Effect of Demographics Structure on Stock Volume: An Empirical Study of Emerging Markets

by

Munibah Munir

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I dedicate my work to my father (Late Munir Ahmed) who had been an inspiration for throughout my life and to my motivational sunshine my daughter (Hania).

CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY

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Thank you all

Abstract

The study investigates the impact of investment on the demographic structure of population i.e., peak earning age and retirement age and its impact on the stock volume of six emerging markets (Pakistan, India, China, Brazil, Poland, and Hungary). The current study employs data of these emerging countries for the period of 1991 to 2016 by using Autoregressive Regressive Distributed Lag (ARDL) approach. The investment made by peak earning age investors has a positive and significant impact on stock volume. Whereas, it is observed the retirement age has a significant and negative impact on stock volume. The results of the study suggested that in the peak earning age people invest in the stock market and at retirement age, they withdraw their investment from stock markets.

Key words: Change in demographics, Stock Volume, Earning Yield, Inflation, GDP, Budget Deficit, ARDL.

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Abbreviations

OLG	Overlapping Generation Theory
KSE-100	Karachi Stock Exchange (Pakistan)
NSE	National Stock Exchange (India)
SSE	Composite Shanghai Stock Exchange (China)
BUX	Budapest Stock Exchange (Hungary)
WSE	Warsaw Stock Exchange (Poland)
IBOV	Sao Paulo Stock Exchange (Brazil)
GDP	Gross Domestic Product
UN	United Nation
P/E	Price Earning
DY	Dividend Yield
The USA	The United States of America
M/O	Middle to Old
EY	Earnings Yield
CPI	Consumer Price Index
ARDL	Autoregressive Distributed Lag
ECM	Error Correction Model
PPP	Purchasing Power Parity
RGDP	Real Gross Domestic Product
VEC	Vector Error Correction
OECD	Organization for Economic Cooperation and Development
CUSUM	Cumulative Sum
CUSUMSQ	CUSUM Squared

Chapter 1

Introduction

1.1 Introduction

The influence of a changing demographic structure on the price of financial assets has been the subject of a substantial amount of research and discussion. Demographics can affect economic dynamic in the different ways. While economist has studied their impact on aggregate consumption, saving, labor supply and social program. Little work has been done on whether and how demographic functions influence the capital market. Demographics in any country have played a protuberant role for the economy and political developments of industrialized economies (Quayes & Jamal, 2004). Demographics structure is the study of human and it is a study of human population. Any changes in population size over time has a link with peak earning age and their behavior to invest and secure for their retirement age (Poterba, 2004). The aging issue is very important and emotional: Who is going to take care of grandparents? That's why Peoples mostly safe in their working days to secure their old age when they got off for working and stay at home after retirement. It is very clear stock volume always adjust in between demand and supply and information, it is the bottom line for the stock volume. In the market there are many buyers who want to buy shares, market price will be a rise, if more share and fewer buyers, the stock volume trends to down. Stock volume always responds to the fluctuations in the demand and supply for stocks,

that fluctuations come from the buyers and sellers as market participants (Plerou, Gopikrishnan, Gabaix, & Stanley, 2002).

There are many studies which show that there is a significant relationship between macroeconomic variables and stock returns. Singh, Mehta, & Varsha, (2011). Macroeconomic variables have a direct link with any country economy so any increase in it or decrease directly affect the individuals saving pattern and income. There is a puzzling empirical relationship between inflation and stock returns, and it is negatively correlated with each other (Fama, 1990). According to investor point of view, they want to know about real assets stock can provide them hedge in contradiction of inflation. On other macroeconomic variable is GDP, GDP growth rate is directly related to Demographic structure and earning pattern or any nation because when generation reaches to earning stage of life, growth rate and interest rate also increases. It cannot wise to say, as demography is not important, it has a significant downward effect on the real GDP growth, especially in the term of per capita and put more and more stress all those programs which are support by government for benefit of the population and earning system. At different age level, individuals react differently towards their saving/consumption and government budget, so due to the budget deficit, there can be inefficiency in the stock market (Rezessy, 2005).

Over 70's years, there was a standard way of that era, the value of stock price was based line for price-to-earnings ratio which is inverse to earning yield (McWilliams, 1996), but still, it is one of a most familiar method to use for measure valuation. The intuition behind the link between demographics structure and financial asset prices is the life-cycle hypothesis, which suggests young people (aged 20-39) are likely to be net borrowers (Favero, Gozluklu, & Tamoni, 2011). According to the list of the emerging countries, they have totally different behavior and the trend towards the population structure and earning pattern. In some Asian countries peak earning age started from the early 30s and in some European countries, it started from early 20s. For example, a person who born in early 80's in Pakistan and India is near to enjoy their thirties. When we compare this cohort peak-earning age with rest of countries it has little late influence of a changing

demographic structure on the price of financial assets. The dramatic rise in the US stock volumes in the 1990s can be partly attributed to the growing demand for financial assets, as the first group of the generation reached the peak earning age in the early 1990s and increased their holdings of financial assets (especially equity shares) to save for retirement (Quayes & Jamal, 2004), but in the context of Pakistan it has little late over rest of the country. Since most of the peak-earning age factors are still in their peak earning age, there is some concern that equity prices will face a considerable downward pressure when they retire and begin to liquidate equity holdings from their financial portfolio (Abel, 2003). In fact, the oldest cohorts of the peak earning age have already started to retire. One of the reasons for this concern is that the proportion of population between the ages of 45 and 64 is near its peak, and it is projected to decline over the next two decades.

This study contributes to the existing literature in four ways. Firstly, it explains the peak earning age effect on stock volume in the emerging markets. Secondly, it investigates the retirement age contribution towards stock volume. Thirdly, macroeconomic variables effect in the emerging markets stock market over the life cycle of individuals under different age structure. Fourthly, this study examines the earning yield effect on stock volume when individuals take as per indicator to predict in their peak and retirement age.

1.2 Theoretical Background

1.2.1 Life-Cycle Theory

Thus, financial asset prices would decline or be unaffected as the age group increases. The standard economic model of wealth accumulation suggests that consumption decisions are made in a life-cycle framework, where consumption-smoothing requires one to save during the working years to support consumption after retirement (Goyal, 2004). According to the life-cycle hypothesis, individuals invest in housing assets in their 20s and 30s and as they approach retirement age,

they allocate more of their savings to financial assets. Hence, there is greater demand for financial assets when an individual reaches the latter earning age prior to retirement, especially between the ages of 45 and 64. The ratio of people belonging to the age groups characterized as peak borrowers and peak savers changes because of different population growth rates, investors 'relative risk aversion increases with age. The middle-aged (aged 40-60) are involved heavily in the accumulation of net assets. This is because they are at the peak of their earnings potential, and likely to be saving for retirement. A relative increase in the size of this group would lead to a high demand for financial assets, e.g. stocks and bonds, resulting in an increase in financial asset prices. As the age group enters retirement (aged 60+), they start to dissimulate their wealth. As a result, financial asset prices could come under downward pressure. The corollary to these two hypotheses is that if the proportion of population who are in their pre-retirement age is high at any given time, it will have an enhancing effect on the price of relatively risky financial assets, and when they retire and divest their risky equity assets in favor of holding fixed income assets, it will have a depressing effect on the price of equity assets.

During the life when an individual's entry into their peak earning age, they start for investment which leads to high demand overall rise in the stock market. After enjoying their peak earning time they moved for retirement age, at this stage they want to earn money in more secure form and withdraw from stocks and invest in real estate business or some other secure ways. On this stage, there is again, high supply for stocks and the overall stock volume goes down. Wherever it is about to check the demographic age structure effect on the stock market, there are two thinker groups: (1) one group who have to believe very doomsday situation which is melting down of the market. They believe that, when in the retirement individuals sell their assets, young individuals on that time will buy all these stocks. Results that in a decrease of stock volume, on retirement age individuals would have small nest egg than they forecasted or anticipated. (2) Other group believe there is no chance of meltdown the market because highly forecastable age for retirement of individuals can be reflected in the pricing of assets in the progressive financial markets. As an outcome, on the retirement market will not

meltdown, as the price is already in (Brooks, 2006). These two concepts give space to an efficient market hypothesis, it is not possible to beat the market just because all the price is already integrated with the relation information, efficient market hypothesis plays backbreaker role for forecasting (Fama, 1970).

According to an economic point of view, life-cycle hypothesis theory is about to explain the individual's consumption patterns. It has suggested the individual's behavior and plans over the life for consumption and savings (Ando, & Modigliani, 1963). Young individuals do not invest much because they earn less; individuals in the age of middle are the most important part in the life-cycle hypothesis who earn more and invest more; aged individuals invest very less because they have less life behind to enjoy the fruits of their investments. From all countries, it is not possible to have same consumption and saving patterns over the life-cycle. It is not as simple and quick, retirees just once decide and withdraw their all investment, and the main factor is uncertainty. Which directly affects the consumption and saving pattern. As per this theory, individuals in 20s and 30s do investment for housing assets until they have reached to retirement, for saving mostly their allocation is based on financial assets. Later, high demand for financial assets when before retirement an individual's later in peak earning age. The risk aversion life-cycle theory explains, that with the rise in age individual become risk-averse, because on the retirement individual prefer the less risky income which is in the form of fixed income rather than equity assets which are is riskier. The consequences of the above 2 hypotheses: the pre-retirement proportion of the population at any time is high, as compared to risky financial assets it has more effect on the price, on the retirement they invest in fixed income assets and strip form the risky equity assets, which can lead the quality assets price downward.

1.3   Overview of Markets

Agtmael, (1981) World Bank economists first time was used this term emerging market economy, it means an economy which has the low class to middle class

per capita income. All those countries which come under this section have approximately 80% of world population, and contain 20% world's economy. All the countries under this section, can be different from each other on the bases on big to small, can be considered as emerging due to their reforms and developments. There is no doubt about China, it is one of powerful market in the world same as another side smallest economy like Tunisia, both belong to emerging market, only reason is both smallest and biggest markets have started working on economic development and reforms and start working on to open their markets door and emerge with the rest of the world because EME are experiencing the fast-growing markets. It is that nation's economy which is working for to move and get the advancement through debt in the local market and equity and stock exchange rules and standards. These markets are not more developed and advanced countries and meet that countries level standards, but try and work on to maintain the infrastructure and economy which are more developed than countries market as frontier wise (Kvint, 2010).

There is a long list of countries which comes under the category of the emerging market economy by in my work, I will discuss more focusing economies like Pakistan, India, China, Hungry, Poland, and Brazil. The biggest reason to study China and India along with Pakistan is the economic and political issues. To cover up the Asian side, I also consider the two countries from Central Europe and one from Latina and South America. My study is base one shift in demographics over the period and their earing time effect on stock volume along with some macroeconomic variables. As per the new projection report of the UN's world population prospects (2013), China and India will remain the 2 most populated countries, by having 19% and 18% respectively of the whole world population. Roughly in 2024 India population will cross the China Population. To explain the demographic structure of population there are 2 fundamental ways to relate it to birth and death which is fertility and mortality. So, it is very interesting to study these countries along with Pakistan under the category of emerging markets along with peak earning age and its shift effect on stock volume.

1.3.1 Pakistan Stock Market and Demographics

According to the Purchasing power parity, Pakistan is the 24th largest country in the world and as per GDP, it has a 44th number in the world. In the 21st century, the first 4 years, KSE 100 index among other stock markets in the world was finest performing stock market. In 2005 Pakistan Listed Company's stock market was had $5,937 capitalization according to World Bank. After the General electronics in 2008, many political issues, inflation mounting, deficit current account and military war on borders KSE 100 faced deep decline. In 2009 market bounced back and achieve its successor time till 2011. In 2014 Pakistan stock market made the new record with KSE 100 index 907 point's highest level. From 1994 to 207 Pakistan was the part of the emerging market MSCI, but in 2008 when the stock market crash and faced allot panicked situation Pakistan investor decided to close the door for the existence of the foreign investors. In 2015 Pakistan was added to reclassification in the EM and in May 2016 they announced the re-add Pakistan in the list of EM index.

Along with Pakistan economy and stock market conditions, it is very important to consider the Pakistani demographics, their trend to earn and consumption over the life cycle. Through the information of age and age structure can get an idea of the economic, political and social background and forecasting. According to the data peak earning age is starting for 30 to till 60 and after 60 moved for retirement. During this time period how an individual invest in stock, due to this investment how stock volumes move and when an individual goes into retirement and secure their after retirement life withdraws from the stock changes in the stock volume along with the different Marco-economic variables.

1.3.2 Indian Stock Market and Demographics

According to the Purchasing power parity, India is the 3rd largest country in the world and as per GDP, it has a 6th number in the world. In the 21st century the first 4 years. NSE is established is 1992 in India with a market capitalization $1.41 trillion, according to March 2016, it was world 12th stock market. Among many
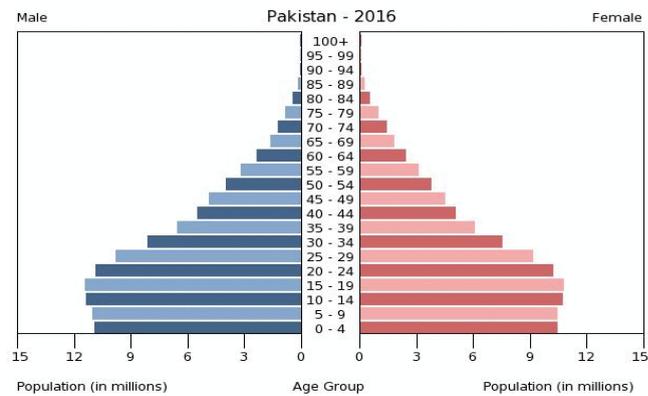
FIGURE 1.1: Pakistan's demographics.

other countries, India is one of the diversified country, which open doors for the rest of the world and emerging market in the form of open economy. In 1991 through a program economic liberalization, they open their economy to emerging market. Due to its largest population and faster growth they can achieve the average faster long-run growth. It is the 2nd country in the world as per population wise. Almost 43% of the population in India fall under the head 25-64, that is most earning age. Some of the states are in India has the highest trend to invest in stock market, but the biggest issue is registered investors are less than non-registered investors in India. As world 2nd largest country in the base population, with 43% peak earning age population, its stock market really effect due to demographic structure change along with macroeconomic variables under the head of emerging market.
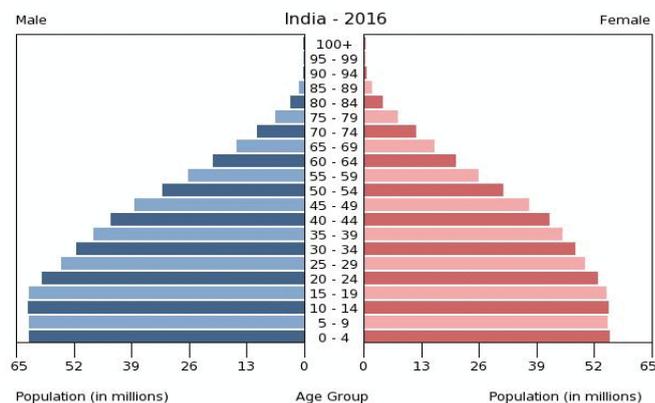
FIGURE 1.2: Indian demographics.

1.3.3 China Stock Market and Demographics

According to purchasing power parity China is the world largest economy and 2nd largest country as per nominal GDP. China stock market has a long history, in 1866 first time traded its share, but with Shanghai Stock exchange it traded in 1904. From all ups and downs in 1990 Shanghai Stock exchange was re-established. China is the world largest populated country, with that level almost 85% of urban chines especially household invest in equity and 30% in stock from their collective cash.
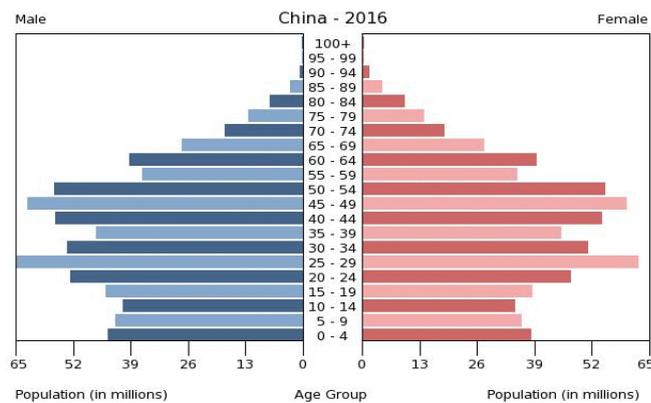
FIGURE 1.3: China's demographics.

1.3.4 Hungry Stock Market and Demographics

In the world, Hungary is the 49th country on the base of GDP which is calculated through purchasing power parity. Hungary Stock market was founded in 1864, and now in 2016, it has \$28.01 billion capitalizations. On the basis of figure 4 are the age structure of Hungary and its shows most population male and female fall under the age range 40-44 and 60-64. Most peak earning age and average retirement age is 62-65, means it has an effect on the stock market price.
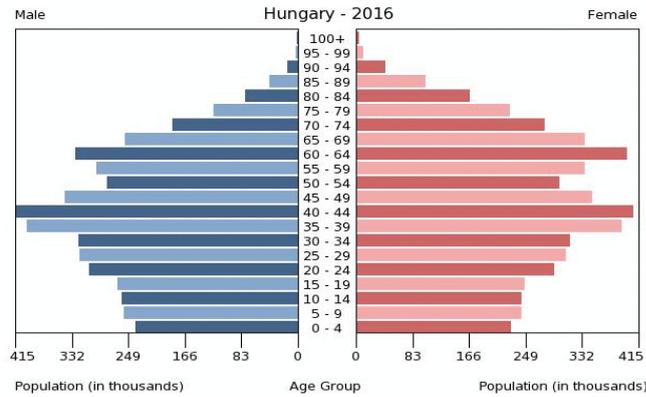
FIGURE 1.4: Hungry demographics.

1.3.5 Poland Stock Market and Demographics

According to World Bank Poland is the highest-income economy by having the 20th number on the basis of GDP. From 2010, among all European countries, Poland growth rate continues tough the highest level. Its stock exchange was founded in 1991, and best stock market index in the emerging market.
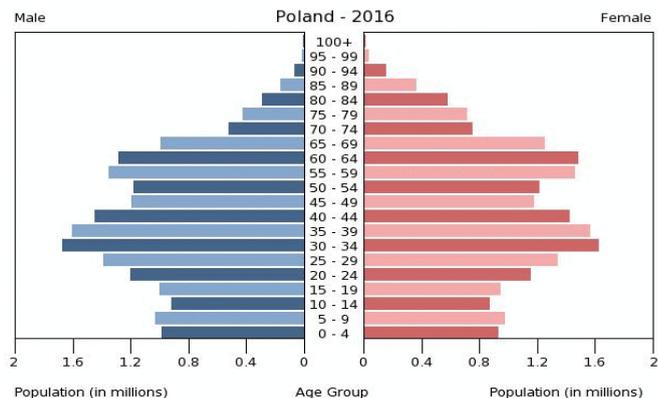
FIGURE 1.5: Poland demographics.

1.3.6 Brazil Stock Market and Demographics

According to purchasing power parity, Brazil is the 8th largest economy and 9nd largest country as per nominal GDP. It is the inward-oriented economy and 2nd largest in America, one of the largest economies in Latin America. From 2010-12

it was ranked one of the fastest growing economies in the world. It was founded in 1890 by a state-owned until the mid-1960s it was remained owed by state companies. In 1972, it was the first stock market which implemented an automatic system for online information. Its population is made up of many different origins, like American, European, Arab, Japanese, and African with almost more than 55% population which come under the category of peak earning age. The Average retirement age in Brazil is around 65. Figure 1.6 shows the age structure.
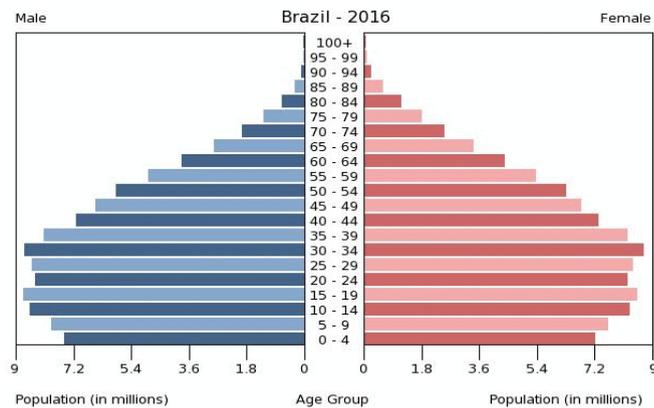
FIGURE 1.6: Brazil demographics.

1.4   Problem Statement

The peak earning of individual's investment is always the focal point for many investors and researchers due to the issue of how demographics structure will affect the general economy and specifically stock market. From all, one most common understandable view is that stock returns rate will be low in the future as when peak earners will be reached to their retirement and see their financial assets. However, this hypothesis is still intuitive, inconsistent when turns out with fundamental standards for asset pricing and market equilibrium.

The purpose of this study is to investigate the demographic structure of population effect on stock volume. Furthermore, the intention of this research is to study the peak-earning age effect on equity price along with macroeconomic factors in

the context of emerging markets (Pakistan, China, India, Hungary, Poland, and Brazil).

1.5   Research Questions

This study aims to answer the following questions

1. How peak-earning age does the effect of emerging markets stock volume? And whether retirement age has effect emerging markets stock volume?

2. What is the impact of the budget deficit, GDP, and inflation on of the stock volume in the emerging markets in the context demographic structures?

3. How earning yield does have an effect on emerging markets stock volume?

1.6   Research Objectives

Demography has an impactful relation to the stock market and its trend. No doubt it is all time more concerning and impressive questions for all levels in any country. The main objective of this study base on the above research questions are:

1. To examine the peak-earning and retirement age effect on emerging markets stock volume.

2. To explore the macroeconomic variables (budget deficit, GDP, and inflation) effect on emerging markets stock volume in the context demographic structures.

3. To investigates the earing yield effect on emerging markets stock volume in the context demographic structures.

1.7   Significance

This study makes a considerable contribution to the existing literature by providing the evidence about quality information in the context of emerging markets. There is a number of works done in the literature has studied the link between demographic structure and stock price but less with stock volume and demographic structure under such macroeconomic variables in the context of emerging countries. In the early research demographic structure was specified to equity premium, but different contemporary studies look at peak-earning age impacts on stock volume.

This study is helpful in different ways, firstly this study contributes to the current literature through empirical evidence of emerging markets. Secondly, investors can consider this as evidence to determine wither peak-earning age is threatening to drown in financial assets when they withdraw their investment over their retirement and can be helpful to understand the stock market trend over the upcoming years. Thirdly, information related to peak earning and retirement age can highlight the key elements of emerging markets stock volume by an investor in the decision-making process and policymakers it can be valuable in regulating and monitoring the stock market. Fourthly, this study helpful for risk managers, peak-earning age change and risk adverse effect can help to understand the hedging and the assessment of the different projects whose cash flows have a direct link with the risk and changing age factors. Fifthly the whole world population trend and growth in changes, this study can help to understand the population trend in investment and after retirement along with most populated countries till 2024.

1.8   Research Gap

There is a number of studies about demographic structure of the population in the European countries especially in the context of baby boomers, but not in the context of emerging countries. Furthermore, demographic structure of population was specified to equity premium and stock volume not in the context of stock

volume. Thus, this study will fill the gap of demographic structure of population on stock volume in the emerging markets.

1.9 Plan of Study

The remainder of the study is organized in different Chapters.

Chapter 2 reviews the related literature view and some empirical evidence from past about demographic structure of population effect on stock volume along with macroeconomic variables.

Chapter 3 discuss data description and methodology.

Chapter 4 consists of the results and discussion.

Chapter 5 comprises of conclusion, recommendations, and direction for future research.

Chapter 2

Literature Review

2.1 Demographic Structure of Population and Stock Price

Demographics is the study of humans and human population, growth, movement, and structure. When we talk about demographic structure it has a link with the population description and how over the period of time demographic structure and shifting in the age. Demographic factors and any change in it have strong impact or influence on both assets price and economic variables, as this is taken more general belief amongst many analysts, investors and academic researchers. Through different financial news and information can give a clear idea about the relationship between demographic trends or shift and asset prices. In different countries and different researchers have been tried to give an idea about demographic trends with assets prices (stock price, bond, bond yields, dividend, etc.). The whole world is moving to experience an extreme shift in composition and size of the population. In many countries like Japan, such drastic shift has already started and sooner will be noticeable in many other countries. As per the new projection report of the UN's world population prospects (2013), China and India will remain the 2 most populated countries, by having 19% and 18% respectively of the whole world population. Roughly in 2024 India population will cross the

China Population. To explain the demographic structure of population there are 2 fundamental ways to relate it to birth and death which is fertility and mortality.

As per literature view, there are many ways in which demographics can affect the price of assets (stock). A direct way is over the life-cycle how investors select the assets and portfolio. Modigliani and Brumber (1954) develop the life-cycle hypothesis, which is about the consumer's consumption and how consumer saves and make decisions about smooth consumption and saving over the whole life. In assets and portfolio selection over a different stage in the life-cycle can take the step for dynamic supply-demand changing for assets and add something in the asset prices (Bodie, Treussard, & Willen, 2007).

As per literature support and academic research whenever discusses the demographic structure of the population is directly linked to the baby boomers and they're earning or saving trend. But it is not wise and finds no way to link every country demographic trend as like baby boomers. In this paper, according to my nature of countries and data, my focus point is the peak earning age which has links to some extent with baby boomers generation. The population of who born early 1980's to 1990's are the children of baby boomers. But as per my data and available information, my target point is to get an idea of how peak earning age population reacts towards investment, over the period of time how they save or consume their earning, according to their investment how stock price move.

Above from the theoretical arguments about the financial assets prices can be different from age to the age of the population, but as per the empirical evidence support, such consistent change is the price is less decisive. There is a relationship between demographic structure and assets price, Bakshi and Chen (1994) argue, by using US data during 1900-1990, for a test they create 2 hypothesis. The first hypothesis was the life-cycle investment: to secure their old age a large part of individual invest financial assets when they are their peak earning age, during 1966-80 real S&P index prices decrease and shift to invest in the house which leads the increase in the price of houses because baby boomer would enter into their peak earning age and states to invest in houses. In 1980, baby boomers are reaching their saving age so they invest in stock market, the result is a decline

in stock prices. In their 2nd hypothesis, they talk about risk factor when the individuals are ready to take a risk or when they avoid risk and there is a positive relation between risk premium and age. With consumption growth data, they took an average age, to test the stock and T-bills return and come up with it has a significant relation. From this result, it is confirmed as with the age change risk behavior also change, in the old age investor prefer less risky assets. So age link with risk aversion means while affecting the assets return.

There is a link between Demographic structure and equity premium over developed markets, this study has done Ang & Maddaloni (2003). They use 3 age structure: (1) above 20 years individuals' average age, (2) over 65 year's adult's fraction, (3) population proportion among20-64 working age. They find strong evidence that demographic changes can a track line for future equity premium, but weak evidence in the US market. Also, they find there is a difference among demographic variables which is used to predict the equity premium in the USA and other developed countries.

According to Asset Price Meltdown Hypothesis, on the retirement of baby boomer (peak earners), they withdraw from asset holding which will be an adverse effect on assets price. According to Poterba (2001) concludes the proportion of the population has a positive correlation with the peak earning age and in the earnings yield ratio, it can reflect the financial assets demand. Moreover, he argues that is not due to consequences of the decline in the price for predictable future as when the peak earning individual's retirees would keep their assets for the bequest reason. He rejects this hypothesis; he argues for when individuals are in their peak earning age, assets holding raises sharply but when they retired it fall slowly. He further forecast for assets demand not as much sharply decline as sharply raise when they invest in 2020 and 2050. On the other side of a complementary paper, Able (2001) come up with the argument which is as per Poterba study only discuss demand-side factors to maintain the relationship between demographic structure and in the stock price which comes from the price of capital. Results would be more different if supply-side factors also are taken into consideration. From all, he winds up his study a decrease in the stock would not be ignored because

population proportion in the peak earning or saving age goes down when peak earning generation moves closer to their retirement. He uses general equilibrium model to explain the bequest reason and rational expectation in his theoretical results. As per the model, the relationship is as stock price for the peak-earning increase, when this cohort retires there is the rational outcome as stock price decrease, no matter they decide to hold it until the end of their lives. After that, increase assets demand from the peak-earners when they retire cannot offset the financial assets price decline.

As an individual when life goes on, his behavior for risk change over their life, this age shifting in the population and over life-cycle of baby boomers have some major implications in the capital market (Brooks 2002; Abel 2003). It has no doubt as many studies gave direction towards in the late 1980s to 1990s market goes up with the fact as baby boomers were getting entering in their middle age which can say a peak earning age for that generation (Bakshi and Chen 1994). Moreover, different factors can capture the demographic shift effects. On the asset demand, most of the demographic trends are rational and predictable and use for asset demand anticipation. On the other side, the Demographic structure has to reflect the current price of the assets. However, most of the time individual who had retired may prefer to continue to keep the equities for the healthy source of finance if they have a life as per expectation to support their consumption (Poterba 2001). The empirical relationship in between age and the portfolio selection for the US stock market and base on when individual age up how he adjusts his revelation towards the stock market. For this analysis, Ameriks & Zeldes (2004) use the universities teacher's pension data and finds that when the individuals older they totally shift from the stock market and go for withdrawals.

Bae (2004), in his paper stock price and demographic structure with a cointegration approach, concludes as the proportion of the population near to retirement or after retirement has significantly negative relation with stock price. He further argues there is no impact on stock price when peak earner population is near to 45-65. His finding was consistent with the idea as spending side is more important

than saving side in the US economy because US economy is more spending oriented economy. Opposite results from Bae, Jamal, and Quayes (2004) concludes as there is a positive relationship between peak earning age and stock price by using regular regression model. Furthermore, Quayes and Jamal in (2016) argue that the population in the peak earning age has a significantly positive relationship with the stock price but when they retire they have a negative relation with the stock price it is because pension holders and retirees mostly prefer fixed-income assets with low risk over different high-risk level stocks.

2.2 Demographic Structure of Population, Earning Yield and Stock Price

Earning Yield can be described as earning per share for recent 12 months and divided by current market price per share. It is inverse to P/E ratio; which divides the stock price by earning per share. There is a strong effect of P/E ratio in the stock market this evidence is taken from Spanish market and use the beta to explain the expected returns and P/E jointly with a cross-section (De Pena, Javier, Gil-Alana, 2003). In the paper, GeanaKoplos, Magill, and Quinzi (2004) explain the trend relationship with the dividend yield ratio by using the middle-aged people age range 40-49 and for young people used age range 20-29 and came up with the result that there is a negative relationship in long-term with dividend yield ratio and age proportion.

In another paper, Favero, Gozluklu, and Tamoni (2001) use that ratio to measure the relationship between young population and middle- age population, it is an important forecaster in long-run DY ratio. In 2010 to 2013 there was a decrease in assets prices due to demographic trend shift in population, but that was a huge breakdown in the prices of an asset since that result would be too small (Lim and Weil, 2003). Goyal (2004) finds a positive correlation between peak earning age to the proportion of the population and even positive relation with demand for equity assets. To examine this, he uses the US stock market data, further find over

next 50 years the outflows are not expecting to increase to that level which can become reason and have concern for baby boomers retirements. By running the aggression model he confirms that stock market outflows decrease as per increase in the population age increase which comes under middle age structure, there is suggestion rise in the stock market.

After all in 2010, Bae finds the negative relation between retirees and stock price by using the cointegration method, but from all, at the end, he has failed up to link the positive relationship between the proportion of the population and stock price. Liu & Spiegel (2005) argue that there headwinds relationship between US population and Stock market. For analysis, he uses the M/O ration which is about the ratio between young individuals (40-49) and old individuals (60-69). To check the long run trends in P/E ratio M/O fairly gives the results and about 61% movement in the S&P 500 stock from 1954-2010 has explained by using the M/O ratio. Through model future stock prices have the effect of demographics which is to some extent bearish. Till 2021 there is a downward pressure on the real stock prices, about 13% decline cumulatively in 2010. Till 2027, there is no chance as real stock prices move back at 2010 prices. As per their results in 2030, prices would be 20% more than 2010.

Over 70's years, there was a standard way of that era, the value of stock price was based line for price-to-earnings ratio which is inverse to earning (McWilliams, 1996), but still, it is one of a most familiar method to use for measure valuation. Stock returns can enjoy the advantage if there is low price-to-earnings ratio it is based on historical data evidence (Basu, 1977) and to have special risk-return ability stock have to correlate negatively with price-to-earnings ratios (Fama, & French, 1992). There is a significant relationship between price-to-earnings ratio which is reverse to earning yield ratio with some significant variables like dividend per share, expected earnings-growth and earning risk and dividend payout ratio as this ratio (price-to-earnings) have an effect on the market investor strategic value (Constand, Freitas & Sullivan, 1991). Lewellen, (2004) finds that EY has a fundamental impact on stock returns and addition to dividend yield with additional stock return earning yield has more independent forecasting power. Lau,

Lee, & McInish, (2002), study the relationship between stock return and beta in long-term with the size of the firm. E/P. CF/P, sales growth, and book to market ratio evidence from Malaysian and Singaporean stock market between time periods 1988-99. They find a positive relation between stock returns and Beta by having positive market excess return and vice versa effect. In Malaysian market they find stock returns and earning yield has a positive relation by using earning yield is a predictor of stock returns.

2.3 Demographic Structure of Population, Inflation and Stock Price

When word inflation comes to mind, its mean high consumer prices which lead to low sale and profit. High inflation means the value of money decrease unless inflation is less than interest rates and low purchasing power. For example State bank of Pakistan increase the interest rated to reduce the inflation rate, such changes lead to stock prices down. In the term of commodities, it performs better with inflation and increases the prices. Over the period of life, individual's inflation experience is quite a difference from the expected inflation. This experience difference mean rate of inflation and inflation persistence shocks which can generate the difference between different age cohorts and expected inflation (Malmendier, & Nagel, 2015). Through this inflation learning experience, young people's forecasting high inflation than older peoples by using the high inflation time frame in late 70's and 80's. Young individuals experience in the short time frame high persistence of inflation and inflation rate. As individual's inflation expectation increase they stir for consumption and expenditure but with the age passing, they are more sensitive to inflation. Individual's inflation expectation plays an important role in investment decision and matters more on the different level of life or age structure.

It has examined why individuals who think of specific prices report higher inflation expectations. Through hypothesizes that, when individuals base their inflation

expectations on prices they pay, more extreme price changes will come to mind. Many researchers has find that, when making predictions about the future (e.g., how much they will enjoy a sports game, how long a train ride will take, etc.), people tend to incorporate their past experiences - with the more extreme ones being more likely to come to mind (Morewedge, Gilbert, & Wilson, 2005). If so, individuals who think of specific price changes to form their inflation expectations will be disproportionately focusing on items for which they experiencing extreme price changes, even if these changes are only temporary, and even if these items have a low expenditure weight in official estimates of inflation.

Above all, then there is a puzzling empirical relationship between inflation and stock returns, and it is negatively correlated with each other (Fama, 1990). According to investor point of view, they want to know about real assets stock can provide them hedge in contradiction of inflation. As per financial theory, in the CPI (consumer price index) inflation rate is reflecting which shows the overall rising price effect on goods and services. When there is a need for more money to purchase the same thing or when prices rise, both cases inflation happened. Inflation rate affects both the stock risk and volatility. In two sections inflation can be divided one is expected inflation which is come from the economists and consumers yearly plan, in that case, individual's less prefer to hold cash and value of money decrease due to inflation. The second type of inflation is unexpected inflation which is beyond the expectation of the consumers and economists, which has more harmful effects.

Boucher, (2004) study new point of view which is about the relationship between inflation and stock price to estimate the real stock price long-run trend, which is shown in earning price ratio and together realized and expected inflation to forecast the fluctuations in the stock market. Specifically, they argue that for both such forecasting attributes in excess returns and stock returns these differences can be considered in or out of the sample. Further, they conclude that such variables can give information related to future stock returns and provide in-between horizon which cannot examine other forecasting popular variables. Hamad (2006), argue

that there are many factors which influence the Saudi stock market: national income, oil prices. Inflation and interest rated.

By using basic present value method it is not easy to find out the inflation has a direct effect on stock price or returns. When we talk about share price it means the present value of the share dividends which will be received in future as owning the share also forecasted future price. In the nominal terms price and dividend can affect through inflation, but in real price, it has not a direct effect. Quite different but simple words it can say price and dividend ration can be affected by inflation. However, it is assumed in the Fed model as an individual's portfolio has stocks and bonds, these are assets substitutes and after that when individual's portfolio reallocate through change inflation rate it can affect. Gallagher and Taylor (2002) argue in his paper as the stock price has a negative relation with inflation in the supply shocks, but at the demand side they didn't find out any strong evidence as there is a relationship between inflation and stock price. Though Fisher effect, inflation has a negative short-run effect on stock price but in long-run it has a negative impact on real stock price (LIN, 2009). To investigate this relation, in this paper author use panel econometric techniques and generalize Fisher hypothesis. Further, in his paper, he argues as in the case of inflation uncertainty it has a negative effect on real stock price by using the sample size of advanced countries it is not as same effect in short term and long term on real stock price when we talk about developed and developing countries. In another paper, the author discusses that inflation didn't erode for real stock price in long-run by using the sixteen separate industrialized countries (Rapach, 2002). Inflation can decrease the real stock return when the capital gain tax is the charge for nominal returns that can lead towards the stock prices decline (Feldstein, 1980). In most cases, stockholders do not get an idea about how inflation affects the nominal value (Modigliani and Cohn, 1979). As per the empirical results, most of the time industrialized countries have the negative relation between stock returns and inflation, but it cannot be as same as emerging countries. Akmal, (2007) argues in his paper, the inflation effect and black economy on stock price in the Pakistan stock market by using the ARDL approach to investigate the long-term effect and for short-term he used

ECM approach. He finds that stock returns have an effect on inflation in long-term but opposite in short term.

Ioannides, Katrakilidis, and Lake (2002) use the Greece data from 1985 to 2000 to investigate the relationship between stock returns and inflation. They argue that by using Fisher's hypothesis stock returns can hedge against inflation. Further, they discuss it regarding the inflation pressures stock market react with immune behavior. In their study they found out 3 different relationships: first is there is a safe place for investors in Greece stock market. On the basis of empirical evidence that relationship is classified into 3 types. First is stock market and inflation being positively correlated. For this investigation, they use ARDL approach with cointegration method with the combination of GC effect, by using they checked the long-term and short-term relation effect in the variables along with the directional effects. Over the first-sub time frame, there is a negative relation between stock market and inflation in the long run. With Fama, & Schwert (1997) study, this finding has reliable, in 2nd sub-time frame bi-directional long-term effects. In the stock market and inflation, there is a causal effect. In the 2nd sub-time frame, there is a causal effect from inflation to the stock market. Spyrou, (2001) and again in 2004 finds a positive relationship between inflation and stock returns by using sample size from Asian countries and Latin America.

Al-Khazali, (2003) use the Fisher hypothesis for this investigation in the 9 countries: Hong Kong, Japan, South Korea, Malaysia, Taiwan, Thailand, Australia Indonesia, and Korea. He argues that real common stocks return and expected inflation were independent and with 1-to-1 correspondence with the rate of expected inflation is vary with nominal stock returns. By using the VAR model showed the nominal Stock returns have GC effect with the sense as in 3 variable system error variances forecast most of the time is accounted with their own innovations; for the stock returns variation explanation inflation not appear; for expected inflation variation explanation stock returns not appeared. Through expected inflation, the stochastic system of the nominal stock return does not affect. This study does not fulfill the process to find out the consistent negative retort of inflation on stock

returns shocks or vice versa in the countries. In all countries, this study rejected the generalized Fisher hypothesis.

On the other side, some authors find a negative relation in short-term but positive relation for the long run by using co-integration analysis (Al-Khazali and Pyun, 2004). However, all in all, most authors find a negative relationship between stock price in industrialized countries (Quayes and Jama, 2008), Rapach 2002), Feldstein, 1980).

Different studies find out that expected inflation is not hedge with the stock returns and used this evidence alongside the Fisher hypothesis. Fisher's hypothesis uses to investigate the relation between stock returns and inflation. This hypothesis has used to test the inflation governing process, inflation expectations measurement and for data time aggregation (Madsen. 2004). The paper establishes Fisher hypothesis typical test on the bases on theoretically and empirically which can mislead and most of time not disclose more about the reliability of the Fisher hypothesis which is used to explain the model specification difference, date time collection, in the data sample persistence of inflation and even for used methods for expected inflation it is particularly influential as the collaboration between persistence of inflation and model specification. As a dependent variable real ex-post stock returns were used, which the assumption as expected inflation would be calculated by using actual inflation rate. Moreover, the test was in the favor of Fisher hypothesis when nominal stock returns were taken as depended variables for expected inflation by using tools and low-frequency data.

2.4   Demographic Structure of Population, GDP and Stock Price

Gross domestic product mostly uses as main indicators to evaluate the financial health of any economy. Over a specific time, it shows the total market value of all goods and services domestically. GDP growth rate is directly related to Demographic structure and earning pattern or any nation because when generation

reaches to earning stage of life, growth rate and interest rate also increases. It cannot wise to say, as demography is not important, it has a significant downward effect on the real GDP growth, especially in the term of per capita and put more and more stress all those programs which are support by government for benefit of the population and earning system. But all these factors are very well known and obvious and hard to think as these are not already shows in the current low stock price (Cornell, 2012). Gagnon, Johannsen, & Lopez-Salido (2016), argue in their paper life expectancy and labor supply has great influence on GDP growth rate and real interest rates. For the analysis they use the past and forecasted US demographics in the family compositions, they found since 1980's demographics along have 1.25% point decrease in the GDP growth and real interest rates. Arnott, & Chaves, (2012) examine the demographic changes effects in three dimensions: PPP adjusted growth rate of GDP long real per capita, excess returns of the stock market and excess returns of the bond market. For this analysis, they use econometric tool which is the first time they use and allow them to all given information in the profiles of the population with the help of polynomial curve on the demographic age group regression coefficients. They use 22 countries data over the 60 years for panel spanning. Furthermore, on the demographic variables, they force-fit a polynomial, and find strong significance, as in the early age individuals are not helpful for GDP. They no contribute and not even help out for stock and bond returns in any logical way; even their parents do not allow them to invest. In the GDP growth young adults has the high-level power, they have foundations for innovation and spirit for business. But still they not invest because they are overspending. Adults which are in the middle-age are the main pillars for stock market returns, they are in the age of peak earning saving and even for investment. Adults do not contribute to the GDP growth in any way, not in stock or bond market; they do not invest it to buy goods or services.

There are many studies which show that there is a significant relationship between macroeconomic variables and equity returns. Singh, Mehta, & Varsha, (2011), use the linear regression model to check the macroeconomic influences on stock returns between the periods 2003 to 2008. Macroeconomic variables are exchange

rate, GDP, employment rate, money supply, inflation and return in the Taiwan 50 index 50 listed companies. Rather than single stock, this analysis was based on the stock portfolio. For this portfolio, they use P/E ratio, price to book and yield ratio. Above portfolios have a model as the firms rank for each portfolio, they use stock returns as dependent variables in the regression models and independent variables was macroeconomic variables. From the empirical results, they find GDP and exchange rate affect all the returns other than small companies PBR portfolio. On small PBR portfolios, inflation has a significant effect, but GDP and exchange rate has a significant effect on small companies PBR portfolios. Money supply and employment have no significant effect on stock returns.

When the growth of GDP rate is higher, it is taken as good news in the recessions of stock price and in the expansion, it is taken as bad news (McQueen, Grant, & Roley, 1993). It means like that when investors seem a high GDP growth rate in the period of recession they interpreted this as there is going to improve the economy which takes towards high stock prices. On the other side when investors seem to have low GDP growth rate they take is as bad news in the period of expansion, means they think that low-level lead for high-interest rate and overall low stock price. Birz, & Lott, (2011), use the newspaper heading to measure the relationship between macroeconomic factors and stock returns and how investor interpreted this news and have expectations regarding the economic growth. In their analysis they find, news which is directly related to GDP growth, retail sales and unemployment have a significant effect on stock returns. But there is causing the problem they indicate as news related to any economy activities and at the end of the stock market. Carstrom (2002) argue there is a link between stock price and real gross domestic product, in 2 ways he explains this; (1) any change in the future RGDP can become a reason for today stock market price change. (2) When stock price change there is no matter what was the reason, it can cause for firm's assets size reduction and affect borrowing cost. To borrow money it costs more for business, they invest less due to the difficulty to borrow which lead to slow RGDP growth. From this it is clearer, the stock price is used for economic activity prediction, and the main reason is future RGDP in the existing stock price.

This paper uses a Panel Vector Auto-Regressive (PVAR) approach to analyze the short-run dynamics of private investment to shocks to fundamental and financial influences in emerging market economies. They examine in the emerging market the short-run changes in the private investment to shocks to important issues and financial influences, the analysis conclusion was: (1) in large stock investment is persistence; (2) investment and GDP have strong co-movement; (3) in the credit market for development investment response will be determined by demand. Moreover, in the Latin America and emerging Asia such event have effects are same in the magnitude, but Latin America due to such credit conditions is the more unexpected difference. Bennarcer, Boughrara, Ghazouani (2007) use the sample data of 8 MENA countries to check as there is any relationship between asset prices and monetary policy and examine monetary policy has a significant effect on stock price particularly in Saudi Arabia, Egypt, Tunisia, and Bahrain. In some countries, stock returns do not react and in some countries has an upward trend and vice versa. Al-Abedallat, & Al-Shabib, (2012), study the macroeconomic factors effect on investment and GDP in the Amman Stock market from 1999-09, for analysis they used multiple regression models through SPSS and concludes the following points: (1) movement in the investment and GDP affect the Amman Stock exchange price movement; (2) investment has direct effect on stock index; (3) GDP also has direct impact but less than from invest in the Amman Stock index.

2.5 Demographic Structure of Population, Budget Deficit and Stock Price

When we talk about the budget deficit, it can be taken as an indicator to tell about the financial health of any economy when expenses cross the line over revenue. The word budget deficit is mostly used to explain the government spending, not in the track of business or any individual person spending. Every human does not matter at which stage of life he or she is living, his/ her spending or saving pattern directly affected by the government budget.

There is a relationship between stock price and budget deficits, budget deficit and inflation through the demographic structure have a negative effect on stock price (Quayes & Jamal, 2010). Jamal and Quayes (2004) use the demand-supply technique to explain that peak-earning age from 45 to 64 has a significant positive effect on prices of equity assets. Bae (2010) examine the effect of parts of peak age population which is derived from accounting interaction between equity demand and price in the market by using cointegration technique. He concludes peak age fraction of the population has no a significant impact on equity price, but there is a significantly negative link between retirees fraction and equity price. Jamal and Quayes (2004), use the demand-supply model and conclude the following effect can be possible: (1) peak age fraction of population, (2) retirees population fraction, (3) difference between 2 demographic parts on price of equity and concluded that peak age fraction of population effect positively on the price of equity, retiree's fractious effect negatively on the price of equity. As per difference between peak age fraction and retirees, fraction gives the different results and just because explanatory variable as Jamal and Quayes use peak age fraction population and retiree's fraction and Bae used just peak age. Further, they use VEC technique to check the relationship between peak age fraction of population and price of equity in long-run through cointegration. When individuals reach their peak age they observe and structural break over the time.

Kwon & Tai (1999), examine from the Taiwan, Singapore, South Korea, and Hong Kong stock market that macroeconomic variables like budget deficit and money supply are very a significant for stock price determination for analysis, they use quarterly stock prices index data and finding was as consistent with literature about these variables and submitted there is equilibrium relationship between these variables and stock price in long-run in all the 4 countries; in short-run any change in the fiscal or monetary policy cannot importantly affect the stock price as quickly as fully.

Galí, L´pez-Salido, & Vallés, (2007) argue that there is a huge difference between rule-of-the-thumb behavior and sticky price behavior individuals, in the rule-of-the-thumb behavior individuals consumption is equal to labor income. The as

high level of taxes which is necessary to support the budget has a negative relation with consumption but for sticky price individual's consumption increased with the increase in the government spending. It is quite interesting when we link up this concept with demographic structure and budget deficit. At different age level, individuals react differently towards their saving/consumption and government budget. Bernanke, (2005) find a positive relationship between demographic structure and saving level in the industrial countries. Opposite to this paper, there is a negative relationship between population age level increase with saving of peoples (Bosworth, & Chodorow-Reich, 2007). Saving pattern of an individual can't be done in the isolation it has a direct link with government spending and earning in other words government budget. When an expense is more than the revenue it opens the new door which is called the budget deficit.

Past federal budget deficits have an impact on the stock market, and evidence from the Canada and Germany (Darrat, & Brocato, 1994)? Rezessy, (2005) find an inefficiency in the stock market due to the deficit in the budget. By using a fundamental hypothesis which is past budget deficit has a significant and negative effect on the stock market as per the study is stock returns remain constant market would be inefficient as per available information about the future budget policy (Laopodis, 2009). Fiscal policy of any country has an impact on the financial market either direct way which is through interest rates and bounds and indirectly which through stock returns (Tavares, & Valkanov, 2003). Through OECD countries from 1992-02, Ardagna (2009) argue that stock price increase and interest rate fall associated with fiscal's consolidation and the reverse happened over the fiscal period expansion. Further, he argues large changes in the fiscal posture totally depend on the country fiscal situation initially towards the financial markets and fiscal construction nature. With high-level of the government deficit, any adjustment in fiscal happened in the years of the county can implement through the government spending cutting and which became a reason for the substantial and permanent downfall in the government debt has linked with the stock price increase and high decreases in the interest rate. In the fiscal contraction sample, that results can make healthy through inflation, GDP control and financial policies

liberation and monetary indicators. Fiscal expansions sample, to specific changes such results are to some extent less robust.

From all the details arguments on either stock volumes future issue side, it is more wise and informative to seek more empirical evidence and test alternative hypotheses. The main determination of this study is to find out the relationship between peak earning age population proportion and stock volume, through different macroeconomic factors which directly or indirectly affect the stock volume along side by side changes in the demographics over the life-cycle of any individuals.

Chapter 3

Data Description and Methodology

3.1 Data Description

The annual data is used in this study for the period 1991 to 2016 for six emerging countries Pakistan, India, China, Brazil, Poland, and Hungary. The data for this study is collected from different sources. GDP data is obtained from World Development Indicators website. For Pakistan budget deficit as a percentage of GDP data is collected from the State Bank of Pakistan Website, rest of the countries budget deficit data is obtained from the organization for economic co-operation and development (OECD) website. In lieu of computing, the inflation rate is collected from OECD website. Demographic data-the proportion of population between the ages of 30 and 60 and the proportion of the population who are 60 and above, are obtained from the Pakistan Bureau of Statistics office and rest of the countries in the list of emerging market was obtained from OECD. Finally, Stock volume data is collected from Yahoo Finance and investing.com website and the earnings yield ratio are obtained from State Bank of Pakistan website and trading economist's website.

3.2 Variable Description

To get the maximum values both dependent and independent variables have been transformed by adding one and take natural log (Kelly, & Ljungqvist, 2011).

Dependent (Output) Variables	Independent (Input) Variables
1. Stock Volume	1. Inflation
	2. GDP
	3. Budget deficit percentage of GDP
	4. Earnings Yield
	5. Age
	a. A1 (30-44)
	b. A2 (45-60)
	c. A3 (60+)

3.2.1 Dependent Variable

3.2.1.1 Stock Volume

In this study stock volume is used as dependent variables. A total number of shares traded in a year is used as a proxy of stock volume. On different time period, a different individual at different age level invests in the stock, through volume it is quite easy to understand the total number of shares traded in a year. Jamal, & Quayes, (2004), Quayes and Jamal, (2016) and Brooks, (2003) have used the stock volume data to check the demographics impact on stock volume.

3.2.2 Independent Variables

This study has used the following variables as independent variables:

3.2.2.1 Inflation

Consumer price index is used as a proxy for inflation. Consumer price index is chosen because it covers broad base measure for average change calculation in the

foods and services price over a specific period. Inflation means high consumer prices which can become a reason for low sales and low profit. Inflation has been used as independent variables by Akmal (2007), Al-Khazali, & Pyun, 2004) and Quayes, & Jamal, (2008).

$$\text{Inflation rate} = \left(\frac{T_2 - T_1}{T_1}\right) \times 100 \qquad (3.1)$$

where T_2 is current CPI and T_1 is historical CPI.

It is hypothesized that there is the negative association between stock volume and inflation.

3.2.2.2 GDP

Total market value of all goods and services produced domestically is used the proxy of GDP. To check the financial health of any economy one of the main indicators is GDP. It shows the total market value of all goods and services domestically over a specific period. It has a direct relation to demographic structure and any individual earnings, because the interest rate and growth rate also increase when any individual reach their peak earning a time of the life. Cornell, (2012) and Arnott, & Chaves, (2012) used GDP as input (independent variable) for their studies.

$$\text{GDP} = C + I + G + (X - M) \qquad (3.2)$$

where C is private consumption, I represents gross and government investment, G is government spending, X is exports and imports are M.

It is hypothesized that there is the negative association between stock volume and GDP.

3.2.2.3 Budget Deficit Percentage of GDP

Percentage of GDP has used a proxy of the budget deficit. The word budget deficit is mostly used to explain the government spending, not in the track of business or

any individual person spending. Every human does not matter at which stage of life he or she is living, his/ her spending or saving pattern directly affected by the government budget.

$$\text{Budget Deficit} = \frac{BudgetDeficit}{GDP} \times 100 \tag{3.3}$$

It is hypothesized that there is the negative association between stock volume and Budget Deficit.

3.2.2.4   Earning Yield

Earnings per share and market price per share has used a proxy of earnings yield. It describes as earning per share for recent 12 months and divided by current market price per share. As an explanation of independent variable GeanaKoplos, Magill, and Quinzi, (2004) used earning yield. But for this study it is buying from an online source and use it, so below equation is just for the understanding purpose.

$$EY = \frac{EPS}{MPPS} \times 100 \tag{3.4}$$

It is hypothesized that there is the positive association between stock volume and earnings yield.

3.2.2.5   Age

Demographics is the study of humans and human population, growth, movement, and structure and demographic structure has a link with the population description and over the period of time demographic structure change and shifting in the age. On different age level individuals has the different way to consume and earn. As per my study, age has been divided into three sections. First is 30-44 age it is early earning time, 45-60 peak earning time and 60+ is after retirement age. at every different level, individuals behave to invest is totally different and after retirement

to secure their older age individuals they prefer to invest in that way which gives a fixed amount of earning with less risk.

A1: It is hypothesized that there is the positive association between stock volume and a1.

A2: It is hypothesized that there is the positive association between stock volume and a2.

A3: It is hypothesized that there is the negative association between stock volume and a3.

3.3 Economic Model

$$\log S_{it} = \beta_0 + \beta_1 \log E_{it} + \beta_2 \log Y_{it} + \beta_3 \log \pi_{it} + \beta_4 \log A_{it} + \beta_5 \log G_{it} + e_{it} \quad (3.5)$$

where, S = average volume of stocks traded; E = earning yield; Y = real GDP; π = inflation rate; G = budget deficit as a percentage of GDP; A = demographic component of population; e = error term.

3.4 Data Analysis Scheme

3.4.1 Descriptive Statistics

To find out the statistical behavior of data descriptive statistics is used. In the first step, estimation is to estimate the variables mean, median and mode. Mean also call arithmetic mean which is an average of all numbers. To estimate the mean, in a set add all numbers and divide it with by total of numbers. Median is about the middle number of the set. To estimate the median, as per size and number appears middle number is median. The most repeated number in a set is mode.

To measure the dispersion standard deviation is mostly used. To measure the data spread about mean it is used, STD is the sum square root of squared deviation from the mean and divided by total observation number.

According to the statistical definition, Skewness is to measure the asymmetry of the probability distribution of real value random variable about its mean, it can be positive, negative or even not defined. But according to qualitative skew interpretation is quite complicated and unintuitive.

At the end finally, as per statistics, Kurtosiss measures the distribution of the data around real-valued random variables. It is mostly used to define the charts inclinations in the field of statistics. In the charts, it can be present as fat low tails, skinny tails with even distribution and concentrated distribution towards mean.

3.4.2 Correlation Matrix

On the second step, estimate the correlation analysis to find out the multicollinearity between independent variables. It the situation in which 2 or more independent variables are highly correlated in multivariable regression, which means as per significant accuracy degree one variable can predict the other linearly. It is one weak technique because it is not talking about the cause and effect relationship. To get the better picture of the affairs, for this study used co-integration analysis which is used to measure the information flow and co-movement of stock volume over different emerging countries.

3.4.3 ARDL

To analysis, the cross-sectional time series data economists used different methods, from all the models one of the famous developed models are Engle and Granger (1987) and Johansen and Juseliues (1990). But these models have some serious weakness like in the small sample size con-integration is not the good use. It is also one of important function in co-integration that all variables are integrated in one order. A larger number of observations not as much can give robustness as compared to a large number of the time period (Hakkio & Rush, 1991). So it is very important to use a large number of the period as compared to a large number of observations.

To avoid these issues, this study follows one of the nearly developed techniques of co-integration which is ARDL (Autoregressive Distributed Lag) and one of popular technique among many economists. Economists like (Pesaran and Smith, 1998; Pesaran and Shin, 1999 and Pesaran, Shin and Smith, 2001) used ARDL approach to analyze the economic variables. This ARDL co-integration has many plus points over the simple co-integration method. Through ARDL approach can be applied to check the variables stationary either they are correlated with level or first difference or fractionally like 1(0), 1(1). Error correction model is used, which can help to investigate the short run adjustment by not losing the long run information.

This study using the following equation for ARDL technique and analysis:

$$lnsv_t = \beta_0 + \sum_{i=1}^{p} \beta_i lnsv_{t-i} + \sum_{i=1}^{p} \gamma_i lninf_{t-i} + \sum_{i=1}^{p} \theta_i lnGDP_{t-i} + \sum_{i=1}^{p} \psi_i lnbd_{t-i}$$

$$+ \sum_{i=1}^{p} \omega_i lney_{t-i} + \sum_{i=1}^{p} \Psi_i la1_{t-i} + \mu_t$$

$$(3.6)$$

$$lnsv_t = \beta_0 + \sum_{i=1}^{p} \beta_i lnsv_{t-i} + \sum_{i=1}^{p} \gamma_i lninf_{t-i} + \sum_{i=1}^{p} \theta_i lnGDP_{t-i} + \sum_{i=1}^{p} \psi_i lnbd_{t-i}$$

$$+ \sum_{i=1}^{p} \omega_i lney_{t-i} + \sum_{i=1}^{p} \Psi_i la2_{t-i} + \mu_t$$

$$(3.7)$$

$$lnsv_t = \beta_0 + \sum_{i=1}^{p} \beta_i lnsv_{t-i} + \sum_{i=1}^{p} \gamma_i lninf_{t-i} + \sum_{i=1}^{p} \theta_i lnGDP_{t-i} + \sum_{i=1}^{p} \psi_i lnbd_{t-i}$$

$$+ \sum_{i=1}^{p} \omega_i lney_{t-i} + \sum_{i=1}^{p} \Psi_i la3_{t-i} + \mu_t \tag{3.8}$$

In the above equations, α_0 is the drift component and μ_i is the error term as white noise error. Where I range from 1 to p.

In ARDL economists uses the 4 steps generally, in the 1st step, find out the long-term relationship exists between variables by applying the F statistics (Bound Test). 2nd step is to determine the optimal lag length by using the standard criteria in the ARDL approach i.e., AIC (Akaike information criterion). In 3rd step, EC model estimation is done. The main purpose of the EC is to check long-run equilibrium speed adjustment. The last step is to estimate CUSUM and CUSMSQ for the fitness model checking.

Start with unit root test to check each variable integration level either 1 (0 or 1) (1) because as per the Quattara (2004), if variables are 1 (2) then F value according to Pesaran, Shin, and Richard, (2001) becomes valid. That approach starts with bound test, F-statistics is to determine the long-term relationship between variables.

Null Hypothesis

$$H_0 : \phi_1 = \phi_2 = \phi_3 = \phi_4 = \phi_5 = 0$$

Alternative Hypothesis

$$H_0 : \phi_1 \neq 0 \ \phi_2 \neq 0 \ \phi_3 \neq 0 \ \phi_4 \neq 0 \ \phi_5 \neq 0$$

The F-statistics value will be determined on the basis of the 2 sets of the critical values which is suggested by Pesaran, Shin and Smith (2001) as values is 1(0) or

1(1). As per bases of above-mentioned hypothesis, the long run relation can be interpreted as if F-statistics is more than the upper level then null hypothesis will be rejected and concluded as there is a long-run relation between variables and if less then upper value then null hypothesis will be accepted and concluded there is no long-run relation. If the F-value is between the upper and lower values then no results can be withdrawn.

The second step is from the equation determine the ARDL which optimal lag length will be according to SBC and AIC criteria for a long-run relationship, whereas SBC is used for small lag length and AIC is for larger lag length. After the confirmation of long-run, relationship researcher go for error correction model in the 3rd step. ECM helps to determine the long run relation speed adjustment. ECM equations are given below:

$$lnsv_t = \beta_0 + \sum_{i=1}^{p} \beta_i lnsv_{t-i} + \sum_{i=1}^{p} \gamma_i lninf_{t-i} + \sum_{i=1}^{p} \theta_i lnGDP_{t-i} + \sum_{i=1}^{p} \psi_i lbd_{t-i}$$

$$+ \sum_{i=1}^{p} \omega_i lney_{t-i} + \sum_{i=1}^{p} \Psi_i la1_{t-i} + \beta ECM_{t-i} + \mu_t$$

$$(3.9)$$

$$lnsv_t = \beta_0 + \sum_{i=1}^{p} \beta_i lnsv_{t-i} + \sum_{i=1}^{p} \gamma_i lninf_{t-i} + \sum_{i=1}^{p} \theta_i lnGDP_{t-i} + \sum_{i=1}^{p} \psi_i lbd_{t-i}$$

$$+ \sum_{i=1}^{p} \omega_i lney_{t-i} + \sum_{i=1}^{p} \Psi_i la2_{t-i} + \beta ECM_{t-i} + \mu_t$$

$$(3.10)$$

$$lnsv_t = \beta_0 + \sum_{i=1}^{p} \beta_i lnsv_{t-i} + \sum_{i=1}^{p} \gamma_i lninf_{t-i} + \sum_{i=1}^{p} \theta_i lnGDP_{t-i} + \sum_{i=1}^{p} \psi_i lbd_{t-i}$$

$$+ \sum_{i=1}^{p} \omega_i lney_{t-i} + \sum_{i=1}^{p} \Psi_i la3_{t-i} + \beta ECM_{t-i} + \mu_t$$

$$(3.11)$$

The main objective of this chapter discussion to discuss the methodology, dataset used for this study. This study used the ARDL approach the determined the Demographic Structure of Population effect on stock volume along with economic variables in the emerging market. According to the many economists, this approach has many advantages, this technique can be used for stationary properties no matter variable are integrated at the level of 1st difference. Through ECM in ARDL model, short-term integrated adjustment without losing the long run information can be determined. A small sample is better in ARDL as compared to other co-integration methods. Through this technique, a number of variables can use as compared to any other econometric approach. After discussion the methodology section uses of data in this study, next chapter discusses in detail the findings and results of the study.

Chapter 4

Data Analysis and Discussion

Following results has been found after the empirical analysis of data.

4.1 Descriptive Statistics

Table 4.1 shows the values of mean, median, maximum, Minimum, STD, skewness, and kurtosis for all the independent values.

Average value of inflation during the time is 6.711% with maximum value 28.303 which is highest inflation rate for Hungry in 1995 among other emerging countries in this study and lowest inflation again for hungry in 2016 which is 0.0603%. Inflation data is positively skewed and value is 1.498. Kurtosis value of inflation is at peak on basis of value is more than 3 and not normally distributed because Jarque-Bera test tells the test goodness-of-fit and normally distributed between skewness and kurtosis. Next is GDP, the average value is $.27 \times 10^{12}$% the maximum value is 1.10×10^{13}% in China in 2015 while in 2016 in Pakistan minimum GDP value is 272.67%. Average volatility in GDP is 2.35×10^{12} and positively skewed and kurtosis value is 10.081. It is peaked data and not normally distributed.

Average earning yield data during the time period is 83.285% with maximum value 443.6% in Hungry in 2015 and the minimum value is 0.027% in China in 2007. Volatility averagely is 100.566 and by having 1.021 value it is positively skewed. Kurtosis value is more than 3 mean it is peak data and JB shows data is not

TABLE 4.1: Descriptive Statistics.

	INF	GDP	EY	Bd	A1	A2	A3
Mean	6.711	$1.27^{(12)}$	83.285	4974.32	97068.5	69320.7	42811.8
Median	6.134	$2.38^{(11)}$	11.87	408.420	20254	12789.2	6837.5
Maximum	28.30	$1.10^{(13)}$	443.6	92910	345984	306213	215962
Minimum	0.060	272.67	0.027	1.264	1997.44	1919.58	1581.62
Std. Dev.	4.841	2.35	100.56	14568.9	124950	93150.2	60258.7
Skewness	1.498	2.757	1.021	4.334	0.940	1.198	1.396
Kurtosis	6.971	10.081	3.421	22.860	2.131	2.973	3.691
Jarque-Bera	105.1	342.25	18.456	1995.56	18.1762	24.408	35.154
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Note: * INF is the inflation is the inflation rate in percentage, GDP is the real gross domestic products is also in percentage, EY is the earnings yield ratio in percentage and Bd is the budget deficit is a percentage of GDP.*
*** All Age structures (A1, A2 A3) is taken a number of heads.*

normally distributed. BD average data for this time period is 4974.316 percentage of GDP. BD maximum value is 92910% in Pakistan in 2010 and the minimum value is 1.264% in China in 2004. Average volatility is 14568.97 and skewed is positively associates. Peak data with not normally distributed.

According to data age range has 3 different sections, A1 (30-44), A2 (45-60), and A3 (60+). Mean for the mentioned 3 different ages is 97068.55, 69320.7, and 42811.84 times respectively. Maximum value for a1 is 345984.7 in China in 2004 and in 2002 Hungry has minimum a1 value 1997.449, in 2016 China has Maximum value 306213.7 under the section head of a2 and in 2016 Hungry has minimum value 1919.584, and again in 2016 China has Maximum value for a3 is 215962.3 and again Hungry in 1995 has minimum value 1581.628. Average volatility for the 3 ages is 124950.4, 93150.24, and 60258.71 respectively. All the ages have positive skewness, but a1 and a2 Kurtosis value is less than 3 means data is flat and a3 kurtosis value is more than 3 which means peak data. JB test shows data is not normally distributed for all age levels.

After the limited discussion of data behavior, next table shows the results of correlation among variables.

4.2   Correlation Matrix

Table 4.2 reports the correlation results for all independent variable and check either there is a problem for multicollinearity among these variables. The first variable is a log of inflation and log GDP it has the negative relation which is -0.16231 a very weak correlation. LINF has the highest correlation with a budget deficit which is 0.322907. Correlation between all variables is significant and not create a problem to rise the multicollinearity. LGDP and LEY are negatively correlated with value -0.1029, it is correlated negatively with LBD too. Specifically, age factors are one of those causes which create multicollinearity when population takes a sample so there is a high chance for strong correlation.

TABLE 4.2: Correlation Matrix.

	LINF	LGDP	LEY	LBD
LINF	1			
LGDP	-0.16231	1		
LEY	-0.33984	-0.1029	1	
LBD	0.322907	-0.31364	-0.1248	1

4.3   Unit Root Test

Table 4.3 presents unit root test results which is applied to the data. The main purpose of this test to determine either data in integrated on level 1 (0) or 1st difference 1 (1). To investigate the order level for this study Augmented Dickey-Fuller (ADF) unit root test is used for the null hypothesis of a unit root. It is used to check the unit root presence in the autoregressive model. The basic assumption in this model is error term is statistically constant and independent over time. If some variables are stationary on level 1 (0) and some are stationary on 1st difference 1 (1) than ARDL model is used for data analysis.

As per the indication of Table 4.3, Linf and LGDP are stationary on level 1 (0) and significant at 5% critical value and has significant values. But some variables

TABLE 4.3: Unit Root Test.

Variables	ADF-Level	Level	ADF-1st Diff	1st Difference
Lsv	-2.7033	Non-Stationary	-10.88115*	Stationary
Linf	-4.437*	Stationary	-10.4996	Non-Stationary
LGDP	-7.360*	Stationary	-11.25556	Non-Stationary
Ley	-2.230	Non-Stationary	-11.11369*	Stationary
Lbd	- 2.403	Non-Stationary	-10.48934*	Stationary
la1	-2.149	Non-Stationary	-9.864629*	Stationary
la2	-2.256	Non-Stationary	-9.910791*	Stationary
la3	-2.297	Non-Stationary	-9.874184*	Stationary
Critical Value				
1%	-4.051450		-4.052411	
5%	-3.454919		-3.455376	
10%	-3.153171		-3.153438	
Note: * represent 5% Significant level				

are nor stationary on level 1 (0) and give insignificant results so on 1st difference 1 (1) lsv, Ley, lbd, la1, la2, and la3 are significant at 1st difference 1(1). The unit root test indicates no variable is on 2nd difference 2 (0) or beyond to that. Above table indicates some variables are integrated of order one and some variables are integrated of order level so, ARDL model can use for analysis to investigate long-run relationship presence between variables. The first step in the ARDL model to estimate the step by step equation (3.6), (3.7), and (3.8).

Due to the low Durbin-Watson value which causes for autocorrelation, when estimating all age values under one equation so three different equations used for estimation and one more reason is to check how individual in different age time invest and affect the stock volume.

4.4 ARDL

To estimate the ARDL approach AIC criteria is used, Table 4.4 shows the ARDL estimate in each case of earning age.

TABLE 4.4: Autoregressive Distributed Lag Estimates for a1.

Autoregressive Distributed Lag Estimates				
ARDL(1, 0, 1, 0, 1, 1) selected based on AIC				
Dependent Variable is LSV				
Independent Variables	**Coefficient**	**Std. Error**	**T-Ratio**	**Prob.**
LSV(-1)	0.858993	0.049561	17.3322	0
LINF	0.011649	0.275391	0.042299	0.9664
LGDP	0.021125	0.07788	0.271253	0.7868
LGDP(-1)	-0.1418	0.082901	-1.71048	0.0906
LBD	-0.0179	0.104552	-0.17118	0.8645
LEY	-1.0209	0.28286	-3.60921	0.0005
LEY(-1)	0.936955	0.282042	3.322041	0.0013
LA1	-1.14164	0.315378	-3.61992	0.0005
LA1(-1)	0.857962	0.323211	2.654496	0.0094
C	8.121841	3.555697	2.284177	0.0247

R-squared	0.837942	S.D. dependent variables	3.893642
Adjusted R-squared	0.821914	AIC	3.924838
S.E. of regression	1.643127	Durbin-Watson stat	2.005852
F-statistic	52.28069		
Prob(F-statistic)	0		

Table 4.4 indicates that LGDP has a significant relationship with LSV, its coefficient is -0.1418, so negative sign show it has an inverse relation with LSV other words, Its mean 1% increase in GDP will decrease the stock volume by 0.1418%. The reason behind this decrease in real GDP gives the impression as low per capita income and investor take is as bad news for the economy (Birz, & Lott, 2011).

Same as with LEY has a significant effect but its coefficient is positive so 1% increase in earnings yield will increase the stock volume by 0.936955%. First earning age as per the study is fall under the section of la1 (30-44) and has a significant effect on LSV. The reason behind this in some emerging countries the peak earning age start form this range and they start to invest to secure theirs after retirement age (Ang & Maddaloni, 2003). Intercept value is (0.0247) which has a significant effect and indicated as some omitted variables other than this study variables has an effect on stock volume. These can be some other macroeconomic variables, some country-specific variables, and some overall emerging market-related variables.

Adjusted R-square value is 0.821914. The explanatory power of the model is high which shows the good fitness of the model. Furthermore, F-statistics tells the good-fitness of the model. Prob F-statistics is 0.000000 shows there is no problem with the model. Durbin-Watson test is 2.005852 mean auto-correlation problem is solved.

As per Table 4.5, significant results from the second equation is LGDP and LEY all have a significant effect on stock volume but with the negative coefficient sign. The main and important reason behind it as the real gross domestic product is economic variable and has a direct link any country economy so any increase in it or decrease directly affect the individuals saving pattern and income. GDP growth rate is directly related to Demographic structure and earning pattern or any nation because when generation reaches to earning stage of life, growth rate and interest rate also increases. It cannot wise to say, as demography is not important, it has a significant downward effect on the real GDP growth, especially in the term of per capita and put more and more stress all those programs which are support by government for benefit of the population and earning system (Cornell, 2012).

LEY has a significant effect but its coefficient is positive so 1% increase in earnings yield will increase the stock volume by 0.907025%. La2 has significant value with positive coefficient value, this is the peak earning time for most of the countries. As 1% increase in la2 investment level will increase the level by 0.87394%. Like in Pakistan and India most peak earning time starts from 40-55, so under this head, it has a positive effect on stock volume. The population in the peak earning age has

a significantly positive relationship with the stock price (Quayes and Jamal, 2016). Intercept value (0.0199) results in interpretation is as same as proceeded, there are some omitted variables which has an effect on the stock volume other than this study. According to the Adjusted R-square value, F-Statistics probability there is no problem in the variable and good-fit. According to Durbin-Watson test, there is no auto-correlation problem in the model.

TABLE 4.5: Autoregressive Distributed Lag Estimates for a2.

Autoregressive Distributed Lag Estimates ARDL(1, 0, 1, 0, 1, 1) selected based on AIC Dependent Variable is LSV				
Independent Variables	**Coefficient**	**Std. Error**	**T-Ratio**	**Prob.**
LSV(-1)	0.857407	0.049896	17.18396	0
LINF	-0.00285	0.277875	-0.01025	0.9918
LGDP	0.021097	0.079281	0.266112	0.7908
LGDP(-1)	-0.15423	0.084734	-1.82022	0.072
LBD	-0.0358	0.107103	-0.33429	0.7389
LEY	-0.97316	0.274371	-3.54689	0.0006
LEY(-1)	0.907025	0.273872	3.311858	0.0013
LA2	-1.15508	0.319725	-3.61273	0.0005
LA2(-1)	0.87394	0.325568	2.684356	0.0086
C	8.451783	3.56617	2.369989	0.0199

R-squared	0.837827	S.D. dependent var	3.893642
Adjusted R-squared	0.821788	AIC	3.925547
S.E. of regression	1.643709	Durbin-Watson stat	2.008753
F-statistic	52.23645		
Prob(F-statistic)	0		

TABLE 4.6: Autoregressive Distributed Lag Estimates for a3.

Autoregressive Distributed Lag Estimates ARDL(1, 0, 1, 0, 1, 1) selected based on AIC Dependent Variable is LSV				
Independent Variables	**Coefficient**	**Std. Error**	**T-Ratio**	**Prob.**
LSV(-1)	0.858988	0.050195	17.11292	0
LINF	-0.00489	0.275498	-0.01776	0.9859
LGDP	0.027161	0.080732	0.336428	0.7373
LGDP(-1)	-0.15523	0.08636	-1.79749	0.0756
LBD	-0.04674	0.113031	-0.4135	0.6802
LEY	-0.95739	0.268867	-3.56082	0.0006
LEY(-1)	0.904877	0.272279	3.323349	0.0013
LA3	-1.23366	0.334051	-3.69303	0.0004
LA3(-1)	0.938317	0.347365	2.701246	0.0082

R-squared	0.837827	S.D. dependent var	3.893642
Adjusted R-squared	0.821788	AIC	3.925547
S.E. of regression	1.643709	Durbin-Watson stat	2.008753
F-statistic	52.23645		
Prob(F-statistic)	0		

Table 4.6 shows the results of the third age phrase that is la3 (60+), as per the results no economic variable has a significant effect on stock volume expect LGDP and LEY. The reason behind it after retirement individuals just think about to live secure and tension free life they just want only one thing fixed the amount of earning with less or to some extent risk-free. After retirement individuals just want a specific fixed amount, so LGDP with negative amount means the inverse effect of stock volume, they consider it as bad news for the economy due to decrease negative GDP and withdraw from stocks and start to invest in fixed income resources. After retirement individuals have a significant effect on stock volume with the negative coefficient. The proportion of the population near to retirement or after retirement has a significantly negative relationship with the stock price

and when they retire they have a negative relation with the stock price it is because pension holders and retirees mostly prefer fixed-income assets with low risk over different high-risk level stocks. (Bae, 2004).

Table 4.7: Bond Test.

Dependent Variables	F-Statistics	Decision
Linf, lGDP, ley lbd la1	2.269798	No long run relation
Linf, lGDP, ley lbd la2	2.285985	No long run relation
Linf, lGDP, ley lbd la3	2.249918	No long run relation
Lower-bound critical value at 5%	2.62	
Upper-bound critical value at 5%	3.79	

The long-run relation can be interpreted as, if F-statistics is more than the upper level then null hypothesis will be rejected and concluded as there is a long-run relation between variables and if less then upper value then null hypothesis will be accepted and concluded there is no long-run relation. The bound test has applied to check long-run co-integration and bound test results are reported in the above tables and calculated F-statistics is less than the upper value at 5% significant level, accept the null hypothesis mean there is no long-run relationship between variables. So further steps in the ARDL model for the long-run relationship, ECM will not be applied.

After doing the analysis for above three equations, from the list of macroeconomic variable one variable has a significant effect which is LGDP, as the real gross domestic product is economic variable and has a direct link any country economy so any increase in it or decrease directly affect the individuals saving pattern and income. GDP growth rate is directly related to Demographic structure and earning pattern or any nation because when generation reaches to earning stage of life, growth rate and interest rate also increases. It cannot wise to say, as demography is not important, it has a significant downward effect on the real GDP growth, especially in the term of per capita and put more and more stress all those programs which are support by government for benefit of the population and earning system. Further LEY has a significant effect on stock volume. In assets

and portfolio selection over a different stage in the life-cycle can take the step for dynamic supply-demand changing for assets and add something in the asset prices (Bodie, Treussard, & Willen, 2007). As per the three age structure A1, A2, and A3 has significant effect, A1 and A2 has positive significant effect because both are peak earning time and over the life cycle of the investors they are risk taker and invest in stock but with the passage of time when they move towards retirement and old age their behavior toward saving and consumption change and mostly are risk-averse that's why third equation results shoes significant results with negative associations. The population in the peak earning age has a significantly positive relationship with the stock price but when they retire they have a negative relation with stock price it is because pension holders and retirees mostly prefer fixed-income assets with low risk over different high-risk level stocks.

Chapter 5

Conclusion and Recommendations

5.1 Conclusion

This study has reviewed the related research literature that there is a link with demographic variables with stock volume. The purpose of this study is to check how the shift in demographics structure can affect the stock volume along with macroeconomic variables. There are many factors and reasons which can affect the stock volume over a specific time period, but this study specifically includes the demographic structure along with macroeconomic factors and ignored the other related factors.

Firstly, results of the analysis over different age sections indicate in different age time different variables affect the stock volume out of seven variables, results for the analysis regarding determinants of stock volume indicate that out of seven independent variables; only three independent variables have significantly affected the stock volume in the emerging markets.

In 1st age structure, la1 has a significant effect on stock volume with the positive association, and accept the hypothesis. Its mean during their peak earning age in 30's individuals invests in a stock with the intention to secure theirs after retirement age. This investment has the positive effect on stock volume, but if

earning of investment decrease it can negatively affect the stock volume. The hypothesis of a positive association between earning yield and stock volume is rejected results indicate ley has a significant effect on the negative association and lgdp also has a significant effect on stock volume with the negative association. So, the hypothesis of a negative association between GDP and stock volume is accepted. Most of the time individuals take GDP good news in the recessions of stock volume and in the expansion. In the recession time individuals when they seem high growth rate they link it with the economy is going to improve and high stock volume and On the other side when investors seem to have low GDP growth rate they take is as bad news in the period of expansion, means they think that low-level lead for high-interest rate and overall low stock volume.

Secondly, in the 2nd age structure, la2 in 40's in some countries stills individuals are in the peak earning time so again for the investment they invest in stock volume, the hypothesis of the positive association of la2 and stock volume is accepted because la2 has the positive significant effect on stock volume. Again, in this age structure, Lgdp has the negative association and accept the hypothesis. For la2 earnings yield, the hypothesis of positive association of earning yield and stock volume is accepted results indicate ley has a significant effect on the positive association.

Lastly, in the 3rd age structure which is retirement age, has a significant effect on stock volume but with the positive associations. The hypothesis of negative association of la3 and stock volume is rejected. On this stage of life, investors want only those investment which has less risk and mostly they prefer to a fixed source of income. After 60+ age individuals only depend on their earning which they save and behave risk adversely. To invest in stocks in riskier than to invest in the fixed source of income. But as per the results, it is positively associated with stock volume it is quite possible at the time of retirement, a new cohort of peak earners set aside this stock withdrawals with new peak earners investment. Peak earning age and retirement age offset each other simultaneously. So it, not the threat to the stock volume when peak-earning peoples withdraw their investment from the stock market. Other macroeconomic factors like GDP has a significant effect on

stock volume, any change in the future RGDP can become a reason for today stock market price change. When stock volume change there is no matter what was the reason, it can cause for firm's assets size reduction and affect borrowing cost. To borrow money it costs more for business, they invest less due to the difficulty to borrow which lead to slow RGDP growth.

This study contributes to the present literature in the way of changes in age effect on stock volume and price. Age of individuals is many links with the earning time and investment and future saving so this can be useful for local and foreign investors while analyzing the not only Pakistani stock market but in the context of emerging markets too. Further research can be done regarding the gender specification of this age range and trend to invest in the equity market and bond market. After this it is very strong believe, that is very much difficult to just mainly focus on the specific age-related demographics which are defining factors of demographics; young, middle, and old age individuals, but more important is their preference to consume, save worker and invest in the changing world.

5.2 Recommendations

As, the retiree's proportion increase, it will decrease the stock volume and negatively affect the stock volume. Peak earning age and the retirement age of the population has opposite direction. Investors in their peak earning time should be observant regarding the stock volume and use stock volume to predict price movement. Larger the retirees and more strong pension system in the countries the more stock volume negatively affected. It is noted as peoples retirement decision depends upon the social security as the only source of income, has a significant effect on stock volume to stock volume. Investors in peak and retirement age should be vigilant regarding the uncertainty in the market and monitor market direction while investing or withdrawing with carefully estimation of the risk and benefit analysis too much extent it is wise able to take or avoid risk. Investors should be vigilant towards the price-to-earnings ratio or earnings yield of the stocks, this can be a sign to predict the stock which is preferable over others. In the list of

emerging countries list, due to different geographical and cultural difference peak earning age and retirement time is different, investors should be attentive to their own country specification and trend. An investor should be vigilant for demand and supply, the demand side is more important and related to demographics in the peak earning age and this the demand can be offset with the supply of the after retirement age. Macroeconomic factors have an effect on the stock market, an investor should be vigilant for GDP and inflation rate during their peak earning age to invest and after retirement to re-invest.

5.3 Future Direction of the Research

This study opens the window of new opportunity for other researchers, especially in the Pakistan and emerging market. At the end, nothing can be under and up the level, everything can be normalized, further, this study can open a new door for the new researcher as when individuals sell their investment after retirement there must be a new cohort of young individuals which want to invest. This new cohort of young individual's demand can be either offset by the supply of old cohort of individuals or not and how this can effect on stock volume.

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