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Abstract

The paper studies the causality relationship between economic openness and indigenous factors. The construction of the Openness Index and the Indigenous Index provides a measure on the extent of openness and indigenous development among world economies. The two indices are used to study their causality. The empirical findings show that there are bi-directional dynamic causality relationships between openness and indigenous factors. Indigenous factors help to forecast openness factors and vice versa.

JEL Classifications: C33, F02, O11.
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1. Introduction

While inter-dependence among world economies can be the ultimate objective in globalization (UNCTAD 2004), the major economic debates on globalization can be condensed into the discussion on two types of factors: openness factors and indigenous factors. Openness often refers to such external factors as trade, capital flows and foreign direct investment in globalization. For example, Frankel and Romer (1999) show that trade has a positive effect on income growth, while Feldstein (2000) has identified the five aspects of globalization to include the gains from international flows of goods and capital, the increase in foreign direct investment, the occurrence of currency crises, the fluctuation of relative currency values and the segmentation of global capital market.

Other studies on globalization have brought up the relevance of such indigenous factors as the rule of law, political stability, education attainment, democracy and so on in their impact on growth and globalization. For example, Li and Reuveny (2003) provide an empirical study on economic openness and democracy; Mah (2002) examines the impact of globalization with openess on income distribution in Korea; Heinemann (2000) studies whether or not globalization of openness restricts budgetary autonomy which can be seen from the indigeneity of the economy, while Dollar and Kraay (2003) emphasize the importance of institutions in indigeneity and study the empirical relationship between some proxies of institutions and trade.

The conceptual dichotomy in the performance of these two groups of factors can be seen as complementary with rather than conflicting to each other. Ng and Yeats (1998), for example, show that economies that are more outward oriented in trade and governance policies generally achieved a higher level of GDP per capita. Wei (2003) looks at Asia's globalization experience and finds that the risk and reward for an

economy to embrace globalization depends in part on the quality of its public governance. The importance of good governance has also been studied by Basu (2003), Brusis (2003) and the World Bank (World Bank 2005).

Many empirical studies have mainly concentrated on analyzing the causality relationship between individual factors in the two sub-dimensions of globalization, but not on the overall relationship between the two aspects of openness factors and indigenous factors. It is of interest to distinguish the indigenous factors from the openness factors and study their inter-relationship. While it is generally accepted that openness factors do have a direct impact on globalization, it is possible that indigenous factors can have both a direct impact on globalization and economic growth, and an indirect impact through improvement in the performance of openness factors.

This paper points to the importance of indigenous factors in both its direct impact and its indirect impact through the openness factors on growth and globalization. Instead of looking at some single sub-dimensions in either the openness or the indigenous factors, this paper examines the overall causality relationship between the two groups of factors. Similar to other studies in the construction of the globalization index (Kearney 2002; Lockwood 2004; Anderson and Herbertsson 2005; Dreher 2006; Heshmati 2006 and Li *et al*. 2007), we will generate the indigenous factors and the openness factors into two separate of indices in order to study their bi-directional causality relationship.

Numerous recent studies on globalization tend to use a mixture of openness and indigenous factors in constructing an index to rank different economies (Kearney 2002; Lockwood 2004; Anderson and Herbertsson 2005; Dreher 2006; Heshmati 2006 and Li *et al*. 2007). One advantage in constructing a globalization index is that it

can be used for empirical study with a parsimonious regression model in which the multi-linearity or omitted variables problems can effectively be avoided. Such empirical studies can also be used in comparative analysis on the different performance of globalization among economies. However, in these studies openness and indigenous factors are not separated in the construction of the globalization index.

For our empirical study on the relationship between the two groups of globalization, two composite indices are constructed by the principal component analysis (see for example, Rencher 2002; Li *et al*. 2007), respectively, for 13 openness factors and 14 indigenous factors to provide an overall and separate measurement of openness and indigenity among 122 world economies for the eight years period (1998-2005). The definition of factors and the data source are given in the Appendix. With the available data, the two indices have respectively covered the most important aspects of openness and indigeneity in an economy. To study the relationship between openness and indigeneity, we first specify static panel data models and estimate their contemporaneous commutative effects. Then we turn to the dynamic panel data model to test their Granger causality using a recent approach in Hurlin and Venet (2001) and Hurlin (2007). Our empirical study shows that there is a bi-directional causality relationship between openness and indigeneity. Indigeneity helps to forecast openness and at the same time openness helps to forecast indigeneity.

The remainder of this paper is organized as follows. Section 2 briefly illustrates the openness index and the indigenous index and presents rankings of the two indices for the world economies in our sample. Section 3 conducts the Granger causality test by specifying a dynamic panel data model. Section 4 concludes the paper.

2. The Two Indices

It is generally known that there exists no uniformly agreed methodology to weight individual indicators before aggregating them into a composite index. One commonly applied method for weighting the indicators for the construction of a globalization index is the principal component analysis (PCA) (Lockwood 2004; Dreher 2006; Heshmati 2006; Li *et al*. 2007). In this section we use the multivariate technique of factor analysis and PCA to construct two indices of openness and indigeneity (see for example, Rencher 2002; Andersen and Herbertsson 2005).

In the construction of the Openness Index, we follow Kearney (2004) to group the openness factors into four categories of Economic Integration, Technology Connectivity, Personal Contact, and International Engagement; though the factors in each category are slightly modified due to data differences (see also Lockwood 2004; Dreher 2006; and Heshmati 2006). However, we also include Economic Freedom as an additional category in the list of openness factors as freedom of an economy can greatly affect the degree of openness in globalization. In constructing the Indigenous Index, we follow Li *et al*. (2007) in grouping the factors into the two categories of Institutional Establishment, and Education and Health. Besides, we include Inflation as an additional category as inflation provides a good summary indicator on economic indigeneity. The various categories of openness and indigenous factors are shown in Table 1.

To constructing the two indices, we first transform each variable to a unit-free index as Lockwood (2004) and Dreher (2006) did. Since we use panel data, the transformation is conducted on an annual basis. We denote the original variable as z_{it}. Then the correspondingly transformed variable is

$$Z_{it} = \begin{cases} \dfrac{z_{it} - \min_t z_{it}}{\max_t z_{it} - \min_t z_{it}}, & \text{if higher } z_{it} \text{ indicates higher openness (indigeneity),} \\ \dfrac{\max_t z_{it} - z_{it}}{\max_t z_{it} - \min_t z_{it}}, & \text{if higher } z_{it} \text{ indicates less openness (indigeneity).} \end{cases}$$

The multiple factor analysis is then applied to the transformed data to construct the two indices (see Rencher 2002; Andersen and Herbertsson 2005). Compared with the average or other subjective weighting methods (Kearney 2004), different weights in our construction are objectively assigned to component series to reflect their different economic significance. Therefore, non-stability of weights for the factors in the indices is not an issue since our construction of the two indices is data-driven and adaptive.

Table 2 and Table 3 show, respectively, the ranking of the 8-year average of the Openness Index and the Indigenous Index for our sample economies.[1] In the Openness Index, the two most open or globalized world economies are Hong Kong with an average score of 0.656 and Singapore with an average score of 0.642.[2] The United States ranks 15th in the Openness Index with the average score of 0.488. The ranking of China (105th) and India (109th) are similar in the Openness Index. When considering the two indices, there are 16 economies in the top 20 of the Indigenous Index are also listed in the top 20 of the Openness Index. For example, Hong Kong ranks higher in the Openness Index than in the Indigenous Index. The United States have the same ranking in the two indices. Although China ranks low in the two indices, China has a higher ranking (ranked 89th) in Indigenous Index than in the

[1] The rankings will not make a difference whether one uses the calculated indices here or the further panel normalized indices introduced in the beginning of next section as the latter is equal to the former scaled by a positive constant.

[2] Due to the difference in the methodology, categorization of factors and the sample of economies in construction, the rankings according to the Openness Index in this study are not completely the same as those rankings in Dreher (2006). However, the rankings are generally consistent with each other. For example, between the two rankings, there are 16 world economies which are similarly included in top 20 of the two indices.

Openness Index (ranked 105th).

In both indices, there are seven European Economies in the top 10. In the Openness Index, Hong Kong and Singapore are the two Asian economies that are ranked first and second and the other one is New Zealand (8th) from Oceania. For the Indigenous Index, Canada, Australia and New Zealand are the other ones in the top 10 except the seven European economies. Asian Economies fail to enter the top 10 in the Indigenous Index, though both Hong Kong and Singapore are situated in the top 20.

Table 1 Openness Index and Indigenous Index: Factors and Categories

Openness Factors	Indigenous Factors
I. Economic Integration	I. Institutional Establishment
1) Total trade flow (% GDP)	1) Corruption Perception Index
2) Foreign direct investment (% GDP)	2) Voice and accountability
3) Gross private capital flow (% GDP)	3) Political stability
4) Restrictions: Average applied tariff rates (unweighted in %)	4) Government effectiveness
II. Economic Freedom	5) Regulatory quality
5) Trade freedom (%)	6) Rule of law
6) Financial freedom (%)	7) Control of corruption
7) Investment freedom (%)	8) Property rights protection
III. Technology Connectivity	9) Regulatory scores
8) Internet users	II. Education and Health
IV. Personal Contact	10) Primary school enrollment rate
9) International tourism (% population)	11) Public spending on education
10) International voice traffic	12) Primary school pupil-teacher ratio
V. International Engagement	13) Total health expenditure
11) Membership of international organizations	III. Inflation
12) Government transfer (% GDP)	14) Growth rate of implicit GDP deflator (annual %)
13) Troop contribution (% of total)	

Note: See Appendix Table for definitions and sources of data.

Table 2 Openness Index (Average of 1998-2005)

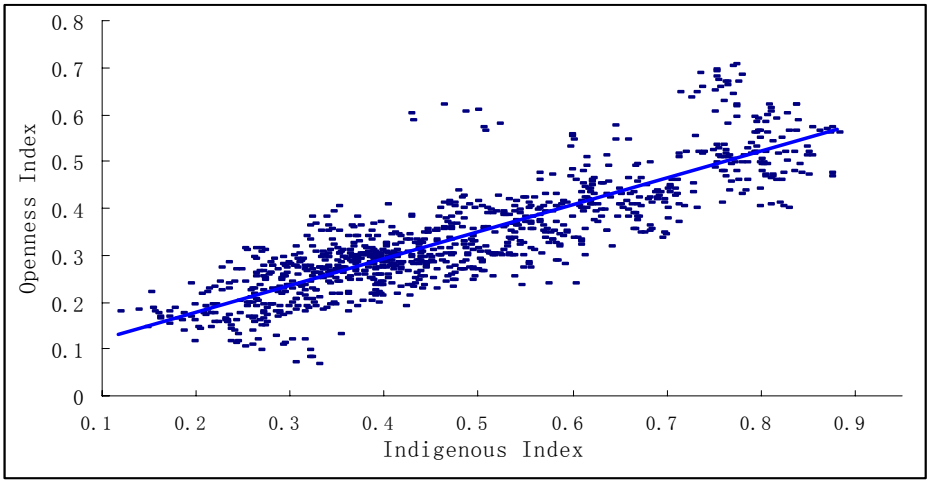
Ranking/Economy	Score	Ranking/Economy	Score	Ranking/Economy	Score
1 Hong Kong	0.656	42 Bolivia	0.371	83 Mauritius	0.270
2 Singapore	0.642	43 Greece	0.370	84 Russia Fed.	0.269
3 Ireland	0.630	44 Uruguay	0.376	85 Senegal	0.268
4 Netherlands	0.581	45 Botswana	0.365	86 Kenya	0.268
5 Switzerland	0.580	46 Armenia	0.357	87 Indonesia	0.268
6 Sweden	0.563	47 Japan	0.356	88 Ecuador	0.265
7 United Kingdom	0.537	48 Croatia	0.353	89 Tunisia	0.265
8 New Zealand	0.524	49 Turkey	0.342	90 Brazil	0.260
9 Demark	0.519	50 Malaysia	0.341	91 Tanzania	0.259
10 Estonia	0.510	51 Costa Rica	0.338	92 Bangladesh	0.259
11 Austria	0.509	52 Peru	0.332	93 Nigeria	0.258
12 Czeck Republic	0.508	53 Columbia	0.328	94 Georgia	0.255
13 Belgium	0.508	54 Bulgaria	0.325	95 Morocco	0.255
14 Finland	0.502	55 Lesotho	0.323	96 Venezuela, RB	0.250
15 United States	0.488	56 Albania	0.321	97 Malawi	0.247
16 Canada	0.484	57 Argentina	0.320	98 Gabon	0.245
17 Australia	0.475	58 South Africa	0.320	99 Papua Guinea	0.245
18 Iceland	0.471	59 Nicaragua	0.319	100 Saudi Arabia	0.241
19 Germany	0.463	60 Ghana	0.317	101 Egypt	0.240
20 Italy	0.450	61 Paraguay	0.312	102 Madagascar	0.238
21 France	0.439	62 Macedonia	0.311	103 Eritrea	0.231
22 Spain	0.437	63 Mexico	0.309	104 Rwanda	0.220
23 Portugal	0.433	64 Moldova	0.306	105 China	0.218
24 Norway	0.424	65 Guatemala	0.305	106 Yemen, Rep.	0.218
25 Malta	0.419	66 Romania	0.305	107 Belarus	0.215
26 Hungary	0.419	67 Thailand	0.310	108 Kazakhstan	0.214
27 Israel	0.413	68 Philippines	0.299	109 India	0.214
28 Poland	0.408	69 Guyana	0.295	110 Niger	0.209
29 El Salvador	0.406	70 Kuwait	0.295	111 Sierra Leone	0.205
30 Cyprus	0.405	71 Mali	0.291	112 Tajikistan	0.205
31 Trinidad/Tobago	0.388	72 Honduras	0.287	113 Angola	0.200
32 Swaziland	0.384	73 Zambia	0.287	114 Ethiopia	0.193
33 Chile	0.384	74 Ukraine	0.285	115 Vietnam	0.187
34 Solvak Republic	0.383	75 Uganda	0.283	116 Burundi	0.180
35 Lithuania	0.383	76 Kyrgyz Rep.	0.283	117 Congo, Rep.	0.180
36 Taiwan	0.380	77 Cambodia	0.283	118 Azerbaijan	0.173
37 Latvia	0.380	78 Pakistan	0.282	119 Sudan	0.166
38 Korea Republic	0.380	79 Fiji	0.280	120 Lao PDR	0.142
39 Jordan	0.377	80 Dominican	0.280	121 Iran	0.123
40 Panama	0.376	81 Sri Lanka	0.277	122 Syrian Arab	0.113
41 Slovenia	0.371	82 Oman	0.275		

Table 3 Indigenous Index (Average of 1998-2005)

Ranking	Economy	Score	Ranking	Economy	Score	Ranking	Economy	Score
1	Denmark	0.856	42	Malaysia	0.538	83	Nicaragua	0.372
2	Iceland	0.835	43	Slovak Republic	0.536	84	Moldova	0.369
3	New Zealand	0.828	44	Latvia	0.525	85	Zambia	0.362
4	Finland	0.827	45	Tunisia	0.523	86	Guatemala	0.349
5	Sweden	0.814	46	Lesotho	0.518	87	Tanzania	0.349
6	Norway	0.807	47	Tunisia	0.518	88	Kenya	0.348
7	Switzerland	0.803	48	Jordan	0.504	89	China	0.342
8	Canada	0.798	49	Brazil	0.489	90	Armenia	0.340
9	United Kingdom	0.789	50	Panama	0.489	91	Albania	0.335
10	Australia	0.781	51	El Salvador	0.487	92	Ethiopia	0.334
11	Singapore	0.766	52	Netherlands	0.478	93	Papua	0.330
12	Germany	0.762	53	Bulgaria	0.473	94	Yemen, Rep.	0.330
13	Austria	0.760	54	Thailand	0.473	95	Russia Fed.	0.326
14	Ireland	0.756	55	Croatia	0.468	96	Ukraine	0.324
15	United States	0.755	56	Guyana	0.463	97	Venezuela, RB	0.320
16	Hong Kong	0.741	57	Saudi Arabia	0.454	98	Cambodia	0.316
17	France	0.708	58	Mexico	0.452	99	Ecuador	0.309
18	Belgium	0.704	59	Argentina	0.452	100	Eritrea	0.306
19	Portugal	0.695	60	Malawi	0.447	101	Paraguay	0.306
20	Chile	0.684	61	Morocco	0.445	102	Kyrgyz Rep.	0.302
21	Japan	0.682	62	Fiji	0.443	103	Syrian Arab	0.301
22	Spain	0.677	63	Swaziland	0.441	104	Kazakhstan	0.297
23	Malta	0.676	64	Turkey	0.424	105	Rwanda	0.294
24	Slovenia	0.649	65	Mali	0.419	106	Niger	0.292
25	Cyprus	0.644	66	Egypt	0.418	107	Belarus	0.291
26	Taiwan	0.641	67	Madagascar	0.417	108	Bangladesh	0.288
27	Israel	0.638	68	Gabon	0.414	109	Iran	0.284
28	Estonia	0.637	69	Colombia	0.410	110	Georgia	0.274
29	Hungary	0.612	70	Bolivia	0.410	111	Vietnam	0.269
30	Italy	0.609	71	India	0.407	112	Pakistan	0.267
31	Czech Republic	0.603	72	Ghana	0.407	113	Indonesia	0.263
32	Lithuania	0.595	73	Philippines	0.405	114	Azerbaijan	0.255
33	Costa Rica	0.590	74	Sri Lanka	0.402	115	Sierra Leone	0.253
34	Botswana	0.584	75	Peru	0.401	116	Nigeria	0.247
35	Greece	0.571	76	Senegal	0.399	117	Lao PDR	0.230
36	Korea, Rep.	0.567	77	Uganda	0.395	118	Burundi	0.228
37	Uruguay	0.559	78	Romania	0.385	119	Sudan	0.211
38	Poland	0.559	79	Mauritius	0.379	120	Tajikistan	0.207
39	Kuwait	0.558	80	Dominican	0.378	121	Angola	0.168
40	Oman	0.545	81	Macedonia	0.377	122	Congo, Rep.	0.157
41	South Africa	0.543	82	Honduras	0.375			

Figure 1 presents the scatter plot diagram and the trend line for the panel data of the two indices in our sample. A general impression is that the economies with a high level of openness also perform highly in indigenous factors, and vice versa. We will present a formal study on the causality relationship between the two indices.

Figure 1 Scatter of the Openness Index and Indigenous Index



3. Granger Causality Test

Given that the causality relationship between openness and indigeneity may be heterogeneous across different world economies, we follow Hurlin and Venet (2001) and Hurlin (2005, 2007) to conduct a new causality test on heterogeneity. Hurlin (2007) presents Monte Carlo simulations which show that the test statistics can substantially augment the power of the Granger non-causality tests even for samples with very small T and n dimensions. This new causality test allows one to take into account both the heterogeneity of the causal relationships and the heterogeneity of the data generating process, contrary to the conventional causality test in panel data dynamic models (Holtz-Eakin *et al*. 1988).

In our case, we specify the following dynamic linear model

$$y_{it} = \gamma_i y_{i,t-1} + \beta_i x_{i,t-1} + \alpha_i + u_{it}, \tag{3}$$

where u_{it} are independently and identically distributed $(0, \sigma_u^2)$, α_i are the economy specific effects, and autoregressive parameters γ_i and regression coefficients β_i differ across economies. Here, we choose one lag length. This is due to the relatively short time series $(T = 8)$ for each economy and according to the

requirement $T > 5 + 2k$ in Proposition 5 and Proposition 6 of Hurlin (2007), where k is the lagged order. We use the same notations as those in Hurlin and Venet (2003) and Hurlin (2007).

We first conduct the homogeneity test for the coefficients β_i:

$$H_0 : \beta_i = \beta_j \quad \forall (i, j). \tag{4}$$

The test statistic is

$$F_H = \frac{(RSS_0 - RSS_1)/(n-1)}{RSS_1/(n(T-4))} \sim F(n-1, n(T-4)),$$

where RSS_0 is the residual sum of squares from the Within estimator and $RSS_1 = \sum_{i=1}^{n} RSS_{1,i}$, where $RSS_{1,i}$ is the residual sum of squares of the individual estimation obtained under the alternative hypothesis $\beta_i \neq \beta_j \ \exists i, j$. Our calculation using the Gauss program shows that the null hypothsis of homogeneity is rejected for the model with openness or indigeneity as the dependent variable (see the second row in Table 8). Therefore, the regression coefficients β_i are heterogeneous.

The homogeneity test implies that we next need to test the homogenous non-causality (HNC) hypothesis under the heterogeneity of regression coefficients β_i. The null is

$$H_0 : \beta_i = 0 \quad \forall i = 1, \cdots, n. \tag{5}$$

The alternative is $H_1 : \beta_i = 0 \ \forall i = 1, \cdots, n_1; \ \beta_i \neq 0 \ \forall i = n_1 + 1, \cdots, n,$ which means that there exists a subgroup of economies (with dimension n_1) for which the variable x does not Granger cause y and another subgroup (with dimension $n - n_1$) for which x Granger causes y. Under the alternative we allow β_i to differ across economies, which is consistent with the test result of the null (4). This alternative is more general than that of Holtz-Eakin *et al*. (1988) as there is causality for all the economies in the

sample when $n_1 = 0$; no causality for all the economies when $n_1 = n$; no causality for some economies when $0 < n_1 < n$. Therefore, in our case, if the null (5) is accepted, the variable x does not Granger cause y for all the economies in the sample. If (5) is rejected and $n_1 = 0$ the variable x Granger causes y for all economies. On the contrary, if $n_1 > 0$, the variable x Granger causes y, but the causality relationship is heterogeneous. Hurlin's (2007) test fails to determine whether $n_1 = 0$ or $n_1 > 0$ when the HNC hypothesis (5) is rejected, but it can be concluded that the variable x does Granger cause y, no matter whether the causality is homogenous or heterogeneous.

The statistic associated with the HNC null hypothesis (5) is given by

$$W_{HNC} = \frac{1}{n}\sum_{i=1}^{n} \frac{RSS_{2,i} - RSS_{1,i}}{RSS_{1,i}/(T-3)},$$

where $RSS_{2,i}$ is the residual sum of squares under the null (4) for the i-th economy and $RSS_{1,i}$ is defined as above. This statistic does not have a Fischer distribution as the statistic F_H above. By Hurlin's (2007) result, for a fixed T with $T > 5 + 2k$ and some assumptions on the data generating process,

$$Z_{HNC} \equiv \frac{\sqrt{n}\left(W_{HNC} - \mu_T\right)}{\delta_T} \to N(0,1) \text{ in distribution as n} \to \infty,$$

where $\mu_T = k(T-2k-1)/(T-2k-3)$ and $\delta_T = (T-2k-1)/(T-2k-3)\sqrt{2k(T-k-3)/(T-2k-5)}$. In our case, $\mu_T = 5/3$ and $\delta_T = 10\sqrt{2}/3$ since $T = 8$ and $k = 1$. Therefore, we can construct the z-statistic Z_{HNC} and conduct the z-test of normality.

The HNC test results are listed in the third row in Table 4. The HNC null hypothesis (5) is rejected in both the models with openness and indigeneity dependent variables. It follows that openness Granger causes indigeniety and indigeniety also

Granger causes openness, no matter whether the causality is homogenous or heterogeneous in the sense of Hurlin and Venet (2003). There are bi-directional significant causality relationships between openness and indigeneity.

Table 4 Homogeneity Test and Homogenous Non-Causality Test

	Openness as the Dependent Variable	Indigeneity as the Dependent Variable
Homogeneity Test for $H_0: \beta_i = \beta_j \quad \forall(i, j)$	$F_H(121, 488) = 5.157$, reject H_0 at 1% level $\Rightarrow \beta_i$ are heterogenous.	$F_H(121, 488) = 2.321$, reject H_0 at 1% level $\Rightarrow \beta_i$ are heterogenous.
Homogenous Non-Causality Test for $H_0: \beta_i = 0 \quad \forall i$	$Z_{HNC} = 23.541$, reject H_0 at 1% level $\Rightarrow$ Indigeneity Granger causes Openness	$Z_{HNC} = 25.289$, reject H_0 at 1% level $\Rightarrow$ Openness Granger causes Indigeneity

4. Conclusion and Discussion

Recent studies in globalization have considered the importance of both the quantifiable variables that measure an economy's gain in the globalization process, and domestic factors whose development may impact on economic growth. This paper brings together two sets of factors: openness factors that relate mainly to the external aspect of an economy, and indigenous factors that reflect the internal performance of an economy.

Armed with the data for 122 world economies for the period of eight years, and contrary to the conventional approach of the principle component analysis, a factor analysis method is used to construct the Openness Index and the Indigenous Index to rank the economies in our sample. The result shows that economies that rank high in the Openness Index also rank high in the Indigenous Index, though there are exceptions. The two indices provide clear indications as to the importance in the successful performance of the two sets of factors. There is a positive relationship between openness on indigeneity. According to the Hurlin-Venet Granger causality test using a heterogenous dynamic panel data model, we show that there is a

bi-directional relationship between openness and indigeneity. Improved performance in indigeneity helps to enhance and forecast openness, while at the same time improved openness performance helps to forecast indigeneity.

The empirical results show the important role of indigenous factors. It is often taken for granted that such openness factors as trade, foreign direct investment, and international engagement are all there is in globalization. The missing link is the performance in indigenous factors, which can have a two-folded relationship in the globalization performance of an economy. The direct relationship is one in which the performance of indigenous factors does act as an effective indicator on an economy's external or openness relationship. A more reliable rule of law, for example, provides convincingly the legal protection the economy provides. Indirectly, the successful performance of openness factors depends significantly on the performance of the indigenous factors. For a developing economy to attract foreign direct investment, for example, a reliable education system guarantees a good supply of human capital.

There are also policy implications for both advanced and less developed economies from the empirical results. Economies that rank low in the two indices tend to be the less developed economies, which can exercise separately a policy on economic openness and a policy on the improvement in the performance of indigenous factors. The introduction and promotion of an appropriate and effective policy on internal factors can improve the image of a less developed economy both at the international level that in turn facilitates further development in economic openness. For the advanced economies, their difference in the performance between the two indices requires the introduction of relevant policies that can improve the weaker performance in the two indices.

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Appendix Data and Definition of Variables

The data set composes of a total of 122 world economies and twenty eight factors for the period of 1998-2006. Table A below summarizes the definitions and data sources of the twenty eight factors.

Table A Definitions and Data Sources of Factors

Total trade flows (% of GDP): Sum of exports and imports of goods and services measured as a share of GDP.

Foreign direct investment (% of GDP): Sum of the absolute values of inflows and outflows of FDI recorded in the balance of payments measured as a share of GDP.

Gross private capital flows (% of GDP): Sum of the absolute values of direct, portfolio, and other investment inflows and outflows recorded in the balance of payments financial account, excluding changes in the assets and liabilities of monetary authorities and general government. The indicator is calculated as a ratio to GDP in U.S. dollars.

Average applied tariff rates (unweighted in %): Unweighted averages for all goods in ad valorem, applied, or MFN rates whichever is available.

Trade freedom (%): A composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services.

Financial freedom (%): A measure of banking security and independence from government control.

Investment freedom (%): An assessment of the free flow of capital, especially foreign capital.

Internet users (per 1,000 people): The number of people with access to the worldwide network.

International tourism (% of population): Sum of arrivals and departures of

international tourists.
International voice traffic (in minutes per person): The sum of international incoming and outgoing telephone traffic.
Membership in international organizations: Absolute number of international inter-governmental organizations.
Government transfer (% of GDP): Sum of credit and debit divided by GDP.
Troop contribution (% of total): The number of peacekeeping troop contribution to UN as the ratio of total peacekeeping troop to UN.
Corruption perception index: The degree to which corruption (defined as the abuse of entrusted power for private gain) is perceived to exist among public officials and politicians.
Voice and accountability index: The extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Political stability index: The perception on the stability of the government in power.
Government effectiveness: The combined responses to the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the creditability of government commitment to policies.
Regulatory quality: The provision of market-friendly policies, such as price control, adequacy in bank supervision and other regulation in such areas as foreign trade and business development.
Rule of law: The extent to which agents are confident in and abide by the rules in the society, including perceptions in the incidence of crime, effectiveness and predictability of the judiciary and contract enforceability.
Control of corruption: The extent of corruption, defined as the exercise of public power for private gain. It is based on the scores of variables from polls of experts and surveys.
Property right protection: The degree of property right protection and the extent property right law enforcement.
Regulatory scores: A measure on how easy or difficult it is to open and operate a business, and whether regulations are applied uniformly to all businesses.
Primary school enrolment rate: The ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to primary school education.
Public spending on education (% of GDP): The current and capital public expenditure on education expressed as a percentage of total government expenditure.
Primary school pupil-teacher ratio: The number of pupils enrolled in primary schools divided by the number of primary school teachers.
Total health expenditure (% of GDP): This consists of recurrent and capital spending from central and local government budgets, external borrowings and grants and donations and health insurance funds.
Growth rate of implicit GDP deflator (annual %): The growth of the GDP implicit deflator, which is the ratio of GDP in current local currency to GDP in constant local currency.
GDP per capita: Gross domestic product (current dollars) divided by the population.

Sources: *International Financial Statistics*, IMF (May 2007); *World Development Indicators*, World Bank (1998-2006); TRAINS Database, UNCTAD; IDB CD ROMs, WTO; *Index of Economic Freedom*, Heritage Foundation (1998-2006); *The World Factbook*, Central Intelligence Agency; *Balance of Payment Statistics*, United Nations; Department of Peacekeeping Operation, United Nations; *Corruption Index*, Transparency House (1999-2006); *Aggregating Governance Indicators*, World Bank (1999-2006); and *National Accounts*, OECD.