

MPRA

Munich Personal RePEc Archive

An Analysis on Economic Opportunity

Li, Kui-Wai

City University of Hong Kong

January 2014

Online at <https://mpra.ub.uni-muenchen.de/59339/>

MPRA Paper No. 59339, posted 18 Oct 2014 14:11 UTC

An Analysis on Economic Opportunity

Kui-Wai Li*

Abstract

Although economic opportunity is considered as a latent variable, it can serve as another factor in promoting growth and development. Through the construction of an economic opportunity index, this paper identifies the extensity and intensity channels through which economic opportunity are created. Data on 24 variables for 184 world economies for the period 2000-2010 are collected for the empirical analysis. The methodology involves the use of principle component analysis in constructing three indices for the parametric and non-parametric regression analyses. The country sample is divided into OECD and non-OECD economies so as to examine their different performance. Extensity seems to be the more important channel to all economies, but for non-OECD economies, a higher performance in intensity can enrich the effect of extensity on economic opportunity.

Keywords: Economic opportunity, Extensity, Intensity, World economy.

JEL classifications: C8, O11.

* Corresponding author: Department of Economics and Finance, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong SAR, China. Tel: 852 34428805; Fax: 852 3442 0195; E-mail: efkwli@cityu.edu.hk.

Acknowledgement: The author is grateful to the comments from the referees and participants in three presentations (University of Geneva and Vilnius University in December 2013 and APEC Study Center Consortium Conference in May 2014), research funding support from Swiss Network of International Studies and a private donor, David Zhang, and research assistance from Elena Sarti, Siyang Ye and Jin Yao. The author is solely responsible for errors found in the paper.

I Introduction

In transforming various production factors to output, studies that used input-output analysis have given way to analysis on total factor productivity and efficiency. In addition to endogenous growth studies, growth and development studies have focused on regional differences, influence of socio-economic variables, and distinctions between domestic and external variables in globalization. Other literatures on growth and development have touched on financial liberalization, capital flow, trade, regional features, human capital, business cycles development, fiscal policy and income distribution, development through stages and institutional advancement (Miller and Blair, 2009; Solow, 1957; Douglas, 1976; Li and Liu, 2011; Aghion and Howitt, 1998; Barro, 1999; 2000; Deininger and Squire, 1996; Bhagwati, 2004; Tamura, 2006; Li and Zhou, 2010; Zhou and Li, 2011; Li, 2012; Panzironi and Gelber, 2012; Bekaert, *et al.*, 2005; Grossman and Helpman, 1990; Lucas, 1988, 1990; Kenny and Williams, 2001; Acemoglu and Robinson, 2012; Galor, 2000; Easterly and Rebelo, 1993; King, *et al.*, 1988; Young, 1994; Kejak, 2003; Kosempel, 2004).

Despite the variety of literature in the growth and development, there are still unanswered questions and idea gaps in economic growth studies. The concept of “gaps” has been used to explain growth constraints in developing countries. Thirlwall (1978) pointed to the savings gap and foreign exchange gap in the “two gaps analysis”, while Romer (1993) raised the “idea gap and object gap” in the access to ideas capable of generating economic values. One possible “idea” gap relates to situations when economies with similar resource endowments differ considerably in their growth and development outcomes. Although economic opportunity has often been included as titles in numerous studies (Demirgüç-Kunt and Levine, 2008; O’Neil, 2012), it has not been used as an instrument in measuring the difference in growth and development. There is clearly a lack of literature that considers and applies economic opportunity as a mechanic to growth and development (Lucas, 1988).

Conceptually, economic opportunity can be regarded as “internality” that reflects growth or development potentials as a result of certain economic activities. Economic opportunity is intuitive, invisible, intangible, non-quantifiable, immeasurable, but is cumulative and multiplicative. Intuitively, economic opportunity shows a process that indicates the degree of effectiveness between an *ex-ante* economic situation, where production factors are available, and an *ex-post* economic situation, where opportunity outcomes are generated. Economic opportunity

can be defined as a process or channel through which economic possibilities and chances are created from the extensive and intensive applications of production factors. Empirically, economic opportunity is considered as a latent variable that could be predicted by observable variables (Loehlin, 1998).

This paper studies economic opportunity as a variable in explaining growth and development. The discussion first considers the meaning of economic opportunity, and then extends the analysis to two channels of extensity and intensity in the creation of economic opportunity. Section II explains the proxy variables selected for economic opportunity, intensity channel and extensity channel. Data mainly from the World Bank and the Human Rights Index are used to identify a total of 24 variables for the sample of 184 world economies for the 11 years' period from 2000 to 2010. The empirical analysis will be conducted on the entire sample, which is then divided into OECD and non-OECD economies.

Section III discusses the methodology that comprises of the principle component analysis to identify the weights of the variables grouped under different categories. The weights are then used to calculate three indices for economic opportunity, extensity and intensity. Both parametric linear regression and non-parametric regression analyses are applied to the entire sample as well as the division between OECD and non-OECD economies. The empirical results are reported in Section IV, while Section V concludes the paper.

II Data Compilation

Economic opportunity could be another source of scarcity in development, as its availability could impact on economic outcomes. Economic opportunities can differ among economies even with similar endowment background due probably to the difference in the utilization of resources and the complementary conditions through which the resources are being utilized. Conceptually, economic opportunity depends on a collection of factors that could either lead to an expansion in the amount of available resources or an increase in the amount of economic activities given the available resource endowment. Without a physical substance of its own, economic opportunity is regarded as a latent variable predictable by other observable variables in the multiple indicators multiple causes (MIMIC) model (Joreskog and Goldberger,

1975). To conduct an empirical analysis on economic opportunity, one can construct the extensity channel and intensity channel through which economic opportunities will be affected.

The extensity channel covers the “width” of resource availability. The availability of resources is fundamental to the increase in economic opportunity. Typical proxy variables for the extensity channel can include domestic capital, foreign direct investment and official assistance from international organizations. The intensity channel is more substantial and covers the “depth” through which economic opportunities are generated from available resources, and include a number of socio-economic, political and environmental factors and categories.

The vast World Bank data are categorized into a number of feasible categories and the most representative variables from that category are selected by using correlation tests. There can always be debates in the choice of variables, and dilemma exists between length of the time series and spread of countries (Sala-i-Martin, 1997; Durlauf *et al.*, 2005). Given the spread of variables in the World Bank data, it is typical to find that fewer countries have longer time series data. Using the criterion that the variables must have at least 80 percent of the data points produces a total data set of 184 economies for the 11 years from 2000 to 2010. For the few missing values, we either take the average values for data in between years, or construct a trend value at the beginning or the end of the sample period. Regression analysis is used to locate the missing values if there are only a few data points for a chosen variable. Lastly, the data for a neighboring economy with similar background is used if the entire data series is unavailable. For example, the Singapore data are used for the missing values of expenditure on health care and mortality rates for both economies of Hong Kong and Macao. Figure 1 summarizes the proxy variables in the MIMIC model.

The proxies for economic opportunity are represented by performance in industry, service and export, employment and communication. Industry and service output values are the *ex-post* outcome of economic opportunities. The size of employment obviously can directly reflect the magnitude of economic opportunity. Economic opportunity can also be reflected in the amount of personal and business communications. There are a total of nine proxies for economic opportunity: i) value added in industry and services (expressed as percentage of GDP), ii) export of goods and services (expressed as percentage of GDP), iii) export of high-technology products (as percentage of total manufactured exports), iv) employment to population ratio (15+ years of age), v) labor participation rate (percentage of population above 15 years of age), vi) air transport

(registered carrier departures worldwide), vii) internet users (per 100 people), viii) mobile and ix) fixed-line telephone subscribers (per 100 people).

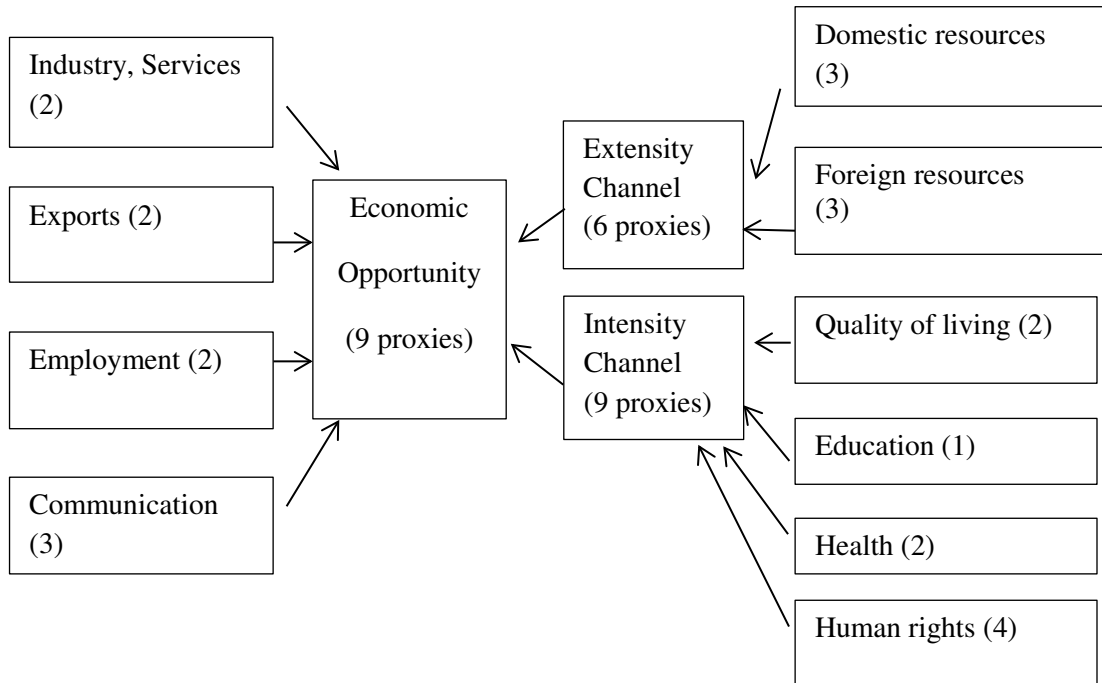


Figure 1 The MIMIC Model for Analyzing Economic Opportunity

The categories in the extensity channel are straight forward as they include all the available resource channels. Domestic investment in the form of gross capital formation should give rise to employment opportunities. This effectively reflects the size of domestic investment. Domestic credit to the private sector reflects the amount of business opportunities through the banking sector. Economic opportunity arising from the stock market can be seen from market capitalization of listed companies. The six proxies used in the extensity channel include: i) gross capital formation, ii) domestic credit to private sector, iii) market capitalization of listed companies (as percentages of GDP), iv) the net inflow of portfolio equity, v) foreign direct investment and vi) net official development assistance and official aid received (U.S. currency as percentage of GDP).

The nine proxies chosen for the intensity channel can be grouped under four categories of quality of living, education, health and human right. They are: i) carbon emissions (CO2, metric tons per capita); ii) inflation (Consumer Price Index), iii) total public spending on education

(percentage of GDP), iv) total health expenditure (percentage of GDP), v) mortality rate (less than 5 years of age per 1,000 live births), vi) electoral self-determination, vii) freedom of religion, viii) freedom of speech and ix) independence of the judiciary. The data on human right are obtained from the Cingraneli-Richards (CIRI) Human Rights dataset.

III Methodology

We first standardize the variables by transforming the data into comparable scales in the range [0, 1]. For each year and each variable, with the exception of carbon emissions, inflation and mortality rate, all data point are recalculated as $(V - \text{Min}(V))/(\text{Max}(V) - \text{Min}(V))$, where V represents the value of the variable in the original data set. For the variables of carbon emissions, inflation and mortality rate, the formula $(\text{Max}(V) - V)/(\text{Max}(V) - \text{Min}(V))$ is used.

The principle component analysis (PCA) is used to construct the three indices of economic opportunity, extensity and intensity. The PCA weightings maximize the variance of the indices (Rencher, 2002). Due to possible correlation among the chosen proxy variables, the PCA method can reduce the number of factors to capture the maximum variation and commensurate on the different measurement units of the variables. Most importantly, the PCA selects the weights by the data itself. The principal components are extracted from the correlation matrix of the variables, in a way that they accounted for the highest percentage of variation. The PCA is applied to the whole sample period to ensure consistence.

The factor analysis is applied to determine the weights for the proxy variables in constructing the three indices (Thompson, 2004). Suppose that there are p variables x_1, \dots, x_p that serve as the indicators of all factors in the construction of the index and m underlying common factors f_1, \dots, f_m . The common factors are orthogonal to each other. We have the following basic model:

$$\begin{aligned} x_1 - \mu_1 &= \alpha_{11}f_1 + \alpha_{12}f_2 + \dots + \alpha_{1m}f_m + \varepsilon_1 \\ x_2 - \mu_2 &= \alpha_{21}f_1 + \alpha_{22}f_2 + \dots + \alpha_{2m}f_m + \varepsilon_2 \\ &\vdots \\ x_p - \mu_p &= \alpha_{p1}f_1 + \alpha_{p2}f_2 + \dots + \alpha_{pm}f_m + \varepsilon_p, \end{aligned}$$

where each error term is accounted for the part of the variable that is not common with other variables, the coefficients α_{ij} are factor loadings, showing how each individual x_i depended on the common factors, f_1, \dots, f_m . We follow Rencher (2002, Chapter 13) to assume the following:

$$\begin{aligned} E(f_j) &= 0, \text{Var}(f_j) = 1, \text{cov}(f_j, f_k) = 0, j \neq k; \\ E(\varepsilon_i) &= 0, \text{Var}(\varepsilon_i) = \psi_i, \text{cov}(\varepsilon_i, \varepsilon_j) = 0, i \neq j; \\ \text{cov}(\varepsilon_i, f_j) &= 0. \end{aligned}$$

The first m principal components are considered as good candidates for the common factors, f_1, \dots, f_m . Hence, f_1, \dots, f_m are the first m principal components of the correlation matrix. Without loss of generality, we use standardized variables, x_1, \dots, x_p , in the correlation matrix. Therefore $\alpha_{ij} = \text{corr}(x_i, f_j)$. The variance of x_i can be partitioned into a component due to the common factors f_1, \dots, f_m , namely,

$$\sigma_{ii} = \text{Var}(x_i) = (\alpha_{i1}^2 + \alpha_{i2}^2 + \dots + \alpha_{im}^2) + \psi_i \equiv h_i^2 + \psi_i,$$

where communality $= h_i^2 = \alpha_{i1}^2 + \alpha_{i2}^2 + \dots + \alpha_{im}^2$, and specific variance $= \psi_i$. They are also called the common variance and specific variance, respectively. The factor loadings (the correlation between x_i and the principal components) $(\alpha_{i1}, \alpha_{i2}, \dots, \alpha_{im})$ and the communality h_i^2 reflect the contribution of x_i to the principal components. The larger the communality h_i^2 is, the more contribution the communality has in the variance of x_i , and the more information about x_i is reflected. A larger communality of variable x_i shows higher significant differences of the individual variable in the common factor. Therefore, the communality can be used as a gist to determine the weight for each of the individual factors. The following steps summarize the PCA procedures:

Step 1: Conduct PCA on the correlation matrix R of the sample of the variables, x_1, \dots, x_p , and select the first m principal components, f_1, \dots, f_m , with the cumulative proportion of the total variance greater than 85%, i.e. $\sum_{i=1}^m \lambda_i / \sum_{i=1}^p \lambda_i \geq 85\%$, where $\lambda_1, \lambda_2 \dots \lambda_p$ are the p eigenvalues of R with $\lambda_1 \geq \dots \geq \lambda_p$.

Step 2: For each x_i ($i=1, 2, \dots, p$), calculate the correlation between x_i and each principal component f_j , $j=1, 2, \dots, m$, namely, $\alpha_i = (\alpha_{i1}, \alpha_{i2}, \dots, \alpha_{im})$, and construct the communality $H_i \equiv h_i^2 = \alpha_{i1}^2 + \alpha_{i2}^2 + \dots + \alpha_{im}^2$.

Step 3: Determine the weights $w = (w_1, w_2, \dots, w_p)$ of indicators $x_1, x_2 \dots x_p$ as follows:

$$w_i = \frac{H_i}{\sum_{j=1}^p H_j}$$

Finally, the economic opportunity index (EOIND) is calculated as: $EOI = \sum_{i=1}^p w_i x_i$. These weights are used to calculate the value of the three indices for every country for each of the 11 years in the sample period.

The EOI becomes the dependent variable, while both the extensity index (EXIND) and intensity index (ININD) are the independent variables in the regression analysis. We use the lagged independent variables as instrument variables, as this avoids the endogeneity problem (Griliches, 1957; Marschak and Andrews, 1944; Blundell and Powell, 2003). The regression is conducted on individual years such that the change in the impact of the independent variables can be considered. For the parametric analysis, the equation for the entire sample is:

$$EOI_{i,t} = \alpha_0 + \alpha_1 * EXIND_{i,t-1} + \alpha_2 * ININD_{i,t-1}, \quad (1)$$

with economy i and time t . A dummy variable is used to identify the OECD and non-OECD countries. We set the dummy variable $OECD$ as 1 / 0 if it is an OECD / non-OECD economy. The parametric equation becomes:

$$EOI_{i,t} = \alpha_0 + \alpha_1 * EXIND_{i,t-1} + \alpha_2 * ININD_{i,t-1} + \alpha_3 * OECD * EXIND_{i,t-1} + \alpha_4 * OECD * ININD_{i,t-1}. \quad (2)$$

Effectively, α_3 and α_4 show the difference of coefficients between non-OECD and OECD economies in extensity and intensity, respectively.

We improve the parametric estimates by using non-parametric regressions, because parametric models could be misspecified and lead to inconsistent and inefficient estimates and suboptimal test statistics (Henderson *et al.*, 2008). The predictor in nonparametric regression analysis does not take a predetermined form but is constructed according to information derived from the data. We apply the following nonparametric model:

$$y_{it} = m(x_{i,t-1}) + v_i + u_{it}, \quad (3)$$

where y_{it} is the EOI index for economy i in year t , $m(x_{i,t-1})$ is an unspecified function, $x_{i,t-1} = (ININD_{i,t-1}, EXIND_{i,t-1})$. v_i is the unobserved country characteristics, fixed or random or no individual effects. u_{it} is the stochastic term with $E[u_{it}|x_{i,t-1}] = 0$.

Various specification tests are conducted before estimation. The first is the Li-Hsiao test for the individual effects in Equation (3) (see Corollary 3 in Li and Hsiao, 1998), which corresponds

to the parametric Breusch-Pagan test. The null hypothesis is $H_0: v_i = 0$, i.e. $v_i + u_{it}$ is a white noise. The Li-Hsiao test statistic is asymptotically standard normal. The statistic for our sample is computed as 42.239435. Thus, H_0 is rejected and the individual effects exist. Hence the second step is needed to test the null hypothesis of the random effects. We follow the J -test statistic in Henderson *et al.* (2008):

$$\hat{f} = \{nT(nT - 1)\}^{-1} \sum_{i=1}^n \sum_{t=2}^T \sum_{j=1}^n \sum_{s=2, (j,s) \neq (i,t)}^T \hat{u}_{it} \hat{u}_{js} K_h(x_{i,t-1} - x_{j,s-1}),$$

where $\hat{u}_{it} = y_{it} - \hat{m}(x_{i,t-1})$ under the fixed effects assumption and $K_h(v) = \prod_{s=1}^2 [h_s^{-1} k(v_s/h_s)]$. The J -test statistic and its p -value are 0.0105 and 0.4960, respectively. So the null of random effects cannot be rejected. Hence, our empirical analysis is based on the estimation of the random effects model.

As in Ullah and Roy (1998), the nonparametric random-effects (RE) model shown in Equation (3) is estimated by local linear kernel method. The local nonparametric RE estimator of m and β (the partial derivatives of $m(x_{i,t-1})$) can be obtained by minimizing:

$$(y^* - Z^*(x)\delta(x))' K(x)(y^* - Z^*(x)\delta(x)) = \sum_{i=1}^n \sum_{t=2}^T (y_{it}^* - z_{it}^* \delta(x))^2 K\left(\frac{x_{i,t-1} - x}{h}\right),$$

where $y^* = \Omega^{-1/2}y$, $Z^*(x) = \Omega^{-1/2}Z(x)$, and $\Omega^{-1/2} = I_{n(T-1)} - (1 - \lambda^{1/2})DD'/T$; $D = I_n \otimes \iota_T$, ι_T is an $(T - 1) \times 1$ vector of unit elements. $Z(x)$ is an $n(T - 1) \times (q + 1)$ matrix with it th element $[1 \ x_{it} - x]$ and $\delta(x) = [m(x) \ \beta(x)]'$ is a $(q + 1) \times 1$ parameter vector, $y_{it}^* = y_{it} - (1 - \lambda^{1/2})\bar{y}_i$, $z_{it}^* = z_{it} - (1 - \lambda^{1/2})\bar{z}_i$, and $\lambda = \sigma_u^2 / (\sigma_u^2 + T\sigma_v^2)$. This amounts to the LS regression of $\sqrt{K_{it}}y_{it}^*$ on $\sqrt{K_{it}}z_{it}^* = [\sqrt{K_{it}}\lambda^{1/2} \ \sqrt{K_{it}}(x_{i,t-1}^* - x^*)]$. The proposed estimator is:

$$\tilde{\delta}_{RE}(x) = (Z^{*'}(x)K(x)Z^*(x))^{-1}Z^{*'}(x)K(x)y^*.$$

The kernels are chosen as the Gaussian function and the bandwidth is taken as $h = c_0 \text{std}(x)(nT)^{-1/8}$, where $\text{std}(x)$ is the sample standard deviation of x .

By constructing the above nonparametric RE model, we can get the estimation of the two partial derivatives $f_1(\text{ININD}, \text{EXIND})$ and $f_2(\text{ININD}, \text{EXIND})$, which are the marginal effects of intensity index and extensity index on the growth of EO, respectively. To study the contingent growth effects, we equally partition $[\min_{i,t}\{x_{i,t-1}\}, \max_{i,t}\{x_{i,t-1}\}]$ into 49 sub-intervals with 50 endpoints x_i , where x is ININD and EXIND. We are interested in the following marginal effects:

$$\begin{aligned} & \hat{f}_1(\text{mean}(\text{ININD}), \text{EXIND}_i), \hat{f}_2(\text{mean}(\text{ININD}), \text{EXIND}_i) \text{ and} \\ & \hat{f}_1(\text{ININD}_i, \text{mean}(\text{EXIND})), \hat{f}_2(\text{ININD}_i, \text{mean}(\text{EXIND})), \end{aligned}$$

where $i = 1, \dots, 50$, and $\text{mean}(x)$ is the sample mean of (x) . The estimates $\hat{f}_1(\hat{f}_2)$ describe the contingent relationship between the marginal effects of Intensity Index (Extensity Index) and the changes in EXIND and ININD. The upper and lower bands of the bootstrap 95% pointwise confidence interval are also provided.

IV Parametric and Non-parametric Estimations

Table 1 summarizes the weights, the mean and median values of the whole sample and the two subsamples of OECD and non-OECD economies (see Appendix Table A1). For the three indices, the mean and median values of OECD economies are higher than non-OECD economies, and the differences are statistically significant. There are a number of observations from the 2010 ranking for the three indices (see Appendix Table A2). A number of economies have moved up or down in the ranking between 2000 and 2010, and only a handful of countries that have stayed constant in a similar position among the three indices. No economy has appeared in all three indices among the top 20 rankings in 2010. There is diversity among the rankings of economies, suggesting that economies have performed differently in the three dimensions. Smaller world economies can also be ranked high in the three indices. For many low ranking economies, which are mainly developing economies, a common feature is that their rankings have fallen considerably. One can conclude that there is diversity among the three indices, and the top rankings may not be occupied only by advanced industrialized economies. Indeed, a number of smaller economies rank high in all three indices. The correlation ratios between the three indices are low, as shown in Table 2, suggesting that the chosen proxies can appropriately be used to study economic opportunity.

Table 3 reports the parametric regression for the whole sample showing the coefficients for individual years and for the entire sample. All estimated coefficients are positive, suggesting that the chosen variables for both the extensity and intensity channels are useful in explaining economic opportunity. The extensity channel is more important than the intensity channel, as the coefficients of the former are larger than the coefficients of the latter, with the exception of 2010. Despite the difference in values, the influence of both channels showed a declining trend as all their coefficients have gradually declined, especially in 2008-2009 financial crisis. On the contrary, the influence of intensity on economic opportunity is quite stable. The R-squared for

the first few years in the sample period is larger than the latter years, implying that the explanatory variables are powerful in the earlier years.

Table 1 Weights and Indices

Weights (percentages)								
EO	EX				IN			
Industry, services	21.07	Domestic resources		48.35	Life quality		30.98	
Export, high-tech	29.63	Foreign resources		51.65	Education		16.05	
Employment, labor	19.77				Health, mortality		26.97	
Communication	29.54				Human rights		26.00	
	Sample [1,840 obs.]		OECD [340 obs.]		Non-OECD [1,500 obs.]		Test of Difference	
			(A)		(B)		(A) – (B)	
	Mean	Median	Mean	Median	Mean	Median	t-test	Wilcoxon z-test
EOIND	0.266	0.253	0.345	0.345	0.248	0.243	<.0001***	<.0001***
EXIND	0.176	0.161	0.200	0.183	0.170	0.155	<.0001***	<.0001***
ININD	0.643	0.649	0.754	0.765	0.617	0.616	<.0001***	<.0001***

*** = 1% significance.

Table 2 Correlation Ratios

	EOIND	EXIND	ININD
EOIND	1	0.229201	0.242344
EXIND	0.229201	1	0.169384
ININD	0.242344	0.169384	1

Table 3 Parametric Linear Estimation for Economic Opportunity

Year	Extensity Coefficients	Intensity Coefficients	R-squared
2001	0.682335***	0.084763*	0.253304
2002	0.503167***	0.107164**	0.190828
2003	0.416854***	0.121935***	0.159596
2004	0.465765***	0.138431***	0.180236
2005	0.266883***	0.126481***	0.095087
2006	0.273458**	0.138647***	0.091431
2007	0.201778**	0.126356**	0.071541
2008	0.189538**	0.111744**	0.066876
2009	0.142835	0.122277**	0.058992
2010	0.049841	0.142504***	0.059909
Aggregate	0.206006***	0.137791***	0.095177

Notes: *, ** and ***, respectively denote significance at 10%, 5%, and 1% level.

Table 4 Parametric Linear Estimation for Economic Opportunity: OECD and Non-OECD

Year	Extensity	Intensity	OECD Dummy	OECD Dummy	R-squared
	Coefficients	Coefficients	Extensity	Intensity	
	(1)	(2)	(3)	(4)	
2001	0.574335***	-0.021275	-0.126963	0.147897**	0.365381
2002	0.410956***	0.002335	-0.067955	0.122786***	0.320341
2003	0.302734***	0.001860	0.171244	0.084708	0.318290
2004	0.357346***	0.006594	0.008449	0.116030**	0.319553
2005	0.168562*	-0.022541	0.305630	0.060814	0.282836
2006	0.105158	0.016428	0.289148	0.062492	0.270934
2007	0.075253	0.002318	0.329908*	0.041542	0.266523
2008	0.107315	-0.019252	0.191338	0.080944	0.263422
2009	0.174783*	-0.041733	-0.526160	0.349116**	0.259063
2010	0.018549	0.008313	0.173555	0.075003	0.227069
Aggregate	0.144634***	0.001294	0.094337*	0.102818***	0.269521

Note: Notes: *, ** and ***, respectively denote significance at 10%, 5%, and 1% level.

In the performance between OECD and non-OECD economies, columns (1) in Table 4 shows that most of the coefficients for extensity for non-OECD economies are significantly larger than zero, implying that extensity variables do have a positive impact on economic opportunity. However, column (2) shows that all coefficient estimates for intensity are not significantly different from zero. For non-OECD economies, the intensity channel is not as useful as the extensity channel in the creation of economic opportunity.

Columns (3) and (4) in Table 4, respectively, show the difference of coefficients between non-OECD and OECD economies in the impact of extensity and intensity channels on economic opportunity. For the OECD countries, we can see that most of the coefficients of OECD dummy for extensity in column (3) are not significantly different from zero, meaning that the difference between OECD and non-OECD countries is not significant and variables in the extensity channel also have a positive impact on the creation of economic opportunity in OECD countries. As for the coefficients of OECD dummy for intensity in column (4), about half of the estimated coefficients are all significantly larger than zero. We can conclude that intensity is also an important channel on the creation of economic opportunity in OECD countries.

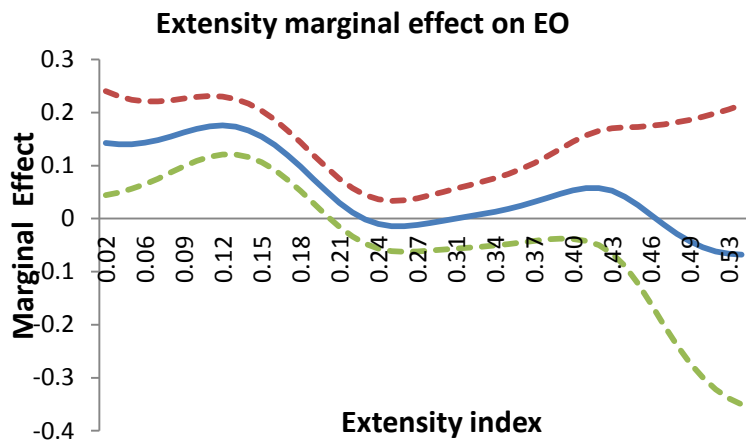
The parametric analysis concludes that both extensity and intensity channels can have significant impact on economic opportunity for the advanced OECD economies. For non-OECD

economies, economic opportunity can mainly be derived from extensity only. There can be different reasons. For developing and emerging economies, the various extensity variables show the different capital resources that could be channeled to the creation of economic opportunity. However, one possible reason for the insignificance of intensity in non-OECD economies could be their low level of achievement in various intensity variables.

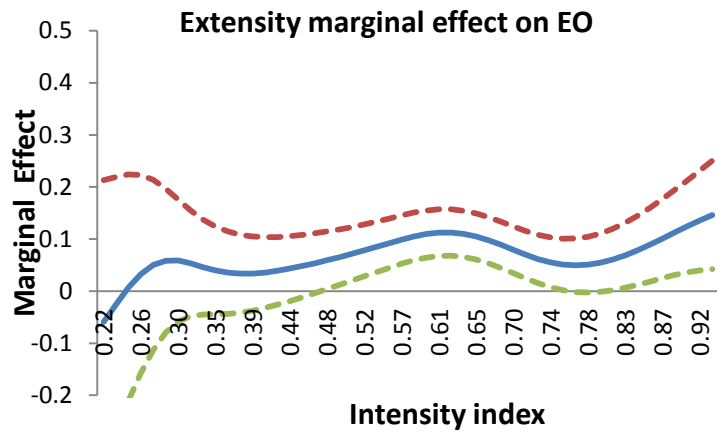
The non-parametric estimates can provide additional results. Figure 2 shows the contingent relationship between the marginal effects of the two indices on growth of economic opportunity. The extensity index varies from 0.0244 to 0.5358, while the mean value of intensity is 0.642. In Figure 2(a), the non-parametric estimate shows that at a low level, the marginal effect of the extensity index is positive and significant on economic opportunity, implying that economies with a low level of extensity index can obtain more economic opportunity by improving the performance of their extensity variables. However, the impact declines as the extensity index rises, suggesting that when the intensity index is also at a relatively low level, improvements in the extensity variables would not help to gain more economic opportunity. In Figure 2(d), the marginal effect of intensity index is insignificant at most of the data points.

The scale of the intensity index ranges from 0.2174 to 0.9299, while the extensity index is kept at its mean value at 0.176. In Figure 2(c), the marginal effect of the extensity index on economic opportunity is insignificant when the intensity index is at its low level, but it becomes positive and significant as intensity index increases. The lesson is that when the intensity index is increasing and after it has reached a certain level, the marginal effect of extensity on economic opportunity becomes positive and significant. Furthermore, the increase in the marginal effect means that the intensity level can affect the impact of extensity on economic opportunity. The marginal effect of intensity on economic opportunity shown in Figure 2(b) is not significant at most of the data points.

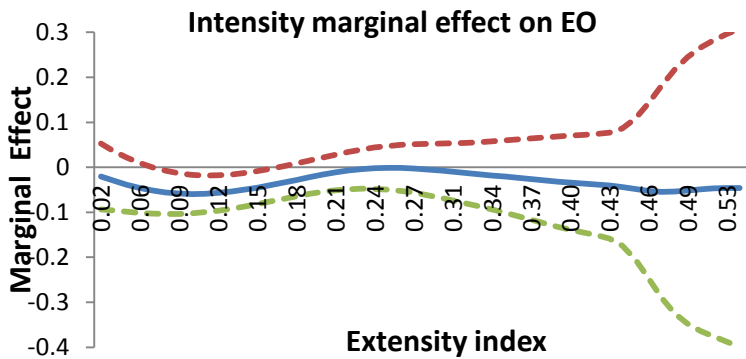
The two observations suggest that the extensity index is more relevant than the intensity index to economic opportunity. Firstly, at low level of extensity, the increase in extensity can promote economic opportunity, but the impact is constrained by the intensity index. Secondly, an improvement in the intensity index does produce a positive marginal effect of extensity on economic opportunity.



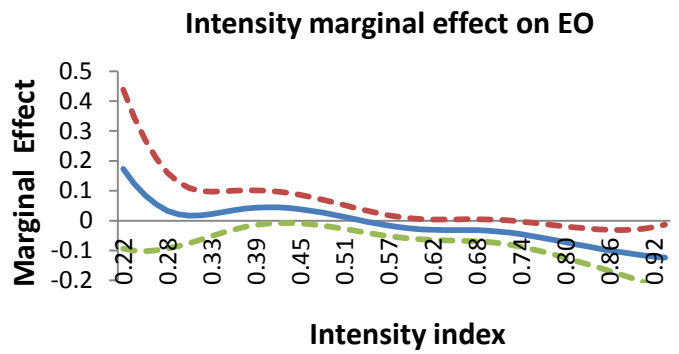
(a)



(c)

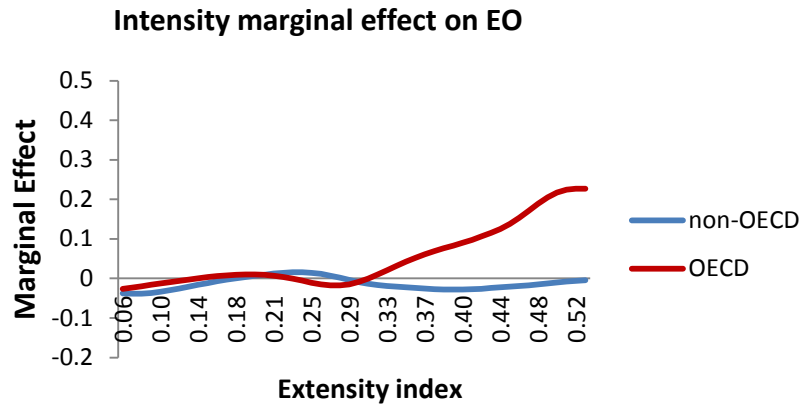


(b)

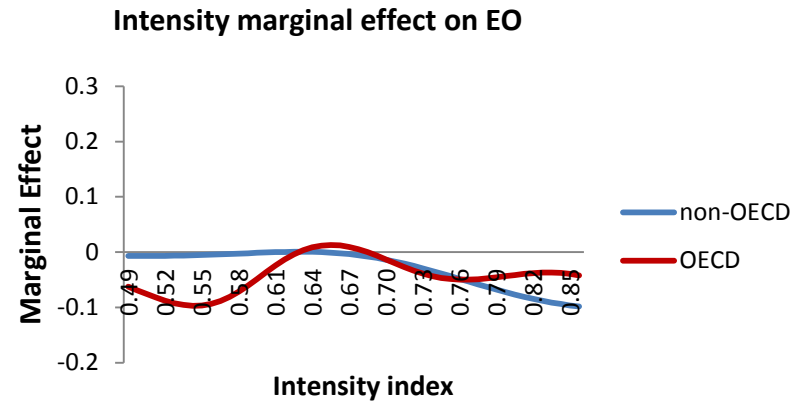


(d)

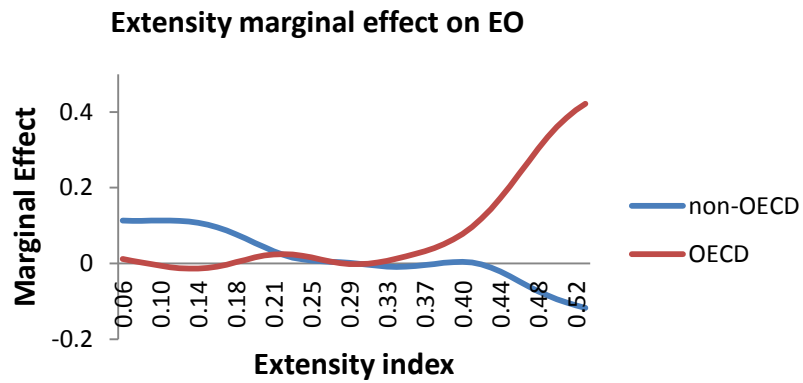
Figure 2 Marginal Effects: Whole Sample



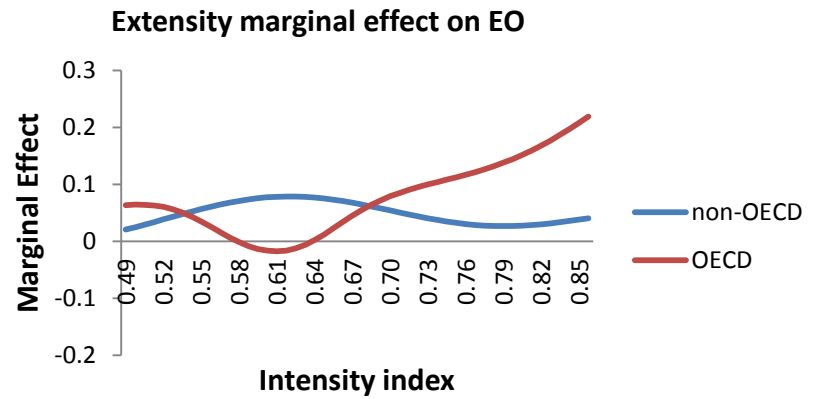
(a)



(c)



(b)



(d)

Figure 3 Marginal Effects: OECD and Non-OECD

The non-parametric regression estimates for the OECD and non-OECD economies are shown in Figure 3. For OECD economies shown in Figures 3(a) and 3(b), when the extensity index is high, the marginal effects of both intensity and extensity indices on growth of economic opportunity are positive. Similarly in Figure 3(d), when the intensity index is high, the marginal effect of extensity on economic opportunity is positive.

For Non-OECD countries, Figure 3(b) shows that when the extensity index is low, the marginal effects of extensity on economic opportunity is positive and significant, meaning that when a non-OECD economy has a low extensity index, infusing more capital resources will probably help the economy to generate more economic opportunities. But, then the effect becomes weak when the extensity index reaches a high level. This suggests that infusing more capital resources to non-OECD economies would not have much impact on economic opportunity when the intensity index is at a relatively low level. In other words, the performance of the extensity on economic opportunity needs to have a strong support on the performance of the intensity index. This argument is supported by Figure 3(d), which shows that for non-OECD economies, an increase in intensity index would produce a positive and significant extensity marginal effect on economic opportunity. One can conclude that improvement in the intensity index for non-OECD economies can increase the performance of extensity effect on economic opportunity.

V Conclusion

This paper fills an intellectual gap by analyzing the concept of economic opportunity. As a latent variable, economic opportunity is examined from a number of proxy variables. Serving as an outcome of economic activity, economic opportunity is considered from a combined usage of economic resources (extensity) and socio-economic complements (intensity). While extensity measures the availability of production factors, intensity shows the extent to which economic opportunity could be generated when the complementary factors are taken into account. Each of the two channels can have independent impact on economic opportunity.

As a topic on its own, economic opportunity has hardly been studied theoretically and in empirical analysis. This paper provides both a conceptual and empirical analysis based on a collection of data consisted of 24 variables from 184 world economies for the period from 2000

to 2010. The empirical analysis divides the sample into OECD and non-OECD economies. The principle component analysis is applied to identify the weights of the variables so as to calculate the three indices. Both parametric and non-parametric regressions have been applied.

The empirical results show that both extensity and intensity variables can contribute positively to economic opportunity. The OECD show a stronger performance in both extensity and intensity variables. For non-OECD economies, their performance in extensity can be improved if they show improvements in intensity variables. The bottleneck in the generation of economic opportunity in non-OECD economies rests in their generally low intensity index. Their improvement in intensity would help extensity variables to promote economic opportunity. The findings in this paper are in line with other studies that advocated for the improvement of domestic factors to growth (for example, Li and Zhou, 2010).

The empirical findings can have further implications on economic development and growth, especially for non-OECD economies. Various suggestions can be made, for example, in improving the institutional factors and civic development so as to provide a healthier environment for intensity variables to perform (Acemoglu and Robinson, 2012). Stability and peace seem to be the more important economic scenarios through which economic opportunity can be nurtured, especially in economies constantly facing unrest and conflicts.

As compared to other existing indices, such as the Globalization Index (Kearney Inc., 2002; Andersen and Herbertsson, 2005; Dreher, 2006), the *Index of Economic Freedom* conducted annually by the Heritage Foundation and the annual *Global Competitiveness Report* produced by the World Economic Forum which mostly summarize the current status of different world economies, the Economic Opportunity Index (EOI) can provide the future potential of economies. Since economic opportunity reflects an *ex post* situation, the EOI is powerful in that it reflects the need to improve *ex ante* conditions. The EOI indicates what can be done, rather than what has been done in promoting development and growth.

Given the multi-dimensional coverage in the EOI, growth and development can more comprehensively and powerfully be explained than using single economic or socio-economic variables. The futuristic nature of the EOI can further be studied from the performance of individual economies on an annual basis in order to see the performance of individual world economy. Subsequently, investment activities would be directed to economies ranked high in the EOI. Similarly, governments can make use of the EOI for policy orientation. In a nutshell, this

study will open up a new chapter of intellectual discussion in development economics, and further investigations on how economic opportunity impacts on growth can follow.

Appendix

Appendix Table A1 The Weights Estimated from Principle Component Analysis

Economic Opportunity									
Factor Loading	Export of goods & services	Industry value added	Services value added	High-tech export	Employment to pop. ratio	Labor participation rate	Air transport	Internet users	Mobile & fixed line tel.
Comp 1	0.2188	-0.0836	0.4280	0.1999	-0.2639	-0.2944	0.1925	0.4938	0.5336
Comp 2	-0.0548	-0.2943	0.1816	0.2000	0.6207	0.5962	0.1967	0.1970	0.1384
Comp 3	0.4966	0.6344	-0.3924	0.3497	0.1505	0.1374	-0.0183	0.1564	0.0916
Comp 4	-0.4644	0.1964	-0.2311	0.1782	-0.0921	-0.0903	0.8018	-0.0270	-0.0199
Comp 5	0.0126	0.3089	-0.0109	-0.8566	0.1000	0.1524	0.1615	0.2637	0.2042
Com H	0.5133	0.6301	0.4237	0.9678	0.4960	0.4924	0.7450	0.3774	0.3544
Weights	10.27	12.60	8.47	19.36	9.92	9.85	14.90	7.55	7.09
Intensity Channel									
	CO2 emission	Inflation	Public spend education	Health expenditure	Mortality rate	Freedom of speech	Electoral self-determ.	Freedom of religion	Independence of judiciary
Comp 1	-0.0871	0.1193	0.2227	0.3436	0.2619	0.4629	0.4429	0.3550	0.4533
Comp 2	0.6715	-0.1618	0.0440	0.0968	-0.5798	0.0941	0.1700	0.3497	-0.1244
Comp 3	0.1868	0.6155	0.6110	0.3038	-0.0334	-0.1859	-0.1680	-0.2028	-0.1245
Comp 4	-0.0097	0.7486	-0.5861	-0.1396	-0.1033	0.0474	0.1249	0.2053	-0.0767
Comp 5	0.1349	0.1204	0.3926	-0.8632	0.1009	0.0842	0.0341	0.1667	0.1475
Comp 6	0.5941	-0.0038	-0.2013	-0.0303	0.4543	0.1387	0.2903	-0.5432	-0.0253
Com H	0.8646	0.9942	0.9630	0.9852	0.6331	0.2863	0.3543	0.6544	0.2647
Weights	14.41	16.57	16.05	16.42	10.55	4.77	5.91	10.91	4.41
Extensity Channel									
	Net inflow of portfolio equity	Foreign direct investment net inflows	Net official assistance & aid	Gross capital formation	Domestic credit to private sector	Market capitalization			
Comp 1	0.1342	0.3170	-0.4094	0.1322	0.6086	0.5710			
Comp 2	0.6728	0.5153	0.0808	0.4033	-0.1912	-0.2759			
Comp 3	0.1488	0.4013	0.5390	-0.6912	0.0775	0.2060			
Comp 4	-0.4122	0.1557	0.6226	0.5772	0.0310	0.2902			
Comp 5	0.5378	-0.6509	0.3707	0.0948	0.3642	0.0905			
Com H	0.6627	0.5513	0.8523	0.9910	0.4139	0.5288			
Weights	16.57	13.78	21.31	24.78	10.35	13.22			

Note: Com H = Commuality H. Weights are expressed in percentages.

Appendix Table A2 The Three Indices

2010 Ranking	Economic Opportunity Index		Intensity Index		Extensity Index	
	Country	Change from 2000 (Average ranking)	Country	Change from 2000 (Average ranking)	Country	Change from 2000 (Average ranking)
1	Singapore	1 (1)	Kiribati	0 (1)	Luxembourg	0 (1)
2	U.S.A.	-1 (2)	U.S.A.	2 (2)	Liberia	180 (17)
3	Iceland	6 (3)	Costa Rica	21 (18)	Hong Kong	-1 (3)
4	Hong Kong	7 (8)	East Timor	76 (11)	East Timor	1 (2)
5	P. N. Guinea	42 (17)	Denmark	-3 (3)	China	9 (4)
6	Switzerland	1 (5)	Lesotho	22 (7)	Cape Verde	16 (7)
7	Korea, Rep.	3 (10)	Iceland	-4 (4)	Turkmenistan	56 (106)
8	Qatar	25 (25)	Belgium	36 (14)	Maldives	75 (36)
9	Netherlands	-4 (6)	New Zealand	1 (9)	Djibouti	142 (51)
10	China	22 (19)	Micronesia	-1 (6)	Bahrain	131 (49)
11	U. A. E.	26 (22)	Sweden	-6 (5)	Vietnam	43 (18)
12	Luxembourg	10 (20)	Austria	36 (35)	Saint Lucia	17 (11)
13	Canada	-5 (12)	Norway	24 (10)	Bhutan	-6 (5)
14	U. K.	1 (13)	Barbados	5 (17)	Mongolia	20 (23)
15	Macao	23 (33)	Slovenia	25 (23)	Solomon Is.	150 (77)
16	Malaysia	-13 (4)	Ireland	29 (36)	South Africa	14 (19)
17	Ireland	-11 (9)	Netherlands	3 (19)	Macao	-4 (6)
18	Equ. Guinea	1 (18)	Finland	-4 (13)	Switzerland	-15 (8)
19	Germany	6 (21)	Saint Lucia	-7 (12)	Qatar	104 (15)
20	Norway	-3 (16)	Chile	11 (43)	Algeria	88 (52)
21	Barbados	9 (23)	Portugal	-10 (8)	Belarus	91 (76)
22	Sweden	-8 (15)	Canada	-6 (22)	Australia	11 (22)
23	Denmark	-10 (11)	Belize	47 (38)	Morocco	53 (45)
24	Cyprus	33 (36)	Japan	9 (26)	Spain	3 (14)
25	Philippines	-13 (14)	Uruguay	-2 (24)	Congo, D.R.	159 (111)
26	Kazakhstan	40 (46)	Estonia	16 (42)	India	72 (43)
27	Malta	-23 (7)	Botswana	-20 (21)	Singapore	-21 (16)
28	New Zealand	-2 (30)	Dominica	15 (37)	Oman	147 (116)
29	France	6 (32)	Switzerland	-23 (16)	Korea, Rep.	8 (32)
30	Brunei	9 (35)	Australia	6 (34)	Chad	49 (47)
31	Bahrain	13 (39)	Malta	1 (15)	Cyprus	-5 (24)
32	Costa Rica	-11 (27)	Hungary	-10 (25)	Canada	7 (29)
33	Anti.&Bar.	13 (37)	Solomon Is.	-7 (31)	Nepal	49 (78)
34	Australia	-10 (29)	Grenada	1 (32)	Haiti	44 (57)
35	Thailand	-15 (26)	Samoa	24 (45)	Lebanon	56 (70)
36	Austria	-7 (31)	Bahamas	16 (53)	Tonga	41 (63)
37	Japan	-19 (28)	Anti.&Barbu.	41 (63)	Malaysia	-27 (34)
38	Vietnam	4 (41)	StVincent&G.	-30 (20)	Thailand	18 (44)
39	StKitts & Nev.	9 (42)	Cape Verde	-1 (29)	U.K.	-18 (35)
40	Estonia	-17 (34)	France	-13 (28)	SaoTome&P.	106 (25)
41	Czech Rep.	8 (38)	U.K.	23 (30)	St Kitts&Ne.	-33 (10)
42	Slovenia	18 (44)	Namibia	-29 (40)	Netherlands	-31 (33)

43	Saint Lucia	13 (48)	Czech Rep.	4 (61)	Denmark	-12 (38)
44	Belgium	-8 (40)	Cyprus	-14 (33)	Samoa	49 (93)
45	Israel	-11 (49)	Brazil	5 (49)	Chile	12 (58)
46	Finland	-30 (24)	Spain	-17 (46)	Micronesia	-6 (37)
47	Trin. & Toba.	20 (56)	Argentina	-6 (39)	USA	-35 (26)
48	Hungary	-3 (45)	Guatemala	23 (67)	Japan	-39 (21)
49	Bahamas	-9 (47)	StKitts&Ne.	12 (64)	Vanuatu	10 (81)
50	Brazil	0 (50)	Lithuania	3 (47)	Indonesia	70 (124)
51	Slovak Rep.	17 (57)	Poland	6 (44)	Sweden	11 (65)
52	Zimbabwe	33 (55)	Germany	-1 (51)	Kiribati	-10 (48)
53	Russia	6 (65)	Vanuatu	-32 (27)	Portugal	-30 (41)
54	Peru	35 (77)	Suriname	1 (57)	Panama	-2 (102)
55	Eritrea	19 (58)	Luxembourg	-1 (56)	Burundi	119 (53)
56	Venezuela	31 (79)	Mauritius	2 (50)	Armenia	58 (66)
57	StVincent&G.	33 (83)	P. N. Guinea	18 (54)	Romania	99 (127)
58	Azerbaijan	45 (84)	Greece	27 (87)	Ireland	-39 (27)
59	Spain	18 (63)	El Salvador	-3 (58)	Dominica	-9 (46)
60	Congo Rep.	-7 (66)	Moldova	38 (81)	Niger	103 (128)
61	Kuwait	-20 (53)	Korea, Rep.	12 (59)	Mauritius	7 (84)
62	Seychelles	7 (62)	Djibouti	26 (84)	Montenegro	44 (71)
63	Portugal	-12 (54)	Montenegro	-1 (55)	Grenada	-47 (12)
64	Grenada	-36 (52)	Bolivia	20 (72)	Suriname	114 (126)
65	Lithuania	19 (74)	South Africa	-16 (60)	Senegal	36 (91)
66	Uruguay	29 (86)	Italy	-49 (48)	Nicaragua	-38 (31)
67	Bolivia	-36 (68)	Trin. & Toba.	9 (74)	Mauritania	13 (28)
68	Tanzania	10 (75)	SaoTome&Pr.	-34 (41)	Tanzania	62 (96)
69	Uzbekistan	-6 (61)	Liberia	42 (100)	Iran	-2 (54)
70	Latvia	48 (76)	Jamaica	-3 (68)	Gambia	39 (69)
71	Mexico	-19 (59)	Tonga	3 (95)	Malawi	-24 (61)
72	Ecuador	-8 (73)	Bosnia H.	27 (94)	New Zealand	-17 (62)
73	Chad	81 (113)	Malawi	24 (91)	Norway	19 (97)
74	Dominica	-19 (60)	Paraguay	-59 (65)	Tunisia	-1 (113)
75	Panama	18 (91)	Burundi	67 (101)	Guyana	-39 (55)
76	Tajikistan	-49 (43)	Latvia	-37 (62)	Fiji	68 (137)
77	Angola	-34 (64)	Croatia	13 (73)	Lesotho	-62 (73)
78	Chile	26 (97)	Guyana	-60 (52)	U.A.E.	40 (129)
79	Rwanda	4 (51)	Panama	-33 (66)	Mozambique	-55 (59)
80	Oman	25 (120)	Dom.Rep.	12 (90)	France	-37 (79)
81	Croatia	17 (82)	Ghana	5 (86)	Kyrgyz Rep.	15 (132)
82	Indonesia	-24 (71)	Comoros	77 (119)	Bulgaria	71 (87)
83	Bhutan	19 (100)	Colombia	-18 (70)	Benin	27 (134)
84	Ukraine	28 (112)	Ecuador	28 (88)	Sri Lanka	0 (119)
85	Burma	-24 (69)	Sierra Leone	-25 (79)	Belgium	-39 (75)
86	Zambia	8 (99)	Albania	17 (83)	Austria	-38 (72)
87	Cambodia	-5 (81)	Haiti	-21 (71)	Botswana	-17 (98)
88	Belarus	3 (96)	Mongolia	-7 (96)	Nigeria	95 (163)
89	Poland	34 (108)	Serbia	71 (97)	Albania	-45 (74)
90	Madagascar	-25 (70)	Cuba	36 (106)	Colombia	82 (155)
91	Laos	-18 (90)	Senegal	3 (85)	Equ. Guinea	-87 (20)
92	Colombia	5 (101)	Ukraine	14 (98)	Croatia	43 (86)
93	Paraguay	18 (98)	Burkina Faso	25 (124)	Macedonia	11 (130)

94	Botswana	-32 (78)	Swaziland	43 (108)	Slovenia	-6 (82)
95	Bulgaria	38 (116)	Lebanon	-26 (103)	Kazakhstan	60 (80)
96	Burkina Faso	-26 (80)	Georgia	24 (102)	Saudi Arabia	36 (125)
97	Libya	37 (125)	Seychelles	-15 (89)	Italy	-26 (105)
98	Mozambique	-44 (67)	Israel	-26 (80)	Barbados	-1 (50)
99	Gabon	-7 (102)	Maldives	16 (122)	Seychelles	-14 (109)
100	SaoTome& Pr.	26 (123)	Benin	-17 (105)	Laos	21 (112)
101	Argentina	14 (104)	Slovak Rep.	-22 (78)	Afghanistan	76 (40)
102	Mauritius	-16 (85)	Philippines	-7 (93)	Russia	50 (138)
103	Burundi	6 (95)	Congo, Rep.	40 (123)	Ghana	-29 (115)
104	Uganda	-28 (72)	Togo	28 (115)	Bahamas	-38 (99)
105	Nepal	-33 (92)	Bulgaria	26 (92)	Peru	20 (152)
106	Malawi	7 (107)	Macedonia	-81 (76)	Libya	70 (170)
107	Montenegro	12 (110)	Gabon	21 (114)	Moldova	-18 (67)
108	Senegal	-33 (89)	Niger	6 (113)	Malta	-76 (94)
109	Serbia	-30 (103)	Honduras	-41 (75)	Finland	-92 (68)
110	Greece	-9 (106)	Peru	-19 (82)	Honduras	-61 (60)
111	Haiti	-31 (87)	Gambia	2 (107)	Mexico	2 (139)
112	Italy	-41 (93)	Bhutan	44 (128)	Latvia	4 (56)
113	Maldives	24 (129)	Tanzania	20 (137)	Israel	-41 (104)
114	Gambia	-15 (105)	Mali	-27 (99)	Ethiopia	-11 (83)
115	Guinea	5 (122)	Kenya	29 (121)	Bangladesh	0 (133)
116	Romania	-35 (119)	Mozambique	-11 (112)	Jordan	-75 (30)
117	Cape Verde	18 (127)	Cambodia	23 (109)	Estonia	-57 (42)
118	Dom. Rep.	-8 (115)	Guinea	47 (150)	StVincent&G	-60 (39)
119	Cuba	2 (111)	Singapore	5 (139)	Serbia	-12 (123)
120	Guyana	-6 (128)	Hong Kong	-10 (129)	Ecuador	13 (147)
121	Georgia	1 (88)	Macao	-14 (135)	Uganda	-19 (122)
122	Togo	-16 (114)	Guinea-Biss.	-22 (125)	Madagascar	32 (88)
123	Saudi Arabia	17 (133)	Romania	-6 (118)	Gabon	16 (146)
124	Sierra Leone	-17 (94)	Kyrgyz Rep.	26 (116)	Uzbekistan	47 (157)
125	Guatemala	-9 (117)	Zambia	-4 (120)	Namibia	3 (135)
126	Kyrgyz Rep.	-26 (132)	Mexico	-37 (104)	Germany	-88 (107)
127	Cameroon	-3 (131)	Uganda	34 (127)	Czech Rep.	-74 (103)
128	Suriname	28 (139)	Cote d'Ivoire	-1 (146)	Brazil	-2 (158)
129	Ethiopia	1 (118)	Fiji	-52 (77)	Burma	51 (180)
130	Belize	-5 (130)	Thailand	-28 (110)	P.N. Guinea	-55 (114)
131	Honduras	-23 (126)	Turkey	8 (145)	Poland	-32 (149)
132	Fiji	-1 (134)	Malaysia	-9 (138)	Rwanda	-42 (118)
133	El Salvador	-5 (135)	Nepal	2 (136)	Philippines	-11 (151)
134	Turkmenistan	-38 (124)	Nicaragua	-71 (69)	Sudan	14 (117)
135	Mongolia	18 (143)	Rwanda	33 (156)	Congo, Rep.	-6 (144)
136	Jamaica	-48 (109)	Armenia	-20 (132)	Tajikistan	26 (165)
137	Bangladesh	-5 (136)	Tunisia	-18 (134)	Bosnia H.	-76 (110)
138	Macedonia	19 (153)	Iraq	36 (160)	Burkina Faso	2 (143)
139	Cote d'Ivoire	-12 (121)	Jordan	-35 (111)	Sierra Leone	-22 (108)
140	Kenya	6 (146)	Cameroon	22 (144)	Greece	-95 (86)
141	Samoa	3 (140)	Bangladesh	-19 (131)	Slovak Rep.	-54 (120)
142	Tonga	19 (152)	Algeria	-17 (141)	Zambia	-78 (95)
143	Nicaragua	4 (145)	Vietnam	9 (153)	Mali	-74 (101)
144	Benin	-6 (142)	Mauritania	14 (155)	Ukraine	3 (140)

145	Albania	23 (161)	Indonesia	12 (152)	Kenya	-8 (159)
146	Ghana	-29 (137)	Angola	37 (169)	Iceland	-128 (9)
147	Micronesia	1 (144)	Venezuela	-38 (117)	Turkey	-20 (167)
148	Sudan	33 (179)	Bahrain	25 (164)	Jamaica	-113 (64)
149	Morocco	1 (155)	Azerbaijan	20 (158)	C. Afri. Rep.	18 (179)
150	Vanuatu	-21 (138)	Belarus	-4 (149)	Togo	-14 (161)
151	Armenia	-6 (159)	Egypt	-15 (143)	Belize	-86 (136)
152	Iran	26 (165)	Morocco	-11 (147)	Georgia	-58 (90)
153	Turkey	-10 (156)	India	-24 (130)	Antigua Bar.	-133 (13)
154	Congo, D. R.	-2 (147)	Sri Lanka	-46 (126)	Argentina	-16 (162)
155	Bosnia H.	21 (169)	Iran	9 (163)	Costa Rica	3 (150)
156	Nigeria	19 (167)	Laos	24 (176)	Egypt	-51 (142)
157	Lebanon	16 (171)	Yemen	-12 (148)	Guinea	-26 (164)
158	C. Afri. Rep.	-19 (151)	Oman	-7 (154)	Lithuania	-9 (141)
159	Tunisia	8 (166)	Tajikistan	-6 (162)	Kuwait	5 (131)
160	Lesotho	-24 (141)	Equa. Guinea	19 (180)	Cambodia	-36 (153)
161	Djibouti	-2 (163)	Burma	15 (179)	Hungary	-80 (121)
162	Sri Lanka	-2 (160)	Sudan	9 (170)	Paraguay	-19 (173)
163	Solomon Is.	-5 (157)	Uzbekistan	4 (168)	Bolivia	-68 (160)
164	India	-15 (148)	China	-1 (165)	Venezuela	-45 (154)
165	Namibia	-3 (149)	Russia	-31 (151)	Syria	4 (156)
166	Swaziland	-24 (150)	Chad	0 (177)	Brunei	-80 (148)
167	Moldova	-26 (154)	Syria	-66 (142)	Iraq	6 (100)
168	Guinea-Bissau	-13 (158)	Libya	2 (167)	Uruguay	0 (175)
169	Egypt	10 (173)	Saudi Arabia	-20 (159)	Cameroon	-9 (168)
170	South Africa	-19 (162)	C. Afri. Rep.	-40 (161)	Comoros	-4 (178)
171	Kiribati	-2 (168)	Afghanistan	6 (172)	Dom. Rep.	-60 (171)
172	Niger	-9 (164)	Madagascar	-76 (133)	Azerbaijan	-30 (92)
173	Jordan	-8 (172)	Congo, DR	11 (174)	Pakistan	-14 (166)
174	Liberia	8 (176)	Ethiopia	-81 (140)	Cote d'Ivoire	5 (183)
175	Algeria	-3 (174)	Kazakhstan	0 (175)	El Salvador	-41 (174)
176	Pakistan	4 (177)	Brunei	-28 (173)	Guatemala	-26 (169)
177	Mauritania	0 (181)	Turkmenistan	1 (181)	Trin. & Toba.	-77 (145)
178	East Timor	-14 (170)	Kuwait	-40 (166)	Zimbabwe	-21 (176)
179	Yemen	-5 (178)	Eritrea	-32 (171)	Angola	-9 (182)
180	Syria	-10 (175)	Nigeria	-25 (157)	Yemen	-35 (177)
181	Mali	-10 (180)	Pakistan	-9 (178)	Swaziland	-20 (181)
182	Comoros	1 (183)	U. A. E.	-1 (182)	Cuba	-1 (184)
183	Afghanistan	1 (184)	Qatar	-1 (183)	Guinea-Biss.	-132 (172)
184	Iraq	-18 (182)	Zimbabwe	-30 (184)	Eritrea	-159 (89)

References

- Acemoglu, Daron, and James A. Robinson, (2012), *Why Nations Fail?* London: Profile Books.
- Aghion, P., and P. Howitt, (1998), *Endogenous Growth Theory*, Cambridge, MA: The MIT Press.
- Andersen, T. M., and T. T. Herbertsson, (2005), “Quantifying Globalization”, *Applied Economics*, 37, 1089-1098.
- Barro, R. J., (1999), “Human Capital and Growth in Cross-country Regressions”, *Swedish Economic Policy Review*, 6, 237-277.
- Barro, R. J., (2000), “Inequality and Growth in a Panel of Countries”, *Journal of Economic Growth*, 5, 5-32.
- Bekaert, Geert, Campbell R. Harvey, and Christian Lundblad, (2005), “Does Financial Liberalization Spur Growth?”, *Journal of Financial Economics*, 77, 3-55.
- Bhagwati, Jagdish, (2004), *In Defense of Globalization*, New York: Oxford University Press.
- Blundell, Richard, and James L. Powell, (2003), “Endogeneity in Nonparametric and Semiparametric Regression Models”, in Mathias Dewatripont, Lars Peter Hansen, and Stephen J. Turnovsky (eds), *Advances in Economics and Econometrics*, Chapter 8, Cambridge: Cambridge University Press, 358-360.
- Deininger, K., and L. Squire, (1996), “A New Dataset Measuring Income Inequality”, *World Bank Economic Review*, 10, 3, 565-592.
- Demirgüç-Kunt, A. and Ross Levine, 2008, *Finance and Economic Opportunity*, Policy Research Working Paper 4468, Development Research Group, Washington D.C.: The World Bank, January.
- Douglas, Paul H., 1976, “The Cobb-Douglas Production Function Once Again: Its History, Its Testing and Some New Empirical Values”, *Journal of Political Economy*, 84, 5, October, 903-916.
- Dreher, Axel, (2006), “Does Globalization Affect Growth? Evidence from a New Index of Globalization”, *Applied Economics*, 38, 1091-1110.
- Durlauf, Steven N., P. A. Johnson, and J. R. W. Temple, (2005). “Growth Econometrics”, in P. Aghion and Steven N. Durlauf (eds.), *Handbook of Economic Growth*, Vol. 1, Part A, Chapter 8, Amsterdam: Elsevier B.V., 555-677.
- Easterly, William, and Sergio Rebelo, (1993), “Fiscal Policy and Economic Growth”, *Journal of Monetary Economics*, 32, 417-458.

- Galor, O., (2000), "Income Distribution and the Process of Development", *European Economic Review*, 44, 706-712.
- Griliches, Z., (1957), "Specification Bias in Estimates of Production Functions", *Journal of Farm Economics*, 39, 8-20.
- Grossman, Gene M., and Elhanan Helpman, (1990), "Trade, Innovation, and Growth", *American Economic Review*, 80, 2, May, 96-91.
- Henderson, D. J., R. J. Carroll, and Q. Li, (2008), "Nonparametric Estimation and Testing of Fixed Effects Panel Data Models", *Journal of Econometrics*, 144, 257-175.
- Heritage Foundation, (various years), *Index of Economic Freedom*, Washington D.C.
- Joreskog, Karl G., and Arthur S. Goldberger, (1975), "Estimation of a Model with Multiple Indicators and Multiple Causes of a Single Latent Variable", *Journal of the American Statistical Association*, 70, 351, 631-639.
- Kejak, Michal, (2003), "Stages of Growth in Economic Development", *Journal of Economic Dynamics and Control*, 27, 5, March, 771-800.
- Kearney, A. T. Inc., (2002), "Globalization Index", *Foreign Policy Magazine*, Washington D. C.: Foreign Policy.
- Kenny, Charles, and David Williams, (2001), "What Do We Know about Economic Growth? Or, Why Don't We Know Very Much?", *World Development*, 29, 1, 1-22.
- King, Robert G., Charles I. Plosser, and Sergio T. Rebelo, (1988), "Production, Growth and Business Cycles", *Journal of Monetary Economics*, 21, 195-232.
- Kosempel, Stephen, (2004), "A Theory of Development and Long Run Growth", *Journal of Development Economics*, 75, 201-22.
- Li, Kui-Wai, (2012), *Analyzing the Kuznets Relationship using Nonparametric and Semiparametric Methods*, CIRJE, University of Tokyo, Japan, CIRJE-F-839, January.
- Li, Kui-Wai, and Tung Liu, (2011), "Economic and Productivity Growth Decomposition: An Application to Post-reform China", *Economic Modelling*, 28, 366-373.
- Li, Kui-Wai and X. Zhou (2010), "Openness, Domestic Performance and Growth", *Economics Letters*, 107, January, 13-16.
- Li, Q., and C. Hsiao, (1998), "Testing Serial Correlation in Semiparametric Panel Data Models", *Journal of Econometrics*, 87, 207-237.

- Loehlin, John C., (1998), *Latent Variable Models: An Introduction to Factor, Path and Structural Analysis*, New Jersey: Lawrence Erlbaum Associates Publishers.
- Lucas, Jr. R. E. (1988), “On the Mechanics of Economics Development”, *Journal of Monetary Economics*, 22, 3-42.
- Lucas, Jr. R. E., (1990), “Why Doesn’t Capital Flow from Rich to Poor Countries?”, *American Economic Review*, 80, 2, May, 92-96.
- Marschak, J., and W. H. Andrews, (1944), “Random Simultaneous Equations and the Theory of Production”, *Econometrica*, 12, 143-205.
- Miller, Ronald E. and Peter Blair, (2009), *Input-Output Analysis: Foundations and Extensions*, 2nd edition, Cambridge: Cambridge University Press.
- O’Neil, Jim, (2012), *The Growth Map: Economic Opportunity in the BRICs and Beyond*, London: Penguin.
- Panzironi, Francesca and Katharine Gelber, (2012), *The Capability Approach: Development Practice and Public Policy in the Asia-Pacific Region*, London: Routledge, May.
- Rencher, Alvin, (2002), *Methods of Multivariate Analysis*, 2nd edition, New York: Wiley-Interscience.
- Romer, Paul, (1993), “Idea Gaps and Objective Gaps in Economic Development”, *Journal of Monetary Economics*, 32, 543-573.
- Sala-i-Martin, X., (1997), “I Just Ran 2 Million Regressions”, *American Economic Review*, 87, 2, 178-183.
- Solow, R. M., (1957), “Technical Change and the Aggregate Production Function”, *Review of Economics and Statistics*, 39, 312-320.
- Tamura, Robert, (2006), “Human Capital and Economic Development”, *Journal of Development Economics*, 79, 26-72.
- Thirlwall, A. P., (1978), *Growth and Development*, 2nd edition, London: Macmillan.
- Thompson, Bruce, (2004), *Exploratory and Confirmatory Factor Analysis: Understanding Concepts and Applications*, Washington D.C.: American Psychological Association.
- Ullah, A., and N. Roy, (1998), “Nonparametric and Semiparametric Econometrics of Panel Data”, in Ullah, A., and D. E. A. Giles (Eds.), *Handbook of Applied Economic Statistics*, New York, Marcel Dekker, pp. 579-604.
- World Economic Forum, (various years), *The Global Competitiveness Report*, Switzerland.

Young, Alwyn, (1994), “Lessons from the East Asian NICS: A Contrarian View”, *European Economic Review*, 38, 964-973.

Zhou, X. and Kui-Wai Li, (2011), “Inequality and Development: Evidence from Semiparametric Estimation with Panel Data”, *Economics Letters*, 113, 3, December, 203-207.