International Journal of Innovative Research and Scientific Studies, 8(6) 2025, pages: 1907-1919

IJIRSS
International Journal of Innovative Research & Scientific Studies

ISSN: 2617-6548

URL: www.ijirss.com

Death benefits versus annuitization: What motivates individuals to choose?

Ahmed S. Abdelzaher[1], Hany Khalifa[2], Elamira S. Othman[3], Mona Halim[4], Eslam Abdelhakim Seyam[5*]

[1,3,4]*Financial Sciences Department, Applied College, Imam Abdulrahman Bin Faisal University, Saudi Arabia.*
[2]*Misr Life insurance, Egypt.*
[5]*Department of Insurance and Risk Management, College of Business, Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia.*

Corresponding author: Eslam Abdelhakim Seyam (*Email: isiam@imamu.edu.sa*)

Abstract

This study analyzes determinants influencing annuities vs. endowment insurance choise in the Egyptian insurance market with particular consideration for COVID-19 pandemic effects. Through an all-encompassing list of 32,774 cases sampled randomly between the years 2008-2024, regression analysis analyzed the effect of the variables gender, residence province, payment regularity, age insured, and term on demand for both policies. Our results reveal significantly larger demand for annuities over the demand for the policies for the duration of the study, with annuities registering consistently larger mean sum insured values registering preference for long-term financial horizons with income security. COVID-19 pandemic registered overwhelming rise in annuities demand (mean difference = -117,342) compared with modest increments in endowment insurance demand (mean difference = -12,352.5). Gender effect varied with type of policies with women registering lower annuity pay but larger endowment pay relative to men. Provincial variability and regularity in pay significantly influenced demand for the policies. Our findings substantiate that insurance policy choices are largely dictated by demographic, geographic, and financial variables with COVID-19 acting as an accelerator for risk awareness for income insecurity. Insurers need to develop focused marketing strategies directly referent on the dimensions of the demographics with the results suggesting potential for growth for annuity policies for emerging marketplaces where risk for income insecurity is highest.

Keywords: Annuities, COVID-19 pandemic, Endowment insurance, Individuals' decision, Insurance demand.

DOI: 10.53894/ijirss.v8i6.10044
Funding: This study received no specific financial support.
History: Received: 28 July 2025 / **Revised:** 29 August 2025 / **Accepted:** 1 September 2025 / **Published:** 19 September 2025

Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Publisher: Innovative Research Publishing

1. Introduction

Individuals can choose among available financial products during retirement period when it comes to managing retirement income and bequest motive. For instance, life insurance, especially term insurance or endowment, riskless bonds and annuities. In other words, the household should decide the required percentage of liquid wealth to be directed to consumption, annuities premiums, endowment insurance premiums or investment.

The following table shows the development of endowment payments versus annuities payment in Egyptian insurance market across 10 years.

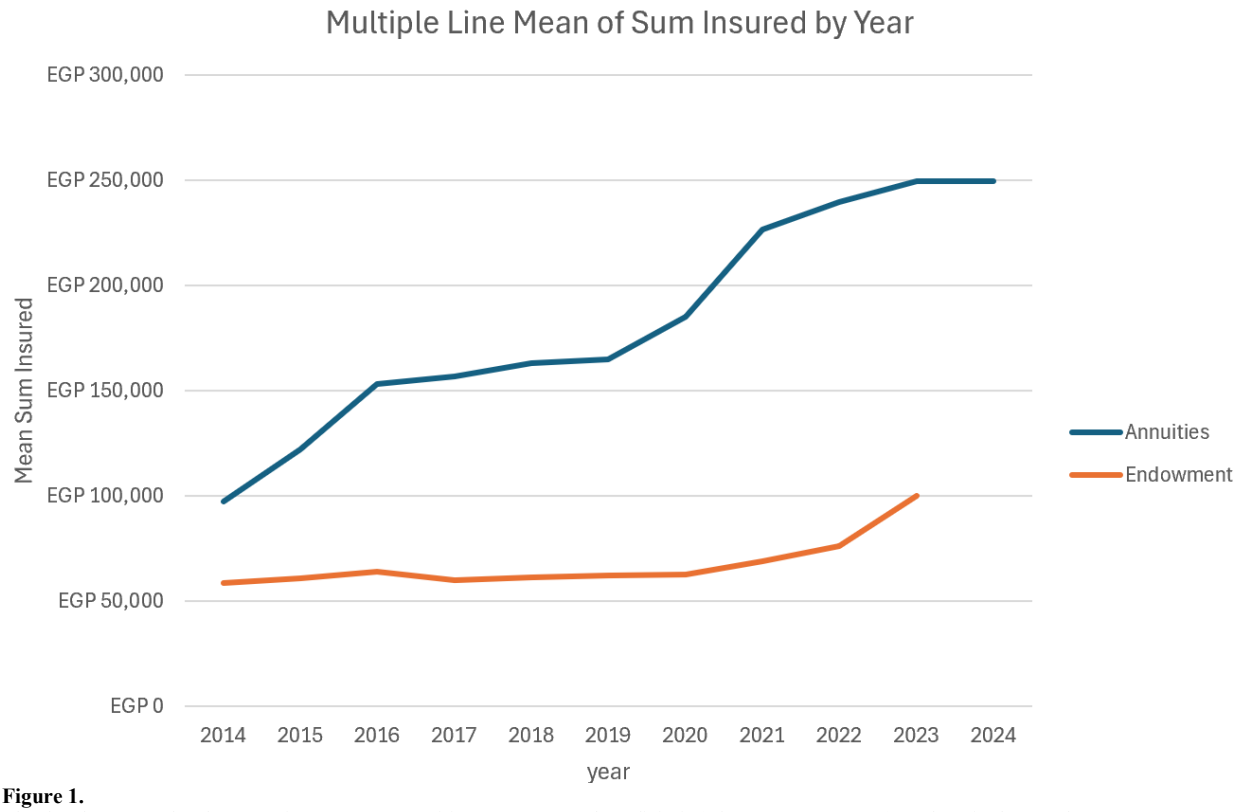

Figure 1.
The development of endowment insurance vs annuities (payments to beneficiaries) from 2014 to 2024 (Numbers in thousands)

Based on the previous table's details, annuities illustrate a consistent and significant increasing pattern. The mean sum insured increased sharply between 2019 and 2023, likely that could be due to higher demand during the Covid 19 pandemic. This sharp increase could be a result of individuals seeking financial security. The growth stabilizes after 2023 maintaining a high mean sum insured of approximately EGP 250000. On the other hand, endowments show a relatively stable value from 2014 to 2020. A moderate increase emerges started in 2021 and accelerated notably between 2022 and 2024, which reach a mean sum insured of about EGP 100000. Over the entire period annuities have higher sum of insured than endowments and the gap between them increased over time which could indicate a stronger demand for annuities compared to endowments.

The major concern is to examine what motivate individuals in the Egyptian insurance market to choose between purchasing life insurance especially endowment insurance so they can guarantee systematic payments to their beneficiaries or to annuitize. We targeted the motivation of the individuals to choose between endowment insurance and annuities through analyzing the effect of five crucial explanatory that may direct individuals to choose the relevant alternative. To our knowledge the majority of the extant literature examined life insurance demand separately and the factors encourage individuals to annuitize.

Furthermore, we tested whether the individuals' decision to purchase endowment or to annuitize changed based on the same explanatory variables during the Covid 19 pandemic. As the pandemic caused economic disruption, health uncertainties, directed individuals to reassess their financial needs and hence it made significant changes regarding individuals' decision to buy insurance products

2. Literature Review

However, most of the extant literature investigated life insurance demand separately or the key determinants that encourage individuals to buy annuities. For instance, Lewis [1] investigated dependents and life insurance demand, the demographic structure of households is the key element for the breadwinner to decide buying life insurance. Browne and Kim [2] focused on providing international analysis for life insurance demand as the average growth of life insurance sector was higher than 25% as an average annual rate from 1950 to the mid of 1980. Zietz [3] examined the economic and demographic factors that may motivate individuals to buy life insurance and provided a better understanding of what

convinces individuals to decide buying life insurance. For instance, demographic factors, the availability of innovative products that insurers provide especially during the last decade, aging of the population, and nontraditional households were the key elements that direct individuals to buy life insurance.

Dushi and Webb [4] stated that individuals who save money for retirement rarely choose to annuitize. The authors conclude, the thought that people don't annuitize because they are not interested in annuitization is false. Also, the small percentage of individuals annuities shouldn't be considered as an indicator of underlying preference, but it should be constitutional elements or factors about framing and availability of annuity options. Also, individuals choose to annuitize when they accumulate enough amount for retirement age and the option to annuitize is present at an appropriate age. Finally, the authors mentioned that there is an old saying "annuity is not bought but must be sold" and the private insurance market is reluctant to invest more in annuities as it is not easy to predict life expectancy over the next 30 years. Also, there is no alternative for annuities sellers to hedge longevity risk. So, the government should interfere to facilitate longevity bonds sales, so yield adjusts life expectancy changes. Also, Economists should devote a high level of attention to the decumulation phase so annuitization puzzle can be solved. Conversely, life insurance demand at the OECD countries increased significantly because of increasing the dependents numbers, distinguished education level, Social Security expenditures and declining life expectancy which inspire individuals to decide to have life insurance coverage Li, et al. [5].

Hu and Scott [6] concluded that longevity annuities outweigh immediate annuities because of the behavioral advantage, and it maximizes the insurer's benefits. Julié, et al. [7] investigated the role of gender framing and defaults regard deciding to annuitize. They eliminate unjust annuity pricing and anti-selection. The study found that women prefer to annuitize more than men. In other words, they provided a behavioral explanation based on framing approach and risk aversion. The authors followed Brown [8] who focused on annuity puzzle and concluded that future studies should pay more attention to behavioral explanation when it comes to making annuitization decisions.

The retirement scheme in the US has been reshaped due to the aging of the US population and the demise of the defined benefits. As a result, high pressure on the government and the citizens regard retirement alternatives. This scenario encouraged people to think about how they can convert the accumulated assets of funds into income after retirement. The recommendations were considering an immediate annuity as a mechanism to maximize income after retirement through insurers who promised to pay monthly or yearly income provided that the insured is obliged to a one-time premium payment. Also, longevity annuities were present as a new alternative. It's like immediate annuity except there are no initial payouts as the premiums paid in advance and the benefits are due in the future. The author concluded that immediate annuities require full annuitization of the retiree full portfolio. However, individuals who are willing to annuitize only a portion of their funds or assets can choose longevity annuities. Hence, longevity annuitization is considered the best alternative compared to immediate annuities for everyone [9]. Also, Horneff, et al. [10] and Schulze and Post [11] mentioned that the amount to be invested in bonds, stocks or life annuities can be determined and postponing the purchase of annuities is not the optimal solution, especially in the gradual annuities cases as investors can achieve a favorable mix of bonds and stocks as liquid assets and liquid life annuities

Benartzi, et al. [12] focused on annuitization puzzle and stated that around 10% of men who will retire at age 65 probably will live 27 years after retirement and for women life expectancy after retirement is 30 years. However, the theoretical prediction that many individuals will choose to annuitize a percentage of their wealth, the reality that only a tiny share of individuals will choose to annuitize, a part of the reason is that 21% of defined contributions plans provides annuities as an option. Also, most individuals have not accumulated enough money to annuitize. As a result, there is no annuitization puzzle for this segment of society. Additionally, Lockwood [13] investigated the bequest motives and annuities puzzle, the paper focused on answering two major questions. First, to what extent, the bequest motive eliminates purchases of available annuities in the market with fair price? Second, the number of individuals who will annuitize if each person has one of several bequest motives estimated in the saving literature? Through using a numerical life cycle model, the author concluded that moderate bequest motive is much weaker compared to what is essential to terminate purchases of actuarily fair annuities and in a simulation to decide to annuities or not. In the United States by single retirees, there are five out of six estimates of bequest motives significantly reduce the demand for annuities. Individuals with reasonable bequest motives can buy annuities as a portion of their wealth and hence the bequest motive can't provide an explanation why most people don't annuitize their wealth and bequest motives play considerable function in limiting annuitization. Benartzi, et al. [12] extended the previous studies by investigating why annuities puzzle remain puzzle. The authors focused on four factors regarding challenging the assertion that complete annuitization is the best choice. First, if annuities menus are incomplete? For instance, the major available type of annuity is nominal annuity. However, there are other types of annuities that provide hedge for different kinds of risks. For example, inflation risks that provide exposure to the equity market are unavailable. So nominal annuity doesn't have the option to hedge against inflation and on top of that, nominal income decreases with age. Second, this kind of annuities is irreversible. As a result, it cannot be sold or borrowed, especially if there is a liquidity shortage. Third and fourth, the authors analyzed the bequest motives and the default risk of annuity provider to examine the consequence of the previous two factors on annuity demand. Using stochastic life cycle model, the authors stated that an individual devotes a percentage of wealth for annuitization at age 65 so he can decide the amount to be saved and to be consumed. Also, an individual can assign liquid wealth between riskless bonds and stocks. The model contained all major risks that a retiree may face. For instance, longevity risk, inflation risk, capital market risk and background risks. The authors found that full annuitization is considered an optimal choice regardless of the availability of nominal annuities and individuals assign almost the entire wealth to annuities and ensure against chocks through annuity's income. As a result, utility level but not the demand for annuities decreases due to incomplete annuities market. Finally, the authors conclude that it is the best choice for individuals to annuitize only a percentage of their wealth

in case the absence of variable annuities and borrowing limitations are forced. Conversely, full annuitization is the best regardless of the availability of real or nominal annuities provided that the individual can save from annuity income. Nominal annuities allow individuals to save out of the annuity income so they can hedge against inflation and background risks and have sufficient equity exposure. Contrarily, Beshears, et al. [14] ignored how much annuitization puzzle remains, instead they focused on elasticity of annuitization demand and the design of annuities products or in other words, what motives are crucial for annuitization choices? Two large surveys were conducted for aged 50 to 75. The major questions of the survey investigated the most crucial factors that increase the incentive for annuitization, providing partial annuitization option comparing to all or nothing alternative, the preference for annuities consumers according to intertemporal slope annuity payout and annuities products that gives bonus. They found that, annuities providers can increase the demand for annuitization through designing products that provide flexibility for beneficiaries. Examples of annuities products that provide flexibility are bonus annuity, annuity with multiple annual bonuses and limited penalty free early withdrawal. Most consumers prefer partial annuitization choice over all or nothing as partial annuitization availability increases the average percentage of wealth which ends up as an annuity. One of the most crucial factors that increase the appeal of consumers toward annuitization is framing changes especially the frame that make partial annuitization notable. Finally, counter party risk plays a significant role in consumers' annuitization choice as a result regulations can take an action toward counterparty risk to increase the demand for annuitization. Conversely, Truett and Truett [15] compared life insurance demand in two countries, The United States and Mexico. The growth of life insurance purchases increased significantly and the major factors that spurred individuals to buy life insurance coverage were the income level and the level of education. Also, Liebenberg, et al. [16] studied the demand of life insurance in a dynamic framework as a function of financial conditions and household life cycle changes. Results revealed a considerable linkage between life insurance demand and life events. For instance, new parenthood. Also, the household who became jobless are more likely to relinquish or to cancel their life insurance coverage. Kjosevski [17] focused on identifying the major determinants of the demand of life insurance in central and southern Europe. The study included fourteen countries and results illustrated that inflation rate, GDP per capita, education, level, rule of law and health expenditure are the most considerable and significant factors that increase life insurance demand. Inkmann and Michaelides [18] examined empirical factors for individuals who participated in the insurance market and found life insurance demand to be positively related to the bequest motive measures. Fier and Carson [19] used a U.S. data using the state level to investigate the subsequent demand of life insurance against mortality risk and catastrophes. Results indicate that states with a considerable rate of catastrophes be inclined to purchase life insurance greater than other states. Also, Sunstein and Zeckhauser [20] agreed that individuals overreact when it comes to interacting with high severity- low probability events. Therefore, catastrophic events may motivate individuals to purchase life insurance coverage and hence increase the demand of life insurance.

Hubener, et al. [21] used portfolio choice model for retired couples to choose between annuities and life insurance, especially the demand for annuities, term life coverage, bonds and stocks. In other words, the optimal solution for retired couples is to combine financial products in retirement portfolio. Conversely to most of the extant literature that investigated only the optimal strategy for single individual or for single representative agent when it comes to household. As a result, the major concern here is to show and explain the joint financial decision making for retired couples together. The model captured the optimal demand for single and joint annuities, stocks, bonds and term life insurance. Also, through the applied model, the authors determined the key factor for life insurance demand as it is purchased to protect the surviving spouse and to ensure his ability to afford adequate level of consumption after his partner's death. So, if a high percentage of retirement wealth is pre-annuitized for one spouse only, then the incentive to buy life insurance is to secure the annuity income losses because of the death of the better endowed partner. Furthermore, if the couples have a bequest motive or not, the death of one spouse means that surviving partner has no demand for life insurance. Based on data from the United States, the authors show that, annuitized pension income from all sources except Social Security income is distributed unbalanced between the wife and the husband as husbands prefer to buy term insurance more comparing to wives. Also, term life insurance demand is not affected by the number of children and hence, life insurance demand is mainly driven by a provision motive not by a pure bequest motive. As a result, optimal portfolio is weighed with joint annuities and the main reason for buying life insurance is to protect the surviving spouse from losing annuitized income.

Gatzert and Klotzki [22] investigated enhanced annuities which pay pensions higher than the standard annuities and only prominent in the United Kingdom insurance market comparing to other insurance markets. The authors mainly focused on the demand and limitations or barriers that face offering enhanced annuities also, the potential markets implications for enhanced annuities. For instance, the German insurance market. A survey was conducted focusing on the German insurance market and results show that, the potential market for enhanced annuities in the short and medium term is expected to be limited and the key element in this case of supply and demand is competitive pressure. Also, the relevance of enhanced annuities may increase significantly during the long run. The rates of annuities in general are expected to increase considerably and offering enhanced annuities will support the high rates. The major risks of annuities remain the same. However, offering enhanced annuities will encourage uninsured individuals to acquire insurance coverage. The authors conclude that, distributors related- barriers are the most considerable factor the limit the spread of enhanced annuities with respect to the demand limitations. As a result, an intensive training program for the enhanced annuities distributors will help overcome the barriers of enhanced annuities. Also, introducing enhanced annuities will support the growth of annuities market. Contrariwise, Hambel, et al. [23] investigated life insurance demand especially during health risk shock. In other words, life cycle problems when there is availability for families to buy long term insurance coverage which has realistic lump-sum costs. The family cannot access the insurance market if the wage earner is suffering from health shock. For instance, extending the existing or the current policy or buying new coverage. Results showed that

families with family head younger than 30 years old don't demand long term insurance but short- term insurance contracts and the demand for long term insurance remains unaffected. The presence of health shocks, large fees by the insurers, high labor income volatility and high level of income reduce the demand for long term insurance contracts. correspondingly, it's optimal to add term insurance, annuities or health insurance. Families face financial hardships or poverty especially if the wage earner dies early because of health shock which stops families from renewing short term insurance coverage. Subsequently, Social Security can mitigate or lessen this case by making transfer payments

Zerriaa and Noubbigh [24] investigated life insurance demand in the Middle East and North African countries- MENA region- Results showed that, inflation rate, the income level, educational level, life expectancy and the financial development of each country stimulate the demand for life insurance. Also, Hoy, et al. [25] developed a two- period model to capture where individuals face uncertainty of the amount of insurance needed and the mortality risk and achieved that, Guaranteed renewal (GR) coverage gives the opportunity for individuals to insure against reclassification risk. Also, using (GR) for renewal during high-risk types forces the insurer to provide prices which are considered lower than what is actuarially fair. As a result, the demand for insurance during high- risk types will increase significantly to be over insurance and hence create adverse selection issues. Jaspersen [26] focused on two-folds. First, providing clear details of which questions have been investigated by experiments and what are the fields that have not yet been examined regard life insurance demand. Second, providing a framework for the design of insurance demand experiments. The author provided a structured literature survey of empirical status that included the choices of insurance demand and their experimental methodology. Also, Low and Fekete-Farkas [27] examined life insurance demand in Malaysia as a rapidly developing economic environment and the effects of Covid-19 pandemic on life insurance demand. Financial literacy, religiosity and saving motives are the key element that increase life insurance demand.

Pashchenko and Porapakkarm [28] examined the effect of life value on annuities demand and found that, if individuals prefer early resolution of uncertainty, they will be less interested in buying annuities especially if the life value is considerably high. Also, they get a good understanding of annuities puzzle and the low level of demand for annuities is considered evidence that individuals favor early resolution of uncertainty. Also, Abou Daya and Bernard [29] discussed what influence individuals' decisions when it comes to annuitization? A simultaneous test was conducted and an analysis of short-term stock expectations. The results showed that the individuals who trusted expectations of financial analysis avoid purchasing annuities

Li and Wei [30] investigated the ideal decision of families concerning the purchase of life insurance, annuities or investment especially in stock index, nominal bonds and inflation linked bonds during price illusion. The major concern of individuals and families is maximizing the expected utility of their income. Results reveal that annuities demand for retirees decreased and the purchase of life insurance among young adults increased considerably during the price illusion. Also, one of the crucial factors that contribute significantly to annuities' puzzle is price illusion. Also, Chen, et al. [31] examined the optimal insurance mix for the insured and for the insurers' best product mix of deferred annuities and life insurance coverages. Matching the supply and demand between the insurers and the insureds, results showed that when annuities loading is low and life insurance loading is high equilibrium occurs which suggests reviewing pricing and underwriting policies.

3. Research Motivation

The development of annuities payment versus life insurance (endowment) payments is showing a notable level of fluctuation in the Egyptian insurance market comparing to other markets. For instance, the US insurance market (see Appendix). Also, the purchase of term- insurance coverages is extremely low insurance and annuities in the Egyptian insurance market.

As a result, we are interested in

1- providing an explanation for the development of annuities versus life insurance (endowment) demand. In other words, what are the major factors that encourage individuals to buy life insurance or to annuitize in the Egyptian insurance market.
2- Capture the effect of Covid 19 pandemic on the individuals' preference to annuitize or to buy life insurance (endowment). In other words, what changed in endowment demand versus annuities demand during Covid -19 pandemic in the Egyptian insurance market.
3- Why are the values of annuities payments across the period from 1990 to 2020 considerably higher compared to endowment payments.

4. Research Hypotheses

Based on literature and data availability in the Egyptian insurance market insurance, we ended up with the following hypotheses to examine the development of annuities payment versus endowment payment

1. Gender, province of residence, frequency of payments, insured age, and insurance period all have a significant impact on the demand for annuities policies as indicated by annuities sum insured.
2. Gender, province of residence, frequency of payments, insured age, and insurance period all have a significant impact on the demand for endowments policies as indicated by endowments sum insured.

3. The demand for annuities and endowment insurance policies as measured by the sum insured is significantly different before and after the COVID 19 pandemic influenced by gender, province, payment frequency, insured age, and insurance period.

4.1. Variables and Research Data

The research utilizes a dataset which contains 32774 cases randomly selected that represents the Egyptian life insurance market. The data covers the period from 2008 to 2024. This data provides a comprehensive representation of the market which offers insights into the trends and factors that influence the demand for annuities and endowment insurance policies over a 16-year period. The following table presents the research variables used in our study.

Table 1.
Dependent and independent variables

Variable	Type	Description	Measurement/Levels
Sum Insured	Dependent	The total monetary amount insured for the policy.	Continuous
Gender	Independent	The gender of the insured.	Categorical (Male, Female)
Province	Independent	The province where the insured resides.	Categorical (Province 1 to Province 7)
Payment periodicity	Independent	The payment schedule chosen for the insurance policy.	Categorical (Quarterly, Monthly, Annually, and Half Yearly)
Insured Age	Independent	The age of the insured individual at the start of the policy.	Continuous
Insurance Period	Independent	The duration of the insurance policy.	Continuous

4.1.1. Descriptive Statistics

Table 2.
Descriptive Statistics of Insured Age, Insurance Period, and Sum Insured for Annuities and Endowment Policies.

	Annuities			**Endowment**		
	Insured Age	**Insurance Period**	**Sum Insured**	**Insured Age**	**Insurance Period**	**Sum Insured**
Mean	31.19	27.37	128414.08	35.24	16.42	67231.2
Median	31	28	108000	35	16	50000
Mode	30	30	180000	35	15	50000
Std. Deviation	6.341	4.92	81204.379	7.649	4.612	138840
Variance	40.208	24.207	6594151147	58.504	21.272	1.93E+10
Skewness	0.344	0.359	1.101	0.373	0.296	131.043
Std. Error of Skewness	0.019	0.019	0.019	0.004	0.004	0.004
Kurtosis	-0.376	1.468	1.357	-0.243	-0.1	24830.54
Std. Error of Kurtosis	0.038	0.038	0.038	0.008	0.008	0.008
Minimum	19	15	1485	20	5	31000
Maximum	50	45	450000	65	30	30000000
Percentiles 25	26	25	72000	30	13	42000
Percentiles 50	31	28	108000	35	16	50000
Percentiles 75	35	30	180000	40	20	75000

The mean, the median, and the mode suggest that most people choose annuities are in their early 30s. While for endowment contracts the measures of central tendency show a slightly older age compared to annuities. For Annuities, insurance period results illustrate a preference for long term insurance coverage while the insurance period for endowment suggests that endowment policies are typically chosen for shorter durations. The extreme skewness and kurtosis values for the sum Insured in endowment policies indicate a highly irregular distribution potentially due to a few very high value policies.

Table 3.
Descriptive Statistics of Gender, Province, and Payment Periodicity for Annuities and Endowments Policies.

Gender				
	Annuities		**Endowment**	
	Frequency	**Percent**	**Frequency**	**Percent**
Female	3681	22.5	131693	33.9
Male	12706	77.5	257244	66.1
Total	16387	100	388937	100
Province				
Province 1	1098	6.7	24664	6.3
Province 2	949	5.8	12092	3.1
Province 3	1745	10.6	64629	16.6
Province 4	4428	27	103163	26.5
Province 5	2367	14.4	35089	9
Province 6	1469	9	34973	9
Province 7	4331	26.4	114327	29.4
Total	16387	100	388937	100
Payment periodicity				
Quarterly	1024	6.2	25698	6.6
Annually	826	5	25784	6.6
Monthly	13958	85.2	321014	82.5
Half Yearly	579	3.5	16441	4.2
Total	16387	100	388937	100

Most annuity holders are male both for Annuities and Endowment contracts. Provincial variations suggest that demographic conditions play a significant role in insurance demand and we can notice that Provinces 4 and 7 have a higher value both for annuities and endowment contracts. For Payment periodicity, monthly payment option is the most favored periodicity for both annuities and endowments policies.

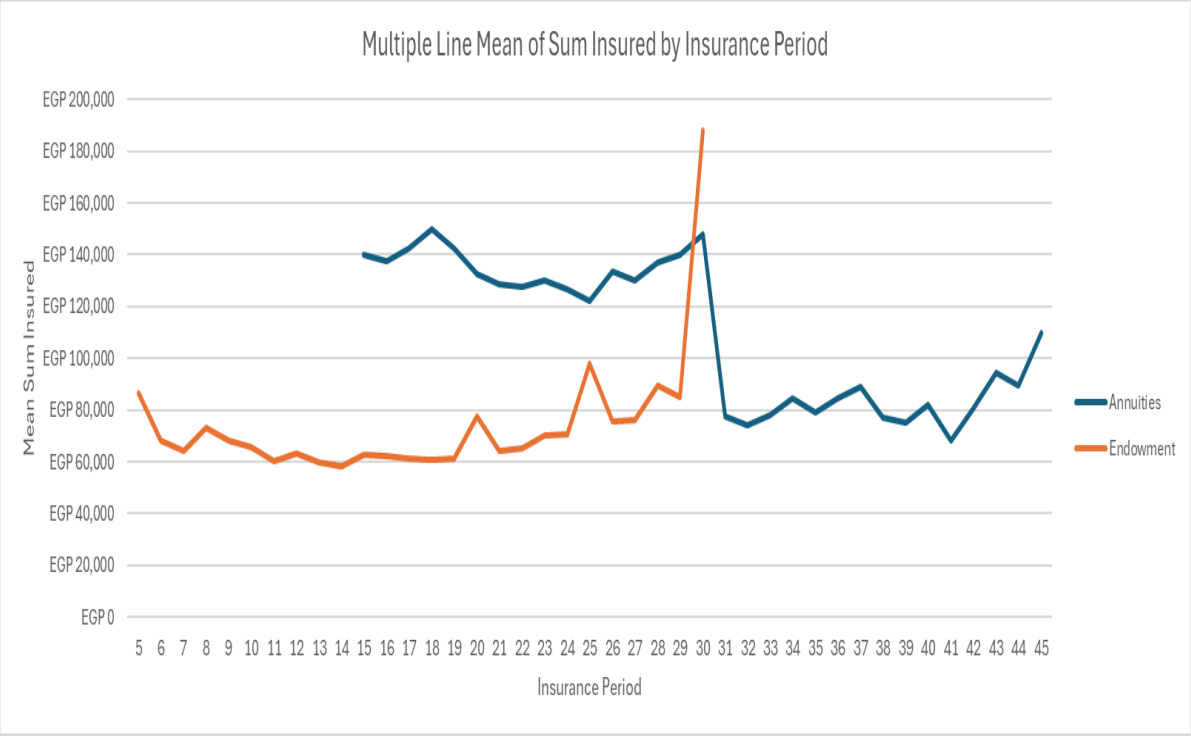

Figure 2.
Comparison of Mean Sum Insured for Annuities and Endowment Policies Over Different Insurance Periods.

Before the 30th insurance period the mean sum insured for annuities stayed consistently between EGP 120000 and EGP 150000 and begins from Insurance Period 15. In contrast, endowment policies start from insurance period 5 and fluctuate from EGP 60000 to EGP 100000 with mean sums insured generally lower than annuities except for the 30th insurance

period where the mean sum insured for endowment reached approximately EGP 190000. This sudden spike is an outlier in the overall trend which suggests that there was a unique factor or event that led to this significant rise in the insured sum for endowments policies.

After the 30th insurance period the mean sum insured for annuities decreased dramatically and maintains similar levels of endowment sum insured before the 30th insurance period. The absence of endowment policies after the 30th insurance period reinforces the nature of annuities as which provides stable and reliable insurance coverage over long periods.

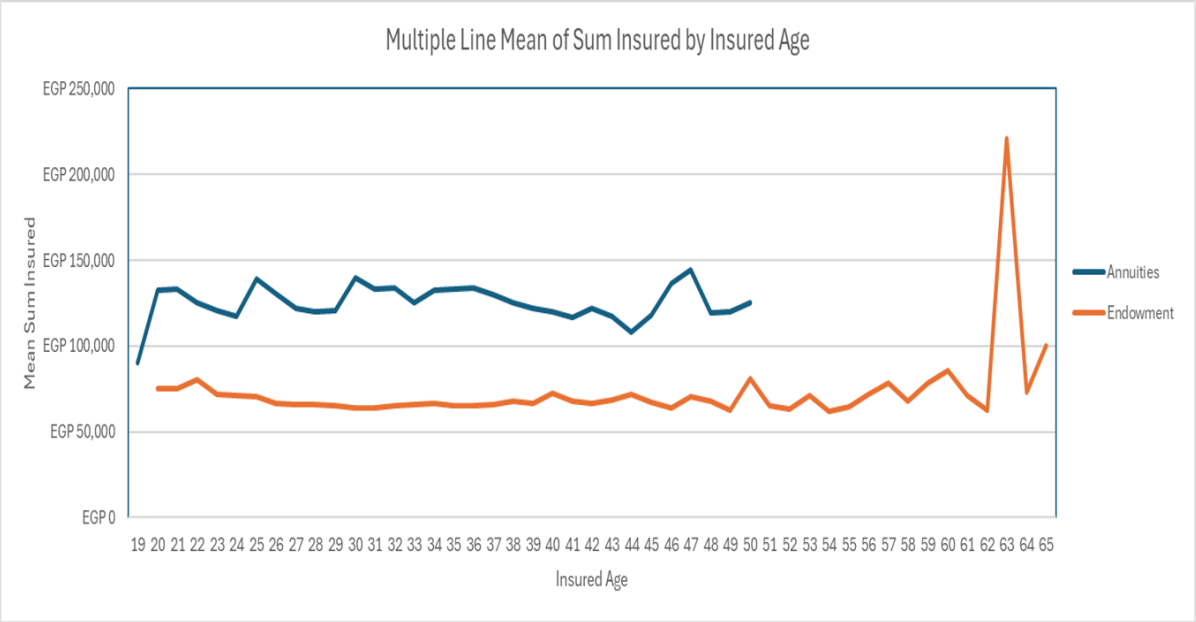

Figure 3.
Mean Sum Insured by Insured Age for Annuities and Endowment Policies.

The chart highlights that annuities have a consistently higher mean sum insured compared to endowments across all age groups. This could suggest that annuities are more popular for long-term financial planning. The spike at age 62 in endowment policies may point to age-related financial planning behaviors.

4.1.2. Analytical Analysis

Table 4.
Regression Analysis of Annuities and Endowment Sum Insured.

Annuities						
Parameter	**B**	**Std. Error**	**95% Wald Confidence Interval**		**Hypothesis Test**	
			Lower	**Upper**	**Wald Chi-Square**	**Sig.**
(Intercept)	358995.6	8558.468	342221.3	375769.9	1759.487	0
Female	-5350.11	1465.629	-8222.69	-2477.53	13.325	0
Male	0	.	.	.	.	.
Province 1	22851.7	2654.701	17648.58	28054.82	74.098	0
Province 2	33201.39	2805.266	27703.17	38699.61	140.076	0
Province 3	29012.72	2221.196	24659.26	33366.18	170.61	0
Province 4	-3769.1	1673.633	-7049.36	-488.838	5.072	0.024
Province 5	1696.563	2022.96	-2268.37	5661.492	0.703	0.402
Province 6	25845.82	2365.039	21210.42	30481.21	119.427	0
Province 7	0	.	.	.	.	.
Quarterly	-31941.3	2804.477	-37437.9	-26444.6	129.718	0
Annually	-21335.8	3666.192	-28521.4	-14150.2	33.868	0
Monthly	-12720.9	4235.293	-21022	-4419.92	9.021	0.003
Half Yearly	0	.	.	.	.	.
Insurance Age	-2651.35	132.3377	-2910.72	-2391.97	401.39	0
Insurance Period	-4487.68	171.037	-4822.9	-4152.45	688.435	0
(Scale)	6.08E+09	67220569	5.95E+09	6.22E+09		
Endowment						
(Intercept)	48859.08	1880.599	45173.17	52544.98	674.991	0

Female	3140.702	471.9443	2215.708	4065.696	44.287	0
Male	0	.	.	.	.	.
Province 1	121.086	978.4721	-1796.68	2038.856	0.015	0.902
Province 2	7505.49	1324.995	4908.548	10102.43	32.087	0
Province 3	8850.762	687.4306	7503.423	10198.1	165.769	0
Province 4	5331.482	595.0216	4165.261	6497.703	80.284	0
Province 5	-1304.33	845.1494	-2960.79	352.137	2.382	0.123
Province 6	1700.731	846.8471	40.942	3360.521	4.033	0.045
Province 7	0	.	.	.	.	.
Quarterly	-26128.2	896.5916	-27885.5	-24370.9	849.237	0
Annually	-6154.36	1220.488	-8546.47	-3762.25	25.427	0
Monthly	-4134.94	1380.796	-6841.25	-1428.63	8.968	0.003
Half Yearly	0	.	.	.	.	.
Insurance Age	288.653	31.3678	227.173	350.133	84.68	0
Insurance Period	1528.661	52.3421	1426.072	1631.249	852.941	0
(Scale)	1.91E+10	43388371	1.9E+10	1.92E+10		

The regression results for the annuities section reveal several important conclusions. Gender has negative significant impact on annuities payments which means that women tend to receive lower annuity payments than men. Provinces 1, 2, 3, and 6 show significant positive coefficients which suggests that residing in these provinces leads to higher annuity payments compared to Province 7. The frequency of payment also affects annuity payments. Quarterly, annually and monthly payments have significant negative coefficient. That means lower annuity payments for them compared to the baseline of half yearly payments. Both Insurance Age and Insurance Period are significant with negative coefficients which means that higher ages and longer periods are associated with lower annuity payments.

For endowment payments gender is statistically significant also. The variable named “female” show a positive and significant coefficient which means that females receive higher endowment payments compared to men unlike its effect on annuities payments. Regional analysis reveals mixed results. Quarterly payments have the biggest negative impact. Insurance Age and Insurance Period are both significant with positive coefficients. This result contrasts with annuities which illustrates that these variables have negative relationships with annuity payments.

Table 5.
Regression Analysis of Annuities Sum Insured Before and After COVID 19 Pandemic.

Pre Covid 19 Pandemic Annuities						
Parameter	**B**	**Std. Error**	**95% Wald Confidence Interval**		**Hypothesis Test**	
			Lower	**Upper**	**Wald Chi-Square**	**Sig.**
(Intercept)	299514.9	7807.512	284212.5	314817.4	1471.674	0
Female	-3806.93	1345.721	-6444.5	-1169.37	8.003	0.005
Male	0	.	.	.	.	.
Province 1	26401.88	2386.424	21724.57	31079.19	122.398	0
Province 2	39697.06	2509.365	34778.8	44615.33	250.259	0
Province 3	30108.46	2017.471	26154.29	34062.63	222.722	0
Province 4	0.994	1511.514	-2961.52	2963.508	0	0.999
Province 5	-1591.62	1855.18	-5227.71	2044.466	0.736	0.391
Province 6	24096.98	2223.534	19738.94	28455.03	117.446	0
Province 7	0	.	.	.	.	.
Quarterly	-32805.1	2535.383	-37774.4	-27835.8	167.416	0
Annually	-21735.6	3320.698	-28244	-15227.1	42.843	0
Monthly	-11615.1	3843.939	-19149.1	-4081.1	9.13	0.003
Half Yearly	0	.	.	.	.	.
Insurance Age	-2475.8	120.6298	-2712.23	-2239.37	421.234	0
Insurance Period	-3002.92	156.0198	-3308.72	-2697.13	370.449	0
(Scale)	4484945028.684	52350868	4.38E+09	4.59E+09		
Post Covid 19 Pandemic Annuities						
(Intercept)	237057.7	32082.9	174176.4	299939.1	54.596	0
Female	15466.08	4868.061	5924.855	25007.3	10.094	0.001
Male	0	.	.	.	.	.
Province 1	1683.421	10468.51	-18834.5	22201.33	0.026	0.872
Province 2	9395.67	11865.46	-13860.2	32651.54	0.627	0.428

Province 3	31784.17	7912.32	16276.31	47292.03	16.137	0
Province 4	3376.097	6422.545	-9211.86	15964.05	0.276	0.599
Province 5	20901.79	6706.031	7758.208	34045.37	9.715	0.002
Province 6	3549.897	6840.312	-9856.87	16956.66	0.269	0.604
Province 7	0	.	.	.	.	.
Quarterly	-32589.9	10440.12	-53052.1	-12127.6	9.744	0.002
Annually	-15549.3	13380.18	-41774	10675.35	1.351	0.245
Monthly	-26845	15165.54	-56568.9	2878.952	3.133	0.077
Half Yearly	0	.	.	.	.	.
Insurance Age	-1743.79	469.3208	-2663.64	-823.94	13.805	0
Insurance Period	2817.523	725.2242	1396.109	4238.936	15.094	0
(Scale)	8112621226.262	2.78E+08	7.59E+09	8.68E+09		

The table presents regression results which highlight the influence of the independent variables on annuity payments before and after the COVID 19 pandemic. The results indicate some shifts in the variables that have significant effect on annuity payments before and after pandemic period. The most notable change is the reversal of the gender effect. Females were disadvantaged before pandemic but now they benefit from higher annuity payments after pandemic. Geographical differences remain important, but the impact of provinces has become less significant for some regions after the COVID 19 pandemic. Payment frequency continues to negatively affect annuity payments. Both Insurance Age and Insurance Period remain crucial factors in determining annuity payments. The drop in the intercept values after pandemic suggests a general decrease in annuity payments that could be due to broader economic impacts of COVID 19 pandemic.

Table 6.
Regression Analysis of Endowment Sum Insured Before and After COVID 19 Pandemic.

Pre Covid 19 Pandemic Endowment						
Parameter	**B**	**Std. Error**	**95% Wald Confidence Interval**		**Hypothesis Test**	
			Lower	**Upper**	**Wald Chi-Square**	**Sig.**
(Intercept)	38902.43	2027.867	34927.88	42876.98	368.023	0
Female	5304.409	504.2196	4316.157	6292.661	110.671	0
Male	0	.	.	.	.	.
Province 1	-1061.69	946.8758	-2917.53	794.154	1.257	0.262
Province 2	1841.128	1386.759	-876.869	4559.125	1.763	0.184
Province 3	6614.824	701.223	5240.452	7989.195	88.987	0
Province 4	3976.342	612.6417	2775.586	5177.097	42.126	0
Province 5	-1712.64	880.021	-3437.44	12.175	3.787	0.052
Province 6	131.253	872.9532	-1579.7	1842.21	0.023	0.88
Province 7	0	.	.	.	.	.
Quarterly	-16708.8	885.2572	-18443.8	-14973.7	356.245	0
Annually	-305.152	1226.374	-2708.8	2098.496	0.062	0.803
Monthly	-372.32	1373.812	-3064.94	2320.302	0.073	0.786
Half Yearly	0	.	.	.	.	.
Insurance Age	470.749	34.4855	403.159	538.339	186.34	0
Insurance Period	807.359	57.401	694.855	919.863	197.831	0
(Scale)	10194013477.779	32385537	1.01E+10	1.03E+10		
Post Covid 19 Pandemic Endowment						
(Intercept)	55364.76	3139.568	49211.32	61518.2	0	0
Female	4306.91	792.5036	2753.632	5860.188	0	0
Male	0	.	.	.	.	.
Province 1	3675.667	1818.094	112.269	7239.065	0.262	0.043
Province 2	13043.97	2247.743	8638.477	17449.47	0.184	0
Province 3	11548.46	1196.949	9202.477	13894.43	0	0
Province 4	6586.722	1025.551	4576.679	8596.766	0	0
Province 5	-1342.31	1440.318	-4165.28	1480.666	0.052	0.351
Province 6	2745.732	1457.225	-110.376	5601.84	0.88	0.06

Province 7	0	.	.	.	.	.
Quarterly	-38013.4	1619.587	-41187.7	-34839	0	0
Annually	-15451.7	2162.468	-19690	-11213.3	0.803	0
Monthly	-10177.6	2469.935	-15018.6	-5336.64	0.786	0
Half Yearly	0	.	.	.	.	.
Insurance Age	99.721	50.9905	-0.219	199.66	0	0.051
Insurance Period	2597.098	86.9033	2426.771	2767.426	0	0
(Scale)	28233824597.706	91416132	2.81E+10	2.84E+10		

The table illustrates regression results related to endowment payments as a dependent variable before and after the COVID 19 pandemic. Regional differences have become more significant for provinces 1, 2, and 6. Payment frequency remains the same which negatively impacts endowment payments, and we can notice that Quarterly payments having the largest negative effect. Insurance Age still has a significant effect but with reduced effect while Insurance Period effect becomes stronger. Overall, the COVID 19 pandemic altered the dynamics of endowment payments because some independent variables become more statistically significant, and others become less.

Table 7.
Comparison of Sum Insured Before and After COVID 19 Pandemic for Annuities and Endowments: T-Test Results.

Insurance Type	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Annuities	-49.961	1932.883	0	-117342	2348.693	-121948	-112736
Endowment	-27.518	309976.6	0	-12352.5	448.888	-13232.3	-11472.7

The p value of 0 for annuities payments shows a significant change in demand before and after the pandemic. The mean difference of -117342 suggests a significant increase in annuities payments after the pandemic. In contrast, the analysis of endowment insurance payments shows t value of -27.518 suggests a less impact compared to annuities. The results suggest that both types of insurance experienced statistically significant increases in demand with annuities being more affected than endowment policies. One explanation for this result could be due to the increase in people's awareness of risk related to income security after the COVID 19 pandemic.

5. Conclusion

The study explores the determinants that influence the preference of insureds between annuities and endowment insurance within the Egyptian insurance market. Annuities and Endowment insurance policies demand is significantly influenced by gender, province of residence, payment frequency, insured age, and insurance period. The findings underscore significant differences in demographic, geographical, and financial factors which shape the demand for insurance products. Annuities exhibit a higher mean sum insured compared to endowment policies which give an indication that insureds prefer long term financial planning and income security. Monthly periodicity of payments may be observed in both categories, which might indicate that such products meet the policyholders' demands either due to liquidity needs or flexibility of investment strategy when paying premiums.

Moreover, these demands are significantly different before and after the COVID 19 pandemic. The COVID 19 pandemic emerged as a pivotal event which significantly altered the demand dynamics. After the pandemic a notable change occurred with a significant increase in annuity payments which could be because of increased awareness of income security risks. On the other hand, while endowment policies also saw increased demand, their growth was less noticeable.

References

[1] F. D. Lewis, "Dependents and the demand for life insurance," *The American Economic Review,* vol. 79, no. 3, pp. 452-467, 1989.

[2] M. Browne and K. Kim, "An international analysis of life insurance demand," *Insurance Mathematics and Economics,* vol. 2, no. 16, p. 180, 1995.

[3] E. N. Zietz, "An examination of the demand for life insurance," *Risk Management and Insurance Review,* vol. 6, no. 2, pp. 159-191, 2003. https://doi.org/10.1046/j.1098-1616.2003.030.x

[4] I. Dushi and A. Webb, "Household annuitization decisions: Simulations and empirical analyses," *Journal of Pension Economics & Finance,* vol. 3, no. 2, pp. 109-143, 2004. https://doi.org/10.1017/S1474747204001696

[5] D. Li, F. Moshirian, P. Nguyen, and T. Wee, "The demand for life insurance in OECD countries," *Journal of risk and Insurance,* vol. 74, no. 3, pp. 637-652, 2007. https://doi.org/10.1111/j.1539-6975.2007.00228.x

[6] W.-Y. Hu and J. S. Scott, "Behavioral obstacles in the annuity market," *Financial Analysts Journal,* vol. 63, no. 6, pp. 71-82, 2007.

[7] C. Julié *et al.*, "Identification in daily practice of patients with lynch syndrome (hereditary nonpolyposis colorectal cancer): Revised bethesda guidelines-based approach: versus: molecular screening," *Official Journal of the American College of Gastroenterology| ACG,* vol. 103, no. 11, pp. 2825-2835, 2008.

[8] J. R. Brown, *Understanding the role of annuities in retirement planning*. Chicago, IL: University of Chicago Press, 2009, pp. 178-206. https://doi.org/10.7208/chicago/9780226497105.003.0007
[9] J. S. Scott, "The longevity annuity: An annuity for everyone?," *Financial Analysts Journal,* vol. 64, no. 1, pp. 40-48, 2008.
[10] W. J. Horneff, R. H. Maurer, and M. Z. Stamos, "Life-cycle asset allocation with annuity markets," *Journal of Economic Dynamics and Control,* vol. 32, no. 11, pp. 3590-3612, 2008.
[11] R. N. Schulze and T. Post, "Individual annuity demand under aggregate mortality risk," *Journal of Risk and Insurance,* vol. 77, no. 2, pp. 423-449, 2010.
[12] S. Benartzi, A. Previtero, and R. H. Thaler, "Annuitization puzzles," *Journal of Economic Perspectives,* vol. 25, no. 4, pp. 143-164, 2011. https://doi.org/10.1257/jep.25.4.143
[13] L. M. Lockwood, "Bequest motives and the annuity puzzle," *Review of Economic Dynamics,* vol. 15, no. 2, pp. 226-243, 2012.
[14] J. Beshears, J. J. Choi, D. Laibson, B. C. Madrian, and S. P. Zeldes, "What makes annuitization more appealing?," *Journal of Public Economics,* vol. 116, pp. 2-16, 2014.
[15] D. B. Truett and L. J. Truett, "The demand for life insurance in Mexico and the United States: A comparative study," *Journal of Risk and Insurance,* vol. 57, no. 2, pp. 321-328, 1990. https://doi.org/10.2307/253306
[16] A. P. Liebenberg, J. M. Carson, and R. E. Dumm, "A dynamic analysis of the demand for life insurance," *Journal of Risk and Insurance,* vol. 79, no. 3, pp. 619-644, 2012.
[17] J. Kjosevski, "The determinants of life insurance demand in central and southeastern Europe," *International Journal of Economics and Finance,* vol. 4, no. 3, pp. 237-247, 2012.
[18] J. Inkmann and A. Michaelides, "Can the life insurance market provide evidence for a bequest motive?," *Journal of Risk and Insurance,* vol. 79, no. 3, pp. 671-695, 2012.
[19] S. G. Fier and J. M. Carson, "Catastrophes and the demand for life insurance," *Journal of Insurance Issues,* pp. 125-156, 2015.
[20] C. R. Sunstein and R. Zeckhauser, "Overreaction to fearsome risks," *Environmental and Resource Economics,* vol. 48, no. 3, pp. 435-449, 2011.
[21] A. Hubener, R. Maurer, and R. Rogalla, "Optimal portfolio choice with annuities and life insurance for retired couples," *Review of Finance,* vol. 18, no. 1, pp. 147-188, 2014.
[22] N. Gatzert and U. Klotzki, "Enhanced annuities: Drivers of and barriers to supply and demand," *The Geneva Papers on Risk and Insurance-Issues and Practice,* vol. 41, no. 1, pp. 53-77, 2016.
[23] C. Hambel, H. Kraft, L. S. Schendel, and M. Steffensen, "Life insurance demand under health shock risk," *Journal of Risk and Insurance,* vol. 84, no. 4, pp. 1171-1202, 2017.
[24] M. Zerriaa and H. Noubbigh, "Determinants of life insurance demand in the MENA region," *The Geneva Papers on Risk and Insurance-Issues and Practice,* vol. 41, no. 3, pp. 491-511, 2016. https://doi.org/10.1057/gpp.2016.1
[25] M. Hoy, A. Mirza, and A. Sadanand, "Guaranteed renewable life insurance under demand uncertainty," *Journal of Risk and Insurance,* vol. 88, no. 1, pp. 131-159, 2021.
[26] J. G. Jaspersen, "Hypothetical surveys and experimental studies of insurance demand: A review," *Journal of Risk and Insurance,* vol. 83, no. 1, pp. 217-255, 2016.
[27] D. Low and M. Fekete-Farkas, "The demand for life insurance in a developing country and the mediating role of persuasion," *Journal of International Studies,* vol. 14, no. 3, pp. 138–154, 2021. https://doi.org/10.14254/2071-8330.2021/14-3/9
[28] S. Pashchenko and P. Porapakkarm, "Value of life and annuity demand," *Journal of Risk and Insurance,* vol. 89, no. 2, pp. 371-396, 2022.
[29] M. H. Abou Daya and C. Bernard, "What matters in the annuitization decision?," *Swiss Journal of Economics and Statistics,* vol. 158, no. 1, p. 14, 2022. https://doi.org/10.1186/s41937-022-00094-4
[30] W. Li and P. Wei, "Optimal life insurance and annuity decisions under money illusion," *Insurance: Mathematics and Economics,* p. 103141, 2025.
[31] H. Chen, J. Gao, and W. Zhu, "A unified framework for insurance demand and mortality immunization," *North American Actuarial Journal,* vol. 28, no. 2, pp. 469-490, 2024. https://doi.org/10.1080/10920277.2023.2218465

Appendix

Table 1.
The development of Payments under life insurance policies (Payments to beneficiaries' vs annuities payments) throughout the period from 1990 to 2020 (millions) in the United States Insurance Market.

Year	Beneficiaries' payments	Beneficiaries' payments %	Annuities payments	Annuities payments %	Total payments
1990	24571	43	32570	57	57142
1991	25429	41	36592	59	62022
1992	27209	42	37575	58	64785
1993	28764	41.6	40380	58.4	69144
1994	32555	44.6	40439	55.4	72995
1995	34528	41.6	48473	58.4	83002
1996	37125	42.5	50227	58.5	87353
1997	37490	40.5	55077	59.5	92568
1998	40104	39.9	60407	60.1	100511
1999	40316	39.2	62310	60.8	102848
2000	44109	39.1	68701	60.9	112811
2001	46481	45.7	55227	54.3	101709
2002	48155	46.7	54961	53.3	103116
2003	53189	48.9	55582	51.1	108771

2004	51521	45.7	61216	54.3	112738
2005	52967	45.3	63961	54.7	116931
2006	55657	43.9	71124	56.1	126781
2007	57848	44.4	72441	55.6	130289
2008	59874	46.2	69723	53.7	129597
2009	59473	47	67065	53	126538
2010	58331	45.4	70151	54.5	128482
2011	62176	45.5	74474	54.5	136650
2012	63157	46	74141	54	137298
2013	64252	44.9	78849	55.1	143101
2014	67869	47.9	73821	52.1	141690
2015	74369	48.9	77715	51.1	152084
2016	76928	49	79131	51	155159
2017	76972	48.5	81733	51.5	158706
2018	79761	48.9	83350	51.1	163111
2019	78401	47.1	88056	52.9	166457
2020	90448	49.7	91540	50.3	181988