

INVESTORS OPINION ON RISK IN MUTUALFUND

Submitted in partial fulfillment of the requirements for the award of
Master of Business Administration

By

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DEPARTMENT OF BUSINESS ADMINISTRATION
SCHOOL OF MANAGEMENT STUDIES

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by AICTE
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **TAMILSELVAN P 39410256** who carried out the project entitled “**INVESTORS OPINION ON RISK IN MUTUAL FUND**” under my supervision from January 2021 to March 2021.

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Submitted for Viva voce Examination held on _____

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DECLARATION

I **TAMILSELVAN P 39410256** hereby declare that the Project Report entitled **Customer perception towards Online Shopping Applications** is done by me under the guidance of Dr.UMAMAHESHWARI M.A., MBA, M.Phil., Ph.D at SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY, CHENNAI is submitted in partial fulfillment of the requirements for the award of Master of Business Administration degree.

DATE:

PLACE:

SIGNATURE OF THE CANDIDATE

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ABSTRACT

Mutual fund industry has developed rapidly and gained a lot of popularity from the past couple of decade, especially after incorporation of unit Trust of india in 1964. There has concomitantly evolved a rich plausible academic literature consisting of numerous topics related to mutual funds. One of the most frequently addressed topics in the current literature is Investor's perception and preferences about various mutual funds schemes and the factors which influence different class of investors to invest in mutual funds. With the background, a survey was conducted among 100 mutual fund investors. On the basis of literature review, it reveals that safety, past return and liquidity are the most influencing factors in indicating most of the investors' opinion on mutual fund schemes.

Investors achieve important advantages from mutual funds such as expert professional management, reduction in risk, diversified portfolios, liquidity of investment, tax benefits and economies of scale. The interests of the investors are protected by SEBI.

Individual investors have developed keen interest in the capital market, attaining higher returns and capital gains along with fiscal concessions. Since small investors generally do not have sufficient time, knowledge, experience and resources for directly approaching the capital market, they have to rely on an intermediary which undertakes informed investment decisions and provides the benefits of professional expertise. This is what a mutual fund does. Mutual funds are governed by SEBI.

SEBI has the authority to issue guidelines and to supervise and regulate the working of mutual funds through Mutual Funds Regulations, 1993 have been amended from time to time. Mutual funds provide stability and sustainability to the stock market also.

Mutual funds in India provide linkage among various financial institutions operating in the money and capital markets with which the household and corporate sectors are closely linked. They mobilise personal savings and enable small and medium investors to reap benefits of their investments.

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CHAPTER INTRODUCTION

INTRODUCTION:

BASICS OF MUTUAL FUNDS

Before explaining what is mutual fund, it's very important to know the area in which mutual funds works, the basic understanding of stocks and bonds. **STOCKS** Stocks represent shares of ownership in a public company. Examples of public companies include Reliance, ONGC and Infosys. Stocks are considered to be the most common owned investment traded on the market.

BONDS Bonds are basically the money which you lend to the government or a company, and in return you can receive interest on your invested amount, which is back over predetermined amounts of time.

Bonds are considered to be the most common lending investment traded on the market. There are many other types of investments other than stocks and bonds (including annuities, real estate, and precious metals), but the majority of mutual funds invest in stocks and/or bonds.

A Mutual Fund is a trust that pools the savings of a number of investors who share a common financial goal. The money thus collected is then invested in capital market instruments such as shares, debentures and other securities. The income earned through these investments and the capital appreciation realised are shared by its unit holders in proportion to the number of units owned by them. Thus a Mutual Fund is the most suitable investment for the common man as it offers an opportunity to invest in a diversified, professionally managed basket of securities at a relatively low cost.

The flow chart below describes broadly the working of a mutual fund: Mutual funds are considered as one of the best available investments as compare to others they are very cost efficient and also easy to invest in, thus by pooling money together in a mutual fund, investors can purchase stocks or bonds with much lower trading costs than if they tried to do it on their own. But the biggest advantage to mutual funds is diversification, by minimizing risk & maximizing returns.

DIVERIFICATION

Diversification is nothing but spreading out your money across available or different types of investments. By choosing to diversify respective investment holdings reduces risk tremendously up to certain extent. The most basic level of diversification is to buy multiple stocks rather than just one stock. Mutual funds are set up to buy many stocks.

Beyond that, you can diversify even more by purchasing different kinds of stocks, then adding bonds, then international, and so on. It could take you weeks to buy all these investments, but if you purchased a few mutual funds you could be done in a few hours because mutual funds automatically diversify in a predetermined category of investments (i.e. - growth companies, emerging or mid size companies, low-grade corporate bonds, etc).

HISTORY OF THE INDIAN MUTUAL FUND INDUSTRY:

The mutual fund industry in India started in 1963 with the formation of Unit Trust of India, at the initiative of the Government of India and Reserve Bank of India. The history of mutual funds in India can be broadly divided into four distinct phases.

First Phase – 1964-87

Unit Trust of India (UTI) was established on 1963 by an Act of Parliament. It was set up by the Reserve Bank of India and functioned under the Regulatory and administrative control of the Reserve Bank of India. In 1978 UTI was de-linked from the RBI and the Industrial Development Bank of India (IDBI) took over the regulatory and administrative control in place of RBI. The first scheme launched by UTI was Unit Scheme 1964. At the end of 1988 UTI had Rs.6,700 crores of assets under management.

Second Phase – 1987-1993

(Entry of Public Sector Funds) 1987 marked the entry of non- UTI, public sector mutual funds set up by public sector banks and Life Insurance Corporation of India (LIC) and General Insurance Corporation of India (GIC). SBI Mutual Fund was the first non- UTI Mutual Fund established in June 1987 followed by Canbank Mutual Fund (Dec 87), Punjab National Bank Mutual Fund (Aug 89), Indian Bank Mutual Fund (Nov 89), Bank of India (Jun 90), Bank of Baroda Mutual Fund (Oct 92). LIC established its mutual fund in June 1989 while GIC had set up its mutual fund in December 1990. At the end of 1993, the mutual fund industry had assets under management of Rs.47,004 crores.

Third Phase – 1993-2003

(Entry of Private Sector Funds) With the entry of private sector funds in 1993, a new era started in the Indian mutual fund industry, giving the Indian investors a wider choice of fund families. Also, 1993 was the year in which the first Mutual Fund Regulations came into being, under which all mutual funds, except UTI were to be registered and governed. The erstwhile Kothari Pioneer (now merged with Franklin Templeton) was the first private sector mutual fund registered in July 1993. The 1993 SEBI (Mutual Fund) Regulations were substituted by a more comprehensive and revised Mutual Fund Regulations in 1996. The industry now functions under the SEBI (Mutual Fund) Regulations 1996.

The number of mutual fund houses went on increasing, with many foreign mutual funds setting up funds in India and also the industry has witnessed several mergers and acquisitions. As at the end of January 2003, there were 33 mutual funds with total assets of Rs. 1,21,805 crores. The Unit Trust of India with Rs.44,541 crores of assets under management was way ahead of other mutual funds.

Fourth Phase – since February 2003

In February 2003, following the repeal of the Unit Trust of India Act 1963 UTI was bifurcated into two separate entities. One is the Specified Undertaking of the Unit Trust of India with assets under management of Rs.29,835 crores as at the end of January 2003, representing broadly, the assets of US 64 scheme, assured return and certain other schemes. The Specified Undertaking of Unit Trust of India, functioning under an administrator and under the rules framed by Government of India and does not come under the purview of the Mutual Fund Regulations. The second is the UTI Mutual Fund, sponsored by SBI, PNB, BOB and LIC. It is registered with SEBI and functions under the Mutual Fund Regulations. With the bifurcation of the erstwhile UTI which had in March 2000 more than Rs.76,000 crores of assets under management and with the setting up of a UTI Mutual Fund, conforming to the SEBI Mutual Fund Regulations, and with recent mergers taking place among different private sector funds.

TYPES OF MUTUAL FUND SCHEMES

Wide variety of Mutual Fund Schemes exists to cater to the needs such as financial position, risk tolerance and return expectations etc. thus mutual funds has Variety of flavors, Being a collection of many stocks, an investors can go for picking a mutual fund might be easy. There are over hundreds of mutual funds scheme to choose from. It is easier to think of mutual funds in categories, mentioned below

Overview of existing schemes existed in mutual fund category: BY STRUCTURE

Open - Ended Schemes:

An open-end fund is one that is available for subscription all through the year. These do not have a fixed maturity. Investors can conveniently buy and sell units at Net Asset Value ("NAV") related prices. The key feature of open-end schemes is liquidity.

Close - Ended Schemes:

These schemes have a pre-specified maturity period. One can invest directly in the scheme at the time of the initial issue. Depending on the structure of the scheme there are two exit options available to an investor after the initial offer period closes. Investors can transact (buy or sell) the units of the scheme on the stock exchanges where they are listed. The market price at the stock exchanges could vary from the net asset value (NAV) of the scheme on account of demand and supply situation, expectations of unitholder and other market factors.

Alternatively some closeended schemes provide an additional option of selling the units directly to the Mutual Fund through periodic repurchase at the schemes NAV; however one cannot buy units and can only sell units during the liquidity window. SEBI Regulations ensure that at least one of the two exit routes is provided to the investor.

Interval Schemes:

Interval Schemes are that scheme, which combines the features of open-ended and close-ended schemes. The units may be traded on the stock exchange or may be open for sale or redemption during pre-determined intervals at NAV related prices.

Overview of existing schemes existed in mutual fund category: BY NATURE

1. Equity fund:

These funds invest a maximum part of their corpus into equities holdings. The structure of the fund may vary different for different schemes and the fund manager's outlook on different stocks. The Equity Funds are sub-classified depending upon their investment objective, as follows: • Diversified Equity Funds • Mid-Cap Funds • Sector Specific Funds • Tax Savings Funds (ELSS) Equity investments are meant for a longer time horizon, thus Equity funds rank high on the riskreturn matrix.

2. Debt funds:

The objective of these Funds is to invest in debt papers. Government authorities, private companies, banks and financial institutions are some of the major issuers of debt papers. By investing in debt instruments, these funds ensure low risk and provide stable income to the investors. Debt funds are further classified as: • Gilt Funds: Invest their corpus in securities issued by Government, popularly known as Government of India debt papers. These Funds carry zero Default risk but are associated with Interest Rate risk. These schemes are safer as they invest in papers backed by Government. • Income Funds: Invest a major portion into various debt instruments such as bonds, corporate debentures and Government securities. • MIPs: Invests maximum of their total corpus in debt instruments while they take minimum exposure in equities. It gets benefit of both equity and debt market. These scheme ranks slightly high on the risk-return matrix when compared with other debt schemes. • Short Term Plans (STPs): Meant for investment horizon for three to six months. These funds primarily invest in short term papers like Certificate of Deposits (CDs) and Commercial Papers (CPs). Some portion of the corpus is also invested in corporate debentures. • Liquid Funds: Also known as Money Market Schemes, These funds provides easy liquidity and preservation of capital. These schemes invest in short-term instruments like Treasury Bills, inter-bank call money market, CPs and CDs. These funds are meant for short-term cash management of corporate houses and are meant for an investment horizon of 1day to 3 months. These schemes rank low on risk-return matrix and are considered to be the safest amongst all categories of mutual funds.

3. Balanced funds:

As the name suggest they, are a mix of both equity and debt funds. They invest in both equities and fixed income securities, which are in line with pre-defined investment objective of the scheme. These schemes aim to provide investors with the best of both the worlds. Equity part provides growth and the debt part provides stability in returns. Overview of existing schemes existed in mutual fund category:

Overview of existing schemes existed in mutual fund category: BY INVESTMENT

OBJECTIVES

- **Growth Schemes:** Growth Schemes are also known as equity schemes. The aim of these schemes is to provide capital appreciation over medium to long term. These schemes normally invest a major part of their fund in equities and are willing to bear short-term decline in value for possible future appreciation.
- **Income Schemes:** Income Schemes are also known as debt schemes. The aim of these schemes is to provide regular and steady income to investors. These schemes generally invest in fixed income securities such as bonds and corporate debentures. Capital appreciation in such schemes may be limited.
- **Balanced Schemes:** Balanced Schemes aim to provide both growth and income by periodically distributing a part of the income and capital gains they earn. These schemes invest in both shares and fixed income securities, in the proportion indicated in their offer documents (normally 50:50).
- **Money Market Schemes:** Money Market Schemes aim to provide easy liquidity, preservation of capital and moderate income. These schemes generally invest in safer, short-term instruments, such as treasury bills, certificates of deposit, commercial paper and inter-bank call money.
- **Other schemes:**
 - Tax Saving Schemes:** Tax-saving schemes offer tax rebates to the investors under tax laws prescribed from time to time. Under Sec.88 of the Income Tax Act, contributions made to any Equity Linked Savings Scheme (ELSS) are eligible for rebate.
 - Index Schemes:** Index schemes attempt to replicate the performance of a particular index such as the BSE Sensex or the NSE 50. The portfolio of these schemes will consist of only those stocks that constitute the index. The percentage of each stock to the total holding will be identical to the stocks index weightage. And hence, the returns from such schemes would be more or less equivalent to those of the Index.
 - Sector Specific Schemes:** These are the funds/schemes which invest in the securities of only those sectors or industries as specified in the offer documents. e.g. Pharmaceuticals, Software, Fast Moving Consumer Goods (FMCG), Petroleum stocks, etc. The returns in these funds are dependent on the performance of the respective sectors/industries. While these funds may give higher returns, they are more risky compared to diversified funds. Investors need to keep a watch on the performance of those sectors/industries and must exit at an appropriate time.

PROS AND CONS OF MUTUAL FUNDS

For investments in mutual fund, one must keep in mind about the Pros and cons of investments in mutual fund.

Advantages of Investing Mutual Funds:

1. Professional Management - The basic advantage of funds is that, they are professional managed, by well qualified professional. Investors purchase funds because they do not have the time or the expertise to manage their own portfolio. A mutual fund is considered to be relatively less expensive way to make and monitor their investments.
2. Diversification - Purchasing units in a mutual fund instead of buying individual stocks or bonds, the investors risk is spread out and minimized up to certain extent. The idea behind diversification is to invest in a large number of assets so that a loss in any particular investment is minimized by gains in others.
3. Economies of Scale - Mutual fund buy and sell large amounts of securities at a time, thus help to reducing transaction costs, and help to bring down the average cost of the unit for their investors.
4. Liquidity - Just like an individual stock, mutual fund also allows investors to liquidate their holdings as and when they want.
5. Simplicity - Investments in mutual fund is considered to be easy, compare to other available instruments in the market, and the minimum investment is small. Most AMC also have automatic purchase plans whereby as little as Rs. 2000, where SIP start with just Rs.50 per month basis.

Disadvantages of Investing Mutual Funds:

1. Professional Management- Some funds don't perform in neither the market, as their management is not dynamic enough to explore the available opportunity in the market, thus many investors debate over whether or not the so-called professionals are any better than mutual fund or investor himself, for picking up stocks.
2. Costs – The biggest source of AMC income is generally from the entry & exit load which they charge from investors, at the time of purchase. The mutual fund industries are thus charging extra cost under layers of jargon.
3. Dilution - Because funds have small holdings across different companies, high returns from a few investments often don't make much difference on the overall return. Dilution is also the result of a successful fund getting too big. When money pours into funds that have had strong success, the manager often has trouble finding a good investment for all the new money.
4. Taxes - when making decisions about your money, fund managers don't consider your personal tax situation. For example, when a fund manager sells a security, a capital-gain tax is triggered, which affects how profitable the individual is from the sale. It might have been more advantageous for the individual to defer the capital gains liability.

REGULATORY AUTHORITIES

To protect the interest of the investors, SEBI formulates policies and regulates the mutual funds. It notified regulations in 1993 (fully revised in 1996) and issues guidelines from time to time. MF either promoted by public or by private sector entities including one promoted by foreign entities is governed by these Regulations. SEBI approved Asset Management Company (AMC) manages the funds by making investments in various types of securities. Custodian, registered with SEBI, holds the securities of various schemes of the fund in its custody. According to SEBI Regulations, two thirds of the directors of Trustee Company or board of trustees must be independent. The Association of Mutual Funds in India (AMFI) reassures the investors in units of mutual funds that the mutual funds function within the strict regulatory framework. Its objective is to increase public awareness of the mutual fund industry. AMFI also is engaged in upgrading professional standards and in promoting best industry practices in diverse areas such as valuation, disclosure, transparency etc.

CHAPTER – 2

REVIEW OF LITERATURE

LITERATURE REVIEW

“BOOKS ARE THE QUIETEST AND MOST CONSTANT FRIENDS; THEY ARE THE MOST ACCESSIBLE AND WISEST COUNSELORS, AND THE MOST PATIENT OF TEACHERS.”

-Charles W.Eliot

Review of literature is very important to give better understanding and insight necessary to develop a broad conceptual framework in which a particular problem can be examined. It helps in the formation of specific problem and helps acquaint the investigator to what is already known in relation to the problem under review and it also provides a basis for assessing the feasibility of the research, Review of literature is important to a scholar in order to know what has been established and documented as there are critical summaries of what is already known about a particular topic. Therefore a review of literature helps in relating the present study to the previous ones in the same field.

Martin P. and McCann B. (1998) in their book titled “The Investor’s Guide to— Fidelity Funds – Winning Strategies for Mutual Fund Investing” have very nicely guided investors regarding issues related with mutual fund investing. They have advised that Investors should focus on sectors of the global economy that have the greatest potential for profit in order to beat the market averages. By combining this approach with the safety provided by mutual funds’ inherent diversification, mutual funds become an investment vehicle with all the advantages of trading individual securities and none of the disadvantages. Like any other investment, it is essential to develop a strategy for selecting which funds to buy and sell – and when. These decisions should not be left to the emotions or to chance.

Gremillion L (2005) in his book “Mutual Fund Industry Handbook – A— Comprehensive Guide for Investment Professionals” has given detailed information about working of mutual fund industry. It has also mentioned the different type of challenges faced by various professionals connected with this industry. The book has provided a broad and comprehensive sweep of information and knowledge, which will help everybody who has serious interest in the industry.

Tyson E (2007) in his book “Mutual Funds for DUMMIES” (5th edition) has— provided practical and profitable techniques of mutual fund investing that investors can put to work now and for many years to come. By proper selection investor can identify good schemes, where fund managers invest in securities as per that match investors’ financial goals. Investors can spend their time doing the activities in life that they enjoy and are best at. Mutual Funds should improve investors’ investment returns as well as their social life. The book helps investors how to avoid mutual fund investing pitfalls and maximizing their chances for success. Whenever any investor wants to buy or sell a mutual fund, the decision needs to fit his overall final objectives.

Jank S (2010) in his Discussion Paper on “Are there disadvantaged clieneles in— mutual funds?” has mentioned that mutual fund investors chase past performance, even though performance is not persistent over time. This means that investors buy mutual funds that had a high return in the past. On the other hand, investors are reluctant to withdraw their money from the worst performing funds. This behavior has often been attributed to the irrationality of mutual fund investors. Sophisticated investors rationally chase past performance, because high past performance is a signal for managerial ability. No significant difference was found between investor composition of the worst performing funds and those with average performance.

Singh B K (2012) in an article “A study on investors’ attitude towards mutual— funds as an investment option” from International Journal of Research in Management has reiterated the need for spreading the awareness about Mutual Funds among common masses. There is a strong need to make people understand the unique features of investment in Mutual Funds. From the existing investors point of view the benefits provided by mutual funds like return potential and liquidity have been perceived to be most attractive by the invertors’ followed by flexibility, transparency and affordability.

Divya K. (2012) in the article “A Comparative study on evaluation of Selected— Mutual Funds in India” from International Journal of Marketing and Technology has suggested that the investment managers whose performance is below benchmark index should have a relook at their investment strategy and asset allocation. Investing styles should be redesigned according to up & down swings of the market to generate superior performance. To increase the efficiency and popularity of mutual funds, the regulator should set the standard criteria of benchmarks which will be helpful to asset management companies. **Goel S et al (2012)** in the article “A Review of Performance Indicators of Mutual— Funds” from Researchers World – Journal of Arts, Science & Commerce have reiterated that the Stock picking ability and lengthy tenure of fund managers are favourable for mutual funds’ performance. Performance of the Mutual Fund is also related to its ownership style. Local mutual funds perform better than the foreign mutual funds as they have better knowledge of the local market. Mutual Fund companies with larger asset base are performing better than lower asset base companies.

Vanaja V. and Karrupasamy R (2013) in the article “A study on the performance— of select Private Sector Balanced Category Mutual Fund Schemes in India” from International Journal of Management Sciences and Business Research have mentioned that Out of five private sector balanced category mutual funds (under study) two earned a return above the average returns. Two have made negative returns. All the private sector balanced category funds selected for the study have a positive Sharpe ratio. The range of excess returns over risk free return per unit of total risk is wide. All the funds selected for the study have a positive Treynor ratio. All the funds selected for the study has positive Jensen’s alpha indicating superior performance.

Narayanasamy R. and Rathnamani V (2013) in an article “Performance— Evaluation of Equity Mutual Funds(on selected Equity Large Cap Funds)” from International Journal of Business and Management Invention have mentioned that all funds performed well during the period under study despite volatility in the

market. The fall in NIFTY during the year 2011 impacted the performance of all selected mutual funds. In order to ensure consistent performance of mutual funds, investors should also consider statistical parameters like alpha, beta, standard deviation besides considering NAV and total return.

Santhi N.S. and Gurunathan K. (2013) in the article “The growth of Mutual Funds and Regulatory Challenges” from Indian Journal of Applied Research have mentioned that as mutual fund industry has grown tremendously over past few years, Regulators are keeping close watch on any potential impact of mutual fund products on financial stability and market volatility. The growth of mutual funds has been accompanied by innovative products and servicing methods. Regulators will have to do balancing act by carefully managing risks and not imposing unnecessary regulation.

Iqbal N (2013) in an article titled, “Market Penetration and Investment Pattern of Mutual Fund Industry” from International Journal of Advanced Research in Management and Social Sciences has mentioned that although mutual funds are predominantly present in urban areas but have started capturing rural markets also through new range of products, new strategies adopted for Rural Market Penetration and with new awareness programs. As rural market integrate more and more with urban, there will be huge inflow of investors. The responsibility of various intermediaries’ especially mutual funds will increase manifold.

Sharma R and Pandya N K (2013) in the article “Investing in Mutual Fund: An overview” from Asian Research Journal of Business Management mentioned that still number of people are not clear about functioning of Mutual Funds, as a result so far they have not made a firm opinion about investment in mutual funds. As far existing investors, return potential and liquidity have been perceived to be most attractive. There is a lot of scope for the growth of mutual funds in India. People should take decision based on performance of Mutual fund rather than considering whether it is private sector or public sector.

Sharma N. and Ravikumar R (2013) in an article “Analysis of the Risk and Return relationship of Equity based Mutual Fund in India” from International Journal of Advancements in Research & Technology have mentioned that their study investigated the performance of Equity based mutual fund schemes using Capital Asset Pricing Model (CAPM). In the long run private and public sector mutual funds have performed well. But while comparing the performance over last 15 years it is found that private sector mutual funds have outperformed the Public Sector mutual funds. The schemes of private sector mutual funds not only performed better than those of public sector mutual funds but were also found to be less risky.

Vasanth S. et al (2013) in an article “Evaluating the Performance of some selected open ended equity diversified Mutual fund in Indian mutual fund Industry” from International Journal of Innovative Research in Science, Engineering and Technology have stated that risk appetite of an investor plays an important role in selection of mutual fund. While deciding their investment in mutual funds investor should take decision based on their investment objective and analyze the fund based on various criteria such as risk prevailing the market

Jani D and Jain R (2013) in an article “Role of Mutual Funds in Indian Financial— System as a Key Resource Mobilizer” from Abhinav Journal (International Monthly Referred Journal of Research in Management & Technology) have reiterated that since fundamentals of Indian economy are relatively strong, the economy will be on a successful path in the coming year. As economy grows, Mutual Funds are going to be key resource mobilizer for Indian financial system. Indian Mutual Fund industry is going to observe good growth rate in near Future.

Nair R K (2014) in the article “Indian Mutual Fund Market – A tool to stabilize— Indian Economy” from International Journal of Scientific and Research Publications has reiterated that a Mutual fund is a powerful tool to stabilize Indian economy. The products of mutual funds are playing a vital role in mobilizing scattered savings among investors and channelize these funds to infrastructural development of the country. The banks and Financial Institutions are also playing a crucial role by promoting mutual fund business in the country.

Sehdev R and Ranjan P (2014) in the article “A study on Investor’s perception— towards mutual fund investment” from Scholars Journal of Economics, Business and Management have mentioned that mostly people are preferring balanced funds and debt funds. After that people look for Equity diversified and Sector funds. The factors responsible for investors’ preference for mutual funds as an investment option are benefits and transparency, returns, redemption period, Liquidity and Institutional Investor’s activity. For information on mutual funds people are mostly depending on internet rather than any other media channel.

Cici G et al (2014) in their Discussion Paper on “Market transparency and the— marking precision of bond mutual fund managers” have stated that the transparency enhancing TRACE (Trade Reporting and Compliance Engine) system was associated with large and statistically decreases in cross fund bond mark dispersion. They also find some evidence that issuer initiations into Markit’s CDS (Credit Default Swap) spread database also contributed to a decrease in bond mark dispersion, but only in pre –TRACE era. These results support the view about people “operating largely in the dark” applied to not just retail investors but also to professional fund managers.

Srivastava S and Malhotra S (2015) in an article “A Paradigm Shift in Risk— Measuring Tools of Mutual Fund Industry” from International Journal of Informative & Futuristic Research have mentioned that equity funds are performing better than debt funds. A strong linear relationship was found between risk and return. Fund managers can adopt Calmar ratio and safety first ratio to analyze the risk of selected funds. No fund is risk free and Investors should invest in equity and equity related instruments to diversify the risk.

Prabhu G and Vechalekar N.M. in the article “Perception of Indian Investor— towards investment in mutual funds with special reference to MIP Funds” from IOSR Journal of Economics and Finance have mentioned that most of the investors are aware of various schemes of mutual funds. The mutual fund investors mainly belong to the age group from 19 years to 55 years. The investors fall in the income group of Rs 30,000 to Rs 70,000 and above. Investors prefer mutual funds due to diversification of portfolio and tax benefits.

CHAPTER – 3

RESEARCH METHODOLOGY

NEED FOR THE STUDY:

Customer perception provides the information what a customer needs and what has already made them satisfied with the services provided. E-commerce Industry must analyze the Customer perception towards their Applications in order to survive in the competition in the industry. Many customers have their favorite Shopping Applications in which they buy often because of some reason or feature that is available in that Application. A study on customer perception will bring out some new ideas to tackle the competitors' strategies.

OBJECTIVES OF THE STUDY:

„Objectives of the study’ describes about what the research is trying to achieve and it also summarizes the accomplishments to be achieved by the researcher in the study. There are Primary objective and Secondary objective to a study. Primary objective should be an abridged form of the statement of the problem. Secondary Objective should try to establish a relation between two or more variable related to the study.

Primary Objective of the study:

- To analyze the risk in mutual fund and to elaborate various factor that affect the investment in mutual fund

Secondary Objectives of the study:

- To find out the factors affect the growth of mutual fund
- To study the issues faced by the customers while investing in mutual funds.
- To analyse which sector is risk free for investment in mutual fund.
- To analyse the different sectors of mutual fund.

RESEARCH DESIGN :

Research design refers to the overall strategy utilized to carry out research that defines a concise and logical plan to tackle the data collection and interpretation, analysis and discussion of data.

Descriptive Research Design:

The research design of the study is Descriptive research. The Descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual or of a group. The studies concerned with specific predictions, with narration of facts & characteristics concerning individual, group or situation are all examples of descriptive research studies.

SAMPLING PLAN:

Population:

Population refers to the group of people defined in many ways that are relevant to the research study. The population of the study is Online shopping applications users in Chennai.

Sample Unit:

Sample Unit is the part of a population which are helpful and relevant to the research study. The sample unit for the project is the people using online shopping applications in Chennai.

Sample Size:

The sample size of a study is the total number of samples that are selected from the Sample unit using which the Data are collected. The sample size of the study is 200.

Sample Selection Method:

Convenience sampling method is a type of non-probability sampling. This method is used when the part of the population is close to hand. Convenient sampling method can be used to select sample and collect the data needed.

Period of Study:

Period of study describes the period, that is, the date of beginning of the study and the date of ending of the study. Period of study is from January 2021 to March 2021.

DATA COLLECTION METHOD:

There are two different types of data that are adopted for a project. They are primary and secondary data.

Primary Data:

Primary data are those which are collected for the first time and they happen to be original in nature. Here, in this research, Primary data are collected through questionnaire. Questionnaire is one of the data collection tools which is used to collect primary data.

Secondary Data:

Secondary data are the data that are collected from journals, articles, books and other data that are available online.

Statistical Tools Used:

The statistical tools used are Percentage analysis, Bar diagram, Pie chart, Chi Square test in spss.

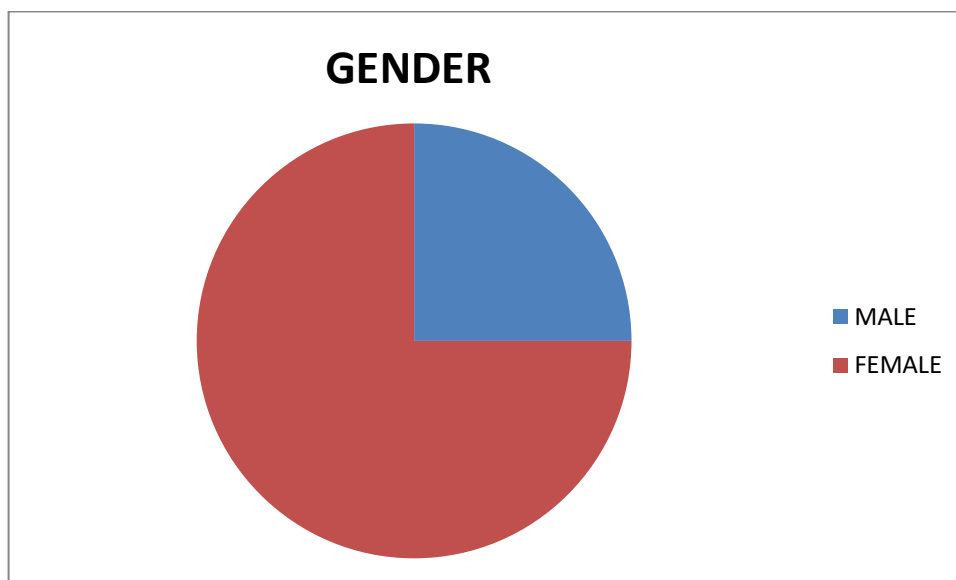
CHAPTER – 4

DATA ANALYSIS AND INTERPRETATION

4.1 PERCENTAGE ANALYSIS:

Table 4.1.1: Gender Of The Respondents

GENDER	NO. OF RESPONDENTS	PERCENTAGE
MALE	75	75%
FEMALE	25	25%
TOTAL	100	100



Source: primary data

Chart 4.1.1: Gender Of The Respondents

INTERPRETATION:

From the above table it is interpreted that the number of male respondents is 75% and the number of female respondents is 25%.

INFERENCE:

Majority (75%) of the respondents are Female.

Table 4.1.2: SALARY Of The Respondents

MARITAL STATUS	NO. OF RESPONDENTS	PERCENTAGE
BELOW 30000	35	35%
BELOW 50000	12	12%
ABOVE 50000	52	52%

Source: primary data

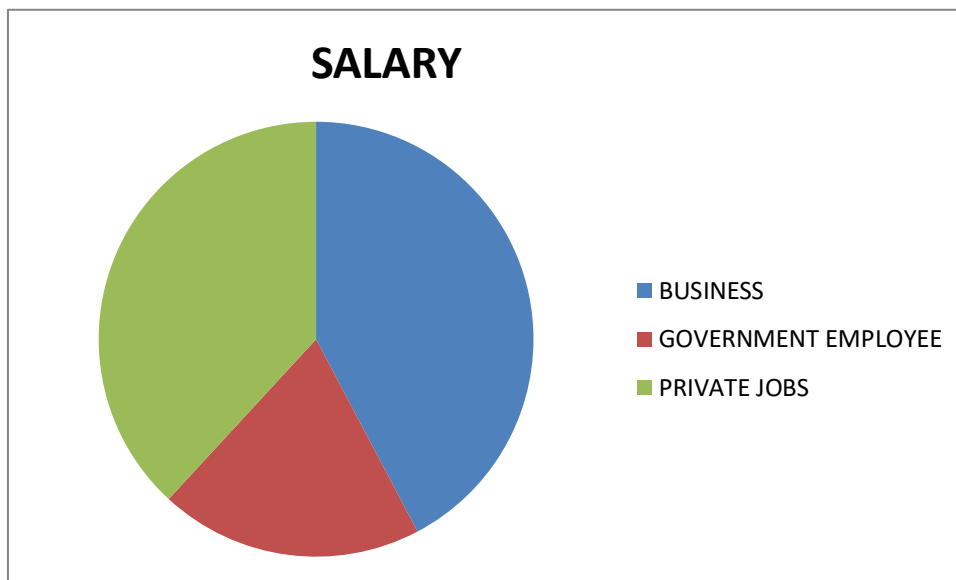


Chart 4.1.2: SALARY Of The Respondent

INTERPRETATION:

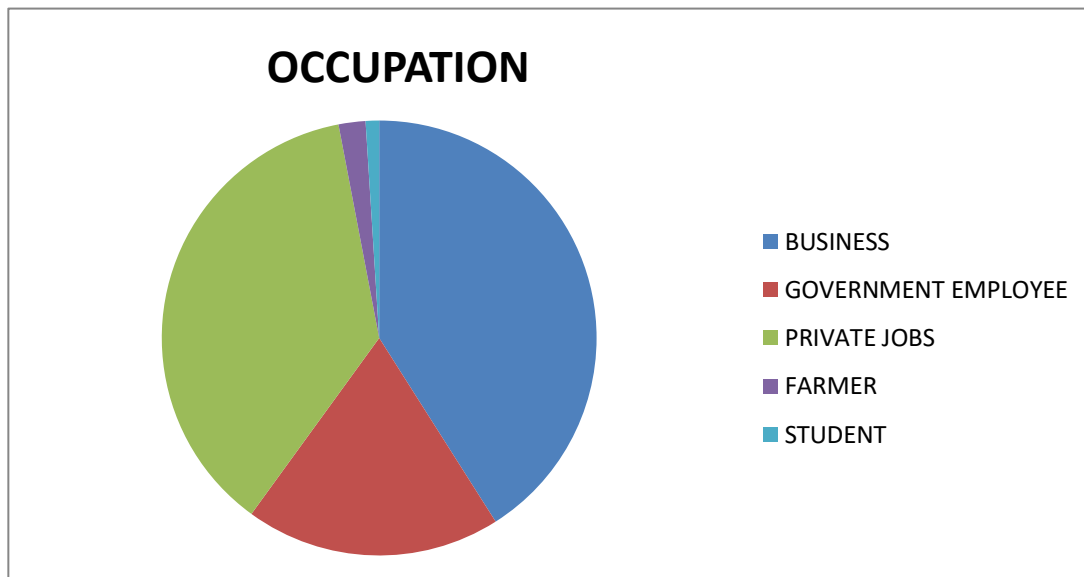
From the above table it is interpreted that 53 person get below 30000 Salary and 35 persons get below 50000 salary and 12 person get above 50000 salary.

Inference:

Half of the sample get below 30000 salary

Table 4.1.3: Occupation Of The Respondents

AGE CATEGORIES	NO.OF RESPONDENTS	PERCENTAGE
BUSINESS	41	41%
GOVERNMENT JOBS	19	19%
PRIVATE JOBS	37	37%
FARMER	2	2%
STUDENT	1	1%
TOTAL	100	100%



source: primary data

Chart 4.1.3: OCCUPATION Of The Respondents

INTERPRETATION:

From the above table it is interpreted that the number of respondents doing business 41 and 19 respondents doing govt jobs and 37 respondents doing private jobs

INFERENCE:

Majority of respondents belong to government job and private job .

Table 4.1.4: INVESTMENT SECTOR Of The Respondents

OCCUPATION	NO. OF RESPONDENTS	PERCENTAGE
GOLD	15	15%
SHARES	24	24%
SECTOR FUNDS	37	37%
INSURANCE POLICY	5	5%
REAL ESTATE	6	6%
BANK DEPOSIT	11	11%
FARMING	1	1%
MUTUAL FUND	1	1%
TOTAL	100	100%

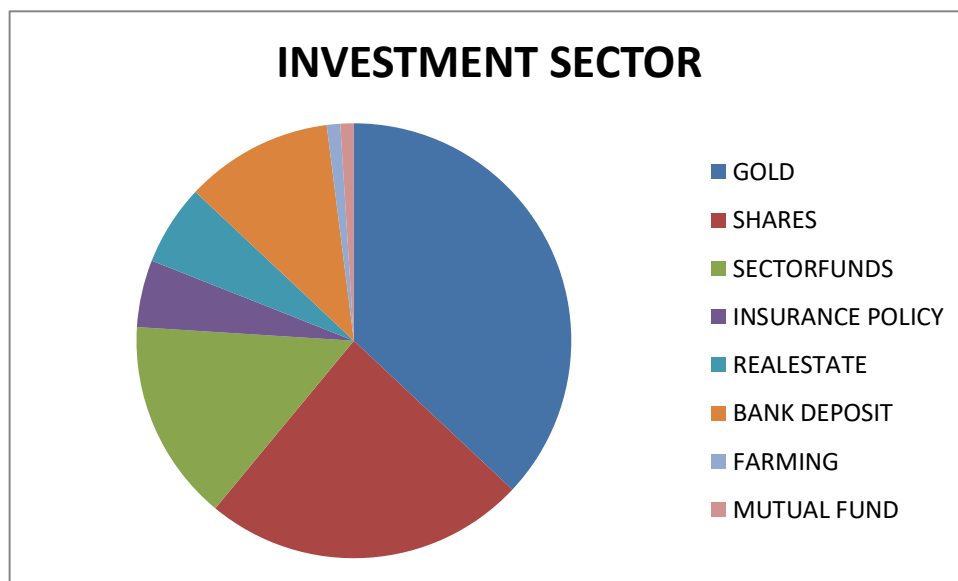


Chart 4.1.4: INVESTMENT SECTOR Of The Respondents

INTERPRETATION:

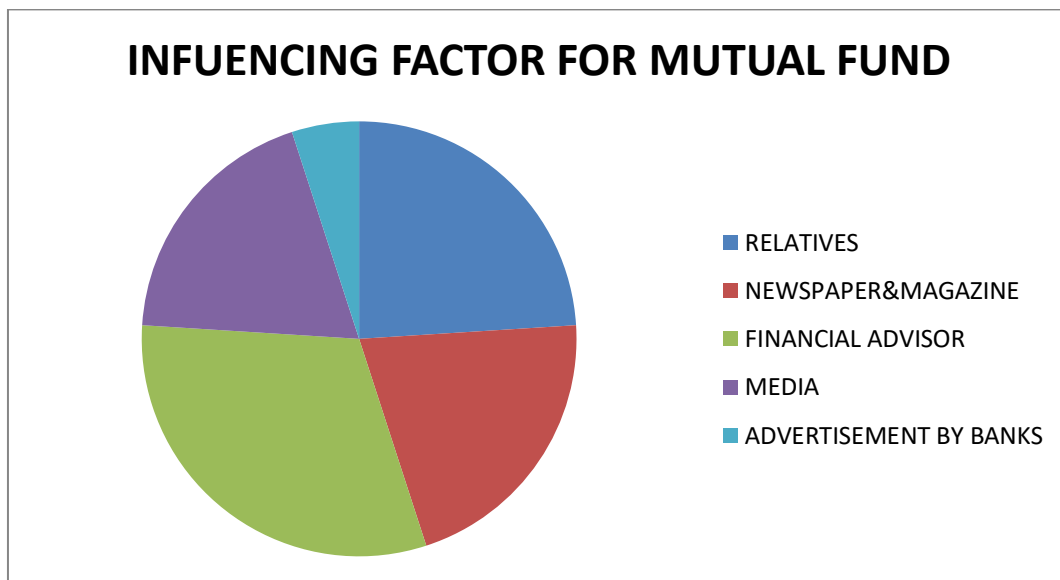
From the above table it is interpreted that the percentage of respondents who invest in shares 24% and in gold 37% and in sector funds 15% and in insurance 5%.

INFERENCE

Majority (37%) of the respondents invest in gold.

Table 4.1.5: Annual Income of the respondents

INFLUENCING FACTOR	NO. OF RESPONDENTS	PERCENTAGE
RELATIVES	24	24%
NEWSPAPER&MAGAZINE	21	21%
FINANCIAL ADVISOR	31	31%
MEDIA	19	19%
ADVERTISEMENT BY BANKS	15	5%
TOTAL	100	100%



source: primary data

Chart 4.1.5: influencing factor of the respondents

INTERPRETATION:

From the above table it is interpreted that 24% of respondents influenced by relatives And 21% by newspaper and magazine and 31% by financial advisor.

INFERENCE:

Majority (31%) of the respondents is influenced by financial advisor.

Table 4.1.6: Frequency Of Purchasing Using Online Shopping Applications

FREQUENCY LEVEL	NO. OF RESPONDENTS	PERCENTAGE
VERY OFTEN	32	16%
OFTEN	67	33.5%
NOT VERY OFTEN	49	24.5%
RARE	35	17.5%
VERY RARE	17	8.5%
TOTAL	200	100%

source: primary data

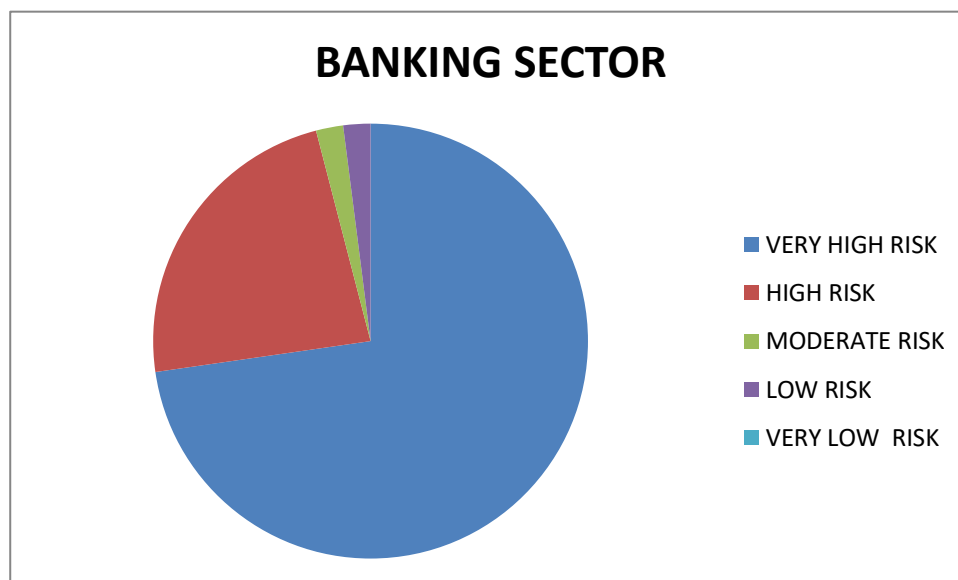


Chart 4.1.6: Frequency Of Purchasing Using Online Shopping Applications

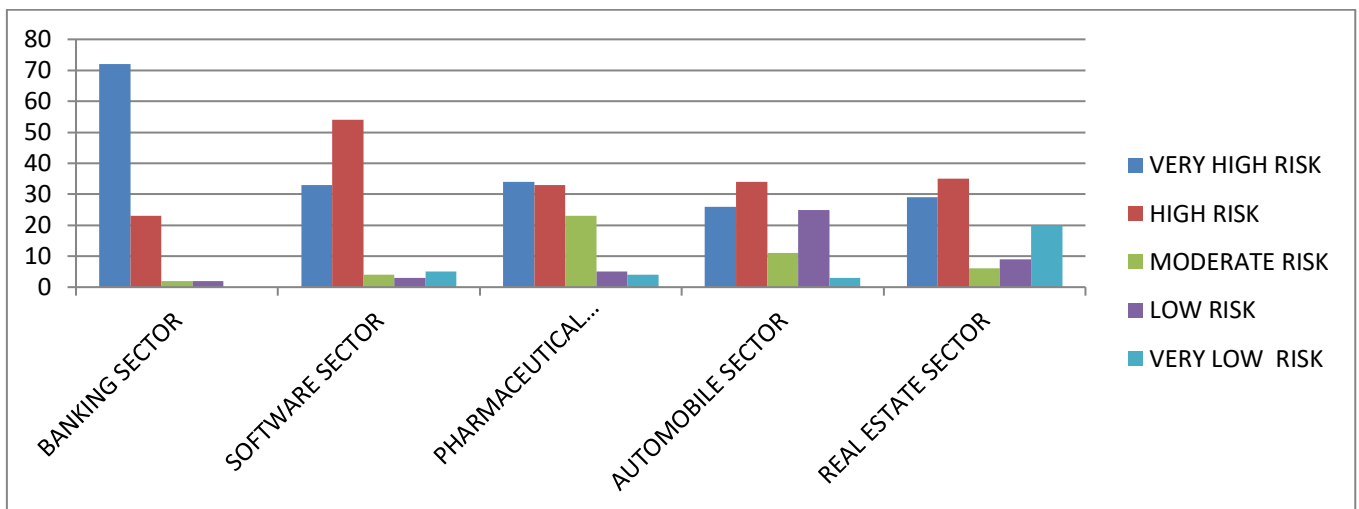
INTERPRETATION:

From the above table it is interpreted that the percentage of frequency of respondents using online shopping applications very often is 16%, often is 33.5%, not very often is 24.5%, rare is 17.5% and very rare is 8.5%.

INFERENCE:

Majority (33.5%) of the respondents purchase Often.

RISK ANALYSIS ON DIFFERENT INVESTMENT SECTOR



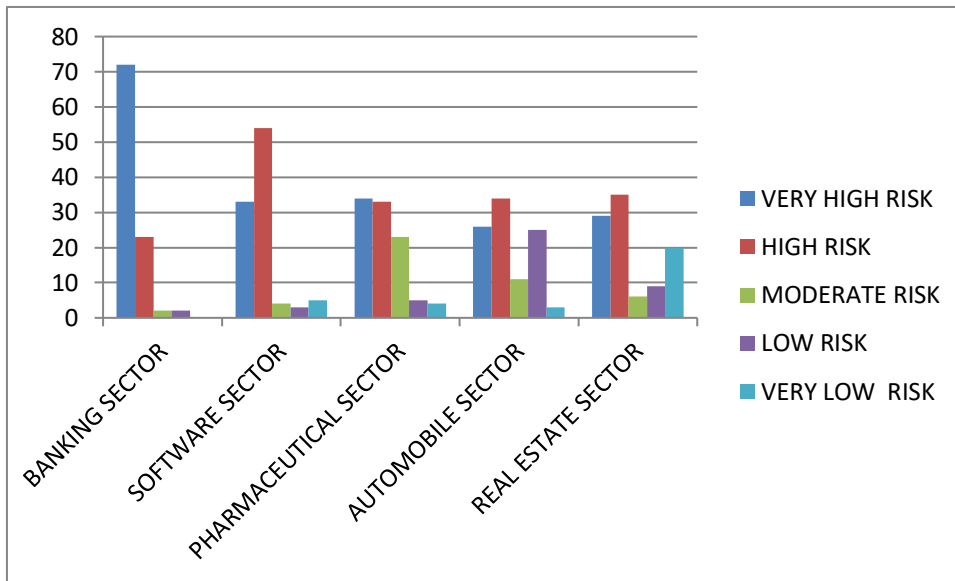
INTERPRETATION:

From the table it is interpreted that banking sector sector has very high risk and soft sector has moderate risk and real estate sector has low risk .

Inference:

The real estate sector has high risk.

*RETURN ANALYSIS ON DIFFERENT
INVESTING SECTOR*



DIFFERENT TYPES STATISTICAL ANALYSIS

INTRODUCTION

This page shows how to perform a number of statistical tests using SPSS. Each section gives a brief description of the aim of the statistical test, when it is used, an example showing the SPSS commands and SPSS (often abbreviated) output with a brief interpretation of the output. You can see the page [Choosing the Correct Statistical](#) for a table that shows an overview of when each test is appropriate to use. In deciding which test is appropriate to use, it is important to consider the type of variables that you have (i.e., whether your variables are categorical, ordinal or interval and whether they are normally distributed), see [What is the difference between categorical, ordinal and interval variable](#) for more information on this.

About the hsb data file

Most of the examples in this page will use a data file called **hsb2**, high school and beyond. This data file contains 200 observations from a sample of high school students with demographic information about the students, such as their gender (**female**), socio-economic status (**ses**) and ethnic background (**race**). It also contains a number of scores on standardized tests, including tests of reading (**read**), writing (**write**), mathematics (**math**) and social studies (**socst**). You can get the hsb data file by clicking on [hsb2](#).

One sample t-test

A one sample t-test allows us to test whether a sample mean (of a normally distributed interval variable) significantly differs from a hypothesized value. For example, using the hsb2 data file, say we wish to test whether the average writing score (**write**) differs significantly from 50. We can do this as shown below.

t-test

/testval = 50

/variable = write.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
writing score	200	52.7750	9.47859	.67024

One-Sample Test

	Test Value = 50					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
writing score	4.140	199	.000	2.7750	1.4533	4.0967

The mean of the variable **write** for this particular sample of students is 52.775, which is statistically significantly different from the test value of 50. We would conclude that this group of students has a significantly higher mean on the writing test than 50.

One sample median test

A one sample median test allows us to test whether a sample median differs significantly from a hypothesized value. We will use the same variable, **write**, as we did in the one sample t-test example above, but we do not need to assume that it is interval and normally distributed (we only need to assume that **write** is an ordinal variable).

nptests

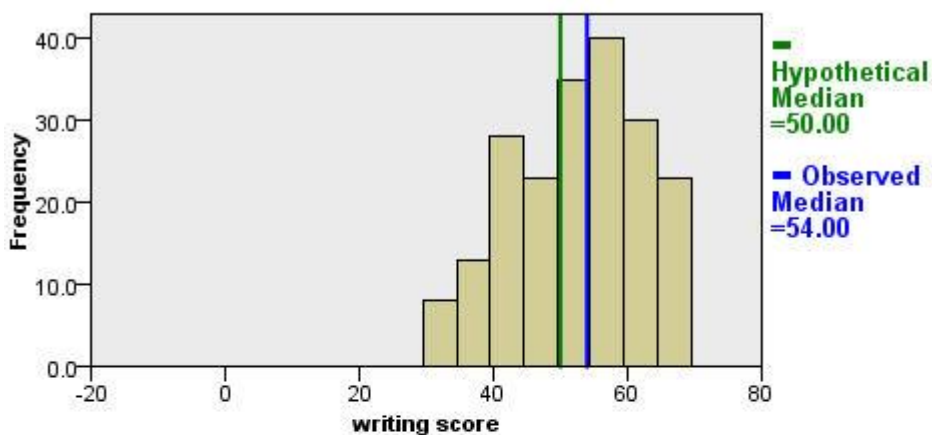
/onesample test (write) wilcoxon(testvalue = 50).

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The median of writing score equals 50.00.	One-Sample Wilcoxon Signed Rank Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

One-Sample Wilcoxon Signed Rank Test



Total N	200
Test Statistic	13,177.000
Standard Error	806.235
Standardized Test Statistic	4.126
Asymptotic Sig. (2-sided test)	.000

Binomial test

A one sample binomial test allows us to test whether the proportion of successes on a two-level categorical dependent variable significantly differs from a hypothesized value. For example, using the [hsb2 data file](#), say we wish to test whether the proportion of females (**female**) differs significantly from 50%, i.e., from .5. We can do this as shown below.

npar tests

/binomial (.5) = female.

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
FEMALE	Group 1	male	91	.46	.50	.229 ^a
	Group 2	female	109	.54		
	Total		200	1.00		

a. Based on Z Approximation.

The results indicate that there is no statistically significant difference ($p = .229$). In other words, the proportion of females in this sample does not significantly differ from the hypothesized value of 50%.

Chi-square goodness of fit

A chi-square goodness of fit test allows us to test whether the observed proportions for a categorical variable differ from hypothesized proportions. For example, let's suppose that we believe that the general population consists of 10% Hispanic, 10% Asian, 10% African American and 70% White folks. We want to test whether the observed proportions from our sample differ significantly from these hypothesized proportions.

npar test

/chisquare = race

/expected = 10 10 10 70.

RACE

	Observed N	Expected N	Residual
hispanic	24	20.0	4.0
asian	11	20.0	-9.0
african-amer	20	20.0	.0
white	145	140.0	5.0
Total	200		

Test Statistics

	RACE
Chi-Square ^a	5.029
df	3
Asymp. Sig.	.170

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 20.0.

These results show that racial composition in our sample does not differ significantly from the hypothesized values that we supplied (chi-square with three degrees of freedom = 5.029, $p = .170$).

Two independent samples t-test

An independent samples t-test is used when you want to compare the means of a normally distributed interval dependent variable for two independent groups. For example, using the hsb2 data file, say we wish to test whether the mean for **write** is the same for males and females.

t-test groups = female(0 1)
/variables = write.

Group Statistics

	female	N	Mean	Std. Deviation	Std. Error Mean
writing score	male	91	50.1209	10.30516	1.08027
	female	109	54.9908	8.13372	.77907

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
writing score	Equal variances assumed	11.133	.001	-3.734	198	.000	-4.8699	1.30419
	Equal variances not assumed			-3.656	169.707	.000	-4.8699	1.33189

Because the standard deviations for the two groups are similar (10.3 and 8.1), we will use the “equal variances assumed” test. The results indicate that there is a statistically significant difference between the mean writing score for males and females ($t = -3.734$, $p = .000$). In other words, females have a statistically significantly higher mean score on writing (54.99) than males (50.12).

Wilcoxon-Mann-Whitney test

The Wilcoxon-Mann-Whitney test is a non-parametric analog to the independent samples t-test and can be used when you do not assume that the dependent variable is a normally distributed interval variable (you only assume that the variable is at least ordinal). You will notice that the SPSS syntax for the Wilcoxon-Mann-Whitney test is almost identical to that of the independent samples t-test. We will use the same data file and the same variables in this example as we did in the [independent t-test example](#) above and will not assume that **write**, our dependent variable, is normally distributed.

npair test
/m-w = write by female(0 1).

Test Statistics^a

	writing score
Mann-Whitney U	3606.000
Wilcoxon W	7792.000
Z	-3.329
Asymp. Sig. (2-tailed)	.001

a. Grouping Variable: FEMALE

The results suggest that there is a statistically significant difference between the underlying distributions of the **write** scores of males and the **write** scores of females ($z = -3.329$, $p = 0.001$).

Chi-square test

A chi-square test is used when you want to see if there is a relationship between two categorical variables. In SPSS, the **chisq** option is used on the **statistics** subcommand of the **crosstabs** command to obtain the test statistic and its associated p-value. Using the hsb2 data file let's see if there is a relationship between the type of school attended and students' gender (**female**). Remember that the chi-square test assumes that the expected value for each cell is five or higher. This assumption is easily met in the examples below. However, if this assumption is not met in your data, please see the section on Fisher's exact test below.

crosstabs

/tables = schtyp by female

/statistic = chisq.

type of school * FEMALE Crosstabulation

Count		FEMALE		Total
		male	female	
type of school	public	77	91	168
	private	14	18	32
Total		91	109	200

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.047 ^b	1	.828		
Continuity Correction ^a	.001	1	.981		
Likelihood Ratio	.047	1	.828		
Fisher's Exact Test				.849	.492
Linear-by-Linear Association	.047	1	.829		
N of Valid Cases	200				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.56.

These results indicate that there is no statistically significant relationship between the type of school attended and gender (chi-square with one degree of freedom = 0.047, $p = 0.828$).

Let's look at another example, this time looking at the linear relationship between gender (**female**) and socio-economic status (**ses**). The point of this example is that one (or both) variables may have more than two levels, and that the variables do not have to have the same number of levels. In this example, **female** has two levels (male and female) and **ses** has three levels (low, medium and high).

crosstabs

/tables = female by ses

FEMALE * SES Crosstabulation

Count		SES			Total
		low	middle	high	
FEMALE	male	15	47	29	91
	female	32	48	29	109
Total		47	95	58	200

/statistic = chisq.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.577 ^a	2	.101
Likelihood Ratio	4.679	2	.096
Linear-by-Linear Association	3.110	1	.078
N of Valid Cases	200		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 21.39.

Again we find that there is no statistically significant relationship between the variables (chi-square with two degrees of freedom = 4.577, $p = 0.101$).

See also

- SPSS Learning Module: An Overview of Statistical Tests in SPSS

Fisher's exact test

The Fisher's exact test is used when you want to conduct a chi-square test but one or more of your cells has an expected frequency of five or less. Remember that the chi-square test assumes that each cell has an expected frequency of five or more, but the Fisher's exact test has no such assumption and can be used regardless of how small the expected frequency is. In SPSS unless you have the SPSS Exact Test Module, you can only perform a Fisher's exact test on a 2×2 table, and these results are presented by default. Please see the results from the chi squared example above.

One-way ANOVA

A one-way analysis of variance (ANOVA) is used when you have a categorical independent variable (with two or more categories) and a normally distributed interval dependent variable and you wish to test for differences in the means of the dependent variable broken down by the levels of the independent variable. For example, using the [hsb2 data file](#), say we wish to test whether the mean of **write** differs between the three program types (**prog**). The command for this test would be:

oneway write by prog.

ANOVA

writing score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3175.698	2	1587.849	21.275	.000
Within Groups	14703.177	197	74.635		
Total	17878.875	199			

The mean of the dependent variable differs significantly among the levels of program type. However, we do not know if the difference is between only two of the levels or all three of the levels. (The F test for the **Model** is the same as the F test for **prog** because **prog** was the only variable entered into the model. If other variables had also been entered, the F test for the **Model** would have been different from **prog**.) To see the mean of **write** for each level of program type,

means tables = write by prog.

Report

writing score

type of program	Mean	N	Std. Deviation
general	51.3333	45	9.39778
academic	56.2571	105	7.94334
vocation	46.7600	50	9.31875
Total	52.7750	200	9.47859

From this we can see that the students in the academic program have the highest mean writing score, while students in the vocational program have the lowest.

Kruskal Wallis test

The Kruskal Wallis test is used when you have one independent variable with two or more levels and an ordinal dependent variable. In other words, it is the non-parametric version of ANOVA and a generalized form of the Mann-Whitney test method since it permits two or more groups. We will use the same data file as the one way ANOVA example above and the same variables as in the example above, but we will not assume that **write** is a normally distributed interval variable.

npars tests

/k-w = write by prog (1,3).

Ranks

	type of program	N	Mean Rank
writing score	general	45	90.64
	academic	105	121.56
	vocation	50	65.14
	Total	200	

Test Statistics^{a,b}

	writing score
Chi-Square	34.045
df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: type of program

If some of the scores receive tied ranks, then a correction factor is used, yielding a slightly different value of chi-squared. With or without ties, the results indicate that there is a statistically significant difference among the three type of programs.

Paired t-test

A paired (samples) t-test is used when you have two related observations (i.e., two observations per subject) and you want to see if the means on these two normally distributed interval variables differ from one another. For example, using the hsb2 data file we will test whether the mean of **read** is equal to the mean of **write**.

t-test pairs = read with write (paired).

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	reading score	52.2300	200	10.25294	.72499
	writing score	52.7750	200	9.47859	.67024

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	reading score - writing score	-.5450	8.88667	.62838	-1.7841	.6941	-.867	199	.387

These results indicate that the mean of **read** is not statistically significantly different from the mean of **write** (t = -0.867, p = 0.387).

Wilcoxon signed rank sum test

The Wilcoxon signed rank sum test is the non-parametric version of a paired samples t-test. You use the Wilcoxon signed rank sum test when you do not wish to assume that the difference between the two variables is interval and normally distributed (but you do assume the difference is ordinal). We will use the same example as above, but we will not assume that the difference between **read** and **write** is interval and normally distributed.

npar test

/wilcoxon = write with read (paired).

Ranks

		N	Mean Rank	Sum of Ranks
reading score - writing score	Negative Ranks	97 ^a	95.47	9261.00
	Positive Ranks	88 ^b	90.27	7944.00
	Ties	15 ^c		
	Total	200		

a. reading score < writing score

b. reading score > writing score

c. writing score = reading score

Test Statistics^b

	reading score - writing score
Z	-.903 ^a
Asymp. Sig. (2-tailed)	.366

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

The results suggest that there is not a statistically significant difference between **read** and **write**.

If you believe the differences between **read** and **write** were not ordinal but could merely be classified as positive and negative, then you may want to consider a sign test in lieu of sign rank test. Again, we will use the same variables in this example and assume that this difference is not ordinal.

npar test

/sign = read with write (paired).

Frequencies

		N
writing score - reading score	Negative Differences ^a	88
	Positive Differences ^b	97
	Ties ^c	15
	Total	200

a. writing score < reading score

b. writing score > reading score

c. reading score = writing score

Test Statistics^a

	writing score - reading score
Z	-.588
Asymp. Sig. (2-tailed)	.556

a. Sign Test

We conclude that no statistically significant difference was found ($p=.556$).

McNemar test

You would perform McNemar's test if you were interested in the marginal frequencies of two binary outcomes. These binary outcomes may be the same outcome variable on matched pairs (like a case-control study) or two outcome variables from a single group. Continuing with the [hsb2](#) dataset used in several above examples, let us create two binary outcomes in our dataset: **himath** and **hiread**. These outcomes can be considered in a two-way contingency table. The null hypothesis is that the proportion of students in the **himath** group is the same as the proportion of students in **hiread** group (i.e., that the contingency table is symmetric).

compute himath = (math>60).

compute hiread = (read>60).

execute.

crosstabs

/tables=himath BY hiread

/statistic=mcnemar

/cells=count.

himath * hiread Crosstabulation

Count

		hiread		Total
		.00	1.00	
himath	.00	135	21	156
	1.00	18	26	44
Total		153	47	200

Chi-Square Tests

	Value	Exact Sig. (2-sided)
McNemar Test		.749 ^a
N of Valid Cases	200	

a. Binomial distribution used.

McNemar's chi-square statistic suggests that there is not a statistically significant difference in the proportion of students in the **himath** group and the proportion of students in the **hiread** group.

One-way repeated measures ANOVA

You would perform a one-way repeated measures analysis of variance if you had one categorical independent variable and a normally distributed interval dependent variable that was repeated at least twice for each subject. This is the equivalent of the paired samples t-test, but allows for two or more levels of the categorical variable. This tests whether the mean of the dependent variable differs by the categorical variable. We have an example data set called [rb4wide](#), which is used in Kirk's book Experimental Design. In this data set, **y** is the dependent variable, **a** is the repeated measure and **s** is the variable that indicates the subject number.

```
glm y1 y2 y3 y4
/wsfactor a(4).
```

Within-Subjects Factors

Measure: MEASURE_1

A	Dependent Variable
1	Y1
2	Y2
3	Y3
4	Y4

Multivariate Tests^b

Effect		Value	F	Hypothesis df	Error df	Sig.
A	Pillai's Trace	.754	5.114 ^a	3.000	5.000	.055
	Wilks' Lambda	.246	5.114 ^a	3.000	5.000	.055
	Hotelling's Trace	3.068	5.114 ^a	3.000	5.000	.055
	Roy's Largest Root	3.068	5.114 ^a	3.000	5.000	.055

a. Exact statistic

b.

Design: Intercept

Within Subjects Design: A

Mauchly's Test of Sphericity^b

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon	
					Greenhouse-Geisser	Huynh-Feldt
A	.339	6.187	5	.295	.620	

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables equals to an identity matrix.

- May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are in the Tests of Within-Subjects Effects table.
- Design: Intercept
Within Subjects Design: A

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
A	Sphericity Assumed	49.000	3	16.333	11.627	.000
	Greenhouse-Geisser	49.000	1.859	26.365	11.627	.001
	Huynh-Feldt	49.000	2.503	19.578	11.627	.000
	Lower-bound	49.000	1.000	49.000	11.627	.011
Error(A)	Sphericity Assumed	29.500	21	1.405		
	Greenhouse-Geisser	29.500	13.010	2.268		
	Huynh-Feldt	29.500	17.520	1.684		
	Lower-bound	29.500	7.000	4.214		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	A	Type III Sum of Squares	df	Mean Square	F	Sig.
A	Linear	44.100	1	44.100	19.294	.003
	Quadratic	4.500	1	4.500	3.150	.119
	Cubic	.400	1	.400	.800	.401
Error(A)	Linear	16.000	7	2.286		
	Quadratic	10.000	7	1.429		
	Cubic	3.500	7	.500		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	578.000	1	578.000	128.444	.000
Error	31.500	7	4.500		

You will notice that this output gives four different p-values. The output labeled “sphericity assumed” is the p-value (0.000) that you would get if you assumed compound symmetry in the variance-covariance matrix. Because that assumption is often not valid, the three other p-values offer various corrections (the Huynh-Feldt, H-F, Greenhouse-Geisser, G-G and Lower-bound). No matter which p-value you use, our results indicate that we have a statistically significant effect of **a** at the .05 level.

Repeated measures logistic regression

If you have a binary outcome measured repeatedly for each subject and you wish to run a logistic regression that accounts for the effect of multiple measures from single subjects, you can perform a repeated measures logistic regression. In SPSS, this can be done using the **GENLIN** command and indicating binomial as the probability distribution and logit as the link function to be used in the model. The exercise data file contains 3 pulse measurements from each of 30 people assigned to 2 different diet regiments and 3 different exercise regiments. If we define a “high” pulse as being over 100, we can then predict the probability of a high pulse using diet regiment.

```
GET FILE='C:\mydata\https://stats.idre.ucla.edu/wp-content/uploads/2016/02/exercise.sav'.
```

```
GENLIN highpulse (REFERENCE=LAST)
```

```
  BY diet (order = DESCENDING)
```

```
/MODEL diet
```

```
  DISTRIBUTION=BINOMIAL
```

```
  LINK=LOGIT
```

```
/REPEATED SUBJECT=id CORRTYPE = EXCHANGEABLE.
```

Tests of Model Effects

Source	Type III		
	Wald Chi-Square	df	Sig.
(Intercept)	8.437	1	.004
diet	1.562	1	.211

Dependent Variable: highpulse
Model: (Intercept), diet

Parameter Estimates

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	1.253	.4328	.404	2.101	8.377	1	.004
[diet=2]	-.754	.6031	-1.936	.428	1.562	1	.211
[diet=1]	0 ^a	.	.	.	.	.	.
(Scale)	1	.	.	.	.	.	.

Dependent Variable: highpulse
Model: (Intercept), diet

a. Set to zero because this parameter is redundant.

These results indicate that **diet** is not statistically significant (Wald Chi-Square = 1.562, $p = 0.211$).

Factorial ANOVA

A factorial ANOVA has two or more categorical independent variables (either with or without the interactions) and a single normally distributed interval dependent variable. For example, using the hsb2 data file we will look at writing scores (**write**) as the dependent variable and gender (**female**) and socio-economic status (**ses**) as independent variables, and we will include an interaction of **female** by **ses**. Note that in SPSS, you do not need to have the interaction term(s) in your data set. Rather, you can have SPSS create it/them temporarily by placing an asterisk between the variables that will make up the interaction term(s).

Tests of Between-Subjects Effects

Dependent Variable: writing score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2278.244 ^a	5	455.649	5.666	.000
Intercept	473967.467	1	473967.467	5893.972	.000
FEMALE	1334.493	1	1334.493	16.595	.000
SES	1063.253	2	531.626	6.611	.002
FEMALE * SES	21.431	2	10.715	.133	.875
Error	15600.631	194	80.416		
Total	574919.000	200			
Corrected Total	17878.875	199			

a. R Squared = .127 (Adjusted R Squared = .105)

These results indicate that the overall model is statistically significant ($F = 5.666$, $p = 0.00$). The variables **female** and **ses** are also statistically significant ($F = 16.595$, $p = 0.000$ and $F = 6.611$, $p = 0.002$, respectively). However, that interaction between **female** and **ses** is not statistically significant ($F = 0.133$, $p = 0.875$).

•

Friedman test

You perform a Friedman test when you have one within-subjects independent variable with two or more levels and a dependent variable that is not interval and normally distributed (but at least ordinal). We will use this test to determine if there is a difference in the reading, writing and math scores. The null hypothesis in this test is that the distribution of the ranks of each type of score (i.e., reading, writing and math) are the same. To conduct a Friedman test, the data need to be in a long format. SPSS handles this for you, but in other statistical packages you will have to reshape the data before you can conduct this test.

npair tests

/friedman = read write math.

Ranks

	Mean Rank
reading score	1.96
writing score	2.04
math score	2.01

Test Statistics^a

N	200
Chi-Square	.645
df	2
Asymp. Sig.	.724

a. Friedman Test

Friedman's chi-square has a value of 0.645 and a p-value of 0.724 and is not statistically significant. Hence, there is no evidence that the distributions of the three types of scores are different.

Ordered logistic regression

Ordered logistic regression is used when the dependent variable is ordered, but not continuous. For example, using the hsb2 data file we will create an ordered variable called **write3**. This variable will have the values 1, 2 and 3, indicating a low, medium or high writing score. We do not generally recommend categorizing a continuous variable in this way; we are simply creating a variable to use for this example. We will use gender (**female**), reading score (**read**) and social studies score (**socst**) as predictor variables in this model. We will use a logit link and on the **print** subcommand we have requested the parameter estimates, the (model) summary statistics and the test of the parallel lines assumption.

```
if write ge 30 and write le 48 write3 = 1.
if write ge 49 and write le 57 write3 = 2.
if write ge 58 and write le 70 write3 = 3.
execute.
```

plum write3 with female read socst
/link = logit
/print = parameter summary tparallel.

Case Processing Summary

	N	Marginal Percentage
write3 1.00	61	30.5%
2.00	61	30.5%
3.00	78	39.0%
Valid	200	100.0%
Missing	0	
Total	200	

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	376.226			
Final	252.151	124.075	3	.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	.462
Nagelkerke	.521
McFadden	.284

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[write3 = 1.00]	9.704	1.203	65.109	1	.000	7.347	12.061
	[write3 = 2.00]	11.800	1.312	80.868	1	.000	9.228	14.372
Location	female	1.285	.322	15.887	1	.000	.653	1.918
	read	.118	.022	29.867	1	.000	.076	.160
	socst	.080	.019	17.781	1	.000	.043	.117

Link function: Logit.

Test of Parallel Lines^a

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	252.151			
General	250.104	2.047	3	.563

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. Link function: Logit.

The results indicate that the overall model is statistically significant ($p < .000$), as are each of the predictor variables ($p < .000$). There are two thresholds for this model because there are three levels of the outcome variable. We also see that the test of the proportional odds assumption is non-significant ($p = .563$). One of the assumptions underlying ordinal logistic (and ordinal probit) regression is that the relationship between each pair of outcome groups is the same. In other words, ordinal logistic regression assumes that the coefficients that describe the relationship between, say, the lowest versus all higher categories of the response variable are the same as those that describe the relationship between the next lowest category and all higher categories, etc. This is called the proportional odds assumption or the parallel regression assumption. Because the relationship between all pairs of groups is the same, there is only one set of coefficients (only one model). If this was not the case, we would need different models (such as a generalized ordered logit model) to describe the relationship between each pair of outcome groups.

Factorial logistic regression

A factorial logistic regression is used when you have two or more categorical independent variables but a dichotomous dependent variable. For example, using the hsb2 data file we will use **female** as our dependent variable, because it is the only dichotomous variable in our data set; certainly not because it common practice to use gender as an outcome variable. We will use type of program (**prog**) and school type (**schtyp**) as our predictor variables. Because **prog** is a categorical variable (it has three levels), we need to create dummy codes for it. SPSS will do this for you by making dummy codes for all variables listed after the keyword **with**. SPSS will also create the interaction term; simply list the two variables that will make up the interaction separated by the keyword **by**.

logistic regression female with prog schtyp prog by schtyp

/contrast(prog) = indicator(1).

Dependent Variable Encoding

Original Value	Internal Value
male	0
female	1

Categorical Variables Codings

		Frequency	Parameter coding	
			(1)	(2)
type of program	general	45	.000	.000
	academic	105	1.000	.000
	vocation	50	.000	1.000

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	3.147	5	.677
	Block	3.147	5	.677
	Model	3.147	5	.677

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	272.490	.016	.021

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	PROG			2.595	2	.273	
	PROG(1)	2.258	1.407	2.578	1	.108	9.568
	PROG(2)	2.046	1.986	1.061	1	.303	7.737
	SCHTYP	1.661	1.141	2.117	1	.146	5.262
	PROG * SCHTYP			2.474	2	.290	
	PROG(1) by SCHTYP	-1.934	1.233	2.461	1	.117	.145
	PROG(2) by SCHTYP	-1.828	1.840	.986	1	.321	.161
	Constant	-1.712	1.269	1.820	1	.177	.181

a. Variable(s) entered on step 1: PROG, SCHTYP, PROG * SCHTYP .

The results indicate that the overall model is not statistically significant (LR chi2 = 3.147, p = 0.677). Furthermore, none of the coefficients are statistically significant either. This shows that the overall effect of **prog** is not significant.

•

Correlation

A correlation is useful when you want to see the relationship between two (or more) normally distributed interval variables. For example, using the hsb2 data file we can run a correlation between two continuous variables, **read** and **write**.

correlations

/variables = read write.

Correlations

		reading score	writing score
reading score	Pearson Correlation	1	.597
	Sig. (2-tailed)	.	.000
	N	200	200
writing score	Pearson Correlation	.597	1
	Sig. (2-tailed)	.000	.
	N	200	200

In the second example, we will run a correlation between a dichotomous variable, **female**, and a continuous variable, **write**. Although it is assumed that the variables are interval and normally distributed, we can include dummy variables when performing correlations.

correlations

/variables = female write.

Correlations

		FEMALE	writing score
FEMALE	Pearson Correlation	1	.256
	Sig. (2-tailed)	.	.000
	N	200	200
writing score	Pearson Correlation	.256	1
	Sig. (2-tailed)	.000	.
	N	200	200

In the first example above, we see that the correlation between **read** and **write** is 0.597. By squaring the correlation and then multiplying by 100, you can determine what percentage of the variability is shared. Let's round 0.597 to be 0.6, which when squared would be .36, multiplied by 100 would be 36%. Hence **read** shares about 36% of its variability with **write**. In the output for the second example, we can see the correlation between **write** and **female** is 0.256. Squaring this number yields .065536, meaning that **female** shares approximately 6.5% of its variability with **write**.

•

Simple linear regression

Simple linear regression allows us to look at the linear relationship between one normally distributed interval predictor and one normally distributed interval outcome variable. For example, using the hsb2 data file, say we wish to look at the relationship between writing scores (**write**) and reading scores (**read**); in other words, predicting **write** from **read**.

regression variables = write read

/dependent = write

/method = enter.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.597 ^a	.356	.353	7.62487

a. Predictors: (Constant), reading score

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6367.421	1	6367.421	109.521	.000 ^a
	Residual	11511.454	198	58.139		
	Total	17878.875	199			

a. Predictors: (Constant), reading score

b. Dependent Variable: writing score

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	23.959	2.806		8.539	.000
	reading score	.552	.053	.597	10.465	.000

a. Dependent Variable: writing score

We see that the relationship between **write** and **read** is positive (.552) and based on the t-value (10.47) and p-value (0.000), we would conclude this relationship is statistically significant. Hence, we would say there is a

Non-parametric correlation

A Spearman correlation is used when one or both of the variables are not assumed to be normally distributed and interval (but are assumed to be ordinal). The values of the variables are converted in ranks and then correlated. In our example, we will look for a relationship between **read** and **write**. We will not assume that both of these variables are normal and interval.

nonpar corr

/variables = read write

/print = spearman.

Correlations

			reading score	writing score
Spearman's rho	reading score	Correlation Coefficient	1.000	.617
		Sig. (2-tailed)	.	.000
		N	200	200
	writing score	Correlation Coefficient	.617	1.000
		Sig. (2-tailed)	.000	.
		N	200	200

The results suggest that the relationship between **read** and **write** ($\rho = 0.617$, $p = 0.000$) is statistically significant.

Simple logistic regression

Logistic regression assumes that the outcome variable is binary (i.e., coded as 0 and 1). We have only one variable in the [hsb2 data file](#) that is coded 0 and 1, and that is **female**. We understand that **female** is a silly outcome variable (it would make more sense to use it as a predictor variable), but we can use **female** as the

outcome variable to illustrate how the code for this command is structured and how to interpret the output. The first variable listed after the **logistic** command is the outcome (or dependent) variable, and all of the rest of the variables are predictor (or independent) variables. In our example, **female** will be the outcome variable, and **read** will be the predictor variable. As with OLS regression, the predictor variables must be either dichotomous or continuous; they cannot be categorical.

logistic regression female with read.

Dependent Variable Encoding

Original Value	Internal Value
male	0
female	1

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.564	1	.453
	Block	.564	1	.453
	Model	.564	1	.453

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	275.073	.003	.004

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	READ	-.010	.014	.562	1	.453	.990
	Constant	.726	.742	.958	1	.328	2.067

a. Variable(s) entered on step 1: READ.

The results indicate that reading score (**read**) is not a statistically significant predictor of gender (i.e., being female), Wald = .562, p = 0.453. Likewise, the test of the overall model is not statistically significant, LR chi-squared = 0.56, p = 0.453.

Multiple regression

Multiple regression is very similar to simple regression, except that in multiple regression you have more than one predictor variable in the equation. For example, using the [hsb2 data file](#) we will predict writing score from gender (**female**), reading, math, science and social studies (**socst**) scores.

regression variable = write female read math science socst

/dependent = write

/method = enter.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.776 ^a	.602	.591	6.05897

a. Predictors: (Constant), social studies score, FEMALE, science score, math score, reading score

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10756.924	5	2151.385	58.603	.000 ^a
	Residual	7121.951	194	36.711		
	Total	17878.875	199			

a. Predictors: (Constant), social studies score, FEMALE, science score, math score, reading score

b. Dependent Variable: writing score

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.139	2.808		2.186	.030
	FEMALE	5.493	.875	.289	6.274	.000
	reading score	.125	.065	.136	1.931	.055
	math score	.238	.067	.235	3.547	.000
	science score	.242	.061	.253	3.986	.000
	social studies score	.229	.053	.260	4.339	.000

a. Dependent Variable: writing score

The results indicate that the overall model is statistically significant ($F = 58.60$, $p = 0.000$). Furthermore, all of the predictor variables are statistically significant except for **read**.

Analysis of covariance

Analysis of covariance is like ANOVA, except in addition to the categorical predictors you also have continuous predictors as well. For example, the one way ANOVA example used **write** as the dependent variable and **prog** as the independent variable. Let's add **read** as a continuous variable to this model, as shown below.

Tests of Between-Subjects Effects

Dependent Variable: writing score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7017.681 ^a	3	2339.227	42.213	.000
Intercept	4867.964	1	4867.964	87.847	.000
READ	3841.983	1	3841.983	69.332	.000
PROG	650.260	2	325.130	5.867	.003
Error	10861.194	196	55.414		
Total	574919.000	200			
Corrected Total	17878.875	199			

a. R Squared = .393 (Adjusted R Squared = .383)

The

results indicate that even after adjusting for reading score (**read**), writing scores still significantly differ by program type (**prog**), $F = 5.867$, $p = 0.003$.

Multiple logistic regression

Multiple logistic regression is like simple logistic regression, except that there are two or more predictors. The predictors can be interval variables or dummy variables, but cannot be categorical variables. If you have categorical predictors, they should be coded into one or more dummy variables. We have only one variable in our data set that is coded 0 and 1, and that is **female**. We understand that **female** is a silly outcome variable (it would make more sense to use it as a predictor variable), but we can use **female** as the outcome variable to illustrate how the code for this command is structured and how to interpret the output. The first variable listed after the **logistic regression** command is the outcome (or dependent) variable, and all of the rest of the variables are predictor (or independent) variables (listed after the keyword **with**). In our example, **female** will be the outcome variable, and **read** and **write** will be the predictor variables.

logistic regression female with read write.

Dependent Variable Encoding

Original Value	Internal Value
male	0
female	1

Omnibus Tests of Model Coefficients

	Chi-square	df	Sig.
Step 1 Step	27.819	2	.000
Block	27.819	2	.000
Model	27.819	2	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	247.818	.130	.174

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	READ	-.071	.020	13.125	1	.000	.931
	WRITE	.106	.022	23.075	1	.000	1.112
	Constant	-1.706	.923	3.414	1	.065	.182

a. Variable(s) entered on step 1: READ, WRITE.

These results show that both **read** and **write** are significant predictors of **female**.

Discriminant analysis

Discriminant analysis is used when you have one or more normally distributed interval independent variables and a categorical dependent variable. It is a multivariate technique that considers the latent dimensions in the independent variables for predicting group membership in the categorical dependent variable. For example, using the [hsb2 data file](#), say we wish to use **read**, **write** and **math** scores to predict the type of program a student belongs to (**prog**).

discriminate groups = prog(1, 3)

/variables = read write math.

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.356 ^a	98.7	98.7	.513
2	.005 ^a	1.3	100.0	.067

a. First 2 canonical discriminant functions were used in the analysis.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 2	.734	60.619	6	.000
2	.995	.888	2	.641

Standardized Canonical Discriminant Function Coefficients

	Function	
	1	2
reading score	.273	-.410
writing score	.331	1.183
math score	.582	-.656

Structure Matrix

	Function	
	1	2
math score	.913*	-.272
reading score	.778*	-.184
writing score	.775*	.630

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

Functions at Group Centroids

type of program	Function	
	1	2
general	-.312	.119
academic	.536	-1.97E-02
vocation	-.844	-6.58E-02

Unstandardized canonical discriminant functions evaluated at group means

Clearly, the SPSS output for this procedure is quite lengthy, and it is beyond the scope of this page to explain all of it. However, the main point is that two canonical variables are identified by the analysis, the first of which seems to be more related to program type than the second.

One-way MANOVA

MANOVA (multivariate analysis of variance) is like ANOVA, except that there are two or more dependent variables. In a one-way MANOVA, there is one categorical independent variable and two or more dependent variables. For example, using the hsb2 data file, say we wish to examine the differences in **read**, **write** and **math** broken down by program type (**prog**).

Multivariate Tests^c

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.978	2883.051 ^a	3.000	195.000	.000
	Wilks' Lambda	.022	2883.051 ^a	3.000	195.000	.000
	Hotelling's Trace	44.355	2883.051 ^a	3.000	195.000	.000
	Roy's Largest Root	44.355	2883.051 ^a	3.000	195.000	.000
PROG	Pillai's Trace	.267	10.075	6.000	392.000	.000
	Wilks' Lambda	.734	10.870 ^a	6.000	390.000	.000
	Hotelling's Trace	.361	11.667	6.000	388.000	.000
	Roy's Largest Root	.356	23.277 ^b	3.000	196.000	.000

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept+PROG

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	reading score	3716.861 ^a	2	1858.431	21.282	
	writing score	3175.698 ^a	2	1587.849	21.275	
	math score	4002.104 ^b	2	2001.052	29.279	
Intercept	reading score	447178.672	1	447178.672	5120.994	
	writing score	460403.797	1	460403.797	6168.704	
	math score	453421.258	1	453421.258	6634.435	
PROG	reading score	3716.861	2	1858.431	21.282	
	writing score	3175.698	2	1587.849	21.275	
	math score	4002.104	2	2001.052	29.279	
Error	reading score	17202.559	197	87.323		
	writing score	14703.177	197	74.635		
	math score	13463.691	197	68.344		
Total	reading score	566514.000	200			
	writing score	574919.000	200			
	math score	571765.000	200			
Corrected Total	reading score	20919.420	199			
	writing score	17878.875	199			
	math score	17465.795	199			

a. R Squared = .178 (Adjusted R Squared = .169)

b. R Squared = .229 (Adjusted R Squared = .221)

The students in the different programs differ in their joint distribution of **read**, **write** and **math**.

Multivariate multiple regression

Multivariate multiple regression is used when you have two or more dependent variables that are to be predicted from two or more independent variables. In our example using the hsb2 data file, we will predict **write** and **read** from **female**, **math**, **science** and social studies (**socst**) scores.

glm write read with female math science socst.

Multivariate Tests^b

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.030	3.019 ^a	2.000	194.000	.051
	Wilks' Lambda	.970	3.019 ^a	2.000	194.000	.051
	Hotelling's Trace	.031	3.019 ^a	2.000	194.000	.051
	Roy's Largest Root	.031	3.019 ^a	2.000	194.000	.051
FEMALE	Pillai's Trace	.170	19.851 ^a	2.000	194.000	.000
	Wilks' Lambda	.830	19.851 ^a	2.000	194.000	.000
	Hotelling's Trace	.205	19.851 ^a	2.000	194.000	.000
	Roy's Largest Root	.205	19.851 ^a	2.000	194.000	.000
MATH	Pillai's Trace	.160	18.467 ^a	2.000	194.000	.000
	Wilks' Lambda	.840	18.467 ^a	2.000	194.000	.000
	Hotelling's Trace	.190	18.467 ^a	2.000	194.000	.000
	Roy's Largest Root	.190	18.467 ^a	2.000	194.000	.000
SCIENCE	Pillai's Trace	.166	19.366 ^a	2.000	194.000	.000
	Wilks' Lambda	.834	19.366 ^a	2.000	194.000	.000
	Hotelling's Trace	.200	19.366 ^a	2.000	194.000	.000
	Roy's Largest Root	.200	19.366 ^a	2.000	194.000	.000
SOCST	Pillai's Trace	.221	27.466 ^a	2.000	194.000	.000
	Wilks' Lambda	.779	27.466 ^a	2.000	194.000	.000
	Hotelling's Trace	.283	27.466 ^a	2.000	194.000	.000
	Roy's Largest Root	.283	27.466 ^a	2.000	194.000	.000

a. Exact statistic

b. Design: Intercept+FEMALE+MATH+SCIENCE+SOCST

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	writing score	10620.092 ^a	4	2655.023	71.325	.000
	reading score	12219.658 ^b	4	3054.915	68.474	.000
Intercept	writing score	202.117	1	202.117	5.430	.021
	reading score	55.107	1	55.107	1.235	.268
female	writing score	1413.528	1	1413.528	37.973	.000
	reading score	12.605	1	12.605	.283	.596
math	writing score	714.867	1	714.867	19.204	.000
	reading score	1025.673	1	1025.673	22.990	.000
science	writing score	857.882	1	857.882	23.046	.000
	reading score	946.955	1	946.955	21.225	.000
socst	writing score	1105.653	1	1105.653	29.702	.000
	reading score	1475.810	1	1475.810	33.079	.000
Error	writing score	7258.783	195	37.225		
	reading score	8699.762	195	44.614		
Total	writing score	574919.000	200			
	reading score	566514.000	200			
Corrected Total	writing score	17878.875	199			
	reading score	20919.420	199			

a. R Squared = .594 (Adjusted R Squared = .586)

b. R Squared = .584 (Adjusted R Squared = .576)

These results show that all of the variables in the model have a statistically significant relationship with the joint distribution of **write** and **read**.

CHI SQUARE TEST:

TABLE 4.2.1: Table showing the association between occupation and investment in mutual fund

Null Hypothesis (H_0) – There is no association between occupation and investment in mutual fund.

Alternate Hypothesis (H_1) – There is association between occupation and investment in mutual fund.

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
How often does the occupation helps investment in mutual fund	100	100.0%	0	0.0%	100	100.0%

Chi-Square Tests			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	34.193 ^a	16	0.005
Likelihood Ratio	36.516	16	0.002
N of Valid Cases	200		

a. 13 cells (52.0%) have expected count less than 5. The minimum expected count is .09.

Source: primary data

INTERPRETATION:

Since p value is lesser than 0.05, we accept Alternate Hypothesis and reject Null Hypothesis. Therefore, there is association between occupation and investment in mutual fund.

ANOVA:**Table 4.3.1: Table showing association between returns and the investment in mutual fund.**

Null Hypothesis, H0: There is no association between returns and mutual funds.

Alternate Hypothesis, H1: There is association between return and mutual fund.

ANOVA						
		Sum of Squares	Df	Mean Square	F	Sig.
INVESTMENT IN MUTUAL FUND	Between Groups	1.380	4	0.345	0.346	0.847
	Within Groups	194.620	195	0.998		
	Total	196.000	199			

INTERPRETATION:

Since p value is higher than 0.05, we accept Null hypothesis and reject Alternate hypothesis. Therefore, There is no association between return and investment in mutual fund.

CHAPTER – 5

FINDINGS:

- Majority (75%) of the respondents are male.
- Majority of the respondents doing govt jobs and private jobs.
- Minimum number of respondents belongs to student category.
- Majority (41%) of the respondents are doing Business.
- Among the Respondents farmer has minimum interest in investing mutual fund.
- Majority (52.5%) of the respondents income is less than 30000.
- Only(12.5%) respondents has income above 50000 .
- Majority (37%) of the respondents like to invest in gold.
- only (24%) of the respondents like to invest in shares.
- 11% of the respondents are like to invest in bank deposit and 6% like invest in real estate and 5% like to invest in insurance sector.
- 66.5% of the respondents strongly Agree that Products Getting delivered Home is the Important need for Online shopping Applications, Whereas Price comparison and No need to travel are the next most important needs in online shopping Applications.
- 45.5% of the respondents are Extremely Attracted to Detailed product description, whereas Wish-list, Discount Offers, Various payment methods and Filter & Search option are the next very Attracting Features in Online Shopping Applications.
- 62.5% of the Respondents feel User-friendly as the Extremely Important feature among others, whereas Tracking of items, Order Confirmation screen, Cash on Delivery, Search and Filter Option and Offers and

Discounts are the Next Extremely Important features for an Online Shopping Applications.

- Majority (53%) of the respondents are Extremely satisfied with Price.
- 55% of the Respondents feel Very satisfied with the Quality of the products and services provided by the Online shopping Applications
- Majority (53.5%) of the respondents prefer Cash on Delivery as their method of payment.
- Majority (45%) of the respondents are feeling very secured with the payment system in online shopping applications.
- 64.5% of the respondents Strongly Agree that Online shopping Applications Are Easy to order, whereas other beneficiary factors chosen by most respondents are variety at one shop, Time saving, can shop any time and Privacy of shopping in Online shopping Applications.
- Majority (45.5%) of the respondents Agree that Possibility of forgery is the major issue in Online shopping Applications, whereas Physical Examination is not possible, Additional charges, Expensive price and Unclear application policies are the next major issues on online shopping applications.
- Majority (42%) of the respondents Strongly Agrees for the complaint „Online shopping is Risky“, whereas "There is no one to guide you", „One cannot shop for immediate usage and have to wait for delivery“ and „Some products lack proper Specifications“ are the next few complaints that are agreed by most of the respondents.
- Majority (60.5%) of the respondents are very satisfied in online shopping applications.

SUGGESTIONS:

- Mutual investment can be done with a proper knowledge of a market condition.
- India is a country with a huge population and there are many sectors for investment we want invest based upon the market condition.

- Many customers are getting used to the online shopping applications and its feature of delivering the products to the door step can have an additional benefit that is, ability to fix the date of the product delivery.
- The vendors can provide more Offers and Discounts, Shorten the Delivery Duration, low Shipping charges, Improved Quality products, Re-stocking of products, Improved refund policy and Simple UI.
- Feedbacks of the customers can be collected after few days from the Delivery of a product which will help the Online shopping Applications to rectify what is wrong from their side.

CHAPTER - 6

6.1. CONCLUSION:

Every investment is inherently connected with risk. Its existence and diversity among various types of investments is one of the driving forces behind the development of the capital market. The risk has also caused emergence and development of alternative investments. Flourishment of this segment of the market has also been influenced by periodical financial crises, which have been the driving force behind the search for investments that would allow investment portfolio diversification and would provide opportunities for profiting, even during price declines on the market. Alternative investments constitute an effective tool for risk diversification, however, they are not suitable for all investors. Institutional investors, including the banks, pension funds, large companies as well as individual investors within the wealth management sector, constitute a dominant group of the investors on the alternative investments market. Investors considering such investments should rely on their own preferences regarding the acceptable risk as well as on the entities acting as the trustees of the investors' assets. Often, it is the experience gained during management of own alternative investment portfolio, which allows verification and assessment of the acceptable level of the risk, definition of the maximum loss tolerance, and designation of achievable financial targets. This book aims to present alternative investments in management of the investors' assets. Analysis of this sector of the global financial market is not possible without determining which alternative investment categories can be qualified within this group. There is still no universal definition of alternative investments which would be agreed on in the financial world and which would indicate a set of homogenous characteristics that are relatively stable over time. As a result, many individual and institutional investors are not fully convinced that 'alternative investments' constitute a separate category of investments. Multitude of various definitions raises the need for creation of some universal patterns, which would allow correct classification of individual investments and at the same time, would make it easier to manage them.

QUESTIONARIE

TOPIC:INVESTORS OPINION ON RISK IN MUTUAL FUND

NAME:TAMILSELVAN

REGISTERNUMBER:39410256

OBJECTIVE:

To analyse the risk in mutual fund and to elloborate various factor that affect the investment in mutual fund.

To analyse investors opinion on various sectors for mutual fund investment.

Questionnaire

1.name: _____

2.GENDER:a)MALE b)female

3.Occupation:a)business b)govt.job c)private emoloyee

4.Education:a)higher secondary b)graduate c)post graduate

5.Martial status:a)married b)unmarried

6.Monthly income:a)below 30000 b)below 50000 c)above50000

7.which of the following sector you would like to invest?

- a)sector fuds
- b)shares
- c)gold
- d)real estate
- e)bank deposit

8.which sector funds do you have?

- a)banking sector
- b)automobile sector
- c)software sector
- d)pharmaceutical sector
- e)real estate

9.which factor influence you to influence invest in sector funds?

- a)capital appreciation
- b)Tax benefit
- c)return
- d)safety on investment
- e)liquidity

10.rank different sector funds based upon the returns:

s.no	Type of sector	v.high return	High return	Moderate return	Low return	Very low return
1	Banking sector					
2	Software sector					
3	Pharmaceutical sector					
4	Automobile sector					
5	RealEstate sector					

11.rank different sector based upon the risk:

s.no	Type of sector	v.high return	High return	Moderate return	Low return	Very lowretur n
1	Banking sector					
2	Software sector					
3	Pharmaceutical sector					
4	Auto mobile sector					
5	Real estate sector					

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