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ORIGINAL RESEARCH PAPER

Pensions and protestants: or why everything in retirement can't be optimized

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Abstract

A common narrative among insurance actuaries and business economists is that national or regional pension systems can be finetuned, optimized, and improved simply by tinkering with demographic and financial parameters; all within the context of the "right" mathematical model. Indeed, recent papers in the actuarial literature have offered technical fixes around savings rates, retirement ages, decumulation strategies as well as more refined mortality and interest rate models. But alas, not everything in the world of pensions and retirement can be optimized, in particular as it relates to the history, background culture, or religion of the underlying population.

This paper documents a statistically significant relationship between a region's pension plan "health status" and the fraction of the region's population identifying as Protestant Christians (PC). We begin the analysis at the national level using a well-known pension quality index and then obtain similar results for the actuarial funded status of U.S. state pension plans.

Overall, this work is within the sphere of recent literature that indicates historical religious beliefs, values, and culture matter for financial economic outcomes; a factor which obviously can't be optimized within a mathematical Hamilton–Jacobi–Bellman (HJB) equation. In other words, some things in retirement are truly beyond control.

Keywords: Pensions; history; religion; retirement; mathematical model

1. Introduction

Many insurance actuaries, pension experts, and economists conduct research, give scholarly presentations, and publish papers on how retirement systems can be finetuned, optimized, and improved. The IMF, the World Bank, the OECD, and a variety of global organizations continuously advocate for policy fixes to expand pension and retirement system coverage. Indeed, there is a large and growing academic and scholarly literature offering technical suggestions around savings rates, retirement ages, decumulation strategies *vis a vis* more robust mortality and interest rate models. The underlying ethos in all this work is that using the right model and/or proper controls, any retirement system can be "improved." Recent examples of this line of research include the following: Boado-Penas et al. (2023), who determined "optimal actions" to keep pension plans solvent by sharing bonus payments with policyholders; Romp & Beetsma (2020) who explored social "welfare maximizing values" for pension parameters and the implications of "intergenerational risk-sharing benefits"; Berstein & Morales (2021) who investigated the "most efficient formulas for both funding pensions and covering longevity risk" and emphasized the importance

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of longevity insurance or Advanced Life Delayed Annuities (ALDAs) within DC plans. Bravo et al. (2021) used an adaptive Bayesian model ensemble to explore "potential policy interventions to address the consequences of the life expectancy gap" in pension policy. Within the same spirit, He et al. (2020) minimized the quadratic deviation between the actual contribution rate and a habitual target in a DB plan set-up as a PAYGO system. Godínez-Olivares et al. (2016) is another example of this spirit. The key message of all these and related papers is that using the right mathematical model, the correct parameters, and the best data, applied mathematicians can improve, fix, and optimize any pension system, be it PAYGO, DB, DC, NDC, or something in between.

In contrast to that technocratic approach, our key policy message – as it relates to pensions and retirement – is that not everything can be optimized or improved because of the background culture and religion of the underlying population. More specifically, this paper documents a statistically significant relationship between a region's pension plan rankings or funded ratio and the fraction of the region's population identifying as Protestant Christians (PC).

We begin the analysis at the national level using a well-known pension quality index and then obtain similar results for the actuarial funded status of U.S. state pension plans. This article contributes to a growing literature that indicates religious beliefs, norms, traditions, practices, and customs matter for financial economic outcomes. Of course, state religion is a statistical "state" variable or factor which obviously can't be a dynamic control variable in a Hamilton–Jacobi–Bellman (HJB) equation.[1] Again, some things in retirement are truly beyond control.

2. Context: history matters

Going back to the origins, the German chancellor Otto van Bismarck – very much a Protestant – is credited with inaugurating the world's first national pension scheme in 1889 after he struggled unsuccessfully against German Catholics in the Kulturkampf of the 1870s. Whether it was his idea or Germany was the "first" is debatable, but his design for social pensions and insurance was soon copied by other countries – notably first Protestant and then eventually Catholic – around the world. Before Bismarck and continuing with the Protestant theme, the first funded pension annuity scheme was developed in Edinburgh by Presbyterian ministers Alexander Webster and Robert Wallace in 1744 during the Scottish Enlightenment. Up to that point, annuity benefits for widows and orphans were paid out of current revenues, a.k.a. systems were unfunded pay-as-you-go. Webster and Wallace were the first to propose managing a pension and annuity fund using sound actuarial principles, and they put the administration in motion through the Scottish (and very Protestant) Church. That fund was offered to all members of the Church of Scotland and professors from the Scottish Universities.[2] That same funding template crossed the Atlantic and was adopted by Presbyterians in Philadelphia in 1761, where it was instrumental in launching the first American life insurance company. Andrew Carnegie (a Scottish Presbyterian) was the philanthropic godfather of TIAA-CREF, launched in 1918. It was the first annuity fund for teachers in the US, well before Social Security was introduced in the 1930s.

The relevance here is that the statistical evidence provided in this paper – and the sections that follow – is consistent with a hypothesis that Protestant Christian organizations, as well as early (Protestant) mathematicians such as Edmond Halley, Abraham De Moivre, Colin McLaurin and

[1]For this, see the interesting experiment reported by Bryan et al. (2021) on the economic impact of a randomized Protestant Christian "theology education" program in the Philippines.

[2]See Harari (2014), Ferguson (2008), Dunlop (1992), and more recently Milevsky (2023, 2024), who documents that Adam Smith participated in this (Protestant managed) annuity scheme and discusses the Presbyterian church influence on the early schemes.

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Richard Price, and Robert Wallace, upon whose actuarial and statistical work these systems were based,[3] had a first mover's advantage in setting up properly funded pension annuities.[4]

3. Context: religion matters

Beyond the historical hypothesis, the financial economist cited as Kumar et al. (2011) identified distinctions within religious dogmas between Protestants and Catholics, as it pertained to their attitudes towards gambling, an extreme form of investing really. They found that Catholics were more likely to hold "lottery-type" stocks than Protestants. See also the work by Callen & Fang (2015, 2020) for similar ideas. It's therefore not unreasonable to conjecture that religious beliefs and attitudes might appear in other financial domains, and here we focus on retirement planning and pension provision.[5] Indeed, the intersection of retirement, pensions, religion, and Protestants goes back much further in history. Max Weber wrote *The Protestant Ethic and the Spirit of Capitalism* and noted that in Germany, "business leaders and owners of capital. . .tend to be predominantly Protestant [relative to Catholics]" and that "the reasons for these differences must be sought principally in their distinct internal characteristics and not in the external historical and political situation of different denominations." Weber's thesis was formulated in the late 1890s, first published (in German) in 1905, and then edited, reprinted with notes, and translated into English in the 1930s by Harvard Professor and noted Sociologist Talcott Parson; vigorously debated a century later.

Within this "spirit of capitalism" literature, Weber was followed by R.H. Tawney's 1926 *Religion and the Rise of Capitalism*. He argued that the Protestant Reformation's emphasis on individualism and the direct relationship between the individual and God paralleled the emergence of individualist competitive economic behavior. Tawney also argued that the relationship was reciprocal and that capitalism, in turn, influenced religion. Indeed, the Weber & Tawney thesis continues to unleash a stampede of scholarship that attempts to prove or disprove the underlying hypothesis that Protestantism – or any form of religion – led to capitalism, or vice versa. A recent addition to this debate is the (2021) book by B.M. Friedman, also called *Religion and the Rise of Capitalism*. The scholarly literature tends to pit sociologists (mostly pro-Weber) against economists (mostly anti-Weber) and is often barricaded or confined within academic silos and journals. Generally speaking, economists tend to dismiss the concept of a "Protestant work ethic," claiming that Max Weber did not really offer a testable hypothesis or that he was blatantly wrong, as evidenced by Venetian capitalism observed in the 8th century, centuries before the Reformation.

The Weber (1905), Tawney (1926), and more recently Friedman (2021) thesis is a jumping-off point for the question: *What about retirement?* Their thesis focused on Protestants and work, while this article focuses on Protestantism and retirement, or more precisely, retirement pensions. To be clear, the current paper does not suggest that there is a *Protestant Retirement ethic*. Instead, this paper is motivated by the idea that Protestantism matters, and that applied mathematicians – and pension policy experts – might want to exhibit greater caution in trying to "fix" a pension system, or "finetune" technical parameters. Again, we document a positive and statistically significant relationship between the overall quality of a region's pension system and the fraction of that region's population identifying as Protestant Christian. We begin the analysis by focusing on

[3]See Haberman & Sibbett (1995), volume VI, for many of the foundational articles in the field of actuarial science, and the prominent role by played by (Protestant) clergy in this development.

[4]See Mierzejewski (2016), Arza & Johnson (2006), and Clark & Craig (2018) for the history of American pensions. Within the literature on pension origins, Perotti & Schwienbacher (2009), Aggarwal & Goodell (2013), as well Rivera-Rozo et al. (2018) discuss pension origins but none link "quality" to the fraction of Protestant Christians.

[5]See, for example, Cocco & Gomes (2012), who examine the impact of longevity risk on retirement decisions.

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countries where the key variable (we call) quality is measured using a well-known national pension ranking system. Then, to further test our results, we present supporting evidence at the U.S. state level, where quality is measured via the actuarial funded ratio of public pension plans.

In both the national and U.S. state level, the quality (i.e., dependent) variable is linked to the fraction of the population that identify as Protestant Christian (i.e., independent variable.) Regardless of region, our results – on both the state and national level – are robust to various specifications. They are also confirmed by an instrumental variable procedure at the national level and an exogenous shock at the state level.

This paper and research can also be located within the (albeit small) world of actuarial history and the history of insurance. Articles on this topic have appeared sporadically over the years, for example, in the edited volume by Dunlop (1992), as well as wonderful collection of classical articles in Haberman & Sibbett (1995), or the history of pensions prior to the 19th century, documented by Lewin (2003), as well as Milevsky (2023) and the recent book by Milevsky (2024). The point here is that while the Protestant Reformation, which began with the reverend Martin Luther in the year 1517, obviously took place over five centuries ago, the impact of that event is not only studied by scholars to this day; it still reverberates in Protestant practices if not beliefs.

Why? Well, Marshall (1980) argued that "systematic routine accountability practices" evolving from Protestant Christian practices prodded "the development of managerial capitalism." Those accountability practices would have been prerequisites for well-managed retirement pension systems. To this exact point, Kohl (2022) has presented historical data on the development and use of insurance across countries during the 19th century. Kohl notes that "Calvinist and Reformed Protestant countries developed significantly higher life and property insurance penetration" during this period and more so than Catholic countries. He labeled this an "elective affinity" between the rise of private insurance and Protestantism and concluded that "Protestant territories were more likely to develop successful insurance companies relative to Catholic ones." The point here (once again) is that there are noticeable differences in finance, economic, and insurance behavior, for regions that identify Protestant Christian versus Catholic.

Independently of the Weber and Tawney axis, our work also complements general research that attempts to uncover the cultural, sociological, and background characteristics of savings behavior and underlying pension and retirement systems. We are obviously not arguing that religion is the only – or even the most important – factor in determining how national or state pension plans are designed and managed, or that pensions systems can't be "controlled and improved." Rather, we are claiming religion has some explanatory power, and therefore there is a built-in limit as to how much a pension system can be "improved." Back to our key message in this paper, the religion of a region truly is something outside the "control" of pension engineers and policymakers. To our knowledge, we are the first to examine how Protestantism could affect the overall quality of a pension system within a region. The question is how to measure quality. We offer two approaches, one based on countries and one for U.S. states.

3. Can country pension plans be ranked?

With the background and literature review behind us, and notwithstanding the difficulty and challenges in ranking the quality of a country's pension system – defined benefit (DB) or defined contribution (DC)[6] – with one summary measure, the renowned organizations Mercer Consulting and the CFA Institute have attempted that, and quite successfully based on its adoption. Their Mercer/CFA index value has rapidly become the most influential classification of a country's retirement pension system. The breakdown is as follows in terms of composition and methodology, which is compiled with the help of Monash Business School. First, 40% of the index's

[6]See Chalmers et al. (2014) for some of the important and nuanced differences in formulas used to determine pension benefits, as well as how participants react to incentives in these plans.

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weighting is allocated to measures of retirement system adequacy, 35% to standards of sustainability, and 25% to measures of integrity. The Mercer/CFA index value and its methodology go well beyond simple financial and economic measures such as coverage, funded ratios, and replacement rates, and that is why it was selected for the national quality measure. Note that for our U.S. state-level results, we focused on (narrower) funded ratios.

To emphasize the importance and reliability of our dependent "quality" variable on the national level, in November 2020, when the Netherlands and Denmark ranked at the top of the Mercer/CFA league tables, the *Financial Times* promptly reported the news.[7] Anecdotally, pension regulators and industry executives around the world routinely boast about their Mercer/CFA rankings or lament their shortcomings. In October 2021, when Iceland's national pension system was crowned the best, and India's the worst, it made national headlines in both countries.[8] Indisputably, this index has gravitas and was therefore selected to be a dependent variable in a regression analysis to be described later in this paper.

In his presidential address to the *American Finance Association*, Scharfstein (2018) offered evidence to support the claim that "policies that promote pension savings also promote the development of capital markets." He motivated his remarks with the examples of two distinct countries, Italy versus Denmark, which we now highlight as well.

Italy's private pension assets as a percent of GDP are less than 10%, while Denmark's is closer to 180%. Undeniably, argues Scharfstein (2018), there is a very wide variation in how different countries approach their own retirement pension financing. Echoing that theme, this paper argues that countries such as Denmark and Italy differ in another important dimension that might be relevant to retirement financing and pension arrangements, the fraction of the country that identify as Protestant Christian. Note that Denmark's pension system has consistently scored above an 80 in the CFA/Mercer index (up to 2022) and is within the "A" category over the entire period from 2019 to 2022. In contrast, Italy has never scored over 60 during the same period and is consistently awarded a "C" grade. Intriguingly, Denmark is approximately 85% Protestant Christian while Italy is less than 2% Protestant. Yes, this is all anecdotal, but suggests once again that there might be a religious angle worth investigating further. We describe the various data sources in much more (exhausting) detail in the next section, but here is a high-level summary.

The main (dependent) variable consists of a numerical score for 24 countries that were ranked in the Mercer/CFA index between 2019 and 2022, together with cultural variables and economic variables from the OECD and other reliable sources, where available. Indeed, a *Wall Street Journal* article commenting on the Pew Research Center survey for 2021 noted that 40% of Americans identify as Protestant, while the Mercer/CFA index value for the U.S. pension system is "C+", which is just slightly better than Italy.[9] Average values from the CFA/Mercer index within our sample range from the Netherlands' 82.93 (highest) score, down to Argentina's 41.70 (lowest) score. The fraction of a country's population that is Protestant ranges from Denmark's 92.77% (highest) down to Spain's 0.5% (lowest). We present a scatter plot in Exhibit 1.

The exhibit is obviously the result of a simple OLS relationship but serves as the motivation (slightly more than an anecdote) for this paper. Many countries cluster around the 0% to 10% Protestant Christian fraction level but have Mercer/CFA index scores that range from as low as 40 to as high as 70. Visually (and statistically), the fit is not perfect. Ergo, the results should be interpreted as suggestive and certainly not indicative of causality. Numerically, the average pension index value is 60.76 and the average Protestant Christian fraction is 29.46%.

We emphasize that this paper goes beyond the national level and conducts a similar analysis at the state level, at which the dependent variable becomes a public pension plan's funded ratio. The variable of interest is the host state's population share that is Protestant per the Pew Research

[7] "Pandemic will hit the pension prospects of billions, warns study", *Financial Times*, October 19, 2020. See link.
[8] *The Business Standard*, for October 20, 2021 (see link) and *The Times of India*, October 20, 2021 (see link).
[9] Source: Ian Lovett, 15 December 2021, "Decline in Religious Affiliation Persists", *Wall Street Journal*.

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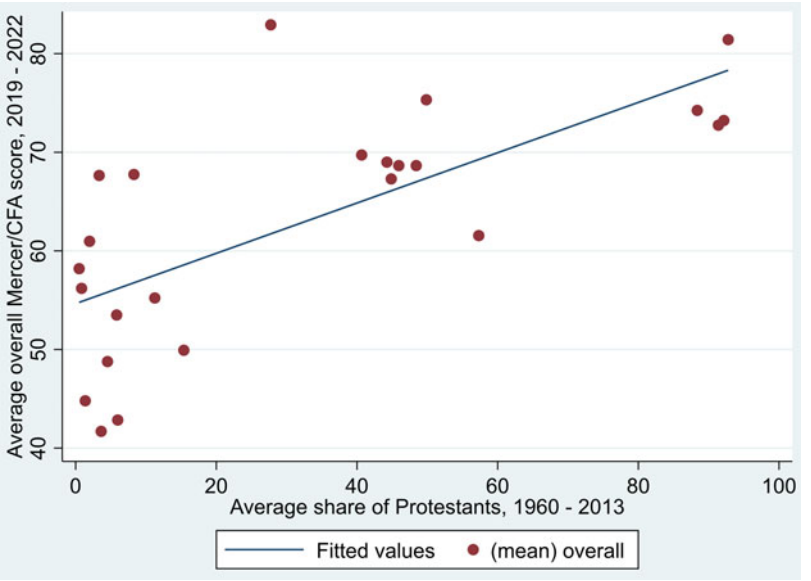


Figure 1. National pension quality versus protestant fraction.

Center. The relationship between funding rates and the prevalence of Protestantism is examined in a panel of public pension funds from 1997 to 2021. The analysis at the U.S. state level is an advantageous complement to the study of retirement systems at the national level because it allows for alternative explanations regarding culture to be ruled out. In addition, the state-level data affords more panels of greater depth (i.e., 25 years, 4,280 fund-year observations).

The volume of information at the state level allows for greater flexibility in specifications, thereby addressing various forms of endogeneity concerns while controlling for the same predictors as in the national level. Regardless of the unit of analysis employed, there is evidence that either the overall quality of a pension plan or the funded ratio improves as the regional share of Protestants increases. We take both sets of results, which are observed through disparate sources and time periods, to be supporting evidence that there is indeed a relationship between retirement savings (via pensions) and Protestantism. Furthermore, an instrumental variable procedure at the national level and an exogenous shock (the Financial Crisis of 2007) at the state level point toward a relationship that is causal in nature. At the national level, we show that the proposed effect prompts enhancements in regional regulatory and governance structures. At the state level, there are cross-sectional dependencies that show how specific Protestant tenets manifest themselves in how public pension plans are funded.

4. Description of the data and results

The relationship between a Region's Protestant Christian Fraction (RPCF)[10] and the "quality" of their pension fund is analyzed at both the country (region) level as well as the U.S. state (region)

[10]We use the term Protestant Christian Fraction to denote the percentage of a region (state or country) that identifies as Protestant Christian. Our RPCF variable, which ranges from [0,1] is obviously distinct from the *percentage* of global Protestants, currently estimated at between 800 million and one billion per the World Christian Database, that happen to reside in that region. That number would be (much) smaller, less accurate and is also why we are careful not to use the phrase Protestant share, or share of Protestants, both of which might lead to confusion.

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level, although the quality variable is measured differently depending on the region. At the country regional level, we utilize the above-noted Global Pension Index (GPI), compiled by Mercer and the CFA Institute, as a broad measure of a country's pension fund system quality. To recap, that scale is composed of three sub-categories: adequacy, sustainability, and integrity, which we also use for domain-specific measures of quality. Briefly, the adequacy scale considers a country's (a.k.a. region's) pension system's ability to disburse an appropriate level of retirement funds to its beneficiaries. The sustainability scale conveys the feasibility of a country's pension system in the long run. Integrity quantifies the extent to which the governance and regulatory environment of private pension funds can foster sound pension systems. Data for the GPI and its components is available between 2019 and 2022, with the 2023 update expected in late November. The average of GPI scores in the sample over the entire period, 60.76, corresponds to a grade of C + according to the 2022 report by Mercer and the CFA.[11] Per the report, such systems are characterized by "some good features. . . major risks and/or shortcomings." For more information on the GPI and other variables in the study, please see Appendix A.

The Region's Protestant Christian Fraction (from here on, RPCF) at the country level, was summarized into one (dependent) variable using the average of numbers between 1960 and 2013. The choice of the timespan for the country's RPCF measure is given by the availability of the data, which comes from the Cline Center for Advanced Social Research. More importantly, the choice to use a static measure of Protestantism at the country level follows several considerations.

First, the limited number of years for which there are GPI scores would restrict the impact of changes over time in the available observations, thereby making the tradeoff toward a static country-level value for the RPCF less onerous. Second, as we noted in the earlier, those who identify as Protestant are inclined towards saving for retirement more intently because their tenets caused them to consider the implications thereof sooner, in a historical sense, than people of other faiths or denominations. Under that premise, it is not practical to identify the lag in the RPCF that would actuate the relationship proposed in this study, particularly since the pertinent data is truncated. For a country, the RPCF is instrumented by an indicator for whether the country itself is characterized by early adherents of Protestantism, or if a country has a colonial link to such early adopters. As such, we compile from the New World Encyclopedia as well as the World Atlas a list of countries in the Mercer-CFA data that have been colonies of Germany, The United Kingdom, or any of the Scandinavian countries.[12]

The relationship between the RPCF and the state of a country's retirement system is observed while controlling for time-varying and static factors. One of the time-varying factors included is the logarithmic transformation of a country's GDP per capita, obtained from the World Bank, corresponding to the year in which GPI scores are observed. Another such control is the logarithmic age of a country's national pension system as of the year in which a GPI value is recorded, and the date of origin of a country's public pension fund has been hand collected.[13] Therefore, the time-varying control variables address a country's ability to fund and sustain its retirement funds through aggregate household wealth[14] as well as the amount of time that the corresponding public pension fund has had to mature in both its governance structures and investments. The static control variables are meant to account for alternative cultural explanations for a country's success, or lack thereof, in its pension system. To that end, we avail ourselves of several of Hofstede's cultural dimension scales, including individualism, uncertainty avoidance, and long-term orientation.[15] As such, the relationship between a country's GPI scores and average share of Protestants is tested through the following model.

[11] Note that with our logarithmic transforms: $e^{4.107} = 60.764$, which is the average score.

[12] For a list of countries in the study, along with their instrument designation, please see the end of Appendix A. Only those countries that have complete data in terms of the model specification described herein have been included in this study.

[13] Like every other data element, they are available from the authors upon request (after publication.)

[14] For related arguments, although in a non-religious context see Rey-Ares et al. (2015), Fisher & Anong (2012).

[15] This was the approach taken by Rivera-Rozo et al. (2018) and Tang & Koveos (2008).

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$$GPI_{k,t} = \beta_0 + \beta_1 RPCF_k + \beta_2 Ln\left(GDP\ per\ capita_{k,t}\right) + \beta_3 Ln\left(Plan\ age_{k,t}\right) + \beta_4 Individualis\ m_k + \beta_5 Uncertainty\ avoidanc\ e_k + \beta_6\ Long\ term\ orientation_k + \sum_t \beta_t \mathbb{I}_t + \varepsilon_{k,t} \quad \text{(EQ.1)}$$

In (EQ.1), the subscripts k and t correspond to country and year designations, respectively. The symbol denoted by $\mathbb{I}$, captures the fixed effects in the time dimension.

At the U.S. state (region) level, we study the relationship between the quality of retirement savings systems and the critical RPCF-dependent variable by focusing on the funded ratio of (public) state pension plans. The funded ratio is collected from the website Public Plans Data (PPD), in which the ratio is defined as the actuarial value of assets to actuarial value of liabilities. Now, researchers in financial economics – versus actuaries – are likely to be weary of both sides of the actuarial balance sheet. Nevertheless, the funded ratio is available from 1997 to 2021, and is the variable utilized. [16] Like the country (as region) level analysis, the RPCF in a U.S. state is treated as a static quantity proxied by figures obtained from Gallup for the year 2013.[17] Control variables used to assess how Protestantism influences the funded ratio of state pension plans include the logarithm of GDP per capita, sourced from the Bureau of Economic Analysis (BEA) as well as the logarithmic age of the public pension plan relative to the year corresponding to a funded ratio, obtained from the same source, the PPD.

Naturally, given the homogeneous nature of the U.S. population, econometric concerns over cultural heterogeneity are minimized when examining the variance of public pension plan-funded ratios. Yet we can't entirely dismiss cultural differences within the USA. At the same time, the RPCF measure varies by state, precluding the explicit use of state-level cultural factors. A sensible alternative is to consider cultural disparities and other measures that vary with geography, by noting a state's regional designation, which follows the BEA's approach. Another source of unobserved heterogeneity could be traced to the sponsor of the pension plan itself. Eaton & Nofsinger (2008) provided evidence that teachers' public pension plans are more likely to be underfunded. Therefore, we incorporate plan type (i.e., teacher, police, fire) in the analysis. Therefore, the relationship between a state's public pension's funded ratio and the share of the population that is Protestant is analyzed using the model below.

$$PFR_{j,t} = \beta_0 + \beta_1 RPCF_j + \beta_2 Ln\left(GDP\ per\ capita_{j,t}\right) + \beta_3 Ln\left(Plan\ age_{j,t}\right) + \sum_t \beta_t \mathbb{I}_t + \sum_p \beta_p \mathbb{I}_p + \varepsilon_{j,t} \quad \text{(EQ.2)}$$

In (EQ.2), the j and t subscripts denote state and year designations, respectively. The $\mathbb{I}_t$ and $\mathbb{I}_p$ signify the use of year and regional (i.e., state groupings) fixed effects.

Following the lead of other researchers who have examined the interaction between Protestantism and economic variables on a global scale, such as Churchill & Smyth (2022), two sources of cross-sectional variation are examined to understand the channels by which the RPCF could affect the funded ratios of public pension plans. Churchill & Smyth (2022) synthesized Weber's (1905) seminal contribution into various channels to explain the incidence of energy poverty in rural Australia. We are concerned with two of the tenets that call attention to their approach. Therefore, one possible explanation for the effect that is documented in this study is the emphasis placed upon "the value of work and occupational success" by Protestants. Such a notion would result in higher incomes and overall prosperity for Protestant households, which in turn would engender higher savings rates. The prosperity channel is operationalized through an indicator variable based on a state's personal income per capita, which is gathered from the BEA.

[16] For these concerns and the challenges that non-marking-to-market accounting poses, see Brown et al. (2011), as well as Novy-Marx & Rauh (2009, 2011). According to those widely reported studies, the "true" funded ratio of many state plans is likely much lower (and much worse) than the actuarial numbers that are the basis of this study. Still, we do not believe this introduces a systematic bias to our key dependent variable: quality.

[17] Figures corresponds to the latest publicly available data from Gallup at the time of writing.

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Table 1. Summary statistics for country-level analysis

Panel A: Descriptive statistics					
Variable	Mean	Standard deviation	5th percentile	95th percentile	Observations
GPI†	4.107	0.031	3.773	4.407	162
Adequacy†	4.12	0.059	3.686	4.412	162
Sustainability†	3.907	0.045	3.199	4.414	162
Integrity†	4.262	0.033	3.798	4.499	162
Protestant average*	29.456	31.662	0.715	92.150	116
GDP per capita†	10.099	0.066	8.268	11.301	126
Plan age†	4.464	0.015	3.902	4.837	140
Individualism*	50.205	24.983	14.000	90.000	156
Uncertainty avoidance*	61.872	23.875	23.000	94.000	156
Long-term orientation*	47.757	22.600	21.159	87.909	168

Panel B: Spearman rank correlations

		1	2	3	4	5	6	7	8	9
1	GPI									
2	Adequacy	0.676								
3	Sustainability	0.748	0.107							
4	Integrity	0.875	0.572	0.541						
5	Protestant average	0.710	0.277	0.694	0.640					
6	GDP per capita	0.717	0.544	0.499	0.637	0.604				
7	Plan age	0.285	0.504	−0.038	0.257	0.121	0.198			
8	Individualism	0.679	0.480	0.519	0.550	0.536	0.662	0.390		
9	Uncertainty avoidance	−0.414	−0.125	−0.491	−0.323	−0.554	−0.429	−0.097	−0.545	
10	Long-term orientation	0.076	0.252	−0.119	0.147	0.003	0.087	−0.078	−0.030	0.106

This table shows the descriptive statistics and correlations for a panel of 43 countries between 2019 and 2022. All variables have been winsorized at the extreme 1% of their distributions annually. In panel A, within group standard deviations are shown except those variables marked with an asterisk, for which the between groups standard deviations are given. An † indicates that a variable has been transformed by taking the logarithm of one plus its winsorized value.

Each year, states are divided into high and low personal income categories based on the median personal income per capita for the period. Another way in which Protestantism – be their beliefs or practices – might affect the funded ratio of public pension plans is by the importance placed on asceticism. The notion of asceticism is captured through a dichotomous variable based on states' personal consumption per capita as reported by the BEA. States are divided into high and low personal consumption categories based on the annual median.

The variables in the study have been 'winsorized' at the extreme 1% of their distributions, annually, and Table 1 presents the summary statistics and correlations for the variables in the country-level analysis. The GPI scale exhibits noticeable correlations with almost every other variable. In particular, the country's RPCF is positively associated with GPI – visually consistent with Fig. 1 displayed earlier – and could explain up to 50% of the variance in retirement system quality before accounting for controls and unobserved factors. Table 2 shows the summary statistics for the analysis of state public pension plans. As in the national (region) level, the funded ratio appears to have a positive, albeit small, correlation with the Protestant ratio.

Our empirical approach is one that exploits the panel structure of the data by implementing a fixed effects regression featuring year dummy variables. In each of the fixed effects regressions throughout this paper, we hypothesize a positive and significant coefficient for the RPCF variable.

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Table 2. Summary statistics for state-level analysis

Panel A: Descriptive statistics					
Variable	Mean	Standard deviation	5th percentile	95th percentile	Observations
Funded ratio	0.783	0.113	0.457	1.058	4,578
Protestant ratio*	51.146	13.155	29.000	73.000	4,474
GDP per capita†	10.807	0.184	10.424	11.228	4,663
Plan age†	4.132	0.109	3.526	4.585	4,537
Panel B: Spearman rank correlations					
		1	2	3	
1	Funded ratio				
2	Protestant ratio	0.084			
3	GDP per capita	−0.249	−0.356		
4	Plan age	−0.391	−0.233	0.312	

This table shows the descriptive statistics and correlations for a panel of 204 public pension funds in the United States between 1997 and 2021. All variables have been winsorized at the extreme 1% of their distributions annually. In panel A, within group standard deviations are shown except those variables marked with an asterisk, for which the between groups standard deviations are given. An † indicates that a variable has been transformed by taking the logarithm of one plus its winsorized value.

In the analysis of the GPI, standard errors are clustered at the country level to abate the impact of omitted variables upon our inferences. The fixed effects regression is repeated for each of the subscales that make up the GPI. One robustness test of the relationship between a country's RPCF and the GPI is a random effects estimation with robust standard errors. Another robustness test entails a two-stage least squares (2SLS) procedure in which the instrument for the average RPCF is an indicator as to whether a country has been an "early adopter" of Protestantism (which is somewhat of an anachronism) or has been colonized by such a country. In terms of the instrument's relevance, we posit that countries with an historical background associated with the inception and spread of Protestantism would have a higher RPCF in the latter part of the twentieth century. The relevance criterion is supported empirically by the first-stage regression outcomes displayed in the subsequent results section. In terms of the instrument fulfilling the exclusion criterion, we argue that the only way in which a country's Protestant origin can affect the quality of its pension system today is through the contemporaneous percentage or fraction of the population that adheres to these beliefs.

At the state (region) level, the fixed effects estimation of the funded ratio from the RPCF variable includes year fixed and regional fixed effects, as well as standard errors clustered at the plan type. The availability of data for the funded ratio affords the use of additional empirical measures. First, in a variation of the primary specification, we interact fixed effects in terms of year and region, resulting in a framework that dynamically controls for omitted factors that vary across time and location simultaneously. Second, we leverage the Financial Crisis of 2007/2008 as a source of exogenous variation. Several researchers in the field, such as Clark & Urwin (2010), Munnell et al. (2011), and Tower & Impavido (2009), noted that pension funds were adversely affected by the Global Financial Crisis. If indeed a higher RPCF is conducive to better quality pension plans, then there should be evidence of improved funding in the aftermath of the crisis for those public funds situated in states that have a higher fraction of percentage of Protestants in their population. We test such an assertion by introducing an interaction term (and corresponding main effects) for the RPCF and an indicator for observations after 2009.

The channels through which the relationship between a state's RPCF affects the funded ratio of public pension plans are tested through interaction terms added to the main effects specification. As such, the prosperity channel is tested by interacting an indicator for whether a state falls above

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Table 3. Relationship between a country's protestant fraction (PF) and global pension index (GPI) scores

	1	2	3	4
Protestant average	0.004*** (0.001)	0.002** (0.001)	0.003** (0.001)	0.002** (0.001)
GDP per capita		0.099*** (0.022)		0.087** (0.026)
Plan age		0.132 (0.091)		0.115 (0.096)
Individualism			0.004** (0.001)	0.001 (0.002)
Uncertainty avoidance			0.001 (0.002)	−0.001 (0.001)
Long-term orientation			0.001 (0.001)	0.000 (0.001)
Constant	4.015*** (0.041)	2.436*** (0.335)	3.722*** (0.142)	2.622*** (0.394)
Within R-squared	0.406	0.710	0.559	0.717
Observations	113	75	109	72
Countries	29	25	28	24

This table shows the results of regressions of the logarithm of GPI scores on the average PF in a country between 1960 and 2013. The main specification, shown in column 4, consists of a panel of 24 countries between 2019 and 2022. The regressions include year-fixed effects and standard errors clustered at the country level, which are shown in parentheses. †, *, **, and *** imply p-values less than 0.10, 0.05, 0.01, and 0.001, respectively.

the median personal income per capita in a year with the PC fraction. Similarly, the asceticism channel is explored through an interaction between the PC fraction and an indicator as to whether a state falls below the median level of personal consumption per capita for the year. For robustness, an additional regression is carried out in which all the interaction and main effects terms for the channels under consideration are included. Such a specification ought to allay concerns that the outcomes for each channel are not merely describing a single underlying source of heterogeneity. Consistent with this thesis, we expect to see positive and significant interaction coefficients.

The evidence for a relationship between the country's RPCF variable and GPI scores is found in Table 3, where Column 1 shows a specification with only the independent variable and year-fixed effects. Column 2 adds time-varying controls, GDP per capita, and the age of a country's public pension plan (both in logarithmic form), to the regression. Column 3 incorporates static controls related to a country's culture. Column 4 displays the full specification as described above.[18] Across all specifications, the average RPCF for the country is positive and significant at 95% confidence at least. The specification in Column 4, which serves as the key piece of evidence at the national level, implies that an increase of one standard deviation in the Protestant fraction increases the GPI by 6.54% ($\beta = 0.002$, $t = 3.08$, $p = 0.005$).[19] The effect size is by no means trivial. For example, an increase of 6.54% applied to the average GPI score would translate into an increase of 3.95 points the scale, which would be enough to bump the average national pension system from a C + to a B. The authors of the 2022 Mercer CFA report describe B systems as having "a sound structure, with

[18]Please note that incomplete specifications (Columns 1–3) relative to our methodological description can afford to have a larger sample size due to a lower propensity of missing data and ensuing listwise deletion. For example, the regression in column 1, which features only the Protestant fraction, encompasses 113 observations from 29 countries.

[19]Since the dependent variable is in logarithmic form, the effect size is found by exponentiating the coefficient times the change in the independent variable. Therefore, the effect size is given by $100 \times (e^{0.002 \times 31.662)} - 1) = 6.537$.

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Table 4. Robustness tests for the relationship between a country's protestant fraction (PF) and global pension index (GPI) scores

	1	2	3
Protestant average	0.002**		0.003*
	(0.001)		(0.001)
Protestant origin		49.201**	
		(13.599)	
GDP per capita	0.074**	21.609***	0.068*
	(0.022)	(5.159)	(0.029)
Plan age	0.125	−16.954	0.127
	(0.083)	(16.417)	(0.098)
Individualism	0.001	−0.750**	0.001
	(0.002)	(0.274)	(0.002)
Uncertainty avoidance	−0.001	−0.250	0.000
	(0.001)	(0.312)	(0.001)
Long-term orientation	0.000	−0.301†	0.000
	(0.001)	(0.154)	(0.001)
Constant	2.663***		
	(0.388)		
Overall R-squared	0.715		0.701

This table presents alternative specifications of the relationship between the logarithm of GPI values and a country's average PF. Column 1 pertains to a random effects estimation with robust standard errors, displayed in parentheses. Columns 2 and 3 show the first and second stages of an instrumental variable procedure in which a country's Protestant Fraction is instrumented by an indicator denoting whether a country is characterized as having a Protestant origin (see Appendix 2). Standard errors 2SLS estimation are clustered at the country level. The sample for all regressions is a panel of 24 countries (72 observations) between 2019 and 2022. †, *, **, and *** imply p-values less than 0.10, 0.05, 0.01, and 0.001, respectively.

many good features, but has some areas for improvement." Moreover, per the text of the report, a difference of at least three points between GPI scores is large enough to be noteworthy.[20]

The robustness tests for the existence of a relationship between the RPCF and the GPI at the country level are found in Table 4. Column 1 in Table 4 shows a random effects estimation with robust standard errors. The regression in Column 1 lacks fixed effects of any kind as well as clustered standard errors, allowing for such findings to be easier to replicate with alternative data. As with the average RPCF coefficient seen in Column 4 of Table 1, the coefficient of interest is positive and significant at 99% confidence ($\beta = 0.002$, $t = 3.28$, $p = 0.001$). A critical robustness test is the 2SLS procedure displayed in Columns 2 and 3 of Table 4, which incorporates year-fixed effects and standard errors clustered by country. Column 2 presents the first-stage regression, in which the endogenous covariate is regressed on the instrument (an indicator denoting the historical preponderance of Protestant Christians in a country) in the presence of other control variables. The PC origin coefficient is significant at 99% confidence, implying that it empirically satisfies the relevance criterion for a suitable instrument ($\beta = 49.200$, $t = 3.62$, $p = 0.001$). In the second stage of the 2SLS procedure (Column 3), the instrumented version of the RPCF is consistent with the coefficients obtained from the fixed as well as random effects estimators. That is, the 2SLS procedure also suggests that Protestantism is directly linked to the overall quality of a country's retirement system ($\beta = 0.003$, $t = 2.61$, $p = 0.016$). To the extent that the reader is satisfied that the instrument meets the exclusion criterion, the result of the 2SLS procedure implies a causal relationship between RPCF and GPI scores.

[20]In the words of the report's authors, "we should not be too definite that one system is better than another when the difference in the overall index value is less than two or three points."

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Table 5. Relationship between subscales of the global pension index (GPI) and the country's protestant fraction (PF)

	1	2	3
Dependent variable	Adequacy	Sustainability	Integrity
Protestant average	0.001 (0.001)	0.004 (0.002)	0.002† (0.001)
GDP per capita	0.108** (0.037)	0.061 (0.079)	0.084 (0.060)
Plan age	0.413*** (0.096)	−0.450* (0.206)	0.213 (0.175)
Individualism	0.001 (0.002)	0.001 (0.005)	0.002 (0.004)
Uncertainty avoidance	0.002 (0.001)	−0.004† (0.003)	0.000 (0.002)
Long-term orientation	0.001 (0.001)	−0.002 (0.003)	0.001 (0.002)
Constant	0.898* (0.322)	5.563*** (1.043)	2.153* (0.957)
Within R-squared	0.724	0.470	0.552

This table shows regressions of the logarithmic component measures of the GPI on a country's average PF. The regressions include year-fixed effects and standard errors clustered at the country level, shown in parentheses. The sample is a panel of 24 countries (72 observations) between 2019 and 2022. †, *, **, and *** imply p-values less than 0.10, 0.05, 0.01, and 0.001, respectively.

Table 5 presents fixed effects estimations that are like the one in Column 4 of Table 3, except that the dependent variable has been replaced with each of the subscales that make up the GPI. While the average RPCF coefficient is positive for each of the subscales, it is only significant at 90% confidence when predicting the integrity subscale ($\beta = 0.003$, $t = 1.85$, $p = 0.077$). The result reveals the nature of the relationship between Protestantism and the status of pension systems. The Integrity measure considers several features of a country's private pension system that address the extant regulatory environment, protections for beneficiaries, and operating costs that are ultimately borne by the system's members. That the connection to the GPI is the strongest through such a subscale supports our contention that Protestants, through their tenets, have been engaged longer than other groups with the structural questions that define a pension system. Thus, it seems that Protestantism affects the well-being of national pension systems by shaping the regulatory and governance framework that contextualizes it.

The findings of the analysis at the state level are shown in Table 6. Column 1 presents the main specification, in which the funded ratios of public pension plans are regressed on a state's RPCF in a fixed effects estimation that includes year and regional fixed effects in addition to standard errors clustered by plan type. In that regression, a state's RPCF is positively related with a public pension plan's funded ratio ($\beta = 0.002$, $t = 3.39$, $p = 0.077$). Therefore, an increase of one standard deviation in the fraction of the state's population that identifies as Protestant implies an increase of 2.63% in a public pension's (actuarial) funded ratio.[21] Note from Table 2 that the average (actuarial, reported) funded ratio for public pension plans in the study is 78.3%. The effect size reported herein would take the average public pension plan slightly above the 80% benchmark that is considered a baseline for sustainability (e.g., Barth et al., 2018).

Column 2 provides a more stringent test by interacting the year and regional fixed effects from the primary specification. While the specification in Column 1 controls for 25 dummies corresponding to each year represented in the panel and seven additional regional dummies, the

[21] Computed as: $0.002 \times 13.155 = 0.026$.

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Table 6. The relationship between public pension funded ratio (PFR) and U.S. state's protestant fraction (PF)

	1	2	3
Protestant fraction	0.002†	0.002†	0.001
	(0.001)	(0.001)	(0.001)
Protestant fraction × post-2009			0.002*
			(0.000)
GDP per capita	0.068	0.076	0.070
	(0.051)	(0.054)	(0.052)
Plan age	−0.173*	−0.177*	−0.175*
	(0.035)	(0.037)	(0.035)
Constant	0.674	0.601	0.661
	(0.699)	(0.749)	(0.718)
Within R-square	0.114	0.120	0.122
Year FE	Yes	No	Yes
Regional FE	Yes	No	Yes
Year-regional FE	No	Yes	No

This table displays regressions of U.S. states' public PFR on the percentage of a state's population that identified as Protestant in 2013. Standard errors clustered by the type of plan are shown in parentheses. The sample is from 1997 to 2021 and encompasses 204 public pension plans (4,280 observations). The sample represents every U.S. state except Louisiana and Mississippi. †, *, **, and *** imply *p*-values less than 0.10, 0.05, 0.01, and 0.001, respectively.

regression in Column 2 controls for 180 year-regional indicators. Yet the result is qualitatively the same as in Column 1 ($\beta = 0.002$, $t = 3.29$, $p = 0.081$).

Column 3 in Table 6 demonstrates the influence of Protestantism on the funded ratio of public pension funds through an exogenous shock. Given the deleterious impact that the Financial Crisis inflicted upon pension funds, we would expect those public plans located in states with a higher percentage of Protestants to recover sooner. Indeed, the interaction coefficient in Column 3 suggests that the funded ratio increases with a state's RPCF in the recovery period ($\beta = 0.002$, $t = 5.24$, $p = 0.035$). The evidence from the exogenous shock is important because it corroborates causality as in the country-level analysis through the instrumental variable approach.

Table 7 reports the findings related to the channels through which the state's RPCF affects the funded ratio of public pension plans. The interaction term in Column 1 supports the notion that the value placed by Protestants on productivity and wealth accumulation induces higher funded ratios ($\beta = 0.001$, $t = 4.75$, $p = 0.042$). That is, the funded ratio is higher for public plans in high personal income states as the local Protestant fraction increases. In Column 2, the role of asceticism as conduit for the effect at hand is shown, such that the interaction between the RPCF and the low personal expenditure indicator is positive and significant at 90% confidence ($\beta = 0.001$, $t = 3.37$, $p = 0.078$). Therefore, public pension plans in low personal consumption U.S. states and an increasing percentage of Protestants (relative to the rest of the US) have higher funded rates. Column 3 shows a specification in which the main effects and interactions are combined to test the prosperity and asceticism channels simultaneously. The signs and significance of the interaction coefficients are consistent with those in columns 1 and 2, suggesting that the cross-sectional effects validating the channels under consideration are distinct. So, there is evidence for the existence of both the prosperity and asceticism channels as sources of heterogeneity after controlling for the other.

As this paper was being revised and prepared for submission, the CFA Institute and MERCER released their updated annual rankings for 2023, and there were no large or major changes in the rankings. In particular, the Netherlands, Denmark, and Iceland remained in the top category with an A score, but a fourth country (Israel) was added to those with an 80 plus score. The lowest-ranked country (with a score of 43) was Argentina, who with Turkey, Thailand, India, and the Philippines all earned D grades. Needless to say, the religion in these countries didn't change

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Table 7. Heterogeneity of effects at the state level

	1	2	3
Protestant fraction × high personal income	0.001*		0.001*
	(0.000)		(0.000)
Protestant fraction × low personal expenditures		0.001†	0.001†
		(0.000)	(0.000)
Protestant fraction	0.002***	0.002	0.001
	(0.001)	(0.001)	(0.001)
High personal income	−0.097†		−0.080†
	(0.027)		(0.023)
Low personal expenditures		−0.010	−0.021
		(0.007)	(0.008)
GDP per capita	0.138	0.087	0.137
	(0.069)	(0.054)	(0.067)
Plan age	−0.177*	−0.177*	−0.179†
	(0.035)	(0.038)	(0.037)
Constant	−0.049	0.484	−0.024
	(0.881)	(0.739)	(0.865)
Within R-square	0.125	0.122	0.129

This table displays regressions of states' public PFR on the percentage of a state's population that identified as Protestant in 2013, i.e., the Protestant Fraction (PF). Standard errors clustered by the type of plan are shown in parentheses. The sample is from 1997 to 2021 and encompasses 204 public pension plans (4,280 observations). †, *, **, and *** imply *p*-values less than 0.10, 0.05, 0.01, and 0.001, respectively.

from 2022 to 2023, and the protestant ones remain (evidently) in the top. That said and as a test of robustness we added the 2023 numbers to our main (national) regression, albeit without the 2023 numbers for GDP per capita which were not yet available, the coefficient on the PC variable was still positive and statistically significant.

5. Summary and conclusion

This paper studies the empirical relationship between the fraction of a region (e.g., country, or U.S. state) that identifies as Protestant Christian, and the overall quality of their pension system. Within the context of a *country*, we find that an increase of one standard deviation in the fraction of the population that identifies as Protestant Christian bears a noticeable change in the grade for the quality of the pension system, as measured by the widely quoted Mercer/CFA index. Likewise, an increase of one standard deviation in the fraction of a *state's* population that identify as Protestant Christian is enough for the average funded ratio of the plan to attain the 80% benchmark for sustainability. To summarize and put it very bluntly, more Protestant Christians (*in* that region) are associated with better pension systems (*for* that region.) The next question a researcher might ask is: *why?*

While this paper is empirical in focus – motivated by the desire to remind pension specialist and technocrats that not everything in retirement systems can be optimized – it also offers some reasons for why this result might be observed. Namely, as part of the literature review and narrative context for the results, it theorizes that Protestant Christianity might affect pension system quality due to: (i) historical factors based on a first mover's advantage, or (ii) intrinsic cultural norms and beliefs about caring for the elderly, or by (iii) fostering a sound regulatory and governance framework. These overlapping yet disparate hypothesis – while not central to the main empirical message of the paper – are consistent with a growing literature regarding the noticeable differences in financial economic behavior and outcomes, simply as a function of religion.

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Data availability statement. The authors will make the entire dataset listed in Appendix A available to other researchers. Data will be posted on https://moshemilevsky.com/university-research/ maintained by corresponding author at York University.

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Appendix A: Data Description and Sources

Variable	Type	Description	Source
PANEL A: COUNTRY-LEVEL ANALYSIS			
Global pension index (GPI)	Dependent variable	A comprehensive measure of the quality of a country's pension fund system	Report from Mercer and the CFA Institute
Adequacy	Dependent variable	A subindex of the GPI addressing the average level of income and net replacement rate afforded by a country's pension fund system	Report from Mercer and the CFA Institute
Sustainability	Dependent variable	A subindex of the GPI conveying the long-term viability of a country's pension system by considering demographics, government debt, contribution rates, and economic, social, and governance factors	Report from Mercer and the CFA Institute
Integrity	Dependent variable	A subscale of the GPI examining how regulation and governance affect a country's pension system	Report from Mercer and the CFA Institute
Protestant average	Independent variable	The average fraction of a country's population estimated as adhering to Protestantism between 1960 and 2013	Cline Center for Advanced Social Research through The Global Economy
Protestant origin	Instrument	A country whose population is characterized as being early adherents to Protestantism, or that shares a colonial link with such a country	New World Encyclopedia - German Colonial EmpireWorld Atlas - Former British ColoniesNew World Encyclopedia - Swedish Colonial Empire
GDP per capita	Control variable	The logarithm of one plus a country's economic output divided by its population, in constant U.S. dollars	The World Bank
Plan age	Control variable	The logarithm of one plus the difference between the year of a GPI score and the year in which national pension plan was enacted by legislation	Hand-collected data available upon request
Individualism	Control variable	A measure of a culture's inclination towards individualism as opposed to collectivism	Geert Hofstede
Uncertainty avoidance	Control variable	A scale reflecting a society's apprehension towards uncertainty	Geert Hofstede
Long-term orientation	Control variable	A cultural dimension addressing a culture's preference towards preparing for the future	Geert Hofstede
PANEL B: STATE-LEVEL ANALYSIS			
Funded ratio	Dependent variable	The ratio of actuarial assets to actuarial liabilities using GASB standards	Public Plans Data

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Variable	Type	Description	Source
Protestant fraction	Independent variable	Percentage of the population estimated to be adherents of Protestantism as of 2013	Gallup
GDP per capita	Control variable	The logarithm of one plus the ratio of a state's GDP to its population. Note that population figures are tracked every 10 years. In non-census years the population is estimated using an annualized rate between censuses	U.S. Bureau of Economic Analysis and the U.S. Census Bureau
Plan age	Control variable	The logarithm of one plus the difference between the year in which a funded ratio is observed and the year in which a public pension plan was founded	Public Plans Data
Region	Fixed effect factor	A factor denoting a state's regional designation per the Bureau of Economic Analysis. Note that there are eight regions identified in the data	Bureau of Economic Analysis
Plan type	Standard error centering factor	A factor indicating the nature of a public retirement plan (i.e., public employee retirement system, teacher retirement system, or police, fire, safety retirement plan.)	Public Plans Data
High personal income	Source of cross-sectional variation	An indicator for whether a state's personal income per capita exceeds the national median for the year	Bureau of Economic Analysis
Low personal expenditures	Source of cross-sectional variation	An indicator for whether a state's personal consumption per capita is less than the national median for the year	Bureau of Economic Analysis

List of countries in the study of Global Pension Index scores and their averages between 2019 and 2022[a]

Country	Mean GPI (logged)	Standard deviation	Mean GPI (raw)	Standard deviation	Protestant origin
Argentina	3.741	0.036	41.700	1.641	No
Australia	4.329	0.008	75.325	1.087	Yes
Austria	3.989	0.017	53.500	1.241	No
Brazil	4.026	0.013	55.225	0.727	No
Canada	4.255	0.005	69.725	0.640	Yes
Chile	4.228	0.014	67.750	0.881	No
Denmark	4.410	0.011	81.425	0.8016	Yes
Finland	4.308	0.005	74.250	1.987	Yes
France	4.115	0.004	60.975	1.497	No
Germany	4.221	0.013	67.300	0.849	Yes

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Country	Mean GPI (logged)	Standard deviation	Mean GPI (raw)	Standard deviation	Protestant origin
India	3.837	0.031	44.800	1.186	Yes
Ireland	4.217	0.025	67.650	2.089	No
Korea (Republic of)	3.922	0.022	49.925	1.207	No
Mexico	3.856	0.049	48.775	5.240	No
Netherlands (the)	4.423	0.015	82.925	1.207	Yes
New Zealand	4.243	0.020	68.650	1.127	Yes
Norway	4.297	0.031	73.225	2.339	Yes
Philippines (the)	3.787	0.012	42.850	0.705	No
Poland	4.039	0.025	56.200	1.458	No
Spain	4.060	0.036	58.200	2.922	No
Sweden	4.292	0.012	72.750	1.420	Yes
Switzerland	4.232	0.026	69.000	2.657	No
United Kingdom	4.218	0.058	68.650	4.702	Yes
United States of America (the)	4.123	0.009	61.550	1.634	Yes

Note: The values averaged in the logarithmic transformation column come from the winsorized (1%) distribution of values.

Please note that we only include in the list those countries that are part of the analysis sample. One important country omitted from our results is Iceland, which generally has high scores in the Mercer/CFA scale. Yet Iceland's first appearance on the Mercer/CFA index is not until 2021. Furthermore, there are no individuality and uncertainty measures for said country. Iceland's exclusion from the analysis sample illustrates the data considerations that have affected sample selection.

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