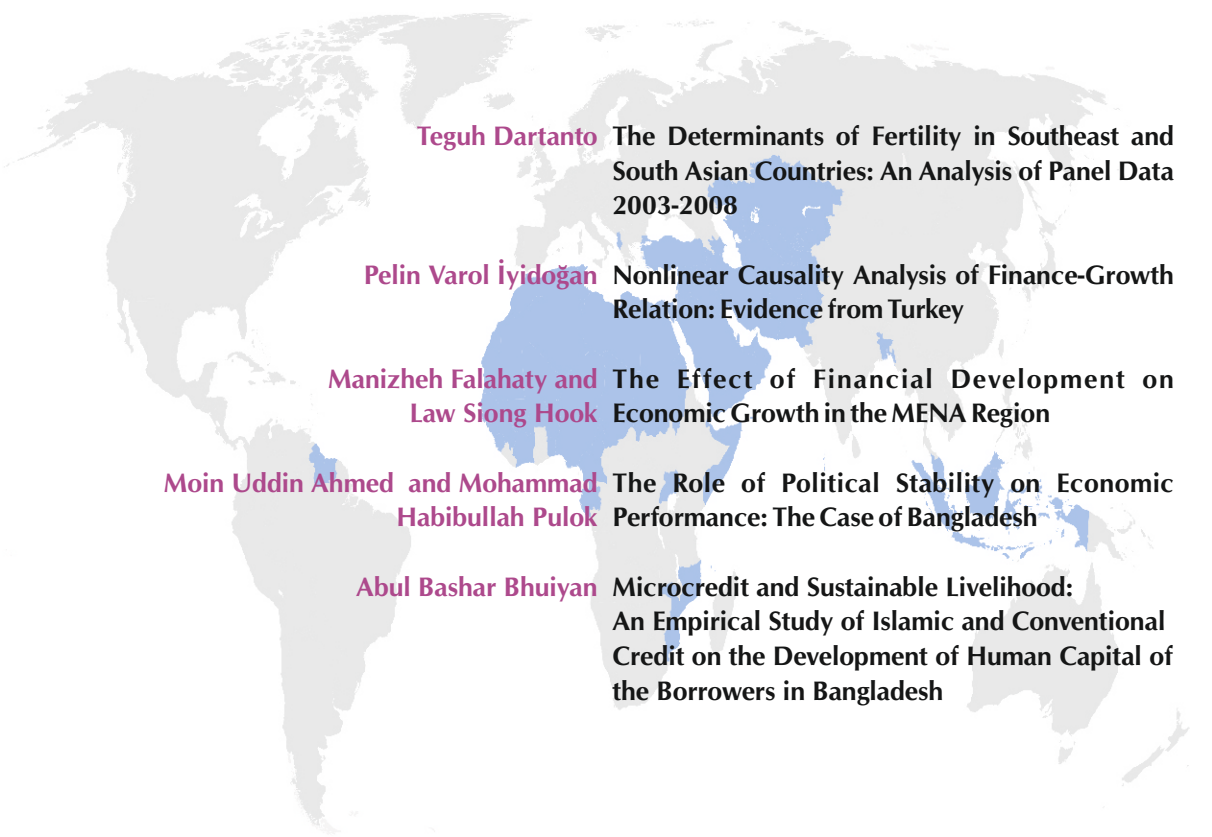


Journal of Economic Cooperation & Development



Teguh Dartanto The Determinants of Fertility in Southeast and South Asian Countries: An Analysis of Panel Data 2003-2008

Pelin Varol İyidoğan Nonlinear Causality Analysis of Finance-Growth Relation: Evidence from Turkey

Manizheh Falahaty and Law Siong Hook The Effect of Financial Development on Economic Growth in the MENA Region

Moin Uddin Ahmed and Mohammad Habibullah Pulok The Role of Political Stability on Economic Performance: The Case of Bangladesh

Abul Bashar Bhuiyan Microcredit and Sustainable Livelihood: An Empirical Study of Islamic and Conventional Credit on the Development of Human Capital of the Borrowers in Bangladesh

JOURNAL OF ECONOMIC COOPERATION AND DEVELOPMENT

Editor in Chief: Prof. Savaş Alpay, SESRIC

Co-editors: Dr. Syed Mahmud, Bilkent University, Turkey
Dr. M. Kabir Hassan, University of New Orleans, USA

Editorial Board Members:

Dr. Abdel-Hameed Bashir
Islamic Development Bank, Saudi Arabia

Dr. Meryem Duygun Fethi
University of Leicester, UK

Dr. Abdeslam Marfouk
Université Libre de Bruxelles, Belgium

Dr. Ömer Demir
The Council of Higher Education, Turkey

Dr. Asad Zaman
International Institute of Islamic Economics,
Pakistan

Dr. Salina H. Kassim
International Islamic University, Malaysia

Dr. Henning Grosse Ruse - Khan
University of Leicester, UK

Dr. Syed Ahmad
McMaster University, Canada

Dr. İsmail Sağlam
TOBB University of Economics and, Turkey

Dr. Turan Erol
Prime Ministry, Turkey

Dr. Kivılcım Metin-Özcan
Bilkent University, Turkey

Dr. Usamah Ahmed Uthman
King Fahd University of Petroleum and
Minerals, Saudi Arabia

Aims and Scope:

Journal of Economic Cooperation and Development (ISSN 1308-7800), previously titled the *Journal of Economic Cooperation among Islamic Countries* (ISSN 0252 - 953X), is a journal of applied research in development economics. The Journal welcomes original papers dealing with important economic and social issues of immediate concern to the developing countries. It will give special attention to those papers which deal with the potentials for and possibilities of promoting and expanding economic and technical cooperation among the developing countries. The Journal appears in English, in March, June, September and December. The Journal is indexed/abstracted in JEL/Econlit.

The *Journal of Economic Cooperation and Development* is printed and published quarterly by the SESRIC. The SESRIC cannot be held responsible for errors or any consequences arising from the use of information contained in the *Journal*. The views and opinions expressed do not necessarily reflect those of the SESRIC. The articles in this *Journal* may be freely quoted or reprinted provided that the source is mentioned and a copy of the publication containing the quotation or reprint is sent to the SESRIC.

Subscriptions: For mail orders and subscriptions, write to: Publications Department, SESRIC, Kudüs Cad, No. 9, ORAN, 06450 Ankara, Turkey. Phone: (90-312) 4686172; Fax: (90-312) 4685726; E-mail: pubs@sesric.org; Home Page: www.sesric.org

© All rights reserved.

ISSN 1308 – 7800

Volume 34, No. 3, September 2013

J o u r n a l o f
E c o n o m i c C o o p e r a t i o n
& D e v e l o p m e n t



Statistical Economic and Social Research
and Training Centre for Islamic Countries
(SESRIC)

Contents

Teguh Dartanto

The Determinants of Fertility in Southeast and South Asian Countries:
An Analysis of Panel Data 2003-2008..... 1

Pelin Varol İyidoğan

Nonlinear Causality Analysis of Finance-Growth Relation:
Evidence from Turkey..... 23

Manizheh Falahaty and Law Siong Hook

The Effect of Financial Development on Economic Growth in the
MENA Region 35

Moin Uddin Ahmed and Mohammad Habibullah Pulok

The Role of Political Stability on Economic Performance:
The Case of Bangladesh..... 61

Abul Bashar Bhuiyan and Arman Hassan

Microcredit and Sustainable Livelihood: An Empirical Study of Islamic
and Conventional Credit on the Development of Human Capital of the
Borrowers in Bangladesh 101

EDITORIAL NOTE

Five papers make up this issue. **The first one, titled *The Determinants of Fertility in Southeast and South Asian Countries: An Analysis of Panel Data 2003-2008*** by *Teguh Dartanto* aims to quantitatively explore the factors influencing fertility rate in Southeast and South Asia by applying econometric model of the panel data. Applying the fixed effect estimation method on the 2003-2008 panel data, this study found that the infant mortality rate is an important factor influencing the high fertility rate in this area. The high elasticity of infant mortality rate implies that parents cover their risk from losing children by producing more children. Surprisingly, the demand for children (fertility rate) follows the demand of normal goods in which one digit increase in log income per capita will increase the fertility rate by 0.334 births per woman.

The second paper, titled ***Nonlinear Causality Analysis of Finance-Growth Relation: Evidence from Turkey*** by *Pelin Varol İyidoğan*, aims to examine the causal relation between financial deepening and economic growth by means of Smooth Transition Autoregressive (STAR) model-based Granger causality analysis applied to the monthly data of Turkey over the period 1998M1-2012M3. The results show that non-linear structure of the series should be considered as the evidence from linear and non-linear causality analysis differs. According to non-linear Granger causality analysis, the financial deepening is found to be causing variable for economic growth in Turkey.

The third paper, titled ***The Effect of Financial Development on Economic Growth in the MENA Region*** by *Manizheh Falahaty* and *Law Siong Hook*, provides new evidence that sheds light on the effect of financial development on economic growth in nine MENA countries over the period of 1991–2009. The empirical results using the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) estimators reveal financial development is a statistically significant determinant of economic growth, but the impact is more apparent on stock market development than banking sector development. This finding suggests that improving the functioning of the banking sector is crucial to spur economic growth in MENA countries.

The fourth paper, titled **The Role of Political Stability on Economic Performance: The Case of Bangladesh** by *Moin Uddin Ahmed* and *Mohammad Habibullah Pulok*, investigates the direct effect of political stability on the economic performance of Bangladesh for the period of 1984-2009. Two different techniques of cointegration have been used to analyse the long run and short run effect. The Engle-Granger method of cointegration did not find any cointegration while Bound Testing Approach did. Once cointegration is found the long run relationship as well as the short run relationship is established. The findings indicate that political stability has negative effect on economic performance in long term while the short run effect is positive. This result is rare but not unique as it supports to the work of Goldsmith (1987) to shed light on Mancur Olson's theory of political stability and growth.

The last and fifth paper, titled **Microcredit and Sustainable Livelihood: An Empirical Study of Islamic and Conventional Credit on the Development of Human Capital of the Borrowers in Bangladesh** by *Abul Bashar Bhuiyan* and *Arman Hassan*, investigates the impact of microcredit on sustainable livelihood of the borrowers of Grameen Bank and Islami Bank microfinance schemes and compares the contributions between these two of MFIs in Bangladesh. Towards the achievement of its objectives, the present study has used descriptive statistical and econometric techniques. The study found that access to credit has contributed towards improving sustainable livelihood of the borrowers of both of MFIs respectively. Furthermore, the findings also revealed that Islami Bank microcredit respondents have a better record of using credit for income generating activities for reducing vulnerability as well as improving livelihood status compared to the Grameen Bank microcredit respondents. The present study recommends for policy considerations for the successful and effective operation of microfinance programs through the increase of controlling authority to participate in the operation of loan uses, the operation of household expenditure as well as overall household activities in Bangladesh.

The Determinants of Fertility in Southeast and South Asian Countries: An Analysis of Panel Data 2003-2008

Teguh Dartanto*

The fertility rate in Southeast and South Asia is relatively high compared to other region in the world, but the trend tends to decrease rapidly. This paper aims to quantitatively explore the factors influencing fertility rate in Southeast and South Asia by applying econometric model of the panel data. Applying the fixed effect estimation method on the 2003-2008 panel data, this study found that the infant mortality rate is an important factor influencing the high fertility rate in this area. The high elasticity of infant mortality rate implies that parents cover their risk from losing children by producing more children. Surprisingly, the demand for children (fertility rate) follows the demand of normal goods in which one digit increase in log income per capita will increase the fertility rate by 0.334 births per woman.

1. Introduction

Southeast and South Asia¹, where almost 30 percent of the world population are living, have a unique demographic characteristic. The prominent demographic characteristics in this region are both high fertility and high infant mortality rate, but the trend tends to decrease rapidly. Total fertility rate for Southeast Asia in the late 1980s was 3.8 births per woman while in 2008 the fertility rate was 2.3 births per woman. During this period, the fertility rate in this region has declined by almost 1.5 births per woman. Recent data shows that between 2003 and 2008, the fertility rate has decreased 0.3 births per woman and the

*Researcher, Institute for Economic and Social Research (LPEM FEUI), Department of Economics, University of Indonesia Email Address: teguh@lpem-feui.org

¹ Countries included in Southeast Asia are Indonesia, Malaysia, Singapore, Philippines, Thailand, Viet Nam, Laos, Myanmar, Cambodia and Brunei Darussalam, while countries included in South Asia are India, Sri Lanka, Maldives, Nepal, Pakistan, Afghanistan, Bhutan and Bangladesh.

2 The Determinants of Fertility in Southeast and South Asian Countries: An Analysis of Panel Data 2003-2008

infant mortality rate also has declined 19 child deaths per-thousand births (under-five infant mortality rate) in Southeast Asia. While in South Asian countries, by 2003 the fertility rate was 4.29 births per woman and it decreased by 1 birth per woman during this period. Moreover, under-five infant mortality rate has also decreased sharply from 102.5 per thousand births (2003) to 81.63 per thousand births (2008)².

According to the survey conducted by Hirschman and Guest (1990) in four Southeast Asian countries (Indonesia, Malaysia, Philippines and Thailand), the declining of fertility rate was caused by several factors such as postponed marriage, increasing coverage of access to quality reproductive health services, declining infant mortality rate, family structure, increasing adult education level particularly for female as well, cultural tradition and religious beliefs. This finding supports The Demographic Transition Theory that socioeconomic factors change the incentives for childbearing (Hirschman, 1994). The rapid development in Southeast Asia and South Asia has changed the economic structure from the agricultural based to an industrial based, which led to a rapid decreasing of fertility rate in this region. In the past, children were viewed as the source of labor force in agriculture activity therefore families bore more children to help them in the agricultural production. In Southeast and South Asia, a rapid social development in education and health has also been observed over two decades. Adult literacy rate and health indicators are surprisingly high in this area. Most research findings in human fertility behavior frequently observed that there is a negative correlation between parent's education, especially female education, and fertility rate. Higher female education will correlate with higher opportunity to get good jobs, better salary and higher career advances, however it will also increase the opportunity cost for bearing children. On the other hand, the improvement of health indicators such as increasing the number of doctors, hospitals and midwives will massively reduce infant mortality rate. A low infant mortality rate indicates a low risk of losing children before they grow up. Therefore, the parents may reduce the demand for children, which leads to less fertility rate.

² UNESCAP Population Data Set, accessed in 10 April 2010.

The rapid change in economic development in this region has also increased income per capita and the standard of living. During the five years period, income per capita of Southeast Asian countries has increased by more than 27 percent or 5.4 percent per year. Meanwhile, the growth rate of income per capita in South Asian countries is 6 percent annually. Higher income indicates the family has higher ability to support children. If we were to view a child as a normal good, then increased income will increase the demand for children and the increased cost of raising children will reduce the demand for children. Therefore, macroeconomic variables such as income per capita and cost might be important factors for household/family's decision on demand for children.

The empirical study on the fertility rate in South and Southeast Asia are relatively scarce both in numbers and in variation of methodologies. The study conducted by Hirschman and Guest using non-parametric method/descriptive analysis has found sources of declining fertility rates but they could not find which factor most influenced the declining rate. This paper aims to explore the important factors that influence the determinants of fertility rate in South and Southeast Asia by utilizing econometric model of panel data. This study focuses on Southeast and South Asian countries, because they have a fairly rapid social and economic development, a relatively similar economic structure and unique demographic characteristics. In addition, this study will also briefly elaborate policy recommendations such as access to public health care in order to decrease fertility and infant mortality rates.

The next section reviews the economic theories of fertility and previous researches addressing fertility issues and it will be continued to present an econometric model and an estimation procedure of panel data to estimate the fertility rate. The fourth section analyzes the determinants of fertility rate in this region. Finally, this study proposes policies how to reduce fertility rate and infant mortality rate.

2. The Theoretical Framework

2.1 The Economic Theories Of Fertility

Becker (1960) said that for most parents, children are viewed as durable goods, primarily a consumer's durable, which yields money income,

4 The Determinants of Fertility in Southeast and South Asian Countries:
An Analysis of Panel Data 2003-2008

satisfaction, to parents. Therefore, the theory of the demand for consumer durables is also a useful framework for analyzing the demand for children. Becker argued that demand for children is determined by income, child costs, knowledge, uncertainty and tastes. De Tray (1973) viewed that children are viewed as home-produced durable assets from whom parents consume a flow of child services such as satisfaction and happiness. Households can increase their production of child services either by increasing the numbers of children (quantity) or by increasing the resource investment (quality) in existing children.

Turkey (1989), using an evolutionary theory, concluded that social and economic success has almost led to an increased in reproductive success. It has been widely accepted as a theoretical framework that the change of human fertility occurs through changes in three variables: supply of children, demand for children and cost of fertility regulation. Hirschman (1994) summarized that there are two major economic approaches to the study of fertility change. First is the ‘new home economics’ approach, which is the application of microeconomic theory to family issues, including fertility. The second approach is the synthesis of economic and sociological theories of fertility presented in the supply and demand framework of Richard Easterlin.

Following the first approach, it will be derived the demand for children. Let's assume there are only two goods, child (X_c) with the price P_c (opportunity cost) and child (X_g) with the price P_g and the family income is exogenous variable (Y). A family utility function follows Cob Douglass Utility Function ($U(X_c, X_g) = X_c^\alpha X_g^\beta$). Then the family will optimize their utility subject to budget constraint.

From the maximizing utility, X_c is the Marshallian demand for children as a function of income and opportunity cost. Higher income will increase the demand for children, whereas opportunity cost will lower demand for children.

$$\underset{X_c, X_g}{\text{Max}} U(X_c, X_g) = X_c^\alpha X_g^\beta$$

$$\text{subject to } P_c X_c + P_g X_g = Y$$

$$L = X_c^\alpha X_g^\beta + \lambda(Y - P_c X_c - P_g X_g)$$

$$X_c = \frac{\alpha Y}{(\alpha + \beta)P_c}$$

$$X_g = \frac{\beta Y}{(\alpha + \beta)P_g}$$

2.2 Previous Research on Fertility Issues

The quantitative study of the determinants of fertility has received much attention in the demographic research for many decades. Friedlander and Morris (1967), using the cross section data of 85 countries³, explored the economic, social, political, and cultural determinants of fertility behavior in different countries. They found the positive and statistically significant relations between fertility and illiteracy, child mortality, proportion of agricultural population, proportion of nonfarm self employment, and overcrowded housing. They also showed a significant negative relationship between fertility and communism. Heer (1966), utilizing data collected from 41 nations during the 1950's, found that fertility is directly associated with per capita income when controls for other relevant variables are instituted. On the other hand, per capita newspaper circulation as index of education and infant mortality are inversely related to fertility.

Yamada (1984) studied the dynamic relationship between two demographic variables--the infant mortality rate and the fertility rate--using time series methodology. This study found that infant mortality and fertility are not independent but rather jointly determined. A decline in infant mortality that is due to an increase in real income per capita triggers a subsequent decline in fertility. Ainsworth et al. (1996) observed the impact of women's schooling on fertility and

³ The data collected for this study are confined to the period of the late 1950's and early 1960's

contraceptive's use in fourteen Sub-Saharan African Countries. They found that female schooling has a negative and statistically significant relationship with cumulative fertility in all of the countries, in both urban and rural areas.

Al Qudsi (1998) estimated the impact of cultural and economic factors on the demand for children based on data collected from Arabic countries. Fertility is a function of real GDP per capita, rate of urbanization, infant mortality rate and female education. The obtained results strongly support the hypothesis that cross-country heterogeneity buttresses differentiated fertility and that female education mitigates high fertility. Child mortality and parents' preferences for sons positively affect fertility⁴. In addition, demand for children is price and income inelastic.

Panopoulou and Tsakloglou (1999) examined the relationship between fertility and socioeconomic variables within a cross-country framework. The empirical results showed that fertility is negatively related with female education, urbanization and family planning but is positively related with the levels of infant mortality and economic development. No significant relationship was found between fertility and female labor force participation.

According to the previous researches, it can generally be concluded that the fertility rate is inversely related to female education and ratio of urban population. Conversely, it is positively correlated with infant mortality rate and economic development particularly an increase in per capita income.

3. Model, Data and Estimation Method

3.1 Econometric Model

According to the economic theory, previous researches, and available data, this study proposes an econometric panel data model for estimating the fertility rate in Southeast and South Asia. The use of this panel data allows us to control unobservable country-specific characteristics that may be correlated with fertility behavior. Some variables may be

⁴ The son preference can reduce fertility since sex selective abortion leads to female fetus being aborted.

country invariant or time invariant that may affect fertility. Other variables may be hard to obtain and their omission leads to bias in the resulting estimates. Panel data are able to control for these countries and time invariant variables whereas a time series or cross section study cannot do. In general, failure to condition on these unobservable will result in inconsistent estimates of the coefficients of these variables (Baltagi, 1995). Examples of factors that are unobservable in our data but could induce country heterogeneity include country differences in the distribution of income among households and according to geographic location.

According to the Marshallian Demand Function, if children are viewed as normal goods, then the income per capita should be positively correlated with demand for children while cost of raising children should be negatively correlated with demand for children⁵. It is assumed that a current income per capita and a current consumer price index do not directly influence the demand for children but there is a two-year time lag. This assumption is based on the fact that a normal pregnancy period is approximately nine months. Therefore, the current condition of income and price will influence the fertility rate in the next year or two years later⁶.

In addition to economic variables, this model also includes other social variables such as child mortality rate, female education, and ratio of urban population. A child mortality rate should be positively correlated to the fertility rate. A high child mortality rate implies that parents will cover their risk of losing children by producing more children. On the contrary, an increase in female education will lower fertility rate because high female education correlates with a high opportunity cost of having children. In addition, the shift of the economic structure from agricultural field to industrial or service field will lower the fertility rate. Therefore, the ratio of urban population should negatively influence the fertility rate.

⁵ The demand for children in this research refers to the fertility rate.

⁶ For technical convenience reason, income per capita is converted in to logarithm value.

8 The Determinants of Fertility in Southeast and South Asian Countries:
An Analysis of Panel Data 2003-2008

The theoretical panel data model is shown as follow:

$$y_{it} = \alpha_i + \beta_i' x_{it} + \varepsilon_{it} \quad (i = 1, 2, \dots, n, t = 1, 2, \dots, T),$$

Where

y_{it} = a dependent variable

x_{it} = vector of independent variables

ε_{it} = error term i.i.d $E(\varepsilon_{it}) = 0$, $E(\varepsilon_{it}^2) = \sigma_\varepsilon^2$, $\{\varepsilon_{it}\}$ and $\{x_{it}\}$

are independent

it = the i -th country at time- t

Based on theoretical model above, it proposes a panel data model for estimating the determinants of fertility rate in Southeast and South Asian countries as follow:

$$TFR_{it} = \alpha_i + \beta_1 IMR_{it} + \beta_2 SER_{it} + \beta_3 URB_{it} + \beta_4 \log(PERCAP_{it}(-2)) + \beta_5 CPI_{it}(-2) + \varepsilon_{it}$$

Table 1. Variable explanation

No.	Variable	Symbol	Data Explanation
1	Fertility Rate	TFR	Total fertility rate per woman
2	Infant Mortality Rate	IMR	Under five mortality rate (per 1000 birth).
3	Female Education	SER	Gross Secondary Enrollment Ratio by Female (per cent)
4	Income per-capita	PERCAP	Income per-capita (US\$) (in logarithm value)
5	Price	CPI	Consumer Price Index
6	Urban Population	URB	Ratio between urban population and total population (per cent)

Source: Author

3.2 Estimation Methods

There are three approaches for estimating the coefficients in the panel model: pooled estimation, fixed effect, and random effect. The choice of estimation method depends on the treatment on the individual effect (α_i), which is taken to be constant over time t and specific to the individual cross-section unit i . If we take α_i to be the same across all units, then ordinary least squares/pooled estimation provides consistent and efficient of α and β . The fixed effect approach takes α_i to be group specific constant term in the regression model. The random effect approach specifies that α_i is a group specific disturbance, similar to ε_{it} except that for each group, there is but a single unit that enters the regression identically in each period (Greene, 2000).

Since this study would like to know the individual country effect, the possible estimation method is either a fixed effect or a random effect. Both of the approaches treat the individual effect (α_i) to be individual/country specific so the outcome of α_i will be different across all country. Greene (2000) stated that the fixed effect model is a reasonable approach when we are confident that the differences between cross section units can be viewed as parametric shifts of the regression function. This model might be viewed as applying only to the cross-sectional unit in the study, not to additional units outside the sample. In other settings, it might be more appropriate to view individual specific constant term as randomly distributed across cross-sectional units. This view will be appropriate if we believe that the sample of cross sectional units was drawn from a large sample population.

The estimation method of the fixed effect states as follows:

$$y_{it} = i\alpha_{it} + X_{it}\beta + \varepsilon_{it} \quad (i = 1, 2, \dots, n, t=1, 2, \dots, T),$$

or in a vector form

$$y = D\alpha + X\beta + \varepsilon$$

Where D is the $nT \times n$ matrix of dummy variable. This model is usually referred as the Least Square Dummy Variable (LSDV) model, which can be estimated using OLS estimation. The OLS estimator of α and β are as follow:

$$\begin{aligned}\beta &= [X' M_d X]^{-1} [X' M_d Y], \\ M_d &= I - D(D'D)^{-1} D', \\ \alpha &= [D'D]^{-1} D'(y - X\beta),\end{aligned}$$

The estimation method of the random effect states as below:

$$y_{it} = \alpha + \beta' x_{it} + u_i + \varepsilon_{it},$$

Where u_i is the random effect specific to the i-th country. We assume that $\{u_i\}$ and $\{\varepsilon_{it}\}$ are independent. We have

$$\Sigma^* = \text{Var}(u_i + \varepsilon_{it}) = \begin{bmatrix} \sigma_u^2 & \cdots & \sigma_u^2 \\ \vdots & \ddots & \vdots \\ \sigma_u^2 & \cdots & \sigma_u^2 \end{bmatrix} + \begin{bmatrix} \sigma_\varepsilon^2 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & \sigma_\varepsilon^2 \end{bmatrix}$$

This model is estimated by Generalized Least Squared (GLS). The GLS estimator of $\gamma' = (\alpha, \beta')$ is:

$$\hat{\gamma}_{GLS} = (X^* \Sigma^{*-1} X^*)^{-1} X^* \Sigma^{*-1} Y$$

Where, $X^* = [e, X]$, e is the $NT \times 1$ vector of ones, and

$$\Sigma^* = I_N \otimes \Sigma$$

We apply the Hausman Test to check whether the fixed effect or the random effect is an appropriate estimation method for this data. The Hausman test is:

$$H_0 = E(u_i | x_{it}) = 0 \quad (\text{Random Effect})$$

$$H_1 = E(u_i | x_{it}) \neq 0 \quad (\text{Fixed Effect})$$

If the $\chi^2_{statistic}$ is larger than $\chi^2_{k,\alpha}$, then H_0 can be rejected. It means the fixed effect will result unbiased and efficient estimator.

3.3 Data Set

The Southeast Asian countries included in this study are Indonesia, Malaysia, Thailand, Philippines, Vietnam, Cambodia and Laos. South Asian countries are India, Pakistan, Afghanistan, Bangladesh and Sri Lanka. This study cannot include all the countries in Southeast and South Asian region due to the differences in social and economic structure and also available data.

This study mostly utilized the ESCAP population data set from 2003 to 2008 published by United Nations Economic and Social Commission for Asia and the Pacific and also The Human Development Report publications published by United Nations for Development Program (UNDP). In 2006, there were no publications of Gross Secondary Enrollment Ratio. Therefore, the extrapolation method is applied to substitute the missing data. To complete the data set, especially for macroeconomic variables such as income per capita and consumer price index, this study utilizes other sources such as Asian Development Bank, World Bank, ESR U.S Department of Agriculture and individual country's publications.

4. The Determinants of Fertility Rate

4.1 The Panel Estimation of Fertility's Determinants

The Hausman test shows that the value of Chi-Square=16.63 (p-value=0.005) is larger than the critical value therefore there H_0 (random effect) can be rejected based on the aforementioned fact. The fixed effect estimated with the Least Square Dummy Variable (LSDV) will give a minimum variance/efficient estimator⁷. The LSDV estimation result is as below:

$$TFR_{it} = 1.351 + 0.018*IMR_{it} - 0.021*SER_{it} - 0.018*URB_{it} + 0.334*LOG(PERCAP_{it}(-2)) - 0.001*CPI_{it}(-2)$$

(1.66)* (37.77)*** (-6.43)*** (-2.31)** (2.70)** (-2.12)**

⁷ The estimation results satisfy statistical requirements and econometric assumptions. However, DW statistic (1.402) is relatively low indicating there is a serial correlation in this estimation. However, we have difficulties to omit this problem in the panel model.

12 The Determinants of Fertility in Southeast and South Asian Countries:
An Analysis of Panel Data 2003-2008

$N = 48$, $F \text{ Stat} = 108725$, $R\text{-squared} = 0.9982$, $S.E. \text{ of Regression} = 0.0742$

***=significant at 1% level, **=significant at 5% level, *=significant at 10% level

Figures in parenthesis are *t*-statistic.

Table 2. Country/individual effect⁸

<i>Cambodia</i> = -0.715	<i>Indonesia</i> = -0.104	<i>Laos</i> = 0.019
<i>Malaysia</i> = 0.773	<i>Philippines</i> = 1.678	<i>Thailand</i> = -0.751
<i>Viet Nam</i> = -0.006	<i>Afghanistan</i> = 0.375	<i>Bangladesh</i> = -0.188
<i>India</i> = -0.723	<i>Pakistan</i> = -0.431	<i>Sri Lanka</i> = 0.112

Source: Author's calculation

According to the LSDV result, all variable signs fit with the theoretical foundation in which the infant mortality rate and income per capita are statistically significant and positively increasing the fertility rate. On the other hand, the consumer price index, female secondary enrollment ratio and urban population ratio are inversely and significantly related to the fertility rate. A positive income per capita and a negative consumer price index show that children can be viewed as normal goods in the household utility function. Therefore, the application of microeconomic theory is suitable in analyzing fertility issues. These findings support the previous researches done by Becker (1960), Heer (1966), Friedlander and Morris (1967), and Rosenzweig (1977), Yamada (1984), Hirschman and Guest (1990), Hirschman (1994), Ainsworth et al. (1996), Al Qudsi (1998), and Panopoulou and Tsakloglou (1999).

4.2 Socio-Economic Indicators and Fertility Rate *Infant Mortality Rate*

According to the estimation result, infant mortality rate (under-five mortality rate) is an important factor influencing the increase in fertility rate in Southeast and South Asian countries. When infant mortality rate increases by one child, it will increase fertility rate by 0.018 births per

⁸ Table 2 shows that Philippines has the highest country effect while India has the lowest country effect. If all independent variables in all country are same or under *ceteris paribus* condition, the fertility rate in Philippines is the highest in this region.

woman. This result shows that the household behavior is risk averse. A high infant mortality rate means a high risk of child's death before growing up. If the households/parents are rational agents, they will reduce their risk by producing more children. Having more children will increase the chance to raise a healthy child highly. If children are viewed as an investment good, the act of producing more children will reduce their risk.

High infant mortality rate is positively correlated with malnutrition of children, low number of doctors, birth unattended by midwives, no access to health services, remote areas, uneducated parents, and poverty. In remote area where most poor and uneducated people live, the births usually have common characteristics like no access to health facilities and lack of midwife services in which is exactly meant by quality reproductive health services. A high infant mortality rate sometimes is followed by a high mother mortality rate and vice versa. The family without a mother will reduce the ability to raise and to bear children. Therefore the chance of losing children will be higher. This condition is known as "Death Trap".

Female Education

The coefficient of female secondary enrollment ratio is equal to -0.021 which means one percentage point increase in female secondary enrollment ratio will decrease fertility rate by 0.021 births per woman. Higher female education will raise the female average marriage age because they have to spend three years to complete junior or senior high school. Female marriage age will shorten productive time for producing babies. Moreover, higher female education will correlate with a higher opportunity to get good jobs, good salary and higher career advances, therefore it will increase the opportunity cost for bearing children.

The more educated female are, the more rational they will be. Consequently, they will consider more aspects in advance such as income, cost of bearing children, future child education before they decide to have children. The female education also correlates indirectly with lowering fertility rate through a positive externality of education. An educated female has more understanding of health issues, which will lower infant mortality rate but result in a lower fertility rate. Michael

(1973) had observed the negative correlation between household education and fertility that more educated couples achieved greater contraceptive efficiency.

Ratio Urban Population

The change of economic structure from an agriculture based to an industrial/service based industry which is shown by a negative urban population coefficient also leads to a decreasing fertility rate. One percentage point increase in urban population will reduce fertility rate by 0.009 births per woman. In order to survive in urban area, both male and female parent need to work in order to satisfy basic needs. Therefore, having more children in urban area will increase both direct costs such as meals, education, babysitter and maid, and also an opportunity cost especially for working mother.

The urban community is usually more concerned with quality of children rather than quantity of children. They will produce fewer children and allocate more resources to increase living qualities for their children. A high ratio of urban population also indicates an economic activity concentrated in urban area. Consequently, it will reduce demand for worker in rural area and it will be followed by a decreasing fertility rate in rural area. This finding is also similar to Rosenzweig's study (1977). Using U.S aggregate data covering the period from 1939-1960, he concluded that the importance of the reduction in the value of children as productive assets in agriculture as a factor in the post war decline in the U.S farm birth rate.

Income Per Capita and Consumer Price Index

The fertility rate (demand for children) follows the same demand for normal goods in which the income per capita and consumer price index are both positively and negatively influencing the demand. One digit increase in log income per capita will increase the fertility rate by 0.334 births per woman. However, the current per capita income and consumer price index are not related to the current fertility rate. There are two years lags between fertility rate and per capita income as well as consumer price index. It means that the 2008 total fertility rate was influenced by the 2006 income per capita and consumer price index. If

the parents and the couples consider the current income and price as important factors for reproduction and marriage decision, then there will be at least more than one year lag from the time decision to child birth.

Based on the microeconomic theory of consumer behavior, the Marshallian demand for a normal good is increasing in income and decreasing in price. Higher income means higher ability to support child bearing. Therefore, they will demand/consume more children to raise their utility. Moreover, in Islamic countries, a man is able to practice polygamy as long as he fulfills the following requirements: 1) provide money to support each of his family, 2) obtain permission from his first wife, and 3) spend equal amount of time and money on each family. Consequently, an increase in income can lead to polygamy practice that will increase fertility rate.

On the other hand, the consumer price index as an indicator for the cost of raising children has a negative relationship with fertility rate. An increase in consumer price index without an income growth will decrease purchasing power of a society in which the family income will not be enough to support child bearing. The sharply increase in price could also influence the couple's decision to postpone marriage since the budget might not be enough to cover expenses of wedding ceremony. As a rational agent, the household/family will consider its expected income and expected price change in the future before they decide to have children.

4.3 Policy Implication

Lowering fertility rate through increasing access to quality reproductive health services is still an important policy for developing countries that mostly have limited resources to provide essential public goods such as education, health, and job opportunities. Fewer children mean healthier and well-educated families as well as reduced government burdens to allocate budget on widening access of health and education services. Fewer children also mean households can allocate more resources to education and health care for the child.

According to the sign of coefficient from panel data estimation, lowering fertility rate can be achieved through reducing infant mortality rate, promoting female school enrollment ratio, increasing urbanization, lowering economic growth and promoting inflation. The last three choices are not feasible to be implemented because all policy makers have an objective to increase social welfare through promoting higher economic growth, lower inflation and balancing between rural and urban development. Moreover, since urbanization has a minimal impact on reducing fertility, policy should focus on improving health and educational services in the rural area. Therefore, the possible choices for lowering fertility rate are both implementing low infant mortality rate and promoting female school enrollment ratio policies. If the governments face a budget constraint, they can choose the first policy.

It should be remembered that the proposed policies for lowering infant mortality rate must have a solid basis both theoretically and empirically. In order to provide empirical evidence for a basis of proposing efficacious policy, this study utilizes a simple linear regression to determine the important factors which can massively reduce infant mortality rate (IMR). This regression applies on the cross section data of Asian Countries which is drawn from Human Development Report 2007/2008⁹. Even though, there are many variables that may influence IMR, due to the available data, this study only includes three independent variable: ratio of immunization for measles (IMUN), ratio of births attended by skilled health personal (BAHP) and per capita health expenditure (PHEXP).

It is expected that all independent variables have a significant negative correlation. High ratio of immunization can reduce under-five mortality rate because immunization can provide immunity for children to fight against diseases. In addition, births attended by skilled health personal can lower mother mortality rate, which is directly related to lower infant mortality rate. The presence of mother will increase the ability to raise children in the family. Moreover, the country with high per-capita health expenditure has the ability to provide better health facilities and services therefore the relationship between per capita health expenditure and under-five mortality rate should be negative.

⁹ http://hdr.undp.org/en/media/HDR_20072008_EN_Complete.pdf

The OLS estimation of cross section data can be found below:

$$IMR = 108.004 - 0.342*IMUN - 0.388*BAHP - 0.024*PHEXP$$

(2.44)* (-0.568) (-1.931)** (-2.711)*

$N = 38$, $F\text{-Statistic} = 11.646$, $S.E \text{ of Regression} = 22.108$, $R\text{-Squared} = 0.5068$
 *= significant at 5% level, **= significant at 10% level

Figures in parenthesis are t-statistic.

This finding shows that the birth attended by skilled health personal (BAHP) and per capita health expenditure (PHEXP) are an important factor for reducing the under-five infant mortality rate. Promoting midwife vocational school and nursing vocational school to increase a number of health professional and widening health care accesses will reduce under-five mortality rate by 0.388 child deaths per 1000 birth. Allocating more budgets on health sector will also directly reduce the mortality rate by 0.024 child deaths per 1000 birth. Surprisingly, immunization (IMUN) is negatively reducing infant mortality rate but not statistically significant. It might be caused by a large variance of data so this variable is still important to be considered and cannot easily be neglected in reducing infant mortality rate.

According to Human Development Report 2007/2008, the average of birth attended by skilled health personal in Asian Countries (38 countries) is around 76.86 per cent. However, it is found that the birth attended by skilled health personal in countries like Bangladesh, Nepal and Timor-Leste is still below 20 per cent. This study strongly suggests that those countries which ratio is still below 50 per cent should speed up the number of skilled health personal. It can be achieved through promoting midwife vocational schools and nursing vocational schools.

However, it should be remembered that the main problem in most of the developing countries including country in Asia-Pacific region is that people rely more on the traditional midwives rather than the professional midwives to assist childbirth. To overcome this problem, government should promote the cooperation between the traditional midwives and the professional ones. In addition, government can provide training for

the traditional midwife in order to improve the standard operating procedure in assisting childbirth in a proper and hygienic way.

Furthermore, this study also comes to a common suggestion as many studies did that government should increase budget allocation on health sector especially for those whose per capita health expenditure is still in low level. Though this recommendation has been frequently suggested, however the repetitions will remain governments to continuously pay more attentions on health issues. Moreover, due to the budget constraint, governments can focus on widening access of health services both to low income group and people in rural and remote areas. Because of lack health services, people in these areas sometimes are forced to sell land and other productive assets to get adequate health services in city even though it is a costly alternative. Losing land and other productive assets will impoverish them in the future. Therefore, an increase in health expenditure for widening access of health services at affordable price is not only able to improve the quality of human being but also protect the people from the poverty trap.

5. Conclusion

The rapid social and economic development shown by increasing number of female secondary school enrollment ratio and increasing ratio of urban population has significantly reduced the fertility rate in Southeast and South Asian Countries. Moreover, the under-five mortality rate is an important factor influencing high fertility rate in this area. A higher mortality rate implies a higher risk for losing children before they grow up. Consequently, the parents, as a rational agent, will produce more children to cover their risk. Surprisingly, the fertility rate (demand for children) follows the demand for normal goods, which are increasing in income and decreasing in price.

Lowering fertility rate through increased access to quality reproductive health services remain the best feasible policy option for developing countries that have limited resources to provide essential public goods and to promote employment opportunities. The best strategy to decrease fertility rate is by reducing infant mortality rate. It can be achieved through widening access to health services and promoting midwife vocational schools and nursing vocational schools to increase the

number of health professionals. These policies not only can reduce both infant and mother mortality rate but also can improve the quality of human being. In the long run, it will help to accomplish the Millennium Development Goals (MDG).

6. Acknowledgements

I would like thank Prof. Taku Yamamoto (Hitotsubashi University), Shinya Tanaka, Renny Nurhasana, Abimantra Adhika and Yoshua Wisnungkara, Justin Wang for valuable comments. I also would like thank all participants at Otsubo's Seminar and Fujikawa's Seminar, Graduate School of International Development, Nagoya University, Japan. All remaining errors are my own responsibility.

References

Ainsworth et al. (1996).” the Impact of Women’s Schooling on Fertility and Contraceptive Use: A Study of Fourteen Sub-Saharan African Countries”, *The World Bank Economic Review*, Vol.10, p. 85-122.
<http://wber.oxfordjournals.org> accessed at Nagoya University on April 5, 2010

Al-Qudsi, Sulaiman (1998). “The Demand for Children in Arab ountries: Evidence from Panel and Count Data Model”, *Journal of Population Economic*, vol.1998, no.11, p.435-452.

Baltagi, B (1995). *Econometric Analysis of Panel Data* (New-York: John Wiley & Sons). Becker, Garry (1960), *an Economic Analysis of Fertility*, NBER: www.nber.org/chapters/c2387.pdf

De Tray, Dennis N. (1973). “Child Quality and the Demand for Children”, *The Journal of Political Economy*, Vol. 81, No. 2, Part 2: New Economic Approaches to Fertility, (Mar. - Apr., 1973), p. S70-S95.

Friedlander, Stanley and Morris, Silver (1967). “A Quantitative Study of the Determinants of Fertility Behavior”, *Demography*, Vol. 4, No. 1 (1967), pp. 30-70. URL: <http://www.jstor.org/stable/2060350> Accessed: 05/04/2010 21:23

Greene, William H. (2000), *Econometric Analysis 4th edition* New-Jersey: Prentice-Hall). Hirschman, C. and Guest, P. (1990). “the Emerging Demographic Transitions of Southeast Asia”, *Population and Development Review*, Vol. 16, No. 1, (Mar., 1990), p. 121-152.

Hirschman, Charles (1994). “Why Fertility Changes, *Annual Review of Sociology*”, Vol. 20, (1994), p. 203-233.

Michael, Robert T. (1973).”Education and the Derived Demand for Children”, *The Journal of Political Economy*, Vol. 81, No.2, Part 2: New Economic Approaches to Fertility, (mar.-Apr., 1973), p. S128-S164.
URL: <http://www.jstor.org/stable/1840417> accessed: 11/06/2008

Panopoulou, Giota and Tsakloglou, Panos (1999). “Fertility and economic development: theoretical considerations and cross-country

evidence”, *Applied Economics*, Vol 31: 11, p. 1337-1351. URL: <http://dx.doi.org/10.1080/000368499323229>

Rosenzweig, Mark R. (1977). “the Demand for Children in Farm Households”, *Journal of Political Economy*, Vol. 85, No. 1, (Feb., 1977), p. 123-146. URL: <http://www.jstor.org/stable/1828332> Accessed: 11/06/2008 01:29

Turke, Paul W. (1989). “Evolution and Demand for Children”, *Population and Development Review*, Vol. 15, No. 1, (Mar., 1989), p. 61-90.

Yamada, Tadashi (1984). “Causal Relationships between Infant Mortality and Fertility in Developed and Less Developed Countries”, *NBER Working Paper Series*, December 1984, w1528. <http://www.nber.org/tmp/81378-w1528.pdf>

Yamamoto, T. (2008). “Lecturer Note No.5”, Intermediate Econometric Course, Graduate School of Economics, Hitotsubashi University, Japan, Summer Semester 2008 (unpublished).

Nonlinear Causality Analysis of Finance-Growth Relation: Evidence from Turkey

Pelin Varol İyidoğan¹

The aim of this study is to examine the causal relation between financial deepening and economic growth by means of Smooth Transition Autoregressive (STAR) model-based Granger causality analysis applied to the monthly data of Turkey over the period 1998M1-2012M3. The results show that non-linear structure of the series should be considered as the evidence from linear and non-linear causality analysis differs. According to non-linear Granger causality analysis, the financial deepening is found to be causing variable for economic growth in Turkey.

Introduction

The financial deepening attributed to the development of financial markets has a crucial role in growth process since it provides the efficient allocation of accumulated savings to productive sectors. Though the contribution of finance on economic growth is theoretically postulated, the relation should be examined empirically due to the discrepancies in the regarding literature. According to the framework of Patrick (1966), two possible causal links between financial deepening and economic growth can be classified as demand- following view and supply-leading phenomena. The demand-following approach states that the demand of the investors and savers in the real economy for the services of financial sector would lead to the development of financial sector. Furthermore, the supply-leading view, emphasizing the importance of finance for economic growth, points out two functions of the financial sector that are the transfer of resources to modern sectors

¹ Hacettepe University, Department of Public Finance, Ankara, Turkey
pelinv@hacettepe.edu.tr

and stimulation of an entrepreneurial response in these productive sectors. Patrick (1966) separates the growth process into two stages that begins by supply-leading and proceeds with demand-following approaches. More briefly, in the first stage of growth process, the creation of modern financial institutions contributes to the economic development. However, in the second stage, economic growth induces the demand for financial services and provides financial development. Beside the demand following and supply leading views, the variables in question may be bidirectionally related or have no causal link at all.

Although the finance-economic growth relation has been widely studied in last decades, the theoretical background of the issue is based on the past literature going back to Schumpeter (1911) that argues the role of financial intermediaries in technological innovation and economic development. More recently, Gurley and Shaw (1955), Goldsmith (1969) and Hicks (1969) point out the importance of financial system for stimulating economic growth. Besides, McKinnon (1973) and Shaw (1973) specify economic growth arising from financial development as a result of financial liberalisation. Contrarily, Robinson (1952) contributes to the related literature from a different perspective arguing that economic growth leads to financial development via increasing demand for financial services.

According to Ang (2008), though the theory can be traced back 1950s, empirical perspective of the finance-economic growth relation has developed since 1990s, following cross-country analysis of King and Levine (1993). As the related study, the evidence of positive effect of financial development on economic growth is supported by Levine and Zervos (1998), Calderon and Liu (2003), Christopoulos and Tsionas (2004), Ang (2009). On the other hand, various studies as Thornton (1996), Darrat (1999), Demetriades and Hussein (1999), Deidda and Fattouh (2002), Dritsakis and Adamopoulos (2004), Shan (2005), Ang and McKibbin (2007), Apergis, Filippidis and Economidou (2007) point to different type of interactions rather than the mechanism that output growth is significantly determined by financial development.

Although a wide literature on finance-growth relation has been carried out, this study considerably contributes since the relation is firstly analyzed by employing causality test to a non-linear model, STAR (Smooth Transition Autoregressive Model). Two main motives may be

pointed for non-linear STAR modelling. First, since economic crises leading the change in policy implementations affect both the movement of the variables and the relation between them, a linear model cannot be adequate to capture these asymmetries. Second, STAR model is chosen for modelling non-linearities since it makes possible the transition between the regimes to be gradual.

Non-linear analysis of finance-growth causal relation is important for Turkey since the variables in question are expected to follow non-linear processes over the considered period due to 2001 and 2008 financial crises and the succeeding fiscal and monetary policy responses. Hence, STAR model is employed to Turkish monthly data over the period 1998M1-2012M3. The results of empirical analysis are crucial for determining the optimal policies regarding economic growth and financial markets.

The remainder of the paper is organized as follows. Section 2 discusses the methodology. Section 3 presents the data set and empirical results. Section 4 is concluded.

2. The Methodology

This section examines three issues that are the non-linearity of the series, modelling non-linearities by using appropriate STAR models and the non-linear causal relations. In this context, a univariate STAR model is given by

$$y_t = \pi_{10} + \pi_1' w_t + (\pi_{20} + \pi_2' w_t) F(y_{t-d}) + u_t \quad (2.1)$$

where $\pi_j = (\pi_{j1}, \dots, \pi_{jp})'$, $j=1,2$, $w_t = (y_{t-1}, \dots, y_{t-p})'$, $u_t \sim iid(0, \sigma_u^2)$ and $F(y_{t-d})$ denotes transition function. There are two choices for the transition function that are logistic function in (2.2) and exponential function expressed in (2.3).

$$F(y_{t-d}) = (1 + \exp\{-\gamma_L (y_{t-d} - c_L)\})^{-1} \quad \gamma_L > 0 \quad (2.2)$$

$$F(y_{t-d}) = (1 - \exp\{-\gamma_E (y_{t-d} - c_E)^2\}) \quad \gamma_E > 0 \quad (2.3)$$

The transition functions in (2.2) and (2.3) yield logistic STAR (LSTAR) and exponential STAR (ESTAR) models, respectively. In LSTAR

model, two regimes are presented depending on the small and large values of the transition variable relative to the threshold parameter, c_L . This type of models can be appropriate to model business cycle asymmetries where expansion and contraction periods have different dynamics. On the other hand, the regimes in ESTAR model are subject to small and large absolute values of the transition function relative to c_E . The ESTAR transition function is symmetric around the threshold parameter, while the values close to c_E differ.

Prior to the non-linear causality analysis, STAR modelling procedure can be reviewed in three steps with reference to Teräsvirta (1994). First, a linear autoregressive AR(p) model is specified where appropriate lag length, p, is determined by applying autocorrelation tests and selection criteria such as Akaike Information Criteria (AIC) and Schwarz Information Criteria (SIC). Second, linearity is tested against STAR type non-linearity for different values of delay parameter. The delay parameter, d, with the smallest p-value is selected. The rejection of the null hypothesis $H_0 : \gamma_2 = \gamma_3 = \gamma_4 = 0$ in (2.4) for the delay parameter chosen specifies the non-linear structure. Once the non-linear structure is detected, the next step is to determine the transition variable by the testing procedure detailed in Teräsvirta (1994). The testing procedure is based on the third-order Taylor approximation of the transition function

$$y_t = \gamma_0 + \gamma_1' w_t + \gamma_2' (w_t y_{t-d}) + \gamma_3' (w_t y_{t-d}^2) + \gamma_4' (w_t y_{t-d}^3) + v_t \quad (2.4)$$

where $v_t \sim iid(0, \sigma_v^2)$, $w_t = (y_{t-1}, \dots, y_{t-p})'$ and $\gamma_j = (\gamma_{1j}, \dots, \gamma_{1p})'$.

The following null hypotheses in Table 1 are tested by using LM type tests to select between LSTAR and ESTAR models. Following Van Dijk et al. (2000), the decision rule is simply that ESTAR model is chosen in case the p-value corresponding to F_3 test is the smallest while in other cases LSTAR model should be selected.

Table 1. Selection between logistic and exponential transition functions

F-test	Null hypothesis	Alternative hypothesis
F_4 -test	$H_{01} : \gamma_4 = 0$	$H_{11} : \gamma_4 \neq 0$
F_3 -test	$H_{02} : \gamma_3 = 0 \gamma_4 = 0$	$H_{12} : \gamma_3 \neq 0 \gamma_4 = 0$
F_2 -test	$H_{03} : \gamma_2 = 0 \gamma_3 = \gamma_4 = 0$	$H_{13} : \gamma_2 \neq 0 \gamma_3 = \gamma_4 = 0$

Source: Table is generated by the author in accordance with Teräsvirta (1994).

Following the modelling process, the STAR-based test of Granger causality is performed by additive smooth transition regression model presented below with reference to Skalin and Teräsvirta (1996)

$$y_t = \pi_{10} + \pi_1' w_t + (\pi_{20} + \pi_2' w_t) F(y_{t-d}) + \delta_1' v_t + (\delta_{20} + \delta_2' v_t) G(x_{t-e}) + u_t \quad (2.5)$$

In the regression, $\delta_j = (\delta_{j1}, \dots, \delta_{jq})'$, $j = 1, 2$, $v_t = (x_{t-1}, \dots, x_{t-q})'$, $G(\cdot)$ shows the transition function, and e is an unknown delay parameter. The non-causality hypothesis is $H_0 : G \equiv 0$ and $\delta_{ji} = 0$, $i = 1, \dots, q$. In case there is an identification problem of (2.5) under null hypothesis, it is necessary to approximate second transition function G by its third degree Taylor approximation. Therefore, following Luukkonen et al. (1988), for unknown e lag, Taylor approximation of (2.5) has the form

$$y_t = \pi_{10} + \pi_1' w_t + (\pi_{20} + \pi_2' w_t) F(y_{t-d}) + \kappa' v_t + \sum_{i=1}^q \sum_{j=1}^q \phi_{ij} x_{t-i} x_{t-j} + \sum_{i=1}^q \phi_i x_{t-i}^3 + r_t \quad (2.6)$$

where $\kappa = (\kappa_1, \dots, \kappa_q)'$. The null hypothesis of non-causality analysis is $H_0 : \kappa_i = 0$, $\phi_{ij} = 0$, $\phi_i = 0$, $i = 1, \dots, q$, $j = i, \dots, q$ and the resulted test statistic has $q(q+1)/2 + 2q$ degrees of freedom with χ^2 -distribution.

3. Data set and empirical results

To investigate the finance-growth causal relation in Turkey over the period 1998M1-2012M3, two models are generated. Accordance with the related literature (King and Levine 1993; Rousseau and Wachtel

1998; Ang and McKibbin 2007), the first model uses the ratio of M3 obtained from CBRT Electronic Data Distribution System, to expenditure-based GDP at 1998 prices acquired from Turkish Statistical Institute as a proxy for financial deepening. However, following De Gregorie and Guidotti (1995), Levine (1999), Beck and Levine (2001), Calderon and Liu (2003), the second model employs credits/GDP (credit) rather than M3/GDP (m3) for financial deepening since it directly presents the volume of funds canalized to the private sector. In both models, as a proxy for economic growth, the real GDP per capita (gdpc) is generated by dividing GDP to midyear population estimations of Turkish Statistical Institute.

Prior to the empirical analysis, the unit root test results are reported to examine the stationarity of the seasonally adjusted series. Table 2 includes the results of the ADF (Augmented Dickey Fuller) and PP (Philips- Perron) unit root tests.

Table 2. Stationarity results

Variables	ADF		PP	
	Level	First difference	Level	First difference
credit	1.66 (0)	-4.27*(3)	1.29	-13.42*
m3	-2.12 (3)	-5.59* (2)	-1.92	-11.69*
gdpc	-2.40 (0)	-14.43* (0)	-2.53	-14.38*

Source: Author's estimation.

Notes: (1) The parentheses indicate the appropriate lag length for the ADF regressions. The lags are determined by SIC. (2) *, ** and *** denote that the test statistics are significant at 1%, 5% and %10 level, respectively.

According to both ADF and PP unit root tests, all series are found to be integrated of order one at %1 significance level. As the first step of the analysis, the length of the autoregression, p , is specified by implementing selection criteria and autocorrelation test to the linear autoregressive model. After selecting the order of autoregression as $p=1$ for gdpc, $p=3$ for m3 and $p=4$ for credit, the delay parameters are determined by choosing the value that minimize the p -values of the linearity tests. According to the results in Table 3, the delay parameter,

$d=1$, is selected for both m3 and credit. On the other hand, the smallest value of p_{F_L} indicates $d=3$ for variable gdpc. The linearity tests for gdpc and the variables representing financial deepening verify the non-linear structure of the considered variables.

Table 3. Linearity test results

	p_{F_L}		
	gdpc (p=1)	m3 (p=3)	credit (p=4)
d=1	0.3957	0.0000*	0.0000*
d=2	0.2370	0.0464**	0.0002*
d=3	0.0007*	0.0020*	0.4036
d=4	0.9350	0.0744***	0.0006*
d=5	0.8358	0.0045*	0.0025*
d=6	0.0082*	0.0000*	0.0027*
d=7	0.4051	0.0001*	0.0090*
d=8	0.2085	0.0003*	0.0012*
d=9	0.0960	0.0001*	0.0711***
d=10	0.7565	0.2228	0.0036*
d=11	0.8327	0.0401**	0.0426**
d=12	0.5865	0.0821***	0.2034

Source: Author's estimation.

Notes: 1) p signifies the length of the autoregression, d indicates delay parameter, p_{F_L} shows p-values for F_L linearity tests. 2) The values in bold show the delay parameters corresponding min (p_{F_L}) over delays $d=1, \dots, 12$.

Since linearity is rejected against STAR, the following step of the analysis should be the model determination between ESTAR and LSTAR. According to Table 4 summarizing the results of model selection process, ESTAR models for gdpc and m3 are chosen for estimation since the values of F_3 are the smallest among the test statistics F_4 , F_3 and F_2 . On the other hand, as a result of the large value of F_3 , LSTAR is selected to model non-linear credit variable.

Table 4. Model selection results

	F ₄	F ₃	F ₂	STAR
gdpc	5.307428** (0.0225)	9.591974* (0.0023)	2.483232 (0.1170)	ESTAR
m3	4.999461* (0.0025)	9.195534* (0.0000)	3.622462* (0.0144)	ESTAR
credit	5.230635* (0.0006)	2.148257*** (0.0775)	4.533683* (0.0017)	LSTAR

Source: Author's estimation.

Note: The values in brackets show the p-values for F-statistics.

Table 5 presents the results of non-linear Granger causality tests based on the estimated STAR models. The tests are performed for $q=1$ in (2.6) to avoid size distortion due to the number of degrees of freedom. The results show that both m3 and credit are causing variables rather than caused variables. To sum up, the analysis reveals evidence of causality running from financial deepening to economic growth.

Table 5. Non-linear Granger causality test results

Caused variable	Causing variable		
	gdpc	m3	credit
gdpc	-	12.07*	9.53*
m3	1.48	-	-
credit	0.23	-	-

Source: Author's estimation.

Notes: 1) The values in brackets show the appropriate lag lengths selected by selection criterion (AIC, SIC) and autocorrelation tests. 2) The table merely indicates the results associated with the causality analysis in the study.

The Granger causality analysis is also performed linearly and the results are reported in Table 6. The linear causality tests suggest that gdpc is a causing variable contrary to the results of non-linear model. Comparing

those results from linear and non-linear analysis shows the importance of considering non-linearity.

Table 6. Linear Granger causality test results

Caused variable	Causing variable		
	gdpc	m3	credit
gdpc	-	0.66(1)	0.42(1)
m3	2.53**(3)	-	-
credit	6.95*(4)	-	-

Source: Author's estimation.

4. Concluding remarks

In this study, financial deepening and economic growth relation has been examined for Turkey. The non-linear causality analysis based on STAR, that is one of the regime shifting models is employed. The empirical analysis draws three important conclusions. First, the study lays emphasis on the importance of considering non-linear structures of the series due to the contradiction between the results of linear and non-linear causality analysis. Second, the results are found to be robust to different definitions of the proxies for financial deepening, that are m3 and credit. Third, the empirical analysis shows evidence of causality from financial deepening to economic growth, in other words the validity of supply-leading view of Patrick (1966). This conclusion suggests that the reform process of financial sector has contributed not only to financial deepening indicators but also economic growth in Turkey. Particularly, the fiscal and monetary policies implemented after 2001 crisis have improved fiscal balance leading to a decrease in the pressure of public sector on financial sector. Hence, the transfer of the resources to productive sectors has accelerated economic growth process. As a result, the effect of financial sector on growth should be taken into account by policy makers to foresee the potential effects of economic policies.

References

Ang J.B. (2008), "A Survey of Recent Developments in the Literature of Finance and Growth," *Journal of Economic Surveys*, 22(3), 536-576.

Ang J.B. (2009), "Financial Development and the FDI-growth nexus: The Malaysian Experience," *Applied Economics*, 41, 1595-1601.

Ang J.B. and McKibbin W.J. (2007), "Financial Liberalization, financial sector development and growth: Evidence from Malaysia," *Journal of Development Economics*, 84(1), 215-233.

Apergis N., Filippidis I. and Economidou C. (2007), "Financial Deepening and Economic Growth Linkages: A Panel Data Analysis," *Review of World Economics*, 143(1), 179-198.

Beck T. and Levine R. (2001), "Stock Markets, Banks and Growth: Correlation or Causality," *Worldbank Policy Research Working Paper*, 2670.

Calderon C. and Liu L. (2003), "The direction of causality between financial development and economic growth," *Journal of Development Economics*, 72(1), 321-334.

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

Darrat A.F. (1999), "Are Financial Deepening and Economic Growth Causally Related? Another Look at the Evidence," *International Economic Journal*, 13(3), 19-35.

De Gregorie J. and Guidotti P.E. (1995), "Financial Development and Economic Growth," *World Development*, 23, 433-448.

Deidda L. and Fattouh B. (2002), "Non-linearity between finance and growth," *Economics Letters*, 74(3), 339-345.

Demetriades O.P. and Hussein K.A.(1999), "Does financial development cause economic growth? Time series evidence from 16 countries," *Journal of Development Economics*, 51(2), 387-411.

Dritsakis N. and Adamopoulos A. (2004), "Financial Development and Economic Growth in Greece: An Empirical Investigation with Granger Causality Analysis," *International Economic Journal*, 18(4), 547-559.

Goldsmith R.W. (1969), *Financial Structure and Development*, New Haven, CT: Yale University Press.

Gurley J.G. and Shaw E.S. (1955), "Financial Aspects of Economic Development," *American Economic Review*, 45, 515-538.

Hicks J.R. (1969), *A Theory of Economic History*, Oxford: Oxford University Press.

King R.G. and Levine R. (1993), "Finance and Growth: Schumpeter might be right? *The Quarterly Journal of Economics*," 108(3), 717-737.

Levine R. (1999), "Law, Finance and Economic Growth," *Journal of Financial Intermediation*, 8, 8-35.

Levine R. and Zervos S. (1998), "Stock Markets, Banks and Economic Growth," *The American Economic Review*, 88(3), 537-558.

Luukkonen R., Saikkonen P. and Teräsvirta, T. (1988), "Testing Linearity against Smooth Transition Autoregressive Models," *Biometrika*, 75, 491-499.

McKinnon R.I. (1973), *Money and Capital in Economic Development*, The Brookings Institution, Washington, DC.

Patrick H.T. (1966), "Financial development and economic growth in underdeveloped countries," *Economic Development and Cultural Change*, 14(2), 174-189.

Robinson J. (1952), *The Rate of Interest and Other Essays*, London: MacMillan.

Rousseau P.L. and Wachtel P. (1998), "Financial Intermediation and Economic Performance: Historical Evidence from Five Industrialized Countries," *Journal of Money, Credit and Banking*, 30, 657-678.

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

Shan J. (2005), "Does Financial Development Lead Economic Growth? a vector auto-regression appraisal," *Applied Economics*, 37, 1353-1367.

Shaw E.S. (1973), *Financial Deepening in Economic Development*, Oxford University Press, New York.

Skalin J. and Teräsvirta T. (1996), "Another Look at Swedish Business Cycles, 1861-1988," *The Economic Research Institute, Stockholm School of Economics*, 130, 359-378.

Teräsvirta T. (1994), "Specification, Estimation and Evaluation of Smooth Transition Autoregressive Models," *Journal of the American Statistical Association*, 89, 208-18.

Thornton J. (1996), "Financial deepening and economic growth in developing economies," *Applied Economics Letters*, 3(4), 243-246.

Van Dijk D., Teräsvirta T. and Franses P.H. (2000), "Smooth Transition Autoregressive Models- A Survey of Recent Developments," *Econometric Reviews*, 21, 1-47.

The Effect of Financial Development on Economic Growth in the MENA Region

Manizheh Falahaty¹ and Law Siong Hook²

This paper provides new evidence that sheds light on the effect of financial development on economic growth in nine MENA countries over the period of 1991–2009. The empirical results using the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) estimators reveal financial development is a statistically significant determinant of economic growth, but the impact is more apparent on stock market development than banking sector development. This finding suggests that improving the functioning of the banking sector is crucial to spur economic growth in MENA countries.

1. Introduction

The relationship between financial development and economic growth has been the subject of increasing attention. A growing body of empirical research has found evidence of a robust relationship between financial development and economic growth, which supports the endogenous growth literature that stresses the significance of financial development for long-run economic growth (see Goldsmith 1969; King and Levine 1993; Odedokun 1996; Levine and Zervos 1998; Beck *et al.* 2000; Chang and Ho, 2001; Arestis *et al.* 2001; Chang and Caudill 2005; Eita and Jordaan 2007; Law 2007; Apergis *et al.* 2007).

While the majority of empirical studies show that there exists a positive relationship between financial development and economic growth, it is

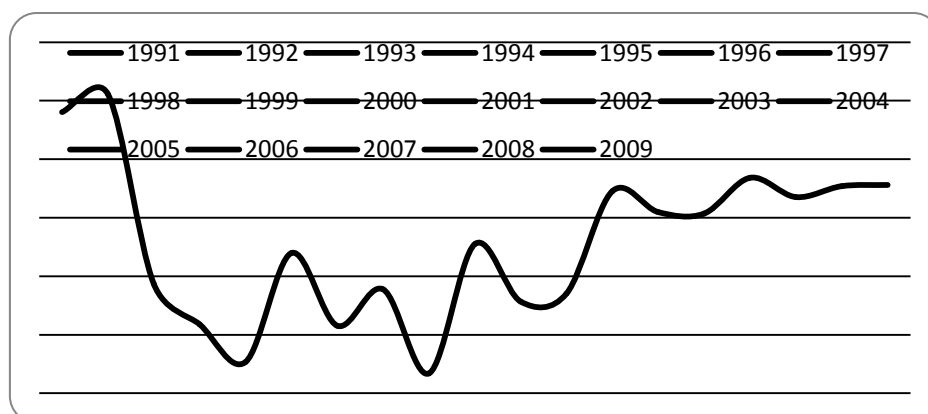
¹ Corresponding author; Economics Department, Faculty of Economics and Management, University Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia, E-mail:manizhehf@ukm.my, mfalahaty@gmail.com

² Economics Department, Faculty of Economics and Management, University Putra Malaysia, Selangor 43300, Malaysia E-mail : lawsh@putra.upm.edu.my

surprising that empirical studies from the Middle East North Africa (MENA) region are limited as well as the fact that the empirical results are mixed. For example; Al-Awad and Harb (2005) point out that financial development and growth may be related in the long run but their results fail to clearly establish the direction of causality. Using a composite index of bank development and stock market development, Naceur and Ghazouani (2007) find that overall financial development is unimportant or even harmful for economic growth in the MENA region. According to Abu-Bader and Abu-Qarn (2008), finance leads to growth in five out of the six MENA countries they studied which were Algeria, Egypt, Israel, Morocco, Syria, and Tunisia. Another study by Rachdi and Mbarek (2011) demonstrates that there is a long-term relationship between financial development and economic growth, but the causal effect is running from economic growth to financial development. In contrast, Kar *et al.* (2011) point out that there is no clear consensus on the direction of causality between financial development and economic growth for all measurements of financial development in MENA countries.

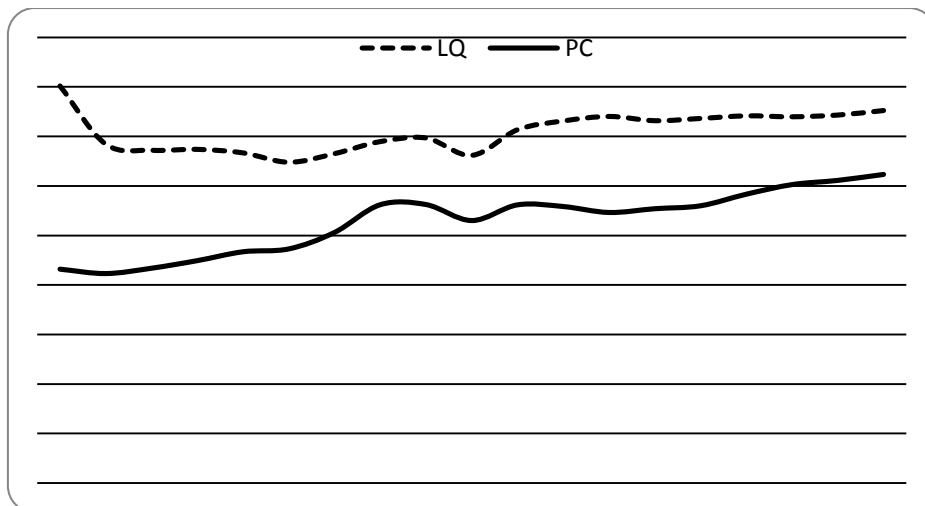
On the other hand, when looking at the growth performance and financial development indicators in the MENA countries in recent years, two observations are noteworthy. First growth has fluctuated more and increased weakly since 1991. Secondly, financial development indicators (which include the banking sector and the stock market) have fluctuated and rose during the last decade.

Figure 1: The average of GDP per capita growth (annual %) of selected MENA countries (1991-2009)



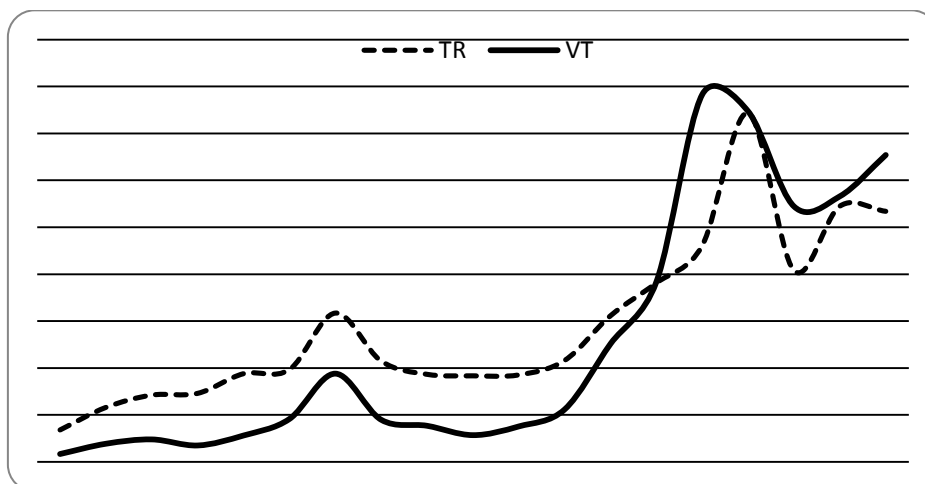
Source: World development indicator (World Bank, 2011)

Figure 2: The average value of Banking Indicators (Liquid Liabilities (M3) as % of GDP and Domestic Credit to Private Sector as % of GDP) of selected MENA countries (1991-2011)



Source: World development indicator (World Bank, 2011)

Figure 3: The average value of Stock Market Indicators (Turnover ratio (TR) and Total Value Traded to GDP (VT)) of selected MENA countries (1991-2009)



Source: Financial Structure Dataset (2011)

The objective of this study is to examine the effect of financial systems on economic growth in MENA countries namely Egypt, Iran, Jordan, Kuwait, Malta, Morocco, Oman, Saudi Arabia and Tunisia during 1991-2009. This study extends on the literature by making several important contributions. Firstly, the relationship between financial development and economic growth has been studied widely in different countries, but only a few empirical studies have been conducted for the MENA region (Al-Awad and Harb 2005; Naceur and Ghazouani 2007; Abu-Bader and Abu-Qarn 2008; Rachdi and Mbarek 2011; Kar *et al.* 2011). However, their studies are mainly based on banking sector development indicators except Naceur and Ghazouani (2007), who used a composite index of the banking sector (two indicators) and stock market indicators (three indicators) for an unbalanced panel data from 11 MENA region countries. Therefore, this study fills the gap by employing both banking sector (three indicators) and stock market (three indicators) development indicators as financial development measures that each one is analyzed separately. Further, we examine empirically the finance/growth nexus by using two measures of GDP (oil and non oil) to analyze the determinants of variation in the magnitude of the financial development contribution across economic growth region. To assess the robustness of our results, we use two econometric techniques namely the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) methods in a panel data context, where both techniques allow for a great amount of heterogeneity and have better properties in small samples.

It is important to note that the effect of the global financial crisis is significant on MENA financial markets. Although financial systems in MENA countries have limited integration with world financial institutions and have not been very vulnerable to the crisis, the MENA countries' real economy has been affected by the global recession. Therefore, it is important for policy makers in the MENA countries to address the vulnerabilities in their economies and attempt to improve on them. In this regard, the results stemming from the MENA region could be of interest to other developing countries in the same stage of financial development for instance like African, Eastern European and Latin American countries which have been reforming their financial systems a great deal in recent years.

This paper is organised as follows. Section 2 explains the empirical model and econometric techniques while the data employed in the

analysis is presented in section 3. Section 4 reports and discusses the econometric results and section 5 finalizes the study with a summary of the paper and concludes the findings.

2. Empirical Model and Econometric Techniques

2.1 Empirical model

In order to test the effectiveness of financial development, this study adopts the framework introduced by Mankiw *et al.* (1992). Consider the following Cobb-Douglas production function:

$$Y_t = K_t^\alpha H_t^\beta (Z_t L_t)^{1-\alpha-\beta} \quad (1)$$

Where Y is real output, K is the capital stock, H is the stock of human capital, L is raw labour, Z is a labour-augmenting factor reflecting the level of technology and efficiency in the economy and the subscript t indicates time. Assuming that $\alpha + \beta < 1$, which implies that there are decreasing returns to all capital. Raw labour and labour-augmenting technology are assumed to grow according to the following functions:

$$L_t = L_0 e^{nt} \quad (2)$$

$$Z_t = Z_0 e^{gt+p\theta} \quad (3)$$

Where n is the exogenous rate of growth of the labour force, g is the exogenous rate of technological progress, P is a vector of financial development policies and the other factors that can affect the level of technology and efficiency in the economy, and θ is a vector of coefficients related to these policies and other variables. In this model, the steady state of output per worker grows at the constant rate g (the exogenous component of the growth rate of the efficiency variable Z). This outcome can be obtained directly from the definition of output per effective worker as follows:

$$\frac{Y_t}{Z_t L_t} = (k_t)^\alpha (h_t)^\beta$$

$$\frac{Y_t}{L_t} = Z_t (k_t)^\alpha (h_t)^\beta \quad (4)$$

Furthermore, the steady-state values of h and k are defined as:

$$h^* = \left[\frac{(s^K)^\alpha (s^H)^\beta}{(n+g+\delta)} \right]^{1/1-\alpha-\beta} \quad (5)$$

$$k^* = \left[\frac{(s^K)^{1-\beta} (s^H)^\beta}{(n+g+\delta)} \right]^{1/1-\alpha-\beta} \quad (6)$$

Substituting these two equations into the production function (4) and taking the logs yields the expression for the steady state output. $\ln\left(\frac{Y}{L}\right) =$

$$\ln Z_0 + gt + P\theta + \frac{\alpha}{1-\alpha-\beta} \ln s^K + \frac{\beta}{1-\alpha-\beta} \ln s^H - \frac{\alpha+\beta}{1-\alpha-\beta} \ln(n+g+\delta) \quad (7)$$

Equation (7) indicates the steady state output per worker where a vector of financial development proxy exist; s^K and s^H are the shares of output of physical and human capital; and δ is the rate of depreciation. The addition of g and δ is assumed to be constant across countries over time. Rearranging Equation (7) yields an estimating equation for the relationship between financial development and output per worker as follows:

$$\ln GDP_{it} = Z_0 + Z_1 T + Z_2 \ln FD_{it} + Z_3 \ln CA_{it} + Z_4 \ln HC_{it} - Z_5 \ln LA_{it} + \varepsilon_{it} \quad (8)$$

In Equation (8)³, GDP is real GDP per capita, T is a time trend, FD refers to the financial development indicators (banking sector and capital market), CA is physical capital, HC is human capital, and LA is the rate of labour growth. Also i identifies the fact that the sample includes a cross-section of data for the selected MENA countries, while t represents the time series element of the data series and ε is an error term. The constant is denoted by Z_0 while Z_1 - Z_5 are the elasticities which show how much an increase in each individual variable will affect economic growth. All the coefficients are expected to carry a positive sign except for labour growth. According to Makdisi *et al.*(2000), many MENA countries are heavily dependent on oil therefore it plays an important role in shaping the growth pattern. Given the above discussion, the proposed Equation (8) will be estimated with non-oil GDP. Thus Equation (9)⁴ is extended as follows:

³This Equation as Model (1) is presented in section 4.

⁴This Equation as Model (2) is presented in section 4.

$$\begin{aligned} \ln NGDP_{it} = & \beta_0 + \beta_1 T + \beta_2 \ln FD_{it} + \beta_3 \ln CA_{it} + \beta_4 \ln HC_{it} - \\ & \beta_5 \ln LA_{it} + \varepsilon_{it} \end{aligned} \quad (9)$$

where $NGDP$ is real non-oil GDP per capita.

In addition, as stated by Rajan and Zingales (2003), market capitalization and private sector credit are more important financial development indicators. Thus, the proposed Equations (8) and (9) will be estimated while both indicators enter the model as the FD index at the same time. This analysis will be improvement obtained results of Equations (8) and (9) and explain the main contribution of banking sector development and stock market development in financial development in the MENA region as well.

2.2 Econometric methods

The unit root test

Before proceeding to the identification of a possible long run relationship it is necessary to verify that all variables are integrated of order one in levels. There are various unit root tests for panel data with each test having their own advantages and restrictions. For this study we have chosen the Levin, Lin and Chu version (LLC) and Im, Pesaran and Shin (1997; IPS) tests, both are based on the well-known Dickey-Fuller procedure. Although the Levin, Lin and Chu (LLC) test has a homogeneity limitation the Im, Pesaran and Shin (IPS) test solves this problem by assuming heterogeneity between units in a dynamic panel framework.

The co-integration test

The panel co-integration test introduced by Pedroni (1999) is employed to analyse the long-run relationship among the variables by using specific parameters which are allowed to vary across individual members of the sample. He has suggested seven tests which can be divided into two groups of panel co-integration statistics namely the within-dimension statistic or panel t-statistic and between-dimension statistic or group t-statistic. In the case of the panel statistics, the first order autoregressive parameter is limited to being the same for all cross sections. If the null is rejected, the parameter is smaller than 1 in its absolute value, and the variables in question are co-integrated for all

panel members. In the group statistics, the autoregressive factor is allowed to differ over the cross section, as the statistics amount to the average of the individual statistics. If the null is rejected, co-integration holds at least for one individual. Therefore, group tests offer an additional source of heterogeneity among the panel members (Dreger and Reimers, 2005).

Cross-sectional Dependency Test

Pesaran (2004) proposes a simple test of error cross section dependence which is applicable to a variety of panel data models, including stationary and unit root dynamic heterogeneous panels with short T and large N. The proposed test is based on the average of the pair-wise correlation coefficients of the OLS residuals from the individual regressions in the panel, and can be used to test for cross section dependence of any fixed order p, as well as the case where no a priori ordering of the cross section units is assumed, and is referred to as the CD test.

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij} \right) \longrightarrow N(0,1) \quad (10)$$

It is clear that the test is correctly centred for fixed N and T, and is robust to single or multiple breaks in the slope coefficients and/or error variances. Also this test has the correct size in very small samples and satisfactory power, and as predicted by theory, is robust in the presence of unit roots and structural breaks.

The FMOLS approach

Having established that the dependent variable is structurally related to the explanatory variables, and thus a long run equilibrium relationship exists among these variables, we proceed to estimate equations (8) and (9) using the fully modified OLS procedure which is appropriate for heterogeneous cointegrated panels (Pedroni, 2000). This methodology addresses the problem of non-stationary regressors as well as the problem of simultaneity bias.

OLS estimation is known to yield biased results because, in general, the regressors are endogenously determined in the I(1) case. We consider the following co-integrated system for panel data:

$$y_{it} = \alpha_i + x_{it}\beta + e_{it} \quad (11)$$

$$x_{it} = x_{i,t-1} + \varepsilon_{it}$$

Where $\xi_{it} = [e_{it}, \varepsilon_{it}]$ is stationary with covariance matrix Ω_i . Following Phillips and Hansen (1990) a semi-parametric correction can be made to the OLS estimator that eliminates the second order bias caused by the fact that the regressors are endogenous. Pedroni (2000) follows the same principle in the panel data context, and allows for heterogeneity in the short run dynamics and the fixed effects. Pedroni's estimator is:

$$\hat{\beta}_{FM} - \beta = \left(\sum_{i=1}^N \hat{\Omega}_{22i}^{-2} \sum_{t=1}^T (x_{it} - \bar{x}_t)^2 \right) \sum_{i=1}^N \hat{\Omega}_{11i}^{-1} \hat{\Omega}_{22i}^{-1} \left(\sum_{t=1}^T (x_{it} - \bar{x}_t) e_{it}^* - T \hat{\gamma}_i \right) \quad (12)$$

$$\hat{e}_{it}^* = e_{it} - \hat{\Omega}_{22i}^{-1} \hat{\Omega}_{21i}, \quad \hat{\gamma}_i = \hat{\Gamma}_{21i} + \hat{\Omega}_{21i}^0 - \hat{\Omega}_{22i}^{-1} \hat{\Omega}_{21i} (\hat{\Gamma}_{22i} + \hat{\Omega}_{22i}^0)$$

where the covariance matrix can be decomposed as $\Omega_i = \Omega_i^0 + \Gamma_i + \Gamma_i$ where Ω_i^0 is the contemporaneous covariance matrix, and Γ_i is a weighted sum of auto-covariance. Also $\hat{\Omega}_i^0$ denotes an appropriate estimator of Ω_i^0 . This method produces two types of estimators, pooled panel estimator and group mean panel estimator. The former is based on 'within dimension' of the panel whereas the latter is based on 'between dimension' of the panel. An important advantage of the between-dimension estimators is that the form in which the data is pooled allows for greater flexibility in the presence of heterogeneity of the co-integrating vectors. Another advantage of the between-dimension is that the point estimates have a more useful explanation in the event that the true co-integrating vectors are heterogeneous. Particularly, point estimates for the between-dimension estimator can be interpreted as the mean value for the co-integrating vectors. This is not true for the within-dimension estimators (Pedroni, 2001).

Robustness test: The Dynamic OLS estimation

Besides using the FMOLS, this study also employs the DOLS estimator recommended by Kao and Chiang (2000) as a robustness check. This technique is a parametric approach and takes into account the potential endogeneity of the variables as well as the presence of serial correlation by including leads and lags of the differenced explanatory variables as additional regressors (Fidrmuc, 2009;441). Kao and Chiang (2000) show that the DOLS estimator outperforms the FMOLS estimator in the

estimation of co-integrated panel regressions. The DOLS estimator can be expressed as follows:

$$y_{it} = \alpha_i + \dot{x}_{it}\beta + \sum_{j=-q_2}^{j=q_2} c_{ij}\Delta x_{it+j} + v_{it} \quad (13)$$

where c_{ij} is the coefficient of a lead or lag of first differenced explanatory variables.

Kao and Chiang (2000) argue that both estimators (FMOLS and DOLS) have the same (normal) limiting properties, although the FMOLS estimator does not improve the properties of the fixed effects estimator in finite samples.

3. The data

This study employs two data sets, corresponding to the two different measures of financial development indicators, namely banking sector development and stock market development. The first measure of financial development contains three banking sector development indicators, namely private sector credit (PC), domestic credit provided by the banking sector (DC) and liquid liabilities (LQ). Private sector credit is defined as the value of credit supplied by financial intermediaries to the private sector. Liquid liabilities measure the ability of banks to mobilize funds whereas domestic credit comprises private credit as well as credit to the public sector. The second measure of financial development comprises three stock market development indicators namely total share value traded (VT), turnover ratio (TR) and stock market capitalization (MC). The total share value traded is a measure of the total value of shares traded during the period. The turnover ratio is a measure of the value of trades of shares on national stock markets divided by market capitalization to capture the efficiency of the domestic stock markets whereas market capitalization refers to the value or capitalization the market puts on a company. In addition, life expectancy, population growth and the Investment share of Real GDP per capita will be used as measures for human capital (HC), labour growth (LA) and capital stock (CA) respectively. Following standard practice, we use real GDP per capita, (GDPC), and non-oil GDP per capita (NGDP) as two measures for economic growth. The data are gathered from the World Development Indicator (World Bank CD-ROM

2011) and World Bank Financial Structure Dataset (2010) and are collected for 9 MENA countries. It is important to note that the sample covered only 9 countries over the period of 1991–2009 because some countries have not yet created stock markets (e.g. Iraq, Libya, Sudan, Syria and Yemen), and other countries established stock markets very recently (UAE). Beside, data were not available for a uniform period for each country, and many countries have established their stock markets recently. Therefore, the number of observations is expected to same across countries leading to estimations over balanced panel data. All financial development indicators (banking sector and stock market) are expressed as ratios to GDP. The definition of the financial development indicators above are presented in Appendix A.

4. Estimation result

4.1 Panel unit root result

Panel unit root tests are reported in Table 1 for data on real GDP per capita (gdp), real non-oil GDP per capita (ngdp), labor growth (la), capital stock per capita (ca), human capital (hc), liquid liabilities (lq), domestic credit (dc), private credit (pc) market capitalization (mc), turnover ratio (tr) and value traded (vt). All these variables are tested both in levels and first differences with a constant and constant plus time trend. The results of both the LLC and IPS panel unit root tests show that the unit-root hypothesis cannot be rejected when the variables are taken in levels. However when first differences are used, the hypothesis of unit root non-stationarity is rejected at the 1% level of difference. These results lead us to conclude that our series are characterized as an I(1) process.

Table 1: Unit Root tests (Model 1 and Model 2)

	LLC				IPS			
	Level		1 th Difference		Level		1 th Difference	
	Constant	Constant +Trend	Constant	Constant +Trend	Constant t	Constant +Trend	Constant	Constant +Trend
lnGDP	3.002 (3)	-0.720 (2)	-4.327* (2)	-5.301* (2)	5.017 (3)	0.615 (2)	-4.261* (2)	-6.508* (2)
lnNG DP	2.006 (3)	0.348 (2)	-5.494* (2)	-3.731* (2)	4.962 (3)	1.789 (2)	-4.722* (2)	-3.463* (2)
lnLA	-2.751 (3)	0.209 (2)	-7.263* (2)	-7.038* (2)	-2.146 (3)	-0.475 (2)	-8.903* (2)	-7.501* (2)
lnCA	3.086 (3)	-5.990 (2)	-12.40* (2)	-11.341* (2)	2.569 (3)	-4.064 (2)	-9.164* (2)	-7.653* (2)
lnHC	-40.384 (3)	-5.082 (2)	-7.015* (2)	-5.154* (2)	-28.211 (3)	-3.121 (2)	-5.105* (2)	-5.248* (2)
lnLQ	-0.419 (3)	-4.201 (2)	-7.175* (2)	-7.290* (2)	0.032 (3)	-2.441 (2)	-7.045* (2)	-5.874* (2)
lnDC	-2.359 (3)	0.448 (2)	-8.820* (1)	-8.040* (2)	-2.287 (3)	1.116 (2)	-7.501* (1)	-5.849* (2)
lnPC	-3.103 (3)	-2.072 (2)	-8.104* (2)	-8.550* (2)	-2.695 (3)	-1.638 (2)	-7.438* (2)	-7.023* (2)
lnMC	-1.122 (3)	-3.747 (2)	-7.081* (2)	-4.225* (2)	-0.229 (3)	-3.621 (2)	-6.481* (2)	-4.305* (2)
lnTR	-3.643 (3)	-3.574 (2)	-8.640* (2)	-5.691* (2)	-3.789 (3)	-1.784 (2)	-7.964* (2)	-5.140* (2)
lnVT	-2.092 (3)	-2.125 (2)	-5.429* (2)	-3.473* (2)	-1.002 (3)	-1.417 (2)	-5.009* (2)	-3.155* (2)

Notes: Asterisk (*) denotes significant at 5% level. Optimal lag lengths are provided in the parentheses.

4.2 Panel co-integration results

The results of panel co-integration are reported in Tables 2 and 3. Table 2 presents the Pedroni co-integration analysis where the dependent variable is GDP per capita. The results reveal that most of the statistics reject the null hypothesis of no co-integration in all the specified models. For example, in models 1a, 1d, 1e and 1f where financial development is proxied by liquid liabilities, market capitalization, turnover ratio and total share value traded respectively, the results demonstrate that five out of seven statistics reject the null hypothesis. However, as shown in Table 2, the findings provide support for the presence of a co-integrating relationship amongst real GDP per capita, financial development, physical capital, human capital and labor growth.

Table 2: Result of Panel Co-integration Tests (Constant with Trend)
(Dependent variable: real GDP per capita)

	Model 1a FD=LQ	Model 1b FD=DC	Model 1c FD=PC	Model 1d FD=M C	Model 1e FD=TR	Model 1f FD=VT
Panel-v	3.4*	0.9	0.4	3.5*	3.1*	1.9*
Panel- ρ	0.6	0.4	0.3	0.8	1.2	1.6
Panel-t	-5.9*	-6.8*	-6.1*	-12*	-7.1*	-9.1*
Panel-adf	-6.1*	-6.9*	-6.4*	-9.3*	-6.1*	-3.8*
Group- ρ	2.4	2.8	2.3	2.4	3.3	3.1
Group-t	-4.2*	-5.2*	-6.5*	-7.7*	-6.2*	-6.3*
Group-adf	-5.4*	-5.9*	-6.2*	-6.8*	-4*	-4.4*

Notes: The critical value for one side tests is -1.64. Hence, large negative value ($k < -1.64$) implies the rejection of null hypothesis (no co- integration). However, exception for v-stat which critical value are 1.64 that rejection of null require value larger than 1.64.

*, ** reject the null of no co-integration at 1% and 5% significance level respectively.

FD= Financial Development; LQ= Liquid Liabilities; DC= Domestic Credit; PC= Private Credit; MC= Market Capitalization; TR = Turnover Ratio; VT= Value Traded.

Table 3 reports the result of the Pedroni co-integration analysis where the dependent variable is non-oil GDP per capita instead of GDP per capita. The results demonstrate that the test statistics reject the null hypothesis of no co-integration in all the models. For example, in model 2c, where financial development is proxied by private credit, the result reveals that three out of seven statistics reject the null hypothesis. Although a few tests reject the null hypothesis of no co-integration at the 1% significance level, the group tests are likely to be more robust than the panel tests and offer an additional source of heterogeneity among the panel members (Dreger and Reimers, 2005). Therefore, the findings provide support for the presence of a co-integrating relationship amongst real Non-oil GDP per capita, financial development, physical capital, human capital and labor growth.

Table 3: Results of Panel Co-integration Tests (Constant with Trend)
(Dependent variable: real non-oil GDP per capita)

	Model 2a FD=LQ	Model 2b FD=DC	Model 2c FD=PC	Model 2d FD=MC	Model 2e FD=TR	Model 2f FD=VT
Panel-v	1.9**	0.5	0.6	1.1	1.7**	1.04
Panel- ρ	2.2	2.5	2.6	2.7	2.6	2.8
Panel-t	-1.1	-0.2	-0.6	0.7	0.7	0.7
Panel-adf	-0.9	-1.5	-3.2*	-1.5	-1.06	-1.5
Group- ρ	3.5	3.9	3.8	3.5	4.2	4
Group-t	-1.1	-3.5*	-4.1*	-2.2*	-1.2	-1.8**
Group-adf	-0.3	-2.4*	-2.6*	-2.1*	-0.02	-0.5

Notes: The critical value for one side tests is -1.64. Hence, large negative value ($k < -1.64$) implies the rejection of null hypothesis (no co-integration). However, exception for v-stat which critical value are 1.64 that rejection of null require value larger than 1.64.

*, ** reject the null of no co-integration at 1% and 5% significance level respectively.

FD= Financial Development; LQ= Liquid Liabilities; DC= Domestic Credit; PC= Private Credit; MC= Market Capitalization; TR = Turnover Ratio; VT= Value Traded.

4.3 Pesaran's Test of Cross-sectional Independence

With respect to the panel unit root and co-integration tests that have been employed so far were constructed under the assumption of cross-sectional independence. However it is important to test for the presence of cross-sectional dependence before implying panel fully modified least squares (FMOLS) and dynamic OLS (DOLS) methods. This is because failing to take into account of cross-sectional dependence may cause severe size distortions and thereby invalidate the estimations and inferences (Hamit-Hagggar, 2011). Table 4 reports the cross-sectional independence results from the Pesaran test. The results of cross-sectional independence for Model (1) and Model (2) for different regressions are conformed in the data.

Table 4: Pesaran's Test of Cross-sectional Independence results

Model 1a FD=LQ	Model 1b FD=DC	Model 1c FD=PC	Model 1d FD=MC	Model 1e FD=TR	Model 1f FD=VT
3.33 (0.05)	3.15 (0.09)	3.20 (0.18)	2.67 (0.07)	3.21 (0.10)	3.48 (0.08)
Model 2a FD=LQ	Model 2b FD=DC	Model 2c FD=PC	Model 2d FD=MC	Model 2e FD=TR	Model 2f FD=VT
-0.38 (0.70)	-1.88 (0.05)	-1.70 (0.08)	-1.71 (0.08)	-1.62 (0.10)	-1.81 (0.07)

Notes: Figures in brackets are probability values. FD= Financial Development; LQ= Liquid Liabilities; DC= Domestic Credit; PC= Private Credit; MC= Market Capitalization; TR = Turnover Ratio; VT= Value Trade. CD test statistic is based on two-sided $N(0,1)$ test and distributed as a standard normal.

4.4 FMOLS estimation results

The fully modified OLS estimates of the co-integrating relationship are reported in Tables 5, 6, 7 and 8. Turning first to Table 5 with time dummies in the specification, the estimated coefficient for human capital is positive and statistically significant at the 1 percent level, as expected by theory, but labor growth is positive which is inconsistent with theory. It is interesting that the coefficient of physical capital is statistically insignificant and in some regressions is negative. The lack of a relationship between physical capital and economic growth may be linked to inefficient economic plans and the financial crisis in the MENA countries. On the other hand, the estimated coefficients for the financial development indicators in the stock market sector are positive and statistically significant at the 5 percent level. While the results show that the estimated coefficients for the banking sector indicators are significant and negative except for Model 1d, which uses liquid liabilities as the financial development measurement.. This indicates that economic growth for MENA countries are affected by financial development and that the stock market indicators are slightly stronger than the banking sector indicators in influencing growth in the MENA region. This finding is different from Naceur and Ghazouni (2007) who find that financial development is unimportant or even harmful for

economic growth in the MENA region. However, the negative and significant association between bank credit (private credit and domestic credit) and growth as shown in Models 1e and 1f may be directly linked to the overwhelming public sector and inefficiency in the credit allocation. With regards to the control variables, the empirical results show that human capital plays an important role in determining economic growth due to the fact that the magnitude of its contribution is higher than the other control variables.

Table 5: Panel Group FMOLS Results with time dummies
(Dependent Variable: Real GDP per capita)

FMOLS Regressions						
	Stock Market Development			Banking Sector Development		
	Model 1a (FD= Value traded)	Model 1b (FD = Turnover)	Model 1c (FD = Market Capitalization)	Model 1d (FD=Liquid Liabilities)	Model 1e (FD = Private credit)	Model 1f (FD = Domestic Credit)
Physical Capital	-0.0034 (-1.918)	-0.0231 (-2.519)	0.0126 (-0.737)	-0.0246 (-1.307)	0.0148 (0.860)	-0.0158 (-1.112)
Human Capital	5.255 (5.483)*	2.792 (2.923)*	5.160 (8.583)*	6.610 (9.444)*	3.145 (2.876)*	4.274 (6.755)*
Labour Growth	0.0481 (6.368)*	0.044 (6.123)*	0.0507 (6.584)*	0.0460 (9.479) *	0.0515 (10.471)*	0.052 (9.162)*
Financial Development (FD)	0.0064 (2.107)**	0.0152 (2.117)**	0.0196 (2.076)**	-0.106 (-1.693)	-0.054 (2.350)**	-0.083 (1.820)

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t-statistics. The sign of the coefficient and t-statistics can be inconsistent due to the t-statistic computation in FMOLS is different.

Table 6 repeats the analysis of Tables 5 with the alternative proxy for economic growth, namely non-oil GDP per capita as the dependent variable. Table 6 shows that all the estimated coefficients in the different regressions for physical capital are positive and statistically significant at the 1 percent level, as expected by theory. The coefficient of human capital is statistically significant and positive except for Model 1a, where the total share of value traded is the proxy for financial

development. For labor growth, the estimated coefficients are statistically significant and negative except for Models 1a to 1c where the stock market indicators are employed as the financial development measurement.

The estimated coefficients for the financial development indicators are statistically significant and negative where the banking sector proxies are used but insignificant when financial development is proxied by the stock market sector. As shown in Table 6, the coefficients associated to the banking sector indicators are negative and have high values (columns (4) to (6)). These findings are different from that obtained before which shows the importance of the stock market indicators in promoting economic growth.

Table 6: Panel Group FMOLS Results with time dummies
(Dependent Variable: Real Non-Oil GDP per capita)

FMOLS Regressions						
	Stock Market Development			Banking Sector Development		
	Model 1a (FD= Value traded)	Model 1b (FD = Turnover)	Model 1c (FD = Market Capitalization)	Model 1d (FD=Liquid Liabilities)	Model 1e (FD = Private credit)	Model 1f (FD = Domestic Credit)
Physical Capital	0.372 (7.762)*	0.352 (7.187) *	0.438 (8.620) *	0.280 (8.554) *	0.403 (8.612) *	0.269 (7.041) *
Human Capital	-2.125 (-0.011)	4.647 (-2.436) **	0.916 (3.722) *	0.479 (4.737) *	7.380 (-2.483) **	6.582 (1.975) **
Labour Growth	-0.0038 (1.253)	0.004 (1.713)	-0.0199 (1.305)	-0.010 (2.840) *	-0.038 (7.117) *	-0.010 (4.400) *
Financial Development (FD)	0.0051 (-0.257)	0.007 (-0.602)	-0.020 (0.186)	-0.488 (-9.254) *	-0.173 (-4.348) *	-0.348 (-4.649) *

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t-statistics. The sign of the coefficient and t-statistics can be inconsistent due to the t-statistic computation in FMOLS is different.

In order to compare the relative importance of both stock market and banking sector development in influencing growth, this study re-estimated Models (1) and (2) but with both indicators included in the

specification. As shown in Table 7, the estimated coefficient for stock market development is significant and positive while the banking sector is significant and negative for all the regressions. These results confirm that economic growth is affected by financial development, especially stock market development, in the MENA region. However, the significance and negative association between the banking sector, acting as a proxy of financial development, and economic growth during the observed period reveals the inefficiency of the credit allocation process, credit regulation and state owned banking in the MENA region. This finding is in line with Naceur and Ghazouni (2007) who find that there is no association between bank development and economic growth because of a high degree of financial repression in the MENA region. Indeed, the negative contribution of the banking sector indicators in the financial development process is mainly due to the underdevelopment of the banking system in MENA countries, implying limited efforts to press ahead with further development in response to higher growth. In addition, the development of capital market activities promotes higher economic activity which creates opportunities for financial diversification in light of the underdevelopment of the banking system.

Table 7: Panel Group FMOLS Results

	Dependent Variable: Real GDP per capita		Dependent Variable: Real Non-oil GDP per capita	
	without time dummies	with time dummies	without time dummies	with time dummies
Physical Capital	0.002 (-0.225)	-0.004 (0.791)	0.138 (2.747)*	0.348 (8.741)*
Human Capital	6.173 (30.284) *	3.952 (4.508)*	8.427 (22.414)*	6.176 (-2.666)*
Labour Growth	0.201 (8.893) *	0.039 (7.285)*	-0.153 (7.261)*	-0.013 (2.693)*
Market Capitalization	0.028 (0.440)	0.036 (4.284)*	0.028 (0.622)	0.042 (-0.530)
Private credit	-0.110 (-2.438)**	-0.054 (2.989)*	-0.022 (-3.140)*	-0.098 (-6.319)*

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t-statistics. The sign of the coefficient and t-statistics can be inconsistent due to the t-statistic computation in FMOLS is different.

Table 8 highlights the summary of the above results, where stock market development has a greater impact than banking sector development in influencing economic growth in the MENA region.

Table 8: Summary of the Results (FMOLS) - Financial Development and Growth

			Dependent Variable: Real GDP per capita		Dependent Variable: Real Non-oil GDP per capita	
			Without time dummies	With time dummies	Without time dummies	With time dummies
Financial Development Indicators	Banking Sector	Liquid Liabilities	(+) Significant	Insignificant	(-) Significant	(-) Significant
		Private credit	Insignificant	(-) Significant	Insignificant	(-) Significant
		Domestic Credit	(-) Significant	Insignificant	Insignificant	(-) Significant
	Stock Market	Value traded	(+) Significant	(+) Significant	(+) Significant	Insignificant
		Turnover	(+) Significant	(+) Significant	Insignificant	Insignificant
		Market Capitalization	(+) Significant	(+) Significant	(+) Significant	Insignificant

Robustness Checks

4.5 DOLS estimation results

This study employs the DOLS estimation procedure as a robustness check and the results are reported in Tables 9 and 10. As shown in Table 9, the estimated coefficients for the financial development indicators namely share value traded, turnover ratio and stock market capitalization are statistically significant at the 5 percent level and positive while for models 1d to 1f, which use banking sector indicators, are significant but negative. On the other hand, when we employ non-oil GDP per capita as the dependent variable, as reported in Table 10, the only estimated coefficients which were found to be statistically significant were two of the stock market development indicators namely, share value traded and turnover ratio. They were estimated to be positive, whereas the other indicators were insignificant and negative except Model 2c.

Overall, the DOLS results support those obtained from the FMOLS estimations which shows the importance of the stock market indicators in promoting economic growth. In fact, the findings provide new evidence in understanding that financial development has had a significant effect on economic growth in the MENA region and that stock market indicators are slightly stronger than banking sector indicators in influencing growth. With regards to the control variables, the empirical results also show that human capital plays an important role in determining economic growth due to having the correct sign and a high value, which is consistent with theory.

Table 9: Panel Group DOLS Results (Dependent Variable: Real GDP per capita)

	Stock Market Development			Banking Sector Development		
	Model 1a (FD= Value traded)	Model 1b (FD = Turnover)	Model 1c (FD = Market Capitalization)	Model 1d (FD=Liquid Liabilities)	Model 1e (FD = Private credit)	Model 1f (FD = Domestic Credit)
Physical Capital	-0.549 (-11.77)*	-0.478 (-10.29)*	-0.524 (-10.94)*	-0.433 (-9.18)*	-0.467 (-9.68)*	-0.479 (-10.15)*
Human Capital	20.091 (24.46)*	20.389 (28.05)*	19.997 (25.79)*	19.989 (26.68)*	20.732 (27.23)*	20.020 (30.03)*
Labour Growth	0.440 (49.24)*	0.288 (29.44)*	0.566 (66.87)*	0.403 (40.24)*	0.443 (51.81)*	0.427 (46.05)*
Financial Development (FD)	0.012 (3.05)*	0.181 (10.25)*	0.070 (3.46)*	-0.276 (-3.18)*	-0.342 (-5.00)*	-0.237 (-4.16)*
R ²	5.799	7.247	4.909	5.056	5.599	6.178

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t-statistics.

Table 10: Panel Group DOLS Results
(Dependent Variable: Real Non-Oil GDP per capita)

	Stock Market Development			Banking Sector Development		
	Model 2a (FD= Value traded)	Model 2b (FD = Turnover)	Model 2c (FD = Market Capitalization)	Model 2d (FD=Liquid Liabilities)	Model 2e (FD = Private credit)	Model 2f (FD = Domestic Credit)
Physical Capital	-0.231 (-3.11)*	-0.179 (-2.30)*	-0.239 (-3.00)*	-0.173 (-2.66)*	-0.208 (-2.69)*	-0.199 (-2.64)*
Human Capital	18.410 (14.06)*	18.672 (16.08)*	18.071 (14.01)*	18.133 (19.57)*	18.51 (15.05)*	18.284 (17.11)*
Labour Growth	0.227 (15.94)*	0.179 (11.48)*	0.321 (22.80)*	0.276 (20.00)*	0.322 (23.33)*	0.299 (20.08)*
Financial Development (FD)	0.047 (2.61)*	0.150 (5.34)*	0.019 (0.59)	-0.142 (-1.19)	-0.095 (-0.87)	-0.106 (-1.17)
R ²	2.252	2.504	1.958	1.912	2.112	2.153

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t- statistics.

5 Conclusion

This study examines the effect of financial development on economic growth using a panel of nine MENA countries over the period of 1991 to 2009. Pedroni panel co-integration, fully modify ordinary least squares and dynamic ordinary least squares methods are employed in the analysis. The estimated results confirm that each financial sector (banking sector-stock market) has a unique and different effect on economic growth. There is strong evidence that financial development has a significant effect on economic growth in the MENA region and stock market indicators look slightly stronger than banking sector indicators. The significance and negative association between the banking sector indicators, as financial development measurements, and economic growth during the observed period reveals that there is an inefficient credit allocation process, as well as inefficient credit regulation and state owned banking in the MENA region. In fact, government intervention appears to have negative effects resulting in efficiency losses according Mckinnon (1973) and Shaw (1973).

The findings of this study have important policy implications. It is obvious that policies that support both bank and stock market development are more favourable, rather than in favour of either banks or stock markets. Improving the banking sector, especially in its credit allocation process, strengthening credit regulation and reinforcing competition in the banking sector and privatizing the state owned banks can help to progress financial development programs and raise economic growth. Moreover, improving the corporate governance of MENA banks through initiatives, such as the one launched in 2005 which affected on board structures, risk management, competitiveness, investment and disclosure, enables banks to allocate capital efficiently and contributes to overall economic growth. On the other hand, improving and enhancing growth and liquidity as well as regulatory reforms and increased liberalization in the stock markets within the MENA region is expected to enhance regional intermediation of resources through the close integration of financial markets and will stimulate economic growth in the region.

To this end, it is very important to mention that the MENA region has completely different pattern of political rules and evolution in the course of the past two decades. The MENA region has experienced successive waves of protest, some sparked by economic conditions, others by political events. While the links between economic and political protest vary from country to country, they are much more closely intertwined in this region. Thus, It is apparent that policies that address both political and economic forces are more favourable, rather than in favour of either politics or economics. Since the development of financial sector and macroeconomic stability may depend on the political movements, it is important for the political leaders to manage the political risks and ensure that policies have time to work, take advantage of opportunities they encounter and avoid the pitfalls and the paths away from crisis they may pursue.

References

- Abu-Bader, S., and Abu-Qarn, A. (2008), "Financial development and economic growth: Empirical evidence from six MENA countries", *Review of Development Economics*, 12, 803-817.
- Al-Awad, M. and Harb, N. (2005) "Financial development and economic growth in the Middle East", *Applied Financial Economics*, 15, 1041-1051.
- Apergis, N., Filippidis, I. And Economidou, C. (2007), "Financial deepening and economic growth linkages: A panel data analysis", *Review of World Economics*, 143(1), 179-198.
- Arestis, P., Demetriades, P. And Luintel, K. (2001), "Financial development and economic growth: The role of stock markets", *Journal of Money, Credit and Banking*, 33(1), 16-41.
- Beck, T. and Levine, R. (2004), "Stock markets, banks, and growth: Panel evidence", *Journal of Banking and Finance*, 28(3), 423-442.
- Kao, C. and Chiang, M. H. (2000), "On the estimation and inference of a co-integrated regression in panel data", *Advances in Econometrics*, 15: 179-222.
- Chang, T. and Caudill, S. (2005), "Financial development and economic growth: The case of Taiwan", *Applied Economics*, 37(12), 1329-1335.
- Chang, T. and Ho, Y. (2001), "Financial development and economic growth in South Korea: A note on testing demand-following or supply-leading hypothesis", *Indian journal of economics*, 82, 153-160.
- Christopoulos, D. and Tsionas, E. (2004), "Financial development and economic growth: Evidence from panel unit root and co-integration tests", *Journal of Development Economics*, 73(1), 55-74.
- Dreger, C. and Reimers, H. (2005), "Health care expenditures in OECD countries: A panel unit root and cointegration analysis", *International Journal of Applied Econometrics and Quantitative Studies*, 2(5), 20.

Eita, J. and Jordaan, A. (2007), "A causality analysis between financial development and economic growth for Botswana"; University of Pretoria, Department of Economics.

Fidrmuc, J. (2009), "Gravity models in integrated panels", *Empir Econ*, 37:435–446.

Goldsmith, R. (1969), "Financial structure and development New Haven"; CN:Yale University Press.

Im, K., Pesaran, M. and Shin, Y. (2003), "Testing for unit roots in heterogeneous panels", *Journal of Econometrics*, 115(1), 53-74.

Kar, M., Nazlıoğlu, Ş. and Ağır, H. (2011), "Financial development and economic growth nexus in the MENA countries: Bootstrap panel granger causality analysis", *Economic Modelling*, 28, 685-693.

King, R. G. and Levine, R. (1993 a), "Finance and growth: Schumpeter might be right", *Quarterly Journal of Economics*, 108, 717-732.

King, R. G. and Levine, R. (1993 b), "Finance, entrepreneurship, and growth: Theory and evidence", *Journal of Monetary and Economics*, 32, 513-542.

Law, S. H (2007), " Openness and financial development: Panel data evidence from various stages of economic development", *Journal of Emerging Market Finance*, 6;145.

Levin, A., Lin, C. and James Chu, C. (2002), "Unit root tests in panel data: Asymptotic and finite-sample properties", *Journal of Econometrics*, 108(1), 1-24.

Levine, R. (1991), "Stock markets, growth, and tax policy", *Journal of Finance* 46, 1445-1465.

Levine, R. (1997), "Financial development and economic growth: Views and agenda", *Journal of Economic literature*, 35(2), 688-726.

Levine, R. and Zervos, S. (1998), "Stock markets, banks, and economic growth", *The American Economic Review*, 88(3), 537-558.

Lucas, R. E. (1988), "On the mechanics of economic development", *Journal of monetary Economics*, 22(1), 3-42.

Makdisi, S., Fattah, Z. and Limam, I. (2000), "Determinants of growth in the MENA countries", Global Research Project (GRP) paper.

Naceur, S. and Ghazouani, S. (2007), "Stock markets, banks, and economic growth: Empirical evidence from the MENA region", *Research in International Business and Finance*, 21(2), 297-315.

Odedokum, M. (1996), "Alternative econometric approaches for analysing the role of the financial sector in economic growth: Time-series evidence from LDCs", *Journal of Development Economics*, 50(1), 119-146.

Pedroni, P. (1996), "Fully Modified OLS for heterogeneous co-integrated panels and the case of purchasing power parity", (No. 96-020): Indiana University Working Papers in Economics.

Pedroni, P. (1999), "Critical values for co-integration tests in heterogeneous panels with multiple regressors", *Oxford Bulletin of Economics and Statistics*, 61(s 1), 653-670.

Pedroni, P. (2000), "Fully modified OLS for heterogeneous co-integrated panels", *Advances in Econometrics*, 15, 93-130.

Pedroni, P. (2004), "Panel co-integration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis", *Econometric Theory*, 20(03), 597-625.

Rachdi, H. and Mbarek, H. B. (2011), "The causality between financial development and economic growth: Panel data co-integration and GMM system approaches", *International Journal of Economics and Finance*, 3(1).

Robinson, J. (1952), *The rate of interest and other essays*: Macmillan London.

Saini, A., Baharumshah, A. Z., and Law, S. H. (2010), "Foreign direct investment, economic freedom and economic growth", *International Evidence Economic Modelling*, 27(5).

Appendix A: Definition and Sources of the Data

Financial development Indicators	Definition	Sources
1.Liquid Liabilities/GDP	The sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency(M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements(M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
2.Domestic Credit/GDP	Includes all credit to various sectors on a gross basis. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
3.Private Sector Credit/GDP	Financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
4.Stock Market Capitalization/GDP	Market capitalization is the share price times the number of shares outstanding.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
5. Stock Market Turnover Ratio	Ratio of the value of total shares traded and average real market capitalization.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
6.Total Share Value Traded/GDP	Stock traded refers to the total value of shares traded during the period.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).

The Role of Political Stability on Economic Performance: The Case of Bangladesh

Moin Uddin Ahmed¹ and Mohammad Habibullah Pulok²

Political stability generally plays pivotal role in the process of economic development of any country. In this paper, we investigated the direct effect of political stability on the economic performance of Bangladesh for the period of 1984-2009. Two different techniques of cointegration have been used to analyse the long run and short run effect. The Engle-Granger method of cointegration did not find any cointegration while Bound Testing Approach did. Once cointegration is found the long run relationship as well as the short run relationship is established. Our findings indicate that political stability has negative effect on economic performance in long term while the short run effect is positive. This result is rare but not unique as it supports to the work of Goldsmith (1987) to shed light on Mancur Olson's theory of political stability and growth.

1. Introduction

Political instability has been a notable feature of Bangladesh since her birth in 1971. The country faced enormous challenges in the path of growth but still maintained a good rate. However, till now, the country still falls into category of the least developed countries. The population growth was around 2%³ until 1997 which swallowed up the economic

¹ The author is a Lecturer at Institute of Health Economics, University of Dhaka, Bangladesh. Address: Institute of Health Economics, University of Dhaka, Arts Faculty Building (4th Floor), Dhaka-1000, Bangladesh, Email: moin.ahmed@ihe.ac.bd

² The author is a Lecturer of Economics at Southeast University, Bangladesh. Address: Department of Economics, Southeast University, House #64, Road#18, Block#B, Banani, Dhaka-1213, Bangladesh. E-mail: mohammad.pulok@barcelonagse.eu

³ World Bank Data

growth to some extent. There are other adverse economic and socio-economic situations which make it hard to grow the country faster. So, it is of importance to analyse the effect of non-economic factors like political stability on economic performance. The political and civil-military bureaucratic leadership has failed to meet people's expectation in the last four decades. Economic growth has been pretty steady but income inequality is very high as compared to other developing countries. In comparison basis the growth was lower than some countries in South Asia. So, if the country becomes politically stable will it be contributing to the growth? Or, is it already performing well in such adverse socio-economic situation? Is the effect long term or short term? These questions will be answered later in this paper. In this paper, the effect of political stability on economic performance of Bangladesh has been empirically analysed based on both theoretical specification and empirical specification.

The paper is outlined as follows: section 2 reviews some previous studies regarding political stability and economic performance, section 3 specifies the theoretical model and data, section 4 focuses on the methodology and empirical specification, section 5 presents the results of estimation section 6 includes result discussion and sensitivity analysis and section 7 concludes the paper.

2. Literature Review

In this section, some earlier studies regarding the relationship between political stability and economic growth are discussed. Most of the existing empirical studies link political instability rather than stability with economic growth. The earlier works include the studies by Venieris and Gupta (1986) and Gupta (1990). Barro (1990) in his cross sectional analysis found that economic growth is affected negatively by political instability as property rights are hardly implemented in unstable political situation. Edwards and Tabellini (1991) showed that a heavy borrowing due to short term fiscal policy by unstable political leaders deter long run economic growth. Devereux and Wen (1996) argued that unstable political situation discourages private investments which in turn affects economy negatively. Alesina and Perroti (1996) used three different variables to proxy for the political instability and found it causing a decrease in economic growth. In Edward's (1998) report negative relation is found between political instability and

productivity growth for a panel of 93 countries for the period of 1960-1990, though the relation was relatively weak. Drazen (2000) identified two reasons for which political instability affects economic performance. Firstly, it creates uncertainty about future return from the investment of firms and private agents, which inhibits the society as a whole to accumulate physical capital. Again, there is a direct effect of political instability on productivity as it distorts the functions of the market. Lower economic growth due to lower human capital accumulation owing to endemic political instability is the finding of Maloney (2002) for his study of Latin American countries. Campos and Karanasos (2007) used power ARCH framework with yearly data for Argentina for the period 1896-2000 and came up with the conclusion that both the informal political stability (assassinations and strikes) and the formal political stability (constitutional and legislative changes) have direct negative effect on economic performance. The effect of formal instability was stronger in the long run while the effect of informal instability was stronger in the short run in their study. Yunis et. al (2008) investigated the effects of various political instability factors on economic growth for selected Asian countries during 1990-2005. The study found close relationship between political stability and economic growth and the results showed that the role of political stability is more important than economic freedom. Aisen and Veiga (2010) used GMM estimator for linear dynamic panel data models on a sample of 169 countries, and 5-year periods from 1960 to 2004 to investigate the link between political instability and economic growth, and found that lower growth is associated with higher degree of political instability.

Country specific studies include the study of Munoz (2009) and Astteriou and Price (2001). Munoz (2009) used ARDL framework to investigate the link between political instability and economic growth for Venezuela for the period of 1983-2000. He found that political instability affects growth negatively but not through the channel of investment. Astteriou and Price's study was to test the influence of political instability on UK economic growth for 1961-1997 using GARCH-M model which revealed negative effect on growth and positive effect on growth certainty. Astteriou and Siriopoulos (2000) examined the relationship empirically for Greece and found strong negative association. The only study which, showed that political stability has negative impact on economic growth was by Goldsmith

(1987). Though he found that for LDCs, political stability negatively affected economic growth, it was only to a little extent.

There are not many econometric studies to analyse the effect of political stability on economic performance for Bangladesh. Quazi (2003) found that political instability affect negatively to the savings of Bangladesh using Engle-Granger Cointegration approach for the period 1971-2003. There is another mentionable study by the Dhaka Chamber of Commerce and Industry (DCCI) which is more an economic policy paper rather than econometric study.

3. Model and Data

3.1 The Model:

The role of political stability on economic growth can be analysed using the Solow growth model. The “Growth accounting”⁴ can be used to find the other proximate causes of growth and the exercise begins by postulating the Cobb-Douglas production function as follows:

$$Y = BK^{\alpha}L^{1-\alpha}$$

Here,

Y = Real gross domestic product

L = Number of labours

K = Physical capital

B = Hicks-neutral productivity term

α = share of physical capital in the production

$1 - \alpha$ = share of labour in the production

In per worker term,

$$\begin{aligned}\frac{Y}{L} &= \frac{BK^{\alpha}L^{1-\alpha}}{L} \\ \Rightarrow y &= B\left(\frac{K^{\alpha}}{L^{\alpha}}\right)\frac{L}{L} \\ \Rightarrow y &= Bk^{\alpha}\end{aligned}$$

⁴ Abramovitz(1956) and Solow(1957)

$y = \frac{Y}{L}$ = Real GDP per unit of labour and $k = \frac{K}{L}$ = physical capital per unit of labour

By taking logarithm both side

$$\log y = \log B + \alpha \log k \quad (3.1)$$

Now, let us incorporate political stability in the above specification. North (1990) argued that institutions in a country determine its long-run economic performance. Here, institutions refer to political stability, quality of government, independent judicial system, political rights, property rights etc. Political stability can directly affect the growth through affecting total factor productivity of the country. It is assumed that political stability affects economic growth by enhancing or reducing total factor productivity (TFP) term B . Assume the total factor productivity term B as a function of political stability, ρ

$$B(\rho) = B e^{\sigma \rho} \quad (3.2)$$

Where σ = magnitude of political stability growth

ρ = political stability

$$B = B_0 e^{gt}$$

g = growth rate of technology, t = time

Combining equations (3.1) and (3.2),

$$\log y = \log B + \sigma \rho + \alpha \log k$$

$$\Rightarrow \log y = \log(B_0 e^{gt}) + \sigma \rho + \alpha \log k$$

$$\Rightarrow \log y = B_1 + gt + \sigma \rho + \alpha \log k \quad 3.3$$

where $B_1 = \log B_0$

The coefficient σ will measure the effect of political stability on economic growth directly. It is to be noted that it is often hard to

estimate structural equation like (3.3) using purely time series data because of the nonstationary properties of the data. Estimation in the structural form can lead to spurious regression if cointegration is not found among the variables. More is discussed in the section 4.2 later.

3.2 Data

The variables of interest in this study are real GDP per worker (one of the measures of economic performance), investment per worker and political stability. Real GDP per capita (y_t) and investment as a percentage of real GDP (k_t) will be used for proxies of real GDP per worker and investment per worker. The annual time series data from 1984 to 2009 for Bangladesh will be used in the study. The sources of the data for these two variables are Penn World Table (Version 7.0) of Alan Heston, Robert Summers and Bettina Aten. The source of the “Political stability” variable is the PRS (Political Risk Services) group from the ICRG (International Country Risk Guide). Further historical data was not possible to use because of the data of political stability is only available from 1984. The variable political stability is a kind of political risk rating which provides a way of assessing the political stability of the countries covered by ICRG on a comparable basis. Based on risk ratings the countries can be divided into five categories. The political risk rating of 0.0% to 49.9% indicates a very high risk; 50.0% to 59.9% high risk; 60.0% to 69.9% moderate risk; 70.0% to 79.9% low Risk; and 80.0% or more very low risk. It means that if the point increases the political stability increases.

4. Methodology

Most economic time series variables are non-stationary. Estimates based on these non-stationary variables usually lead to spurious regression and the result is not meaningful to interpret. These variables can be made stationary by appropriate differencing depending on its order of integration. But we can lose long run information because of differencing. But the regression in level form will be meaningful if the variables are cointegrated. To test the existence of long run relationship in time series econometrics, the cointegration technique is a dominant one. There are several approaches to test the long run relationship. Two step residuals based test (Engle-Granger, 1987), the system based reduced rank regression approach (Johansen: 1991, 1995), the variable

addition approach(Park,1990),the residual based approach of Shin(1994),stochastic common trend approach(Stock and Watson,1988),and ARDL Bound testing approach(Pesaran and Shin,1999 and Pesaran, Shin and Smith: 1996,2001) are the techniques used in different circumstances. We will investigate the existence of cointegration with two methods for their respective strength in each case. The methods are Engle-Granger's two step residuals based test and Bound Testing Approach of cointegration.

4.1 Engle-Granger's Two Step Method for Testing Cointegration:

This test allows the theoretical model to be tested for any existence of long run relationships, and if they are found to be cointegrated then the long run relationship can be represented in the structural form (as in equation 3.3). It allows estimating the short run disequilibrium relationship at the same time. Economically speaking, two or more variables are cointegrated when they have a long run or equilibrium relationship among them. So in other word, an attempt to test for the existence of cointegration is nothing but the investigation of long run relationship among the variables. The well-known test of cointegration suggested by Engle-Granger(1987) is to run the following regression(4.1.1) to establish the relationship found in the equation (3.3) after verifying that the underlying variables are in the same order of cointegration.(The unit root test as a way of finding the order of integration of the variables will later be discussed in section 4.3)

$$\ln y_t = \alpha + \beta_1 \ln k_t + \beta_2 pst_t + u_t \quad (4.1.1)$$

where y_t = real GDP per capita, k_t = investment as a percentage of real GDP, pst_t = political stability index, u_t = error term

The asymptotic distribution of β s is not standard. But Engle-Granger advocated that betas are to be estimated by OLS and then to test stationarity or existence of unit root of the following residual

$$\hat{u}_t = \ln y_t - \hat{\alpha} - \hat{\beta}_1 \ln k_t - \hat{\beta}_2 pst_t$$

The null hypothesis is none existence of cointegration. However, the limiting distribution of t test does not follow the limiting distribution of

Dickey-Fuller used in unit root test. Though Engle-Granger (1987) first supplied the critical values for one regressor, later it was extended by Engle and Yoo (1987) and at present MacKinnon (1999, 2010) has the most completed table so far. It is to be noted that testing cointegration and representation of long run relationship are two different things. Once it is found that the cointegration exists among the variables, the following equation in level form can be estimated and it will not then be spurious.

$$\ln y_t = \alpha_1 + \beta_1 \ln k_t + \beta_2 pst_t + gt + e_t$$

Finally, the following error correction model can be estimated to capture the short run dynamics.

$$\Delta \ln y_t = \alpha_1 + \lambda_1 \Delta \ln k_t + \lambda_2 \Delta pst_t + gt + \gamma_1 ECM_{t-1} + v_t$$

Where,

$$ECM_{t-1} = \hat{e}_{t-1} = \ln y_{t-1} - \hat{\alpha}_1 - \hat{\lambda}_1 \ln k_{t-1} - \hat{\lambda}_2 pst_{t-1} - \hat{g}(t-1)$$

$\Delta \ln y_t$ = first difference of $\ln y_t$, t = time trend, ECM_{t-1} =error correction term at period $t-1$

4.2 ARDL Bound Testing Approach:

There are number of factors which make the ARDL Bound test approach more appealing. The approach is suitable for small sample (Pesaran *et al.*, 2001). The Johansen's cointegration technique requires large sample to yield a valid result.(Ghatak and Siddiki, 2001). The methodology is applicable for purely I(1) and I(0) variables ,or mixed of I(1) and I(0) variables. The ARDL model concedes consistent estimator of long run coefficients irrespective of whether the underlying regressors are purely I(0),I(1) or mutually cointegrated(Pesaran et al 2001) .In ARDL approach, only a simple reduced form of equation is required (Pesaran and Shin,1995) whereas in other techniques there are system of equations. The ARDL bound testing allows tractability of using different lags of the regressors as opposed to the cointegration VAR models where different lags of different variables is not allowed.(Pesaran et al,2001) .In the ARDL bound testing procedure

both dependent and independent variables can be introduced with lags. The term “auto regressive” refers that the lag of dependent variable are allowed to determine the present dependent variable whereas the term “distributed lag” refers to the lag of independent variables. This technique is plausible as the change in independent variable may or may not cause change to dependent variable instantaneously as considered in theoretical model.

However, to apply the bound testing approach we need to make sure there is no existence of I(2) variables. The critical F statistics are not valid in the presence of any I(2) variable in the abovementioned approach.(Ottara, 2004).And, we should be careful about using the critical values for small sample size. In this study the critical values from Narayan (2004) will be used as the sample size is small.

To apply the ARDL bound testing approach we need to define our model empirically. The reason is, this test may not allow us to follow the structural form of model (*equation 3.3*). Then, we need to proceed based on the reduced form of equation. Such reduced form of equation can be:

$$y_t = f(k_t, pst_t)$$

We will use the reduced form of equation in double log form as

$$\log y_t = \alpha + \beta_1 \log k_t + \beta_2 \log pst_t$$

where y_t = real gdp per capita, k_t = investment as a percentage of real gdp, pst_t = political stability index

There are several intuitions to define the model in such way. If variables are expressed in log form the problem of non-normality can be reduced.(Wooldridge, 2006). In Bound test approach if the existence of cointegration is found then in the presentation of long run relationship often requires lag of dependent and independent variables as regressors which is not the case in the Engle-Granger presentation of long run relationship. This is the reason of deviating from our defined theoretical model into the empirical model. But our objective of finding any long run relationship between economic growth and political stability can still be achieved with this procedure. In some sense this

technique of finding long run relationship has the advantage that endogeneity problem can be solved by dint of adding lag dependent variables in the regressor's side.(Wooldridge,2006) .It is to be noted that it is not necessary to have many determinants of growth in the equation as the lag dependent variables can serve the purpose of omitted variables if any.

For our case the following unrestricted error correction version of the ARDL model can be presented.

$$\Delta \ln y_t = \alpha_0 + \sum_{i=1}^p \varphi_i \Delta \ln y_{t-i} + \sum_{i=0}^p \theta_i \Delta \ln k_{t-i} + \sum_{i=0}^p \lambda_i \Delta \ln pst_{t-i} + \partial_1 \ln y_{t-1} + \partial_2 \ln k_{t-1} + \partial_3 \ln pst_{t-1} + \nu_t \quad (4.2.2)$$

$\Delta \ln y_t$ = first difference of $\ln y_t$, $\Delta \ln k_t$ = first difference of $\ln k_t$,
 $\Delta \ln pst_t$ = first difference of $\ln pst_t$

The equation (4.2.1) can be estimated using the OLS method. An F test is performed to test the existence of the long run relationship. The null hypothesis of no cointegration $H_0 : \partial_1 = \partial_2 = \partial_3 = 0$ is tested against alternative hypothesis of $\partial_1, \partial_2, \partial_3$, are not simultaneously 0. But the asymptotic distribution of F statistics is non-standard. It depends on the number of regressors, the number of I(0) and I(1) variables and the inclusion of trend and intercept. As we have a relatively small sample size, critical values reported by Narayan(2004) are used for this study. There are two sets of critical values for each sample size: lower critical value (lower bound) which assumes the variables are purely I(0) and upper critical value(upper bound) which assumes the variables are purely I(1).If the calculated F statistic exceeds the upper bound then the null hypothesis of no cointegration can be rejected, which means there exists long run relationship among underlying variables. If the calculated F statistic is below the lower bound, the null hypothesis of no cointegration cannot be rejected, which means there is no long run relationship among the variables. However, the inference is inconclusive if the calculated statistic falls between lower and upper bound. Then it is necessary to analyse time series characteristic of the variables before reaching to any conclusion.

In every case lag can be selected based on Akaike information Criterion (AIC) or Schwarz Bayesian Criteria (SBC) given that the model does not suffer from autocorrelation, ARCH and non-normality. Pesaran and Shin(1999) recommended to use 2 lags as maximum lag for annual data. If cointegration is found then the long run model is estimated as in the following:

$$\ln y_t = \alpha_0 + \sum_{i=1}^p \beta_i \ln y_{t-i} + \sum_{i=0}^p \phi_i \ln k_{t-i} + \sum_{i=0}^p \psi_i \ln pst_{t-i} + u_t \quad (4.2.2)$$

Even though the cointegration exists among the variables the result will be of no importance if the parameters are not stable along the data periods. Instability in parameter arises because of structural breaks, so it is important to check whether parameters are stable to make the inference fully dependable. Pesaran and Pesaran (1997) advocated to apply the cumulative sum of recursive residuals (CUSUM) test (Brown *et al* ,1975) as a test of parameter constancy.

If there exists a long run relationship (existence of cointegration) the following error-correction version of ARDL model can be estimated:

$$\Delta \ln y_t = \alpha_0 + \sum_{i=1}^p \varphi_i \Delta \ln y_{t-i} + \sum_{i=0}^p \theta_i \Delta \ln k_{t-i} + \sum_{i=0}^p \lambda_i \Delta \ln pst_{t-i} + \gamma(ECM_{t-1}) + \nu_t \quad (4.2.3)$$

Where,

$$ECM_{t-1} = \ln y_{t-1} - \alpha_0 + \sum_{i=2}^p \beta_i \ln y_{t-i} + \sum_{i=1}^p \phi_i \ln k_{t-i} + \sum_{i=1}^p \psi_i \ln pst_{t-i} \quad (4.2.4)$$

The sign of the coefficient of the error correction term (ECM_{t-1}) must be negative i.e. $\gamma < 0$. The absolute value of γ decides how quickly the equilibrium is restored. The value of error correction term ranges from 0 to -1.

4.3. Unit Root Test

Unit root test examines the existence of unit root of a data generating process. It will help us to conclude about the order of the integration of the underlying variables. For Engle-Granger's cointegration test it is necessary to have same order of integration of the variables. Then we

can proceed to test whether there cointegration exists or not. For ARDL Bound testing approach it is important to make sure that no variable is I (2.) The Augmented Dickey-Fuller test will be employed as a test of unit root in this paper.

Consider the following stochastic process:

$$Y_t = \tau Y_{t-1} + u_t \quad (4.3.1)$$

Where u_t is the white noise error term.

If $\tau = 1$, that is, in the case of unit root becomes a random walk without drift which is non-stationary stochastic process. The equation (4.3.1) can also be presented as

$$\begin{aligned} \Delta Y_t &= (\tau - 1)Y_{t-1} + u_t \\ &= Y_{t-1} + u_t \end{aligned} \quad (4.3.2)$$

where $\Delta Y_t = Y_t - Y_{t-1}$

With drift and trend into consideration the following two models can be written. The equation (4.3.3) contains only drift and the equation (4.3.4) contains both drift and trend.

$$\Delta Y_t = \alpha + \theta Y_{t-1} + u_t \quad (4.3.3)$$

$$\Delta Y_t = \alpha + \theta Y_{t-1} + \delta t + u_t \quad (4.3.4)$$

The parameter of interest in all equations (4.3.2-4.3.4) is θ , if $\theta = 0$ then the sequence Y_t contains a unit root. The test involves estimating one (or more) equation of the above using the OLS to get the estimated value of θ , and associated standard error. Comparing the resulting t statistics with the appropriate critical value of the Dickey-Fuller table it can be said whether to accept or reject the null hypothesis of $\theta = 0$.

However in the Dickey-Fuller test, it is assumed that error terms u_t are uncorrelated with each others. In cases where u_t are correlated the augmented version of Dickey-Fuller test is used. It is done by adding

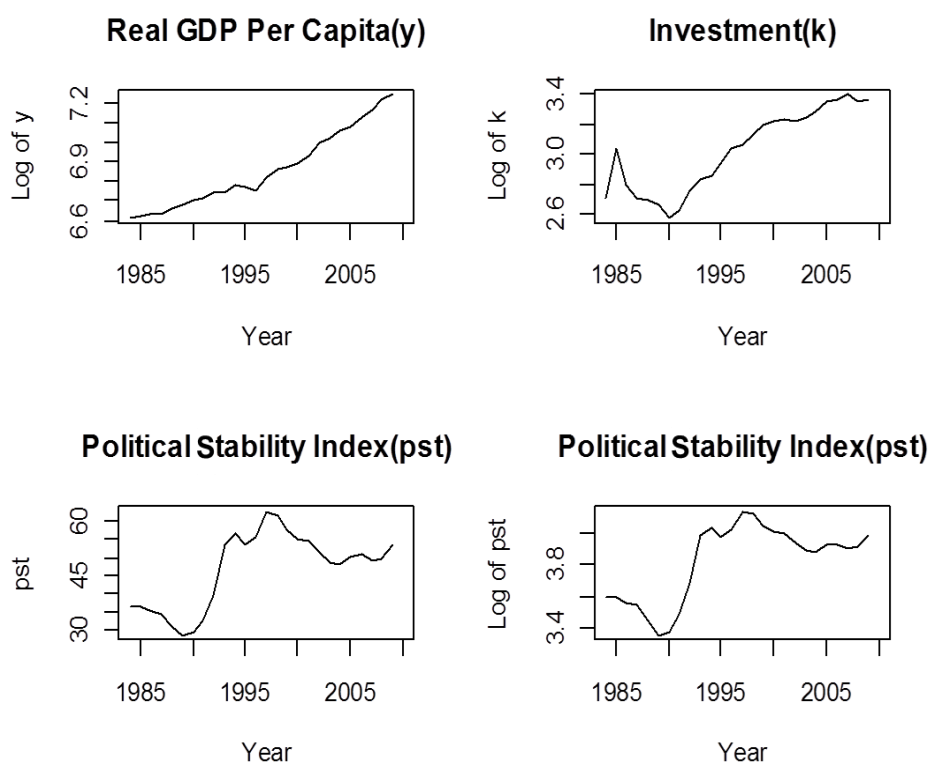
lags of dependent variables. An optimum number of lag is often decided empirically. The idea is to include enough lag terms so that the error terms are not correlated.

5. Graphical Analysis and Estimation:

5.1 Graphical Analysis

It is always better to inspect the variable graphically before going to the formal test. From the Figure-1 it can be easily understood that none of the variables are stationary in their level form because the mean is not constant throughout the periods. Bangladesh maintained a steady growth in real GDP per capita (in log form), and rating of political stability was never high. The log of investment to GDP ratio also maintained a steady rate except one or two occasions.

Figure-1: Plot of the time series variables in level form



5.2 Results of Unit Root Test

To conduct the Augmented Dickey-Fuller (ADF) test as a test of unit root the procedures described in Enders (2004) has been followed. The result is presented in Table-1:

Table-1: Result of Unit root test (Augmented Dickey-Fuller Test)

Variable	Trend and Constant	Constant	No Trend and No Constant	Order of Integration
$\ln y_t$	- 0.30(2) ⁺	-	-	I (1)
$\Delta \ln y_t$	-5.69 ^{***} (1)	-	-	
$\ln k_t$	-2.73 (3)	-1.18 (3)	1.25 (3)	I (1)
$\Delta \ln k_t$	- 3.27 [*] (1)	-	-	
pst_t	-1.39 (2)	-1.32 (2)	0.54 (2)	I (1)
Δpst_t	-3.45 [*] (1)	-	-	
$\ln pst_t$	-1.57 (2)	- 1.34 (2)	0.74 (2)	I (1)
$\Delta \ln pst_t$	-3.26 [*] (1)	-	-	

Notes:

1. The null hypothesis=unit root
2. ***, ** and * represent significance at 1%, 5% and 10% respectively
3. Lag lengths are in the parenthesis
4. + inference made using normal distribution
5. $\Delta \ln y_t$ = first difference of $\ln y_t$, $\Delta \ln k_t$ = first difference of $\ln k_t$,
 $\Delta \ln pst_t$ = first difference of $\ln pst_t$, Δpst_t = first difference of pst_t

Table-1 shows that, all the underlying variables have unit root in their level form but do not have unit root in their first difference form. The level of significance was 10% which is often set by researcher as it is very hard to reject the null hypothesis of unit root due to low power of ADF test. From the unit rest test it can be said that all variables are I(1). So the Engle-Granger Cointegration test can be performed as the variables are of the same order of integration. And, the Bound Testing procedures can be applied as no variable has order of integration of two or more.

5.3 Result of Engle-Granger Cointegration Test

In the Engle-Granger test of cointegration the equation 4.1.1 has been estimated using OLS. Then the Augmented Engle-Granger test is performed on the estimated residuals of the above mentioned equation to test the null hypothesis of no cointegration. The Augmented Engle-Granger test is same as the ADF test except the critical values are different. The test is performed with no trend and no constant, and lag lengths were selected in such way so that error terms are not auto-correlated. The critical values were extracted from the table in Mackinnon (2010) using the formula stated in his paper. (*Appendix-C*) Comparing the calculated statistics with the critical values the null hypothesis of no cointegration cannot be rejected even at 10% significance level. (Table-2) As no cointegration is found among the variables, the equation cannot be estimated in level form as in *equation (3.3)*, so does the long run relationship as the theoretical model. Therefore I will proceed with Bound test of cointegration which may not estimate the exact theoretical model but it may come up with long run information if cointegration is found.

Table-2: Engle-Granger Cointegration Test

Calculated Statistics	Critical Values		
-1.20	1%	5%	10%
	-4.88	-4.08	-3.69

Note: Critical values are calculated using the table in Mac Kinnon(2010)⁵

5.4 Results of Bound Test of Cointegration

To proceed with the bound test approach it is needed to specify a general unrestricted the ARDL model and then reduce the model like in *equation (4.2.1)*. “General to Specific” method is followed to acquire the specific unrestricted model. As the sample size is limited in the study, the start did not have too many lags. But in every stage of reducing the model from the general the ARDL model the criteria of no autocorrelation, no ARCH and normality is maintained. The reduction

⁵ See Appendix C

took place by removing the least significant lag from the model except the intercept and the variables in level form. As in the process of reduction there were several unrestricted ARDL models fulfilling the abovementioned criteria, the specific model was selected based on the lowest Schwartz-Bayesian Criteria (BIC) and the lowest Akaike Information Criterion (AIC).

[Appendix-A:Table A1] Once the unrestricted model is selected (*ARDLUN1*), the null hypothesis of no cointegration is tested as described in section 4.2 .The results are given in the Table 3. The calculated F statistic is higher than upper critical bound so that the null hypothesis of no cointegration can be rejected. It is to be noted that the critical values were for sample size 30 whereas the sample size in this study is 26. It was the nearest possible critical value to compare. Still the calculated F statistics is high enough for such conclusion.

Table-3: Bound Test of Cointegration

Calculated F Statistics	Critical Values					
33.27	1%		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	6.18	7.87	4.26	5.47	3.43	4.47

Notes: 1. The null hypothesis is no cointegration

2. Critical values are from Narayan (2004) for unrestricted intercept and no trend

5.5 Results of Long Run and Short Run Dynamics

The existence of cointegration in the lights of Bound testing approach will allow the estimation of the long run model. The selection of the long run will be based on Schwartz Bayesian Criterion and Akaike Information Criterion, given that, the model suffers from no auto correlation, no ARCH (auto regressive conditional heteroskedasticity) and non-normality. The starting selection of the lag was bit trivial as starting with 2 lags of each variable was not enough to attain the objective of no auto correlation. But the model with the lowest SBC and AIC was selected as the optimal long run model(*LR5*) given that fulfils the abovementioned criteria. (See Appendix A: Table A1) The estimated coefficients of the selected long run model are given in Table: 4 in the following:

Table-4: Long run Estimates

Dependent Variable: $\ln y_t$		
Regressors	Coefficients	Standard Errors
Constant	0.09	0.28(0.32)
$\ln y_{t-1}$	0.97***	0.05(18.14)
$\ln k_{t-2}$	0.08*	0.04(1.82)
$\ln pst_{t-1}$	0.08*	0.05(1.68)
$\ln pst_{t-2}$	-0.10*	0.06(-1.82)
F statistics=542.6(p value:0.00) Jarque-Bera test=0.87(p value:0.65) Shapiro-Wilk test=0.95(p value:0.42)		

Note: 1. Calculated t statistics are in the parenthesis

2. ***, ** and * represent significance at 1%, 5% and 10% respectively

3. $\ln y_{t-1}$ =one period lag of $\ln y_t$, $\ln k_{t-2}$ = two period lag of $\ln k_t$, $\ln pst_{t-1}$ =one period lag of $\ln pst_t$, $\ln pst_{t-2}$ =two period lag of $\ln pst_t$

From the table 4, it is clearly evident that the coefficient of investment has its expected sign and it is positive. The coefficient is significant at 10% level significance which is acceptable for such small sample size. However, the model contains two lags of political stability and both of them are significant at 10% level. The long run multiplier for investment k_t and political stability, pst_t is calculated as 2.33 and -0.67 (See Appendix C: C2). We should be careful about the interpretation as both the independent variables are expressed in percentage and their log forms are used as regressors. It means that 1% point increase in the political stability index (pst_t) will result in a decrease of 0.67% in real GDP per capita. And for investment variable, it can be said that investment to real GDP ratio (k_t) goes up by one percentage point, the real GDP per capita will increase by 2.33%. Once the long run model is established, the short run dynamics can be presented using error correction model. The Engle-Granger's two step procedure of error correction model has been estimated and the results are presented in table 5.

Table-5: Short Run Dynamics: Error Correction Model

Dependent Variable: $\Delta \ln y_t$		
Regressors	Coefficients	Standard Errors
Constant	0.02***	0.01 (2.00)
ECM_{t-1}	-0.75*	0.37(-2.02)
$\Delta \ln y_{t-1}$	0.48*	0.22(2.14)
$\Delta \ln y_{t-2}$	-2.31	0.13(-1.68)
$\Delta \ln y_{t-3}$	0.20	0.16(1.28)
$\Delta \ln y_{t-4}$	0.09	0.09(0.94)
$\Delta \ln k_t$	0.24**	0.09(2.58)
$\Delta \ln k_{t-1}$	0.001	0.06(0.03)
$\Delta \ln k_{t-2}$	-0.04	0.40(-1.06)
$\Delta \ln pst_{t-1}$	0.07***	0.02(3.43)
F statistics =22 (p value: 0.00) Jarque-Bera test =0.06 (p value:0.97) Shapiro-Wilk test =0.96 (p value:0.86)		

Notes: 1. Reported standard errors are Newey-West standard errors

2. t statistics in the parenthesis

3. ***, ** and * represent significance at 1%, 5% and 10% respectively

4. $\Delta \ln y_{t-1}$ =one period lag of $\Delta \ln y_t$, $\Delta \ln y_{t-2}$ =two period lag of $\Delta \ln y_t$, $\Delta \ln y_{t-3}$ =three period lag of $\Delta \ln y_t$, $\Delta \ln y_{t-4}$ =four period lag of $\Delta \ln y_t$, $\Delta \ln k_{t-1}$ =one period lag of $\Delta \ln k_t$, $\Delta \ln pst_{t-1}$ =one period lag of $\Delta \ln pst_t$, $\Delta \ln pst_{t-2}$ =two period lag of $\Delta \ln pst_t$, ECM_{t-1} =one period lag of ECM_t

However the inference will be made based on Newey-West correction because the error correction model suffers from autocorrelation. The error correction term is negative and significant at 10% level. It shows how quickly the equilibrium is restored once the model is out of equilibrium and the significance of the coefficient tells whether it adjust in the same period or not. If the coefficient is not significant it means that the adjustment takes place in the same period. In this study the coefficient of error correction term (ECM_{t-1}) is significant at 10% level and the absolute value is 0.75. So, once the model deviates from the equilibrium it adjusts 75% in that period. However, the error correction

model tells that the political stability has positive effect on economic performance in short run.

6. Result Discussion and Sensitivity Analysis:

In examining the relationship between political stability, it is found that the political stability has a negative effect in the long run but positive effect in the short run. Though the findings contradict most of the similar studies, on the other hand it gives support to the Mancur Olson's theory of political stability and growth. He averred that political stability has such effect on economic growth because of the activities of self-seeking interest group or "distributional coalition" (Goldsmith, 1987). A society which does not change with boundaries inclines to cumulate more collusion. Olson concludes that distributional coalition slows down the capacity to adopt new technologies in the face of changing economic condition, and thereby reduces the economic growth. Distributional coalition also creates the scope for rent seeking for the interest groups at the same time. For a least developed country like Bangladesh the theory suits more as Olson stated and Goldsmith confirmed in his research note. I would like to quote the reasoning of Olson as Goldsmith did in his research notes.

"The dense network of distributional coalitions that eventually emerges in stable societies is harmful to economic efficiency and growth, but so is instability. There is no inconsistency in this; just as special-interest groups leads to misallocation of resources and divert attention from production to distributional struggle, so instability diverts resources that would otherwise have gone into productive long term investments into forms of wealth that are more easily protected. On the whole stable countries are more prosperous than unstable ones and this is no surprise. But, other things being equal, the most rapid growth will occur in the society that have lately experienced upheaval but are expected nonetheless to be stable for the foreseeable future."

However, it should be noted that the effect of political stability on economic performance in this study is not channelled through investment. The result can be different if the effect of political stability is examined through investment channel and should not be confused with the results found in this study. Now, we turn our discussion to analyse critically about the estimated econometric model. Two methods

of cointegration technique have been used to find the long run relationship between economic performance and political stability. The Engle-Granger procedure did not find any cointegration following the theoretical model. It may be due the sample size, model specification or due to low power of test. With the empirical specification the Bound test approach by Pesaran has been applied and the cointegration among the variables has been found. In finding the unrestricted ARDL model for bound test the criteria of no serial correlation, no ARCH and normality have been strictly maintained. The autocorrelation was not only tested for a specific lag but for lags upto 15 with a boundary of p value of 30%. I think the procedure is superior to any rules of thumb for selecting a specific lag to test the autocorrelation. Similar point goes for the test of the presence of ARCH. The null hypothesis of no ARCH was tested for upto 15 lags and conclusion of no ARCH has been made when there was no ARCH for each of these lags. Non-normality is not a serious problem a for a large sample size. But the major challenge in the study was the small size. From selecting lag to diagnostic tests I needed to very careful keeping in mind of the small sample size. Therefore maintaining normality assumption was not an exception. However for the standard error of the error correction model needed to be corrected for autocorrelation before making inference as it does not allow adding more lags to solve the problem. The inference was made based on the Newey-West standard error. The parameter constancy was confirmed with recursive CUSUM test and OLS CUSUM test. (*Appendix B: figure B10 and B11*)

The study only used investment and political stability as independent variables. It ignores an important variable of human capital which is identified as an important determinant of growth. There were few reasons for not including it; small sample size was most important reason of all. Unfortunately the data was not available for the whole period of study. Omitting human capital from the regression is not a problem until it is correlated with political stability. If human capital is correlated with political stability then the estimates result in biased estimators. But the problem has been tackled using lag of dependent variable as a proxy human capital and all other determinants of growth which are likely to be correlated with political stability. The study commenced with the only possibility of causality from political stability to economic performance. It did not consider the reverse causality.

These are few caveats of this study. It is may be due to very small sample size or not including some important determinants.

7. Conclusion:

In this paper, we have investigated the direct impact of political stability on economic performance of Bangladesh for the period 1984-2009. To the best of our knowledge, this is the first study which attempts to analyse the relationship between political stability and economic performance for Bangladesh using time series econometric approach. Our objective of the paper is to examine the existence of long run as well as the short run effect of political stability on economic performance of Bangladesh. Two different techniques of cointegration have been used in this regard. At First, the Engle-Granger method of cointegration is applied to estimate the augmented Solow model of economic growth in structural form where political stability is incorporated in total factor productivity term. The Engle-Granger method does not find any cointegration, therefore nothing can be inferred about long run relationship. Then the ARDL Bound Testing approach has been implemented on the reduced form of the model and cointegration has been found. Once cointegration is found, the long run relationship as well as the short run relationship has been established. The results of this study indicate that political stability has negative effect on economic performance in the long run while the short run effect is positive. . Undoubtedly, destabilizing events interrupt economic activities in the short term, but these can set the stage for more rapid growth in the medium term. Political stability can have such negative effect on economic growth in the long run because of the activities of self-seeking interest group or “distributional coalition”. A society which does not change with boundaries inclines to cumulate more collusion and distributional coalition slows down the capacity to adopt new technologies in the face of changing economic condition, and thereby reduces the economic growth. Distributional coalition also creates the scope for rent seeking for the interest groups at the same time. Again, one should not misinterpret the result found in this study that political instability can improve the economic performance of Bangladesh. Political instability diverts resources that would otherwise have gone into productive long term investments just as special-interest groups leads to misallocation of resources and divert attention from production to distributional struggle in a stable society. There is no

inconsistency in this. Therefore, the findings from our study do not necessarily recommend that the political stability should be remained to improve economic performance of Bangladesh. In general, stable political environment is always expected to foster the economic growth in a least developed county like Bangladesh but overstressing political stability as the key determinant of economic performance can be redundant from a policy perspective.

References:

Aisen A. and Veiga F.J. (2010), “How Does Political Instability Affect Economic Growth?”, *Central Bank of Chile Working Papers*, No 568

Alesina, A., Ozler, S., Roubini, N. and Swagel, P. (1996), “Political instability and economic growth”, *Journal of Economic Growth*, 1, 189–211.

Asteriou, D. and S. Price, (2001), “Political Instability and Economic Growth: UK Time Series Evidence”, *Scottish Journal of Political Economy*, 48, 383–399.

Barro, R.J. (1991), “Economic growth in a cross section of countries”, *Quarterly Journal of Economics*, 106(2), 407–443.

Brown, R. L., J. Durbin, and J. M. Evans (1975), “Techniques for Testing the Constancy of Regression Relationships over Time”, *Journal of the Royal Statistical Society, B* 37, 149–163.

Campos N. and Karanasos M. (2007), “Growth, Volatility and Political Instability: Non-Linear Time-Series Evidence for Argentina, 1896–2000”, *William Davidson Institute Working Paper Number 891*

Devereux, M. and J. Wen (1996), “Political Uncertainty, Capital Taxation and Growth”, mimeo, University of British Columbia, Vancouver, Canada.

Dickey, D. A. and Fuller W. A. (1981), “Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root”, *Econometrica*, 49, 1057–1072.

Dimitrios Asteriou and Costas Siriopoulos (2000), “The Role of Political Instability in Stock Market Development and Economic Growth: The Case of Greece”, *Economic Notes by Banca Monte dei Paschi di Siena SpA*, vol. 29, no. 3–2000, pp. 355–374

Drazen, A. (2000), *Political Economy in Macroeconomics*, Princeton University Press, New Jersey.

Edwards, S. and G. Tabellini. (1991), “Political Instability, Political Weakness and Inflation: An Empirical Analysis”, *NBER Working Paper* 3721.

Enders, W. (2004), *Applied Econometric Time Series*, Wiley

Engle, R. and Granger, C. (1987), “Cointegration and Error Correction Representation: Estimation and Testing”, *Econometrica* 55, 251-276

Engle, R. F. and B. S. Yoo (1987), “Forecasting and testing in co-integrated systems”, *Journal of Econometrics*, 35, 143–159.

Ghatak and Siddiki, (2001), “The use of the ARDL approach in estimating virtual exchange rates in India”, *Journal of Applied Statistics*, 28(5), 573-583

Goldsmith A.A. (1987), “Does Political Stability Hinder Economic Development? Mancur Olson's Theory and the Third World”, *Comparative Politics*, Vol. 19, No. 4 pp 471-480

Hall, R. and Jones, C. (1999), “Why do some countries produce so much more output per worker than others?”, *Quarterly Journal of Economics*, 114, 83-116.

Heston A., Summers R. and Aten B. (2011). *Penn World Table Version 7.0*. Center for International Comparisons at the University of Pennsylvania (CICUP)

Johansen, S. (1991), “Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models”, *Econometrica*, *Econometric Society*, vol. 59(6), pages 1551-80

Johansen S. (1995), “Likelihood-Based Inference in Cointegrated Vector Autoregressive Models”, OUP Catalogue, *Oxford University Press*, number 9780198774501

MacKinnon J.G. (2010), “Critical Values for Cointegration Tests”, *Queen's Economics Department Working Paper* No. 1227

Mancur Olson,(1982), *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*, New Haven: Yale University Press

Maloney, William, (2002), “Missed Opportunities: Innovation and Resource-Based Growth in Latin America”, *Economía*, 3(1), 111-167

Munoz R.(2009), “Political Instability and Economic Growth: the case of Venezuela (1983 - 2000)”, *Political Uncertainty and Macroeconomic Outcomes: Theoretical and Empirical Essays*, University of Essex, PhD Thesis

Narayan, P. K. (2004), “Reformulating critical values for the bounds F - statistics approach to cointegration: an application to the tourism demand model for Fiji”, *Department of Economics Discussion Papers* No. 02/04, Monash University, Melbourne, Australia

North, D. (1990): *Institutions, Institutional Changes, and Economic Performance*, Cambridge University Press, New York.

Ouattara, B. (2004), “Foreign Aid and Fiscal Policy in Senegal”. *Mimeo University of Manchester*.

Park, J. (1990), *Testing for Unit Roots and Cointegration by Variable Addition. Advances in Econometrics: Cointegration, Spurious Regressions and Unit Roots*. Greenwich, CT: JAI Press.

Pesaran, M. H. and Shin, Y. (1999), “An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis”, In Strom, S. (Ed.): *Econometrics and Economic Theory in 20th Century: The Ragnar Frisch Centennial Symposium*, Chapter 11, Cambridge University Press, Cambridge.

Pesaran, M.H., Shin, Y. and R.J. Smith (2001), “Bounds Testing Approaches to the Analysis of Level Relationships”, *Journal of Applied Econometrics* ,16, 289-326.

Quazi R.M. (2003), “Effect of political instability on the domestic savings rate in Bangladesh: An Empirical Study”, *Journal of Bangladesh Studies* ,5(1), 36-46

Stock and Watson (1988), “Testing For Common Trends”, *Journal of the American Statistical Association*, 83, 1097-1107

The PRS Group, (2010), “International Country Risk Guide (ICRG)”
East Syracuse, NY, USA; <http://www.prsgroup.com/>

Venieris, Y. and Gupta, D. (1986), “Income Distribution and Socio-Political Instability as Determinants of Savings: A Cross-Sectional Model”, *Journal of Political Economy*, 96, 873-83.

Wooldridge, J. M. (2006), *Introductory Econometrics: A Modern Approach*, MIT Press, Cambridge, MA.

Younis M, Lin, Y. Sharahili, S. Selvarathinam (2008), “Political Stability and Economic Growth in Asia”, *American Journal of Applied Sciences*, 5(3), 203-208

Appendix A:**Table-A1:** Diagnostic tests of Unrestricted ARDL models

Unrestricted ARDL Model	No Auto-Correlation	No ARCH	Normality	SBC	AIC
ARDLUN1	Yes	Yes	JB=0.25(0.88) SW=0.97(0.78)	-119.57	-135.24
ARDLUN2	Yes	Yes	JB= 0.25(0.88) SW=0.97(0.78)	-122.61	-137.24
ARDLUN3	Yes	Yes	JB=0.13(0.94) SW=0.98(0.88)	-124.81	-138.39

Table-A2: Diagnostic tests of Long Run models

Long Run Model	No Auto-Correlation	No ARCH	Normality	SBC	AIC
LR1	Yes	Yes	JB= 0.90(0.64) SW=0.97(0.59)	-96.88	-108.66
LR2	No	Yes	JB=0.95(0.62) SW=0.97(0.59)	-100.05	-110.66
LR3	Yes	Yes	JB=0.61(0.74) SW=0.96(0.50)	-102.73	-112.15
LR4	Yes	Yes	JB= 0.05(0.98) SW=0.97(0.63)	-105.31	-113.56
LR5	Yes	Yes	JB=0.87(0.65) SW=0.96(0.42)	-107.53	-114.60

Notes:

1. SBC and AIC represent Schwartz Bayesian Criteria and Akaike Information Criteria respectively
2. Figures related to auto-correlation test are given in Appendix B
3. p values are mentioned in the parentheses for the Normality test(JB=Jarque-Bera test, SW=Shapiro-Wilk test) .The null hypothesis is residuals are normal.

Table A3: Test for ARCH for unrestricted ARDL models

ARDLUN1			ARDLUN2			ARDLUN3		
TxR-sq		Chi-sq(q)	TxR-sq		Chi-sq(q)	TxR-sq		Chi-sq(q)
1	0.9074042	3.841459	1	0.9098648	3.841459	1	0.6456204	3.841459
2	0.5737690	5.991465	2	0.5830913	5.991465	2	0.1960560	5.991465
3	1.7545421	7.814728	3	1.7647258	7.814728	3	2.8474550	7.814728
4	1.5273834	9.487729	4	1.5464106	9.487729	4	2.6750229	9.487729
5	2.3261160	11.070498	5	2.3229951	11.070498	5	3.5368037	11.070498
6	3.5878697	12.591587	6	3.5814078	12.591587	6	4.5494917	12.591587
7	3.2215039	14.067140	7	3.2122443	14.067140	7	4.8672966	14.067140
8	6.6796609	15.507313	8	6.7458372	15.507313	8	7.2437978	15.507313
9	8.4243854	16.918978	9	8.4328932	16.918978	9	10.3500273	16.918978
10	11.0000000	18.307038	10	11.0000000	18.307038	10	11.0000000	18.307038
11	10.0000000	19.675138	11	10.0000000	19.675138	11	10.0000000	19.675138
12	9.0000000	21.026070	12	9.0000000	21.026070	12	9.0000000	21.026070
13	8.0000000	22.362032	13	8.0000000	22.362032	13	8.0000000	22.362032
14	7.0000000	23.684791	14	7.0000000	23.684791	14	7.0000000	23.684791
15	6.0000000	24.995790	15	6.0000000	24.995790	15	6.0000000	24.995790

Notes: 1.The null hypothesis is no ARCH.

2.The presence of ARCH is tested up to 15 lags.

3.In every column the values in the left side are calculated statistics and the values in the right side are critical χ^2 statistics

Table A4: Test for ARCH for unrestricted ARDL model

LR1			LR2			LR3		
TxR-sq	Chi-sq(q)		TxR-sq	Chi-sq(q)		TxR-sq	Chi-sq(q)	
1	0.2090837	3.841459	1	0.1887824	3.841459	1	0.1086632	3.841459
2	2.1348807	5.991465	2	2.1588362	5.991465	2	2.2026139	5.991465
3	2.5467353	7.814728	3	2.5925910	7.814728	3	2.3998104	7.814728
4	3.3220358	9.487729	4	3.3338694	9.487729	4	2.6419374	9.487729
5	2.8782068	11.070498	5	2.8831276	11.070498	5	2.4870650	11.070498
6	3.7430192	12.591587	6	3.7298716	12.591587	6	3.2955053	12.591587
7	4.8869319	14.067140	7	4.8632067	14.067140	7	4.8647057	14.067140
8	5.0929608	15.507313	8	5.0409244	15.507313	8	5.2716537	15.507313
9	4.7807380	16.918978	9	4.7279785	16.918978	9	4.9908709	16.918978
10	7.7378323	18.307038	10	7.7832901	18.307038	10	8.1961846	18.307038
11	12.5175624	19.675138	11	12.5052150	19.675138	11	12.6116763	19.675138
12	12.0000000	21.026070	12	12.0000000	21.026070	12	12.0000000	21.026070
13	11.0000000	22.362032	13	11.0000000	22.362032	13	11.0000000	22.362032
14	10.0000000	23.684791	14	10.0000000	23.684791	14	10.0000000	23.684791
15	9.0000000	24.995790	15	9.0000000	24.995790	15	9.0000000	24.995790

Table A4: Test for ARCH for unrestricted ARDL model (Continued)

LR4			LR5		
TxR-sq		Chi-sq(q)	TxR-sq		Chi-sq(q)
1	0.01544479	3.841459	1	0.3956865	3.841459
2	2.00937625	5.991465	2	2.5223136	5.991465
3	1.97254443	7.814728	3	2.4162638	7.814728
4	2.32691550	9.487729	4	3.4159921	9.487729
5	2.27005827	11.070498	5	3.2721897	11.070498
6	2.54177564	12.591587	6	3.2408672	12.591587
7	5.03779213	14.067140	7	5.2696242	14.067140
8	5.58613918	15.507313	8	5.3403925	15.507313
9	5.30055960	16.918978	9	4.9819825	16.918978
10	7.88210939	18.307038	10	7.5826401	18.307038
11	12.91629121	19.675138	11	12.9875130	19.675138
12	12.00000000	21.026070	12	12.00000000	21.026070
13	11.00000000	22.362032	13	11.00000000	22.362032
14	10.00000000	23.684791	14	10.00000000	23.684791
15	9.00000000	24.995790	15	9.00000000	24.995790

Notes: 1. The null hypothesis is no ARCH.

2. The presence of ARCH is tested up to 15 lags.

3. In every column the values in the left side are calculated statistics and the values in the right side are critical χ^2 statistics

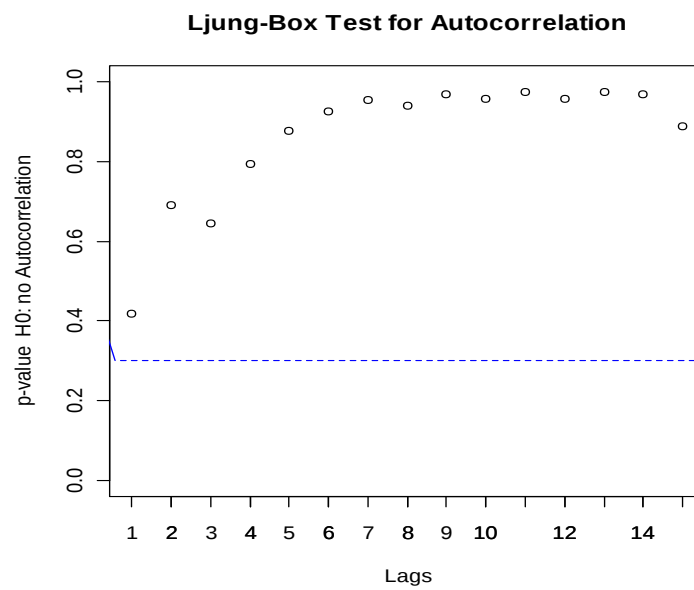
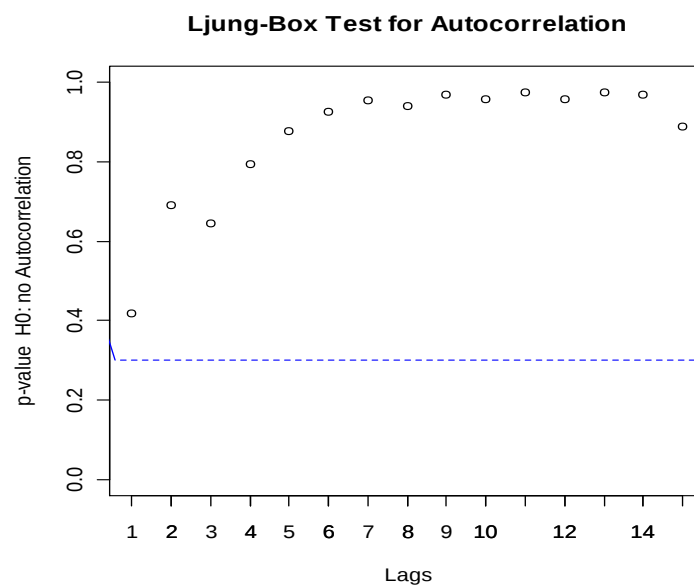
Appendix: B**Figure B1:** Test of auto-correlation for unrestricted ARDL model 1 (ARLDLUN1)**Figure B2:** Test of auto-correlation for unrestricted ARDL model 2 (ARLDLUN2)

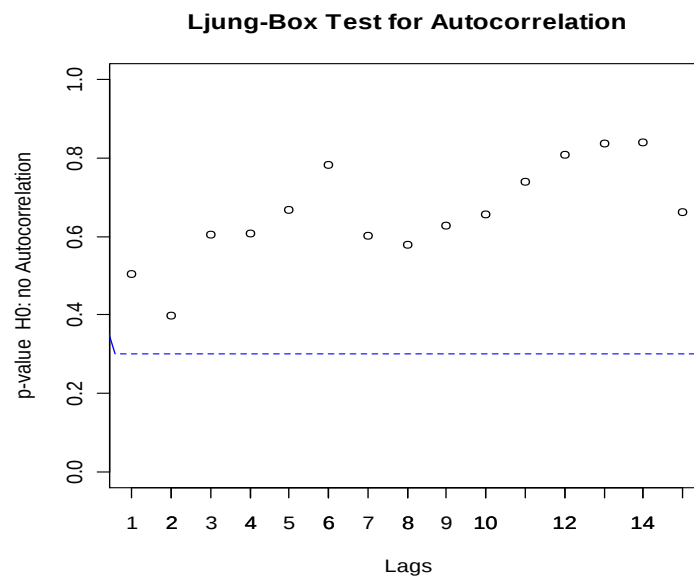
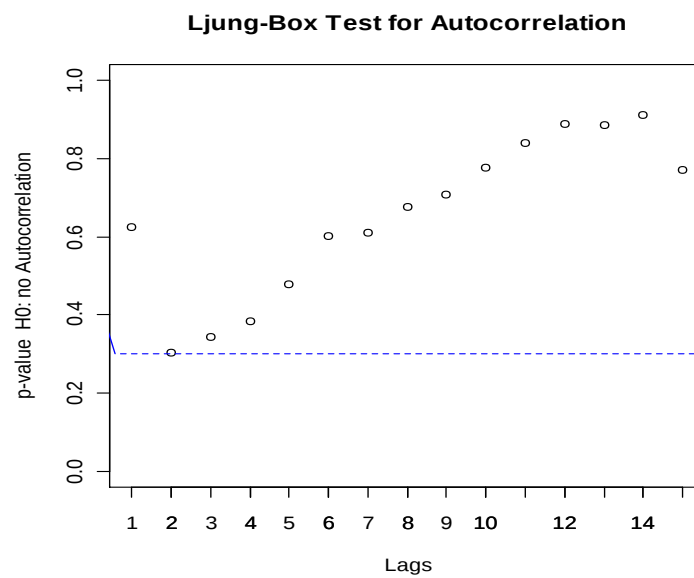
Figure B3: Test of auto-correlation for unrestricted ARDL model 3 (ARLDLUN3)**Figure B4:** Test of auto-correlation for Long run model 1 (LR1)

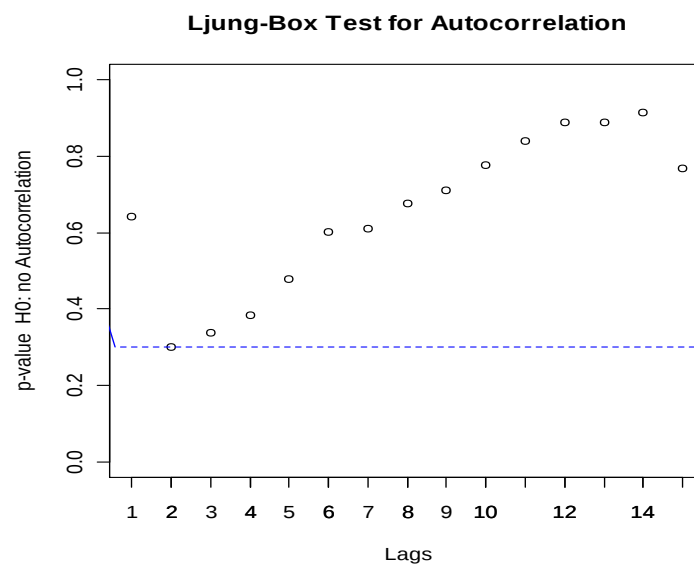
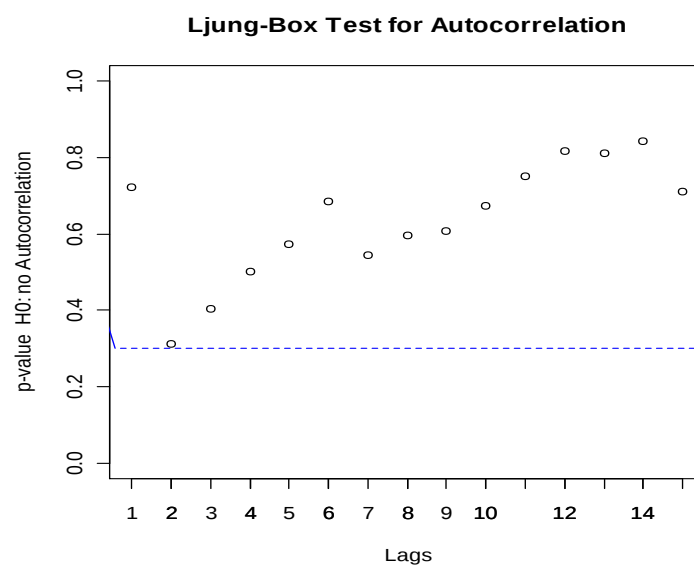
Figure B5: Test of auto-correlation for Long run model 2 (LR2)**Figure B6:** Test of auto-correlation for Long run model 3 (LR3)

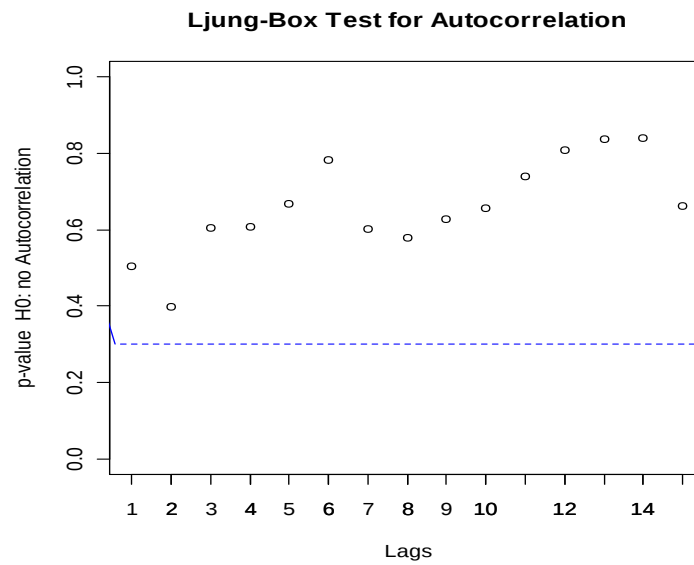
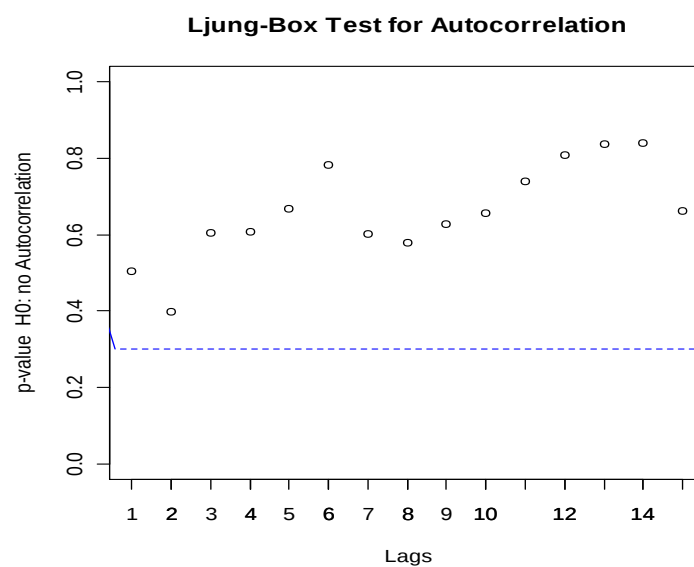
Figure B7: Test of auto-correlation for Long run model 4 (LR4)**Figure B8:** Test of auto-correlation for Long run model 5 (LR5)

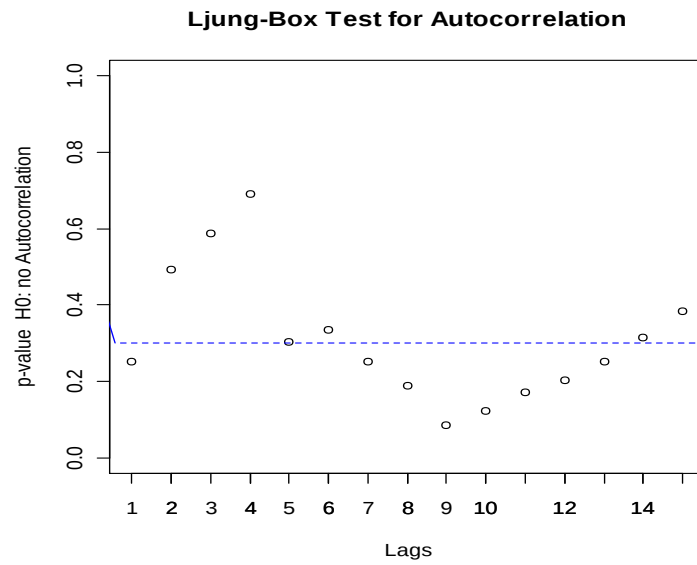
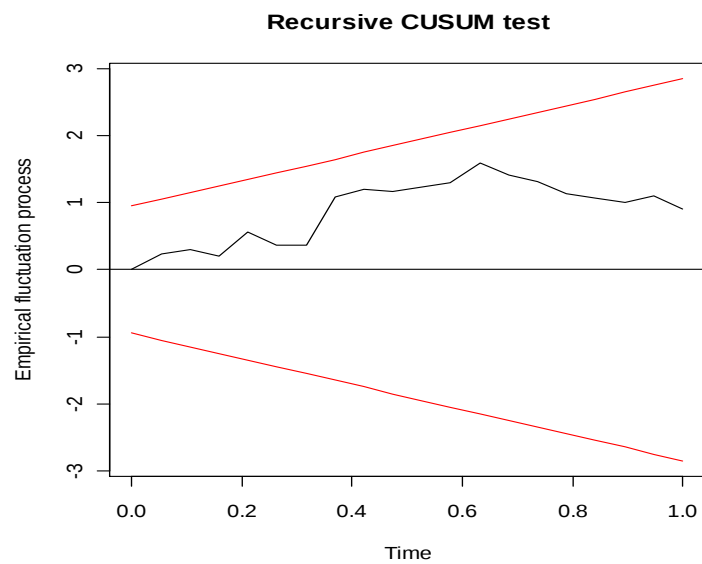
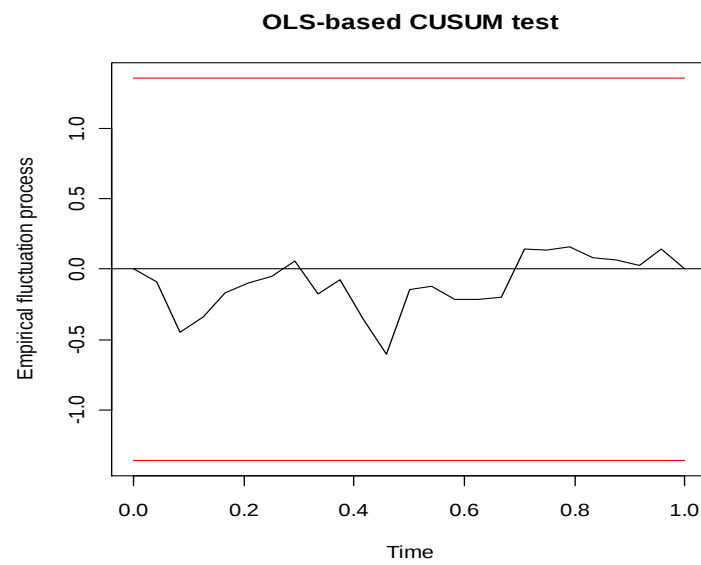
Figure B9: Test of auto-correlation for Error Correction model**Figure B 10:** Recursive CUSUM test for long run model

Figure B 11: OLS based CUSUM test for long run model



Appendix: C

C1. Critical Value calculation for Engle-Granger Test (Mac Kinnon, 2010)

T=Number of observation=26, N=Number of I(1) series which null of non-cointegration is being tested=3, β_∞ : Estimated asymptotic critical values (with estimated standard errors in parentheses) , β_1 : Coefficient on $T-1$ in response surface regression , β_2 : Coefficient on $T-2$ in response surface regression , β_3 : Coefficient on $T-3$ in response surface regression. Formula for estimation of critical values is given below:

$$\beta_\infty + \beta_1/T + \beta_2/T^2 + \beta_3/T^3$$

Table C1: Critical Values for Engle-Granger test for cointegration

1%	5%	10%
-4.88	-4.08	-3.69

Note: Critical values mentioned here are for test with constant as values for test with no constant and no trend was unavailable

C2. Calculation of long run multiplier from Table 4

In long run

$$\ln y_t = \ln y_{t-1} = \ln y_t^*$$

$$\ln k_{t-2} = \ln k_t^*$$

$$\ln pst_{t-1} = \ln pst_{t-2} = \ln pst_t^*$$

So according to our estimated long run model:

$$\begin{aligned}
\ln y_t^* &= \alpha + \beta_1 \ln y_t^* + \gamma_1 \ln k_t^* + \lambda_1 \ln pst_t^* + \lambda_2 \ln pst_t^* \\
\Rightarrow \ln y_t^* - \beta_1 \ln y_t^* &= \alpha + \gamma_1 \ln k_t^* + (\lambda_1 + \lambda_2) \ln pst_t^* \\
\Rightarrow (1 - \beta_1) \ln y_t^* &= \alpha + \gamma_1 \ln k_t^* + (\lambda_1 + \lambda_2) \ln pst_t^* \\
\Rightarrow \ln y_t^* &= \frac{\alpha}{1 - \beta_1} + \frac{\gamma_1}{1 - \beta_1} \ln k_t^* + \frac{\lambda_1 + \lambda_2}{1 - \beta_1} \ln pst_t^*
\end{aligned}$$

So the long run multiplier for $\ln k_t$ is $\frac{\gamma_1}{1 - \beta_1}$ and the long run

multiplier for $\ln pst_t$ is $\frac{\lambda_1 + \lambda_2}{1 - \beta_1}$.

Appendix: D**List of variables and their sources**

Variable	Source
Real GDP per capita(y_t)	Penn World table 7.0
Investment as a percentage of real GDP(k_t)	Penn World table 7.0
Political stability(pst_t)	International Country Risk Guide

Microcredit and Sustainable Livelihood: An Empirical Study of Islamic and Conventional Credit on the Development of Human Capital of the Borrowers in Bangladesh

Abul Bashar Bhuiyan¹ and Arman Hassan²

This study investigates the impact of microcredit on sustainable livelihood of the borrowers of Grameen Bank and Islami Bank microfinance schemes and compares the contributions between these two of MFIs in Bangladesh. Towards the achievement of its objectives, the present study has used descriptive statistical and econometric techniques. The study found that access to credit has contributed towards improving Sustainable livelihood of the borrowers of both of MFIs respectively. Furthermore, the findings also revealed that Islami Bank microcredit respondents have a better record of using credit for income generating activities for reducing vulnerability as well as improving livelihood status compared to the Grameen Bank microcredit respondents. The present study recommends for policy considerations for the successful and effective operation of microfinance programs through the increase of controlling authority to participate in the operation of loan uses, the operation of household expenditure as well as overall household activities in Bangladesh.

1. Introduction

In present day world, sustainable livelihood is essential for good living. Basic human rights have waned over the years. So did the required means of asset ownership, essential assets and adequate income for the poor. Chances for anyone to participate in collective decision making are low in the face of shocks (David and Jonathan, 2009). They are surviving in a state of deprivation and face the central problem behind

¹ The School of Business Innovation and Technopreneurship University Perlis Malaysia,
Email: bashariuk@gmail.com

² Lower Merion High School, USA

sustainable human development. In the country of Bangladesh, diversity in human poverty is increasing and so is the percentage of the population living under the poverty line every year. The situation of poverty is worsening, with an increasing number of marginal impoverished people every year - from 78.2 million in 1970 to 80.46 million in 2009 (Imai and Azam, 2010, Islam, 2009).

Thus, providing the poor with credit will generally help solve their problems. In this regard, a microfinance program is generally perceived as a practical and attractive method for providing the poor accessibility to credit, hence reducing poverty and achieving of sustainable livelihood. In many ways since its conception, the idea of microcredit has still been unsuccessful in reducing the overall poverty level in Bangladesh (Amin et al., 2003, Bhuiyan et al., 2012). Similarly, many studies have found that the interest rate microfinance institutions (MFI's) charge, ranging from 15 to 20 percent of institutional cases, and 33 to 120 percent for non-institutional cases, as one of the major barriers behind reaching a finance solution for the poor in Bangladesh (Kabeer, 2001, Amin et al., 2003). Moreover, conventional microcredit is stopping the practice of the spiritual, moral and ethical dimensions of human socioeconomic development, which is precious in sustainable human development (Ahmed, 2006, Alam, 2009).

On the other hand, Islamic financing is just a part of daily life among whole parts of activities where Islam wants to provide complete and sustainable ways of human life through establishing justice and goodness in the all virtues of the basic set of social and economic institutions which should be through the ultimate satisfaction of Allah (SWT). Allah (SWT) has clearly communicated in the Quran to assist each other in righteous deeds (Al-Quran, Surah Al Maida, Verse no.2), where an agreement should be written having witnesses with faithfulness between parties where any future transaction is involved (Al-Quran, Sura Baqarah, Verse No.282). But Allah promises you His forgiveness and bounties (Al-Quran, 2:268). In such issues, Islamic microfinance has been recognized as the an alternative to conventional microfinance within the priorities of the spiritual, moral and ethical dimensions of human-socio-economic development. The Rural Development Scheme (*hereafter referred to as RDS*) is the largest Islamic Microcredit program in Bangladesh (Ahmed, 2006, Alam, 2009,

Habib et al., 2004, M. Mizanur Rahmana et al., 2008, Parveen, 2009, Rahman and Ahmad, 2010, Uddin, 2008). In such situations, it is more important to understand how Islamic and conventional microfinancing impact progress towards sustainable development of linking together, in the way of sustainable livelihood of the borrowers.

2. Background of the Study

2.1 Microcredit approach and sustainable livelihood

The microcredit and microfinance has defined as interchanged which designed to extend small loans to the poor for self-employment projects that generate income. Moreover, “Microcredit refers to micro loans, whereas microfinance offers too small loans with other financial service as well as savings, insurance, etc.” Similarly, Buckley noted in 1997, that microcredit is a part of microfinance which is used to provide small credit to the poor people, although microfinance also involves additional non-credit financial service (Buckley, 1997). Microfinance is further defined by Hossain and Bose in 2004 as the offering of small, collateral free loans to members of cooperatives who do not already have the funds for income-generating activities (Hossain et al., 2004). Examining these different definitions, this study amalgamates them into one holistic classification: “Microfinance is the provision of access of a small amount of credit to the poor with no assets for collateral, no financial records, no credit history, and no access to income generating activities to alleviate poverty.”

On the other hand, Sustainable livelihood refers to livelihoods where individuals can cope with and recover from external stress and shocks, while enhancing their capabilities for the present and future. W.C.E.D., in 1987, defined sustainable development as the ability to meet current needs without compromising this ability for future needs (W.C.E.D, 1987).

Sustainable livelihood (SL) can then be thought in regards to the fight to eliminate poverty. A holistic approach, SL seeks to capture and understand the causes of poverty without narrowing the focus to just a few factors, such as economic issues or food insecurity. SL also tries to connect the different aspects of poverty, which is a more effective prioritization of action at an operational level (D.F.I.D. 2001). The

Department for International Development (DFID), as one part of a three-pronged plan to eliminate poverty, introduced an active project in 1997 to promote sustainable livelihoods. Since then, various subgroups within the DFID have been working to operationalize the sustainable livelihoods objective. The process has required extensive consultation with partners along with reflection upon early efforts to implement sustainable livelihoods approaches (D.F.I.D, 2001). The study has been acknowledged from quotations of above discussion from the comprehensive work by (Bhuiyan et al., 2012) where provided excellent discussion on microfinance and sustainable livelihood.

2.2 Sustainable livelihood framework and link to microcredit

The SL framework is the process of form which organizes various factors those constrain or enhance livelihood opportunities and that affect how these people create a livelihood for themselves and their households. Resources and livelihood assets are in closest reach of the people, and stand in the center of the framework. Vulnerability contexts dictate their degree of access to these assets, considering trends (economic, political, and technological), shocks (example, epidemics, natural disasters, civil strife, etc.) and seasonality (prices, production, and employment opportunities). The living environment also influences the level of access, affecting how people use their assets to accomplish their goals. These are their livelihood strategies.

Microfinance is the practice of offering access to small credit with collateral security free to members of cooperatives who otherwise would not have access to the capital necessary to begin efforts to alleviate poverty. The system has been recognized as a powerful and effective tool for combating poverty, with access to credit for the poor rapidly expanding over the past few decades in the area of hopeless and helpless hunger society around the world (Basher, 2010, Hossain, 1988, Kabir Hassan and Tufte, 2001, Morduch, 1999),.

Bangladesh is the one of the most densely populated yet productive developing countries in the world. In the past three decades, the Bangladeshi economy has faced challenges such as natural disasters and political unrest and corruption. In such situations, microcredit provided the poor the credit they needed to raise their family income through

various Income Generating Activities (IGA's) and sustainable livelihood (improving health, easier access to education, practical skills, etc.) After these people succeed, they acknowledge their important roles in the family, and other relatives honour their decision with microcredit. Finally, microcredit borrowers able to ensure the opportunity of sustainable livelihood through properly overcome of the above successive factors, if all other livelihood assets remain constant. The study has been acknowledged for the above discussion from quotations of the comprehensive work by (Bhuiyan et al., 2012).

3. Review of Literature

The study categorise two sets of literature based on theoretical and empirical evidence of microfinance as well as providing two sub-section of review of literature into both of Islamic and Grameen microcredit schemes. The summary table of literature review has attached in the Appendix C.

3.1 Theoretical Evidence of Grameen Bank Scheme

In the context of theoretical point of view, literature identified that microcredit has been recognized as a powerful tools to reduce of poverty and ensure sustainable livelihood in developing countries. Moreover, Morduch (2000) mentioned in his studies that microfinance has put forward an enticing "win-win" proposition: microfinance institutions that follow the principles of good banking will also alleviate the most poverty. This vision forms the core of widely-circulated "best practices," but as a general proposition the vision is fully supported neither by logic nor by the available empirical evidence. Recognizing the limits to the "win-win" proposition is an important step towards reaching a more constructive dialogue between microfinance advocates that prioritize financial development and those that prioritize social impacts (Morduch, 2000). In the same way, Dowla's in 2006 work examines how Grameen Bank in Bangladesh created social capital that had been a boon to the explosive growth of Microfinance in Bangladesh and elsewhere. Using Putnam's definition, he shows how Grameen Bank created social capital by forming horizontal and vertical networks while establishing new norms and fostering new levels of social trust to solve the collective action problems of the poor's access to capital. The fact that a Microfinance Institution (MFI) can create social capital has strong policy implications. Since social capital is a public good-non-excludable

and non-rivalrous the market will underprovide such good. This paper shows that Microfinance corrects another type of market failure-under the provision of a public good, in addition to correcting the failure of the credit market. In the debate over the need for subsidies, the social capital building aspects of an MFI need to be taken into account (Dowla, 2006).

3.2 Empirical evidence of Grameen Bank Microcredit Scheme

The microcredit has been recognized to develop improvement on socioeconomic development and sustainable livelihood, to better the household standard of living for borrowers. For better or more exact understanding of its impact, this study has an overlook on existing literature. Schuler et.al has conducted research with ethnographic and structured survey data from a study in rural Bangladesh to explore the relationship between domestic violence against women and their economic and social dependence. The study's findings suggest that group-based credit programs can reduce violence towards women by making women's lives more public. The institution of violence against women is deeply rooted, however, and the authors argue that much extensive intervention will be needed to significantly make a difference (Schuler et al., 1996)

On the other hand, Hermes, Lensink, & Mehrteab have investigated the impact of monitoring and social ties on moral hazard behavior within group lending programs, based on data from an extensive questionnaire given in Eritrea among a sample of 102 groups. They show that the monitoring and the social ties of group leaders, and not the other group members reduce the moral hazard behavior within groups (Hermes et al., 2005). However, Sen has analyzed a panel dataset on 379 rural Bangladeshi households interviewed between 1987-88 and in 2003. Using a "livelihoods" framework, his work contrasts the fortunes of ascending households (which escape poverty) and descending households (which fall into poverty). The findings confirm that Bangladesh made considerable progress in reducing poverty in the 1980's and 1990's (Sen, 2003).

3.3 Theoretical Evidences of Islami Bank Microfinance Scheme

The Islamic financing is providing the complete and sustainable ways of human life through establishing justice and goodness in the all virtues of the basic set of social and economic institutions towards the ultimate satisfaction of Allah (SWT). The theoretical part of the Islamic microfinance shows that there is a great potential to cater to the needs of the poor. Islamic MFIs have some inherent characteristics that can mitigate some of the problems faced by conventional MFIs. Ahmed mentioned that Islamic banks can provide microfinance more efficiently benefiting from its scale of operations. To support some of the theoretical assertions, empirical evidence is given from the experience of Rural Development Scheme, a microfinance program of Islami Bank Bangladesh Limited (Ahmed, 2004). Moreover, Dusuki in 2006 examined the potential of group-based lending scheme of microfinance. It is argued that group-based lending approach is not a subject alien to Islam, as it is deeply inscribed in Ibn Khaldun's concept of 'Asabiyah' or social solidarity (Dusuki, 2006).

Another study assessed the potential of Islamic financing schemes for micro financing purposes. They argued that Islamic finance has an important role for furthering socio-economic development of the poor and small (micro) entrepreneurs without charging interest (read: *riba*). The study also found that there is a nexus between Islamic banking and microfinance as many elements of microfinance could be considered consistent with the broader goals of Islamic banking (Rahim and Rahman, 2007). Moreover, Akhter et.al recognized Islamic microfinance as an important component in poverty alleviation strategies. While conventional microfinance products have been successful in Muslim majority countries, these products do not fulfil the needs of all Muslim clients (Akhter et al., 2009b). However, Obaidullah and Mohamed-Saleem in 2008 highlight the need for creativity and innovation in poverty alleviation efforts using Shariah compliant mechanisms. Contemporary mechanisms in use by mainstream Islamic banks and financial institutions may indeed be grossly inappropriate in the context of local economies and for financing micro livelihood projects (Obaidullah and Mohamed-Saleem, 2008). Finally, Kaleem and Ahmed in 2010 argue that charity-based Islamic MFIs will be financially and socially sustainable as these are to be based on the concepts of brotherhood, local philanthropy, and volunteer services.

Charity-based Islamic MFIs will provide money for consumption as well as production purposes and, thus, can broadly target the economic and social needs of the poorest of the poor. They can help minimize indebtedness and reduce unequal distribution of wealth in society (Kaleem and Ahmed, 2010).

3.4 Empirical evidence of Islami Bank Microcredit Scheme

M. Mizanur Rahmana et al. found in 2008 assessed the achievement of the RDS and its impact on the livelihood of the rural people. The study analysed many facets of the RDS and concluded that it was generally a success. Household income and expenditure had increased significantly and clients had a positive opinion towards the micro investment program as it improved their standards of living (M. Mizanur Rahmana et al., 2008). In the same way, Akhter et al., in 2009 examined of Islamic microfinance organization operating. The findings of the study indicates that it is providing its services for all living below the poverty line including the “extreme poor” and Interest free loans can be used as a powerful tool against poverty (Akhter et al., 2009a). However, Parveen examine about institutional, financial and economical sustainability of the above model by using various indicators. The empirical analysis of the study revealed that RDS of IBBL has been treated as a sustainable MFI in the rural development and poverty alleviation of Bangladesh within a short span of time since its establishment (Praveen, 2009).

Furthermore, Ahmed in 2006 assesses the extent to which this objective has been achieved by RDS of IBBL. He found that the success of a micro finance program depends on its impact on raising the income of its members and ultimately on improving the living standard of the poor. Identification of the contributory factors of RDS in poverty alleviation shall pave the way for diversification of RDS activities and development plans (Ahmed et al., 2006). The study also acknowledged about the quotations scholars about the potentiality of Islamic Microfinance in Muslim countries especially they mentioned that the Islami Bank microfinance has considered as a successful provider of credit to the poor borrowers (Alam, 2009, Basher, 2010, Bhuiyan et al., 2012, Habib et al., 2004, Rahman and Ahmad, 2010)

4. Methodology of the Study

The present study has used descriptive, statistical and econometric techniques of survey of existing microcredit borrowers. The Purposive method of stratified random sampling was used to select samples of respondents. There are 450 samples that have been collected from the survey field, whereas 255 samples have been collected from the Grameen Bank microcredit scheme and 195 from the Islami Bank microcredit scheme from the Sylhet and Chittagong Division in Bangladesh on 2009. The sample size has been also fixed on the basis of total number of MFIs members in the respected area. The appropriate sample size and total population size and all analysis tables have given in the Appendix B. Moreover, a structural questionnaire about microcredit contribution of microcredit on human capital has given in the appendix A. The summary table of literature review has attached in the Appendix C.

5. Findings and Analysis of Results

5.1 Contribution of Microcredit on Human Capital

Human capital is one of the most important livelihood assets which contain the household members' skills, knowledge, and ability to work all enabling people to pursue different livelihood strategies. The following survey output would be able to give empirical evidence of how credit contributions affected the improvement of their livelihoods.

5.1.1 Borrower's Skill Development:

The level of borrower's skill development after involvement in credit by comparing the microcredit schemes of Islami Bank and Grameen Bank. The survey data was categorized on the basis of five observation scales: (i) Highly Disagree=1, (ii) Disagree=2, (iii) Normal=3, (iv) Agree=4 and (v) Highly Agree=5. The table 03 shows the about the respondent's personal confidence improvement, the study reveals that 59.49% of Islami Bank respondents said that it increased and 43.53% of Grameen Bank respondents noted an increase in self confidence after their involvement with credit. 21.02% and 28.23% said no change, but only 19.49 % and 28.24% said that it decreased their self-confidence. Furthermore, based on the average value of all responses, the current

status of self-confidence average is 3.49 and 3.14 and standard deviation of 1.18 and 1.12 for Islami Bank and Grameen Bank respondents respectively. This means that microcredit borrowers overall have increased their self-confidence by using loans in income generating activities, thus improving their standard of living.

5.1.2 Borrower's self-capability of solving own problems

The table 04 shows about the respondent's ability to solve their own problems, the study found that 56.41% of Islami Bank respondents reported that it increased and 40.39% of Grameen Bank respondents reported the same. 25% and 37% of respondents said no change but 18.46% and 22.75% said that it decreased their self-confidence. Furthermore, based on the average value of all responses, the current status of capability of solving own problems is 3.47 and 3.20 with a standard deviation of their capability to solve their own problems 1.09 and 0.92 respectively. The Islami Bank respondents increased their self-capability of solving own problems compared to Grameen Bank respondents in terms of livelihood improvement.

5.1.3 Borrower's personal responsibility

The table 05 shows about the respondent's feeling of personal responsibility towards one's family, the study revealed that 62.56% of Islami Bank and 54.12% of Grameen Bank respondents reported an increase in their personal responsibility after involvement with credit. On the other hand, 12% of Islami Bank and 22% of Grameen Bank respondents said no change to their level and only 25.64% of Islami Bank and 23.92% of Grameen Bank reported that it decreased their personal responsibility towards the family. Based on the average value of all responses, the current status of personal responsibility towards the family is averaged at 3.47 and 3.31, with a standard deviation of 1.31 and 1.00 for Islami Bank and Grameen Bank respondents respectively. It is also denoted that Islami bank respondents generally did better than Grameen Bank members.

5.1.4 Borrowers capability in operating income generating activities (IGAs)

The table 06 shows about the respondent's personal capability in operating income generating activities (IGAs), the study indicates that 50.77% of Islami Bank and 46.27% of Grameen Bank respondents agreed that it increased their personal capability for operating income generating activities after involvement with credit. 24% of Islami Bank and 20% of Grameen Bank respondents said no change, while 25.13% of Islami Bank and 33.73% of Grameen Bank respondents said it decreased. In the same way, based on the average value of all responses, the current status of personal capability for operating income generating activities is 3.31 and 3.08 with standard deviations of 1.13 and 1.30 for Islami Bank and Grameen Bank respondents respectively. The overall result of the study shows that microcredit influences the borrower's abilities to operate businesses for increasing income and improving livelihood statuses. In comparing the results of both MFIs, the Islami Bank respondents still use borrowed money more efficiently than Grameen Bank members.

5.1.5 Borrower's capability for the control of usage of the loan

The table 07 shows about the respondents' capability for controlling loan usage, the study shows that only 31.28% of Islami Bank respondents said it increased and 29.02% of Grameen Bank respondents said it increased; 23% and 22% said no change but 47.18% and 48.63% said it decreased their capability to control loan usage. In the same way, the current status of capability for control loan usage averages at 2.64 and 2.65 with standard deviations of 1.31 and 1.37 for Islami Bank and Grameen Bank respondents, respectively.

5.1.6 Borrower's capability for the control of household expenditure

The table 08 shows about the respondent's capability to control household expenditure, the study shows that only 29.23% of Islami Bank and 22.35% of Grameen Bank respondents agreed that it increased their capability to control household expenditure. Moreover, 30% of Islami Bank and 29% of Grameen Bank respondents said no changes but 41.03% of Islami Bank and 49.02% of Grameen Bank respondents said that it decreased their capability to control household expenditure. In the

same way, based on the average value of all responses, the current status of capability for control household expenditure is 2.82 and 2.56 with standard deviations of 1.25 and 1.23 for Islami Bank and Grameen Bank respondents respectively. The study's results denoted that males or husbands of the female borrowers are still controlling the operation of household expenditure even though roughly 95% of microcredit borrowers are female. This indicates a lack of freedom and independence among women and their influence in making family decisions.

5.1.7 Borrower's capability for the control of household activities

The table 09 shows about the respondent's capability to control overall household activities, the study shows that only 27.69% of Islamic Bank respondents said it increased while 26.67% of Grameen Bank respondents said the same; 28% and 23% said no changes, while 44.10% and 50.20% said it had decreased their capability. In the same way, based on the average value of all responses, the current status of capability for control household expenditure are 2.67 and 2.11 along with standard deviations of 1.26 and 1.41 for Islami Bank and Grameen Bank respondents, respectively. The study result further bolstered the notion that men generally are controlling operation of household expenditures.

5.1.8 Borrowers' Children's Education

The table 10 shows the participation of borrower's children's education; 63.6% of Islami Bank and 57.6% of Grameen Bank respondents agreed that it increased their children's education but 36.4% and 42.4% reported no improvement in their children's education. The study output indicates that access to microcredit motivated the respondents to send their children for education and it is also a positive sign for improvement of livelihood.

6. Conclusion

The study aims to assess microcredit's contributions on the sustainable livelihood of the borrowers of two MFI's in terms of human capital. In general, from the empirical evidence the study output revealed,

microcredit is heavily involved towards the sustainable livelihood of poor borrowers. In comparing the results of Islamic and Conventional microcredit's contributions on the sustainable livelihood, the study found that in the case of respondents' personal confidence improvement, 59.49% of Islami Bank respondents and 43.53% of Grameen Bank respondents said that it increased. Moreover, Islami Bank microcredit borrowers overall have increased their self-confidence by using loans in income generating activities, thus improving their standard of living when compared to Grameen Bank microcredit borrowers. Furthermore, in the case of respondents' increase of personal responsibility towards the family, the study showed an increase - 62.56% of respondents from Islami Bank and 54.12% of Grameen Bank. It may be concluded that Islami bank respondents did better than Grameen Bank members. The study further finds that the Islami Bank respondents increased their self-capability of solving own problems compared to Grameen Bank respondents in terms of livelihood improvement. Moreover, microcredit program in general influences borrowers to operate businesses to generate income. In comparing the result of both MFIs, the Islami Bank respondents have better utilized their borrowed credit more efficiently than Grameen Bank members.

The survey result of the both of Islamic and conventional MFIs shows that males or husbands of the female borrowers are still controlling the operation of loan uses, the operation of household expenditures, and overall household, given that 95% of microcredit borrowers are female. This implies females do not have enough influence in the decision making process within the family. The study output also indicates that access to microcredit motivated the respondents to send their children for education and shows a positive sign for improvement of livelihood. Islami Bank respondents have improved their human capital after getting access to credit more than did Grameen Bank respondents. Therefore, faith in microfinance program does play a role in influencing the borrower's decision.

- 114 Microcredit and Sustainable Livelihood: An Empirical Study of
Islamic and Conventional Credit on the Development of
Human Capital of the Borrowers in Bangladesh

References

AHMED, H. 2004. Frontiers of Islamic Banking: A Synthesis of Social Role and Microfinance. *The European Journal of Management and Public Policy*, 3-1.

AHMED, M. 2006. Impact of Rural Development Scheme on Poverty Alleviation: A Case Study. Dhaka, Bangladesh Research, Planning and Development Division Islami Bank Bangladesh Limited.

AHMED, S. M., PETZOLD, M., KABIR, Z. N. & TOMSON, G. 2006. Targeted intervention for the ultra poor in rural Bangladesh: Does it make any difference in their health-seeking behaviour? *Social Science & Medicine*, 63, 2899-2911.

AKHTER, W., AKHTAR, N. & JAFFRI, S. K. A. 2009a. Islamic Micro-Finance And Poverty Alleviation: A Case of Pakistan. *Proceeding of the 2nd CBRC*.

AKHTER, W., AKHTAR, N. & JAFFRI, S. K. A. Year. Islamic Micro-Finance And Poverty Alleviation: A Case of Pakistan. *In: 2nd CBRC 2009b* Lahore, Pakistan.

AL-QURAN 2:268. *Sura Baqarah, Verse No.268*.

AL-QURAN Sura Baqarah, Verse No.282.

AL-QURAN Surah Al Maida, Verse no.2.

ALAM, M. N. 2009. Interest-Free Microfinance to Micro Entrepreneurs in Rural Bangladesh. *First International Microfinance Conference on Microfinance*. ULB Brussels, June 2-4,.

AMIN, S., RAI, A. S. & TOPA, G. 2003. Does microcredit reach the poor and vulnerable? Evidence from northern Bangladesh. *Journal of Development Economics*, 70, 59-82.

BASHER, M. 2010. Promotional role of microcredit: Evidence from the Grameen Bank of Bangladesh. *Journal of International Development*, 22, 521-529.

BHUIYAN, A. B., SIWAR, C., ISMAIL, A. G. & AMINUL ISLAM, M. 2012. Microfinance and sustainable livelihood: A conceptual linkage of Microfinancing approaches towards sustainable livelihood. *American Journal of Environmental Sciences*, 8, 328-333.

BUCKLEY, G. 1997. Microfinance in Africa: Is it either the problem or the solution? *World Development*, 25, 1081-1093.

D.F.I.D 2001. Briefing Sustainable Livelihoods and Poverty Elimination DFID, 2001 London, UK: Department for International Development

DAVID, R. & JONATHAN, M. 2009. The Impact of Microcredit on the Poor in Bangladesh: Revisiting the Evidence. Centre for Global Development, Working Paper Number 174.

DUSUKI, A. W. 2006. Empowering Islamic Microfinance: Lesson from Group-Based Lending Scheme and Ibn Khaldun's Concept of 'Asabiyah. *4th International Islamic Banking and Finance Conference*. Monash University, Kuala Lumpur.

HABIB, M. A., HAQUE, M. S., MIAN, M. R. U. & BASHAR, M. A. 2004. Micro Credit: An Experience of Islami Bank Bangladesh Limited. Department of Agricultural Finance Bangladesh Agricultural University, Mymensingh-2202, Bangladesh.

HERMES, N., LENSINK, R. & MEHRTEAB, H. T. 2005. Peer Monitoring, Social Ties and Moral Hazard in Group Lending Programs: Evidence from Eritrea. *World Development*, 33, 149-169.

HOSSAIN, M. 1988. Credit for the Alleviation of Rural Poverty: The Grameen Bank in Bangladesh. Washington DC.

HOSSAIN, M., BOSE, M. L. & AHMAD, A. 2004. Nature and impact of women's participation in economic activities in rural Bangladesh: insights from household surveys. *Occasional Paper*, 41.

116 Microcredit and Sustainable Livelihood: An Empirical Study of
Islamic and Conventional Credit on the Development of
Human Capital of the Borrowers in Bangladesh

IMAI, K. & AZAM, M. 2010. Does Microfinance Reduce Poverty in Bangladesh? New Evidence from Household Panel Data. *Discussion Paper Series*.

ISLAM, N. 2009. Can Microfinance Reduce Economic Insecurity and Poverty? By How Much and How? : Department of Economic and Social Affairs, United Nations.

KABEER, N. 2001. Conflicts Over Credit: Re-Evaluating the Empowerment Potential of Loans to Women in Rural Bangladesh. *World Development*, 29, 63-84.

KABIR HASSAN, M. & TUFTE, D. R. 2001. The X-Efficiency of a Group-Based Lending Institution: The Case of the Grameen Bank. *World Development*, 29, 1071-1082.

KALEEM, A. & AHMED, S. 2010. The Quran and Poverty Alleviation A Theoretical Model for Charity-Based Islamic Microfinance Institutions (MFIs). *Nonprofit and Voluntary Sector Quarterly*, 39, 409-428.

KREJCIE & MORGAN 1970. Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, 30, 607-610).

M. MIZANUR RAHMANA, JAFRULLAH, M. & ISLAM, A. T. 2008. Rural Development Scheme Bangladesh Limited (IBBL): Assessment Challenges. *IIUM Journal of Economics and Management* 16, no. 2 139-163.

MORDUCH, J. 1999. The role of subsidies in microfinance: evidence from the Grameen Bank. *Journal of Development Economics*, 60, 229-248.

MORDUCH, J. 2000. The Microfinance Schism. *World Development*, 28, 617-629.

OBAIDULLAH, M. & MOHAMED-SALEEM, A. 2008. Innovations in Islamic microfinance: lessons from Muslim aid's Sri Lankan experiment.

PARVEEN, J. A. 2009. Sustainability Issues Of Interest-Free Micro-Finance Institutions In Rural Development And Poverty Alleviation. The Bangladesh Perspective. *Theoretical and Empirical Researches in Urban Management* 2.

PRAVEEN, J. 2009. Sustainability Issues Of Interest-Free Micro-Finance Institutions In Rural Development And Poverty Alleviation. The Bangladesh Perspective. *Theoretical and Empirical Research in Urban Management*, 11.

RAHIM, A. & RAHMAN, A. 2007. Islamic Microfinance: A Missing Component in Islamic Banking. *Kyoto Bulletin of Islamic Area Studies*, 1-2, 38-53.

RAHMAN, M. & AHMAD, F. 2010. Impact of microfinance of IBBL on the rural poor's livelihood in Bangladesh: an empirical study. *International Journal of Islamic and Middle Eastern Finance and Management*, 3, 168-190.

SCHULER, S. R., HASHEMI, S. M., RILEY, A. P. & AKHTER, S. 1996. Credit programs, patriarchy and men's violence against women in rural Bangladesh. *Social Science & Medicine*, 43, 1729-1742.

SEN, B. 2003. Drivers of Escape and Descent: Changing Household Fortunes in Rural Bangladesh. *World Development*, 31, 513-534.

UDDIN, M. M. 2008. Credit for the Poor: The Experience of Rural Development Scheme of Islami Bank Bangladesh Ltd. *The Journal of Nepalese Business Studies*, Vol. V No. 1.

W.C.E.D 1987. Sustainable Development. A Guide to Our Common Future (The Bruntland Report). Geneva: World Commission on Environment and Development.

- 118 Microcredit and Sustainable Livelihood: An Empirical Study of
Islamic and Conventional Credit on the Development of
Human Capital of the Borrowers in Bangladesh

APENDIX-A

SURVEY QUESTIONNAIRE

**MICROCREDIT AND SUSTAINABLE LIVELIHOOD: AN
EMPIRICAL STUDY OF ISLAMIC AND CONVENTIONAL
CREDIT ON THE DEVELOPMENT OF HUMAN CAPITAL OF THE
BORROWERS
IN BANGLADESH**

Note: The information will be used only for research purposes and will keep confidentially. (Please answer all questions: fill in the blank and tick in the appropriate. Put multiple answers where applicable).

INTERVIEWER INFORMATION

ID _____

Name _____

Date for Interview _____ Time of interview _____

SECTION A: GENERAL INFORMATIONS:

Name of the Respondent _____

Address: ☐ 1. Sylhet Division ☐ 2. Chittagong Division

Handphone _____ Housephone _____

A1. Gender: ☐ Male ☐ Female

A2. Marital Status:

☐ Single (Unmarried) ☐ Married ☐ Widow ☐ Divorcee

A3. Religions?

☐ 1. Islam ☐ 2. Buddha. ☐ 3. Hindu ☐ 4. Christian ☐ 5. Others

A4. Respondents Education achievement:

Education Level	Marks ()
No Schooling	
Primary	
Secondary School Certificate (SSC)	
Higher Secondary Certificate (HSC)	
Graduate	
Postgraduate	
Total	

A5. Age of Respondent :----- (actual age at 2009)

A6. Numbers household members:-

A.7. Number of HHs member staying together:-

A.8. Number of Earning Members:-

A. 9. Children's Education:

Education Level	Number of Children
No Schooling	
Primary	
Secondary School Certificate (SSC)	
Higher Secondary Certificate (HSC)	
Graduate	
Postgraduate	
Total	

A.10. Household Status:

☐ Male headed ☐ Female headed

A.11 Increased participation children education

☐ Yes ☐ No

**SECTION B: FOR GRAMEEN BANK'S OR RURAL
DEVELOPMENT SCHEM'S MEMBER**

B1. Borrowers Information:

Branch Name :-----

Area/Block Name:-----

Centre Name:-----

Borrower's No:-----

B2. Main economic activity before joining as a member of GB or RDS ?

1. Housewife/not working 2. Working (please specify).....

B3. Since when you join GB or RDS? -----(Year)

B4. Types of GB or RDS Membership: (May choose more than one)

☐ Basic loan

☐ Other types of loan

B5.Total amount of loan received (Taka):-

B6. How many times taken loan from GB or RDS? :-

B7.Years of involvement with credit programmes.....years

SECTION C: CONTRIBUTION OF MICROCREDIT ON HUMAN CAPITAL

The statements below are related to capacity building/ entrepreneurship of Borrowers current in comparison to before joining GB or RDS. Please answer by circling the scale of 1 to 5(1= highly disagree (HD), 2=Disagree (D), 3= somewhat disagree (SD), 4=Agree (A), 5=Highly agree (HA))

Code	C Borrowers Capacity Building	HD	D	SD	A	HA
A	My self-confidence has increased	1	2	3	4	5
B	I am capable of solving my own problems	1	2	3	4	5
C	I am capable of being responsible to myself and family	1	2	3	4	5
D	Chances to increase my income is better	1	2	3	4	5
E	Borrowers capability in operating income generating activities (IGAs)	1	2	3	4	5
F	Borrower's capability for the control of usage of the loan	1	2	3	4	5
G	Borrower's capability for the control of household expenditure	1	2	3	4	5
H	Borrower's capability for the control of household activities	1	2	3	4	5

Thanks for your Cooperation

APENDIX-B**Table 1:** Distribution of sample collection and field area by MFIs

MFIs		Study field area		Total
		Sylhet Division	Chittagong Division	
Grameen Bank(GB)%		147	108	255
		57.60	42.40	100
Islami Bank (RDS)%		71	124	195
		36.40	63.60	100
	Total	218	232	450
	%	48.40	51.60	100

Source: Primary Data from Survey at 2009

Table 2: Distribution of the number of populations and sample sizes at 95% confidence level

Number of microcredit borrowers	Sample size at 95% confidence
75000	382
100000	384
250000	384
500000	384
1000000	384
25000000	384

Sources: (Krejcie and Morgan, 1970)

Table 3: Comparison of the level of borrowers Self-confidence after joining microcredit schemes

Borrowers Self-confidence has increased									
MFIs	Observation Scale					Average Value of Scale	S.D	Proportion of high	Proportion of Low
	1	2	3	4	5*				
GB	25	47	72	90	21	3.14	1.12	43.53%	28.24%
Islami Bank	18	20	41	80	36	3.49	1.18	59.49%	19.49%

Source: Primary data from survey in 2009

Table 4: Comparison of the level of borrower's self-capability of solving own problems after joining microcredit schemes

Self-Capability of solving own problems									
MFIs	Observation Scale					Average Value of Scale	S.D	Proportion of high	Proportion of Low
	1	2	3	4	5*				
Grameen Bank	7	51	94	89	14	3.2	0.92	40.39%	22.75%
Islami Bank	12	24	49	80	30	3.47	1.09	56.41%	18.46%

Source: Primary data from survey in 2009

Table 5: Comparison of the level of borrower's self-capability of responsibility after joining microcredit schemes

Increase my capability of responsibility									
MFIs	Observation Scale				Average Value of Scale		S.D	Proportion of high	Proportion of Low
	1	2	3	4	5*			4 and 5	1 and 2
Grameen Bank	12	49	56	123	15	3.31	1	54.12%	23.92%
Islami Bank	24	26	23	79	43	3.47	1.31	62.56%	25.64%

Source: Primary data from survey in 2009

Table 6: Comparison of the level of borrower's self-capability for IGAs after joining microcredit schemes

Increase my capability for IGAs									
MFIs	Observation Scale					Average Value of Scale	S.D	Proportion of high	Proportion of Low
	1	2	3	4	5*			4 and 5	1 and 2
Grameen Bank	44	42	51	86	32	3.08	1.3	46.27%	33.73%
Islami Bank	14	35	47	75	24	3.31	1.13	50.77%	25.13%

Source: Primary data from survey in 2009

Table 7: Comparison of the level of borrower's capability for the control of usage of loan after joining microcredit schemes

Increase my capability for control loan usage									
MFIs	Observation Scale					Average Value of Scale	S.D	Proportion of high	Proportion of Low
	1	2	3	4	5*			4 and 5	1 and 2
Grameen Bank	70	54	57	42	32	2.65	1.37	29.02%	48.63%
Islami Bank	54	38	42	46	15	2.64	1.31	31.28%	47.18%

Source: Primary data from survey in 2009

Table 8: Comparison of the level of borrower's self-capability for controlling household expenditure after joining microcredit schemes

Increase my capability for control household expenditure									
MFIs	Observation Scale					Average Value of Scale	S.D	Proportion of high	Proportion of Low
	1	2	3	4	5*			4 and 5	1 and 2
GB	66	59	73	34	23	2.56	1.25	22.35%	49.02%
Islami Bank	33	47	58	36	21	2.82	1.23	29.23%	41.03%

Source: Primary data from survey in 2009

Table 9: Comparison of the level of borrower's self-capability for control of household activities after joining microcredit schemes

Increase my capability for control my household activities									
MFIs	Observation Scale					Average Value of Scale	S.D	Proportion of high	Proportion of Low
	1	2	3	4	5*				
GB	74	54	59	54	14	2.11	1.26	26.67%	50.20%
Islami Bank	60	26	55	26	28	2.67	1.41	27.69%	44.10%

Source: Primary data from survey in 2009

Table 10: Microcredit contribution on children's education of borrowers

MFIs	Increased participation children education		Total
	No	Yes	
GB	108	147	255
%	42.4	57.6	100.0
RDS	71	124	195
%	36.4	63.6	100.0
Total	179	271	450
%	39.8%	60.2%	100.0%

Source: Primary data from survey in 2009

APPENDIX C

The summary table of literature review:

Literature Review of theoretical evidence of Grameen Bank Scheme			
Author Name	Objectives of the study	Methodology Used	Major Findings
Morduch (2000)	To Justify the Microfinance program potentiality	Descriptive Discussion	The microfinance institutions can be a way of alleviates the poverty from the developing countries.
Dowla 's (2006)	Examines how Grameen Bank in Bangladesh created social capital that had been a boon to the explosive growth of Microfinance in Bangladesh and elsewhere	Putnam's definition	Grameen Bank Microfinance provides access of credit created social capital that had been a boon to the explosive growth of microfinance in Bangladesh and elsewhere
Literature Review of Empirical evidence of Grameen Bank Microcredit Scheme			
Schuler, S. R., Hashemi, S. M., Riley, A. P. & Akhter, S. (1996)	To explore the relationship between domestic violence against women and their economic and social dependence.	Descriptive methods	Findings suggest that group-based credit programs can reduce violence towards women by making women's lives more public.
Hermes, Lensink, & Mehrteab (2005)	To measure the impact of monitoring and social ties on moral hazard behaviour within group lending programs	Descriptive methods	Show that the monitoring and the social ties of group leaders, and not the other group members reduce the moral hazard behavior within groups
Sen (2003)	To contrasts the fortunes of ascending households (which escape poverty) and descending households (which fall into poverty	panel dataset	The findings confirm that Bangladesh made considerable progress in reducing poverty in the 1980's and 1990's

Literature Review of theoretical evidence of Islami Bank Scheme			
Ahmed (2004)	How Islamic MFIs have some inherent characteristics that can mitigate some of the problems faced by conventional MFIs	Descriptive discussion	Islamic banks can provide microfinance more efficiently benefiting from its scale of operations
Dusuki (2006)	examined the potential of group-based lending scheme of microfinance	Descriptive discussion	It is argued that group-based lending approach is not a subject alien to Islam, as it is deeply inscribed in Ibn Khaldun's concept of 'Asabiyah' or social solidarity
(Rahim and Rahman (2007)	assessed the potential of Islamic financing schemes for micro financing purposes.	Descriptive discussion	The study also found that there is a nexus between Islamic banking and microfinance as many elements of microfinance could be considered consistent with the broader goals of Islamic banking
Akhter et al. (2009)	Islamic micro-finance as an important component in poverty alleviation strategies	Descriptive discussion	Islamic micro-finance as an important component in poverty alleviation strategies
Obaidullah and Mohamed-Saleem, (2008)	To measure the creativity and innovation in poverty alleviation efforts using Shariah compliant mechanisms	Descriptive discussion	Contemporary mechanisms in use by mainstream Islamic banks and financial institutions may indeed be grossly inappropriate in the context of local economies and for financing micro livelihood projects
Kaleem and Ahmed in 2010	To Justify the Microfinance program potentiality	Descriptive discussion	The study found that charity-based Islamic MFIs will be financially and socially sustainable as these are to be based on the concepts of brotherhood, local philanthropy, and volunteer services

Literature Review of Empirical evidence of Islami Bank Microcredit Scheme			
M.Mizanur Rahman et al., 2008	To assessed the achievement of the RDS and its impact on the livelihood of the rural people	Descriptive methods	Household income and expenditure had increased significantly and clients had a positive opinion towards the micro investment program as it improved their standards of living
Akhter et al., in 2009	To examine of Islamic microfinance organization operating	Descriptive methods	The study indicates that it is providing its services for all living below the poverty line including the “extreme poor” and Interest free loans can be used as a powerful tool against poverty
Praveen, (2009)	To examine about institutional, financial and economical sustainability	Descriptive methods	The study revealed that RDS of IBBL has been treated as a sustainable MFI in the rural development and poverty alleviation of Bangladesh within a short span of time since its establishment
Ahmed et al., (2006)	To assesses the extent to which this objective has been achieved by RDS of IBBL	Descriptive methods	He found that the success of a micro finance program depends on its impact on raising the income of its members and ultimately on improving the living standard of the poor

NOTES TO CONTRIBUTORS

Papers to be submitted should be written in English not exceeding 8000 words. All articles will be refereed. The articles submitted to the Journal of Economic Cooperation and Development should be original contributions and should not be under consideration for any other publication at the same time. Manuscripts must be submitted electronically in MS Word format to (oicankara@sesric.org). Articles must be typewritten, double-spaced and with ample margins and all pages (including those containing any diagrams and tables) must be numbered consecutively. Arabic numerals are to be used throughout.

The first page of the manuscript should contain the title, name/s and institutional affiliation/s of the author/s. Contact information including the name, phone and fax numbers and e-mail address of the corresponding author should be provided at the bottom of the first page. An abstract not exceeding 200 words should also be included in this first page.

It is the author's responsibility to ensure that where copyright materials are included within an article the permission of the copyright holder has been obtained. Confirmation of this should be attached separately.

All diagrams, charts and graphs should be prepared in black and white and referred to as figures and consecutively numbered. Tables should be kept to a minimum and contain only essential data. Each figure and table must be given an Arabic numeral, followed by a heading and be referred to in the text.

Special attention should be given to quotations, footnotes and references which should be accurate and complete. A double-spaced list of references containing all the works referred to is to be added at the end of the article. The reference list style must follow the following examples:

Ali, M. (1995), *Islamic Banking and Its Problems*, Routledge, London.

Brander, J. (1995), *Strategic Trade Policy*, in G. M. Grossman and K. Rogoff (eds), *Handbook of International Economics*, North Holland; Amsterdam

Shabbir, M. (2003), "Adequacy of Disclosure in Islamic Financial Institutions", *Journal of Islamic Banking & Finance*, 20(1), 55-60.

Correspondence address: Journal of Economic Cooperation and Development, SESRIC, Kudüs Cad, No. 9, ORAN, 06450 Ankara, Turkey.
E-mail: pubs@sesric.org



STATISTICAL, ECONOMIC AND SOCIAL RESEARCH
AND TRAINING CENTRE FOR ISLAMIC COUNTRIES

Kudüs Cad. No:9 Diplomatik Site 06450 ORAN-Ankara, Turkey
Tel: (90-312) 468 61 72-76 Fax: (90-312) 468 57 26
Email: oicankara@sesric.org Web: www.sesric.org