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Influence of demographic variables on acceptance of pension plans: Experience in South Bengal

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Abstract
This study explores the influence of demographic variables on the acceptance of pension plans among urban and semi-urban populations in South Bengal. Using a three-stage cluster sampling technique, primary data are collected from 399 respondents and analyzed via chi-square tests, Fisher's Exact Test, and Cramer's V effect size metrics. Results reveal significant associations between pension plan acceptance and age (Cramer's V = 0.19, $p<0.01$), employment status (Cramer's V = 0.20, $p<0.001$), individual income (Cramer's V = 0.32, $p<0.001$), family income (Cramer's V = 0.23, $p<0.01$), and work experience (Cramer's V = 0.27, $p<0.001$). Education shows a borderline association (Cramer's V = 0.11, $p = 0.073$). Gender, caste, marital status, working sector, and family size are non-significant. The study highlights the need for age-specific financial literacy programs, tiered pension schemes for low-income groups, and employer-mandated enrollment in formal sectors. Limitations include urban bias and reliance on non-probability sampling; future research should incorporate rural populations and qualitative insights.

Keywords: Pension plans, demographic variables, retirement planning, financial literacy, south bengal, chi-square analysis, pension plan acceptance

Introduction
Retirement planning is a crucial aspect of financial security, ensuring a stable income flow for individuals in their post-working years. In India, with its rapidly aging population and evolving socio-economic landscape, the significance of pension systems has grown manifold. Despite the availability of both government-backed and private pension plans, participation remains limited, especially in regions characterized by economic and cultural diversity, such as West Bengal. This study explores the factors influencing pension plan acceptance, offering valuable insights into the interplay of demographic variables and retirement planning behaviors.

Grounded in the *Theory of Planned Behavior* (Ajzen, 1991) [1], the study posits that financial preparedness is influenced by attitudinal, normative, and control factors tied to life stage and socioeconomic status. Theoretically, pension plans are rooted in the principles of social security and financial stability, serving as a safety net for individuals' post-retirement. They not only promote long-term savings but also reduce dependency on state welfare systems. Globally, research has highlighted the role of demographic factors such as age, income, education, and employment status in shaping pension adoption. Studies by Huberman, Iyengar, and Jiang (2007) [9] and Patgiri and Gogoi (2021) [14] emphasize the influence of income and financial literacy on retirement planning, while Clark and Strauss (2008) [3] demonstrate the significance of risk attitudes and socio-demographic traits. However, there remains a notable gap in regional studies addressing these dynamics within the Indian context, particularly in West Bengal.

From a socio-economic perspective, the lack of awareness and participation in pension plans poses challenges for individuals and policymakers alike. Financial literacy remains alarmingly low in India, particularly among workers in unorganized sectors, where affordable schemes such as the Atal Pension Yojana have yet to achieve significant penetration. This study addresses these issues by examining how demographic factors influence pension plan acceptance in South Bengal.

The findings aim to provide actionable recommendations for improving financial inclusion and retirement security in the region.

The implications of this study extend beyond academia, offering practical insights for policymakers, financial institutions, and community organizations. By identifying barriers to pension adoption, the research advocates for targeted interventions, such as financial education programs, simplified pension products, and increased accessibility. These measures can enhance the overall adoption rate, contributing to a more equitable and sustainable retirement system.

The present study is structured as follows: the subsequent section reviews the existing literature on demographic factors and pension plan participation, highlighting gaps and justifying the need for this research. The methodology section outlines the sampling techniques and analytical tools employed, followed by an in-depth discussion of the findings. The final sections provide conclusions and recommendations, drawing from empirical evidence to suggest policy measures for improving pension plan adoption in South Bengal.

Review of Literature

The interplay of demographic variables such as age, gender, income, education, and employment status, significantly influences pension plan participation and investment behavior.

Theoretical Foundations: The Life Cycle Hypothesis (Modigliani, 1966) [13] and Theory of Planned Behavior (Ajzen, 1991) [1] provide frameworks for understanding retirement planning. The former posits that individuals save proportionally to their anticipated lifespan, while the latter links behavioral intentions to attitudes, subjective norms, and perceived control—factors mediated by demographics like income and education.

Socio-Demographic Factors and Pension Planning

Research consistently highlights the critical role of socio-demographic factors in shaping participation and decision-making regarding pension plans. Huberman, Iyengar, and Jiang (2007) [9] found that gender, income, and employer contributions significantly influence participation and contributions in pension plans, suggesting that demographic characteristics serve as primary determinants of retirement behavior. Similarly, Clark and Strauss (2008) [3] demonstrated that risk attitudes and socio-demographic traits such as age and income guide pension-related decisions in both the U.S. and U.K. contexts.

Awareness and Accessibility of Pension Schemes

Awareness of pension schemes remains a challenge for certain worker categories, particularly in unorganized sectors. Venkatesh and Vanishree (2013) [23] investigated unorganized workers in India and observed that demographic factors like education and age impacted their awareness levels and willingness to participate in pension schemes. Unlike Tamil Nadu, where caste significantly impacts financial access (Venkatesh & Vanishree, 2013) [23], South Bengal's historical emphasis on secularism and labor mobility may dilute caste-based disparities. Ramesh (2017) [17] extended this analysis to private sector employees in Tamil Nadu, finding substantial demographic variations in pension awareness. Pushpa (2021) [16] reaffirmed these trends, highlighting the influence of demographics on awareness levels, corpus contributions, and long-term financial planning.

Investment Behavior and Satisfaction with Pension Systems

Investment behavior is also shaped by demographic and socio-economic characteristics. Patgiri and Gogoi (2021) [14] explored the influence of demographics on satisfaction with the National Pension System (NPS), emphasizing the role of education and income in shaping perceptions and investment behavior. Hung, Yoong, and Brown (2012) [5] highlighted persistent gender gaps in financial literacy globally, which adversely affect women's retirement planning outcomes, despite higher participation rates.

Global Perspectives on Pension Systems

Cross-national studies reveal the universal relevance of demographic factors in pension planning. Hwang and Greenford (2005) [11] analogized life insurance adoption with pension plan participation, observing the significant impact of income and education. Bhaduri (2013) [2] and Sonig (2016) [22] discussed the implications of aging populations and socio-economic transformations for pension reforms, underscoring the global challenges posed by demographic trends. Seethal and Menaka (2018) [19] further emphasized retirement readiness scores as indicators of shifting demographic priorities in financial planning.

Emerging Research on Defined Contribution Plans

Defined contribution plans have gained traction as a preferred retirement savings vehicle. Research by the Economic Policy Research Institute (2019) showed how age, income, and employment status contribute to disparities in retirement plan access and participation. Similarly, Tao Xu (2022) [24] examined rural pension system participation in China, highlighting the influence of factors like gender, health, and savings on pension adoption.

Financial Literacy and Generational Trends

Generational differences in financial literacy also affect pension-related behaviors. The Pew Charitable Trusts (2017) [15] revealed that older workers generally have better access to and participation rates in retirement plans compared to younger cohorts. Studies like those by the Pension Research Council (2016) demonstrated the interplay between financial literacy and demographic factors in determining contribution rates and investment decisions.

Demographics and Sustainability of Pension Systems

Demographic trends also impact the sustainability of pension systems. Sahu and Hooda (2015) [18] analyzed pension adequacy across nations, linking system sustainability to demographic diversity. The Society of Actuaries (2021) [21] further illustrated how aging populations affect asset values and the financial health of pension plans in Canada, the UK, and the U.S.

Research Gap and Objective

Literature highlights significant influences of demographic factors such as age, gender, income, education, and employment status on pension plan participation, awareness, and investment behavior. However, most studies are geographically concentrated in regions such as the U.S., U.K., and specific Indian states like Tamil Nadu and Assam. Limited research exists on the acceptance and adoption of pension plans in West Bengal, particularly in understanding how demographic variables uniquely shape attitudes and behaviors toward pension schemes in this region.

Additionally, while many studies address general awareness and participation rates, there is a lack of focused exploration of how these demographic factors interact to influence the acceptance of pension plans, particularly in culturally diverse and economically varied states like West Bengal. Addressing this gap could provide targeted insights for policymakers and financial institutions aiming to improve pension adoption rates in the region. This gap justifies the need for your proposed research objective:

'To study the effect of different demographic variables on acceptance of Pension Plans in West Bengal.'
This objective will fill the existing void in understanding demographic influences on pension plan acceptance in this specific regional context.

Research Methodology

Population and Sample

The study focuses on the population residing in Southern West Bengal. A total of 399 participants have been selected as the sample size, adhering to Cochran's formula, which recommends a minimum sample size of 384.

The study utilizes a three-stage cluster sampling technique, with data collection conducted between January and April 2024. Ethical compliance was ensured through informed consent and anonymization. The sampling process is detailed as follows:

- **Stage I:** From the 14 districts of South Bengal (Bankura, Birbhum, Hooghly, Murshidabad, Nadia, Howrah, Kolkata, North Twenty-Four Parganas, Paschim Bardhaman, Paschim Medinipur, Purba Bardhaman, Purba Medinipur, Purulia, and South Twenty-Four Parganas), 5 districts were selected randomly, namely, Hooghly, Howrah, Kolkata, North Twenty-Four Parganas, and Purulia.
- **Stage II:** Two urban or semi-urban areas within each selected district were chosen as per convenience for further data collection.
- **Stage III:** A total of 45 respondents were approached in each selected area using network sampling and snowball sampling techniques. Respondents completed the survey either physically or through Google Forms. Initially, 450 questionnaires were collected. Following scrutiny, 399 valid responses were retained for the study.

The distribution of the selected sample units across districts and areas is as follows

1. **Hooghly:** Two areas, Uttarpara and Raghunathpur, are chosen, contributing 40 respondents each, making a total of 80 valid responses from this district.
2. **Howrah:** Two areas, Santragachi and Liluah, are included, with 45 and 43 valid responses, respectively, resulting in a total of 88 responses.
3. **Kolkata:** Data are collected from two areas, Canning Street and Camac Street, yielding 35 and 40 valid responses, respectively, for a total of 75 responses.
4. **North Twenty-Four Parganas:** Two areas, Barrackpore and Ashoknagar, are surveyed, producing 40 and 41 valid responses, respectively, totaling 81 responses.
5. **Purulia:** The areas surveyed in this district are Purulia Town and Anara, which contribute 35 and 40 valid responses, respectively, amounting to 75 responses.

Study Variables: Data obtained for 12 demographic variables, namely, Place of Residence, Age, Gender, Caste, Marital Status, Employment Status, Working Sector, Monthly Income, Monthly Family Income, Family Size, Work Experience, Educational Qualifications from each respondent. Regarding acceptance of pension plans, respondents are asked whether they have bought any pension plan from private/government insurance companies or not.

Hypothesis for Objective

The following null and alternative hypotheses are framed to achieve the research objectives using

1. **Null Hypothesis $H1_0$**: There is no association between Age and acceptance to pension plans; Alternative Hypothesis $H1_a$: $H1_0$ is not true.
2. **Null Hypothesis $H2_0$**: There is no association between Gender and acceptance to pension plans; Alternative Hypothesis $H2_a$: $H2_0$ is not true.
3. **Null Hypothesis $H3_0$**: There is no association between Caste and acceptance to pension plans; Alternative Hypothesis $H3_a$: $H3_0$ is not true.
4. **Null Hypothesis $H4_0$**: There is no association between Marital Status and acceptance to pension plans; Alternative Hypothesis $H4_a$: $H4_0$ is not true.
5. **Null Hypothesis $H5_0$**: There is no association between Employment Status and acceptance to pension plans; Alternative Hypothesis $H5_a$: $H5_0$ is not true.
6. **Null Hypothesis $H6_0$**: There is no association between Working Sector and acceptance to pension plans; Alternative Hypothesis $H6_a$: $H6_0$ is not true.
7. **Null Hypothesis $H7_0$**: There is no association between Family Size and acceptance to pension plans; Alternative Hypothesis $H7_a$: $H7_0$ is not true.
8. **Null Hypothesis $H8_0$**: There is no association between Education and acceptance to pension plans; Alternative Hypothesis $H8_a$: $H8_0$ is not true.
9. **Null Hypothesis $H9_0$**: There is no association between Individual Income and acceptance to pension plans; Alternative Hypothesis $H9_a$: $H9_0$ is not true.
10. **Null Hypothesis $H10_0$**: There is no association between Family Income and acceptance to pension plans; Alternative Hypothesis $H10_a$: $H10_0$ is not true.
11. **Null Hypothesis $H11_0$**: There is no association between Working Experience and acceptance to pension plans; Alternative Hypothesis $H11_a$: $H11_0$ is not true.

Research Tool

Chi-square test is applied to examine the associations between demographic variables and pension plan acceptance. However, for small expected cell counts, (e.g., where all cells ≤ 5), Fisher's Exact Test is applied.

Limitation: The study has limitations, including urban/semi-urban bias, and non-probability sampling techniques. Data was collected from urban and semi-urban areas, excluding rural populations with distinct socioeconomic dynamics. Additionally, snowball and network sampling techniques may introduce selection bias.

Discussions on Results: Frequency distribution of holding any Pension Plans from insurance companies are presented in Table 1. Out of 399 valid responses, 357 respondents (89.5%) have not availed a pension plan, while 42 respondents (10.5%) have opted for one.

Table 1: Distribution of Pension Plans Availed/Opted

Response	Frequency	Percent
No	357	89.5
Yes	42	10.5
Total	399	100.0

The overwhelming majority (nearly 9 out of 10) have not taken any pension plan. This suggests a substantial lack of penetration of pension products in the surveyed population.

Table 2 captures the cross tabulation of acceptance of pension plans and demographic variables. We note that the acceptance rate of pension plans increases with age, peaking in the 50-60 group (15 out of 69, 21.7%). Male respondents have a slightly higher acceptance rate (24 out of 255, 9.4%) than female (18 out of 144, 12.5%). Caste and acceptance also vary, with the "General" category showing the highest acceptance rate (33 out of 324, 10.2%).

Table 2: Contingency Table for Demographic Variables and Acceptance to Pension Plans

		Availed any Plans		Total
		No	Yes	
Age Group and Acceptance				
Age Group	Upto 30	78	3	81
	30-40	87	6	93
	40-50	66	9	75
	50-60	54	15	69
	Above 60	72	9	81
Gender and Acceptance				
Gender	Female	126	18	144
	Male	231	24	255
Caste and Acceptance				
Caste	General	291	33	324
	OBC	30	3	33
	SC	27	6	33
	ST	9	0	9
Marital Status and Acceptance				
Marital Status	Bachelor	90	6	96
	Married	261	36	297
	Widowed/Divorced/Separated	6	0	6
Employment Status and Acceptance				
Employment Status	Employed	120	15	135
	Entrepreneur	3	0	3
	Partially Employed	9	3	12
	Retired	54	12	66
	Self-Employed	90	12	102
	Unemployed	81	0	81
Working Sector and Acceptance				
Sector	Organised	137	21	158
	Unorganised	138	21	159
Family Size and Acceptance				
Family Size	1-2	84	15	99
	3-4	248	27	275
	5-7	13	0	13
	Above 7	12	0	12
Educational Qualifications and Acceptance				
Qualifications	Below 10th Std.	33	0	33
	10th Std.	21	0	21
	12th Std.	21	3	24
	Graduate/Diploma	192	27	219
	Post-Graduate/PG Diploma	78	9	87
	Professional/Vocational	3	0	3
	PhD	9	3	12
Individual Income and Acceptance				
Income Level	Upto 10000	30	3	33
	10000-20000	60	9	69
	20000-30000	45	0	45
	30000-50000	30	12	42
	50000-70000	27	0	27
	70000- 1 Lakh	24	3	27
	Above 1 lakh	45	9	54
	NA	81	0	81

	Cannot Disclose	15	6	21
Family Income and Acceptance				
Family Income Level	Upto 10K	45	3	48
	10K -20K	54	6	60
	20K -30K	63	0	63
	30K-50K	39	9	48
	50K-70K	24	3	27
	70K -1 L	33	9	42
	1L-1.5L	27	0	27
	Above 1.5L	72	12	84
Work-Experience and Acceptance				
Experience in years	Below 5 Yrs	48	3	51
	5 Yrs - 10 Yrs	72	3	75
	10 Yrs - 15 Yrs	33	9	42
	15 Yrs - 20 Yrs	30	3	33
	20 Yrs - 30 Yrs	33	9	42
	Above 30 Yrs	67	15	82
	Not Applicable	74	0	74
Column Total for each Contingency Table		357	42	399

Married individuals have the highest acceptance rate (36 out of 297, 12.1%), while bachelors exhibit lower acceptance (6 out of 96, 6.3%). Retired individuals and self-employed individuals have higher acceptance rates compared to employed individuals (15 out of 135, 11.1%). No pension plans were availed by entrepreneurs or unemployed respondents. Working sector acceptance rates are similar between organized and unorganized sectors. Family size acceptance rates are highest for smaller families (1-2 members), while acceptance drops significantly for larger family sizes (0 acceptance for family sizes of 5-7 and above 7). Higher education correlates with higher acceptance, with graduates/diploma holders and post-graduates/PG diploma holders having the highest rates. Individual income acceptance is higher among higher-income groups, with the "30000-50000" income bracket showing the highest rate (12 out of 42, 28.6%). Family income acceptance rates increase with family income, peaking in the "Above 1.5L" bracket (12 out of 84, 14.3%). Work experience acceptance increases with experience, with those with "Above 30 years" experience showing the highest rate (15 out of 82, 18.3%).

Table 2 postulates that acceptance to pension plan is positively linked to factors like age, income, family size, and education. However, certain groups, like ST caste, widowed/divorced individuals, unemployed, and those with lower education, show zero participation. Both organized and unorganized sector workers have comparable acceptance.

Table 3 summarizes the statistical outcomes of tests performed to determine the relationship between various demographic variables and the acceptance of Pension plans. The Chi-square or Fisher's Exact Test was used, depending on the appropriateness for the data, and Cramer's V was calculated where applicable to measure the strength of association.

Table 3: Hypotheses Tests Outcomes

Demographic Variable	χ^2/Fisher's Exact Test	df	p-value	Cramer's V (p-value)	Conclusion
Age	15.056	4	0.005	0.19 (0.000)	Reject $H1_0$
Gender	0.932	1	0.334	-	Accept $H2_0$
Caste	2.557*	-	0.439	-	Accept $H3_0$
Marital Status	2.662*	-	0.254	-	Accept $H4_0$
Employment Status	21.308*	-	0.000	0.20 (0.000)	Reject $H5_0$
Working Sector	.000	1	0.982	-	Accept $H6_0$
Family Size	3.983*	-	0.209	-	Accept $H7_0$
Education	10.543*	-	0.073	0.11 (0.000)	Accept $H8_0$
Individual Income	72.25*	-	0.000	0.32 (0.000)	Reject $H9_0$
Family Income	21.555	7	.003	0.23 (0.000)	Reject $H10_0$
Working Experience	29.190	6	.000	0.27 (0.000)	Reject $H11_0$

No. of Valid Cases: 399* Fisher's Exact Test is applied since Chi-square is less reliable.

The study found a significant association between age and pension plan acceptance ($\chi^2 = 15.056$, $p = 0.005$). The weak but meaningful effect size (Cramer's V = 0.19, p = 0.000) suggests that older individuals, particularly those aged 50 - 60 and above 60, were more likely to opt for pension plans. Employment status strongly influenced pension plan uptake (Fisher's Exact Test, p = 0.000, Cramer's V = 0.20). Retirees and formally employed individuals likely drove this trend. The strongest predictor of pension plan acceptance (Fisher's Exact Test, p = 0.000, Cramer's V=0.32) is individual income, indicating higher-income groups (e.g., ₹30,000 - 50,000 and above ₹1 lakh) were more likely to enroll. Higher family income correlated with greater acceptance (χ^2 = 21.555, p = 0.003, Cramer's V=0.23), mirroring individual income trends. Likewise, longer work experience significantly predicted pension plan adoption (χ^2 = 29.190, p = 0.000, Cramer's V=0.27), with the highest acceptance among those with over 30 years of experience. While the statistical evidence for education's influence is borderline (Fisher's Exact Test, p = 0.073), the practical

patterns in the data suggest that higher education levels weakly but meaningfully correlate Cramer's V = 0.32), with pension plan acceptance. This aligns with global trends linking education to financial preparedness.

The study also finds no significant association between gender, caste, marital status, working sector, or family size and acceptance to pension plans. There exists no significant difference in acceptance rates between males and females, no significant variation in pension plan uptake by caste categories, no detectable impact of marital status, identical acceptance rates in organized and unorganized sectors, and no association observed with family size, with no uptake in larger families (5+ members).

The study finds that acceptance of savings among 50-60-year-olds is highest at 21.7%, aligning with the Life Cycle Hypothesis. The highest uptake was observed in the ₹30,000-50,000 bracket, indicating liquidity as a prerequisite for savings. Graduates showed higher acceptance, suggesting regional financial literacy gaps. South Bengal showed no gender gap, despite global trends, possibly due to progressive urban norms or sampling bias towards educated women. There were no caste-based disparities, possibly due to affirmative policies and urbanization diluting traditional hierarchies.

The analysis highlights that certain demographic variable, such as age, employment status, individual income, family income, and working experience, have significant effects on pension plans. Conversely, variables such as gender, caste, marital status, working sector, family size, and do not show significant associations. The study found a weak but non-random association between education and pension plan acceptance.

Conclusions

This study highlights the critical role of demographic factors in shaping the acceptance of pension plans among individuals in South Bengal. The findings reveal that variables such as age, employment status, individual income, family income, and work experience significantly influence pension plan acceptance, underscoring their importance in targeted policy interventions. Older individuals, those with higher incomes, and those with substantial work experience were more likely to adopt pension plans, indicating the influence of financial stability and life stage on retirement planning decisions.

Conversely, gender, caste, marital status, working sector, and family size were not found to have a significant impact on pension plan acceptance, demonstrating that these factors do not strongly affect retirement planning behaviors in the studied population. Education showed a weak yet notable association with pension acceptance, reinforcing the need for enhanced financial literacy initiatives to promote awareness and adoption.

The study underscores the importance of tailored interventions, such as simplified pension products, increased accessibility, and financial education programs, particularly targeting low-income groups and younger individuals. These measures can address gaps in pension adoption and improve financial security in the region. Pension Plan sellers can partner NGOs for age-targeted campaigns and design low-premium pension schemes for informal workers.

By bridging the gap in research specific to West Bengal, this study provides actionable insights for policymakers and financial institutions to drive higher pension plan participation rates, contributing to a more inclusive and sustainable retirement system. Future studies should use stratified sampling to better represent rural populations and use mixed methods approaches like interviews to uncover qualitative barriers like institutional distrust.

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