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Types of Banking Institutions and Economic Growth: An Endogenous Growth Model

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Abstract
There is mixed support for the hypothesis that the banking sector is a channel for economic growth. While most studies on economic growth in Gulf Cooperation Council (GCC) countries have not distinguished between conventional banks and Islamic banks, this study contributes to the empirical literature by comparing the respective impacts of Islamic banks and commercial banks on economic growth among GCC countries during the period 2001–2009, bringing out policy implications. The main result of panel data regressions is that both conventional and Islamic banks have fuelled economic growth, with the latter having a more significant impact. These results contradict the findings of some single-country studies that have examined the impact of Islamic banking on economic growth.

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Keywords Finance; Economic growth; Dynamic panel data models; GCC countries

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1. Introduction

Although the impact of the banking sector on economic growth has been extensively discussed theoretically and empirically in the relevant literature[i], four main issues remain ambiguous and require further research attention. Firstly, empirical studies have shown mixed support for the hypothesis that banking sector and financial markets have significant impacts on economic growth. While on the one hand, Nobel laureate Merton Miller (1998) has pointed out the importance of financial markets on economic growth (see also Levine and Zervos (1998)), on the other hand, another Nobel laureate, Robert Lucas (1988), indicates that the impact of finance on economic growth is not significant (see also Jones (2002)). Secondly, many previous studies on finance and growth do not seem to have distinguished between different types of banks, such as conventional banks or Islamic banks. Thirdly, previous studies on the impact of Islamic banking on growth are essentially single-country studies whose findings are difficult to generalize (see for example, Abduh and Omar (2012) for Indonesia; Hafas and Ratna (2009) for Malaysia). Fourthly, many previous studies (e.g., Goaied and Sassi 2010) have not examined the feedback causality and cointegration between the banking sector and economic growth in Gulf Cooperation Council (GCC) countries. To fill these *four* gaps in the empirical literature, this paper investigates the impact of Islamic and commercial banks on economic growth in GCC countries during the period 2001–2009. The paper also illustrates the impact of Islamic banks on growth by constructing and employing a simple endogenous growth model, which builds heavily upon the several contributions to the literature on endogenous growth.

Recently, the Islamic finance market has grown at 15-20% on average over the last five years, with the fastest growth recorded in the financial sector (Derbel *et al.* 2011). The high growth rate in Islamic banking can be because of its advantages over conventional banking (Goaied and

Sassi 2010). This point, as well as the theoretical approaches on modeling the impact of the banking sector on economic growth, will be discussed in section 2. In addition, we extend the AK endogenous growth model developed by Pagano (1993) by introducing the developments in Islamic financial market as an argument in the production function. Section 3 provides the empirical specification, data sources, empirical findings. Section 4 presents the conclusions and policy implications.

2. Theoretical Approaches and Empirical Evidence

Bagehot (1873) is the first study that emphasized the role of the banking sector in the economy (see Levine (2005) and Demirguc-Kunt and Levine (2008) for a survey). He focused on how central banks can use interest rate during the management of financial crises. Schumpeter (1912) also stressed on the importance of banking sector in facilitating innovation and economic growth. The work of Schumpeter is supported by many empirical studies (e.g., King and Levine 1993a). However, Robinson (1952) argues that finance does not affect growth, as financial development may merely be a response to variations in the real sector. With this in mind, Lucas (1988) indicates that the role of finance in economic growth has been overestimated.

The neoclassical growth model, developed by Solow (1956 and 1957), shows a weak impact of financial intermediation on capital accumulation, productivity, and hence economic growth. This is mainly due to diminishing returns of capital accumulation. In contrast to the neoclassical growth model, the new (endogenous) growth theory predicts that financial development can positively contribute to long run growth (King and Levine 1993b). King and Levine (1993b) show that monitoring and financing entrepreneurs may reduce investment costs, and increase the rate of economic growth.

To comply with Islamic law (known as *Shariah*), in particular its zero interest rate feature, new financial instruments have been developed in Islamic banks. Hassan and Lewis (2007) list seven Islamic financial instruments: (1) Murabaha (mark-up financing or cost-plus financing), (2) Mudaraba (trust financing), (3) Musharaka (joint venture or profit and loss sharing "PLS"), (4) Ijara (leasing), (5) Salam (advance purchase), (6) Istisna (commissioned manufacture), and (7) Bai bi-thamin ajil (deferred payment financing). With zero interest rate, it is expected that Islamic banks may benefit the economy without market distortions (Yousefi *et al.* 2012). Building on Pagano (1993), we present a simple endogenous growth model to illustrate the link between Islamic financial development and economic growth.

2.a. The Model

We extend the endogenous growth model[ii] developed by Pagano (1993) by introducing the developments in the Islamic financial market as an argument in the production function. Specifically, the production function of the AK model is modified in the following way:

$$Y = A\,(FL)\,K \qquad (1)$$

where aggregate output (Y) is a linear function of aggregate capital stock (K), and marginal productivity of capital (A) depends on the level of the Islamic financial market (FL). A single good is produced in the economy that is either invested or consumed. The capital good depreciates at the rate of δ per period:

$$I = K' - (1-\delta)\,K \qquad (2)$$

where (I) is gross investment, (K) is current aggregate capital stock, and (K') is the aggregate capital stock in the subsequent period.

$$S = s(FL)Y \qquad (3)$$

where (S) is the gross saving and (s) denotes the saving rate that depends on the level of the Islamic financial market.

$I = \varphi(FL)S$ *(4)*

Following Pagano (1993), we assume that (1- φ) of the saving is lost in the process of Islamic financial intermediation. Using equation (1), we can derive the following equation:

$dY = A_{FL} K\, d(FL) + A(FL)\, dK$ *(5)*

where d(FL) is *change in the level of Islamic financial market.* Dividing each term by Y in equation (5) and using (1), we obtain the following equation:

$dY = A_{FL} K\, d(FL) + A(FL)\, dK$

$\frac{dY}{Y} = A_{FL}\ d(FL) / A + \frac{dK}{K}$ *(6)*

Using equation (2), $I = K' - K + \delta K$

$I = dK + \delta K$ since $dK = K' - K$

$\frac{dK}{K} = \frac{I}{K} - \delta$ (7)

$\frac{dK}{K} = \frac{AI}{AK} - \delta$

$\frac{dK}{K} = A\frac{I}{Y} - \delta$ (8)

Substituting (8) into (6), we obtain:

$\frac{dY}{Y} = A_{FL}\ d(FL) / A + A\frac{I}{Y} - \delta$

$g = \frac{dY}{Y}$ *;* where g stands for the growth rate of output

$g + \delta = A_{FL}\ d(FL) / A + A\frac{I}{Y}$

$g + \delta = A_{FL}\ K\frac{d(FL)}{Y} + A\frac{I}{Y}$

$g + \delta = A_{FL}\ K\frac{IFD}{Y} + A\frac{I}{Y}$ *(9)*

Where IFD = d(FL), that is, Islamic financial development (IFD) is equal to the change in the level of the Islamic financial market. $\lambda = A_{FL}\ K$ is the marginal product of total factor productivity due to Islamic financial market development.

$$g + \delta = \lambda \frac{IFD}{Y} + A\frac{I}{Y} \qquad (10)$$

If we regress (g+ δ) on $\frac{IFD}{Y}$, we can obtain an estimate of λ. Similarly, if we regress (g+ δ) on $\frac{I}{Y}$ we can obtain an estimate of A. Combining (2), (3) and (4), we get

$$\varphi(FL)s(FL)Y = dK + \delta K$$

$$\varphi(FL)s(FL)A(FL)K = dK + \delta K$$

$$\varphi(FL)s(FL)A(FL) = \frac{dK}{K} + \delta$$

$$\frac{dK}{K} = \varphi(FL)s(FL)A(FL) - \delta \qquad (11)$$

If we substitute (11) into (6), we obtain:

$$g = A_{FL}\ IFD / A + \varphi(FL)s(FL)A(FL) - \delta \qquad (12)$$

Where: A_{FL} / A denotes the change in A due to the Islamic financial market. From (12), we can conclude that both the level of, and also the developments in, the Islamic financial market affect the growth rate of output[iii].

Pagano (1993) shows that financial market development affects the growth rate through three channels, namely, funneling savings to firms, improving capital allocation, and affecting savings rate. In addition to the three channels specified in Pagon (1993) additional four channels may explain how Islamic banks can contribute to the economic growth more than conventional banks do. The first channel is by directly linking between the real sector and the financial sector. Specifically, in Islamic banking, the flow of money is always associated with the flow of goods and services. The second channel is by encouraging entrepreneurship and small and medium sized enterprises (SMEs). Imam and Kpodar (2010) indicate that small and new firms can get finance from

Islamic banks even if they have no credit history. This may increase competition, innovation, and output growth. The third channel is by promoting equality. The use of Islamic financial instruments promotes equality and reduces unemployment. For example, Salam (advance purchase) is used in agriculture sector to offer finance to farmers through forward sales contracts between Islamic banks and farmers. Based on this contract, buyers pay in advance for agriculture goods that will be supplied latter. This promotes development, and reduces inequality and unemployment in the rural sector (El-Ghattis 2010), which in turn promotes economic growth (Stiglitz 2012). The fourth channel is through the ethical values of Islamic banking, which are well-known as based on religious beliefs. Weber (1905 [1930]) argues that religion promotes ethical principles (such as thrift, charity, social justice, and fighting corruption), which can have positive impacts on investment and economic growth (Barro and McCleary 2003).

3. Empirical Specification and Results

As Oman's first Islamic bank was established only in 2011, Oman is excluded from our panel dataset. The data for five GCC countries from 2001 to 2009 are pooled. The following six panel data regressions examine the hypothesis that Islamic and conventional banks Granger-cause economic growth in five GCC countries from 2001 to 2009.

$$\text{Growth}_{it} = \sum_{\text{J=1}}^{\text{N}} \beta_{0\text{j}} D_{jt} + \beta_1 \text{Growth}_{1,\text{it-1}} + \beta_2 \text{CON\_Banks}_{1,\text{it-1}} + \text{e}_{\text{it}} \quad (3.1)$$

$$\text{Growth}_{it} = \sum_{\text{J=1}}^{\text{N}} \alpha_{0\text{j}} D_{jt} + \alpha_1 \text{Growth}_{1,\text{it-1}} + \alpha_2 \text{ISL\_Banks}_{1,\text{it-1}} + \varepsilon_{\text{it}} \quad (3.2)$$

$$\text{Growth}_{it} = \sum_{\text{J=1}}^{\text{N}} \lambda_{0\text{j}} D_{jt} + \lambda_1 \text{Growth}_{1,\text{it-1}} + \lambda_2 \text{All\_Banks}_{1,\text{it-1}} + \psi_{\text{it}} \quad (3.3)$$

$$\text{CON\_Banks}_{it} = \sum_{\text{J=1}}^{\text{N}} \eta_{0\text{j}} D_{jt} + \eta_1 \text{Growth}_{1,\text{it-1}} + \eta_2 \text{CON\_Banks}_{1,\text{it-1}} + \mu_{\text{it}} \quad (3.4)$$

$$\text{ISL\_Banks}_{it} = \sum_{J=1}^{N} \delta_{0j} D_{jt} + \delta_1 \text{Growth}_{1,it-1} + \delta_2 \text{ISL\_Banks}_{1,it-1} + \upsilon_{it} \quad (3.5)$$

$$\text{All\_Banks}_{it} = \sum_{J=1}^{N} \phi_{0j} D_{jt} + \phi_1 \text{Growth}_{1,it-1} + \phi_2 \text{All\_Banks}_{1,it-1} + \omega_{it} \quad (3.6)$$

The variable Growth is the growth rate of GDP per capita, PPP (at constant 2005 international dollars). Table A.1 in appendix A shows the growth rate of GDP per capita, PPP (at constant 2005 international dollars) for five GCC countries from 2001 to 2009. Djt are cross-section dummy variables. When j=i, D_{jt}=1, else D_{jt} = 0. In the context of Granger (1969) causality, ISL_Banks captures the value of Islamic finance at time t-1 as a percentage of GDP, and CON_Banks variable represents the value of loans by conventional banks at time t-1 as a percentage of GDP. The All-Banks variable is the sum of ISL-Banks and CON_Banks variables. The number of lags is determined based on the Schwarz (1978) Criterion.

The Islamic and conventional banks' variables measure the values of finance by Islamic and conventional banks, respectively. Data on this is collected from GCC Banks Financial Reports published by the Institute of Banking Studies in Kuwait, recorded as percentage of GDP (current US$), and from World Bank (2013). There is a significant difference between the finance provided by Islamic banks and loans provided by conventional banks. The Islamic finance variable is the sum of all Islamic financial instruments (IBS 2011: 200). The loans provided by conventional banks' are defined as "all types of loans, advances, discounts and overdrafts provided to others by the bank" (IBS 2011: 16).

Equations (3.1), (3.2), (3.3), (3.4), (3.5), and (3.6) can be justified by the existing theoretical approaches in the literature, as well as by the mathematical model that we constructed and

discussed earlier. The above six equations yield a panel data least squares dummy variable (LSDV) model (i.e. fixed effects model). Since our data set has T (time periods) relatively large to N (Cross sections), the Least Squares Dummy Variables (LSDV) model generates *very similar results* to the random effects model (Kmenta, 1986). Islam (1995) indicates that LSDV is better than the random effects model and is equivalent to the Maximum Likelihood (ML) estimator when the lagged dependent variable is on the right hand side of the panel data equation. However, the LSDV model does not allow for heteroskedasticity, autocorrelation, and contemporaneous correlation. For this reason, we apply the Parks (1967) method to the LSDV model. The use of the Parks (1967) method and its steps are justified as follows.

Previous studies on GCC countries are few and did not examine the cross section correlation (e.g., Goaied and Sassi 2010). This may lead to biased results (Greene 2000). Specifically, the Parks (1967) method that is used in this study yields efficient results when the number of time-series is relatively larger than the number of cross sections (Messemer and Parks 2004). The assumptions of the Parks method allows for contemporaneous correlation, which yields a Cross-sectionally Correlated and Timewise Autoregressive (CCTA) model (Kmenta 1986). The Parks method extends the method of Seemingly Unrelated Regressions (SUR), proposed by (Zellner, 1962) by allowing for an autoregressive error structure (Anderson *et al.* 2009). The Parks method has three main steps: first, to estimate the autoregressive parameters, second, to estimate the contemporaneous covariance terms, and third, to use feasible-GLS to estimate coefficients and standard errors.[iv]

Some previous studies (Levine *et al.* 2000) have found feedback causality between finance and growth, which may result in an *endogeneity* problem**.** For this reason, we use *lagged* independent variables rather than current independent variables. The lagged independent variables are used as instruments in some previous studies (e.g., Levine 2005). The Sargan (1958) test shows that the instruments as a group are exogenous. In addition, there is little need to use both the difference and system generalized method of moments (GMM) estimators since the number of time series is greater than the number of cross sections (Blundell and Bond 1998). The empirical findings based on equations (3.1), (3.2) and (3.3) can be summarized in the following table:

Table (3.1) presents panel data regressions results for the *Growth* variable. Values in parentheses are t-statistics.

Regression Method:	LSDV Model (Regression 3.1)	LSDV Model (Regression 3.2)	LSDV Model (Regression 3.3)	Parks Method (Regression 3.4)	Parks Method (Regression 3.5)	Parks Method (Regression 3.6)
Growth(t-1)	0.20051 (0.06604)	0.12565 (0.03926)	0.13445 (0.8721)	0.27720 (3.143)	0.13352 (1.844)	0.18135 (2.311)
ISL_Banks(t-1)	0.30636 (0.03165)	Not Included	Not Included	0.70668 (3.251)	Not Included	Not Included
ecCON_Banks (t-1)	Not Included	0.026505 (0.07673)	Not Included	Not Included	0.20642 (2.986)	Not Included
All_Banks (t-1)	Not Included	Not Included	0.22704 (1.563)	Not Included	Not Included	0.18188 (3.497)
R^2	0.2640	0.3019	0.3011	0.6684*	*0.6535	*0.6968
RUNS test	19 RUNS, 21 POS, 24 NEG	19 RUNS, 18 POS, 27 NEG	19 RUNS, 19 POS, 26 NEG	22 RUNS, 18 POS, 27 NEG	21 RUNS, 21 POS, 24 NEG	23 RUNS, 19 POS 26 NEG
Cross-Sections	5	5	5	5	5	5
Time-Periods	9	9	9	9	9	9
Total Observations	45	45	45	45	45	45

***** Buse Raw-Moment R^2

The Lagrange multiplier test for cross-section heteroskedasticity, discussed in Greene (2000), indicates that there is evidence to reject the hypothesis of homoskedasticity. In addition, the Breusch-Pagano (1980) Lagrange multiplier test indicates that there is an evidence to reject the hypothesis of no contemporaneous correlation. To overcome such problems, the Parks (1967)

method is used. Specifically, the empirical results of Table (3.1) and tables (A.2) and (A.3) in appendix (A) overcome three limitations of previous studies. Firstly, many previous studies have not tested the contemporaneous correlation; this may have led to biased results as in regressions (3.1), (3.2), and (3.3). To avoid such problems we have used the Parks (1967) method to estimate the six panel data regression models in the empirical specification section. Hansen (1992) tests for parameter instability, indicating that the model is stable. In the light of Granger (1969), the results of regressions (3.4), (3.5), and (3.6) that are summarized in Table (3.1) indicate that both Islamic and conventional banks Granger-causes economic growth. However, the impact of Islamic banks on economic growth is more significant than conventional banks on economic growth in GCC countries during the period 2001–2009. As the institutional and legal framework of GCC countries are not examined due to the unavailability of data, these empirical results have to be interpreted with caution. For instance, the annual Country Policy and Institutional Assessment (CPIA) index is not available for GCC Countries (World Bank, 2013).

Secondly, many previous studies on GCC countries have not examined the cointegration between growth and finance (e.g. Goaied and Sassi 2010). In addition, previous studies that did test the cointegration did not also account for cross-sectional dependence (Chang 2004). To overcome these limitations, this study has used the four error-correction-based panel cointegration tests developed by Westerlund (2007). Specifically, these four cointegration tests use the bootstrap approach suggested by (Chang, 2004). The results of Westerlund (2007) cointegration tests (see table (A.2) in appendix (A)) show that our panel data regressions are not spurious. In other words, growth is cointegrated with Islamic finance and conventional banking loans[v].

Thirdly, previous studies on GCC countries did not examine the feedback causality (e.g. Goaied and Sassi 2010). Based on the results of table (A.3) in appendix (A), the economic growth does not cause development in both Islamic finance and conventional banks' loans. Based on the results of appendix (A) tables and table (3.1), there is a *unidirectional* causality from finance to economic growth. This result implies that finance is one of the main determinants in the process of economic growth. In addition, finance does not follow economic growth. Specifically, there is *no* feedback causality between finance and economic growth in GCC countries during the period 2001–2009. This result supports some previous studies (see for example, Christopoulos and Tsionas (2004) for 10 developing countries). On the other hand, the empirical findings of this study contradict the results of some previous single-country studies that examine the impact of Islamic banking on economic growth in developing countries (Hafas and Rtana (2009) for Malaysia). One explanation is that the results of these single-country studies are difficult to generalize.

4. Conclusions and Policy Implications

Previous studies have not extensively examined the impact of Islamic banking on economic growth in GCC countries. More specifically, many previous empirical studies on Islamic banking have focused only on efficiency (e.g., Cihák and Hesse, 2008), or are single-country studies with findings difficult to generalize. To fill this gap in literature, this paper has empirically investigated the potential effects of Islamic banking on economic growth in GCC countries using dynamic panel data models. We have also extended the Pagano (1993) endogenous growth model by including developments in Islamic financial market as an argument in the production function.

Using a Cross-sectionally Correlated and Timewise Autoregressive (CCTA) model, the results of panel data regressions have indicated that both Islamic and conventional banks Granger-causes economic growth. In addition, the impact of Islamic banks on economic growth has been more significant than that of conventional banks in GCC countries during the period 2001–2009. On the other hand, economic growth does not Granger cause a development in both Islamic finance and conventional banks' loans. Our results contradict the findings of some previous single-country studies that have examined the impact of Islamic banking on economic growth in developing countries.

Our empirical results also have four implications for understanding the political economy of banking sector reforms in GCC countries. Firstly, the presence of Islamic banks increases the competition and efficiency in the banking sector. Secondly, the main principles of Islamic banking (e.g., zero nominal interest rate) result in efficient allocation of resources. This point is consistent with Friedman (1969). Thirdly, the presence of Islamic banks encourages innovation activities by providing risk sharing, which positively affects economic growth (Pagano 1993). Fourthly, the use of interest-free loans can reduce the income gap and improve socio-economic development. Future research should empirically investigate Islamic banking as a channel of reducing income inequality within countries.

The study has two main limitations. First, it focuses only on GCC countries; to get more generalizable results, other countries should be added to the panel data set. Second, the study did not examine the institutional and legal framework of GCC countries; future research should add institutional and legal indicators as control variables. However, unavailability of data could be one main obstacle for future research (World Bank 2013).

Appendix A

Table (A.1) the growth rate of GDP per capita, PPP (constant 2005 international $)

Year	Bahrain	Kuwait	Qatar	Saudi Arabia	UAE
2001	3.897%	-2.720%	0.422%	-2.546%	-2.044%
2002	5.332%	0.003%	4.367%	-3.518%	-0.718%
2003	6.356%	14.177%	-1.154%	3.459%	7.087%
2004	1.734%	7.044%	10.426%	1.279%	1.990%
2005	-0.090%	6.959%	-6.272%	1.921%	-2.736%
2006	-4.688%	1.289%	-0.475%	0.003%	-5.133%
2007	-5.039%	0.264%	5.249%	-0.802%	-8.480%
2008	-6.491%	8.892%	5.898%	1.590%	-8.465%
2009	8.028%	4.438%	-5.073%	-2.242%	-11.178%

Source: World Bank (2013)

Table (A.2) Westerlund ECM panel cointegration tests

Bootstrapping critical values under H0.
Results for H0: no cointegration
With 5 series and 1 covariate
Average AIC selected lag length: 1
Average AIC selected lead length: 0

Static	Robust P-value for H0: no cointegration between Commercial Banks and Economic Growth	Robust P-value for H0: no cointegration between Islamic Banks and Economic Growth	Robust P-value for H0: no cointegration between All Banks and Economic Growth
Gt	0.000	0.000	0.000
Ga	0.000	0.000	0.000
Pt	0.000	0.000	0.000
Pa	0.000	0.000	0.000

Table (A.3) presents panel data regression results. Values in parentheses are t-statistics.

Regression Method:	Parks Method (Regression A.1) Dependent Variable: *Com_Banks*	Parks Method (Regression A.3) Dependent Variable: *ISL_Banks*	Parks Method (Regression A.4) Dependent Variable: *ALL_Banks*
Growth(t-1)	-0.27643E-06 (-1.061)	0.35645E-07 (0.7586)	-0.38443E-06 (-1.179)
COM_Banks (t-1)	0.93314E-03 (0.1925E-01)	Not Included	Not Included
ISL_Banks (t-1)	Not Included	-0.10321E-01 (-0.3661)	Not Included

ALL_Banks (t-1)	Not Included	Not Included	0.65789E-02 (0.1265)
Buse Raw-Moment R^2	0.8246	0.9595	0.8951
RUNS test	18 RUNS, 24 POS, 21 NEG	16 RUNS,18 POS,27 NEG	18 RUNS,22 POS,23 NEG
Cross-Sections	5	5	5
Time-Periods	9	9	9
Observations	45	45	45

***** Buse Raw-Moment R^2

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[i] See Badun (2009) and Wachtel (2011) for a survey.

[ii] The endogenous growth theory was inspired by Romer (1986, 1987a, 1987b).

[iii] The increase in A raises the second component of g,_φ(FL)s(FL)A(FL). However, the first component, A_{FL} IFD / A, may decrease with higher capital productivity, A. Therefore, the net effect of higher A on the growth rate, g, is analytically ambiguous. The outcome may depend on many factors, for example, if the rates of return on savings outweigh the increased risk of PLS, the saving rate may increase (See also Ul Haque and Mirakhor (1986) and Ahmed (1994)).

[iv] The steps of Parks method are discussed in previous studies (see for example, Beck and Katz (1995)). It should be also noted that Beck and Katz (1995) use Monte Carlo simulations to test the efficiency of Parks method. They found that Parks method may yield oversized test statistics. To overcome this limitation, we use Panel Corrected Standard Errors (PCSE) suggested by Beck and Katz (1995).

[v] This cointegration should be interpreted with caution since the number of time series is small in our panel data set.