

Institutions, Openness and Economic Growth

OG DAYARATNA-BANDA

Department of Economics & Statistics, University of Peradeniya, Peradeniya, Sri Lanka

ABSTRACT. This paper discusses the channels through which institutions and trade openness affect economic growth. Institutions and trade openness positively contribute to economic growth as they generate positive technological externalities apart from their direct contribution growth. However, the possible feedbacks between institutions and openness are considered to obtain unbiased estimates. Empirical results obtained using panel techniques for cross-country data support this claim. Economies with relatively good institutions and greater trade openness tend to grow rapidly.

JEL Classification No.: F1, F2, O4

KEYWORDS. Institutions, Openness, Economic Growth

Introduction

The impact of trade openness and institutions on economic growth is a controversial issue. Theoretical literature in this area is still at the fledgling stage while empirical findings are inconclusive. Since there are feedbacks between trade openness and institutions, their independent effects become weak in regressions that do not account for these feedbacks. This paper empirically assesses the impact of trade openness and institutions taking into account of the possible feedbacks between trade openness and institutions.

A relatively large literature emphasizes positive nexus between trade openness and economic growth. Some models have explained the role of exports in economic growth noting that export expansion would generate positive externalities and increase productivity by offering greater economies of scale (Feder, 1982). Moreover, exports are likely to alleviate foreign exchange constraints and thereby provide greater access to international markets (Esfahani, 1991). The import side of the economy is also likely to be important in creating feedbacks. Technological spill-over embedded in foreign capital and intermediate goods have potentials to stimulate economic growth (Thangavelu and Gulasekaran, 2004). New growth theories also stress that export sector which attracts much of the FDI is likely to increase economic growth by allowing higher rate of technological innovation and dynamic learning from abroad (Romer, 1993).

The role of institutional variables in economic growth has also received attention in the recent literature. North and Thomas (1973) developed the notion that 'social infrastructure' (Hall and Jones, 1999) or 'social technology' (Nelson and Sampat, 2001) reduces uncertainty, and transaction and information costs to allow agents to capture full social returns to their actions. The strengths of institutions are manifested in such things as: (a) property rights, (b) rule of law, (c) ethnic and social harmony, (d) quality of the bureaucracy, and (e) extent of rent-seeking activities. Seemingly, institutions affect economic progress of nations (Acemoglu et

al., 2004). Empirical literature on innovations underscores the strong correlation between intellectual property rights and innovations (Khan and Sokoloff, 2001). Some studies have discussed the role of institutions relating to crime/expropriation and rent-seeking (Grossman and Kim, 1995).

This paper constructs a simple model to identify the impact of institutions and trade openness on economic growth, by extending a two-sector model of Feder (1982). Our model attempts to capture both the direct effects and technological externalities of trade openness and institutions. The resulting equations are then empirically estimated by dynamic panel techniques using data for a sample of 32 developing countries over years from 1980 to 2005. The rest of the paper is organized as follows. Two versions of the theoretical model are presented in section 2. Section 3 presents empirical methodology. Results are discussed in Section 4. Section 5 provides the conclusion.

Theoretical Framework

We modify the models presented by Feder (1982) and Wang (2000) to incorporate technological externalities of trade openness and institutions, apart from their direct effects. Feder (1982) analyzes the role of exports on growth, whereas Wang (2000) considers the role of government investment in economic growth in their two sector models. Wang also introduces dynamic spill-over into his model. We consider trade openness and institutions in our model in a dynamic set up.

The first model captures dynamic spill-over effects of institutions on private production. Suppose in the first case, total output of the economy (Y) is produced in two sectors: (a) production by the private sector (N), and (b) institutions-building or government sector. Production in the private sector includes externalities of institutions and foreign direct investment. K is the domestic capital stock. FDI is used here as a flow variable. FDI is not correlated with the domestic capital stock in the concurrent period. FDI may be affecting domestic capital formation with a time lag. D is used as a source of capital in the domestic and export sectors. For the analytical purpose this formulation stipulates that formation of foreign capital in this economy is not taken into consideration. The model structure described above can be presented by the following set of equations;

$$Y_t = N_t + G_t$$

(1)

$$N_t = F(L_N, K_N; G_t^*, D_t),$$

$$F'_L > 0, F''_L < 0; F'_K > 0, F''_K < 0$$

(2)

$$G_t = H(L_G, K_G)$$

$$H'_L > 0, H''_L < 0; H'_K > 0, H''_K < 0$$

(3)

$$L = L_N + L_G$$

(4)

$$K = K_N + K_G$$

(5)

$$G_t^* - G_{t-1}^* = \lambda [G_{t-1} - G_{t-1}^*]$$

$$0 < \lambda \leq 1$$

(6)

where F, H are constant returns-to-scale production functions. L, L_N and L_G respectively are total labor, domestic sector labour, and government sector labour, whereas K, K_N and K_G respectively are total capital, domestic sector capital, and government sector capital.

Equation (6) specifies a dynamic process by which institutions create externalities in the private production sector. Wang (2000) first employed this approach in a two sector model in an analysis of inter-sectoral externalities of financial development and real output in supply-leading and demand-following financial development. Unlike Wang (2000), this paper considers a dynamic adjustment process for institutions. Agents in the private production sector are assumed to form an expectation about government actions or services. The greater the anticipation of better services or favorable institutions, the higher will be the production in the private sector because of the improved efficiency.

In addition to externalities captured in F , there are likely to be factor productivity differences between government services production and private sector production. As it is not possible to estimate sectoral marginal factor productivities due to absence of data, we follow Feder (1982) and assume that;

$$\frac{H_K}{F_K} = \frac{H_L}{F_L} = (1 + \theta) \quad -\infty < \theta < \infty$$

(7)

where upper-case letters denote partial derivatives in each input. The factor θ captures the productivity differences allowing the ratios to deviate from unity. Note that if factors are perfectly mobile across sectors, there are no factor productivity differences so that θ becomes zero. In this formulation, either sector could record higher productivity depending on the sign of θ . The productivity difference can take negative or positive value depending on which sector is more productive than the other. Equation (7) implies that:

$$H_K = (1 + \theta)F_K \quad \text{and} \quad H_L = (1 + \theta)F_L$$

(8)

This concludes the set up of the model. The change of aggregate output, private-sector output, and government services production overtime can be obtained by differentiating from (1) to (3) with respect to time:

$$\dot{Y} = \dot{N} + \dot{G}$$

(9)

$$\dot{N} = F_L \dot{L}_N + F_K \dot{K}_N + F_G \dot{G}^* + F_D \dot{D}$$

(10)

$$\dot{G} = H_L \dot{L}_G + H_K \dot{K}_G$$

(11)

Substitute from (8) into (11) and by rearranging, we have:

$$\dot{G} = (1+\theta) [F_L \dot{L}_G + F_K \dot{K}_G] \quad (12)$$

Taking into consideration of (4) and (5), the equation (12) can be written as:

$$F_L \dot{L}_N + F_K \dot{K}_N = F_L \dot{L} + F_K \dot{K} - \frac{\dot{G}}{(1+\theta)} \quad (13)$$

Substitute from (10) into (13), we could derive:

$$\dot{N} = F_L \dot{L} + F_K \dot{K} - \frac{\dot{G}}{(1+\theta)} + F_G \dot{G}^* + F_D \dot{D} \quad (14)$$

Adding \dot{G} to the both sides of (14):

$$\dot{N} + \dot{G} = F_L \dot{L} + F_K \dot{K} + F_D \dot{D} + \left(\frac{\theta}{1+\theta} \right) \dot{G} + F_G \dot{G}^* \quad (15)$$

From (9) substitute \dot{Y} for $\dot{N} + \dot{G}$ into (15);

$$\dot{Y} = F_L \dot{L} + F_K \dot{K} + F_D \dot{D} + \left(\frac{\theta}{1+\theta} \right) \dot{G} + F_G \dot{G}^* \quad (16)$$

Assume, further, an explicit functional form for the private production function such that G^* and D affect private goods production (N) with constant elasticities of μ_g and μ_d (Feder, 1982). The production function of the private goods sector could then be written as $N = G^{*\mu_g} D^{\mu_d} \cdot \Phi(L_N, K_N)$, which provides the following:

$$\frac{\partial N}{\partial G^*} = \mu_g G^{*\mu_g-1} D^{\mu_d} \cdot \Phi(L_N, K_N) = \mu_g \left(\frac{N}{G^*} \right) = F_G \quad (17)$$

$$\frac{\partial N}{\partial D} = \mu_d G^{*\mu_g} D^{\mu_d-1} \cdot \Phi(L_N, K_N) = \mu_d \left(\frac{N}{D} \right) = F_D$$

(18) Substitute from (17) and (18) into (16) to get:

$$\dot{Y} = F_L \dot{L} + F_K \dot{K} + \mu_d \left(\frac{N}{D} \right) \dot{D} + \left(\frac{\theta}{1+\theta} \right) \dot{G} + \mu_g \left(\frac{N}{G^*} \right) \dot{G}^* \quad (19)$$

Dividing both sides of (19) by total output (Y) and rearranging, one could obtain the sources of economic growth:

$$\frac{\dot{Y}}{Y} = \left(\frac{L}{Y} F_L\right) \frac{\dot{L}}{L} + \left(\frac{K}{Y} F_K\right) \frac{\dot{K}}{K} + \left(\mu_d \left(\frac{N}{D}\right)\right) \frac{\dot{D}}{Y} + \left(\frac{\theta}{1+\theta}\right) \frac{\dot{G}}{Y} + \left(\mu_g \left(\frac{N}{G}\right)\right) \frac{\dot{G}^*}{Y}$$

(20)

It is now possible to introduce the process of adaptive expectations of private agents regarding services of institutions. Dynamic adjustment process of equation (6) could be written as:

$$G_t^* = \lambda G_{t-1} + (1-\lambda) G_{t-1}^*$$

(21)

or, after recursive expansion;

$$G_t^* = \lambda \sum_{s=1}^{\infty} (1-\lambda)^s G_{t-s}$$

(22)

The expected level of G_t is a weighted average of all present and previous values of G_t , since weights sum to unity $\left[\lambda \sum (1-\lambda)^s = 1\right]$. Substitute from (21) into (20) and knowing that the specification associated with the adaptive process is identical to the formulation of the Koyck geometric lag, the growth equation (19) now becomes:

$$\begin{aligned} \frac{\dot{Y}}{Y} = & (1-\lambda) \frac{\dot{Y}_{t-1}}{Y_{t-1}} + \left(\frac{L}{Y} F_L\right) \lambda \frac{\dot{L}}{L} + \left(\frac{K}{Y} F_K\right) \lambda \frac{\dot{K}}{K} + \left(\mu_d \left(\frac{N}{D}\right)\right) \lambda \frac{\dot{D}}{Y} \\ & + \left(\frac{\theta}{1+\theta} + \mu_g \left(\frac{N}{G}\right)\right) \lambda \frac{\dot{G}}{Y} \end{aligned}$$

(23)

Equation (23) gives the determinants of economic growth. The first term is the lag of the growth rate. The second and the third terms respectively show the effects of growth of population and the growth of physical capital on economic growth. The fourth term captures the marginal technological externality effects of FDI on economic growth

$\left[\mu_d \left(\frac{N}{D}\right) \lambda\right]$. The last term denotes the effects of marginal factor productivity differences $\left(\frac{\theta}{1+\theta} \lambda\right)$ and marginal technological externalities $\left[\mu_g \left(\frac{N}{G}\right) \lambda\right]$ of institutions (G) on

economic growth. This formulation highlights the fact that the contribution of institutions and trade openness to economic growth depends on whether or not they create positive technological externalities.

Equation (23) can be parameterized in various ways depending on which coefficients one expects to estimate. For estimation purposes, equation (23) is parameterized taking growth of population, growth of capital stock, FDI as a share of GDP, and institution as explanatory variables. This is represented as:

$$\left(\frac{L}{Y} F_L \lambda\right) = \beta$$

(24)

$$\left(\frac{K}{Y} F_K \lambda\right) = \gamma$$

(25)

$$\left[\mu_d \left(\frac{N}{D}\right) \lambda\right] = \sigma$$

(26)

$$\left[\left(\frac{\theta}{1+\theta}\right) + \mu_g \left(\frac{N}{G}\right)\right] \lambda = \tau$$

(27)

$$(1-\lambda) = \alpha$$

(28)

Substitute from (24) to (28) into (23) to get:

$$\frac{\dot{Y}}{Y} = \alpha \frac{\dot{Y}_{t-1}}{Y_{t-1}} + \beta \frac{\dot{L}}{L} + \gamma \frac{\dot{K}}{K} + \sigma \frac{\dot{D}}{Y} + \tau \frac{\dot{G}}{Y}$$

(29)

For convenience, we can denote $\frac{\dot{Y}}{Y} = y_t$, $\frac{\dot{Y}_{t-1}}{Y_{t-1}} = y_{t-1}$, $\frac{\dot{L}}{L} = l_t$, $\frac{\dot{K}}{K} = k_t$, $\frac{\dot{D}}{Y} = d_t$, and $\frac{\dot{G}}{Y} = g_t$,

so that equation (29) can be written as:

$$y_t = \alpha y_{t-1} + \beta l_t + \gamma k_t + \sigma d_t + \tau g_t,$$

(30)

where y , l , and d respectively are growth of output, population growth, FDI as share of GDP, and g approximately measures the institutions.

The above model is extended to explain dynamic spill-over of exports-expansion on economic growth. This can be done by incorporating a private exports goods sector. Suppose now that the total output of the economy (Y) is produced in three sectors: (i) production by the private sector for domestic market (N), (ii) production by the private sector for exports (X), and (iii) production of institutions by the government (G).

As previous, we model the inter-sectoral spill-over explicitly, where the production in each (G) and (X) sectors as well as FDI (D) has technological externality effects on the production of domestic goods sector. Furthermore, we will assume that there will be feedback effects between trade openness and institutions (Acemoglu et al., 2004). There is evidence for the two-way relationship between trade openness and institutions showing that better institutions foster trade (Anderson and Marcouiller, 1999), and greater trade openness results in higher quality institutions (Wei, 2000). In order to capture these interactions, the production function in the private domestic goods sector includes an interaction term of export and institutions (Z). The model also includes externalities of institutions (G) and FDI (D) in the production of export goods.

Unlike in the previous case, this model attempts to capture the adaptive expectations of private agents about the externalities of exports expansion. Equation (37) below specifies the dynamic adjustment process by which exports create technological externalities in the economy. It is assumed that there is no shortage of imported intermediate goods in which trade openness provides important avenue for freely importing intermediate goods. The model structure described above can be presented by the following set of equations;

$$Y_t = X_t + G_t + N_t \quad (31)$$

$$X_t = Q(L_X, K_X; G_t, D_t), \quad Q'_L > 0, Q''_L < 0; Q'_K > 0, Q''_K < 0 \quad (32)$$

$$G_t = H(L_G, K_G) \quad H'_L > 0, H''_L < 0; H'_K > 0, H''_K < 0 \quad (33)$$

$$N_t = F(L_N, K_N; X_t^*, G_t, D_t, Z_t), \quad F'_L > 0, F''_L < 0; F'_K > 0, F''_K < 0 \quad (34)$$

$$L = L_N + L_X + L_G \quad (35)$$

$$K = K_N + K_X + K_G \quad (36)$$

$$X_t^* - X_{t-1}^* = \psi [X_{t-1} - X_{t-1}^*] \quad 0 < \psi \leq 1 \quad (37)$$

where F , H and Q are constant returns-to-scale production functions. L , L_N , L_X and L_G are total labour, labour used in the domestic goods sector, export goods sector, and government sector, whereas K , K_N , K_X and K_G are total capital, capital used in domestic, exports, and government sectors.

In addition to technological externalities captured in F and Q , it is likely that there could be factor productivity differences. Outward-oriented policies or more open regimes are argued to be contributing to growth as marginal factor productivities are higher in export sector than in the domestic goods sector (Feder, 1982). Similar to the previous case, it is assumed that;

$$\frac{Q_K}{F_K} = \frac{Q_L}{F_L} = (1 + \theta_x) \quad -\infty < \theta_x < \infty$$

(38)

$$\frac{H_K}{F_K} = \frac{H_L}{F_L} = (1 + \theta_g) \quad -\infty < \theta_g < \infty$$

(39)

The factor θ_i captures the productivity differences and its properties are the same as explained in the previous case. The equations (38) and (39) imply that:

$$Q_K = (1 + \theta_x) F_K \quad \text{and} \quad Q_L = (1 + \theta_x) F_L$$

(40)

$$H_K = (1 + \theta_g) F_K \quad \text{and} \quad H_L = (1 + \theta_g) F_L$$

(41)

The change of aggregate output, domestic-sector output, export sector output, and institutions-building sector output overtime can be obtained by differentiating from (31) to (34) with respect to time:

$$\dot{Y} = \dot{X} + \dot{G} + \dot{N}$$

(42)

$$\dot{X} = Q_L \dot{L}_X + Q_K \dot{K}_X + Q_G \dot{G} + Q_D \dot{D}$$

(43)

$$\dot{G} = H_L \dot{L}_G + H_K \dot{K}_G$$

(44)

$$\dot{N} = F_L \dot{L}_N + F_K \dot{K}_N + F_G \dot{G} + F_X \dot{X}^* + F_D \dot{D} + F_Z \dot{Z}$$

(45)

Substitute from (40) into (43) and rearranging it to get:

$$\dot{X} = (1 + \theta_x) [F_L \dot{L}_X + F_K \dot{K}_X + Q_G \dot{G} + Q_D \dot{D}]$$

(46)

Substitute from (41) into (44) and rearrange;

$$\dot{G} = (1 + \theta_g) [F_L \dot{L}_G + F_K \dot{K}_G]$$

$$F_L \dot{L}_G + F_K \dot{K}_G = \frac{\dot{G}}{(1 + \theta_g)}$$

(47)

Taking into consideration of (35) and (36), equation (46) can be rewritten as:

$$\frac{\dot{X}}{(1 + \theta_x)} = F_L \dot{L} + F_K \dot{K} - (F_L \dot{L}_N + F_K \dot{K}_N) - (F_L \dot{L}_G + F_K \dot{K}_G) + Q_G \dot{G} + Q_D \dot{D}$$

(48)

Substitute from (45) and (47) into (48) and rearranging it to get:

$$\dot{N} = F_L \dot{L} + F_K \dot{K} + Q_G \dot{G} + Q_D \dot{D} - \frac{\dot{G}}{(1 + \theta_g)} - \frac{\dot{X}}{(1 + \theta_x)} + (F_G \dot{G} + F_X \dot{X}^* + F_D \dot{D} + F_Z \dot{Z})$$

(49)

Adding $\dot{X} + \dot{G}$ to the both sides of (49):

$$\dot{N} + \dot{G} + \dot{X} = F_L \dot{L} + F_K \dot{K} (F_D + Q_D) \dot{D} + \left(\frac{\theta_g}{1 + \theta_g} \right) \dot{G} + F_G \dot{G} + Q_G \dot{G}$$

$$+ \left(\frac{\theta_x}{1 + \theta_x} \right) \dot{X} + F_X \dot{X}^* + F_Z \dot{Z}$$

(50)

From (42) substitute \dot{Y} for $\dot{N} + \dot{G} + \dot{X}$ into (50):

$$\dot{Y} = F_L \dot{L} + F_K \dot{K} + (F_D + Q_D) \dot{D} + \left(\frac{\theta_g}{1 + \theta_g} + F_G + Q_G \right) \dot{G} + \left(\frac{\theta_x}{1 + \theta_x} \right) \dot{X} + F_X \dot{X}^* + F_Z \dot{Z}$$

(51)

Assume now an explicit functional form for the domestic production function such that G , X^* , D and the interaction of trade openness and institutions (Z) affect domestic production (N) with constant elasticities of μ_g , μ_x , μ_d and μ_z (Feder, 1982). The production function of the domestic goods sector is again represented as $N = G^{\mu_g} X^{*\mu_x} D^{\mu_d} Z^{\mu_z} \Phi(L_N, K_N)$. It can be shown that:

$$\frac{\partial N}{\partial G} = \mu_g G^{\mu_g - 1} X^{\mu_x} D^{\mu_d} Z^{\mu_z} \cdot \Phi(L_N, K_N) = \mu_g \left(\frac{N}{G} \right) = F_G \quad (52)$$

$$\frac{\partial N}{\partial X} = \mu_x G^{\mu_g} X^{\mu_x - 1} D^{\mu_d} Z^{\mu_z} \cdot \Phi(L_N, K_N) = \mu_x \left(\frac{N}{X} \right) = F_X \quad (53)$$

$$\frac{\partial N}{\partial D} = \mu_d G^{\mu_g} X^{\mu_x} D^{\mu_d - 1} Z^{\mu_z} \cdot \Phi(L_N, K_N) = \mu_d \left(\frac{N}{D} \right) = F_D \quad (54)$$

$$\frac{\partial N}{\partial Z} = \mu_z G^{\mu_g} X^{\mu_x} D^{\mu_d} Z^{\mu_z - 1} \cdot \Phi(L_N, K_N) = \mu_z \left(\frac{N}{Z} \right) = F_Z \quad (55)$$

Moreover, assuming an explicit functional form for the export goods production function such that G and D affect export production (X) with constant elasticities of η_g and η_d . The production function of the export goods sector could be represented as $X = G^{\eta_g} D^{\eta_d} \cdot \Psi(L_X, K_X)$ and again it could be shown that:

$$\frac{\partial X}{\partial G} = \eta_g G^{\eta_g - 1} D^{\eta_d} \cdot \Psi(L_X, K_X) = \eta_g \left(\frac{X}{G} \right) = Q_G \quad (56)$$

$$\frac{\partial X}{\partial D} = \eta_d G^{\eta_g} D^{\eta_d - 1} \cdot \Psi(L_X, K_X) = \eta_d \left(\frac{X}{D} \right) = Q_D \quad (57)$$

Substitute from (52) to (57) into (51) to get:

$$\begin{aligned} \dot{Y} = & F_L \dot{L} + F_K \dot{K} + \left[\mu_d \left(\frac{N}{D} \right) + \eta_d \left(\frac{X}{D} \right) \right] \dot{D} + \left[\frac{\theta_g}{1 + \theta_g} + \mu_g \left(\frac{N}{G} \right) + \eta_g \left(\frac{X}{G} \right) \right] \dot{G} \\ & + \left(\frac{\theta_x}{1 + \theta_x} \right) \dot{X} + \left(\mu_x \left(\frac{N}{X} \right) \right) \dot{X}^* + \mu_z \left(\frac{N}{Z} \right) \dot{Z} \end{aligned} \quad (58)$$

Dividing both sides of (58) by total output (Y) and rearranging, we could obtain the sources of economic growth that is given as:

$$\begin{aligned} \frac{\dot{Y}}{Y} = & \left(\frac{L}{Y} F_L \right) \frac{\dot{L}}{L} + \left(\frac{K}{Y} F_K \right) \frac{\dot{K}}{K} + \left[\mu_d \left(\frac{N}{D} \right) + \eta_x \left(\frac{X}{D} \right) \right] \frac{\dot{D}}{D} + \left[\frac{\theta_g}{1+\theta_g} \mu_g \left(\frac{N}{G} \right) + \eta_g \left(\frac{X}{G} \right) \right] \frac{\dot{G}}{G} \\ & + \left(\frac{\theta_x}{1+\theta_x} \right) \frac{\dot{X}}{X} + \left(\mu_x \left(\frac{N}{X} \right) \right) \frac{\dot{X}^*}{X} + \left(\mu_z \left(\frac{N}{Z} \right) \right) \frac{\dot{Z}}{Z} \end{aligned} \quad (59)$$

Similar to the previous case, it is now possible to introduce the process of adaptive expectations of private agents regarding externalities of export expansion. The dynamic adjustment process of equation (37) is similar to the process specified with regards to the adaptive expectations of political and economic institutions. It is, therefore, possible to write (59) as:

$$\begin{aligned} \frac{\dot{Y}}{Y} = & (1-\psi) \frac{\dot{Y}_{t-1}}{Y_{t-1}} + \left(\frac{L}{Y} F_L \psi \right) \frac{\dot{L}}{L} + \left(\frac{K}{Y} F_K \psi \right) \frac{\dot{K}}{K} + \left[\mu_d \left(\frac{N}{D} \right) \psi + \eta_d \left(\frac{X}{D} \right) \psi \right] \frac{\dot{D}}{D} \\ & + \left[\left(\frac{\theta_g}{1+\theta_g} \right) \psi + \mu_g \left(\frac{N}{G} \right) \psi + \eta_g \left(\frac{X}{G} \right) \psi \right] \frac{\dot{G}}{G} + \left[\frac{\theta_x}{1+\theta_x} \psi + \mu_x \left(\frac{N}{X} \right) \psi \right] \frac{\dot{X}}{X} \\ & + \left(\mu_z \psi \left(\frac{N}{Z} \right) \right) \frac{\dot{Z}}{Z} \end{aligned} \quad (60)$$

Equation (60) gives the determinants of economic growth that explicitly accounts for export growth and institutional effects. The first term is the lag of the growth rate. The second and third terms respectively show the effects of growth of population and the growth of physical capital on economic growth. The fourth term captures the technological externality effects of FDI on economic growth $\left[\mu_d \left(\frac{N}{D} \right) \psi + \eta_d \left(\frac{X}{D} \right) \psi \right]$. The fifth term denotes the effects of factor productivity differences $\left(\frac{\theta_g}{1+\theta_g} \psi \right)$ and technological externalities $\left[\mu_g \left(\frac{N}{G} \right) \psi + \eta_g \left(\frac{X}{G} \right) \psi \right]$ of institutions (G) on economic growth.

The sixth term measures the effect of the sum of differential factor productivity $\left(\frac{\theta_x}{1+\theta_x}\psi\right)$

and technological externalities of exports $\left[\mu_x\left(\frac{N}{X}\right)\psi\right]$ on economic growth.

Since the purpose here is to test how institutions and trade openness affect economic growth using panel data, equation (60) is parameterized by taking growth of population, growth of capital stock, FDI as a share of GDP, government institution, and trade as a share of GDP as explanatory variables. This is given as:

$$\left(\frac{L}{Y}F_L\psi\right) = \beta$$

(61)

$$\left(\frac{K}{Y}F_K\psi\right) = \gamma$$

(62)

$$\left[\mu_d\left(\frac{N}{D}\right)\psi + \eta_d\left(\frac{X}{D}\right)\psi\right] = \sigma$$

(63)

$$\left[\left(\frac{\theta_g}{1+\theta_g}\right) + \mu_g\left(\frac{N}{G}\right) + \eta_g\left(\frac{X}{G}\right)\right]\psi = \tau$$

(64)

$$\left(\frac{\theta_x}{1+\theta_x} + \mu_x\left(\frac{N}{X}\right)\right)\psi = \phi$$

(65)

$$(1-\psi) = \alpha$$

(66)

$$\mu_z\left(\frac{N}{Z}\right)\psi = \delta$$

(67)

Substitute from (61) to (67) into (60) to get:

$$\frac{\dot{Y}}{Y} = \alpha \frac{\dot{Y}_{t-1}}{Y_{t-1}} + \beta \frac{\dot{L}}{L} + \gamma \frac{\dot{K}}{K} + \sigma \frac{\dot{D}}{Y} + \tau \frac{\dot{G}}{Y} + \phi \frac{\dot{X}}{Y} + \delta \dot{Z}$$

(68)

where y, l, d, x, g and z respectively are growth of output, population growth, FDI as a share of GDP, and trade as a share of GDP, quality of institutions, and the interaction term of institutions and trade. Equations (30) and (69) are different only in that equation (69) captures the externalities of export expansion as well as the interaction of institutions and trade. According to equation (30), there is no role for exports expansion in economic growth, whereas equation (69) indicates that trade and institutions significantly affect growth.

Empirical Methods and Data

Equations (30) and (69) can be transformed into regression equations by adding stochastic error terms. Since data is not readily available for growth of capital stock, domestic investment as share of GDP is used (i) as a proxy for growth of capital stock following Mankiw, Romer and Weil (1992). Use of the investment share of GDP is justified as follows. Suppose $\dot{K} = sY - \Delta K$ and assume that savings share of GDP (s) is equal to the investment share of GDP (i) in which Y is GDP and K is domestic capital stock. Dividing

by K would give the growth of capital stock as $\frac{\dot{K}}{K} = i \frac{Y}{K} - \Delta$. Assume further that the

depreciation rate of capital is zero so that $\frac{\dot{K}}{K} = i \frac{Y}{K}$. Using this in 23 and 60, we have

investment share of GDP for growth of capital. Now, the models can be written as panel econometric models by re-specifying the error terms as follows:

$$y_{it} = \alpha y_{it-1} + \beta l_{it} + \gamma i_{it} + \sigma d_{it} + \tau g_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (70)$$

$$y_{it} = \alpha y_{it-1} + \beta l_{it} + \gamma i_{it} + \sigma d_{it} + \tau g_{it} + \phi x_{it} + \delta z_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (71)$$

where $e_{it} = \mu_i + \lambda_t + \varepsilon_{it}$; μ_i , λ_t and ε_{it} respectively are the unobserved country-specific effects, time-specific effects, and time-varying error term.

Data for investment share of GDP (i) is obtained from Penn World Tables (6.0). Data for growth of GDP (y), foreign direct investment as a share of GDP (d), and population growth (i), are obtained from World Bank (2005). Trade openness is approximated by two variables in two separate regressions as exports as a share of GDP (x) and trade share of GDP. Variables that represent institutions (g) of the economy are always controversial. Institutions, as physical capital and physical infrastructure, constitute a stock. To measure the contribution of institutions, it is necessary to use the institutions as a flow variable. Popular measures of institutions in the literature of international investment climates are taken into account to construct composite index of institutions. These indexes are effective only as raw measures of the strengths of institutions. But, we have no option other than to use these measures to proxy the institutions due to the absence of alternative measures for a longer time period.

The IRIS-dataset (Institutional Reforms and the Informal Sector- Data is from www.countrydata.com), which is the only longest available dataset on institutional quality which covers data from 1982 to 1998, is used. This dataset contains annual values for indicators of the quality of institutions constructed by Stephen Knack and the IRIS Centre, University of Maryland, from monthly International Country Risk Guide data provided by the political risk services group. The composite index is created by six distinct indexes: the index of rule of law, the index of corruption in government, the index of quality of the bureaucracy, the index of ethnic tensions, the index of risk of repudiation of contracts by government, and the index of risk of expropriation of private property. Indexes of corruption, rule of law, bureaucratic quality, and ethnic tensions all range in value from 0 to 6 with higher values indicating better ratings. The scores of the latter two indexes range from 0 to 10, with higher values indicating better ratings, i.e. better institutional quality. A 6-point composite index of institutions is created using these indexes.

In order to minimise time specific effects, data are averaged over non-overlapping 5-year periods. According to the availability of data, a panel that consists of 32 developing countries over 1978-2001 is constructed. Use of 5-year averages can be justified on two grounds. First, 5-year averages can reduce the country specific fluctuations of data. Second, in large cross country empirical exercises, missing observations are always a problem and averaging can partly address this issue.

Equations (73) and (74) are estimated by three panel techniques. In the first method, in order to address the problem of country specific unobserved effects(μ_i), cross-sectional dummy variables are included. Second, the Generalized Least Square (GLS) technique uses the transformation of the models in (73) and (74) by quasi-demeaning in order to eliminate country specific unobserved effects(μ_i). The GLS-estimator is a matrix of weighted average of within-estimator and between-estimator weighing each estimate by the inverse of its corresponding variance. Third, 1-step and 2-step Generalized Method of Moments (GMM) estimations proposed by Arellano and Bond (1991) will be obtained.

Results and Discussion

Equation 73 was first estimated by Least Square Dummy Variable Regression (LSDV) and GLS methods. The results of which are reported in Table 1. For LSDV, the value of R^2 is 0.5620 and the Wald test statistics show that the coefficients are jointly significant. In GLS, the Wald test also suggests that the coefficients are jointly significant. The coefficient of one period lag of growth of GDP is significant in both the estimations. Rate of investment is positive and statistically significant at 10 percent level in LSDV and 1 percent level in GLS. Rate of growth of population is positive and significant at 1 percent level in LSDV. FDI and government institution variables are positive and statistically significant at 10 percent level in both estimations. However, there is notable difference between the results of the LSDV and those of GLS.

Table 1: Modelling Economic Growth by LSDV and GLS

Explanatory Variable	LSDV-Estimator	GLS-Estimator
Growth of GDP (-1) (y_{-1})	-0.2313 (-2.24)*	0.1383 (1.92)*
Foreign Direct Investment (d)	0.1930 (1.67)*	0.1892 (1.73)*
Population Growth Rate (l)	1.9016 (3.04)*	0.2529 (1.16)
Rate of Investment (i)	0.1972 (1.73)	0.1229 (4.08)*
Political and economic institutions (g)	0.2446 (1.69)*	0.2973 (2.62)*
	$R^2 = 0.5620$ W(j): 15.63 [0.008] * W(d): 178.2 [0.000] * AR(1) -2.486 [0.013] * AR(2): -3.127 [0.002] *	$R^2 = 0.2893$ W(j): 459.8 [0.000] * AR(1): 0.6843 [0.494] AR(2): 1.151 [0.250]

Note: the numbers in the parenthesis are t-values and “*” indicates that the coefficients are significant at 1 percent level.

Table 2: Modelling Economic Growth by LSDV and GLS

Explanatory Variable	LSDV-Estimator	GLS-Estimator
Growth of GDP (-1) (y_{-1})	-0.2457 (-2.49)*	0.1745 (2.38)*
Foreign Direct Investment (% of GDP) (d)	0.2074 (1.92)*	0.0042 (0.0332)
Population Growth Rate (l)	1.9149 (3.70)*	0.3244 (1.31)
Rate of Investment (i)	0.2052 (1.62)	0.1103 (3.49)*
Trade Share (x)	0.0201 (1.02)	0.0012 (0.211)
Political and economic institutions (g)	0.3976 (0.975)	0.2808 (1.40)
Interaction Term (z)	--	--
	$R^2 = 0.5716$ W(j): 23.64 [0.00]* W(d): 267.4 [0.00] * AR(1): -2.63[0.00] * AR(2): -3.06[0.00] *	$R^2 = 0.3148$ W(j): 498.6[0.00] * AR(1): 0.62[0.533] AR(2): 1.323 [0.186]

Note: the numbers in the parenthesis are t-values and “*” indicates that the coefficients are significant at 1 percent level.

Table 3: Modelling Economic Growth by LSDV and GLS with Interaction Term

Explanatory Variable	LSDV-Estimator	GLS-Estimator
Growth of GDP (-1) (y_{-1})	0.2587 (-2.91)*	0.1347 (1.83)*
Foreign Direct Investment (% of GDP) (d)	0.2836 (2.74)*	0.2298 (1.94)*
Population Growth Rate (l)	2.3917 (6.68)*	0.2929 (2.82)*
Rate of Investment (i)	0.1957 (1.68)*	0.1203 (3.71)*
Trade Share (x)	0.1707 (4.39)*	0.0815 (3.64)*
Political and economic institutions (g)	1.7110 (4.79)*	0.3869 (1.86)*
Interaction Term (z)	-0.0367 (-6.67)*	-0.0049 (-1.05)
	R^2 : 0.6279 W(j): 81.72[0.00] * W(d): 292.1[0.00] * AR(1): -2.60[0.00] * AR(2): -2.77[0.00] *	R^2 : 0.2941 W(j): 445.9 [0.00] * AR(1): 0.54[0.584] AR(2): 1.28[0.201]

Note: the numbers in the parenthesis are t-values and "*" indicates that the coefficients are significant at the 1 percent level.

Regression equation 74 was first estimated by LSDV and GLS without the interaction term of trade share and institutions (Table 2). Results show that only rate of investment is statistically significant in both estimations. The coefficients of institutions and trade share are not significant even if they are positive.

This may mainly be due to feedbacks between institutions and openness. Equation 74 is then re-estimated incorporating an interaction of trade share and institutions (Table 3). The overall statistics show that the inclusion of an interaction term improves the overall results. Rate of investment, rate of growth of population, FDI as a share of GDP, trade share, and institutions have positive effects on economic growth. The inclusion of an interaction term to capture possible feedbacks improves the overall results.

Table 4: Modelling Economic Growth by GMM

Explanatory Variable	1-Step GMM	2-Step GMM
Growth of GDP (-1) (y_{-1})	0.2153 (2.54)*	0.2363 (1.96)*
Rate of Investment (i)	0.2959 (2.62)*	0.1999 (2.15)*
Population Growth Rate (l)	0.3229 (2.45)*	0.3602 (1.74)*
Foreign Direct Investment (% of GDP) (d)	0.2912 (2.36)*	0.2592 (1.68)*
Trade Share (x)	0.9495 (2.35)*	0.1698 (1.67)*
Political and economic institutions (g)	1.6388 (4.36)*	2.0537 (3.74)*
Interaction Term (z)	-0.02138 (-1.14)	-0.0478 (-1.01)
	W: 63.06 [0.00] * Sargan: 97.7 [0.0]* AR(1): -3.0 [0.00] * AR(2): -1.8 [0.06]	W: 27.7 [0.00] * Sargan: 22.2 [0.00]* AR(1): -1.7 [0.07]* AR(2): -1.68 [0.0]

Note: The numbers in the parenthesis are t-values and "*" indicates that the coefficients are significant at 10 percent level.

Results of the 1-step and 2-step GMM methods in the models which include an interaction term of trade openness and institutions are reported in Table 4. In both models, the Sargan test scores confirm that the instrumental variables (IVs) are valid. Similarly, second degree auto-regressive (AR2) serial correlation is not detected in both models. Inclusion of an interaction term improves the results of both the models. FDI, trade share, and institutions positively affect growth.

Table 5: Determinants of Growth of GDP by GMM

Explanatory Variable	1-Step GMM	2-Step GMM
Growth of GDP (-1) (y_{-1})	0.2231 (1.83)*	0.3194 (1.67)*
Population Growth Rate (l)	2.1072 (3.19)*	2.1072 (2.94)*
Foreign Direct Investment (% of GDP) (d)	0.1680 (1.67)*	0.1696 (1.68)*
Trade Share (x)	0.0999 (1.90)*	0.1333 (2.11)*
Political and economic institutions (g)	1.4295 (2.41)*	1.3311 (1.71)*
Interaction Term (z)	-0.0266 (-2.45)*	-0.0285 (-1.94)*
	W(j): 17.12 [0.00] * Sargan: 12.10 [0.06] AR(1): -1.90 [0.05] AR(2): -0.59 [0.551]	W(j): 19.2 [0.00]* Sargan: 12.4 [0.05] AR(1) -1.93 [0.05] AR(2): -0.53 [0.59]

Note: The numbers in the parenthesis are t-values and "*" indicates that the coefficients are significant at 10 percent level.

A correlation matrix for the sample is obtained in order to identify as to whether the explanatory variables are correlated. Results are reported in Table 5. It clearly shows that institutions index and trade share are correlated (0.6502) indicating that inclusion of an interaction term is justified. Trade share and FDI inflows are positively correlated (0.6028). Moreover, rate of investment and FDI (0.5877), investment and institutions (0.5400) are correlated. These correlations may be creating problems in the model. One of the solutions for this is to drop the investment variable from estimation by GMM (Table 5). In this case, both trade share and institutions significantly affect growth.

Though we used trade share to proxy trade openness following the empirical studies in the literature, the results are not convincing. Therefore, the regressions are re-estimated using the export share instead of trade share to proxy trade openness. The results are reported in Table 6. These results indicate that export share and institutions positively affect growth indicating that they generate positive externalities.

Table 6: Modelling Economic Growth by GMM

Explanatory Variable	1-Step GMM	2-Step GMM
Growth of GDP (-1) (y_{-1})	-0.268594 (-2.98)*	-0.296801 (-1.77)*
Rate of Investment (i)	0.192648 (1.61)	0.257278 (1.01)
Population Growth Rate (l)	2.33470 (4.87)*	2.05229 (2.46)*
Foreign Direct Investment (d)	0.613336 (4.12)*	0.641420 (2.47)*
Export Share (x)	0.323882 (3.30)*	0.320180 (1.86)*
Political and economic institutions (g)	1.46103 (3.30)*	1.60357 (2.90)*
Interaction Term (z)	-0.0778131 (-5.22)*	-0.0775919 (-2.94)*
	W: 99.69 [0.00] * Sarg: 48.18[0.00] * AR(1): -2.64 [0.00]* AR(2): -1.46[0.14] Observations= 160	W: 46.48 [0.00]* Sarg: 14.9[0.03] * AR(1): -1.2[0.21] AR(2): -1.4[0.15] Observations=160

Note: The numbers in the parenthesis are t-values and “*” indicates that the coefficients are significant at 10 percent level.

Conclusions and Policy Implications

The impact of institutions and trade openness on economic growth has been debated. This paper hypothesized that the feedbacks between trade openness and institutions tend to generate inconclusive results in the estimations which include these variables. In this paper, we presented a simple theoretical framework explaining that trade openness and institutions positively contribute to economic growth since they generate technological externalities, apart from their direct effects. Empirical results of panel regressions have confirmed this. The partial/marginal effects of institutions and trade openness on growth are enhanced when an interaction term is included to capture possible feedbacks between openness and institutions. Results conclude that countries can grow faster in an environment of good institutions and greater openness. This study suggests that trade liberalization accompanied by institution-building efforts can create a conducive environment for rapid economic growth.

Economic growth requires a combination of factors, in which it is very difficult to assert what factors are more important over the other set of factors. However, this study examined what would be the growth rate of an economy if there are not good institutions and freer trade. We are not asserting the role of "free trade", but we are emphasizing the role of "freer trade" in maintaining rapid economic growth. The need for good government institutions to facilitate the market economy has also been emphasized.

Even though government builds and maintains strong institutions, economies with protectionist policies possess a number of disincentives. Strong institutions may facilitate domestic competition, but it cannot provide necessary foreign competition for the domestic businesses to thrive when it adopts protectionist policies. Most of the countries in the world are relatively small economies requiring them the access to foreign markets to increase production of which they have competitive advantages entailing the adoption of greater openness. There is no guarantee whether the economies with strong institutions are capable of sustained production of intermediate as well as capital goods necessary for expanding and diversifying industrial sectors without openness. Lack of openness may impede import of necessary intermediate as well as capital goods retarding the long-term sustainability of growth. Developing countries may not be able to undertake the level of innovations required for sustained economic growth without the benefits of foreign knowledge and technology. The open economies tend to attract much FDI providing them with opportunities for acquiring FDI-related technology. Small economies with restricted external economic policies hardly have the access to international technology. Moreover, foreign competition makes domestic dynamic businesses to continuously engage in innovations to be competitive in the market. Weak government institutions would not result in lowering information costs, helping risk-spreading, and lowering rent-seeking activities. This may also have negative effects on openness. In the long run, lack of openness is likely to cause the government institutions to decay. This may subsequently cause overall economic conditions to deteriorate leading to severe economic hardships. As a result, there is a greater possibility for developing countries to sustain higher growth when they adopt a growth strategy consisting of greater openness alongside strong institutions.

On the other hand, greater openness without strong institutions creates a number of disincentives. Institutions are necessary to maintain rule of law assuring political stability for the markets to function effectively. Businesses cannot thrive under anarchy. Greater openness

may provide opportunities for firms to abuse their dominant positions in the absence of domestic regulatory institutions such as competition laws. Greater openness without strong institutions of property rights undermines the potentials for business expansion. Economic decisions cannot be implemented effectively if there are no clearly defined rules and regulations to own and transfer prosperities. In the absence of strong government institutions for social insurance or social safety nets, greater openness may result in social and political unrests emanating from deprivation of economic benefits. Without strong institutions for managing political conflicts, greater openness would not provide an ideal environment for growth since political conflicts devastate the business environment. Differences arising from ethnic, religious, or regional sources need to be managed. Accordingly, greater openness by itself or strong institutions by themselves does not seemingly create an ideal environment for strong growth. Government institutions and openness are complementary determinants of growth.

When countries adopt greater openness and strong institutions, there is likely to be mutually reinforcing positive feedbacks between them. In this context, one may want to wonder as to what the developing countries do in order to create an economic system with greater openness and strong institutions for them to be complementary determinants of growth. Plausibly, the best strategy to be adopted by the developing countries to foster growth is to gradually and sequentially liberalize the economies together with building and maintaining strong institutions. In other words, trade reforms and institutional reforms should be undertaken concurrently as a single process. The following specific policy matters relevant for enhancing the role of openness and government institutions in developing countries are noted.

First, government ought to undertake institutional reforms alongside external liberalization for managing trade policy. Economic liberalization demands increasing trade policy management capacity at the individual country level in terms of building and maintaining institutions such as well-equipped trade and industry ministries, export development boards, and permanent foreign trade missions to manage external trading system.

Second, governments must build and maintain domestic regulatory institutions alongside liberalization. In the absence of regulatory institutions unfair business by private enterprises will create burdens on consumers. Greater openness demands accompanying institutional reforms to create a competitive business environment in the domestic economy.

Third, institutions must be built and maintained for ensuring rule of law thereby political and policy stability. Political stability is crucial for the openness to be effective. Businesses cannot thrive when anarchy rules the business transactions. The creation of transparent legislative and judicial institutions is important for private economic activity. Political neutrality of law enforcement institutions has to be established. Accountability and transparency of law enforcement mechanisms have to be introduced, monitored and enforced.

Fourth, disputes about the form of the state in multi-ethnic societies often generate violent conflicts worsening economic environment thereby retarding the potentials for growth. Divisions emanating from ideological, ethnic, religious, and regional lines must be managed. This may sometimes require reforming the most fundamental institution of a country; the State. The nature of the state needs to be determined to accommodate the interests of various ethnic groups.

Fifth, legal and institutional mechanisms must be established together with liberalization to safeguard rights of physical, human, and knowledge properties. Clearly defined property rights are essential for the openness to be effective. If individuals have proper incentives they will behave in ways which enrich both themselves and the rest of the society. The core of the matter is the right to own and exchange all forms of properties. It shields property owners from the power of the government to grant privileges to special interest groups.

Sixth, external liberalization demands effective system of public administration. Improving public administration by increasing transparency, meritocratic recruitment, and removing excessive red-tape is vital for healthy functioning of the open economies. Meritocratic recruitment increases the likelihood of at least minimal competence. The improved public administration often reduces transaction and information costs and enhances both domestic as well as foreign private investment facilitating rapid economic growth.

Seventh, institutions of social safety nets ought to be built and maintained. External liberalization is likely to create negative consequences for some quarters of the society entailing new institutions to provide social safety nets. Economic liberalization often paves the way for job losses in some industries necessitating institutional mechanisms to safeguard the people who lost jobs during the adjustment periods. Moreover, external liberalization makes the skills of some of the workers obsolete necessitating new institutions to facilitate retraining programmes to upgrade the skills. When there are no institutions to provide social safety nets, severe resistance tend to arise from the social fabric against enhanced openness which will result in weakening the rate of growth of the economy. Since there is perpetual high unemployment in developing countries, creating systems of unemployed benefits is an essential aspect for the well-functioning of the market economy. Moreover, benefits targeted at the poorest segments of the population need to be continued during the period from poverty to affluence.

Eighth, institutional reforms should be undertaken in the labour market together with extensive external liberalization. Impediments in the labour markets often discourage investment, dampen business potentials, and retard growth. Deregulation of labour markets in poor economies is essential. Severe resistance arising from industrial unions often dampens management of external economic policies. Institutions must be built and maintained for settlement of industrial disputes in the liberalized environment.

Finally, capital market reforms in an open economy will also help to support dynamism in increasing investment. This will require reforming institutions in the financial system. Freer capital markets help developing countries to lessen depending on foreign aid. With enhanced openness, there may be a greater potential for the developing countries to attract long-term foreign private investment.

Socio-economic progress requires a conducive and healthy economic incentive structure. Government and social institutions as well as economic policies constitute the incentive structure of an economy. Rational individuals respond to incentives. If the policies and institutions provide incentives for bad behaviour, individually rational people will not hesitate to use those incentives. On the other hand, if incentives are there for individuals to behave in a way that it optimizes social as well as individual welfare such a situation provides the basis for heralding prosperity. Since people generally respond to incentives, governments in developing countries can create right conditions for the market system to function

effectively by implementing correct domestic policies, and building and maintaining strong government institutions which will create the conditions for thriving economic growth.

The findings of our research in this exercise strongly conclude the fact that increased economic globalization requires strong/good government institutions or good governance. Without good governance, greater international integration tends to create discontents in the national economies. On the other hand, even though a country adopts good governance if it practices greater protectionism, the government institutions become deteriorated in the long-term which leads to the retardation of growth efforts. If developing economies adopt greater openness with good governance, they tend to grow faster. Therefore, the general policy implication of our study is that the developing countries must adopt freer trade and good government institutions for fostering economic growth.

Notes

1. Based on these articulations, one may want to believe that former communist regimes collapsed mainly due to their failure to sustain strong institutions that they were adopting during restricted regimes because of the lack of openness or higher protectionism.
2. I do not support the idea of adopting completely open capital and foreign exchange accounts. There are strong theoretical as well as empirical evidence against liberalizing the foreign exchange/capital accounts and markets in developing countries completely. The market-oriented economies need to have some form of restrictions in the capital and foreign exchange markets, as well as there should be a government regulatory mechanism. Completely open capital account tends to generate growth-weakening effects. For a further discussion, see Bhagwati (1998).

References

- Acemoglu D., Johnson S. and Robinson J. A. 2004: 'Institutions as the fundamental cause of long-run growth' *NBER Working Paper* 10481.
- Anderson, J. E., and Marcouiller D. 1999: 'Trade, insecurity, and home bias: an empirical investigation' *NBER Working Paper* No 7000.
- Arellano, M., and Bond S. 1991: Some specification tests for panel data: Monte Carlo evidence and an application to empirical equations' *The Review of Economic Studies* 58: 277-297.
- Bhagwati, J.N. 1998: "The capital myth: The difference between trade in Widgets and Dollars." *Foreign Affairs*. Vol. 77 (3).
- Esfahani, H. S. 1991: 'Exports, imports, and economic growth in semi-industrialized countries' *Journal of Development Economics* 35: 93-116.
- Feder, G. 1982: 'On exports and economic growth' *Journal of Development Economics* 12: 59-73.
- Grossman, H. I., and Kim M. 1995: Swords or plowshares? A theory of the security of claims to property' *Journal of Political Economy* 103: 1275-1288.
- Hall, R. E., and Jones C. I. 1999: 'Why do some countries produce so much more output per worker than others?' *Quarterly Journal of Economics* 114: 391-414.
- Khan, B. Z. Sokoloff K. L. 2001: 'The early development of intellectual property institutions in the United States' *Journal of Economic Perspectives* 15: 233-246.

- Mankiw, N. G. Romer D. and Weil D. N. 1992: A contribution to the empirics of economic growth' *Quarterly Journal of Economics* 107: 407-437.
- Nelson, R. R. Sampat B. N. 2001: 'Making sense of institutions as a factor shaping economic performance' *Journal of Economic Behavior and Organization* 44: 31-54.
- North, D. C. and Thomas R. P. 1973: *The Rise of the Western World*, Cambridge: Cambridge University Press.
- Romer, P. 1993: 'Idea gaps and object gaps in economic development' *Journal of Monetary Economics* 32: 543-573.
- Thangavelu, S. M., and Gulasekaran R. 2004: 'Is there an export or import-led productivity growth in rapidly developing Asian countries? A multivariate VAR analysis' *Applied Economics* 36: 1083-1093.
- Wang, E. C. 2000: 'A dynamic two sector model for analyzing the interrelation between financial development and industrial growth' *International Review of Economics and Finance* 9: 223-241.