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Financial Sector Growth and Annuitization: Evidence from the United States

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A B S T R A C T

We investigate a plausible explanation for the annuitization puzzle, whereby individuals do not annuitize their retirement savings even when rational choice theory suggests that annuitization is a sure way to address longevity risk. Our main purpose is to evaluate the role of a growing local financial sector in promoting annuitization. We assume that annuity benefit payments reflect the effort of the population to protect against longevity risk. Using a unique, U.S. state-level annual dataset for the years 1970-2013, we test whether the development of the financial sector is related to the aggregate decision of a state's population in the decision to annuitize. We find that there is a strong positive relationship between the share of compensation in a state's financial sector and the level of annuity payments in a state. The results are robust to four empirical specifications and support our suggestion that the development of a financial sector is a consideration in the state population's decision to annuitize.

Keywords: Annuities, Longevity Risk, Annuity Puzzle, Retirement, Financial Sector

Ⅰ. Introduction

As the population ages and life expectancy steadily increases, it is increasingly important for consumers to protect against longevity risk. For several decades, researchers have attempted to explain why annuity contracts are under-utilized, despite their ability to successfully aid in protecting against longevity risk.[1] Research on annuities recognizes a phenomenon commonly referred to as the "annuity puzzle", whereby individuals do not annuitize even when rational choice theory suggests that annuitization is a sure way to address the risk of outliving one's assets.[2] The annuity puzzle is typically addressed at the individual level where a variety of individual factors are shown to intervene in this decision (e.g., high fees, bequest motives). These behavioral factors, as well as institutional factors, influence both the savings patterns of individuals up to retirement and decisions regarding the allotment of wealth at the point of retirement.[3] Because annuitization plays a key role in the optimal retirement portfolio, a better understanding of these behaviors is especially important given the cost to individuals, and society as a whole, of suboptimal retirement planning.[4]

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[1] "It is a well-known fact that annuity contracts, other than in the form of group insurance through pension systems, are extremely rare. Why this should be so is a subject of considerable current interest. It is still ill-understood" (Modigliani, 1986, p.307).

[2] See Modigliani, 1986; Benartzi et al., 2011; Brown et al., 2008.

[3] See Benartzi and Thaler, 2007.

[4] See Milevsky, 2013. In this book, the author summarizes the research on life annuities, longevity insurance, and their role in optimizing retirement portfolios. It includes a comprehensive review of the scholarly literature on annuities.

In this paper, we investigate one plausible explanation for the annuitization phenomenon. We contend that greater financial awareness surrounding annuities is associated with both the likelihood to annuitize and the relative share of wealth allocated to retirement plans. Enhanced awareness of financial products, including the availability of partial annuitization, potentially allows the sales of annuities to be framed in such a way that consumers are less willing to reject them altogether as part of a complete retirement portfolio.[5] In addition, we conjecture that a better knowledge of financial products allows consumers to reduce the annuity protection gap, which we define as the difference between the "observed" and the "adequate" levels of annuitization. To explore and test these hypotheses, we use a unique, annual dataset covering all fifty U.S. states from 1970 to 2013. Using a proxy for financial awareness derived from a state's financial sector, the compensation of employees in the financial sector to total compensation in the state, we find evidence that enhanced growth in the financial sector in a state is associated with greater protection against longevity risk through an increase level of annuitization and the subsequent reduction in the annuity protection gap.

The paper proceeds as follows. In section 2, we cover a review of the existing literature on financial literacy, financial awareness, and optimal financial outcomes. In the third section, we introduce our theory about financial awareness and financial decision making and present our hypotheses with regards to financial literacy, financial awareness, financial decision-making, and the annuity protection gap. We describe the data used for our analysis in section 4. Our analytical methodology and results are presented in section five and a final section concludes.

Ⅱ. Background

A large literature has addressed the "annuity puzzle" using a variety of approaches. Theoretical papers, and several corresponding simulations, date back to the Yaari (1965) study of annuitization under the assumption of an uncertain lifetime. Related papers on the demand for annuities have evolved to consider a variety of assumptions, such as an individual's bequest motives (Lockwood, 2012), actuarially fair premiums (Mitchell et al., 1999; Davidoff et al., 2005), and individual health shocks (Ai et al., 2017; Sinclair and Smetters, 2004).[6]

Financial literacy refers to knowledge of basic economic and financial concepts and ideas. Hastings and Mitchell (2011) suggest that when individuals cannot carry out tasks such as calculating compound interest, they are more likely to make suboptimal financial decisions. For many years, US state and federal education policies have targeted financial literacy. The objective of such policies is to generate optimal financial outcomes through greater financial education. Better financial outcomes among a population, such as a population that has adequate retirement savings, are of interest as they reduce the burden on government safety net programs, such as Medicaid and Temporary Assistance for Needy Families. In the U.S., state governments started pushing for the mandatory inclusion of economics education in K-12 curriculum in the early 1950s (Brown et al. 2014). The avowed purpose of these policy initiatives was to increase financial education among the population that would lead to optimal financial decision-making by individuals throughout their life.[7] Despite this attention over time, there is a growing concern that many individuals are making poor financial decisions. A recent report by the Center for Financial

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[5] Brown et al. (2008) propose that limited annuity demand is an outcome of consumers using a narrow "investment frame" when evaluating annuity products, rather than consequences of the annuity for lifelong consumption. When comparing the investment frame to the consumption frame, the investment framework makes the life annuity unattractive to consumers by focusing the attention on intermediate results compared to the end result of how much can be spent over time. The way in which annuities are framed during the sales transaction may play an important role in the demand for such products.

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[6] There are also many empirical papers evaluating annuitization, which similarly take an individual perspective. For instance, Chalmers and Reuter (2012) find evidence that demand for life annuities is related to individual characteristics such as health, and to measures of investor sentiment such as equity returns. Brown et al. (2015) suggest consumers may find that the annuity product hard to value. In addition, many papers offer discussions on possibilities as to why demand for annuity products remain low (e.g., Ameriks (2002)).

[7] An underlying assumption of this relationship is that financial education generates financial literacy that allows consumers to accurately evaluate the need for various types of financial products. Over time, a number of states addressed the concern by requiring that high school students take a course in economics and/or personal finance.

Literacy notes that nearly a quarter of U.S. states have "virtually no requirements for teaching financial literacy at the high school level."[8]

The US experience is not unique. Many countries are facing the same challenge of increasing debt, aging populations, and concerns about the adequacy of retirement savings. Cross-country comparisons show varying levels of financial literacy (e.g., Nicolini, 2019) and a range of approaches to improve household financial decision making (Lusardi and Mitchell, 2011; Atkinson and Messy, 2011). Cordero et al. (2020) note that Australia has had a financial education mandate since 2011, but only a few other countries have developed frameworks to introduce financial education in school curricula. Yoshikuni (2018) highlights the role of the Central Council for Financial Services Information in Japan, which is collaborating with financial institutions and local governments to strengthen financial literacy in the country. Tennyson (2016) notes that some countries have considered strengthening the regulations that certify financial advisors.

Existing research generally concurs that financial and economic education can generate financial literacy. Financial literacy is related to financial awareness, which we define as the generalized exposure to, and understanding of, financial-related products available for purchase, such as annuities. While financial literacy is typically acquired through education and over time, financial awareness, in our context, is propagated by the financial institutions themselves and the people they employ. Bank branches and insurance company headquarters, and the employees of such institutions, bring financial awareness to a population within a given state. We propose that financial awareness does not necessarily require financial literacy. The consumer's decision to annuitize, for example, and the relative share of wealth to annuitize, does not require financial literacy, and is influenced by many factors. For instance, the transaction costs associated with obtaining the necessary information to make this decision may be too high and the knowledge of the suite of available products may not exist. Employees in the financial sector play a key role as financial intermediaries in mitigating transaction costs (Boyd and Prescott, 1986). As such, we equate growth in the financial sector to an increase in financial awareness of the population served by that sector.

Across the U.S., state financial sectors vary in size, even after controlling for population. Further, they have evolved at different rates over time. While it is not our goal to evaluate the drivers of financial sector growth, the development economics literature offers some explanations for this state-level variation. There is substantial literature in the development economics field that addresses the relationship between finance and growth (e.g., Demirgüç-Kunt and Levine, 2008). Most of this research compares the economic development across countries. These studies posit that three major factors affect economic development: endowments of natural resources, location, and accumulated human and physical capital. Research on state-level variation has explored several additional explanations and outcomes for inequalities in economic development, including variations in amenities (Roback, 1982) and the location decisions of firms and households (Wu and Gopinath, 2008). Historically, large financial sectors exist in metropolitan areas such as New York City and Chicago. Charlotte, North Carolina, more recently became a prominent financial market in the 1980s under the direction of financier Hugh McColl. Through aggressive acquisitions, McColl grew the relatively small North Carolina National Bank into Bank of America. Today, Charlotte ranks second only to New York City in headquarters of banking firms.[9] In North Carolina, as of 2016, finance was the second largest economic sector for employment compensation, indicating continued growth in the financial sector.[10]

In the spirit of this research, our analysis begins with an examination of the variation in the development of the financial sector across states in the U.S. and how it relates to annuity benefit payments, recognizing that many factors may explain why some state financial sectors have grown more than others. If growth of the financial sector leads to a more financially aware population, we propose that

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[8] 2015 National Report Card on State Efforts to Improve Financial Literacy in High Schools, Center for Financial Literacy. Further, the U.S. Council for Economic Education, which reviews the state of K-12 economic and financial education in the U.S. notes that there has been no improvement in economic education in recent years, and only slow growth in personal finance education. A study in 2012 involving students in 18 countries found that the mean performance of students in the U.S. was below the average in an assessment for proficiency in financial literacy (OECD (2014)).

[9] https://qz.com/1545417/charlotte-becomes-major-banking-hub-due-to-bbt-suntrust-merger/ (Last accessed March 11, 2021).

[10] North Carolina Annual Economic Report, 2016. https://files.nc.gov/nccommerce/documents/LEAD/Annual-Economic-Report/NC-2016-Economic-Report.pdf (Last accessed March 11, 2021).

states with more developed financial sectors - which we proxy with the share of compensation to employees in the financial sector - will have higher rates of annuitization. The second question we address is whether the rates of annuitization themselves are adequate, a question motivated by research that largely concludes that individuals are not annuitizing to the extent that they should. We create two measures of the annuity protection gap, derived from a needs-based approach, and explore the extent to which our measure of financial awareness can explain variations in this gap across states.

Our contribution to the literature on annuitization is twofold. First, we take an aggregate view of the relationship between financial awareness and annuitization. Most research has evaluated individual behaviors in attempts to relate financial education and/or financial literacy with financial outcomes, such as the decision to annuitize. This type of research may not be able to capture important spillover effects of attribute learning and priming over a person's life, e.g., from interactions with financial intermediaries.[11] Second, we depart from existing literature by analyzing state-level measures. We propose that variation in financial outcomes across states may be driven by state-level differences in the development of an environment that may encourage better financial awareness. Using a dataset that spans 64 years, we exploit state variation to explain the link between this awareness and one specific financial outcome - the decision to annuitize.

Ⅲ. Hypotheses

Unlike credit cards, mortgages, and other financial products, annuities work well for our evaluation of financial awareness because they are generally a 'one-shot' financial product. An individual will use multiple credit cards over their lifetime, learning from the usage of each one of these. The decision to annuitize or not, does not generally benefit from any prior personal experience. Also, since one considers purchasing an annuity to protect against one's own longevity risk, others' experiences provide limited insight.

In this study, we propose that state level annuity benefit payments reflect the effort of the population to protect against longevity risk. We test whether the development of the financial sector - our proxy for financial awareness - is related to the aggregate decision of a state population in the decision to annuitize. Based on previous research described above, we expect a positive correlation between financial awareness and the decision to annuitize. Therefore, we test:

H1: *Financial awareness is positively associated with state-level annuitization.*

As noted, we proxy for the protection against longevity risk with the decision to annuitize. We proxy for financial awareness using the share of the state compensation earned in the financial sector. This measure, and our other control variables are described further below. Since a higher level of annuitization, consequently, has implications for the growth of the financial sector, our analysis below accounts for potential endogeneity.

Next, we turn our focus to the annuity protection gap. In the previous analysis, we can document whether growth in the financial sector is related to annuitization at the state level, but the results do not inform us as to whether the financial sector encourages a level of annuitization that is "optimal." While we can identify states with higher or lower annuitization, on average, we cannot say whether the annuitization level in any particular state is any more adequate than in another state. Thus, in our second stage of analysis, we simulate values which we refer to as "adequate" annuitization and assess the role of the financial sector in minimizing this annuity protection gap.

We create two measures of adequate annuitization and, consequently, derive two measures of the annuity protection gap following a needs-based approach. Our "consumption needs" gap (*CNGap*) is defined as the difference between the contemporaneous state average aggregate consumption per capita and the annuitization per population over 65. We propose that this gap captures the adequacy of the annuity payments in meeting retirees' current consumption needs. While we believe this is the more reasonable measure for our focus, the analysis of how this gap is related to financial awareness, proxied as growth in the financial sector, is limited to the period 1997-2013 due to data availability.

Our alternative measure, the "income replacement" gap (*IRGap*), is the difference between the contemporaneous state

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[11] We do not delve into the specifics of priming effects or attribute-learning in this paper, as those theories are best left for lab-based experiments that can control for a multitude of confounding factors.

average aggregate income per capita and the annuitization per population over 65. This gap reflects the shortfall between the amounts received by those who are annuitizing (e.g., retirees) and current employees. Prior literature leads us to expect that the gap will be positive, but we further expect that this gap will be large because retirees are in a liquidation phase, and therefore do not need to "earn" as much as current employees who are still accumulating funds for retirement.

Since there are other ways for consumers to address longevity risk (e.g., relying on children for support in later years), we do not expect either gap to be close to zero. Nonetheless, we believe that if financial awareness, through growth in the state-level financial sector, is encouraging annuitization, these gap measures will be smaller in states with a higher proportion of compensation in the financial sector. Specifically, we test the following hypotheses:

> H2: *Financial awareness is negatively associated with the "income replacement" gap.*
> H3: *Financial awareness is negatively associated with the "consumption needs" gap.*

Again, we proxy for financial awareness using the share of state compensation earned in the financial sector, and we test the hypothesis for both measures of our annuity protection gap.[12]

IV. Data

The data for this analysis come from several sources. State-level annuity payments (*Ann*) made to annuitants and life insurance benefit payments (*Life*) made to beneficiaries were hand-collected from the American Council of Life Insurers (ACLI) Fact Books.[13] The annuity payments

information is used to construct our key dependent variable, annuity payments per population over 65, which is also adjusted for inflation.[14] We combine the annuity payments data with state-level data on state population, per capita income (*PCIncome*), and the unionization rate (*Union*), all of which is obtained from the U.S. Census Bureau.[15]

Our proxy for financial awareness, *FinSector*, was compiled using data from the US Bureau of Economic Analysis (BEA).[16] The proxy measure is calculated as the share of compensation in the financial sector - financial services, real estate, and insurance - to the total compensation in the state.[17] A larger share of state compensation in the financial services sector indicates not only that a larger share of the population may be employed in financial firms, but also an increased likelihood that the state population is aware of the existence of financial institutions and the products they offer, when compared to states with a smaller share. We propose that *FinSector* captures the essence of what we consider relevant for financial awareness. Similarly, we obtain the share of compensation in the manufacturing sector, *ManSector*, which we use an instrumental variable for *FinSector*. Additionally, to construct our gap measures, *IRGap* and *CNGap*, we obtain data from the BEA on state aggregate income and state aggregate consumption expenditures.[18]

We include, as controls, several variables that may help to explain state differences in annuity payments.

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[12] In the ensuing analysis, both gaps are expressed relative to the relevant adequacy measure (i.e., income or consumption) to show how the annuitization relates, in percentage terms, to the adequate level. Qualitative results do not change if the absolute version of the gaps are used.

[13] 1970-2013. The table within the Fact Book used to collect this information is in the chapter "In the States" where death payments and annuity payments are listed by state. With this information, we

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are unable to further distinguish the types of annuity products that are purchased at the state level. Due to a reporting change, there is no information available for the year 1969. There is no data available for Alaska and Hawaii from 1950-1960.

[14] Inflation adjusted using the Consumer Price Index in 2014 dollars. We use population over 65 instead of total population because a majority of those receiving annuity benefits will be retirees who have annuitized their retirement income. Additionally, we recognize that the timing of the decision to annuitize will vary across individuals: most will make this decision at retirement, when they convert retirement savings into a monthly benefit payment. Thus, total state annuity benefit payments capture decisions that were made in the past, though likely not more than about 10 years ago, on average, if one were to assume a constant flow of annuitants in the pool and given retirement age of 65 and current average life expectancy (male and female) of almost 85 years. We acknowledge that gradual retirement is becoming increasingly common (Delsen and Reday-Mulvey, 1996).

[15] This data is available by decade from 1950-2000. It is available yearly post-2000.

[16] For the period 1960-2013. Reporting changed for this data in 2001.

[17] Of all non-farm employees.

[18] These measures are also adjusted for inflation ($2014) and divided by state population to obtain per capita measures.

First, we expect that *PCIncome* will be positively associated with *Ann* as it reflects a higher amount of earnings over time with which to create an annuity for retirement and negatively related to both *IRGap* and *CNGap*. Second, we include *Union* as the rate of unionization of the state workforce. We use *Union* to proxy for the share of the state population that may be covered by employer-provided pension plans.[19] We expect that *Union* will be negatively related to *Ann* since the larger the share of unionization in a population, the more likely the state has a larger share of the population covered by an employer-sponsored pension. Thus, that share of the population would be less likely to purchase an annuity. For the same reason, we expect a positive relation between *Union* and both the *IRGap* and the *CNGap*. Table 1 provides the summary statistics of the main variables used in our analysis.[20]

Table 1. Summary Statistics, 1970-2013[21] (N=2244)

Variable	Mean	Std. Dev.	Min	Max
Ann	1647.88	1424.49	114.61	21569.05
FinSector	5.51	2.56	1.77	21.36
PCIncome	34.40	8.65	16.21	77.97
Union	16.00	7.93	2.30	42.40
ManSector	19.15	9.39	1.33	45.58
Life	1725.13	718.93	145.32	14414.34
IRGap	95.55	2.91	51.43	99.38
CNGap (N=863)	92.96	4.45	44.83	99.21

V. Methodology and Results

Due to the potential endogeneity problem, we use instrumental variable methods to unveil a plausible channel through which the annuity puzzle can be explained. The idea is to identify and isolate an exogenous source of variation in the financial sector that can explain the annuity

payments per capita. Specifically, our main structural specification is shown in equation (1).

$$Ann_{i,t} = \beta_0 + \beta_1 FinSector_{i,t} + \beta_2 X_{i,t} + \mu_i + \delta_t + \epsilon_{i,t}, \quad (1)$$

where $Ann_{i,t}$ is the real annuity payment per population over 65 in state i and year t, and $FinSector_{i,t}$ is the share of financial compensation to total compensation of employees in state i and year t, our proxy for financial awareness. We are specifically interested in the estimated coefficient on $FinSector_{i,t}$, β_1. The terms μ_i are time invariant state-specific effects that control for unobserved heterogeneity. The dummies δ_t control for time-specific effects. The vector $X_{i,t}$ contains other control variables, including *PCIncome* and *Union*. Finally, the term $\epsilon_{i,t}$ is an idiosyncratic random error term that captures the remaining, unexplained, variation in $Ann_{i,t}$.[22]

The crucial assumption to consistently estimate β_1 is that $Cov(FinSector, \epsilon \mid X, \mu, \delta) = 0$. This assumption might be violated, for example, if equation (1) omits a variable correlated with the financial compensation share. In that case, the omitted variable would be captured by ϵ and the assumption would be violated, with the practical consequence that the estimated coefficient of *FinSector* would be biased because part of the effect of the omitted variable would be incorrectly attributed to *FinSector*. The assumption might also be violated if there are measurement errors in the variables or if there is reverse causality.

To reduce the potential biases that arise due to these problems, we estimate the following first stage, reduced form equation:

$$FinSector_{i,t} = \gamma_0 + \gamma_1 ManSector_{i,t} + \gamma_2 Life_{i,t} + \gamma_3 X_{i,t} + \theta_i + \psi_t + \nu_{i,t} \quad (2)$$

where $ManSector_{i,t}$ is the manufacturing compensation to total compensation share of employees in state i and

year t, and $Life_{i,t}$ is the real per capita life insurance payments made to beneficiaries in state i and year t. The vector $X_{i,t}$ is the same vector of control variables included in (1), and θ_i and ψ_t account for state fixed and time effects in the financial compensation sector, respectively.

The crucial identifying assumptions are now $Cov(Z_{it}, \epsilon | X, \mu, \delta) = 0$ (validity condition) and $Cov(Z_{it}, FinSector_{i,t} | X, \mu, \delta) \neq 0$ (strength condition), where the vector $Z_{it} = (ManSector_{i,t}, Life_{i,t})$ contains the instrumental variables excluded from equation (1). These assumptions are easier to justify both theoretically and empirically. In theory, consider both conditions for both instruments.[23] It is plausible that the manufacturing share and the financial share are correlated, and that the life insurance payments and the financial compensation share are correlated. In fact, in the case of *FinSector* and *ManSector*, since both are shares of the total compensation to employees, it is expected that their correlation will be negative. This satisfies the strength condition. At the same time, it is unlikely that *FinSector* or *Life* will be correlated with *Ann* beyond the effect they might have, indirectly, through *FinSector*.[24]

In Table 2 we show the estimated equation (1) using several econometric techniques. Overall, the estimated coefficient associated with the financial compensation share is positive and statistically significant at the 1% level in all specifications. The coefficient estimate increases from 199.01 using the pooled OLS estimator (column 1) to 418.08 using the Fixed Effects model with time dummies (column 3). This is consistent with attenuation bias in the pooled OLS estimator due to the omission of the unobserved heterogeneity and other potential biases endogeneity biases including measurement error. The coefficient of 364.37 in column 4 implies that, all else equal, a 1% increase in the financial compensation share is associated with an average increase of 364.37 real dollars per population over 65 in annuity payments per year. An increase of 2.82% (which is one standard deviation) in the financial compensation share, is therefore associated with an increase of 1027.52 real dollars per population over 65 in annuity payments per year, on average.

Table 3 runs parallel to Table 2 except that the dependent variables are *CNGap* (Panel A) and *IRGap*

Table 2. Regression results. Dependent Variable is *Ann*

	(1)	(2)	(3)	(4)
	Pooled OLS	FE	FE	FE/IV
FinSector	199.01***	404.30***	418.08***	364.37***
	[38.73]	[118.89]	[107.38]	[44.13]
PC Income	59.15***	-3.44	9.57	7.64
	[6.36]	[27.63]	[14.31]	[9.04]
Union	7.82***	-2.64	-35.04**	0.46
	[2.70]	[12.77]	[15.84]	[7.46]
_cons	-1888.24***	-899.20	-423.99	-906.39***
	[134.28]	[805.37]	[741.57]	[349.18]
Time Dummy	YES	NO	YES	YES
Observations	2240	2240	2240	2238
IVs				ManSector, Life

* p<0.10, ** p<0.05, *** p<.01. Robust standard errors in brackets.

[23]

[24] In practice, the strength condition can be tested with the usual F-test of excluded instruments using the Stock-Yogo weak identification statistic. The validity condition can be tested, conditionally, using over identifying restriction tests, semi-reduced form regressions and falsification tests. The main advantage of having two instrumental variables is that we can perform over identification tests to evaluate empirically the conditional validity of the instruments at hand. We do not find evidence suggesting invalidity of our instruments.

(Panel B). The estimated equation is similar to equation (1) except that *Ann* is replaced by either *CNGap* or *IRGap*. In both panels, *FinSector* and *PC Income* signs are as expected. *FinSector* enters negative and significant, and *PC Income* enters positive and significant. In column 4, which corrects for endogeneity including attenuation biases due to measurement error, *Union* enters insignificant, and *PC Income* and *FinSector* enter statistically significant. A one standard deviation increase in *FinSector* is associated with an average 7.5 percent decrease in *CNGap* and an average 2 percent decrease in *IRGap*. These effects are large in magnitude suggesting that *FinSector* has not only a statistically significant impact on reducing the protection annuity gap, but the effect is large and economically meaningful.

VI. Conclusion

Using a unique approach with U.S. state-level data extending over 50 years, we provide evidence that growth in the state-level financial sector is associated with higher levels of annuitization among an aggregate state population. We document a significant relationship that underscores the potential role of a state's financial sector on financial outcomes within that state population. We show that variations across states and over time in the share of the population working in financial services is significantly related to variations across states and across time in annuity payments.[25] These results confirm our assumption that the financial sector promotes a more financially aware

Table 3. Regression results
• *Panel A* - Dependent variable is *CNGap*

	(1)	(2)	(3)	(4)
	Pooled OLS	FE	FE	FE/IV
FinSector	-0.65***	-0.48*	-0.09	-2.93***
	[0.13]	[0.24]	[0.28]	[0.96]
PCIncome	-0.04*	0.15**	0.30***	0.16**
	[0.02]	[0.05]	[0.05]	[0.07]
Union	-0.00	0.06	-0.16*	0.17
	[0.02]	[0.10]	[0.09]	[0.11]
_cons	101.01***	88.98***	83.12***	106.04***
	[1.00]	[2.25]	[2.71]	[4.56]
Time Dummy	YES	NO	YES	YES
Observations	863	863	863	861

• *Panel B* - Dependent variable is *IRGap*

	(1)	(2)	(3)	(4)
	Pooled OLS	FE	FE	FE/IV
FinSector	-0.40***	-0.80***	-0.86***	-0.78***
	[0.08]	[0.28]	[0.24]	[0.10]
PCIncome	-0.03**	0.13**	0.07**	0.11***
	[0.01]	[0.06]	[0.03]	[0.02]
Union	-0.04***	0.01	0.16***	-0.01
	[0.01]	[0.03]	[0.03]	[0.02]
_cons	101.32***	95.11***	95.24***	96.19***
	[0.27]	[2.11]	[1.49]	[0.76]
Time Dummy	YES	NO	YES	YES
Observations	2240	2240	2240	2238

* $p<0.10$, ** $p<0.05$, *** $p<.01$. Robust standard errors in brackets.

[25] Results using annuity benefit payments per capita are qualitatively the same.

population which is more capable of assessing complex financial products. By taking an aggregate view, we capture the spillover effects associated with increased financial awareness that will not necessarily be revealed in individual-level studies.

Our results have important implications for efforts to promote adequate protection against longevity risk. States can promote the development of a larger financial sector - e.g., by providing incentives for financial services firms to locate in the state. This may increase financial awareness in the population and thus lead to better financial decisions. A population that is protected against longevity risk may consequently reduce the need for public support to the retiree population.

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