GCU
ECONOMIC JOURNAL

CONTENTS

VOLUME LI **2018** **No. 1 & 2**

ARTICLES

GCU Economic Journal, Volume LI (1&2), 2018, pp. 1-22

An Empirical Investigation on the Links between Social Exclusion and Crime

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Abstract: The study explores the elements of excludability related to the social frameworks which are responsible for fueling up the crime rates in a country. The study used proxies developed by the International Institute of Social Studies as a measure for Social Exclusion. The present study examines the relationship using secondary data sources. The data consist of 35 countries covering the time period from 1995 to 2014. The study uses Panel Auto Regressive Distributed Lagged Models (ARDL), purposed by Pesaran, Shin, & Smith (1997) based upon Pooled Mean Group (PMG) estimation. The intergroup cohesion, inclusion of minorities, interpersonal safety and trust and voice accountability had a significant relationship with crime rate. Some demographic and economic variables also had a significant relationship with crime rates. The study concludes that there exists a positive and significant long run relationship between social exclusion and crime. Greater participation in social spheres can play a positive role in building up the society as a whole which will help in combating crime rates.

Keywords: Exclusion, Crime, Voice and Accountability, Pool Mean Group, unemployment, GDP per capita, Demography
JEL Classification: Q56, N30, E24

1. Introduction

Socially excluded individuals are the ones who are deprived socially i.e. not being recognized or valued in contrast to other groups in the society. This deprivation is faced not by the individuals but by the group of people belonging to a specific group on the basis of religion, ethnicity or race. The concept mainly focuses on the social distances, marginalization, inadequate integration and lack of participation in cultural, social, political and economic activities. And this non-participation expedites the

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aggressive behaviors in those marginalized groups and thus urges them to involve in criminal offenses. The ethnic and racial discrimination, lack of freedom of speech, deprivation in basic facilities and lack of political participation will inevitably lead to a higher sense of deprivation that causes a higher involvement of such groups of people in criminal activities (Dertwinkel, 2008).

The Global Peace Index (GPI) has remained constant in the last few years. A number of indicators, used in determining the Global Peace Index, have deteriorated but others have improved. The societal safety and security domain have improved by the likelihood of fallen homicidal rates. However this improvement was counter balanced by the worsening effect of ongoing conflicts and militarization. The death toll has also been increased in the internal conflicts in some countries. A continuous deterioration in the impact of terrorism has also been the factor of not improving the Global Peace Index.

Deprivation makes people feel aggravated and this aggregation compels them to become criminals. Reducing crime rate is one of the priorities of the countries all across the world; as low rates of crimes are seen to be the most important feature of the increased economic growth. Crime reduction, therefore, is synonymous to decreasing the implicit cost of the nation that can lead to enriched wellbeing and quality of life. Despite the fact that policy makers are giving attention to the heightened crime rates, less focus has been placed regarding the institutional factors and elements of social exclusion that are causing the problem. Dilulio (1996) studied link of inadequacy of social capital as being an important determinant in raising the crime rates.

In most studies criminology is related to the economics i.e. the need for money to fulfill material requirements, the social factors i.e. the need of the education, health and other forums ensuring the participation of individuals in a society, and the political and the civil rights for everyone. Even though policies are giving attention to the heightened crime rates, less focus has

been placed regarding the economic, social and institutional factors and elements that are causing the problem.

In the recent years, the social exclusion has also been used widely, however is not specifically defined. The social exclusion is not only concerned with current trajectories but also with the future projections (Atkinson, 1998). Thus, the social factors along with the economic factors also contribute to the individual's behavior towards criminal activities. These criminal activities report the levels of anxiety and stress of the people in the economy and give rise to the sense of insecurity and mistrust in the community. As the effects of crimes are not limited to the victims alone, the whole society feels the wave of threatening and uneasiness.

The criminal activities are stimulated when the individuals are having concerns about their social status and financial conditions. A social risk of falling into delinquent behaviors are closely connected with the life situations like unemployment leading to financial apprehension or the confinement of social independence.

The socio economic background is one of the major conjectures of the cognitive development of the individual in a society. Social exclusion raises the level of anxiety and stress among the people that give rise insecurity and mistrust in the community. Hummelsheim et al., (2011) provided qualitative evidence of the presence of insecurities due to criminal activities that are bound to exist through declining social trust and intergroup conflicts. Glaeser et al., (1996) found the evidence that high level of social interactions can help reducing crime rates in the county. Social interactions seem to create a sense of invulnerability and the feeling of trustworthiness among individuals.

Economic exclusion deprives individuals or set of individuals from the material needs and desires. On the other hand, social exclusion denies the access to the social or the political activities taking place in the country. This study will try to explore the factors and the elements relating to the social and the economic framework of the society, which are responsible for fueling up the criminal acts and offensive behaviors in the country.

2. Literature review

Ehrlich (1973) purposed a model describing the phenomenon of why an individual takes part in illegitimate activities. The data was taken across US states of year 1960, 1950 and 1940, taking into consideration the education, demographic and geographical factors. Later, Ehrlich (1975) studied the relation of crime and education by collecting the data from Bureau of Census of year 1960 on the median school year of all the offenders in state federal and local jails and workhouse. Garaham & Bowling (1995) used self-reporting method, adopted a national random sample of offenders and interviewed them about the background, their family life, their school experiences an aspects of their current life. The study found out that offending is strongly correlated with the parental supervision, the exclusion from school and poor family background. Fajnzylber, Lederman, & Loayza (1998) studied the factors responsible for the crime rates Latin America, Sub Saharan Africa, Eastern Europe, South and East Asia and Middle East. Income inequality had a positive and significant impact on the crime rates, the deterrence effects are significant and are playing an important role in determining the level of crime rates, the policy makers can serve in these regards to reduce crimes.

The study on demographic and economic variables responsible for increased crime rates was undertaken by Entorf & Spengler (2000). The study provided the widespread descriptive analysis of crime and the potential factors that impact the number of offenses in Germany. Bynner (1999) identified the risks involved due to the social exclusion, using longitudinal data of OECD studies. The study proposed that preschool intervention for the enhancement in the development of the children and in the adult life of the excluded group of people can help to reduce crime rates. Similarly, Jenson (2000) undertook an analysis on the marginalization of the Canadian society. The exclusionary distribution of resources i.e. economic, social and political, the lack of social integration and pathologies are found to be the the dynamics of the marginalization.

Cracolici & Uberti (2009) analyzed the level of crime rates in 103 Italian provinces by taking the data of the years 1999 – 2003. A rigorous study was undertaken on the basis of the graphical representations of some of the

specific elements helping to analyze the situation of the criminal activities in the country. Geographical, demographical and deterrence factors were found to be the main ingredients in determining crime rates. Meghir, Palme, & Schnabel (2012) studied the effect of educational reforms on the crime rates, by using a controlled experimentation on the respondents in Sweden. The study used the data from Swedish Population Census of the individuals born between 1945 – 1955. On the other hand, Andersen (2012) took a controlled experiment in Denmark to study the influence and the intensity of social training program on the crime rates of the unemployed in the country.

Qoli (2015) developed the hypothesis that marginalization is the major factor in increasing crime rates. The main purpose of the study was to examine whether social crimes and marginalization are related. The study analyzed how the family income, education, unemployment and immigration is linked with the social crimes and delinquency. It was concluded that there exist a relationship between marginalization and the social crimes in Gorgon. The present study tries to explore the factors and elements relating to the social exclusion that can be responsible for fueling up the criminal behaviors in a country.

A wide range of debate on the growing concern of increased discrimination and unequal behavior towards specific group or class of the society has been made. This prejudicial and biased behavior is faced in both the economic and the social setup of the country. The present study will try to explore the factors and elements relating to the social framework that are responsible for fueling up the crime rates in a country. The study used the proxies developed by the International Institute of Social Studies as a measure for Social Exclusion. These proxies are termed as the Indices of Social Development (ISD) The indicators included in the study to examine the effect of the social exclusion on crime are, intergroup cohesion, interpersonal safety and trust, inclusion of minorities and voice accountability.

3. Data sources

The present study examines the relationship using secondary data sources. The data consist of 35 countries covering the time period from 1995 to 2014

and the selection of countries is done on the basis of availability of data. The data on crime has been taken from (UNODC) United Nations Office on Drugs and Crime. The seven categories of crimes included in this study are assault, kidnapped, theft, burglary, sex violence and homicides. Social exclusion indices that include intergroup cohesion, intergroup safety and trust and inclusion of minorities have been taken from the International Institute of Social Studies (IISS) and voice accountability has been taken from the World Governance Indicators (WGI). Some economic and demographic factors are also included as control variables in the study. The male unemployment rate, youth unemployment rate and GDP per capita is taken from the World Development Indicators (WDI). Male population measuring the count for males from the total population has been taken from United Nations Population Division.

4. The Theoretical Model

The study investigates the profound relationship between social exclusion and crime rates. Social Exclusion is the term originated in 1960's in France having close affinity with the happenings of the French Revolution. The term social exclusion has its roots in sociology and that is why the social exclusion does not only include the lack of material needs of the individuals, but undertake other elements such as lack of participation and the dismissal to the access of fundamental activities in a society (Mathieson, et al., 2008).

It points out to the situation, when beyond an individual's control, he or she is unable to take part in the general activities of the society. Social exclusion is a relative term as it concern itself with the status of one group of the society to another. According to many economists social exclusion is a dynamic process instead of being an outcome or a condition. In other words it means that an individual can pass in or out of such exclusion (Mathieson, et al., 2008). Social exclusion is deeply attached with the increasing criminal activities in a country. Social exclusion is the inability of the individuals to access the facilities or resources available in the country which are non-material in nature. And this inability results into sense of deprivation and unfairness, causing frustration and anxiety. Thus, this socially excluded group gets involved in the offensive activities. Along

with social exclusion factors, there are some economic and demographic factors as well that need to be taken into considerations. This association can be represented as the following functional form:

Crime Rate = f (Social Exclusion, Economic factors, Demographic Factors)

The study has used various proxies for social exclusion (SE) which include intergroup cohesion index (ICI), intergroup safety and trust index (ISTI), inclusion of minorities index (IMI) and voice and accountability (VA).

Intergroup Cohesion measures the ethnic tensions and sectarian rigidities and discriminations. If the group's interconnections are leading to the increased unrest and disturbances then it may cause the crime rates of the economy to rise. And this rise in inclusion of the groups will surly puts a decreasing pressure on the crime rates of the society (Staveren & Hoeven, 2012). This decreasing pressure will be due to the fact that when intergroup cohesion will increase, it will bring the harmony and equality in the existing groups and sectors of the economy. The value of the index reaches from 0 – 1 and the values closer to 1 shows that there exists higher level of social connections between different groups of the society. However, the value closer to 0 shows that the interrelations among society's groups are not favorable (Staveren and Hoeven, 2012).

Interpersonal Safety and Trust focus on the degree of the trust and security that strangers puts on each other. It becomes difficult to undertake a safe and secure society where norm do not exist or have been eroded overtime. The absence of norms and social values leads to the increased crime rates in the society (Heinemann & Verner, 2006). As social norms and values will encompass morality in the individuals which will bring down the crime rates. Interpersonal Safety and Trust Index also ranges from 0 – 1, where values near 0 shows that there is less social cohesion among the individuals of the society. And the values near 1 shows that higher social cohesion is existing among people of the society (Staveren and Hoeven, 2012.

Inclusion of Minorities measures the extent of the facilities and resources, present in the country, being used by the minority groups. The exclusion or the discriminated behavior with the minorities will bring the need for them,

to engage in criminal acts to cover their rights. So high discrimination shows less inclusion of minorities thus, increasing crime rates (Heinemann & Verner, 2006). The value of the index reaches from 0 to 1. The proximity of the index to 1 represents that minorities have higher opportunities to participate and enjoy the facilities available to another majority group. However, the value of the index reaching to 0 shows there exist a systematic bias in social and economic resources in the minority groups of the country.

Voice Accountability refers to the availability of the rights to express their legal views and the accessibility to the power for selecting their government. This non-availability of the rights, in turn escalate the illegitimate behaviors in the minds of the ones who are unable to play their role in the establishment of the society (Jenson, 2000). As high voice accountability will ensure greater participation in the social set up of the country, thus lowering crime rates. The value of this index ranges from -2.5 to 2.5 approximately. The value closer to lower bound (-2.5) means that the freedom of expression and the right to choose the government are not favorable. But if the value is approximating to upper bound i.e. 2.5 means that individuals have the favorable right to express their thoughts and have the right to choose their governments.

The demographic factor included in the study is the total male population. Male population measures the number of people in the country of the age group 15 – 24. Males are considered to be more aggressive and hostile than the females; so the study has included this variable, as for the economies where male population is high the chance for the level of crime rate could also be high.

The economic factors included in the study are GDP per capita, youth unemployment rate and male unemployment rate. GDP per capita (GDP) is one of the most primary indicators of measuring economic performance of a country. This indicator is mostly used to analyze the standard of living of the individuals in general. It is the effective way to do a comparative analysis of the countries with each other as it shows the relative performances of the countries. GDP per capita is expected to be negatively related to crime rates.

According Grönqvist (2011) criminal activities rise with the age and peak in late teens. And if the unemployment rate among youth is high, there is a possible chance that crime rates are higher. At this phase of the human life the individuals are more emotional and are more prone towards criminal activities when not having access to legal means of earnings. Youth unemployment rate measures the unemployment rate among youth of the economy and here the youth is defined as the number of population living in the range of 15 – 24 years.

Sabates et al., (2008) states that males are more aggressive and prone to undertake offensive or criminal activities as compared to female. Therefore, the study includes total male unemployment as a control variable. If the unemployment rate is higher among males of the economy they have more time to sit idle, giving them the opportunity of engaging in crimes. When high levels of unemployment among males exist in the economy, they are therefore urged to accomplish or to satisfy their needs through illegal means i.e. increasing crime rates in the country.

5. Estimation Techniques

The study uses Panel Auto Regressive Distributed Lagged Models (ARDL). The first step is to check the stationarity of the data. Panel Auto Regressive Distributed Lagged (ARDL) estimation is adopted when the variable is stationary at level or at first difference. In other words one must make sure that no variable is integrated of order 2, i.e. I (2). The dependent variable, however, must be integrated at order one i.e. I (1). The study used Levin, Lin, & Chu (2002) panel unit root tests to check stationarity of the variables.

When panel data estimation is considered, two general procedures are commonly exercised. At one extreme, separate equations for all cross sections is estimated allowing all parameters of intercept, slope, short run coefficients, long run coefficients and error variances to vary across groups, known as Mean Group (MG) estimation (Pesaran & Smith, 1995). And at the other extreme the pooled estimation of random or fixed effect estimators is present, where the homogeneity assumption for all parameters except intercept is employed.

The pooled estimation through fixed or the instrumental variable approach of Generalized Methods of Moments (GMM) purposed by Anderson & Hsiao (1981; 1982), Arellano & Bond (1991) and Blundell & Bond (1998) do not produce consistent estimates in dynamic panel data analysis (Pesaran & Smith, 1995) and the estimates are also potentially misleading, unless the slope coefficients are in fact homogenous.

So a useful analysis which lay in between of the above two extremes was purposed and considered by Pesaran, Shin, & Smith (1997), named as Pooled Mean Group (PMG) estimation. This PMG (Pooled Mean Group) estimation technique combines both, the averaging and the pooling of the estimates, keeping in account the panel dynamics of the data. PMG is considered as the intermediate approach which allows the intercepts, short run coefficients and the error variances to vary across cross sections, but puts a constraint of homogeneity on the long run parameters. And in many economic theories, there exist a likely chance of the homogeneity in the long run estimates across different groups (Pesaran, Shin, & Smith, 1997).

Pooled Mean Group approach is applied when time series properties of non stationarity exist in the panel data. The common practice is to keep the time period i.e. T, greater than the number of total cross sections included, i.e. N. However, there exist studies that exist in the empirical research analysis using the T i.e. number of time period included, less than N, i.e. number of cross sectional groups included (Tan, 2006; Rafindadi & Yosuf, 2013; Gallegoa, Rodrígueza & Rodríguez, 2011).

Mean Group and the Pooled Mean Group specify the Short Run and the Long Run estimates of the model, along with the speed of adjustment showing the possible speed with which the equilibrium of the model will reach (Pesaran, Shin, & Smith 1995; 1997). This study intends to estimate the long run relationship between crime rates (CR) and the social exclusion (SE). As Exclusion is a long run process and the effects of exclusion in short run might not be significant and revealing. The choice between PMG and MG is made on the basis of the Hausman Test.

6. Results

The study employs Levin, Lin, & Chu (2002) panel unit root tests to check stationarity of the variables which include. Crime rate, intergroup cohesion index, inclusion of minorities, male population and economic growth are of integrated order 1. These variables are non-stationary at level but stationary at first difference. However, interpersonal safety and trust, voice accountability, male unemployment and youth unemployment are stationary at level i.e. the integration order is 0. The results are provided in the Table 1.

Table 1: Panel Unit Root Test, Levin Lin & Chu (2002)

Variables	**At level**	**At 1st Difference**	**Order of integration**
Crime Rate (CR)	-1.081 (0.1397)	-6.502*** (0.000)	I(1)
Intergroup Cohesion Index (ICI)	3.774 (0.999)	-5.926*** (0.00)	I(1)
Interpersonal Safety and Trust (IST)	-4.924*** (0.00)	…….	I(0)
Inclusion of Minorities (IM)	0.6247 (0.7348)	-4.166*** (0.00)	I(1)
Male Population (MP)	-11.80*** (0.00)	…….	I(1)
Voice and Accountability (VA)	-3.674*** (0.0001)	…….	I(0)
Male Unemployment (MU)	-5.554*** (0.0000)	…….	I(0)

GDP per capita (GDP)	0.191 (0.5760)	-8.440*** (0.0000)	I(1)
Youth Unemployment (YU)	-4.407*** (0.00)	…….	I(0)

***significance at 1% and the values in ( ) provide the probability values

The study has first applied Mean Group (MG) and Pooled Mean Group (PMG) technique and the Hausman Specification Test is applied choose between the two. The specification test showed that the results from the PMG estimation technique are efficient and consistent which are provided in Table 2. The variables CR, EG, GDP, MP are converted into log terms.

Table 2: Pool Mean Group Estimates

Variables	**Model 1**		**Model 2**		**Model 3**	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intergroup Safety and Trust Index (ISTI)	-1.65128	-7.42*** (0.000)				
Intergroup Cohesion Index (ICI)			-0.4045	-2.26** (0.024)		
Inclusion of Minorities Index (IMI)					-2.0254	-3.36*** (0.001)

GDP Per Capita (GDP)	0.8127	4.24*** (0.000)	0.9473	6.88*** (0.000)		
Voice Accountability (VA)					-0.8142	-6.01*** (0.000)
Male Population (MP)			0.2031	1.52 (0.128)		
Youth Unemployment (YU)	0.0194	2.91*** (0.004)				
Male Unemployment (MU)					0.0193	2.64*** (0.008)
Constant	1.17086	4.48*** (0.00)	0.95786	6.51*** (0.000)	3.0118	5.59*** (0.000)
ECT	-0.1972	-4.83***	-0.3661	-8.61***	-0.2181	-5.73***
Hausman Test (Prob.)	(0.2724)		(0.2837)		(0.9367)	

**significance at 5%, ***significance at 1%, the values in () shows the probability of rejecting null hypothesis.

Model 1: The index of interpersonal safety and trust (ISTI) has the significant negative long run relationship with the Crime Rates. When Interpersonal Safety and Trust Index (ISTI) increases by one point the Crime Rates will decrease by 1.65%. As the Interpersonal Safety and Trust (ISTI) shows the level of trust and security an individual feels living in any

neighborhood. The higher values of this index shows higher levels of trust and this leads towards reduced crime rates. When the individuals living in the society have higher trust levels among themselves, there will be less intent of criminal behaviors, due to greater harmony and understanding (Staveren & Hoeven, 2012).

Youth unemployment (YU) has the significantly positive long run relationship with crime, the results shows that when Youth Unemployment (YU) increases by one percentage, crime rate will increase by 0.019%. As the high value of Youth Unemployment (YU) means that high level of youth, who are willing to do the job but are not finding the job. This increases the factor of aggression and frustration in their minds, and urges them to engage in criminal activities to acquire their basic needs and desires (Grönqvist, 2011).

GDP per capita has the significant positive relationship with the crime rates. This positive direction of the relationship of crime and GDP per capita is not common. However Northrup & Klear (2014) also concluded this positive significant relationship of the two variables. The main argument provided by the study is that high GDP per capita levels also have the negative impacts in the society, the biggest negative impact GDP per capita can have on the society is the increasing inequalities (Naguib, 2015). These inequalities will bring the sense of unfairness and deprivation, resulting in increased crime rates. This positive relationship of GDP per capita and Crime rate is also present due to the fact that the economy is not experiencing the trickledown effect of the benefits of high GDP per capita. The result in this study also shows the positive impact of GDP per capita on crime rates in long run, the coefficient shows that as the GDP per capita increases by one percent, the crime rates will rise up by 0.813%.

The speed of adjustment is -0.1972, which indicates that if any disequilibrium occurs in the short-run then variables will converge towards the long-run equilibrium level at the rate of 19.72% annually.

The equational form after putting the parameter estimated through PMG is:

$$\Delta lCR_{it} = -0.1972\ lCR_{i,\,t-1} + 1.171 - 1.651\ ISTI_{it} + 0.0914\ YU_{it} + 0.813\ lEGr_{it} + 0.477\ \Delta ISTI_{it} - 0.0018\ \Delta YU_{it} - 0.192\ \Delta\ lEGr_{it}$$

Model 2: ICI (Intergroup Cohesion Index) has the significantly negative long run relationship with the Crime Rates. When the value of ICI increases by one point, crime rates will decrease by 0.40%. Intergroup Cohesion shows the relations and the co-operations of the different identity groups in the society, so if this index has the higher value, meaning that the co-operation levels are high among different groups in the society so crime rates will be decreased (Staveren & Hoeven, 2012). The relationship between GDP per capita and crime rates is the same as established in model 1 with a minor change in the coefficient value. This shows the robustness of the results. Male Population (MP) also has the significant and positive long run relationship with the crime rates. The results of the PMG estimation shows that when the Male Population increase by 1% there will be an increase of 0.203% in the crime rates. Males are more aggressive so the societies with high male population often prone to report high Crime Rates (Sabates, 2008).

The speed of adjustment value of this PMG result suggests that the system of crime rates involving the variables of Intergroup Cohesion, GDP per Capita and Male Population, will adjust in the direction of the equilibrium at the rate of 36.6% annually.

Following equation will be constructed of the PMG results:

$$\Delta lCR_{it} = -0.366\ lCR_{i,\,t-1} + 0.9578 - 0.405\ ICI_{it} + 0.947_{2i}\ lEGr_{it} + 0.203\ lMP_{it} + 0.006\ \Delta ICI_{it} - 0.413\ \Delta lEGr_{it} - 4.348\ \Delta lMP_{it}$$

Model 3: The results from the PMG estimation, suggested that Inclusion of Minorities Index (IMI) and Voice and Accountability (VA) has the negative impact on Crime Rates in long run, i.e. as the value of any of these indices increases, the crime rate will decrease. However Male Unemployment has the positive relationship with the crime rates in long run, as unemployment among males of the society increase aggressive behavior, leading to the increased crime rates.

The speed adjustment value in this equation is -0.2818, and is also significant, meaning that the equilibrium of this equation will be achieved annually with the rate of 28.18%. In other words the variables involved in this equation will be adjusted and will converge in the direction of the equilibrium in a year at the rate of 28.18%

The coefficient values from the from the PMG estimation, of long run, suggest that if the IMI (Inclusion of Minority Index) increase by one point the crime rates will be decreased by 2.02%. As the inclusion of minorities shows that the groups, which are likely to fall behind are now enjoying their society's role, so their likelihood to involve in the criminal activities will be decreased significantly. Through inclusion individuals will not feel being discriminated. They will be satisfied with the feeling of playing their role in the activities taking place in the social framework and being a valued member of the society. Therefore they will be less frustrated which will reduce the criminal acts (Heinemann & Verner, 2006).

Voice and Accountability (VA) also has the negative significant relationship with crime, showing that as the index of Voice Accountability increases, crime rates will fall by 0.84%. It is due to the fact that voice and accountability ensures the participation of the individuals' right of freedom of speech and the participation in the political set up. The higher value of this index will confirm the role of the individuals' in making and building up a society. This will, for sure, puts a decreasing pressure on the crime rates of the country. In other words Voice and Accountability will bring the sense of belonging and self-satisfaction of being a part of the society in the individuals (Jenson, 2000). The individuals will have less frustration and anxiety if they are ensured that their voice will be heard and they can actively take part in the society's setup.

Male Unemployment (MU) is having a positive and significant relationship with Crime Rates. As the value of Male Unemployment (MU) increases by one percentage it will increase the crime rates by 0.019%. When Male Unemployment is increased, there is the chance that these unemployed males prone towards the illegal and offensive activities to satisfy their needs, thus increasing the Crime Rate. Males are more aggressive (Sabates et al., 2008). Increased unemployment in the males will push them towards

criminal activities. They will steal and will undertake fraudment activities to satisfy their material needs – they would kill for money to generate income.

The equation constructed using the PMG results is:

$$\Delta lCR_{it} = -0.2182\ lCR_{i,\,t-1} + 3.012 - 2.025\ IMI_{it} - 1.842\ VA_{it} + 0.019\ MU_{it} + 4.514\ \Delta IMI_{it} + 0.249\ \Delta VA_{it} + 0.0126\ \Delta MU_{it}$$

7. Conclusion and Policy Recommendations

The empirical estimation through Pooled Mean Group (PMG) analysis of 35 countries, from year 1995 – 2014 concludes that there exists a positive and significant long run relationship between social exclusion and crime. The indicators of the social exclusion were intergroup cohesion, inclusion of minorities, interpersonal safety and trust and voice accountability. Male population, male unemployment, youth unemployment, GDP per capita were included as control variables. The use of PMG estimation was consistent and efficient. The results suggested that the indicators of social exclusion have the significant negative relationship with the crime rate in the long run.

The inequalities in the provision of education must be addressed to reduce the levels of crime rates in the country. The policies that can find ways to address the issues relating to the access, attendance and increased opportunities for individuals after the attainment of education should be effective in reducing the crime rates. The local authorities, mayors and councilor, can be very effective in this manner as they can make sure more efficiently that education is well maintained and easily accessed in their locality.

Inclusion of Minorities has the significantly negative impact on the crime rates as high level of Inclusion of minorities ensures lower exclusion thus lower crime rates. Voice accountability also has a significantly negative relationship with the crime rates, as crime rates are reduced with the increase in the ability of people to express their views and with the ability to participate in political setup of the economy. Male unemployment is

found to be significant and positively related to the Crime Rates in the long run.

Interpersonal Safety and Trust is significant and is negatively associated with the crime rates, as it shows the degree of trustworthiness that an individual places on the other. High trust levels ensure greater level of safety and security among the people. Youth Unemployment and Economic Growth, showed the positive significant relationship with the crime rates. Here Economic Growth is positive as there is no trickling effect of the income earned by the individuals.

Therefore, social exclusion indicators must also be tackled in a way that maximum possible individuals have the feeling of participating and playing their role in the building up and formation of the society as a whole. The inclusion of minority groups and the peoples' ability to have the freedom to speak and elect their government must come as the first foremost priority of the policy makers. The opportunities for the males to participate towards the betterment of the society must be enhanced so that they have less time to engage in illegal activities.

The policy makers must try to increase the pace of trickledown effect of the increased economic growth. The inclusive growth strategies must be employed, so that most of the individuals get benefitted from the increased production and income levels of the economy. Growth is inclusive if it supports high levels of employment and rising wages. For developing countries, this means acquiring competitiveness in new sectors and technologies. The empirical results support the policy propositions that innovation is a powerful driver of employment growth, that innovation-driven growth is inclusive in its creation of unskilled jobs, and that the underlying innovations are fostered by a pro-competitive business environment providing ready access to information, financing, export opportunities, and other essential business services that facilitate the entry and expansion of young firms (Mello, 2012).

References

Anderson, T. W., & Hsiao, C. (1981). Estimation of Dynamic Models with Error Components. *Journal of the American Statistical Association, 76*(375), 598-606.

Anderson, T. W., & Hsiao, C. (1982). Formulation and Estimation of Dynamic Models Using Panel Data. *Journel of Econometrics, 18*(1), 47-82.

Andersen, S. H. (2012). *Unemployment and crime: Experimental evidence of the causal effects of intensified ALMPs on crime rates among unemployed individuals* (No. 38). Rockwool Foundation Research Unit, University Press of Southern Denmark. Retrieved from http://www.rockwoolfonden.dk/app/uploads/2015/12/Unemployment-and-crime_38.pdf

Arellano, M., & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies, 58*(2), 227-297.

Atkinson, A. B., & Hills, J. (1998). *Exclusion, Employment and Opportunity*. Research paper no. CASE 004, Centre for Analysis of Social Exclusion, London School of Economics, London.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journel of Econometrics, 87*(1), 115-143.

Bynner, J. (1999). *Risks and Outcomes of Social Exclusion Insights from Longitudinal Data*. Institute of Education, University of London, London. Retirved from https://www.oecd.org/edu/school/1855785.pdf

Cracolici, F. M., & Uberti, E. T. (2009). Geographical Distribution of Crime in Italian Provinces: A Spatial Econometric Analysis. *Jahrbuch Für Regionalwissenschaft, 29*(1), 1-28.

Dertwinkel, T. (2008). *Economic Exclusion of Ethnic Minorities: On the Importance of Concept Specification.* ECMI Issue Brief no . 19, European Centre for Minority Issues (ECMI).

Dilulio, J. J. (1996). Help Wanted: Economist, Crimes and Public Policy. *Journal of Economic Perpectives, 10*(1), 3-24.

Ehrlich, I. (1973). Participation in Illegitimate Activities: A Theoretical and Empirical Investigation. *Journal of Political Economy, 81*(3), 521-565.

Ehrlich, I. (1975). On the Relation between Education and Crime. In F. T. Juster (Ed.), *Education, income, and human behaviour.* (pp. 313-338) National Bureau of Economic Research (NBER).

Entorf, H., & Spengler, H. (2000). Socioeconomic and demographic factors of crime in Germany: Evidence from panel data of the German states. *International Review of Law and Economics, 20*(1), 75-106.

Fajnzylber, P., Lederman, D., & Loayza, N. (1998). *Determinants of crime rates in Latin America and the world : an empirical assessment.* The World Bank Publications.

Gallegoa, M. S., Rodrígueza, F. L., & Rodríguez, J. V. (2011). Tourism and trade in OECD countries. A dynamic heterogeneous panel data analysis. *Empirical Economics, 41*(2) , 533-554.

Garaham, J., & Bowling, B. (1995). *Young People and Crime.* A Research and Planning Unit Report no. 145, Home Office Research and Statistics Study , London.

Glaeser, E. L., Sacerdote, B., & Scheinkman, J. A. (1996). Crime and Social Interactions. *Quarterly Journal of Economics*, 507-548.

Grönqvist, H. (2011). *Youth Unemployment and Crime: New Lessons Exploring Longitudinal Register Data*. Working Paper No. 7, Swedish Institute for Social Research, Stockholm University.

Heinemann, A., & Verner, D. (2006). *Crime and Violence in Development A Literature Review of Latin America and the Caribbean.* World Bank Policy Research Working Paper 4041, The World Bank.

Hummelsheim, D., Hirtenlehner, H., Jackson, J., & Oberwittler, D. (2011). Social Insecurities and Fear of Crime: A Cross-National Study on the Impact of Welfare State Policies on Crime-Related Anxieties. *European Sociological Review, 27*(3), 327-345.

Jenson, J. (2000). *Thinking about Marginalization: What, Who and Why?* Canaian Policy Research Networks Inc. (CPRN), Ottawa, Onttario. Retrived from http://cprn3.library.carleton.ca/documents/15746_en.pdf

Levin, A., Lin, C.-F., & Chu, C.-S. J. (2002). Unit root tests in panel data: asymptotic and finite sample. *Journal of Econometrics, 108*(1), 1-24.

Meghir, C., Palme, M., & Schnabel, M. (2012). *The Effect of Education Policy on Crime: An Intergenerational Perspective*. Working Paper No. 18145, National Bureau of Economic Research.

Naguib, C. (2015). *The Relationship between Inequality and GDP Growth: an Empirical Approach*. Working Paper Series No. 631, Luxembourg Income Study (LIS), Cross-National Data Center, Luxembourg.

Northrup, B., & Klaer, J. (2014). *Effects of GDP on Violent Crime.* Econometric Analysis Research Papers. Retrived from https://smartech.gatech.edu/handle/1853/51649

Pesaran, M. H., & Smith, R. P. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, *68*(1), 79-113.

Pesaran, M. H., Shin, Y., & Smith, R. P. (1997). *Pooled Estimation of Long Run Relationships in Dynamic Heterogenous Panels*. DAE Working Papers Amalgamated Series, Department of Applied Economics, University of Cambridge.

Qoli, P. K. (2015). The Effect of Marginalization on Crime Rate (Case Study: Koi Mohtasham Gorgan). *Bulletin of the Georgian National Academy of Sciences, 9*(2), 61-64.

Rafindadi, A. A., & Yosuf, Z. (2013). *An Application of Panel ARDL in Analysing The Dynamics Of Financial Development And Economic Growth In 38 Sub-Saharan African Continents*. Paper presented at the Kuala Lumpur International Business, Economics and Law Conference.

Sabates, R., Feinstein, L., & Shingal, A. (2008). *Educational Inequality and Juvenile Crime: An area-based analysis*. Research Report No. 26, Centre for Research on the Wider Benefits of Learning, Institute of Education, London.

Staveren, I. V., & Hoeven, R. V. (2012). *Global Trends in Labour Market Inequalities, Exclusion, Insecurity and Civic Activism.* International Institute of Social Studies. Retrieved from http://hdl.handle.net/1765/38412

Kang Yong Tan (2009) A pooled mean group analysis on aid and growth. *Applied Economics Letters, 16*(16), 1597-1601. DOI:10.1080/13504850701604128.

United Nations Office on Drug and Crime. (2014) Assault, Kidnapped, Theft, Burglary, Sex Violence and Homicides 1995 – 2014. Retrieved from: https://dataunodc.un.org/crime

Barro, R. J., & Lee, J.-W. (2010). A New Data Set of Educational Attainment in the World, 1950–2010. National Bureau of Economic Research (NBER) Working Paper Series. Retrieved from http://www.barrolee.com/

Indices of Social Exclusion. (2014) Intergroup Cohesion, Intergroup Safety and Trust and Inclusion of Minorities. Retrieved from: http://www.indsocdev.org/data-access.html

World Governance Indicators (2014) Voice Accountability. Retrieved from: https://info.worldbank.org/governance/wgi/#reports

World Development Indicators, The World Bank (2014) Unemployment Rate, Male Unemployment Rate, Youth Unemployment Rate and GDP per capita. Retrieved from: http://wdi.worldbank.org/tables

GCU Economic Journal, Volume LI (1&2), 2018, pp. 23-55

Entrepreneurial Factors Contributing towards the Firm's Growth in terms of Employment Generation: A Case Study of Electric Fan Producing Firms in Gujrat District

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Abstract: The objective of the present study is to investigate the importance of entrepreneurial factors being an important source of firm's growth in terms of generating employment opportunities. Primary data collected from a survey of 237 electric fans producing units of Gujrat is being utilized to empirically test the role of entrepreneurial and non-entrepreneurial determinants of firm growth. Multinomial Logit model is employed to find out the role of entrepreneurial factors along with non-entrepreneurial characteristics as important determinants of employment generation. Different problems and obstacles hindering firms' growth in terms of generating employment activities are also been undertaken in the present analysis. The characteristics like educational level of owner/manager of the firm, attitude like part time business, unemployment push, use of internal and external sources of financing, market orientation, sales to local market, number of markets dealing with, risk taking attitude on behalf of entrepreneur, family business, industry specific know how desire of independence, previous ownership experience, working through networks, partnership business, decision to innovate in terms of introduction of new product, new process and major improvements in existing system, diversification in terms of products, on job training, utilization of unique knowhow, price adaptability are found to be important factors affecting firms' growth in terms of employment generational activities. Government should device such policy measures that can help small units to grow and provide employment opportunities.

Keywords: Entrepreneurial factors, Firm growth, employment generation, Multinomial Logit Model, Organizational and Commercial capabilities.
JEL Classification: D23, L25, J23

1. Introduction

The importance of industrialization cannot be denied being a better mean to provide employment opportunities, its contribution towards economic growth as compared to traditional agricultural sector, and more foreign

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exchange earnings through exports of value added products and optimal utilization of domestic resources by establishing forward and backward linkages in the economy (Safdar & Siddiqi, 2011a). In case of developing countries like Pakistan, motivation behind each development policy is to provide employment opportunities to its accelerated growth of population along with a considerable increase in their living standard along with a significant reduction in the poverty levels (Safdar & Siddiqi, 2011b) but establishment of large scale industrialization requires resources in abundance, therefore alternatively, emphasis should be laid on the establishment of small scale sector in order to resolve all these problems[1].

Almost economies of all countries are influenced by performance of SMEs especially in the rapidly changing and progressively growing global market (Aharoni, 1994). Small and medium enterprises (SMEs) are considered to be an important source of generating employment opportunities (Carree & Klomp, 1996, Safdar & Siddiqi, 2011c). The SME have proved themselves as a major source of economic growth and technological progress (Mulhern, 1995, Thornburg, 1993). The experience of developed nations showed that promoting SMEs sector is one of best way to boost up employment activities and particularly a developing country like Pakistan can provide more employment opportunities to its growing population by promoting SMEs sector.

Therefore, it is necessary to facilitate the growth SMEs as they constitute about 99 percent of industrial establishments and according to Kaldor's Laws manufacturing industry contributes directly to economic development (Safdar & Siddiqi, 2011d). Consequently, it is important to understand different determinants of firm growth in order to device such policy options that can facilitate small firm's growth. The focus on the firm growth has been intensified in the last two decades. Various disciplines investigated to find out the determinants of firm growth include innovation, strategy, psychology, economics and network theory. However, it is

1 Government of Pakistan had estimated a required investment of Rs. 5.2 trillion in large scale sector to provide employment opportunities to an addition of 16 million persons to the labor force while only Rs. 8 billion are required in case of small/micro scale sector.(http://www.pakistan.gov.pk/ministries/planninganddevelopment ministry/mtdf)

observed that information regarding firm growth is quite inadequate (Davidsson & Wiklund, 2000, Wiklund et.al, 2007) because of the fragmented nature of existing literature. As research from a psychological point of view asserts on the entrepreneurial behavior (Begley & Boyd, 1987), investigation regarding firm's strategy focuses on the association among business strategy, environment and growth (McDougall et.al 1992). Whereas, research relating to economic conditions concentrate on the relation between firm's growth and its size (Audretsch et.al, 2004). Thus, the existing literature presents more diverse point of views, with a little attention on more integrated presentation of entrepreneurial determinants that explains the process of firm growth.

Therefore, special attention should be given to identify the major determinants of firm growth in a more integrated manner. Consequently, in the present study, the determinants of firm growth are classified into three dimensions including entrepreneurial and non- entrepreneurial characteristics along with the major factors that restrict firm's growth.

The present study has tried to present a broad prospect regarding major determinants of firm growth. A detailed data survey on firm growth is being employed for analytical purposes, conducted by author in the districts of electric fans producing units of Gujrat, presenting detailed information concerning main factors that influence the firm growth. The study has provided an opportunity to explore different determinants of firm growth in an inclusive manner. It has tried to identify the most important factors considered responsible for firm growth by employing a data set comprising of 237 small units.

The study is pioneer in its nature as no empirical study in a particular sector of Gujrat district has so far been conducted to find out the major determinants of firm growth in terms of employment generating activities.

2. Literature Review

Rapid increase of the population in a developing country like Pakistan asks for the provision of employment opportunities on the same rate in order to improve their living standard along with a steady economic growth. SMEs are considered as a better mean for providing employment opportunities as there are about 3.2 million economic establishments In Pakistan, 99 percent of these are accorded as SMEs, and accommodate about 80 percent of non-farm labor force[2]. The role of small and medium enterprises (SMEs) as key source in providing employment opportunities is now well established. The literature review regarding role of SMEs in employment generation can be categorized on the basis of the entrepreneurial and non-entrepreneurial characteristics and growth barriers that restrict the firm growth.

2.1 Entrepreneurial Characteristics

The growth and development of a small firm depends entirely on the motivation and ambition of the owner of that unit. Among the prominent features of an entrepreneur that effects the firm growth involves general background of the owner involving age and education of the owner along with his growth motivation[3] and management know how[4], organizational practices on the behalf of entrepreneurs', technological capabilities and market structure followed by entrepreneurs.

2.1.1 General Background

Growth ambition of the owner is influenced by his age factor and this effect is being investigated by many studies. A significant negative relation between age of the owner and growth ambition is indicated by different studies (Autere & Autio, 2000, Welter, 2001). According to the literature,

2 Economic census of Pakistan 2005.

3 It comprises of risk taking attitude, desire of independence, unemployment push and part time business approach

4 Management know how involves family business, industry specific knowhow, previous ownership experience, work through networks and partnerships.

firm growth is positively influenced by high levels of education (Sapienza & Grimm, 1997, Storey, 1994)[5]. But different empirical studies yield different results as Kolvereid (1992) showed that highly educated entrepreneurs are keen to grow their businesses. A positive relationship between former level of education and firm growth was found in ten out of seventeen empirical studies surveyed by Cooper et al. (1992) [6].

2.1.2 Growth motivation

In the literature relating to small businesses, the small business owner and the entrepreneur are distinctly differentiated. According to Birch (1987) the small business owners are considered as income substituters as they replace the paid-employment income with business income[7]. The importance of personality traits of entrepreneurs is a key factor but they may not essentially leads towards real firm growth. Personality traits effect the growth motivation (Delmar, 1996) in a more promising manner. Therefore, it is concluded that both the willingness and ability of owner along with growth motivation play an important role in entrepreneurial ventures.

The most important characteristic of an entrepreneur to develop his business is considered as risk taking propensity. An entrepreneur can be distinguished from simple business owner as they look for new opportunities, deal with uncertainties in a more promising manner[8]. Gundry and Welsch (1997) realized that the commitment to growth is the main factor that differentiates "high" growth from "low" growth businesses. The internal locus of the control is found to be an important characteristic of successful owner-managers along with the belief of control over their fate (Brockhaus and Horwitz, 1986, Caird, 1990, Chell et al., 1991). Perren (2000) found that the desire to be "one's own boss" was a significant feature in motivating the entrepreneurs to develop their business. Glancey (1998)

5 Education is most probably associated with information and skills, inspiration, self assurance, problem solving aptitude, dedication and control.

6 A Bachelor degree holding entrepreneur was found to have a positive influence on growth and survival of small firms (Cooper et al. (1994)).

7 Hay (1994) has termed income substitutors as “life-stylers" because their goal is to achieve long-term stability instead of growth, and they use business as an income generating activity adequate to sustain a certain "life-style."

8 See for example (McCelland, 1961, Timmons et al., 1985, Chell et al., 1991, Morris and Sexton, 1996)

showed that entrepreneurs initially stimulated by 'being your own boss' are more prone to low growth levels.

The literature suggests that some individuals may have started small businesses because the pressure of unemployment forced them to do it. This factor makes distinction between push and pull hypothesis as the individuals have opted to start a small business because they were left with no other choice (the push hypothesis) and not because they were characterized by entrepreneurial stance and aptitude (the pull hypothesis) (Zhenxi et al., 1999). Likewise, it is argued that individuals who are engaged in a parallel paid-employment job have less time and motivation to invest in the growth of their business (Riding et al., 1998).

2.1.3 Management know-how

The characteristics of management know-how of an entrepreneur are considered as an important factor in the process of firm growth. Management know-how is the possible outcome of many factors like having an intergenerational heritage, or having experience of paid-employment in a similar business, or by having previous management experience being owner of some other business.

Literature suggests that individuals from families owning a business are more inclined to start an entrepreneurial venture by developing knowledge of how to run a business. Empirical evidence suggests that belonging to an entrepreneurial family, augments the probability of survival (Cooper et al., 1994, Papadaki et al., 2000). However, firm's performance is found to be positively affected by prior entrepreneurial experience[9]. According to the literature, the related experience contributes positively in enhancing self-confidence among entrepreneurs (Orser et al., 1998) and leads them to venture success (Delmar and Shane 2006). Past experiences can help them in both in managing new venture (Ripsas, 1998, Shepherd et al., 2000) and take advantage of an already established network of customers, employees,

9 A positive relationship was found among entrepreneurs with general business management experience and their growth ambition (Orser, Hogarth-Scott and Wright 1998).

investors and suppliers (Campbell, 1992) playing a crucial role for the success of a new business.

According to the literature, contact with professional advisors like bankers, accountants, business associates, customers and suppliers can help small business owners in gaining knowledge and access to information networks leading to develop more formal joint venture and alliances. Partnerships and alliances can help both in distributing spread risks and sharing costs along with opening of new markets and development of new services, products and processes (OECD, 2000, Barringer & Greening, 1998). The business ventures also provide psychological support in decision making and other major problems faced by the firm (Perren, 2000).

2.1.4 Organizational/ Business Practice

According to Schumpeterian tradition, growth is positively associated with a company's capacity to innovate (Nelson and Winter, 1978, 1982). Furthermore, in order to enjoy a steady growth, firms are required to respond constantly according to the needs of their customers in new and specific manners. Innovativeness being an important component of entrepreneurial orientation[10] refers to the willingness of a firm to maintain creativeness and experimentation to introduce new products/services, technological control, and R&D in developing new processes.

According to economic theory it is proposed that firms that cater to their local markets are able to attain competitive advantages by quickly responding to customers and properly utilizing networks and community support systems (Safdar and Siddiqi, 2011c). On the basis of resource-based analysis, financial resources and human capital are the termed as most important resources for the growth of small business (Wiklund et al., 2007). Secured financial resources are considered as predominantly vital in supporting firm growth[11] because it is comparatively easy to convert them into other types of resources (Dollinger, 1999). A firm having sufficient resources is capable of doing experiments, increasing both innovativeness

10 Entrepreneurial orientation is defined as a combination of innovation, proactiveness and risk taking on the firm level (Miller, 1983).

11 Bamford, Dean & McDougall, 1997, Sexton & Bowman-Upton, 1991

and chances to pursue new opportunities of firm growth (Castrogiovianni, 1996, Zahra, 1991).

Financial resources of a firm depend mainly on the past financial performance of a firm, as past profit can be reinvested into the business. Eventually, a firm not only depends on external funding, but also utilizes its internal resources to finance business. The firms with superior financial performance have the chance to grow according to the evolutionary theory of "Survival of the fittest" (Coad 2007).

2.1.5 Technological Capabilities of Entrepreneur

Technological capabilities can be defined as "the firm's current ability and its future potential to utilize firm-specific technology to resolve technical problems and to augment the technical functioning of its production processes along with its finished products". The essential component of competition is differences in the technology adopted by different firms; therefore it plays a major role in growth performance of small firms. It involves diversification in their product mix, number of markets dealing with, presence of unique know-how along with on job training capacity of the firm.

Literature suggests positive effect of diversification on growth process of firms by helping them to deal with particular product line demand constraint and creating new growth opportunities. Diversification into new products is considered not only as an important medium of competition but also as a major engine to firm growth (Marris and Wood, 1971).

By utilizing modern means of communication and networks, the firm can diversify its geographic markets. Therefore, the diversification into different geographic markets like national and international markets, will lead to a positive impact on firm's growth. A positive correlation between firm growth and diversification into markets was found by Becchetti and Trovato (2002). Literature concerning determinants of firm growth considers both human capital and financial resources as most important factors effecting small business growth (Wiklund et al., 2007). Human capital can be defined as a combination of knowledge, experience and

skills. On the firm level, the experience, skill and knowledge of the total employees contribute more promisingly as compared to the entrepreneur alone (Chandler & Hanks, 1994, Birley & Westhead, 1990). Human capital can be measured both in terms of specific and generic terms. Generic human capital is defined in terms of different levels of educational attainment by workers. Specific human capital can be measured by employing a dummy variable indicating whether firm is offering on job training to its workers or not (Lee et.al, 2005).

Small firms carry out a large number of technological innovations based on their unique know how approach in an unbalanced manner among industrialized nations and also in newly industrialized countries like Korea. They play an important role in the diffusion of technology and their unique know-how is often based on the improvements of general technologies developed by large firms (Safdar and Siddiqi, 2011c).

2.1.6 Market Structure

The major force behind a firm's growth is considered to be the market structure in which it operates. The growth process of firm in influenced by the fact that whether the firm is operating in competitive market conditions or not. An important aspect of an industry's market structure is whether the entrepreneurs' are able to compete for their products in market or not. The market structure comprises of market orientation and the price adaptability on behalf of its owner/manager.

The efficiency with which a firm sells its products and services to the customers determines its growth establishing market orientation an important determinant of firm growth. Accordingly, market orientation results in improved satisfaction of customers and stakeholders leading to the firm's growth (Hult, Snow & Kandemir, 2003, Narver & Slater, 1990). Empirical evidence suggests that market orientation is significantly associated to the overall growth performance of a firm (Jaworski & Kohli, 1993).

Numerous empirical studies have established the significance of market demand for a firm's innovative activities and its growth (Cohen, 1995, Kleinknecht, 1996). The firm's ability to adapt its pricing policy according

to competitive pressures is positively associated with the growth of expected sales.

2.2 Non- entrepreneurial Characteristics

Individual competencies can be described as the knowledge, abilities or skills mandatory to execute a particular job. Under firm characteristics, the study has employed different determinants of firm growth like Individual firm's characteristics and its share in market.

2.2.1 Individual Firm

The classical firm features can be referred as firm age and size. The Gibrat's law can be considered as pioneer referring to the discussion on the relationship between firm age/size and firm growth (Audretsch et al., 2004). The law focuses on the independence of growth and size[12]. According to this law the firm's growth is proportional to their size, and the growth of all firms takes place at the same rate over an interval of time, despite of their initial size within the same industry[13]. Researchers investigating firm growth by differentiating firms with respect to their sizes proposed that Gibrat's law of size independence is only convincing for firms above a specific size threshold (Bigsten & Gebreeyesus, 2007). A negative relationship is found by an empirical study in US between firm growth, age and size, as postulated by Jovanovic's model (Variyam et al., 1992, Evans, 1987). A negative effect of size on firm growth is also indicated incorporating different countries and industries (Calvo, 2006, Bottazzi & Secchi, 2003, Goddard, Wilson & Blandon, 2002, Almus & Nerlinger, 2000, McPherson, 1996, Dunne & Hughes, 1994).

The capacity of firms to change their market share in response to such pressures helps them to increase their market share accordingly (Harabi, 2005).

2.3 Growth Barriers

12 See e.g. Hart and Prais, 1956, Simon and Bonini, 1958, Hymer and Pashigan, 1962
13 Studies yielding negative support to Gibrat's Law includes Becchetti & Trovato, 2002.

Along with the above mentioned determinants facilitating firm's growth, there are also factors that obstruct the potential growth of the firm named as growth barriers (Davidsson, 1989). Literature suggests that SMEs are mostly hindered by barriers relating to market's entry and their growth in the early stages of their life span as compared to their large counterparts. Frequently addressed restrictions for small businesses growth comprises of institutional barriers, non-institutional barriers and financial barriers.

2.3.1 Institutional Barriers

Institutional barriers are mainly associated with the firms' interaction with government, comprising of taxation problems, legalization issues, and government support programmes along with other barriers. Consistent results from both the theoretical and empirical data states that certain institutions discriminate against the SMEs growth intentionally in the form of un-favorable tax system, complicated rules and regulations and biased policies, thus hampering firm's growth (Davidsson & Henreksson ,2002). The institution barriers employed in the study to calculate their impact on firm's growth comprises of regulation on foreign trade, level of taxes, other regulations, political instability, inflation and price Instability.

According to the theory, trade promotes productivity growth within industries, leading weak firms to exit and allowing strong firms to flourish (Bolaky et.al 2006). Grey economy is considered to be a consequent outcome of over-regulation relating to a particular company sector, providing incentives to the firms to influence the regulatory authorities in their support, leading to the establishment of culture of "unproductive entrepreneurship" (Baumol, 1990). Some suggest that the cumulative effect of rules and regulations is more problematic for small firm as compared to that of an individual regulation (Harris, 2002). The collective impact of employment and other regulations is severely hampering small firm's growth (Edwards et. al., 2003).

Political instability is considered as one of the major constraints having a negative impact on the productivity of manufacturing sector featuring poor business environment (Elhiraika et.al., 2006). At the aggregate level, a high level of risk factor is attached with the presence of weak institutions that

can in turn lead to political instability with a considerable negative impact on overall economic growth and even a stronger adverse effect on individual firm's performance (Fosu, 2003, Gyimah-Brempong, 2004).

Inflation is considered to be one of the important factors that cause the disturbance of business planning – leading to an unfavorable consequence to the firm's capital investment.

2.3.2 Non-institutional barriers

Non-Institutional barriers are mainly associated with the firms' internal resources and capacity utilizations, the scope of market dealing with, different issues relating to human resource management and problems relating to diversify into new markets (Barlett et.al. 2001).

The importance of market demand for a firm's growth is evident from literature (Cohen, 1995, Kleinknecht, 1996). Lack of market demand hinders firm growth. A major factor inhibiting SME's growth is the entrepreneur's inability to branch out the business functions to its managers (Storey 1994). This propensity can be highlighted by shortage of skilled managers, along with their deficiency of business expertise in the vicinity of promotion and business expansion (Bartlett et.al 2001). In addition, they face competition from improved quality and reasonably priced imports. In the presence of all these factors, it can be stated that inability of firms to access new markets can be considered as a major hindrance to firm's growth (Bartlett & Bukvic, 2001).

2.3.3 Financial Barriers

Financial barriers correspond to the lack of financial resources. Credit restriction, equity capital and lack of external debt are considered to be the main hindrance to the growth of SMEs (Becchetti & Trovato, 2002, Pissarides, 1998, Riding & Haines, 1998). According to empirical evidence the financial institutions behave more conservatively while providing loans to SMEs. SMEs are usually charged comparatively high interest rates along with high collateral and loan guarantees (Stiglitz & Weiss, 1981).

On the basis of literature review research model presented in fig 1 can be formulated to investigate the role of entrepreneurial factors in the process of firm's growth.

3. Research Method

3.1 Sources of Data

In the present study, primary data collected through a detailed survey of electric fans producing units is being utilized for analytical purposes. The format of the SMEs questionnaire covers broad aspects of firm growth involving different characteristics of each unit along with its entrepreneurial and non- entrepreneurial characteristics along with a detailed profile of factors that restrict small units to grow further. 237 electric fans producing units were investigated out of which 86 units were found to be experiencing firm growth in terms of employment expansion a total of 83 firms had experienced an employment contraction in the last two years till the survey time, while 68 firms showed no change in their employment growth pattern.

3.2 Multinomial Logit Model for Employment growth

To evaluate the probability of a firm experiencing growth in terms of employment expansion, multinomial logistic regression analysis with maximum likelihood estimation is employed. In the analysis dependent variable takes the value 1 when the firm has practiced a growth in employment in the last two years, it takes the value of 2 when the firm has practiced growth in negative terms and 3 when the firm has experienced no growth in terms of employment generation in the last two years. Explanatory variables in this analysis can be divided into three main categories the entrepreneurial and non-entrepreneurial determinants of firms' growth, along with different factors that restrict a firm to grow in terms of employment growth.

Basic model can be written as

$$Employment = a_0 + a_1 X + e \qquad (3.1)$$

Where

Employment = 1 (if firm is growing in positive terms of employment generation)

= 2 (if firm is growing in negative terms of employment generation)

= 3 (if firm is not growing in terms of employment generation)

X = entrepreneurial and non-entrepreneurial, and factors inhibiting firm's growth.

The interpretation of the multinomial logit model is also presented in terms of relative risk ratios. To interpret the effect on independent variables on the probabilities of each choice marginal effects of each outcome are also calculated. On the basis of the research model presented in the fig.1, major determinants along with their conceptual definitions are presented in Table 1.

4. Estimation Results

Firms were divided into three main categories depending upon their status with respect to employment generating opportunities. . By comparing the level of employment at Feb, 2008 and Feb, 2010, a firm can be assigned the status that whether a firm has experienced growth (increase), has not faced growth (constant) or has practiced growth in negative terms (negative).

The results of the main firm growth equation 3.1 are being shown in Table (2). Estimated results of a multinomial Logit model can be presented in two stages, first by comparing firms experiencing growth with category facing no growth. And secondly, by comparing firms experiencing negative growth with category facing no growth being the reference category.
In case of first stage, firm size, Illiterate owner/manager of the firm, part time business, external sources of financing, market orientation, other regulations affecting firms' growth, political instability, inflation, lack of market demand and skilled labor, restricted access to new markets and financial constraints are found to be significantly and negatively in the

sense that if these factors increases by one point, the multinomial log-odds of a firm experiencing positive growth with respect to situation where firm experiencing no growth would be expected to decrease by coefficient values of these factors by units while holding all other variables in the model constant.

On the other hand, firm age, sales to local market, number of markets dealing with, entrepreneur educated up to secondary level, risk taking attitude on behalf of entrepreneur, family business, industry specific know-how, previous ownership experience, working through networks, partnership business, innovation in terms of introduction of new product and major improvements in existing system, internal sources of financing, diversification, on job training, presence of unique knowhow and increase in market share are found to be significantly and positively in the sense that if these factors increases by one point, the multinomial log-odds of a firm experiencing positive growth with respect to situation where firm experiencing no growth would be expected to increase by coefficient values of these factors by units while holding all other variables in the model constant.

While, age of owner, desire of independence, unemployment push, and innovation in terms of introduction of new process, decrease in market share, price adaptability, and foreign trade regulations affecting firms' growth are proved to be insignificant in the present analysis.

In case of comparison of negative growth firms with respect to no growth category, age of owner, Illiterate owner/manager of the firm, , unemployment push, external sources of financing, decrease in market share, foreign trade regulations affecting firms' growth, level of taxes, other regulations affecting firms' growth, political instability, inflation, lack of market demand and skilled labor, restricted access to new markets and financial constraints are found to be significantly and positively in the sense that if these factors increases by one point, the multinomial log-odds of a firm experiencing negative growth with respect to situation where firm experiencing no growth would be expected to increase by coefficient values of these factors by units while holding all other variables in the model constant.

Whereas, firm age, sales to local market, number of markets dealing with, entrepreneur educated up to secondary level, risk taking attitude on behalf of entrepreneur, desire of independence, family business, industry specific know how, previous ownership experience, working through networks, partnership business, innovation in terms of new process, internal sources of financing, diversification, increase in market share and price adaptability are found to be significantly and negatively in the sense that if these factors increases by one point, the multinomial log-odds of a firm experiencing negative growth with respect to situation where firm experiencing no growth would be expected to decrease by coefficient values of these factors by units while holding all other variables in the model constant.

The factors of firm size , age of owner, part time business, and innovation in terms of introduction of new product and major improvements in existing system, on job training, presence of unique knowhow, market orientation, and are proved to be insignificant in the present analysis.

5. Conclusion

Small and medium enterprises are considered as an important source of providing employment opportunities. In order to explore the contribution of small firms toward employment generation, primary data is being employed collected from a survey of 237 small industrial units. Multinomial Logit model is utilized to find out the contribution of entrepreneurial and non- entrepreneurial factors as important determinants of employment generation. Different problems and obstacles encountered by SMEs in generating employment activities are also been undertaken in the present analysis.

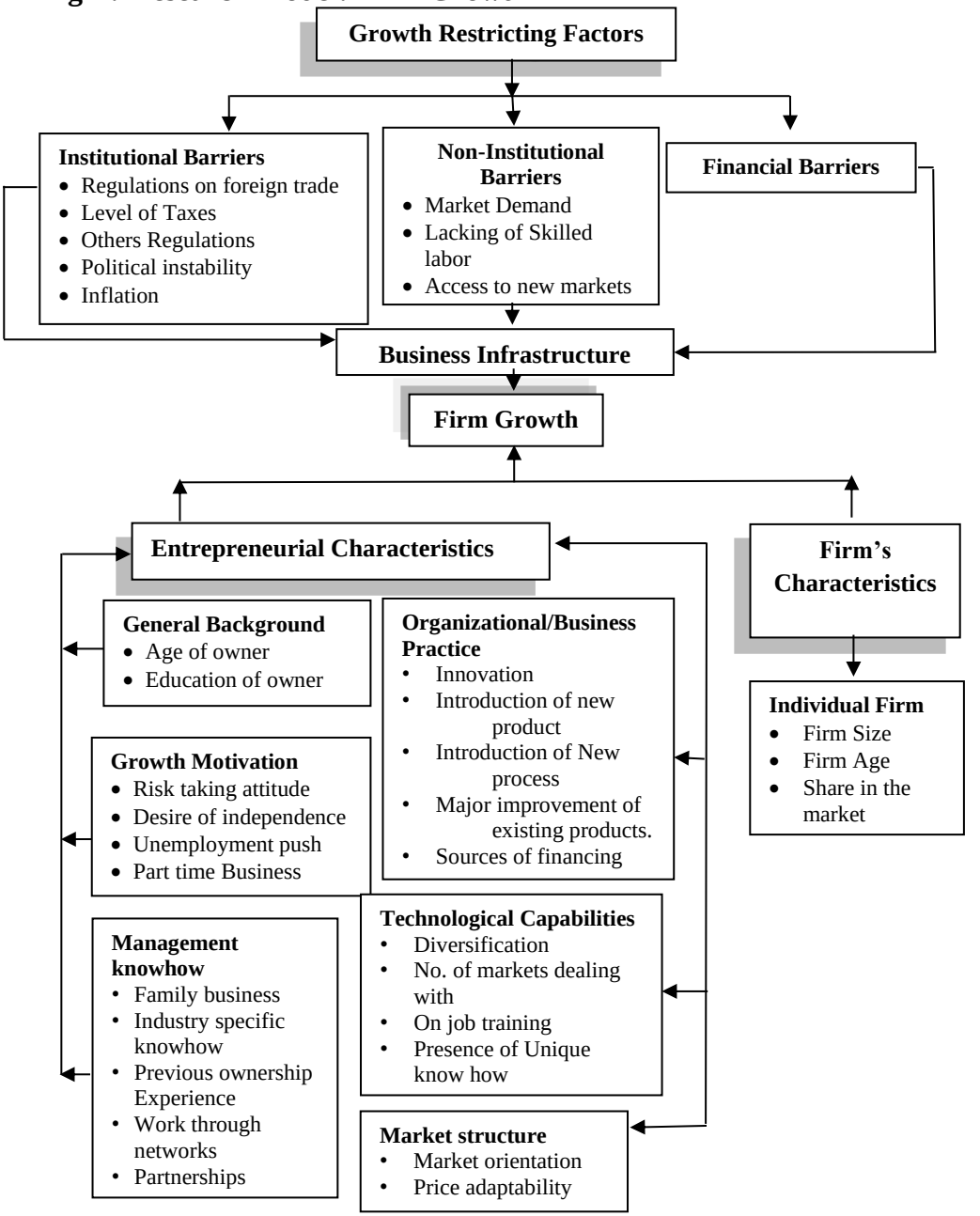
Multinomial Logit model is being utilized to present a comprehensive view of the comparison of firms generating employment opportunities and those not been able to excel in the process of growth with respect to the reference category.

As far as entrepreneurial factors are concerned, the characteristics like educational level of owner/manager of the firm, attitude like part time business, unemployment push, use of internal and external sources of

financing, market orientation, sales to local market, number of markets dealing with, risk taking attitude on behalf of entrepreneur, family business, industry specific know how desire of independence, previous ownership experience, working through networks, partnership business, decision to innovate in terms of introduction of new product, new process and major improvements in existing system, diversification in terms of products, on job training, utilization of unique knowhow, price adaptability are found to be important factors affecting firms' growth in terms of employment generational activities.

Government should provide support to small units so that they can provide employment opportunities. Education of the owner is proved to be significantly affecting the probability of firm growth. Such policy measures should be devised that can help entrepreneurs in their educational training along with the provision of technical and managerial facilities that can promote firms in terms of employment growth. Government should support firms to overcome obstacles that restrict firm's growth. Firm's growth in terms of employment can yield better outcome if these small units are provided with basic infrastructural support in terms of finance, technical and commercial support.

Fig 1: Research Model: Firm Growth



Source: Developed by Author (2011)

Table 1: Determinants of Firm growth

VARIABLES	VARIABLES DISCRIPTION
DEPENDENT VARIABLE	
EMPLGROWTH	Growth in the employment in the last two years (1= increase or positive, 2=decrease or negative, 3=no growth)
INDEPENDENT VARIABLES	
1. ENRTERPRENUIAL CHARACTERISTICS	
2. GENERAL BACK GROUND	
AGEOWNER	Age of the owner in years
EDUOWNER	Education of the owner (0= Illiterate, 5= upto secondary education, 10= upto matric or college, university education)
1. GROWTH MOTIVATION	
RISK	Risk taking propensity of the owner (1= keen to take risks,0=otherwise)
BOSS	Desire of independence (1= started business to be boss,0=otherwise)
UNEMPPUSH	Unemployment Push (1= started business because of unemployment, 0= otherwise)
PARTTIMEB	Part time business (1= currently employed elsewhere, 0=otherwise)
2. MANAGEMENT KNOW HOW	
FAMILYB	Family Business (1= the current business is your family business,0=otherwise)
INDKNOWHOW	Industry specific knowhow (1= any experience of the same business, 0=otherwise)
PREWOWNER	Previous ownership (1= owned some other business,0=otherwise)
NETWORKS	Work through networks (1=yes, 0=no)
PARTNERSHIP	(1= Business is in partnership, 0=otherwise)
3. INNOVATION	
NEWPRODUCT	If the firm has introduced new product in the last two years (1=yes,0=no)
NEWPROCESS	If the firm has introduced new process in the production during the last two years

	(1=yes, 0=no)
MAJIMPROVEMENTS	If the firm has introduced major improvements in the existing system in the last two years (1=yes, 0=no)
LOCALMSALES	Percentage of sales to local markets
FINANCSOURCES	Sources of financing (1=internal, 2=external, 3=both)
4. TECHNOLOGICAL CAPABILITIES	
DIVERCIFICATION	Diversified their product mix during last two years (1=yes, 0=no)
MARKETSNO	No. of markets dealing with
ONJOBTRAIN	On job Training (1=yes, 0=no)
UNIQUEKNOWHOW	Presence of unique knowhow (1=yes,0=no)
5. MARKET STRUCTURE	
MARORIENTATION	Do the owner has market orientation (1=yes, 0=no)
PRICEADAPT	Easily adapt market prices (1=yes, 0=no)
2. FIRM LEVEL CHARACTERISTICS	
1. INDIVIDUAL FIRM	
SIZE	No. of full time employees working
FIRMAGE	No. of years since establishment
MARKETSHARE	Share of the firm in the market during last two years (1=increased, 2=decreased, 3=constant)
3.GROWTH BARIERS	
1. NSTITUTIONAL BARRIERS	
FOREIGNTRADE	Business gets affected by regulations on foreign trade (1=yes, 0=no)
TAXES	Business gets affected by level of taxes (1=yes, 0=no)
OTHERS	Business gets affected by other regulations (1=yes, 0=no)
POLITICALINS	Business gets affected by political instability (1=yes, 0=no)
INFLATION	Business gets affected by inflation and price instability (1=yes, 0=no)
2. NON-INSTITUTIONAL BARRIERS	

MARKETD	Changes in market demand due to imports or other factors effect business (1=yes, 0=no)
LACKSKILL	Constraint of skilled workers effect business (1=yes, 0=no)
ACCESSNEW	Limitation to access new markets affects (1=yes, 0=no)
3. FINANCPROB	Financial constraints hinders firm's growth (1=yes, 0=no)

Table 2: Multinomial Logistic Results Firm Growth

Covariates	Gujarat	Coefficients	RRR	marginal effects	Coefficients	RRR	Marginal effects
	Total sample	Increase			Decrease		
Intercept		-0.035			1.621		
Age of owner		-0.002	0.998	-0.003	0.046***	1.047	0.040
Firm size		-0.025***	0.975	-0.075	0.005	1.006	0.204
Age of Firm		0.024***	1.024	0.046	-0.025***	0.976	-0.014
Sales to local market		0.009*	1.009	0.019	-0.027***	0.973	-0.252
No. of market dealing with		0.256***	1.292	0.096	-0.369***	0.691	-0.529
Education of Firm's owner	Illiterate	-0.238*	0.788	0.025	0.584***	1.793	0.003
	Primary level	0.086*	1.090	0.026	-0.746***	0.472	-0.032
	Matric or above	---	---	---	---	---	---
Risk taking propensity of the owner	No	0.494***	1.639	0.070	-0.408***	0.665	-0.042
	Yes (Ref)	---	---	---	---	---	---
Desire of independence	No	0.142	1.153	0.003	-0.954***	0.385	-0.023

	Yes (Ref)	---	---	---	---	---	---
Unemployment Push	No	-0.098	0.907	-0.018	0.674**	1.962	0.025
	Yes (Ref)	---	---	---	---	---	---
Part time business	No	-0.150*	0.861	0.027	0.105	1.111	-0.007
	Yes (Ref)	---	---	---	---	---	---
the current business is your family business	No	0.268**	1.307	0.051	-0.298**	0.742	-0.015
	Yes (Ref)	---	---	---	---	---	---
Industry specific knowhow	No	0.712***	2.037	0.114	-0.765***	0.465	-0.021
	Yes (Ref)	---	---	---	---	---	---
Previous ownership experience	No	1.228***	3.414	0.191	-0.303*	0.739	-0.013
	Yes (Ref)	---	---	---	---	---	---
Work through networks	No	0.629**	1.875	0.087	-0.682**	0.506	-0.023
	Yes (Ref)	---	---	---	---	---	---
Business is in partnership	No	1.105***	3.019	0.152	-0.653***	0.520	-0.014
	Yes (Ref)	---	---	---	---	---	---
Introduction new product in the last two years	No	0.072*	1.075	0.019	-0.187	0.829	-0.019
	Yes (Ref)	---	---	---	---	---	---
Introduction new process in the production during	No	0.074	1.077	0.007	-0.299**	0.741	-0.026
	Yes (Ref)	---	---	---	---	---	---

the last two years							
Introduction major improvements in the existing system in the last two years	No	0.273**	1.314	0.046	-0.065	0.937	-0.022
	Yes (Ref)	---	---	---	---	---	---
Sources of financing	Internal	1.500***	4.480	0.013	-0.619*	0.539	-0.037
	External	-1.833***	0.160	-0.034	0.951*	2.589	0.012
	Both (Ref)	---	---	---	---	---	---
Diversification	No	0.285**	1.330	0.020	-0.313**	0.732	-0.020
	Yes (Ref)	---	---	---	---	---	---
On Job training	No	0.640***	1.896	0.086	-0.051	0.950	-0.045
	Yes (Ref)	---	---	---	---	---	---
Presence of unique know how	No	0.328**	1.389	0.043	-0.143	0.867	-0.030
	Yes (Ref)	---	---	---	---	---	---
Market orientation	No	0.016	1.017	0.002	0.041	1.042	0.041
	Yes (Ref)	---	---	---	---	---	---
Share of the firm in the market during last two years	Increase	0.470***	1.601	0.077	-1.032***	0.356	-0.053
	Decrease	-0.237	0.789	-0.021	0.269*	1.308	0.043
	Constant (Ref)	---	---	---	---	---	---
Price adaptability	No	0.066	1.068	0.001	-0.388**	0.679	-0.050
	Yes (Ref)	---	---	---	---	---	---

Firm's growth affected by regulations on foreign trade	No	-0.012	0.988	-0.007	0.303**	1.354	0.018
	Yes (Ref)	---	---	---	---	---	---
Firm's growth affected by level of taxes	No	-0.819***	0.441	-0.122	0.699***	2.012	-0.011
	Yes (Ref)	---	---	---	---	---	---
Firm's growth affected by other regulations	No	-1.114***	0.328	-0.157	0.375*	1.455	0.042
	Yes (Ref)	---	---	---	---	---	---
Firm's growth affected by political instability	No	-0.386*	0.680	0.022	0.397*	1.488	0.087
	Yes (Ref)	---	---	---	---	---	---
Firm's growth affected by inflation	No	-0.223*	0.800	0.037	0.161*	1.174	-0.014
	Yes (Ref)	---	---	---	---	---	---
Firm's growth affected by lack of market demand	No	-0.691**	0.501	-0.104	1.372***	3.943	0.030
	Yes (Ref)	---	---	---	---	---	---
Firm's growth affected by lack of skilled labor	No	-0.279**	0.757	-0.050	0.262**	1.300	0.019
	Yes (Ref)	---	---	---	---	---	---

Firm's growth affected by restricted access to new markets	No	-0.177*	0.838	-0.044	0.423***	1.527	0.011
	Yes (Ref)	---	---	---	---	---	---
Financial constraints hinders firm's growth	No	-1.312***	0.269	-0.210	1.356***	3.881	0.029
	Yes (Ref)	---	---	---	---	---	---

Note: *** Significant at 99 percent, ** Significant at 95 percent, *Significant at 90 percent

References

Dollinger, M. J. (2008). *Entrepreneurship: Strategies and resources*. Marsh Publications.

Kleinknecht, A. (1996). New indicators and determinants of innovation: an introduction. *Determinants of innovation. The message from new indicators*, 1-12.

McClelland, D. C. (1965). Toward a theory of motive acquisition. *American psychologist*, *20*(5), 321.

Chell, E., Haworth, J. M., & Brearley, S. (1991). *The entrepreneurial personality: Concepts, cases, and categories*. Routledge.

Marris, R., & Wood, A. (Eds.). (1971). *The Corporate economy: growth, competition, and innovative potential*. Springer.

Nelson, R. R., & Winter, S. G. (1997). An evolutionary theory of economic change. *Resources, Firms, and Strategies. A Reader in the Resource-Based Perspective. Oxford ua S*, 82-99.

Sexton, D. L., & Bowman-Upton, N. B. (1991). *Entrepreneurship: Creativity and growth*. Macmillan Pub Co.

Timmons, J. A., Smollen, L. E., & Dingee, A. L. (1985). *Instructor's Manual to Accompany New Venture Creation: A Guide to Entrepreneurship*. RD Irwin.

Cohen, W. M., & Levin, R. C. (1989). Empirical studies of innovation and market structure. *Handbook of industrial organization*, *2*, 1059-1107.

Brockhaus, R. H., & Horwitz, P. S. (1986). The psychology of the entrepreneur. *Entrepreneurship: critical perspectives on business and management*, *2*, 260-283.

Cooper, A. C., & Gimeno-Gascon, F. J. (1992). Entrepreneurs, process of founding and new venture performance. *The state of the art in entrepreneurship. Boston, MA: PWS Kent Publishing Co*.

Davidsson, P., & Wiklund, J. (2006). Conceptual and empirical challenges in the study of firm growth. *Entrepreneurship and the Growth of Firms*, *1*(1), 39-61.

Autere, J., & Autio, A. (2000). Is entrepreneurship learned? Influence of mental models on growth motivation, strategy, and growth. In *Academy of Management Conference*.

Bolaky, B., & Freund, C. L. (2004). *Trade, regulations, and growth* (Vol. 3255). World Bank Publications.

Papadaki, E., Patenaud, J., Robèrge, H., & Tompa, E. (2000). A longitudinal analysis of young entrepreneurs in Canada. In *CCSBE 21st Annual Conference in Ottawa* (Vol. 9).

Almus, M. (2000). Testing" Gibrat's Law" for Young Firms–Empirical Results for West Germany. *Small Business Economics*, *15*(1), 1-12.

Bartlett, W., & Bukvič, V. (2001). Barriers to SME growth in Slovenia. *MOCT-MOST: Economic Policy in Transitional Economies*, *11*(2), 177-195.

Barringer, B. R., & Greening, D. W. (1998). Small business growth through geographic expansion: A comparative case study. *Journal of Business Venturing*, *13*(6), 467-492.

Baumol, W. J. (1996). Entrepreneurship: Productive, unproductive, and destructive. *Journal of Business Venturing*, *11*(1), 3-22.

Becchetti, L., & Trovato, G. (2002). The determinants of growth for small and medium sized firms. The role of the availability of external finance. *Small Business Economics*, *19*(4), 291-306.

Begley, T. M., & Boyd, D. P. (1987). A comparison of entrepreneurs and managers of small business firms. *Journal of management*, *13*(1), 99-108.

Bigsten, A., & Gebreeyesus, M. (2007). The small, the young, and the productive: Determinants of manufacturing firm growth in Ethiopia. *Economic Development and Cultural Change*, *55*(4), 813-840.

Birley, S., & Westhead, P. (1990). Growth and performance contrasts between 'types' of small firms. *Strategic management journal*, *11*(7), 535-557.

Bottazzi, G., & Secchi, A. (2003). Common properties and sectoral specificities in the dynamics of US manufacturing companies. *Review of Industrial Organization*, *23*(3), 217-232.

Caird, S. (1990). What does it mean to be enterprising?. *British Journal of Management*, *1*(3), 137-145.

Calvo, J. L. (2006). Testing Gibrat's law for small, young and innovating firms. *Small Business Economics*, *26*(2), 117-123.

Campbell, C. A. (1992). A decision theory model for entrepreneurial acts. *Entrepreneurship: Theory and practice*, *17*(1), 21-28.

Carree, M., & Klomp, L. (1996). Small business and job creation: a comment. *Small Business Economics*, *8*(4), 317-322.

Castrogiovanni, G. J. (1996). Pre-startup planning and the survival of new small businesses: Theoretical linkages. *Journal of management*, *22*(6), 801-822.

Chandler, G. N., & Hanks, S. H. (1994). Founder competence, the environment, and venture performance. *Entrepreneurship: Theory and Practice*, *18*(3), 77-90.

Coad, A. (2007). Testing the principle of 'growth of the fitter': the relationship between profits and firm growth. *Structural Change and economic dynamics*, *18*(3), 370-386.

Cooper, A. C., Gimeno-Gascon, F. J., & Woo, C. Y. (1994). Initial human and financial capital as predictors of new venture performance. *Journal of business venturing*, *9*(5), 371-395.

Davidsson, P. (1989). Entrepreneurship—and after? A study of growth willingness in small firms. *Journal of business venturing*, *4*(3), 211-226.

Davidsson, P., & Henrekson, M. (2002). Determinants of the prevalance of start-ups and high-growth firms. *Small Business Economics*, *19*(2), 81-104.

Delmar, F., & Shane, S. (2006). Does experience matter? The effect of founding team experience on the survival and sales of newly founded ventures. *Strategic Organization*, *4*(3), 215-247.

Dunne, P., & Hughes, A. (1994). Age, size, growth and survival: UK companies in the 1980s. *The Journal of Industrial Economics*, 115-140.

Evans, D. S. (1987). Tests of alternative theories of firm growth. *journal of political economy*, *95*(4), 657-674.

Fosu, A. K. (2003). Political instability and export performance in sub-Saharan Africa. *Journal of Development Studies*, *39*(4), 68-83.

Glancey, K. (1998). Determinants of growth and profitability in small entrepreneurial firms. *International Journal of Entrepreneurial Behavior & Research*, *4*(1), 18-27.

Goddard, J., Wilson, J., & Blandon, P. (2002). Panel tests of Gibrat's law for Japanese manufacturing. *International Journal of Industrial Organization*, *20*(3), 415-433.

Gyimah-Brempong, K. (2002). Corruption, economic growth, and income inequality in Africa. *Economics of Governance*, *3*(3), 183-209.

Harabi, N. (2005). Determinants of firm growth: an empirical analysis from Morocco.

Hart, P. E., & Prais, S. J. (1956). The analysis of business concentration: a statistical approach. *Journal of the Royal Statistical Society. Series A (General)*, *119*(2), 150-191.

Harris, L. (2002). Small firm responses to employment regulation. *Journal of Small Business and Enterprise Development*, *9*(3), 296-306.

Hay, M., & Kamshad, K. (1994). Small firm growth: intentions, implementation and impediments. *Business Strategy Review*, *5*(3), 49-68.

Hult, G. T. M., Snow, C. C., & Kandemir, D. (2003). The role of entrepreneurship in building cultural competitiveness in different organizational types. *Journal of management*, *29*(3), 401-426.

Hymer, S., & Pashigian, P. (1962). Firm size and rate of growth. *Journal of Political Economy*, *70*(6), 556-569.

Kohli, A. K., & Jaworski, B. J. (1990). Market orientation: the construct, research propositions, and managerial implications. *The Journal of Marketing*, 1-18.

Kolvereid, L. (1992). Growth aspirations among Norwegian entrepreneurs. *Journal of business venturing*, *7*(3), 209-222.

Lee, K., & Temesgen, T. (2005). Resources For. *Strategies, and Investment Climates as Determinants of Firm Growth in Developing Countries, A Dynamic Resource-based View of the Firm*.

McDougall, P. P., Robinson, R. B., & DeNisi, A. S. (1992). Modeling new venture performance: An analysis of new venture strategy, industry structure, and venture origin. *Journal of Business Venturing*, *7*(4), 267-289.

McPherson, M. A. (1996). Growth of micro and small enterprises in southern Africa. *Journal of development economics*, *48*(2), 253-277.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management science*, *29*(7), 770-791.

Morris, M. H., & Sexton, D. L. (1996). The concept of entrepreneurial intensity: Implications for company performance. *Journal of Business Research*, *36*(1), 5-13.

Mulhern, A. (1995). The SME sector in Europe: A broad perspective. *Journal of Small Business Management*, *33*(3), 83.

Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. *The Journal of marketing*, 20-35.

Nelson, R. R., & Winter, S. G. (1978). Forces generating and limiting concentration under Schumpeterian competition. *The Bell Journal of Economics*, 524-548.

Perren, L. (1999). Factors in the growth of micro-enterprises (part 1): developing a framework. *Journal of Small Business and Enterprise Development*, *6*(4), 366-385.

Ripsas, S. (1998). Towards an interdisciplinary theory of entrepreneurship. *Small Business Economics*, *10*(2), 103-115.

Khan, K. S., & Siddiqi, W. ENTREPRENEURIAL FACTORS CONTRIBUTING FIRM‟ S GROWTH.

Khan, K. S. (2011). Role of Light Engineering Sector in Poverty Reduction Amongst its Employees: A Case Study of Gujranwala, Gujrat and Sialkot Districts.

Khan, K. S. (2011). Determinants of firm growth: an empirical examination of SMEs in Gujranwala, Gujarat and Sialkot districts.

Khan, K. S., & Siddiqi, M. W. (2011). Impact of manufacturing industry on economic growth in case of Pakistan: A Kaldorian Approach.

Sapienza, H. J., & Grimm, C. M. (1997). Founder characteristics, start-up process, and strategy/structure variables as predictors of shortline railroad performance. *Entrepreneurship: Theory and Practice*, *22*(1), 5-25.

Shepherd, D. A., Douglas, E. J., & Shanley, M. (2000). New venture survival: Ignorance, external shocks, and risk reduction strategies. *Journal of Business Venturing*, *15*(5), 393-410.

Simon, H. A., & Bonini, C. P. (1958). The size distribution of business firms. *The American economic review*, *48*(4), 607-617.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American economic review*, *71*(3), 393-410.

Thornburg, L. (1993). IBM's Agents of Influence. *HR MAGAZINE*, *38*, 80-80.

Variyam, J. N., & Kraybill, D. S. (1992). Empirical evidence on determinants of firm growth. *Economics Letters*, *38*(1), 31-36.

Wiklund, J., Patzelt, H., & Shepherd, D. A. (2009). Building an integrative model of small business growth. *Small Business Economics*, *32*(4), 351-374.

Aharoni, Y. (1994). How small firms can achieve competitive advantages in an interdependent world. *Small firms in global competition*, 9-18.

Bamford, C. E., Dean, T. J., & McDougall, P. P. (1997). Initial strategies and new venture growth: An examination of the effectiveness of broad vs. narrow breadth strategies. *Frontiers of Entrepreneurship Research*, *3*, 75-87.

Birch, D. L. (1979). The Job Generation Process: Final Report to Economic Development Administration.

Elhiraika, A. B., & Nkurunziza, J. D. (2006). *Facilitating Firm Entry, Growth, and Survival with Special Attention to SMEs*. African Trade Policy Centre.

Orser, B. J., Hogarth-Scott, S., & Wright, P. (1998). On the growth of small enterprises: the role of intentions, gender and experience. *Frontiers of entrepreneurship research*, 366-380.

Ram, M., Gilman, M., Arrowsmith, J., & Edwards, P. (2003). Once more into the sunset? Asian clothing firms after the national minimum wage. *Environment and planning C: government and policy*, *21*(1), 71-88.

Riding, A. L., & Haines, G. J. (1998). Defaulting on loan guarantees: Costs and benefits of encouraging early-stage growth. *Frontiers of Entrepreneurship Research*, *504518*.

Welter, F. (2001). Who Wants To Grow Up?-Growth Intentions And Growth Profiles Of (Nascent) Entrepreneurs In Germany.

Lin, Z., Picot, G., & Compton, J. (2000). The entry and exit dynamics of self-employment in Canada. *Small business economics*, *15*(2), 105-125.

Delmar, F. (1996). *Entrepreneurial behavior and business performance*. EFI.

GCU Economic Journal, Volume LI (1&2), 2018, pp. 57-87

The Interdependence of Liquidity Risk and Credit Risk in Banks: A Case Study of Pakistan

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Abstract: A strong banking sector is an indispensable for financial development, and plays an essential role for economic growth of an economy. This study examined the relationship between liquidity risk (LR) and credit risk (CR) in the banking sector, using the data of 15 commercial banks of Pakistan over 2002-2016. The study also analyzes the sources of risks on the bank institutional-level and how the relationship between liquidity and credit risk influence to banks. The findings of the study suggest that both risk categories have a reciprocal relationship and also influence banks' stability. The LR and CR have separately improved the stability of the bank, and the impact of their interaction depends on the overall level of bank risk and can either aggravate or mitigate the default risk.

Keywords: Liquidity Risk, Credit Risk, Commercial Banks, Regulations
JEL Classification: D81, G21, G81

1. Introduction

The role of the banking sector is very essential in the economic and financial development of a country. This sector is one of the most fundamental parts of any country's economy. Financial performance of a bank shows its ability to make new resources, from day-to-day operations over a given period and it assessed by net income and cash flow from operations. Banking activities are different from other economic activities due to their assortment of products and services. Therefore, assessing the performance of banking institutions is a vital process and necessary for the persistence of banks' activities, to meet the challenges.

Bankruptcy of financial institutions is a serious threat to the entire economic system, which is associated with all types of financial risks. Risk can be explained as a possibility of undetermined future events which are

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unavoidable, and it affects the profit (Owojori, Akintoye & Adidu, 2011). No doubt banking sector is also facing the different types of risks like financial and non-financial in the current changeable and risky environment. These risks may possibly make threats for the continued existence and achievement of the banks. In this regards, management of risk prevalent in investment options is becoming an emerging issue. In the modern era, the financial institution can take the competitive edge only with the efficient management of risk. It will not only increase the return, but also provide strong strength to survive in a competitive market.

The management (i.e. board of directors of banks) should create an efficient organizational makeup to constantly observed banks 'liquidity. Credit risk is the probability of incurring losses resulting from non-payment of loans or other forms of credit by debtors. A bank, which has liquidity problems, may have trouble in meeting the demands of depositors (Arif & Anees, 2012). Some studies (e.g: Sawada, 2010; Akhtar et al., 2009; Arif & Anees, 2012) also explained the diverse effect of liquidity risk according to its measures. It is determined through two different methods. As per first method, liquidity risk is measured by adjusted asset size, which comprises on the liquidity ratios such as, cash to total asset (Barth et al., 2003; Arif &Anees, 2012), cash to total deposit (Shen et al., 2009; Mugomba, 2013)

This study carries out to accomplish the following objectives

- To investigate the relationship between the liquidity risk and credit risk for banks operating in Pakistan
- To analyze the relationship between the liquidity risk and credit risk with respect to bank size

To the extent of our understanding, at international level, Imbierowicz et al. (2014) investigate the relationship between credit risk and liquidity risk for U.S. commercial banks. However, no study has investigated the relationship between liquidity risk and credit risk empirically for banks of Pakistan. There are few studies that try to explore the relationship between multiple risks [14] faced by banks of Pakistan. However, they have not captured the relationship between liquidity and credit risk explicitly for

[14] Like credit risk, liquidity risk, foreign exchange risk, operational risk and interest rate risk.

banks operating in Pakistan. A few empirical studies, for example, Abdullah et al. (2012) find the negative relationship of debt to equity ratio with liquidity risk both in domestic and foreign banks of Pakistan. Another study by Ahmad et al. (2011) studied the Islamic banks of Pakistan. We find no study that examines the effects of these risks jointly on financial performance of banks, specifically in case of Pakistan. The study evaluated the financial performance of banking sector, which has developed rapidly in last two decades.

It is also very likely that different types of risk faced by banks are interlinked with each other. Therefore, it would be worthwhile to examine the relationship between these two types of risk. In this regard, this study enhances our understanding about the association of two major types of risk, namely as credit and liquidity risk that banks face in their operations.

1.1 Theoretical Foundation and Hypothesis Development

Over the past years, a tremendous amount of literature has dealt with banks' liquidity and credit risks. Explanations for the way banks work and their major risk and return sources are given by two major research strands regarding the microeconomics of banking: (I) the classic financial intermediation theory, most prominently represented by Bryant (1980), and (II) Diamond & Dybvig (1983) presented the industrial organization approach. The financial intermediation models view banks as pools of liquidity that provide both depositors and borrowers with the ready availability of cash, thereby enhancing economic welfare and internalizing economic liquidity risk. The industrial organization approach models suggest the banks are profit-maximizing price takers in oligopolistic loan and deposit markets, facing an upward sloping demand for deposits and a downward sloping demand for loans with respect to increasing interest rates.

On the asset side, banks generate returns through loan interest rates; on the liabilities side, banks face costs through deposit interest rates. The models of both strands of the literature suggest that at least theoretically, there is a relationship between liquidity and credit risk. So far, empirical evidence is ambiguous about the question of whether the relationship is positive or negative. The Monti-Klein framework and its extensions (Prisman, Slovin,

and Sushka, 1986) take borrower default sand sudden fund withdrawals into account, both assumed to be lowering a bank's profit. Equity, other than debt funding and marketable securities are seen as given.

Banks maximize their profits by maximizing the spread between deposit and loan rates. It gives an exogenous main rate of refinancing as well as stochastic borrower defaults and fund withdrawals. From a theoretical perspective, the relationship between liquidity risk and credit risk, therefore seems to be clearly established. The theoretical suggestions underlying by Krasa and Villamil (1992) look at the factors affecting bank size. They focus on the gains from size as compared to the costs of monitoring the quality of a bank's book. They show these two factors liquidity and credit risk ensure that optimal bank size (from the perspective of the equity owner) is determinate.

De Nicolo (2001) measured the relationship between size, charter value and insolvency risk for banks in a range of countries. He finds that charter values (measured by Tobin's q) decrease in size while insolvency risk (measured by Z-score method) rises in size, which is consistent with the Merton (1977) analysis set above. It shows that taking more risk offsets any size related scale economies of diversification benefits. Indeed, large banks' returns on assets and return volatilities increase in size, suggesting large banks choose higher risk than its optimal. Based on assumptions and outcomes of the microeconomic models discussed above, our hypothesis for the relationship between liquidity and credit risk are

H1: There is no relationship between liquidity risk and credit risk in banks.

H2: Bank size has a significant impact on the relationship between liquidity and credit risk.

The remaining paper carries literature review, data, methodology, results & discussions, and conclusion in separate sections in a sequence.

2. Literature Review

Banking sector considers as a key source of financing to business and national income as well. The significant risk has been faced by banks on

daily basis while performing their regular operation (Pukeliene & Deksnyte, 2010). The issue of risk-taking has been a central focus of the banking sector. Financial risk can be narrowed down into credit risk, and liquidity risk. Once the amount of risk within each of these financial risk parameters has been assessed, the overall financial performance of a bank can be determined.

The banking business contains high risk specially when proportion of borrowed funds is far higher than the owners' equity (Owojori, Akintoye & Adidu, 2011). However, varius well-known risk management approaches are used to manage liquidity and credit risk. The purpose of research studies on banking sector is mostly two folds. On the one hand, they are focusing on the operational performance and risk (Jemison, 1987; Iannotta, Nocera, & Sironi, 2007; Beccalli, 2007), while on the other hand, they are linking the risk with financial performance.

2.1 Liquidity Risk

In context of banking sectors, liquidity risk is an important dimension of financial risk, which is the risk of not having borrowing capability or enough cash to meet the day-to-day needs of loan demands or deposit withdrawals by customers. In this case, commercial banks have to borrow emergency funds from outside at excessive cost to meet its obligation (Angbazo, 1997). This risk badly affects a bank's financial position. Therefore, guarantee of the availability of adequate funds is an essential for a commercial bank's management to meet future demands of customers at reasonable cost. Furthermore, the risk of being unable to settle an obligation appropriately is known as liquidity risk (Muranaga & Ohsawa, 2002). In banks, the majority of the assets are funded with deposits, and most of the times the current deposits are used. A bank, which has liquidity problems, may have trouble in meeting the demands of depositors (Arif & Anees, 2012).

The problem of liquidity risk may arise because of the maturity mismatch between assets and liabilities, which creates the liquidity gap. Liquidity gap is the main reason of liquidity risk in banks, which can negatively affect the bank profits. However, this liquidity risk may be mitigated by decreasing the liquidity gap (Plochan, 2007). Higher liquidity gap will create liquidity risk which has adversely effect on financial performance (Arif & Anees,

2012; Mugomba et al., 2013). The commercial banks are not able to increase its liabilities and they try to fund its assets by giving more advances. Therefore, the banks become illiquid which means they are not able to change their assets into money to meet the demand of depositors (Tabari et al, 2013).

The previously studies state that liquidity risk has a positive effect on financial performance (Molyneux & Thornton, 1992; Barth et al, 2003), whereas a few studies found that it has a negative impact on financial performance (Bourke, 1989; Pasiouras & Kosmidou, 2007). Some studies (e.g: Sawada, 2010; Akhtar et al., 2009; Arif & Anees, 2012) also explained the diverse effect of liquidity risk according to its measures. It is determined through two different methods in the literature. As per first method, liquidity risk is measured by adjusted asset size which comprises on the liquidity ratios such as, cash to total asset (Barth et al., 2003; Arif &Anees, 2012), cash to total deposit (Shen et al., 2009; Mugomba, 2013). In case of second method, it is measured by the adjusted loan size, which involves the net loans to total asset and non-performing loans to total asset (Maaka, 2013). According to Ennis and Keister (2006), it is stated that commercial banks are holding more liquid assets when they are operating more, which recommends cash in hand as liquid assets decrease liquidity risk.

In most of the developing countries, the banking sector is ill equipped to face the temporary liquidity shocks and manage the risk effectively. Mugomba et al. (2013) discussed bank solvency measured as loan to deposit ratio and the determinants of bank solvency, profitability of banks, credit risk, liquidity gap, inflation and GDP. It is a requirement of central bank to keep specific amount as cash reserve to maintain liquidity. Central bank regulation sets the minimum fraction of customer deposits as reserve that each commercial bank must hold rather than lend out (Sohaimi, 2013). Every bank tries to keep up sufficient funds to fulfill the requirement and meet the unexpected demands from depositors.

2.2 Credit Risk

The credit risk in the commercial banks arises when the borrower is reluctant to perform his obligation which causes the economic loss for commercial banks (Khan & Khan, 2010). The credit failure in commercial

banks is not new or a rare occurrence, the major reason behind the credit failure is the poor risk management. It can affect the liquidity position as well as cash flows and profitability of commercial banks. Therefore, the credit risk is considered as one of the biggest threats to financial performance and a major reason of bank failures (Greuning & Bratanovic, 2009). The credit operations are an important source of earning for the commercial banks. A large amount of credit money is supported by the strong economic activity in the country. According to Akhtar (2007), the development of the credit operations is based on the growing business activities in the country along with regular improvement in internal credit reviews. It is observed that the default rate in commercial banks has decreased over the last few years, which indicates the effective management of credit risk. Credit risk arises in the banks as the advances are considered uncertain and the bank does not predict exactly the percentage of its loans (Wong, 1997). Once a bank fails to receive principal amount and interest on loans and non-treasury securities, it leads to credit risk.

Adeusi et al. (2014) has focused on the relationship of credit risk management practices and financial performance of commercial banks in Nigeria. Profitability as a measure of financial performance is calculated as return on equity (ROE) and return on asset (ROA). The study concludes that a significant relationship exists between risk management and banks financial performance. Thus, better risk management techniques in terms of managed fund, reduction in cost of bad and doubtful loans and the debt equity ratio leads towards better bank performance.

The loans are also a biggest threat to the bank solvency because of the poor risk management and recovery of loans and advances within the specified time (Fredrick, 2012). The bank needs money from other sources to manage its loans and advances which leads banks towards the central bank to get money on higher interest rate. It is important for bank to manage an effective ratio of loans and advances to avoid such mishap (Ogboi & Unuafe, 2013)

2.3 Interdependence among Liquidity Risk and Credit Risk

There is an enormous account of literature that deliberates on the liquidity and credit risks of commercial banks. De Nicolo (2001) studied the

association among charter value, size and banks' insolvency risk in an assortment of countries. He proposed that risk-taking counterbalances any size economies of scale generated by size that provide diversification gains. Thus, large banks' returns on assets in addition to volatilities in these returns grow in size, signifying that large banks take on more risk than is optimum.

As indicated earlier, the hypothesis of the presence of reciprocal relationship amid liquidity risk and credit risks is reinforced by the theoretic financial intermediation research Bryant (1980). The models proposed by Bryant (1980) and Diamond & Dybvig (1983) verify the inverse relationship between the two risks.

The liquidity and credit risk should assume a positive relationship and should jointly affect bank stability. This notion is reinforced by recent literature that emphasizes on the financial downfall of 2008. It is also explained by Acharya and Viswanathan (2011), Diamond and Rajan (2005), Gorton and Metrick (2012) and He and Xiong (2012).

The model proposed by Diamond and Rajan (2005) was grounded on the belief that banks get money from inexpert depositors, that is then utilized in lending operations. Issues arise when too many economic ventures sponsored with advances yield inadequate funds and consequently bank fails to satisfy demands of its depositors. Owing to such deterioration in assets, gradually all the depositors demand their money back. As a result, banks call in all of their loans and in so doing diminish total liquidity in the financial markets. Hence, higher credit risk is accompanied by higher liquidity risk due to depositors' claim. Acharya and Viswanathan (2011) demonstrated that increased debt/loan in the banking system produces higher risk of a "bank run". Thus, in a crisis, as soon as asset prices start to decline, banks face difficulty to "roll over debt", thus realizing the liquidity risk.

Wagner (2007) also illustrated that increase in liquidity of banks can heighten the risk of instability in the banking system. He argued that even though banks are benefited from more liquidity in assets with reference to stability, distresses turn out to be less expensive for banks, therefore they more likely not to avert them from happening.

Acharya, et al. (2010) empirically concluded that the cash holdings of a bank rises harling the times of financial distress. They developed a model wherein liquid assets become an ex-ante strategic decision of dynamic bank management with the purpose of purchasing other banks' assets at shockingly low prices during a financial crisis. Cai and Thakor (2008) suggested that interbank competition with higher credit risk can diminish liquidity risk.

Lastly, according to Acharya and Naqvi (2012) during a severe financial crisis, household besides corporate depositors assume a "flight for quality" and start depositing their funds with banks at low rates, as a result increased funds in bank. Cole and White (2012), and Berger & Bouwman (2013) focused on bank defaults in the course of financial distress, and observed unwarranted investment banking activities, low levels of equity, and significant investment in real estate loans considerably increases a banks' probability of default.

The above studies show a clear inference that credit risk has a significant role in determining the overall stability for any bank. Hence, based on the evidence enlisted above it may be assumed that joint occurrence of liquidity and credit risks may have been a causal factor for bank defaults specifically in the times of a financial crisis. The several studies (Jemison, 1987; Iannotta, Nocera, & Sironi, 2007; Beccalli, 2007) have examined the financial risks, including credit and liquidity risk related to the earnings response of commercial banks and its effects on the stock returns. There are also a few number of studies about analyzing liquidity risk (Akhter et al., 2011; Arif & Anees, 2012; Tabari et al., 2013) and credit risk (Miller & Noulas, 1997; Poudle, 2012; Ogboi & Unuafe, 2013), with respect to financial performance of banks. The financial risk considered as one of the determinants of banks' profitability. It has been identified that financial different risk have negative influence on performance of commercial banks which may lead towards the banking crises (Maaka, 2012). Bank size also plays a significant role in determining the exposure of these risks for banks (Aggarwal & Jacques, 2001; Jacques & Nigro, 1997; Shrieves & Dahl, 1992; Stolz, Heid, & Porath, 2003; Van Roy, 2003). There is lacuna in research on the joint effects of liquidity and credit on the bank stability and performance while taking into account the size of bank, this study aims to

fulfill this gap by testing the association of these risks with the financial performance of commercial banks in context of Pakistan.

3. Data and Methodology

3.1 Data and sample selection

To analyze the relationship between liquidity and credit risk, the sample of 11 commercial banks and 4 public banks of Pakistan is taken for the period of 2002-2016. The selected sample of 15 banks is based on large capitalization. These are renowned commercial banks of Pakistan.

In this regard information has also been reserved by the reports and statistics presented by the State Bank of Pakistan and Pakistan Bureau of statistics. Data obtained from various editions of the publication Money and Banking Statistics issued by State Bank of Pakistan[15], which contains annual information of the balance sheets, income statements and off-balance sheet items for all banks operating in Pakistan. The sources for macroeconomic data[16] such as GDP, saving ratio, and interest rate collected from IFS, WDI and Pakistan Bureau of statistics.

In this study, a dedication for the work has been made on annual reports of the profit and loss account, balance sheets and off-balance sheets to consider the assumed hypothesis on the relationship of the liquidity risk and credit risk operation of commercial and public banks in Pakistan. Beside this, the subdivision of the sample data has been made to examine the credibility of proxy variables of the liquidity risk and credit risk for the selected banks of Pakistan. The extracted data has been bifurcated into small and large banks. Sample has been constructed under organized measures by deeply reviewing the information of the repost of State Bank of Pakistan and relationship of variables has been generalized to evaluate the impact and relation of liquidity risk and credit risk.

3.2 Methodology

There are two main variables to measure the risk: First measure is the liquidity risk, and second one is the credit risk shown in Table 1. The

[15] http://www.sbp.org.pk/stats/stat-bal-sheet.htm.
[16] http://data.worldbank.org/country/pakistan.

liquidity risk (LR) calculated by subtracting the volume of all assets, which the bank can quickly, and at low cost turn into cash at fair market value. To cover possible short-term withdrawals from the volume of liabilities this can be withdrawn from the bank on short notice. While credit risk (CR) variable will be calculated by dividing the average net loan losses (loan charge-offs minus loan recoveries) in the current year by the average loan loss allowance recorded in the previous year.

Table 1: Bank liquidity risk and credit risk proxy variables

Proxy	***Calculation***
Liquidity Risk (LR)	*[(Demand Deposits + Transaction Deposit + Brokered Deposits + Unused Loan Commitments)-(Cash+ Currency& Coin+ Trading Commercial Paper Securities available for Sale) ± Net Inter-Bank Lending Position ± Net Inter–Bank Acceptances / Total Assets*
Credit Risk (CR)	$\frac{Loan\ Charge - Offs_t - Loan\ Recoveries_t}{Loan\ Loss\ Allowance_{t-1}}$ $Offs_t$ *= written off as uncollected by bank*

To account for possible reciprocal or lagged relationship between the variables this study employed a structural equations approach where systems of equations estimated via generalized least squares. The equations estimated simultaneously directing for the possible endogeneity of the respective independent risk variable in a three stages least square approach.

$$CR_{i,t} = \sum_{\tau=0}^{MAXm} LR_{i,t-\tau} + \sum_{\tau=1}^{MAXn} CR_{i,t-\tau} + Control\ Variables_{i,t} + \in_{i,t} \quad (1)$$

$$LR_{i,t} = \sum_{\tau=0}^{MAXm} CR_{i,t-\tau} + \sum_{\tau=1}^{MAXn} LR_{i,t-\tau} + Control\ Variables_{i,t} + \in_{i,t} \qquad (2)$$

$$\boldsymbol{Endogenous\ Varibles} = CR_{i,t}, LR_{i,t}$$

$$\boldsymbol{Exogenous\ Varibles} = CR_{i,t-\tau}, LR_{i,t-\tau}$$

$$\boldsymbol{Control\ Varibles} = ROA, SR, GDP, TA$$

The dependent variables are stochastic whereas independent variables are non-stochastic. Moreover, the exogenous or independent variables are classified into two categories: predetermined (lagged as well as current) and lagged endogenous. The system of simultaneous equations is said to be complete if the number of simultaneous equations (let say three) is equal to the number of dependent variables (let say three). Structural models consist of complete system of equations. In the study three stage least square (3SLS) technique has been utilized, which is introduced by Zellner & Theil (1962). It can be seen as a special case of multi-equation where the set of instrumental variables is common to all equations. Therefore it is more efficient than two stage least square (2SLS) technique.

In the above set of simultaneous equations, when $\tau = 0$ then t-τ represents the contemporaneous effect. When $\tau = 1$, $t - \tau$ depicts a possible time-lagged effect of the independent variable to observe comprehensively its influence on the dependent variable. In addition, control variables accounting for the bank's general health structure, and interest rate environment are included. These are the log of total assets, the ratio of short-term to long-term deposits, the ratio of trading assets to total assets, commercial loan to total loans, log of GDP, the saving ratio. Furthermore, we are able to address a possible autocorrelation of the dependent variables with regard to possible lagged relationship. The appropriateness of a maximum lag length would be confirmed by employing the Schwert (1989) and Ng-Perron (2000) criteria.

4. Empirical Results and Discussion

This section contains descriptive statistics and the interdependencies of liquidity risk and credit risk of banks with other control variables i.e. total assets, capital ratio, return on assets (ROA), standard deviation (ROA), trading-ratio, saving ratio (SR) and gross domestic product (GDP). The below mentioned simultaneous equation estimated by three stage least square method under three different models and models are providing the different effects of the variables on the theory.

Table 2 shows the descriptive statistics of all variables.

Variables	**Mean**			**Std. Dev.**			**Maximum**			**Minimum**		
Banks	Small Banks	Large Banks	All Banks	Small Banks	Large Banks	All Banks	Small Banks	Large Banks	All Banks	Small Banks	Large Banks	All Banks
Liquidity Risk (LR)	0.59	0.61	1.2	0.19	0.18	0.37	0.93	0.98	1.91	0.06	0.06	0.12
Credit Risk (CR)	0.51	0.51	1.02	0.17	0.18	0.35	0.90	1.10	2	0.20	0.10	0.3
Z-score	1.69	2.85	4.54	1.47	1.85	3.32	6.10	8.25	14.35	0.04	0.03	0.07
Total Assets	18.54	19.86	38.4	0.96	0.72	1.68	15.99	21.35	37.34	19.86	17.94	37.8
Capital Ratio	0.14	0.14	0.28	0.07	0.03	0.1	0.39	0.22	0.61	0.01	0.07	0.08
Return on Assets (ROA)	0.01	0.02	0.03	0.02	0.03	0.05	0.10	0.19	0.29	-0.12	0.00	-0.12
Standard deviation (ROA)	0.03	0.03	0.06	0.01	0.01	0.02	0.05	0.05	0.1	0.01	0.01	0.02
Trading-Ratio	0.05	0.02	0.07	0.07	0.05	0.12	0.21	0.25	0.46	-0.17	-0.00	-0.17
GDP	9.45	9.45	18.9	0.51	0.51	1.02	10.25	10.25	20.5	8.64	8.64	17.28
Saving Ratio (SR)	10.67	10.61	21.28	3.20	3.19	6.39	17.61	17.62	35.23	6.99	6.99	13.98

Table: 3 Correlation Matrix

Variables	Lr	Cr	TA	CAR	ROA	Sd. ROA	TR	SR	GDP
Liquidity Risk (LR)	1.000								
Credit Risk (CR)	0.866	1.000							
Total Assets	0.334	0.233	1.000						
Capital Ratio	0.165	0.381	0.062	1.000					
Return on Assets (ROA)	0.189	0.067	0.043	0.055	1.000				
Standard deviation (ROA)	0.006	0.212	0.288	0.011	0.074	1.000			
Trading-Ratio	0.118	0.116	0.176	0.092	0.257	0.110	1.000		
Saving Ratio (SR)	0.013	0.090	0.378	0.080	0.018	0.520	0.026	1.000	
GDP	0.023	0.368	0.454	0.076	0.087	0.661	0.157	0.800	1.000

The correlation matrix used to measure the direction of relationship and strength between the variables. Table 3 shows the strength and direction between given variable. Its shows a positive relationship between credit risk and liquidity risk, Imbierowicz & Rauch (2014) also found a positive relation. The liquidity risk has a positive association with capital ratio, return on asset and trading ratio. However, the liquidity ratio has a positive relationship with Saving Ratio and GDP. It has shown that credit risk has a positive association with total asset, capital ratio, GDP, Return on Assets (ROA), Trading-Ratio and Saving Ratio.

Three stage least square (3SLS) method is used to check the interdependencies of liquidity risk and credit risk of banks. Table 4 is providing the different scenarios considering the different lag length of the variables and coefficient of the variables in which two general scenarios has analyzed. It is indicating that the highest statistic of 0.3171 is observed under the head of Model 2 as a total effect of the liquidity risk on overall banks and coefficient with credit risk which is maximum to proven the strength and significance of the assumption. The value of total effect in Model 2 increased due to the negative value of coefficient at lag one.

Table 4: Relationship of Liquidity Risk and Credit Risk for all Banks

	(Dependent variable: Liquidity Risk)		
LR-All Banks	**Model 1**	**Model 2**	**Model 3**
CR(t)	0.029**	0.768**	0.197*
	(0.013)	(0.344)	(0.114)
CR(t-1)	_	-0.451*	-0.199**
		(0.250)	(0.099)
CR(t-2)	_	_	0.204**
			(0.102)
Total Effect	0.029	0.3171	0.208
Return on Assets	1.052**	1.314**	1.006**
	(0.429)	(0.489)	(0.459)
Total Assets	-9.850**	-4.900*	-9.570***
	(4.061)	(2.593)	(0.00)
Ln GDP	-0.2185*	0.013*	-0.092*
	(0.116)	(0.007)	(0.046)
Trading Ratio	-0.132*	-0.121*	0.044**
	(0.069)	(0.063)	(0.020)
Saving Ratio	-0.025**	-0.016*	-0.028*
	(0.011)	(0.008)	(0.013)
Observations	195	195	180
R^2	0.5690	0.7008	0.7095

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The second highest total effect observed under the head of Model 3 and the absolute value is 0.208 that is also a promising statistic to judge the assumption made in the study. The least value of total effect observed under the head of Model 1 and the absolute value is 0.029, considered as a least promising situation to judge the assumption. However, assessing the strength of credit risk association with liquidity risk, the results indicating high significant with each other as per the total effects of coefficient.Based on this result our first hypothesis "*there is no relationship between liquidity risk and credit risk for banks operating in Pakistan*" has rejected. Our study is consistent with Nikomaram et al. (2013) and Imane (2015) which shows that there is a positive and significant relationship between credit and liquidity risks. Similarly, Imbierowicz & Rauch (2014) also found a significant relationship between liquidity risk and credit risk with GDP.

Berrios (2013), conducted a study to see the interdependencies of liquidity risk and credit risk and their effect on the operation of banks. They found that there exist a weak coordination between the liquidity risk and credit risk.

Table 5: Relationship of Liquidity Risk and Credit Risk for all Banks
(Dependent variable: Credit Risk)

CR-All Banks	Model 1	Model 2	Model 3
LR(t)	0.226**	0.570**	-0.097*
	(0.097)	(0.270)	(0.051)
LR(t-1)	_	-0.201*	0.042**
		(0.116)	(0.019)
LR(t-2)	_	_	0.096**
			(0.048)
Total Effect	0.2226	0.5675	0.0411
Return on Assets	-0.646**	-0.898**	-0.395**
	(0.323)	(0.420)	(0.181)
T. bills	0.020***	-0.012***	-0.008***
	(0.005)	(0.003)	(0.002)
Capital Ratio	-0.472**	-0.291**	-0.582***
	(0.186)	(0.117)	(0.161)

Ln GDP	-0.241**	-0.210***	-0.409***
	(0.053)	(0.058)	(0.048)
Observations	195	195	180
R-Squared	0.5160	0.6180	0.7085

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Considering the negative figures of ROA in Table 5, it has concluded that there exist an inverse relationship between the profitability and the credit risk i.e. high credit risk lead to low profitability. Crumley (2008) and Leung and Horwitz (2010) also viewed the negative relationship between credit risk and profitability. In this research, main motive behind the study was to investigate the risk approaches and financial crisis in the banks by assessing the credit risk, profitability risk and liquidity risk with interlinked relationships.

In the given situation, operational performance of the bank has viewed as the main fact with credit risk associated with liquidity risk and other controlling variables that are showing strong convincing correlation with each other.

4.1 Relationship between the LR and CR with respect to Bank Size

This section analyzed the data, which has divided according to the size of banks. Similarly, Beltratti and Stulz (2012) divides the data according to the nature and size of banks i.e. small-scale banks and large-scale banks to investigate the impact of liquidity risk and credit risk. Table 6 and 7 observe liquidity risk and credit risk of the small banks in Pakistan.

Table 6: Relationship of Liquidity Risk and Credit Risk for Small-Scale Banks
(Dependent variable: Liquidity Risk)

LR-Small Banks	**Model 1**	**Model 2**	**Model 3**
CR(t)	-0.192*	0.443*	0.295*
	(0.098)	(0.001)	(0.157)
CR(t-1)		-0.433*	0.155**
		(0.231)	(0.070)
CR(t-2)			-0.392**

			(0.174)
Total Effect	-0.192	0.009	0.058
Return on Assets	0.594*	0.979**	1.100
	(0.330)	(0.433)	(0.486)
Total Assets	-3.22**	-3.221**	-4.541**
	(1.448)	(1.457)	(2.241)
Ln GDP	-0.024**	-0.139*	-0.104**
	(0.110)	(0.076)	(0.047)
Trading Ratio	-0.042*	-0.130**	0.238**
	(0.022)	(0.058)	(0.108)
Saving Ratio	-0.050***	-0.039**	-0.041**
	(0.017)	(0.018)	(0.020)
Observations	91	91	85

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6 indicated the impact of liquidity risk on credit risk controlling for other variables and their influence on the operational performance of the small banks in Pakistan. When we take the liquidity risk as dependent variable, the results show a significant but negative relation between LR and CR under Model 1 for small banks. The coefficient of contemporaneous credit risk is -0.192, which shows that when CR decreases by one unit then LR increases by 0.192 units. The results do not change when we take the first lag of credit risk under the head of Model 2. The value of coefficient of the lagged credit risk is -0.433, which show significant but negative relationship between liquidity risk and credit risk.

Our results even do not change when we take the second lag of credit risk under the head of Model 3. The value of coefficient of the lagged credit risk is -0.392, which show significant but negative relationship between liquidity risk and credit risk. The highest statistics of -0.912, observed under the head of model 1 as a total effect of the liquidity risk on small banks and coefficient with credit risk prove the significance of the hypothesis. The second highest value of total effect observed under the head of model 3, which is -0.531, it has statistical significance to justify the assumption made in the study. The negative value (-0.877) of total effect, perceived under model 2 and it is least significant value to defend the hypothesis of the study. Our results are consistent with Abdullah and Khan (2012). All values are defending the significance of association between variables and are

indicating the minor statistics to justify the relation in variables as a meaningful economic bond of performance for small-scale banks in Pakistan.

Table 7: Relationship of Liquidity Risk and Credit Risk for Small-Scale Bank

	(Dependent variable: Credit Risk)		
CR-Small Banks	**Model 1**	**Model 2**	**Model 3**
LR(t)	0.151*	0.366**	-0.0530*
	(0.080)	(0.165)	(0.028)
LR(t-1)		-0.148*	-0.012**
		(0.078)	(0.005)
LR(t-2)			0.170**
			(0.075)
Total Effect	0.151	0.218	0.104
Return on Assets	-0.740*	-0.819**	-0.644
	(0.391)	(0.364)	(0.293)
T-bills	-0.002**	-0.005**	-0.010**
	(0.001)	(0.002)	(0.004)
Capital Ratio	-0.375*	-0.362	-0.406**
	(0.196)	(0.192)*	(0.188)
Ln GDP	-0.080**	-0.067*	-0.116***
	(0.034)	(0.035)	(0.034)
Observations	91	91	85

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 7 shows a significant relationship between dependent and independent variables, and ensuring the strength of individual variable effect on the performance of banks. A study conducted by Nikomaram et al. (2013) also shows that there is significant relationship of bank size with liquidity risk and credit risk and also found that the bank's performance has a close association with size of bank. Size of the bank has become the preferable area for the discussion in the literature.

Table 8: Relationship of Liquidity Risk and Credit Risk for Large-Scale Bank
(Dependent variable: Liquidity Risk)

LR-Large Banks	Model 1	Model 2	Model 3
CR(t)	-0.142**	0.273*	0.014**
	(0.064)	(0.145)	(0.006)
CR(t-1)	_	-0.239**	-0.281*
		(0.105)	(0.148)
CR(t-2)	_	_	0.231**
			(0.108)
Total Effect	-0.412	0.035	-0.0364
Return on Assets	0.960**	1.301**	0.731**
	(0.425)	(0.573)	(0.323)
Total Assets	-1.540***	-1.290**	-1.200**
	(5.610)	(5.450)	(5.270)
Ln GDP	-0.004**	0.041**	0.010**
	(0.002)	(0.018)	(0.004)
Trading Ratio	-0.006**	-0.080**	0.387***
	(0.002)	(0.035)	(0.134)
Saving Ratio	-0.009**	-0.006**	0.0035**
	(0.004)	(0.002)	(0.001)
Observations	104	104	95

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The association of liquidity risk with credit risk in large-scale banks of Pakistan has also observed in this section. In Table 8 the statistics provide the figures of coefficient that reveal the fact of total effects on the performance of the banks. Sohaimi (2013) has viewed the relationship between the banks in term of liquidity risk in the operations of the banking system of Malaysia, and found a strong influence of liquidity risk on the operation of the banks.

Table 9: Relationship of Liquidity Risk and Credit Risk for Large-Scale Bank

(Dependent variable: Credit Risk)

CR-Large Banks	**Model 1**	**Model 2**	**Model 3**
LR(t)	0.222**	-0.006*	-0.388**
	(0.107)	(0.003)	(0.171)
LR(t-1)		-0.024**	0.229**
			(0.100)
LR(t-2)		(0.011)	0.209***
			(0.075)
Total Effect	0.2223	0.009	0.0503
Return on Assets	-0.836*	-0.875**	-0.353**
	(0.440)	(0.385)	(0.155)
T Bills	0.005**	0.004**	-0.006**
	(0.002)	(0.002)	(0.002)
Capital Ratio	-1.027**	-1.007**	-0.914***
	(0.435)	(0.467)	(0.344)
Ln GDP	-	-0.100***	-0.216***
	1.102***	(0.031)	(0.028)
Observations	(0.030)	104	95
	104		

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

In Table 9, the coefficient 0.2223 in Model 1 shows positive impact of total effect of the liquidity risk on large banks. The second highest absolute value of total effect is 0.0503, under the head of Model 3, which is involving the possibility of two lag, which is also a favorable statistic to justify the assumption made in this study. The least absolute value of correlation for total effect is 0.009, under the head of Model 2, which has two lags in the equation that is also substantial statistic to accept the hypothesis, and the remaining model 2&3 also show a positive role of total effect on credit risk.

The results indicate that bank size has a significant impact on the relationship of liquidity and credit risk. Therefore, there is a meaningful relation between liquidity and credit risk in case of bank size. Nikomaram et al. (2013), has investigated the liquidity risk and credit risk with reference of banks in Iran; he assessed the relationship of liquidity risk and credit risk based on the size of banks. They found that the credit risk do not matter whether bank is small or large but liquidity risk has its impacts regarding the size of bank. However, in this study combine relationship of liquidity risk and credit risk is presenting the significant influence for the operations of the banks in Pakistan.

5. Conclusion

Many factors influence the survival of banks. In these factors, liquidity risk and credit risk are of significant nature. This study examine the relationship between the liquidity risk and credit risk analyzed on the performance of commercial and public banks in Pakistan. The assumptions which have designed to estimate the role of the liquidity risk and credit risk are evaluated by many variables. This study takes the data of 11 commercial banks and 4 public banks and subdivided the banks into three categories i.e. small banks, large banks and overall banks. The time-period of the data is of 13 years from 2002 to 2015.

It is analyzed that the liquidity risk and credit risks are the distinctly important features for the performance of the banking sector in right direction and a keen analysis required to assess these factors to make the balance for the occurrence of these factors.

From the above stated results, this study comes up with the following policy implications:

- Liquidity risk is an endogenous determinant of bank performance. Therefore, it has different effects on bank performance in different financial system.
- The greater regulatory empowerment of private monitoring of banks will increase bank liquidity risk and credit risk in market-based financial system.
- Banks should have contingency plans for any abnormal or worst case scenarios

References

Acharya, V., & Naqvi, H. (2012). The seeds of a crisis: A theory of bank liquidity and risk taking over the business cycle. *Journal of Financial Economics*, *106*(2), 349-366.

Acharya, V. V., Shin, H. S., & Yorulmazer, T. (2011). Crisis resolution and bank liquidity. *Review of Financial Studies*, *24*(6), 2166-2205.

Acharya, V. V., & Viswanathan, S. (2011). Leverage, moral hazard, and liquidity. *The Journal of Finance*, *66*(1), 99-138.

Adeusi, S. O., Akeke, N. I., Adebisi, O. S., & Oladunjoye, O. (2014). Risk Management and Financial Performance of Banks in Nigeria. *European Journal of Business and Management*, *6*(31), 336-342.

Aggarwal, R., & Jacques, K. T. (2001). The impact of FDICIA and prompt corrective action on bank capital and risk: Estimates using a simultaneous equations model. *Journal of Banking & Finance*, *25*(6), 1139-1160.

Akhtar, M. F., Ali, K., &Sadaqat, S. (2009). Liquidity Risk Management: A comparative study between Conventional and Islamic Banks of Pakistan. *Journal of Research in business,1*(1), 35–44.

Akhtar, S. (2007). *Changing Risk Management Paradigm- Perspective of Regulator.* CFOs: The Opportunities and Challenges Ahead (p. 8). Karachi: State Bank of Pakistan.

Angbazo, L. (1997). Commercial bank net interest margins, default risk, interest-rate risk, and off-balance sheet banking. *Journal of Banking and Finance,21*(1), 55-87.

Arif, A., &Anees, A. N. (2012). Liquidity risk and performance of banking system. *Journal of Financial Regulation and Compliance,20* (2), 182–195.

Barth, J. R., Nolle, D. E., Phumiwasana, T., &Yago, G. (2003). A cross-country analysis of the bank supervisory framework and bank performance. *Financial Markets, Institutions &Instruments*, *12*(2), 67-120.

Berger, A. N., & Bouwman, C. H. (2013). How does capital affect bank performance during financial crises? *Journal of Financial Economics*, *109*(1), 146-176.

Bourke, P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking & Finance*, *13*(1), 65-79.

Bryant, J. (1980). A model of reserves, bank runs, and deposit insurance. *Journal of banking & finance*, *4*(4), 335-344.

Cai, J.,& Thakor, A. V. (2008). Liquidity risk, credit risk and interbank competition. *Credit Risk and Interbank Competition (November 19, 2008)*.

Cole, R. A., & White, L. J. (2012). Déjà vu all over again: The causes of US commercial bank failures this time around. *Journal of Financial Services Research*, *42*(1-2), 5-29.

Cole, R. A., Goldberg, L. G., & White, L. J. (2004). Cookie cutter vs. character: The microstructure of small business lending by large and small banks. *Journal of Financial and Quantitative Analysis*, *39*(2), 227-251.

De Nicolo, G. (2001, April). Size, charter value and risk in banking: An international perspective. In *EFA 2001 Barcelona Meetings*.

Dermine, J. (1986). Deposit rates, credit rates and bank capital: The Klein-Monti model revisited. *Journal of Banking & Finance*, *10*(1), 99-114.

Diamond, D. W., & Dybvig, P. H. (2000). Bank runs, deposit insurance, and liquidity. *Federal Reserve Bank of Minneapolis Quarterly Review*, *24*(1), 14-23

Diamond, D. W., & Rajan, R. G. (2005). Liquidity shortages and banking crises. *The Journal of Finance*, *60*(2), 615-647.

Dietrich, A., & Wanzenried, G. (2011). Determinants of bank profitability before and during the crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money*, *21*(3), 307–327.

Ennis, H. M., & Keister, T. (2009). Bank runs and institutions: The perils of intervention. *The American Economic Review*,*99*(4), 1588-1607.

Fredrick, O. (2012). The Impact of Credit Risk Management on Financial Performance of Commercial Banks in Kenya. *Africa Management Review*, *3*(1), 22-37.

Gorton, G., & Metrick, A. (2012). Securitized banking and the run on repo. *Journal of Financial economics*, *104*(3), 425-451.

Greuning, H. V., & Bratanovic, S. B. (2009). *Analyzing banking risk: A framework for assessing corporate governance and risk management*. World Bank Publications.

Hassan, K., & Bashir, H. (2003). Determinants of Islamic Banking Profitability. *ERF Paper*.

He, Z., & Xiong, W. (2012). Dynamic debt runs. *Review of Financial Studies*,*25*(6), 1799-1843.

Iannotta, G., Nocera, G., & Sironi, A. (2007). Ownership structure, risk and performance in the European banking industry. *Journal of Banking & Finance*, *31*(7), 2127-2149.

Jacques, K., & Nigro, P. (1997). Risk-based capital, portfolio risk, and bank capital: A simultaneous equations approach. *Journal of Economics and business*, *49*(6), 533-547.

Jemison, D. B. (1987). Risk and the relationship among strategy, organizational processes, and performance. *Management Science*, *33*(9), 1087-1101.

Krasa, S., & Villamil, A. P. (1992). A theory of optimal bank size. *Oxford Economic Papers*, *44*(4), 725-749

Khan, H. M., & Khan, B. (2010). What drives interest rate spreads of commercial banks in Pakistan? Empirical evidence based on panel data. *SBP Research Bulletin*, *6*(2).

Lindquist, K. G. (2004). Banks' buffer capital: how important is risk. *Journal of International Money and Finance*, *23*(3), 493-513.

Maaka, Z. A. (2013). *The relationship between liquidity risk and financial Performance of commercial banks in Kenya* (Doctoral dissertation, University of Nairobi).

Marinkovic, S., & Radovic, O. (2014). Bank net interest margin related to risk, ownership and size: an exploratory study of the Serbian banking industry. *Economic Research- EkonomskaIstraživanja*, *27*(1), 134-154.

Merton, R. C. (1977). An analytic derivation of the cost of deposit insurance and loan guarantees an application of modern option pricing theory. *Journal of Banking & Finance*, *1*(1), 3-11.

Miller, S. M., & Noulas, A. G. (1997). Portfolio mix and large-bank profitability in the USA. *Applied Economics*, *29*(4), 505-512.

Molyneux, P., & Thornton, J. (1992). Determinants of European bank profitability: A note. *Journal of banking & Finance*, *16*(6), 1173-1178.

Mugomba, N.J., Sharara, P., Chikwawa, E.T., &Mushayi, S. (2013). *Impact of Liquidity risk on Banks' Solvency in Zimbabwe.* (Bachelor dissertation, Harare Institute of Technology).

Muranaga, J., & Ohsawa, M. (1997). Measurement of liquidity risk in the context of market risk calculation. *A BIS volume entitled The Measurement of Aggregate Market Risk*.

Nikomaram, H., Taghavi, M., & Diman, S. (2013). The relationship between liquidity risk and credit risk in Islamic banking industry of Iran. Management Science Letters, 3(4), 1223-1232.

Ogboi, C., & Unuafe, O. K. (2013). Impact of credit risk management and capital adequacy on the financial performance of commercial banks in Nigeria. *Journal of Emerging Issues in Economics, Finance and Banking*, *2*(3), 703-717.

Owojori, A. A., Akintoye, I. R., &Adidu, F. A. (2011). The challenge of risk management in Nigerian banks in the post consolidation era. *Journal of Accounting and Taxation*, *3*(2), 23-31.

Pasiouras, F.,& Kosmidou, K. (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance*, *21*(2), 222-237.

Plochan, P. (2007). *Risk management in banking.* (Master thesis, University of Economics Bratislava).

Poudel, R. P. S. (2012). The impact of credit risk management on financial performance of commercial banks in Nepal. *International Journal of Arts and Commerce*, *1*(5), 9-15.

Prisman, E. Z., Slovin, M. B., &Sushka, M. E. (1986). A general model of the banking firm under conditions of monopoly, uncertainty, and recourse. *Journal of Monetary Economics, 17*(2), 293-304.

Pukeliene, V., & Deksnyte, I. (2010). Currency crises: Models and their possibility in Lithuania. *Economics & Management*, *15*(1), 206-211

Salas, V., & Saurina, J. (2002). Credit risk in two institutional regimes: Spanish commercial and savings banks. *Journal of Financial Services Research*, *22*(3), 203–224.

Samartín, M. (2003). Should bank runs be prevented?. *Journal of Banking & Finance*, *27*(5), 977-1000.

Sawada, M. (2010). Liquidity risk and bank portfolio management in a financial system without deposit insurance: Empirical evidence from prewar Japan. *International Review of Economics & Finance*, *19*(3), 392-406.

Shen, C. H., Chen, Y. K., Kao, L. F., &Yeh, C. Y. (2009, June). Bank liquidity risk and performance. In 17th Conference on the Theories and Practices of Securities and Financial Markets, Hsi-Tze Bay, Kaohsiung, Taiwan.

Shrieves, R. E., & Dahl, D. (1992). The relationship between risk and capital in commercial banks. Journal of Banking & Finance, 16(2), 439–457.

Sinkey, J. F. (1983). Commercial bank financial management. New York: Macmillan.

Sohaimi, A. N. A. (2013). Liquidity Risk and Performance of Banking System in Malaysia. Available at SSRN 2271427.

Stolz, S., Heid, F., & Porath, D. (2004). Does capital regulation matter for bank behavior? Evidence for German savings banks. Evidence for German Savings Banks (December 2003). EFMA.

Tabari, N. A. Y., Ahmadi, M., & Emami, M. (2013). The effect of liquidity risk on the performance of commercial banks. International Research Journal of Applied and Basic Sciences, 4(6), 1624-1631.

Wagner, W. (2007). The liquidity of bank assets and banking stability. Journal of Banking & Finance, 31(1), 121-139.

Wong, K. P. (1997). On the determinants of bank interest margins under credit and interest rate risks. Journal of Banking & Finance, 21(2), 251-271.

Van Roy, P. (2005, July). The impact of the 1988 Basel Accord on banks' capital ratios and credit risk-taking: an international study. In EFMA 2004 Basel

GCU Economic Journal, Volume LI (1&2), 2018, pp. 91-103

Economic Growth, Financial Development and International Trade: The Evidence of Pakistan's Preferential Trade Agreements

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Abstract: This study analyzes the link between financial development, economic growth and international trade in case of Pakistan over period 1972-2016 by applying Johansen co-integration and granger causality. This study also checks the benefits of all free trade agreements of Pakistan by using panel regression analysis. The outcomes of the study suggest that there is great link exist between all economic indicators. Financial developments have an effect on the trade openness and afterwards such trade liberalization improves the GDP growth. All FTA/PTA have positive impact on Pakistan's trade and Pakistan economy. Both partners can get more and more benefits from these agreements.

Keywords: Financial Development, Trade, Economic Growth, integration
JEL Classification: F36, N70, F02

1. Introduction

The connection between economic growth, financial expansion and trade flows has become important issues for the developing countries. In the literature, these connections have not been commonly explored. Financial sector and trading activities is most important factors for growth of an economy. It has been recommended that policies for trade and financial openness enhances the production activities and boosts up economic growth. Globally more integrated economies have boosted up more (Mckinnon, 1973; Shaw, 1973; World Bank, 1989; Fry, 1995, 1997; Darrat, 1999; Levine, 1997; Jin, 2000).

Free trade is playing a significant role to raise trade flows between member countries. The concept of Free/Preferential Trade agreements among developed and developing countries has become more popular during the past decades. Since independence, Pakistan has faced large trade crisis, as imports of country have grown more rapidly than exports. The volume of exports can be affect on trade balance as it is a source of international payment for a country.

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There are many studies which examine the export performance of a country under preferential trade agreements. The establishment of PTA needs the willingness of two countries. Grossman and Helpman (1995) argued that such trade agreements enhance the comparative advantages between the partner countries. However, the results are Pakistan's Export Performance inconclusive. There is a huge literature discusses the relationship between financial growth and economic expansion. Most of studies argued that financial developed countries grow economically through different channels; one of them is export growth (Rajan and Zingales, 1998; Hur and Riyanto, 2006; Shahbaz, 2009; Shahbaz and Rahman, 2014; Yuan et al., 2014,). Although, huge literature investigated the relationship of GDP growth, export and financial development but limited studies are available on Pakistan's economy. In this study, main objective is to examine the connection of economic growth, financial expansion and trade flow, and afterwards decide the causal direction for Pakistan. As we know that in recent world no single economy can survive. Need of interdependence has increased day by day. For this purpose, free trade agreements have played main role to full fill the needs of worldwide economies. Pakistan has also signs some free trade agreements with its trading partners. Afterwards, this study will explore the gains of Pakistan's FTA/PTAs for its economy and with which country's FTA is more beneficial for Pakistan's trade

The article organizes as follows: Second section reviews previous studies and section three defines data, model and estimation methodology. Results discussed briefly in Section four and next section concludes the paper.

2. Literature Review

The significant correlation between economic development, finance improvement and trade liberalization has been studied in the empirical and theoretical literature.

The relationship of trade flows and economic growth has considered more important in the literature. Smith (1776) and Robertson (1938) was first to highlight the direct impact of trade flow and economic development. Afterwards, many studies supported this view for many countries (Chow, 1987; Marin, 1992; Bahmani-Oskooee and Alse, 1993; Jin, 1995; Xu, 1996;

Shan and Sun, 1998; Edwards, 1998). Yucel (2009) has investigated this correlation for Turkey and Loots (2000) has supported these findings in case of South Africa.

The literature on financial and economic growth is reviewed by many researchers. King and Levine (1993), Gregorio and Guidotti (1995), Levine and Zervos (1998), and Kenourgios and Samitas (2007) have found strong link for different countries. Demetriades and Hussein (1996), Utkulu and Ozdemir (2004) and Vuranok (2009) have supported the direct links for Turkey and Kilimani (2009) has found this relationship for Ugandan economy. But in few studies like (Shan et al. (2001); Shan and Morris, (2002); Gries et al. (2009), no relationship have not explored for OECD countries. Ahmad et al. (2004), Shirazi and Manap, (2004), Ullah et al (2009), Mahmood (2010), Rahman and Shahbaz, (2012) and Asghar and Hussain (2014) have reported the vital role of economic growth to attracting foreign direct investment for Pakistan.

However, the connection of financial development and trade has get less and limited interest in the literature. Kletzer and Bardhan(1987), Baldwin (1989), Beck (2002), Ribeiro de Lucinda (2003), Slaveryd and Vlachos (2005), Ju and Wei (2005), Wynne (2005) and Becker and Greenberg (2005), have considered the connection between these variables.

But, very few studies analyzed the correlation between financial developments, economic growth and international trade altogether. Khan and Qayyum(2008), Shaheen et al. (2011), Shahbaz and Rahman (2014), Gokmenoglu et al.(2015) and Chandio et al. (2017) have also found a long run relationship between economic growth, international trade and financial development in case of Pakistan. Yucel (2009) and Savrun (2011) have examined bidirectional causality between real income, financial development, and trade in Turkey. But, Hassan and Islam (2005) and Uddin and Chakraborty (2009) have found no relationship in case of Bangladesh. Hanh (2010) has found a casual relationship for 29 developing economies of Asia . Gries et al. (2009) have explored unidirectional causality between financial development, economic growth and trade for Sub- Saharan countries. Katırcıoglu et al. (2007) have also examined this correlation in case of India, and Jenkins and Katircioglu (2010) have found this link in

Cyprus. Rahman (2012) has found this relationship for Australian economy.

Few studies are examined the importance of free trade agreements on Pakistan's trade and economy. However, limited presence of intra-industry trade between Pakistan, India, Bangladesh and Sri Lanka is examined by Khan (2010). Pakistan's export performance has examined by Alam (2012) under free or preferential trade agreements (PTAs). The SAFTA and PTAs has improved export performance of China and Iran. There is no evidence that the bilateral PTAs with Sri Lanka and Mauritius affect export performance of Pakistan. According to Irshad et al. (2014), China should focus on different regions by promoting free trade agreements. Hussain and Shah (2014) examined that under tariff reduction, china takes more benefit from FTA with Pakistan and china. Gul (2014) has suggested that proposed preferential trade agreement (PTA) between Pakistan and Turky would be beneficial by analyzing three different trade indices.

3. Data Collection and Estimation Methodology

This part has discussed data description and estimation methodology in detail.

3.1. Data Source

In this paper data has been used over the period 1972 to 2016 containing variables, Gross Domestic Product (GDP) in constant 2005 US$, financial development index and trade openness define as imports and exports to GDP ratio (TO). Control variables which are used in the model are: Exchange rate, inflation rate, budget deficit, Population rate, capital formation and foreign direct investment etc. Data has been collected from WDI, International Finance Statistics and UN Comtrade.

3.2. Empirical Analysis

This empirical study determines the causality connection among economic development, trade openness, and financial liberalization in Pakistan and its major FTA/PTAs. The ADF unit root tests have been used to check stationarity of data. In order to investigate the co-integration association

between dependent variable and independent variables, Johansen and Juselius (1990) co-integration test is applied. For direction of causality relationship between FD, TO and GDP Granger-causality test have been employed. Afterwards, panel regression has been done to check the impact of Pakistan's FTA/PTA. The following equation is estimated:

$$gdp_t = \beta_0 + \beta_1 fd_t + \beta_2 to_t + \varepsilon_t \quad (1)$$

4. Results and interpretation

In this section overall results have been discussed in details.

4.1. Unit root tests

Stationary of the data has been investigated by ADF unit root tests. The estimated results are revealed that FD, GDP and TO are stationary at their level 1(0). All variables having same order of integration, so we have investigated the co integration. The results are given in Table 5.1 below.

Table 1: The ADF Test

Variables	ADF T-test (at Levels)	Critical Values
FD	-3.710368 (0.0073)	-3.5924 (1%),
GDP	-5.02349 (0.0002)	- 2.9314 (5%) &
TO	-6.94332 (0.0000)	-2.6039 (10%)

4.2. Co integration Analysis

Next we examine the link between financial expansion, trade openness and GDP growth for Pakistan’s economy. The outcomes of Co integration test are reported in Table 2.

Table 2: Johansen’s Cointegration Test

Λ-Trace Eigen-value	H_0	H_1	Trace	5% level	Λ-Max H_0	H_1	Max	5% level
0.350649	r≤0	r>0	37.17326	29.79707	r≤0	r>0	38.56663	19.10162
0.258453	r≤1	r>1	18.60663	15.32471	r≤1	r>1	12.85773	14.26460
0.125143	r≤2	r>2	5.748900	3.841466	r≤2	r>2	5.748900	3.841466

Keeping in view the above, results suggested that there is significant long run correlation exist. These results are in favor with the outcomes of Khan and Qayyum (2008), Shaheen et al. (2011), Shahbaz and Rahman (2014), Gokmenoglu et al. (2015) and Chandio et al. (2017). The estimated equation is given by:

$$gdp_{pk} = 20.036 + 0.2477 fd_{pk} + 1.205 to_{pk} \quad (2)$$

4.3. Granger Causality

Next, direction of causality have examined by getting the evidence of the long run relationship between variables of interest. Table 3 shows the results.

Table 3: Granger Causality Test

Hypothesis	F statistics	P value	Conclusion
$GDP_{pk} \longrightarrow FD_{pk}$	1.92143	0.1732	No Causality
$FD_{pk} \longrightarrow GDP_{pk}$	0.13223	0.7180	No Causality
$TO_{pk} \longrightarrow FD_{pk}$	0.15997	0.0613	Causality Exists
$FD_{pk} \longrightarrow TO_{pk}$	1.47831	0.0012	Causality Exists
$TO_{pk} \longrightarrow GDP_{pk}$	0.76619	0.1024	Causality Exists
$GDP_{pk} \longrightarrow TO_{pk}$	4.84951	0.0333	Causality Exists

Above mentioned result stated that there is no casual relationship has found between FD and GDP growth. But there is two ways causality has existed between FD and TO, and between GDP expansions and TO. So financial development has positive impact on trade openness and which ultimately has improved GDP growth.

4.4. Pakistan's Free/ Preferential Trade Agreements

Pakistan has signed more than ten FTA/PTA to achieve the benefits from trade.

1. Pak-China Free Trade Agreement (24th November 2006).
2. Pak-Malaysia Free Trade Agreement (8th November 2007).
3. Trade and investment framework agreement between USA and Pakistan (25th June 2003).
4. Pak-Afghanistan Transit Trade Agreement between Afghanistan and Pakistan (28th October 2010).
5. Agreement on South Asian Free Trade Area (1st January 2006).
6. Pak-Sri Lanka Free Trade Agreement (12th June 2005).
7. Pak-Iran Preferential Trade Agreement (1st September 2006).
8. Pak-Mauritius Preferential Trade Agreement (30th November 2007).
9. Pak-Indonesia Preferential Trade Agreement (24th November 2005).

Next we check the impact of FTA/PTA on Pakistan's economy.

Table 4: Panel Regression analysis

PTA/FTA	**FD**		**TO**	
Iran	0.351250 (0.1100)	4.415963 (0.015)	-0.386971 (0.006)	2.6262 (0.0009)
Malaysia	4.404328 (0.000)	2.872473 (0.5462)	1.723202 (0.000)	2.013521 (0.000)
Sri Lanka	0.057601 (0.9556)	0.591911 (0.7554)	-0.269952 (0.0156)	0.528347 (0.6541)
USA	2.958673 (0.2114)	26.17397 (0.001)	-7.726019 (0.0000)	-14.36612 (0.004)
Mauritius	0.573741 (0.7144)	7.395295 (0.1345)	0.740989 (0.0000)	2.319117 (0.000)
China	19.25419 (0.000)	21.96789 (0.2115)	4.358337 (0.0065)	5.107254 (0.3373)
Indonesia	0.477964 (0.6547)	6.929028 (0.4256)	0.561344 (0.04554)	1.163835 (0.028)
SAFTA	4.165694 (0.0274)	0.906491 (0.7194)	0.550499 (0.0015)	1.882376 (0.0000)

Note: This table is constructed by applying regression on panel of countries having free trade agreements with Pakistan. In parentheses, t-statistics are given to check the significance of these free trade agreements.

All above mentioned results have supported the view that TO has direct and significant impact on GDP growth of Pakistan for every free trade agreements. Although, agreement with USA is enhanced finance development but agreement with USA have not positively affect on trade balance as imports are increased than exports in case of free trade agreements.

5. Conclusion

This study is examined the correlation and causation between economic growth, international trade and financial development. The results suggested co integration between variables and causality test results found that a change in trade volume and financial development leads a change in economic growth.

So, the Government of Pakistan should take steps to enhance the financial liberalization which accelerates the economic growth and to have a better trade condition. Trade barriers should also reduced for trading partners by signing free trade agreements. Both trading countries having such agreements can enjoy full benefits from trade activities. The Government and State Bank of Pakistan should cooperate with each other for better financial system. So, a better financial system of a country will promote export expansion which will lead better economic growth.

References

Alam, Shaista. (2012). The Effect of Preferential Trade Agreements on Pakistan's Export Performance, *credit research paper No 15/10*

Asghar, N., and Hussain, Z. (2014). Financial Development, Trade Openness And Economic Growth in Developing Countries. *Pakistan Economic and Social Review*, Volume 52, No. 2, pp. 99-126.

Beck, T. and R. Levine. (2004), Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance*, Volume 28(3), pp. 423-442.

Bhagwati, J. (1988), "Export-Promoting Trade Strategy: Issues and Evidence", The World Bank Research Observer, pp. 27-57.

Calderon, C. and L. Liu. (2003), The direction of causality between financial development and economic growth. *Pakistan Economic and Social Review*, Volume 72(1), pp. 321-334.

Cameron, R. (1967). Banking in the Early Stages of Industrialization. 1st Edn., *Oxford University Press, New York, USA*., pp: 349.

Chandio, A., Rehman, A., Jiang, y., and Ali, M. (2017). Financial development, trade openness and economic growth in Pakistan: A granger causality approach. *International Journal of Advanced and Applied Sciences, 4(4)*, Pages: 73-80.

Christopoulos, D. K. and E. G. Tsionas. (2004), Financial development and economic growth: Evidence from panel unit root and cointegration tests. *Journal of Development Economics*, Volume 73(1), pp. 55-74.

Darrat, Ali. F. (1999), "Are Financial Deepening and Economic Growth Causality Related? Another Look at the Evidence", *International Economic Journal*, Vol.13, No.3, pp.19-35.

Demetriades, P. O. and K. A. Hussein. (1996), Does financial development cause economic growth? Time-series evidence from 16 countries. *Journal of development Economics*, Volume 51(2), pp. 387-411.

Din, Musleh-UD, E.Ghani, and O.Siddique. (2003), "Openness and Economic Growth in Pakistan", *The Pakistan Development Review, Vol.42, No.4*, pp.795-807.

Fry, M. J. (1978), Money and capital or financial deepening in economic development? *Journal of Money, Credit and Banking*, Volume 10(4), pp. 464- 475.

Gokmenoglua, K., Yusuf , M. and Nigar, A. (2015). The Relationship among International Trade, Financial Development and Economic Growth: The Case of Pakistan. *procedia economics and finance, page no 489-496.*

Goldsmith, R. W. (1969), Financial Structure and Development. New Haven: *Yale University Press, Volume 1*, p. 969.

Gul, A., (2014). Analyzing Pakistan's Trade Opportunity with Turkey. *The Lahore Journal of Economics* 19, pp. 349–370

Hassan, A. F. M. K. and M. R. Islam. (2005), Temporal causality and dynamics of financial development, trade openness, and economic growth in Vector Auto Regression (VAR) for Bangladesh, 1974-2003: Implication for poverty reduction. *Journal of Nepalese Business Studies*, Volume 2(1), pp. 1-12.

Hussain, M., and Shah, A., (2017). Quantitative Assessment of Pakistan and China Free Trade Agreement. *Pakistan Journal of Commerce and Social Sciences, Vol. 11 (1),* 392-407.

Jalil, A., and Ma, Y. (2008). Financial Development and Economic Growth: Time Series Evidence from Pakistan and China. *Journal of Economic Cooperation, 29,2, pp.* 29-68.

Jenkins, H. P., Katircioglu, S. T. (2010). The bounds test approach for cointegration and causality between financial development, international trade and economic growth: the case of Cyprus. *Applied Economics 43(13),* pp.1699-1707.

Katircioglu, S. T., N. Kahyalar and H. Benar. (2007), Financial development, trade and growth triangle: The case of India. *International Journal of Social Economics*, Volume 34(9), pp. 586-598.

Khan, A., and Qayyum, A. (2008). Trade, Financial and Growth Nexus in Pakistan. *Economic Analysis Working Papers.- 6th Volume – Number 14*

Khan, M. A., A. Qayyum and E. Ghani. (2006), Trade liberalization, financial sector reforms, and growth. *The Pakistan Development Review*, Volume 45(4), pp.711-731.

Khan, M.A. (2010). Financial Development and Economic Growth in Pakistan: Evidence Based on Autoregressive Distributed Lag (ARDL) Approach. *South Asia Economic Journal*, Vol. 9.

Kilimani N. (2009), "The Link between Financial Development and Economic Growth in Uganda: A Causality Test", *The Centre for the Study of African Economies (CSAE) Conference,* 22– 24th March.

King, R.G. and Levine, R. (1993a), "Finance and Growth: Schumpeter Might be Right", *Quarterly Journal of Economics, Vol. 108,* pp.717-737.

Krueger, Anne O. (1998), "Why Trade Liberalization is Good for Growth", Economic Journal, pp. 1513-1522.

Lee, C.H. and Huang, B.N. (2002). The relationship between exports and economic growth in East Asian countries: a multivariate threshold autoregressive approach. *Journal of Economic Development, 27,* pp. 45-68.

Levine, R. (2004), Finance and growth: Theory and evidence. *NBER Working Paper* # 10766.

Loots, E. (2002). Globalisation and Economic Growth in South Africa: Do We Benefit from Trade and Financial Liberalisation? *Johannesburg: Research Paper, Department of Economics, RAU.*

Mahmood, Azhar. (2012). Impact of Financial Development on Economic Growth of Pakistan. *Abasyn Journal of Social Sciences Vol. 6 No. 2.*

Muhammad, S., Mohammad, R., and Farooq, A., (2012). Financial Development, International Trade and Economic Growth in Australia :New Evidence from Multivariate Framework Analysis. *MPRA Paper No. 42023,*.

Neusser, K.; Kugler, M. (1998). Manufacturing growth and financial development: evidence from OECD Countries. *Review of Economics and Statistics*, Vol. 80, pp: 638–46.

Rajan, R. G. and L. Zingales. (1996), Financial dependence and growth. *National Bureau of Economic Research Working Paper* W5758.

Rivera-Batiz, L.A. and P.M. Romer. (1991), "International Trade with Endogenous Technological Change", European Economic Review, pp. 971-1004.

Savrun, Burak. (2011). Financial Development, International Trade and Economic Growth: The Case of Turkey. *Institute of Graduate Studies and Research, Eastern Mediterranean University, Cyprus.*

Schumpeter, J. A. (1911), *The Theory of Economic Development*. Cambridge, MA: Harvard University Press.

Shahbaz, M. and Rahman, M. M. (2014). Exports, financial development and economic growth in Pakistan. *International Journal of Development Issues, 13(2),* 155-170.

Shaheen, S., Awan, S., and Waqas, M. (2011). Financial Development, International Trade and Economic Growth: Empirical Evidence from

Pakistan. *Department of Economics, University of Sargodha, Pakistan. MPRA Paper No. 32876.*

Shan, J. Z., A. G. Morris and F. Sun (2001), Financial development and economic growth: An egg-and-chicken problem? *Review of International Economics*, Volume 9(3), pp. 443-454.

Shaw, E.S., (1973), "Financial Deepening in Economic Development", *Havard University Press, Cambridge, M.A.*

Svaleryd H and Vlachos J. (2005). Financial markets, the pattern of industrial specialization and comparative advantage: Evidence from OECD countries. *European Economic Review, 49(1):* 113-144.

Ullah, S., Zaman, B., Farooq, M. and Javid, A. (2009). Cointegration and causality between exports and economic growth in Pakistan. *European Journal of Social Sciences, 10*, 264-272.

Utkulu, U and D.Ozdemir. (2004). Does trade liberalizarion cause a long run economic growth in Turkey. Econ. Plan., 37: 245-266.

Vuranok, S., (2009), "Financial Development and Economic Growth: A Cointegration Approach", *Institute of Applied Mathematics, Middle East Technical University,*.

Yucel F. (2009). Causal relationships between financial development, trade openness and economic growth: The case of Turkey. *Journal of Social sciences, 5(1):* 33-42.

Zhang J, Wang L, and Wang S. (2012). Financial development and economic growth: Recent evidence from China. *Journal of Comparative Economics, 40(3):* 393-412.

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GCU Economic Journal, Volume LI (1&2), 2018, pp. 105-123

Telecom Penetration and Economic Growth: An Empirical Analysis

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Abstract: The telecom industry is facing serious issues all over the world, the most burning on is the opening of this sector. Pakistan telecom sector also faced many challenges. The study tries to explore the relationship between telecom sector and the economic growth for Pakistan during the period 1996-2016. Our prime objective is to see the telecoms sector's performance in Pakistan during the study period and also see the impact of this sector of GDP as well. Labor force engaged in telecom sector, investment in telecom sector and teledensity are core variables to estimate the model. Simple OLS technique is employed for estimation based on stationarity test. The study found that teledensity and labor engaged in telecom industry have huge and significant impact on economic growth of Pakistan. In addition, results also showed that capital formation (Investment in Telecom) does not have any significant impact on GDP growth in Pakistan. These results have been useful for policy makers in order to establish strong policy to establish and flourish Telcom sector at advanced level of international standard so foreign investors do attract also.

Keywords: Labor force, Investment in Telecom, Teledensity.
JEL Classification: L19, L29

1. Introduction

In this modern era, telecommunication is one of the core sectors for information dissemination all over the world. Modern technologies and networks at advanced levels surprisingly increase in every walk of life no matter whether it is economic, social, or business oriented. The greatest advantage of using advanced and modern communication network increases the efficiency and develops the competition within the sector. Further it also provides the best quality to the customers at the lowest price. Nevertheless, it is observed that when fast growing modern technology is transforming all over the world, millions of citizens of poor countries do not have access to telephone even. European Commission highlighted in its

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2002 report that 33 % of the world population could not have access to made a call even (ECR 2002). A big gap has been developed between those who have access and those who do not.

After many years of development telecom sector become stable but now the current global telecom industry, is again going through turbulence phase. This sector is facing number of challenges and issues, which increases day by day. Therefore, healthy competition has developed with the introduction of mobile and then internet increases this competition and many industries structured all over the world.

On the one hand, great services have been provided in developed countries, but in developing countries due to financial constraints and mismanagement this sector could not boost at that level in developing countries like Pakistan. In this regard, Pakistan Telecommunication Authority (PTA) is working utterly to deal with all expected issues for the best possible solution. For that purpose, consultations with renowned consultants in telecom internationally have been carried out for implementation of reasonable policies.

Now IT industry become the most exciting and dynamic one in Pakistan, which has gone through many dramatic challenges and changes in order to make it competitive internationally.

It is interesting to note that Telecommunication industry is expanding in Pakistan every by not only providing telephone access to urban communities but also to the rural as well in very short time. Total land lines in all networks in 2002 were 4.5 million in Pakistan 3% higher than India. It is also observed that trends for the mobile users have increased over the study period drastically till 2014 and then showed declined for one period and then onward it started increasing. Mobile users were just 2.32% in 2002, which increases and reached 69% in 2015-16, which is huge increase, which shows not only the customers trust on this industry but also take maximum benefit of using this at very reasonable rates. From the figure 1, we may conclude in this digital age, every second citizen is mobile user and

using cell phone at huge level to take maximum advantage by disseminating and collecting information of their own interest. It also confirms from the figure 2, that mobile users have continuous increasing trend till 2015-16.

Figure 1: Teledensity trends during 2002-2016 in Pakistan

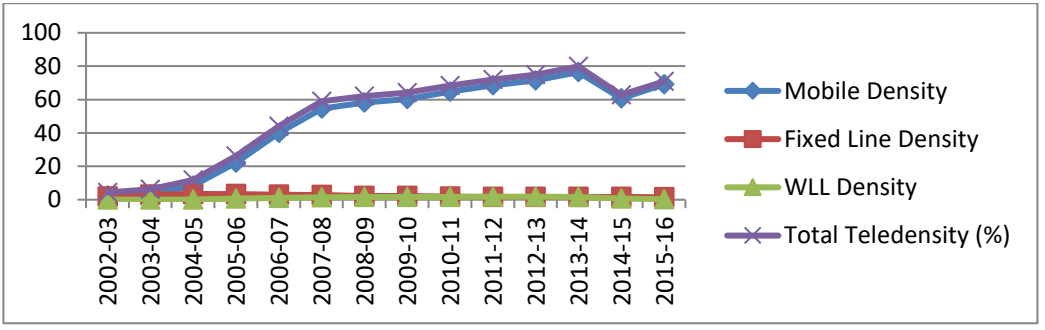
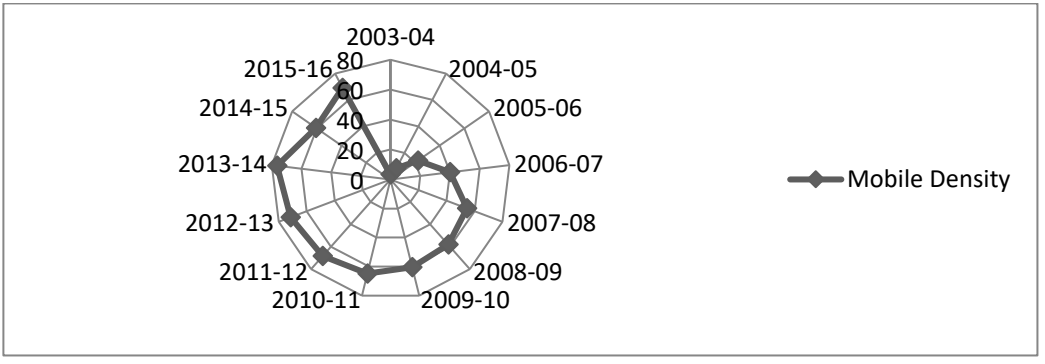
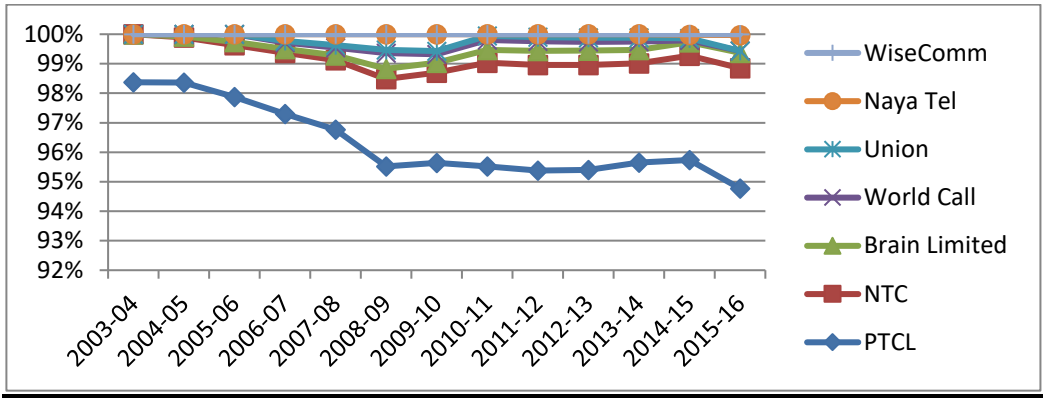


Figure 2: Mobile density during 2002-2016 in Pakistan



There are different companies providing and subscribing mobile users by their own packages and plans. They do provide attractive packages at nominal rates to attract maximum users, due to which PTCL trend of using landline has further declined. Internet services may also provide to the mobile user through packages or through extra payment for the use, which enhances the use of efficient firms' provider of good connectivity and internet services as shown in Figure 3.

Figure 3: Trends of service provider during 2003-2016 in Pakistan



There is no doubt; on the one hand, mobile density has sharply increased during the last 14 years, which leads to increase the share in foreign direct investment as a telecom share in Pakistan. It is good for the economy to boost and provide further incentive to telecom industry and provide attractive rates for the mobile users and internet users at reasonable rate. It is also suggested that when telecom sector flourishes and encourage due t positive trend, it may be the one of the highest share added into FDI in Pakistan as well [figure 4]. Maximum revenue received from cellular in telecom sector during 2003 to 2009 and after 2009, 100% share in telecom industry is obtained from cellular density as shown in figure 5.

Figure 4: Telecommunication share in FDI in Pakistan during 2003-2016

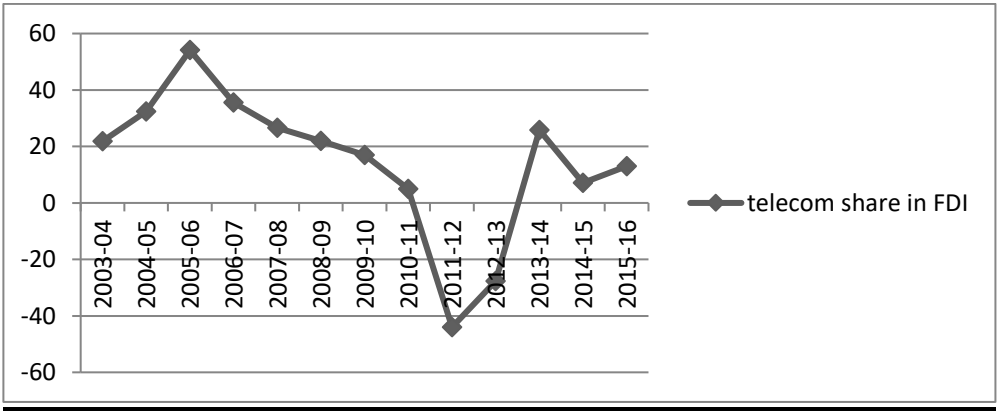
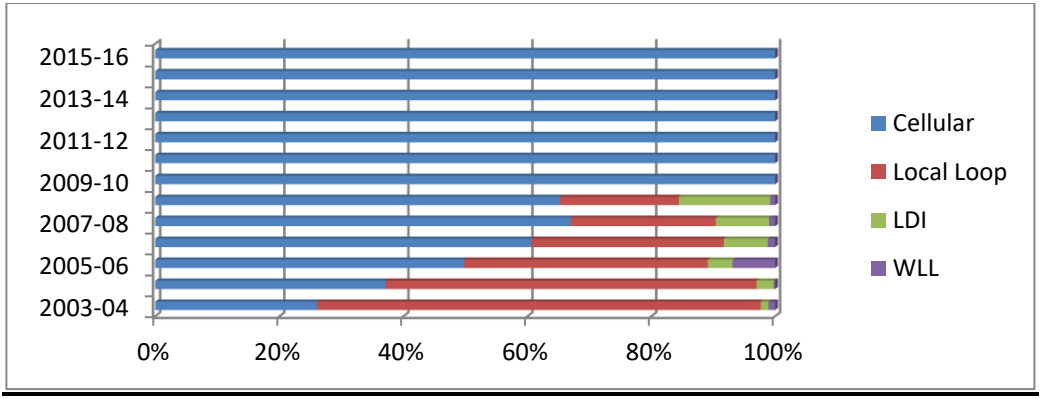


Figure 5: Total Revenue (Rs Millions) in Telecom sector



This study will be very useful for the researchers and for policy makers to see overview of telcom sector performing in Pakistan, and can attract foreign investors to do invest in this sector as there will be high scope and future in Pakistan

2. Literature Review

Roller and Waverman (1996) examined the effect of telecom investment in infrastructure on economic growth using data set of 21 OECD countries for

twenty years. They have applied structural model using telecom investment demand and supply using nonlinear 3SLS. They found that telecom infrastructure and public infrastructure have big difference and showed insignificant impact on economic growth.

Madden and Savage (2000) estimated the telecommunications effect on GDP growth using 43 countries-including 16 developing countries during the period 1975-1990 following the model used by Mankiw, Romer and Weil (1992). They declared the high significance impact of telecom investment on GDP and viewed that such investment should be encouraged.

Torero, Bedi and Chowdhury (2002) analyzed IT sector using panel data for 113 countries. Main findings reveal that high income countries already reached at the optimum level and therefore any nominal change may have very limited effect on the marginal output in telecom industry output. Also there is some significant impact on output of this infrastructural change in high income countries but such change has not been observed in low income countries.

Sridhar (2004) analyzed telecom sector impact on economic growth for developing countries. He tried to study that how economic development could be possible with the enhancement of ICT penetration. He examined the feasibility of telecom sector and viewed that this is one of the core determinant for economic development.

Ding and Haynes (2004) analyzed the importance of telecom sector for China using panel data and explored the regional economic growth through telecom sector. They analyzed the relation between growth of population and telecom infrastructure and declared investment in telecom is the primary source of economic growth and found positive and significant effect.

Cox and Lee (2005) estimated the efficiency in telecom sector for developing countries. They viewed that there is potential for privatizing this sector as independence regulatory authorities can run this sector more

efficiently. They concluded that both privatization and existence of independent regulatory body do not helpful or network expansion in case of Asia Pacific region, though privatization has some positive effect on industrial units.

Negash and Patala (2005) analyzed the telecom sector and economic growth impact by utilizing data of economically developing countries (EDC's). They found high correlation existed between ivestment in telecom sector and GDP growth rate. They further viewed that these EDC's has allocated large proportion of their budget for telecom investment.

Tella, et al. (2007) examined the effect of telecom and economic growth using data set of Nigeria using simultaneous equation model applied 3SLS for the purpose of estimation on the given set of equations. Their findings reveal that there is some good indication of this sector for the growth of an economy and further viewed that land line and cell phone penetration have positive and significant impact on the economic growth of Nigeria. Choudhary, N khan, Aisha, and Salman (2008) viewed after going through in detail about telecom sector reforms in Pakistan. There is no doubt there is difference between public and private sector impact which was analyzed by various survey based studies. They viewed that now more than ninety percent coverage has been provided for mobile users and it could be further improved with the investment in telecom infrastructure and related industries.

Shiu and Lam (2008) estimated the relationship between telecom development and economic growth using panel data for 27 years. They divided the data into lower and higher income groups and found bidirectional relationship European countries part of high income group, while the unidirectional result found for low income countries.

Narayana (2008) also explored the relationship between telecom sector and economic growth using data set for India by further dividing the public and

private sector. He estimated the own price elasticity and income elasticity for this sector and found negative and positive respectively.

Lee, et al. (2009) analyzed the mobile users' growth impact on economic growth for Sub Sahara African countries. They examined two important dimensions for the purpose. One, they estimated the potential endogeneity between telecom expansion and economic growth. Two, they have also measured the degrees of substitutability between mobile cellular and land line telephone explicitly. The results found the positive and significant relationship exist between telecom capital and economic growth.

3. Methodology

Different studies measured the relationship of telecom investment and economic growth by using different variables and different techniques starting from OLS to 3SLS depending on the nature of the data. We have used GDP, Labor force in telecom sector, teledensity, and investment in Telecom industry as main variables followed by the studies (Waverman (2001) Sridhar (2004), Tella (2007) and Narayana (2008).

3.1 Model

The following Cobb Douglas production function [Waverman (2001), Tella (2007) Narayana (2008)] is used for the analysis of the telecom sector and economic growth:

$$GDP = F(K_t, LF_t, TPEN/MTEL/CELL_t).$$

$$Log(GDP_t)=\alpha_0+\alpha_1 log(K_t)+\alpha_2 log\,(LF_t)+\alpha_3 log(TPEN/MTEL/CELL_t)+\varepsilon_{1t} \quad (1)$$

Where,

GDP=Gross domestic product

K_t = investment in Telecom (millions)

LF_t = Labour force worked in telecom industry (millions)

TPEN/MTEL/CELL = Number of telephone per 100 population/sum of main line/cellular teledensity.

In order to make the model linear, we have used double log model as indicated in equation 1.

Due to non-availability of the data on number of telephone per 100 population/sum of main line/cellular teledensity, we have used the total density (TD) as a proxy measured in %.

$$Log(GDP_t)=\alpha_0+\alpha_1 log(K_t)+\alpha_2 log(LF_t)+\alpha_3 log\ (TD) + \varepsilon_{1t} \quad (2)$$

Where, α's show the $Ę_{GDP/K}$, $Ę_{GDP/LF}$, $Ę_{GDP/TD}$ Respectively.

3.2 Data Sources:

This study used data set of 21 years telecom related variables from 1996-2016 of Pakistan. Data have been compiled from Economic Survey of Pakistan, International Financial Statistic (IFS) and Pakistan Telecommunication Authority.

3.3 Variables Definition:

3.3.1. Gross domestic product

Final good and services produced in any country for both resident and non residents are defined as nominal GDP, which is further divided by GDP deflator in order to convert into real GDP, which is used for the analysis in million rupees.

3.3.2. Labor Force(LF):

All the workers who are working in telecom industry during the study period is the part of our data, and data has been gathered from IFS, given in millions.

3.3.3. Telecom investment(K):

All kinds of software and hard ware technology used in telecom sector is the part of telecom investment and may considered as telecom capital as well. It also includes all kinds of installation, existing or new one.

3.3.4. Teledensity (TD):

Teledensity is simply defined as the number of telephones available for the citizens of that particular country in that particular year. This TD is the core variable mostly used in order to show the telecom advancement or development.

4. Results and Discussion

Table 1: Result of Unit Root Test

H_0= Series are stationary **H_1=** otherwise

Variables	**Lags**	**1ST Difference**			**Lags**	**2nd Difference**		
		Intercept	**Trend and intercept**	**none**		**Intercept**	**Trend and Intercept**	**None**
Log GDPG	0	-0.92 (-3.42)	-1.6 (-4.35)	0.47 (-1.99)	0	2.17 (3.55)	2.09 (4.58)	2.22* (2.00)
Log LF	0	4.82* (3.42)	4.39* (4.35)	1.41 (1.99)	0	4.83* (3.55)	3.76 (4.58)	5.35* (2.00)
Log K	0	2.78 (3.42)	2.84 (4.35)	1.95 (1.99)	0	3.35 (3.55)	2.90 (4.58)	3.67* (2.00)
LogTD	0	3.34 (3.42)	5.62* (4.35)	2.52* (1.99)	0	4.53* (3.55)	3.30 (4.58)	4.63* (2.00)

Note: *shows significant level at 5% point.

We have checked the stationarity of the data before estimating the model. All the variables including GDP growth, labor force, capital and teledensity are stationary at levels confirming that we can Ordinary least square for

analysis. We have estimated the equation (2) taking GDPG as dependent variable and LF, telecom investment (K), and TD as explanatory variables in order to see the impact of telecommunication on economic growth of Pakistan during the study period.

As all the variables used in the model are continuous variables.

Also after checking the stationarity it is further confirmed to apply OLS as they are at level. therefore it is most appropriate to apply simple OLS method for estimation.

Table 2: Regression Results

Telecommunication Sector in Pakistan (1996-2016)

Variables	**Coefficients**	**Standard error**	**T - Statistics**
C	-0.3209	0.4808	0.7049
logTD	0.0624	0.0302	2.0386*
logLF	1.1160	0.2708	4.1012**
logK	0.0213	0.0229	0.9301
R-SQUARED	0.9541	F-STATISTIC	68.1557
ADJUSTED R-SQUARED	0.9101	P (F-STATISTIC)	0.0003

**Note: * and ** ** indicates significant at 5, and 1 percent point respectively.

$$LogGDP_t = -0.3209 + 0.0624LogTD + 1.1160LogLF_t + 0.0213LogK_t$$

Double log has taken for the estimation of Eq (2) in order to make equation linear and apply simple Ordinary least square. Teledensity (TD), labor force (LF), capital (K) are used as independent variables, while growth rate of gross domestic product was used as dependent variable. Findings reveal that both variables TD and LF are highly significant, indicating 6.24% increase in GDP with one percent increase in TD, which is good sign also. There is no doubt that the telecom sector is flourishing significantly and help in increasing GDP of Pakistan, as in Pakistan every second person is using cellular facility, internet user and many digital devices. It is not only increase the GDP but also help in increasing the awareness and to the common people of having many information and services at hand without taking botheration. This could be further enhanced with the strong recommendations by ministry to the govt for involvement and encourages investment (both domestic and foreign) in this sector and promote these facilities and awareness campaign to the rural sector of Pakistan too. Similarly labor force engaged in telecom sector increases GDP by 1.1160 percent and significantly affects the growth. Huge employment is generated in this sector, which is expected to further increase with the initiation of establishing franchises and such centers all over the Pakistan. From the result shown for the telecom investment, it may indicate that there is very nominal investment is made in this sector, which could play significant part in enhancing GDP as well.

5. Conclusion and Policy Implications

This study has been undertaken the telecommunication impacts on Pakistan economic growth during 21 years including 1996-2016 using Teledensity, labor force work in telecom sector, Telecom investment and GDP growth rate as core variables for estimation.

The aim of study was to explore that influence of telecom sector's performance on GDP growth during study period. Findings shown in result section indicates the positive association between these two main variables, which is also reflecting that this sector is fast growing and it confirms the

peoples' trust on these offered networks to the great extent. Obviously, it rising trend provides the initiatives and encourages investors to invest more in this sector. With huge increase in teledensity, GDP per capita also improves and showing positive trend.

Most of the related literature indicated that the relationship between telecom sector and economic growth are bidirectional which reflects not only the people's use and trust which on the one side increases their use increase overall economic growth, but also when there is high GDP share in this sector, government of that particular country invest more in this sector of better quality as well. But unfortunately, we do not have bidirectional relationship in developing countries.

We have observed unidirectional relation exist between these two variables, which show that govt could not increase their investment in this sector when there is huge income earned from this sector. Reasons may be priorities, financial constraints or some other reasons as well.

Therefore, there is no doubt that telecom is very important sector and we could not forget its contribution, but for the optimum utilization, we should check its productivity on regular bases and provide health competition. Further research is required to explore how could be optimally mange our funds and resources to get maximum benefits from this and for that we have to opt internal well-structured policies set by developed countries but managing and changing according to our resources, will be very helpful for all in Pakistan.

References

Choudhary, A., N. Khan, A. Abbas, .A. Salman (2008) "Telecom Sector Deregulation, Business Growth and Economic Development" *PICMET 2008 Proceedings,27-31 July,Cape Town, South Africa*.

Cox and Lee (2005) Efficiency and Network Expansion in the Telecommunications Sector: A Study of the Asian Experience, *Indian Journal of Business and Economics*, 4(2), 363-371

Ding,L and, K. Haynes, (2004),"The Role of Telecommunication Infrastructure in Regional Economic Growth of China", *Paper to be presented at the Telecommunications policy Research Conference,Washington,D.C,1-3,2004*

*Roller, L., and L. Waverman, (1996)"*Telecommunication Infrastructure and Economic Development: A Simultaneous Approach", *Discussion papers FS IV69-16.*

Roller, L., and L. Waverman, (2001)"Telecommunication Infrastructure and Control for Country Fixed Effects", *American Economic Review, 91(4):909-923.*

Lee,S. ,J Levendis., and Gutierrez.(2009),"Telecommunications and Economic Growth: An Imperial Analysis of Sub-Saharan Africa",*An International Journal of Policy Modeling,9(2):1-23.*

Madden, G. and S. Savage, (2000),"The International Telecommunication Imbalences: An Empirical Analysis" *Information Economics and policy* 10,173-195.

*Negash,S. and L ,Patala,.(2005),"*Telecommunication Infrastructure in Economically Developing Countries", *The third International Symposium on Ethoiopian Development Studies ,June 18-19,2005,Addis Ababa, Ethopia.*

Narayana,M.(2008),"Telecommunication Services and Economic Growth: Evidence from India", *Discussion paper University of Tokyo CIRJE-F-54*5.

Pakistan, Govt of (Various Issues), Labor Force Survey.

Pakistan, Govt of (Various Issues), International Financial Statistics,

Shiu, A., and P Lam., (2008)."Causal Relationship between Telecommunications and Economic Growth: A Study of 105Countries. *Forthcoming in Regional Studies.*

Sridhar, K., (2004)"Telecommunication Infrastructure and Economic Growth: Evidence from Developing Countries", *Working Paper #14, National Institute of Public Finance and Policy (New Delhi).*

Torero, M., S Choudary, and A Bedi. (2002), "Telecommunications Infrastructure and Economic Growth: A Cross Country Analysis", *Center for Development Research and Institute of Social Studies (ZEF) University of Bonn Germany.*

Tella,S ,L. Amaghion yeodiwe,B. Adesoye, (2007), "Telecommunications Infrastructure and Economic Growth: Evidence from Nigeria *"Paper submitted for the UN-IDEP and AFEA joint conference on "Sector-led Growth in Africa and Implication for he Development" to be held in Dakar, Senegal from November 8-11, 2007.*

Appendix

Table A: % of total teledensity

Years	Mobile Density	Fixed Line Density	WLL Density	Total Teledensity (%)
2002-03	2.32	1.92	0.07	4.31
2003-04	3.23	3	0.02	6.25
2004-05	8.3	3.43	0.17	11.89
2005-06	22.21	3.37	0.66	26.26
2006-07	39.94	3.04	1.08	44.06
2007-08	54.6	2.7	1.4	58.9
2008-09	58.2	2.2	1.6	62
2009-10	60.4	2.16	1.6	64.1
2010-11	64.8	1.9	1.7	68.4
2011-12	68.5	1.7	1.8	72
2012-13	71.4	1.7	1.8	74.9
2013-14	76.46	1.73	1.69	79.89
2014-15	60.7	1.73	0.6	62.9
2015-16	69.12	1.46	0.23	70.81

Table B: Annual Fixed Local Line Subscribers during 2002-2016.

years	PTCL	NTC	Brain Limited	World Call	Union	Naya Tel	Total	Total (millions)	cum f.
2003-04	4,428,900	73,330			-		4,501,171	4.5	4.5
2004-05	5,190,899	81,027	1,520	4,100	-		5,277,531	5.28	9.78
2005-06	5,128,442	92,163	5,880	13,327	200		5,240,012	5.24	15.02
2006-07	4,676,204	99,665	6,089	10,748	2,500	11,000	4,806,206	4.81	19.82
2007-08	4,273,548	103,991	7,376	11,502	3,500	16,500	4,416,417	4.42	24.24
2008-09	3,375,103	104,538	12,234	18,850	3,700	18,850	3,533,275	3.53	27.77
2009-10	3,268,642	104,819	11,267	9,874	3,700	19,500	3,417,802	3.42	31.19
2010-11	2,881,684	105,954	13,280	10,085	4,200	1,649	3,016,852	3.02	34.21
2011-12	2,847,597	107,095	14,076	9,830	4,175	2,860	2,985,633	2.99	37.19
2012-13	2,885,144	107,631	14,662	8,977	4,175	3,699	3,024,288	3.02	40.22
2013-14	3,034,361	106,738	14,410	8,887	4,175	3,773	3,172,344	3.17	43.39

2014-15	3,007,807	110,957	14,410	1,977	2,150	3,699	3,141,700	3.14	46.53
2015-16	2,658,538	114,535	14,410	1,977	3125	15,000	2,805,255	2.81	49.34

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Debreu, G. (1951). The coefficient of resource utilization. *Econometrica 19*(3): 273-292.

Din, M., Ghani, E., & Siddiqui. O (2003). Openness and economic growth in Pakistan. *The Pakistan Development Review* 42(4): 795-807.

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Published by the Department of Economics, GC University, Katchery Road, Lahore 54000, Pakistan.
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