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Understanding The Relative Relationship Between Occupation and Investment Objectives Using Correspondence Analysis

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ABSTRACT

PURPOSE

The investments are being done by women of all walks of life, irrespective of age, marital status, education and occupational status. An attempt has been made to understand the relationship between the occupation and the reasons for which investments are made, namely the investment objectives. The investment objectives vary amongst the individuals and the study tries to understand those objectives preferred by women investors working in various occupations.

METHODOLOGY

For the purpose of study, women investors working in private organisation, government organisation, doing business and practising professionals have been identified. There are 12 investment objectives which have been identified for the study and responses were collected through a structured questionnaire circulated through google forms. To understand the relationship, Correspondence Analysis has been used to visualize the relationship through biplots.

FINDINGS

The biplot has been discussed with respect to relationship between occupation and investment objectives and valuable interpretations have been made. It could be understood from the analysis, there are certain objectives preferred by women investors for their investment decisions and some objectives were not considered at all.

PRACTICAL IMPLICATIONS

The investment avenues offered by financial institutions should be designed and framed according to the preferred objectives of women investors and marketed accordingly.

ORIGINALITY

The research article is first of its kind in understand the relative relationship between occupation and investment objectives of women investors in India and presenting the analysis through visual presentation for better understanding.

Keywords: *Women Investors, Occupation, Investment objectives, Correspondence Analysis*

1. INTRODUCTION

Women investors are playing a significant role in the world of finance, savings and investment. Historically, women have not been actively participating in investment, though there were considerable number of women participating in workforce and earning a considerable income. At present, this trend is gradually changing as women have understood the importance

of managing their money on their own and have become actively involved in managing their finances and investing their money.

There has been a clear upsurge in the number of women participating in investment activities in recent years. This is possible due to various reasons like greater access to financial education and opportunities, as well as shifting cultural norms.

Research suggests that women often have different investment preferences compared to men. They prefer investments which has a long-term perspective like term deposits, gold etc., prefer to take less risk, and show a preference for sustainable or socially responsible investments. (Priya & Seema, 2013, Bayyurt et.al, 2013)

Despite the growing presence of women in investment, there are still challenges and

barriers they face. Despite the increasing involvement of women in various investment opportunities, there remains uncertainty regarding whether women across different sectors and occupations are actively engaging in investment activities with clearly defined investment objectives. Investment objectives can be identified as financial goals which individual investors would like to achieve with their investments. There are multifarious objectives starting from safety, income, wealth appreciation, meeting Childrens' needs etc.

There are also research studies which have considered other variables like risk and return have proved that occupation has a major role in deciding investment objectives. (Maheswari and Mittal, 2017, Mathew and Kumar,2022, Subramaniyam,2016).

The study has been divided into 8 sections: Section 2 deals with the objective of the article; Section 3 deals with the various research articles that deals with association of occupation with investment objectives; Section 4 describes the methodology; Section 5 analyses the results of the study; Section 6 discusses the study, and Section 7 concludes the study.

2. OBJECTIVE

An attempt has been made to understand the perspectives of women investors on their investments based on their occupation and analyse the relationship between the occupation and investment objectives

The objective of this article is to discover the relationship between the occupation of women investors and their investment objectives. Their exists a relative relationship between and within occupation and investment objectives and helps to measure similarities between investment objectives in terms of their relationships with occupation.

The following Occupation has been used for the study: (a). Employed in Private Organisation, (b). Employed in Government Organisation, (c). Doing Business, (d). Practising Professional, (e). Others

Investment objectives have been listed as follows: (a). Safety, (b). Income, (c). Wealth Creation, (d). Tax benefits, (e). Children's education/Marriage etc, (f). Retirement Planning, (g). Purchase of Home, (h). Medical expenses, (i). Returns, (j). Prestige, (k). Stability, and

(l). Transferability

3. REVIEW OF LITERATURE

The study revolves around the relationship between occupation and investment objectives of women investors and so the effort has been made to understand the relationship by reviewing various research studies undertaken in this relationship.

Ikeobi and Arenzi (2016) have studied the association between employment status and investment objectives and were able to prove that employment status has a significant influence on five objectives namely short-term price increase, long term price increase, security, dividend income and speculation investment objectives.

Bishnoi (2014) has analysed investment objectives based on occupation and concluded that safety has been most preferred objective among business, private sector employees and professionals, while public sector employees preferred tax savings as the preferred objective. They have also observed that investors doing business prefer capital appreciation as the second preferred objective when compared to other profession.

Maheswari and Mittal,(2017) have concluded in their study that preferences for investment objectives differ with investors employed in different occupation. Mathew and Kumar (2022) have conducted ANOVA test to understand the factors that are likely to influence the investment decisions based on their occupation and have concluded that there is a significant difference between the factors namely, return, risk, past performance, safety, liquidity and diversification and the occupation of various investors working in different sectors.

Subramaniam (2016) used Chi-square tests to understand the association between occupation and risk tolerance, and has concluded that there is no significant difference between risk tolerance and occupation. Das and Jain (2014) have analysed four objectives namely risk, return, retirement and tax with reference to occupation through Kruskal Wallis Test and have proved that occupation is able to exert influence on return, retirement and tax benefits but no influence on risk.

A study has been undertaken on factors or the investment objectives namely interest rates, risk and return, regular income,

safety and security and tax benefits exclusively for IT Professionals and have concluded that reduced interest rates, tax benefits and regular income are the objectives which has an impact on IT professionals. (Shaik et.al.,2022). Bhatt and Prajapati (2021) have analysed five investment objectives namely, long term growth, risk, return, retirement income and liquidity with respect to occupation and have concluded that occupation has an influence on long term growth and risk and has no effect on other objectives.

A different inference has been proved in a thesis with a clause that regarding risky investments, occupation has no role to play. (Anusha, 2012).

The research studies discussed above established the association between occupation and investment objectives but there have been no studies so far which has analysed a qualified relationship between the two variables. So, a research gap is identified and an effort to understand the relationship and the extent and magnitude of such relationships through relative relationships namely Correspondence Analysis.

4. RESEARCH METHODOLOGY

The study was conducted through a structured questionnaire and a total of 853 samples were collected from respondents of working women across various sectors in Chennai.

The study analyses the occupation and investment pattern by discriminating and displaying in same graphical display, allowing for better visualisation of the relationships among the variables and for which no specific hypothesis has been formulated.

4.1 Correspondence Analysis

Correspondence analysis has been used to understand the relative relationships between occupation and investment objectives, where the nature and structure of relationships between the variables which are evaluated in nominal scales are being described. Correspondence Analysis has been considered as a subset of Principal Component Analysis applied in rows and columns and useful for cross tabulation. (Soral, 2021).

Correspondence analysis and factor analysis are similar in that aspect where both the techniques reduce the variation in the model by calculating minimum number of factors that explains the most variation in the model. Factor analysis explains the covariance between variables by determining those variables going together. Correspondence Analysis explains the association between the two variables. (Doey and Kurta,2011).

Correspondence analysis has been compared with Cluster analysis which discovers whether the different variables are related to each other, whereas correspondence analysis explains how the variables are related. (Doey and Kurta,2011).

5. ANALYSIS & INTERPRETATION

The study has been analysed through Correspondence Analysis which has been explained in the following outputs from SPSS.

Table 5.1: The Objectives have been symbolized as follows:

Objectives	Symbol	Objectives	Symbol
Safety	A	Income	B
Wealth Creation	C	Tax benefits	D
Children's education/Marriage etc	E	Retirement Planning	F
Purchase of Home	G	Medical Expenses	H
Returns	I	Prestige	J
Stability	K	Transferability	M

5.1 **Correspondence Table** – includes the frequencies of each of the rows and columns and calculates the total of rows and columns called the "Active Margin".

Table 5.2: Correspondence Table

Occupation	Objectives												
	A	B	C	D	E	F	G	H	I	J	K	L	Active Margin
Employed in Private Organisation	97	75	80	57	83	23	3	7	7	3	2	4	441
Employed in Govt Organisation	10	9	19	11	33	1	0	1	1	1	0	0	86
Doing Business	13	14	18	14	70	4	2	0	2	0	1	0	138
Practising Professional	10	8	14	10	45	2	1	0	0	1	2	0	93
Others	27	16	13	7	25	1	1	1	0	2	2	0	95
Active Margin	157	122	144	99	256	31	7	9	10	7	7	4	853

5.2 **Row Profiles** – the figures in the table represents the weighted frequency of each of the row points, and the total of the whole row is 1. The calculation of row profiles (the values are taken from Correspondence Table): Row profile = each row point/Active Margin Eg., For the row Employed in Private Organisation, the cell value of Column A = 97/441 = 0.2199 = 0.22 Mass represents calculations which are useful in computing distances between points. The Row Mass is calculated thus: Mass for Column A = Active Margin of A/Total Active Margin = 157/853 = 0.184

Table 5.3: Row Profiles

Occupation	Objectives												
	A	B	C	D	E	F	G	H	I	J	K	L	Mass
Employed in Private Organisation	.618	.615	.556	.576	.324	.742	.429	.778	.700	.429	.286	1.00	.517
Employed in Govt Organisation	.064	.074	.132	.111	.129	.032	0.00	.111	.100	.143	0.00	0.00	.101
Doing Business	.083	.115	.125	.141	.273	.129	.286	0.00	.200	0.00	.143	0.00	.162
Practising Professional	.064	.066	.097	.101	.176	.065	.143	0.00	0.00	.143	.286	0.00	.109
Others	.172	.131	.090	.071	.098	.032	.143	.111	0.00	.286	.286	0.00	.111
Active Margin	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

5.3 **Column Profiles** – the figures in the table represents the weighted frequency of each of the column points, and the total of the whole row is 1. The calculation of column profiles (the values are taken from Correspondence Table): Column profile = each column point/Active Margin Eg., For the column A, the cell value of Row Employed in Private organisation = 97/157 = 0.6178 = 0.618 Mass represents calculations which are useful in computing distances between points. Likewise, the Column Mass is calculated thus: Mass for Column A = Active Margin of A/Total Active Margin = 441/853 = 0.51699 = 0.517

Table 5.4: Column Profiles

Summary								
					Proportion of Inertia		Confidence Singular Value	
Dimension	Singular Value	Inertia	Chi Square	Sig.	Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.316	.100			.764	.764	.032	.000
2	.145	.021			.162	.925	.035	
3	.087	.008			.057	.982		
4	.048	.002			.018	1.000		
Total		.131	111.728	.000[a]	1.000	1.000		

5.4 **Summary Table** – the important table which is used for interpretation of Correspondence Analysis. The Chi square value in the table denotes the total variance explained along the associated probability. The Chi square value is 111.728 with significance value < 0.05. So, it is concluded that there is a significant relationship between occupation and investment objectives.

The model has been able to produced 4 dimensions that are interpretable, which are inter-point distances calculated through Principal Component Analysis

The Total Variance explained by each dimension is called Inertia, which is 0.131 or 13.1%. Dimension 1 has contributed the maximum variance with 10%, Dimension 2 with 2.1%, Dimension 3 with 0.8% and Dimension 4 with 0.2%.

The Singular Value in the model is square root of Inertia. For Dimension 1, Singular value = $\sqrt{0.100} = 0.316$.

The Values in Proportion of Inertia Accounted for represents the percentage of variance which each dimension explains to the total inertia. Dimension 1 has contributed 76.4% of the total 13.1%, which is 0.1 divided by 0.131and Dimension 2 has contributed 16.2% of the total 13.1%.

Table 5.5: Summary Table

Summary								
					Proportion of Inertia		Confidence Singular Value	
Dimension	Singular Value	Inertia	Chi Square	Sig.	Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.316	.100			.764	.764	.032	.000
2	.145	.021			.162	.925	.035	
3	.087	.008			.057	.982		
4	.048	.002			.018	1.000		
Total		.131	111.728	.000[a]	1.000	1.000		

5.5 **Overview Row Points** – The information regarding plotting of each of the row points in biplot are given in this table.

In Mass column, Employed in Private Organisation' has a mass of 0.517, indicating it constitutes approximately 51.7% of the data.

The sign and magnitude of the scores in each dimension help in understanding the relationship between categories. Categories with similar scores are positioned closer together, indicating similar profiles. Doing Business has scores of 0.836 in Dimension 1 and 0.201 in Dimension 2, suggesting its association with the positive end of Dimension 1.

Score in Dimension column represents the coordinates in each dimension and each row category will be situated on the biplot.

Inertia quantifies the dispersion of data points (profiles) around the centroid (average profile) in a multidimensional space. It serves as an indicator of the variance within the dataset, reflecting the degree of association between categorical variables. Higher inertia values suggest greater deviation from independence, indicating stronger relationships among the variables. The loading of each of the points into dimension is represented in Contribution column of Point of Inertia of dimension and the extent to which extraction of dimensions explains each of the points. For example, Employed in Private Organisation loads in Dimension 1 with 36.1% and loads only 8.2% in Dimension 2. Also Dimension 1 explains 94.9% of the variance in Employed in Private Organisation across Investment Objectives.

Table 5.6: Overview Row Points

Occupation	Mass	Score in Dimension		Inertia	Contribution				
					Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		
		1	2		1	2	1	2	Total
Employed in Private Organisation	.517	-.470	.152	.038	.361	.082	.949	.046	.995
Employed in Govt Organisation	.101	.389	.264	.012	.048	.048	.416	.088	.504
Doing Business	.162	.836	.201	.039	.357	.045	.920	.025	.945
Practising Professional	.109	.805	-.230	.025	.223	.040	.907	.034	.941
Others	.111	-.174	-1.012	.018	.011	.785	.060	.928	.987
Active Total	1.000			.131	1.000	1.000			

5.6 **Overview Column Points** - The information regarding plotting of each of the column points in biplot are given in this table. Score in Dimension column represents the coordinates in each dimension and each column category will be situated on the biplot.

Inertia quantifies the dispersion of data points around the centroid in a multidimensional space, serving as an indicator of variance within the dataset. It reflects the degree of association between categorical variables; higher inertia values suggest greater deviation from independence, indicating stronger relationships among variables. Each data point's contribution to a dimension is represented in the contribution column, which shows how much each point influences the inertia of that dimension. For instance, if 'Children's Education/Marriage' (symbolized as E) loads 59.7% in Dimension 1 and not in Dimension 2, it means Dimension 1 accounts for 99.8% of the variance in 'Children's Education/Marriage' across occupations. This highlights the significance of Dimension 1 in explaining the variability of this category.

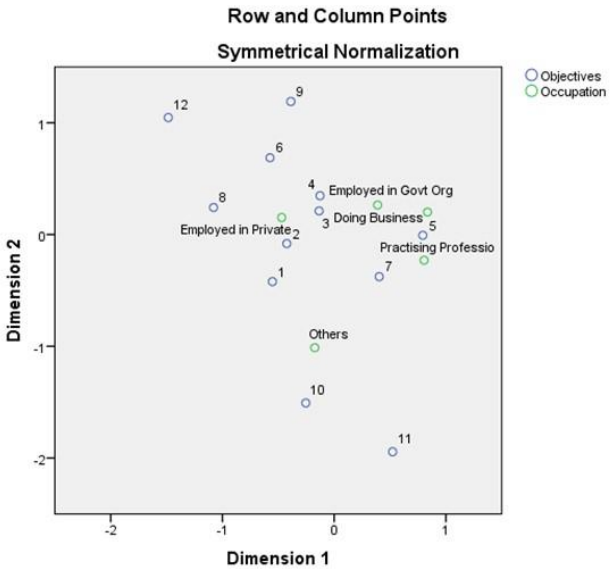
Table 5.7: Overview Column Points

Objectives	Mass	Score in Dimension		Inertia	Contribution				
					Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		
		1	2		1	2	1	2	Total
Safety	.184	-.553	-.421	.023	.178	.224	.781	.208	.990
Income	.143	-.424	-.081	.009	.081	.006	.945	.016	.960
Wealth Creation	.169	-.135	.211	.004	.010	.052	.219	.249	.468

Tax Benefits	.116	-.126	.348	.003	.006	.096	.196	.683	.880
Children's education	.300	.793	-.007	.060	.597	.000	.998	.000	.998
Retirement Planning	.036	-.575	.687	.008	.038	.118	.463	.304	.768
Purchase of Home	.008	.403	-.377	.002	.004	.008	.223	.090	.313
Medical Expenses	.011	-1.079	.242	.004	.039	.004	.913	.021	.934
Returns	.012	-.388	1.191	.003	.006	.114	.162	.701	.863
Prestige	.008	-.254	-1.507	.004	.002	.128	.043	.691	.734
Stability	.008	.523	-1.944	.006	.007	.213	.113	.718	.831
Transferability	.005	-1.485	1.047	.004	.033	.035	.746	.171	.917
Active Total	1.000			.131	1.000	1.000			

5.7 **Biplot** – provides a visual display of each of the values in the dataset with axes plotted in the biplot. A global view of the trends can be provided within the data. Since two dimensions are considered, the results have been displayed in 2D form in the biplot. Similarity or dissimilarity can be understood from the distance between row and column points. Similar profiles have points mapped close to one another and different profiles have points mapped far away from one another.

Figure 1: Biplot



6. DISCUSSION

The study has been undertaken to understand the relative relationships between occupation and investment objectives and has tried to delineate some useful relationships between these two variables.

The Total Inertia being 13.1% explains that there is a significant relationship between occupation and investment objectives, as the Chi square value is high and the relationship between two variables is moderate. It can be explained that Occupation is able to impact the investment objectives to a moderate level.

For the purpose of study, as far as the dimensions are concerned, only Dimension 1 and Dimension 2 has been taken for study as the total variance of both accounts for 92.5% of 13.1. The dimensions can be roughly equated to Factors in Factor Analysis.

The Occupation Employed in Private Organisation and Doing Business with values 36.1% and 35.7% respectively provide significant contribution to explain variance in Dimension 1, Practising Professional with value 22.3% provides next significant contribution to Dimension 1. The Occupation Others with value 78.5% provide significant contribution to

Dimension 2. The Objective Childrens' education/Marriage etc symbolized as E with value 59.7% provide significant contribution to explain variance in Dimension 1. The Objectives Safety and Stability with values 22.4% and 21.3% provide significant contribution to explain variance in Dimension 2.

The biplot has been analysed thus: Occupations Employed in Govt Organisation and Doing Business have Wealth Creation, Tax benefits and Childrens' education/Marriage etc., as their most preferred investment objectives and Purchase of home as the second preferred objective. Practising Professionals have Purchase of home and Childrens' education/Marriage etc as their most preferred investment objectives and Wealth creation and tax benefits as the second most preferred investment objectives. The Occupation Employed in Private Organisation have Income, Safety and Medical expenses as their most preferred investment objectives. The four occupations mentioned above also prefer Retirement Planning as an important objective in their investment decisions.

The objectives Returns, Prestige, Stability and Transferability are farther away from the Occupations implying that these objectives are not considered important by women investors.

7. CONCLUSION

Correspondence analysis has been used to understand the relationship between occupation and investment objectives. The study has undertaken to delineate which objectives are considered important which investing in various investment avenues and to understand the preference of various objectives among women investors working in various occupations. There are research articles which have discussed about the investment objectives in relation to occupation, but as far as the knowledge of researcher is concerned, this article is first of its kind to discuss about the relative relationship between occupation and investment objectives. The study can be taken as a reference point by financial institutions for framing investments for specific objectives and offering investments to women investors emphasising the objective for which the investment is offered. There are schemes which do portray the objective like Sukanya Samriddi Yojana or Insurance schemes, still this can be extended to all types of investments.

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