.26	.00
Turkey	6.40	6.18	5.62	7.46			6.42	.77
Uganda	5.65						5.65	.00
Ukraine	4.01	4.58	5.80				4.80	.91
United Kingdom	7.55	7.49	7.58	7.40	7.55		7.51	.07
United States	7.66	7.73	7.66	7.66	7.27		7.60	.18
Uruguay	7.13						7.13	.00
Venezuela	6.73	7.51					7.12	.55
Viet Nam	6.51	7.09					6.80	.41
Zambia	6.06						6.06	.00
Zimbabwe	3.95						3.95	.00
Mean	6.50	6.62	6.77	6.87	7.27	7.31	6.51	.23

Notes: Time points correspond to different years across countries.

Appendix Table A3. Tetrachoric Correlation Matrix for Pension System Scales

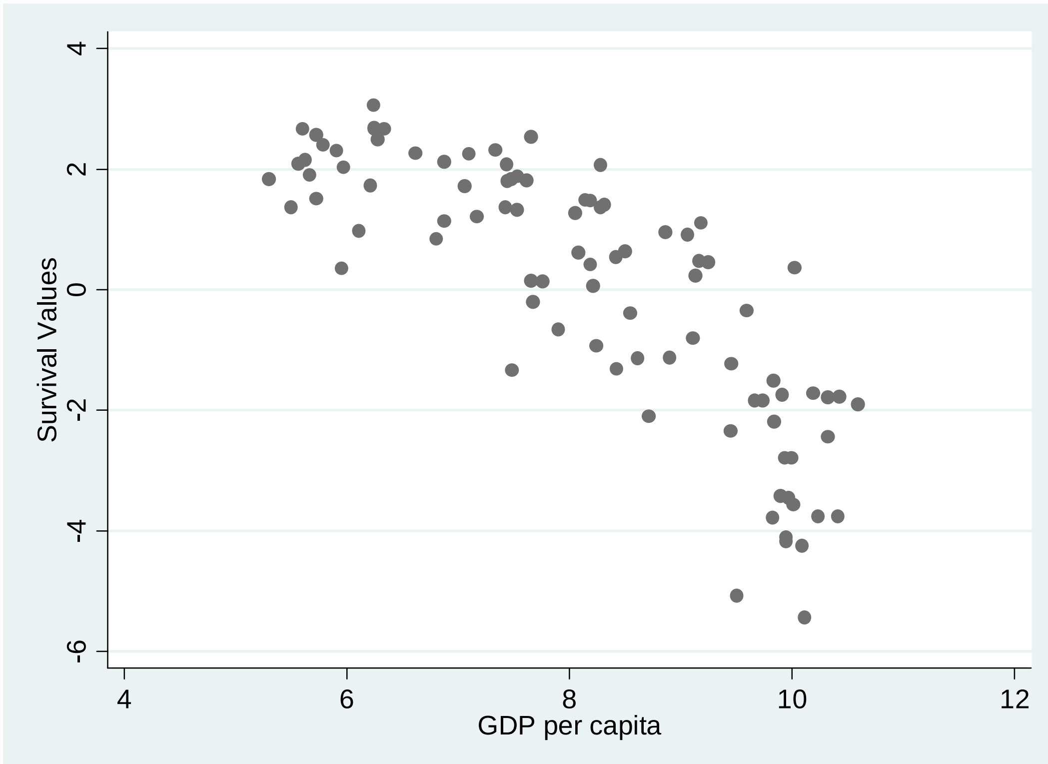
	IRAs	SICL	ITC	MTUN	GNC	GCT
Presence of Individual Retirement Accounts (IRAs)	1.00					
Old Social Insurance System was Closed or is Phasing Out (SICL)	.79	1.00				
Insured Person Contributes More than a Third of Total Contributions (ITC)	.89	.44	1.00			
Presence of Means-tested or Universal Non-contributory Pensions (MTUN)	.11	-.10	.38	1.00		
Government Covers the Whole Cost of Non-contributory Pensions (GNC)	-.21	.02	-.15	.78	1.00	
Government Systematically Subsidizes the System, Regardless of Deficits (GCT)	-.23	.31	-.46	.26	.80	1.00

Notes: Frequencies adjusted when a cell has zero counts and tetrachoric correlations adjusted to be positive (semi)-definite.

Appendix Table A4. Correlation Matrix for Cultural Values Scale

	GIM	RAC	RCC	CHL	AUT	NPR	ABO	EUT
God is very important in respondent's life (GIM)	1.00							
Respondent attends church regularly in a calendar year (RAC)	.75	1.00						
Respondent has quite a lot to a great deal of confidence in the country's churches (RCC)	.84	.69	1.00					
It is more important for a child to learn obedience and religious faith than independence and determination (CHL)	.82	.72	.71	1.00				
Respondent favors more respect for authority (AUT)	.59	.53	.55	.69	1.00			
Respondent has strong sense of national pride (NPR)	.74	.61	.59	.64	.59	1.00		
Abortion is never justifiable (ABO)	.83	.74	.72	.75	.58	.59	1.00	
Euthanasia is never justifiable (EUT)	.86	.74	.78	.75	.58	.66	.88	1.00

Appendix Figure A1. Bivariate Relationship Between GDP per capita and Survival Values



Appendix Figure A2. Non-linear Time Trends in Life Satisfaction