

INEQUALITY IN GLOBALIZATION: AN EXTENSION OF THE GINI INDEX FROM THE PERSPECTIVE OF NATIONAL COMPETITIVENESS

Min-Young Kim*

The Institute for Industrial Policy Studies

ABSTRACT

This article studies the unequal distribution of the benefits a country enjoys from participating in globalization from the perspective of international business. As globalization is a set of mutually beneficial interactions between countries and MNCs to enhance competitiveness of each participant, benefits countries enjoy from globalization should be understood in terms of national competitiveness. In this light, this article applies the generalized double diamond (GDD) model to the analysis of national competitiveness and introduces the globalization inequality index (GII) as an extension of the Gini index to measure inequality in globalization. Statistical analyses of GIIs show that benefits from globalization are unequally distributed over countries and suggest a need for the strategic interpretation of the role of a location in the era of globalization.

Key words: Globalization, Inequality, Gini index, Globalization Inequality Index, National Competitiveness

INTRODUCTION

As multinational corporations (MNCs) accelerate their global expansion through foreign direct investment (FDI), the geography of the world economy witnesses faster changes than ever. In the era of globalization, MNCs, as vehicles of implementing globalization, can make the best use of locational advantages by interacting with countries and, in turn, host countries can get benefits from MNCs in the process of transferring valuable assets. However, there has been constant debate over the benefits globalization has brought to its participants, particularly on the theme of

* The Institute for Industrial Policy Studies, Seoul 120-808, Korea. E-mail: mykim@ips.or.kr

unequal distribution of benefits from globalization. In an attempt to suggest a more convincing answer, this article studies the status of the distribution of benefits a country can enjoy from participating in globalization, by introducing the globalization inequality index (GII).

This article focuses on the role of location as one of the determinants that affect the strategic behaviors of MNCs. Theories list ownership advantages, locational advantages, and internalization advantages as variables determining the decisions of MNCs in FDI (Dunning 1979, 1981, 1988). One of the goals for MNCs to go abroad, according to conventional FDI theories, is to explore locational advantages the host country provides. As FDI primarily refers to the transfer of non-financial and ownership-specific intangible assets by MNCs (Dunning and Rugman 1985), if MNCs prefer certain locations to others, the preference would result in unbalanced accumulation of those assets transferred by MNCs in certain locations. The accumulated assets in the country, in turn, will function as an attractive option for MNCs, resulting in an ever-increasing accumulation. If the benefits of globalization are asymmetrically distributed through selective concentration of investments, the implication of the phenomenon is significant to people in all fields, especially to those in business and policy-making, and therefore appropriate steps should be taken to keep and enhance the competitiveness of both MNCs and countries.

For this purpose, the article studies the inequality in distribution of benefits from globalization through the following stages. Firstly, an appropriate model to analyze the benefits from globalization will be suggested through exhaustive literature reviews. Secondly, a globalization inequality index (GII) will be introduced as an extension of the Gini index to the international level to measure unequal distribution of the benefits from globalization. Lastly, implications of the phenomenon will be discussed from the perspective of business and government.

LITERATURE ON INEQUALITY IN GLOBALIZATION

Literature on unequal distribution of benefits from globalization has largely focused on the theme of inequality in income distribution and has suggested contradictory interpretations of the results. Some studies argue that globalization has driven the world to a more prosperous stage. Dollar and Kraay (2002a) argue that higher growth through greater openness to trade and investment has reduced global inequality and poverty. Integrating individual income distributions for 125 countries, Sala-i-Martin (2002) shows that global income inequality was substantially reduced during the 1980s and 1990s, though there were fluctuations by time and regions. Chen and Ravallion (2001) show that the overall incidence of consumption poverty decreased in the period of 1987-1998, but the rate of poverty reduction was disappointing. Chen and Ravallion (2004) also show that the number of people in poor declined to 1.1 billion

in 2001, a number almost 400 million fewer than what it was 20 years earlier, largely due to the dramatic progress of China. If China had been excluded from the calculation, there would have been little change in the number of people suffering from poverty. Barro (2000) finds a dynamic relationship between openness and inequality. He shows that globalization has a positive effect on the underdeveloped countries, but negative influences on the developed countries.

Other studies, on the other hand, assert that the benefits of globalization have been asymmetrically distributed among countries. With the metaphor, “islands of concentrated wealth in a sea of misery,” Mazur (2000) insists that inequality between and within nations has been increased in the process of globalization. He says that only a small number of countries and firms have enjoyed the benefits of a global economy. Garrett (2004) shows that middle-income countries have been relatively excluded from the benefit of globalization because they have not found a niche in world markets. These studies, however, analyze the sequence of globalization from the viewpoint of income distributions, which do not provide enough implications to understand the complex phenomenon of globalization.

There is other literature with broader perspectives on globalization but does not provide a comprehensive analysis of the phenomenon. Bhagwati (2004) defends the benefits of globalization, arguing that the world needs more globalization, especially in poor countries. Demonstrating counter-evidence to the charges that anti-globalizers make against globalization, he proves that their assertions are misleading or not correct. Wolf (2004) also refutes the criticisms of globalization. He argues that free trade is necessary for sustained growth and that MNCs are not exploitative and do not have negative effects on home countries.

In his analysis of the effects that globalization has brought to the every corner of the world, Friedman (2005) insists that *The World Is Flat*. He argues that the development of technology and communication has enabled countries all around the world to compete on a leveled playing field. As information, a key factor to successful survival of global competition, can now be processed all over the world through a global network, the playing field has been flattened for participants in global competition, thus generating equal chances for the participants.

Criticizing Friedman’s depiction of a flattened world, Prusak (2006) argues, in his article *The World is Round*, that Friedman (2005) confuses information with knowledge. He asserts that, unlike information, knowledge is hard to transfer from one place to another. As knowledge needs time to transfer and is the key to prosperity, he insists that the world is not as flat as described by Friedman (2005). In a similar vein, *The Economist* (2005) criticizes Friedman’s metaphor of a flattened world for the imprecision of its contents and the emptiness of its argument. Varadarajan (2005) also censures Friedman’s analysis, arguing that Friedman analyzes globalization in an

ahistorical manner and he does not differentiate quantitative changes from qualitative ones.

One of the reasons that the previous literature on globalization is full of controversial interpretations of the same phenomenon is that there is confusion in understanding the concepts of globalization (Dollar and Kraay 2002b). Globalization is basically implemented through a strategic interaction between countries and MNCs (Agmon 2003). From this interactive process, countries enjoy the benefits MNCs transfer to the host countries and, at the same time, MNCs expand their strategic resources to the better locational advantage that host countries provide. Therefore, globalization can be understood as a mutually beneficial interaction between countries and MNCs, and thus, enhance competitiveness of both countries and MNCs. In this light, a correct understanding of benefits from globalization should be based on national competitiveness as a whole, not on the limited number of variables comprising national competitiveness such as income distribution and development of infrastructures.

To understand the benefits of globalization more comprehensively and rigorously, a comprehensive model of national competitiveness should first be discussed before we study the status of the distribution of benefits from globalization. The following section discusses the development of models of national competitiveness and suggests the generalized double diamond model as a model to analyze the benefits of globalization.

MODELING

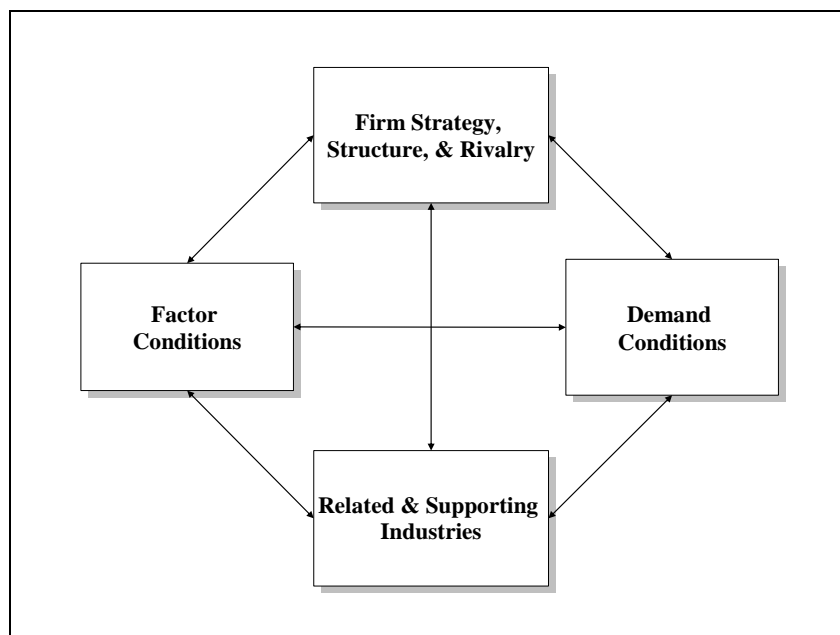
The Diamond Model

In the realm of traditional trade theory, scholars have considered capital, labor, and natural resources as sources of national competitiveness. In reality, however, there are many counterexamples that go against what traditional theorists have argued. Criticizing the conventional model for being at best incomplete and at worst incorrect, Porter (1990) introduced the diamond model in his book, *The Competitive Advantage of Nations*. The diamond model is comprehensive because it creates a single model by incorporating the production factor conditions that most traditional theorists have employed along with other important variables to explain national competitiveness. Therefore, the explanatory power of the diamond model is revolutionary (Ryan 1990, Thain 1990).

The diamond model is composed of two parts: *endogenous* and *exogenous* variables. The endogenous variables are Factor Conditions, Firm Strategy, Structure, and Rivalry, Related and Supporting Industries, and Demand Conditions. The exogenous variables are Government and Chances. Factor Conditions measure the factors of production necessary to compete in certain industries and they can be further divided into two

subcategories of basic factor conditions such as natural resources, climate, and population, and advanced factor conditions such as skilled labor, technology, and know-how. Firm Strategy, Structure, and Rivalry represent the national environment in which companies are created, organized, and managed, as well as the nature of domestic rivalry. Related and Supporting Industries test competitiveness of industries related to a given industry or supplier industries. Demand Conditions show the nature of the domestic market by its size and sophistication. Figure 1 illustrates variables comprising the diamond model and their interaction to spur national competitiveness.

Figure 1. Porter's Diamond Model



Source: Porter (1990)

Table 1 analyzes the focus of previous studies on the benefits of globalization with the variables of the diamond model. As clearly depicted in the table, benefits of globalization studied in the previous literature focus largely on a limited number of variables from the diamond model. Studies on unequal distribution of income highlight Factor Conditions of the diamond model and other studies with broader scopes of the benefits also address each of the other variables of the diamond model. Consequently, for a more comprehensive understanding of the benefits of globalization, a study should lay its basis on a rigorous analytical model of national competitiveness.

Table 1. Focuses of Previous Studies on Benefits from Globalization

Studies	Factor Conditions	Demand Conditions	Related & Supporting Industries	Firm Strategy, Structure, & Rivalry
Dollar and Kraay (2002a)	⊙	○	.	.
Sala-i-Martin (2002)	⊙	○	.	.
Chen and Ravallion (2001, 2004)	⊙	○	.	.
Barro (2000)	⊙	○	.	.
Garrett (2004)	⊙	○	.	.
Bhagwati (2004)	⊙	○	.	○
Wolf (2004)	.	⊙	.	○
Friedman (2005)	○	.	⊙	.
Prusak (2006)	⊙	.	.	.

⊙: major focus, ○: minor focus

The Double Diamond Model

Though Porter's diamond suggests a revolutionary paradigm on national competitiveness, the model is not free from criticism. The major focus of the criticism falls on the scope of national competitiveness: the scope of national competitiveness in Porter's diamond model is basically domestic and the international context should be incorporated in the analysis of national competitiveness. While acknowledging the principles suggested in the diamond model, Dunning (1993) argues that the geographical constituency of the model should be established on very different criteria. Cartwright (1993) tests the diamond model with data from resource-based and export-dependent industries of New Zealand and questions the validity of the diamond model, suggesting that the international context of national competitiveness should be considered. Studying Mexico's leading clusters, Hodgetts (1993) confirms the importance of international context in the explanation of the competitive advantage of non-triad nations that link their diamond into that of triad countries.

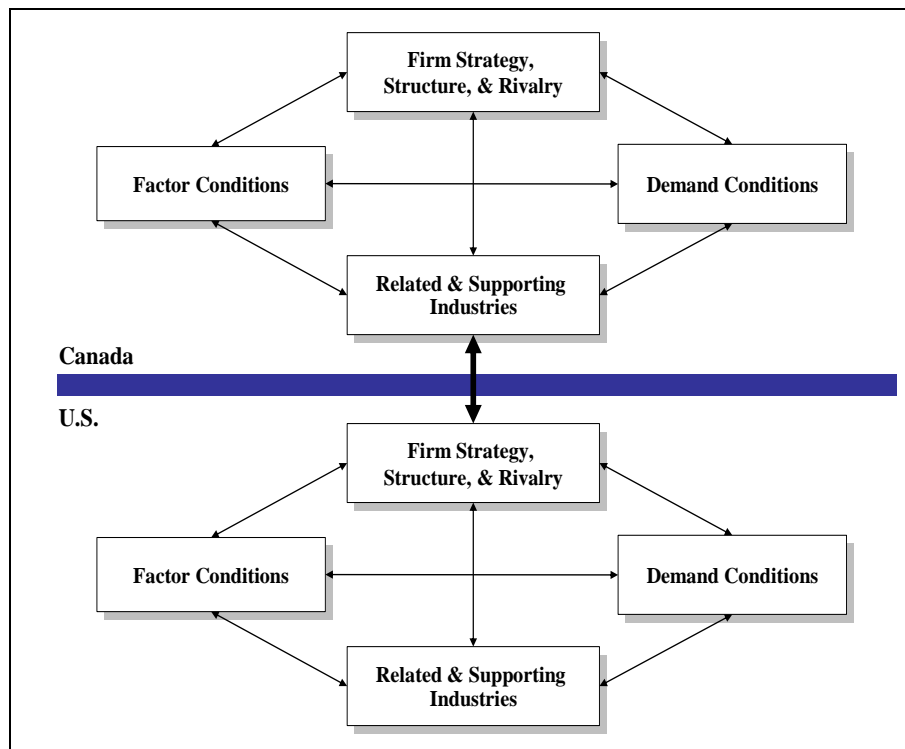
In the case of Canada, Rugman (1991) insists that the limited scope of variables in Porter's diamond makes it hard to explain relevantly the national competitiveness of small economies that rely on foreign markets for most of their sources of development. In addition, in their analysis of the effects of international variables such as international rivalry and foreign markets on the competitiveness of U.S. software firms, Moon and Lee (1995) find that international variables are important not only to the small economies but also to economies with a relatively large size.

In an attempt to correct the flaws in Porter's diamond model, Rugman and D'Cruz (1993) extend Porter's single diamond model into the double diamond model by incorporating the international context of national competitiveness. They criticize Porter's diamond with the following logic. In Porter's diamond, global firms obtain sustainable competitive advantage with successful utilization of components in their

home country diamond. This is true in the case of large economies with a big domestic diamond such as Japan, Europe, and the U.S. The same principle, however, is not applicable to the small, open, and trading economies such as Canada and New Zealand, because these countries have limited domestic diamonds. To correct this flaw, Porter's diamond model should be modified in a way that each country with a small domestic diamond can set its own diamond against a relevant 'triad' diamond. In other words, small economies should consider the double diamond: the diamond of a relevant triad and the diamond of each of their own home-countries.

Through the incorporation of international context, Rugman and D'Cruz (1993) successfully correct the flaw of Porter's diamond model and enhance the explanatory power of the diamond model. The double diamond has been empirically applied to the study of national competitiveness of such countries as Canada, New Zealand, and Mexico (Cartwright 1993, Hodgetts 1993, Rugman and Verbeke 1993) and proves its validity as a comprehensive model encompassing both domestic and international contexts of national competitiveness. The double diamond model is depicted in Figure 2.

Figure 2. Double Diamond Model



Source: Rugman and D'Cruz (1993)

The Generalized Double Diamond Model

Though the double diamond successfully extends the scope of national competitiveness and many empirical studies prove its validity, it still has some structural problems with regard to explaining national competitiveness, especially in an era of ever-increasing globalization. As discussed before, firms in a globalized economy must make the most of domestic and international contexts, regardless of their home countries' stage of economic development. In this light, just taking a country's relevant 'triad diamond' in connection with its domestic diamond can not explain the national competitiveness of countries such as Korea and Singapore that target resources and markets not just in domestic contexts but also in global contexts (Moon, Rugman, and Verbeke 1998, Cho and Moon 2000). In other words, these countries utilize not only the triad diamonds but also the global diamond that includes economies other than the triad, and therefore need to incorporate other nontriad countries into the analysis of national competitiveness. For example, an analysis of Korean trade in 2005 shows that trade with about 7 countries comprises two-thirds of total trade in which trade with China, Japan, and U.S. makes up a half¹. Consequently, for an economy like Korea, trade with nontriad countries should not be neglected. If the double diamond model is to be employed to explain the national competitiveness of Korea, however, the results would be like a bunch of grapes, because the double diamond analyzes each of countries with which a country is related to in the global economy, as depicted in Figure 2. When considering the number of countries participating in the global economy, handling each of the multiple diamonds is certainly not an efficient way of analyzing national competitiveness.

In addition, recent data in FDI show different trends from conventional FDI in that not only firms from developed countries invest in less developed countries, but also firms from less developed countries have started investing in developed countries (Moon and Roehl 2001). Furthermore, South-South investment is also on its way of increase (Battat and Aykut 2005). After all, it is clear that a model of national competitiveness must be comprehensive enough to cover not only the domestic diamond but also the global diamond that includes both triad countries and other non-triad countries participating in the global economy.

In brief, the double diamond has two limitations in explaining national competitiveness. Firstly, the double diamond considers international contexts as the diamonds of triad, a structure not applicable to small economies. Secondly, the double diamond does not provide an efficient explanation of the relationship with other countries, especially when it comes to multiple diamonds.

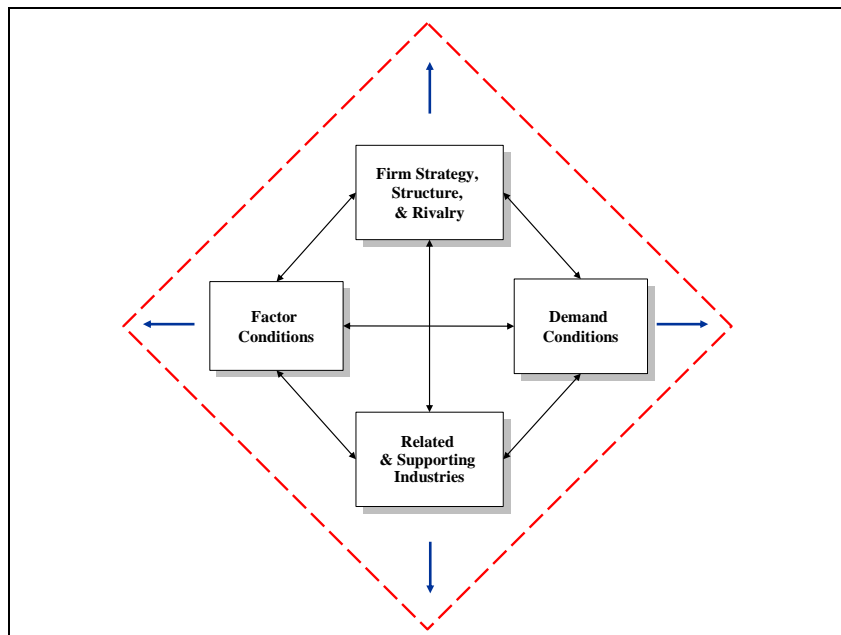
To correct the limitations of the double diamond model, Moon, Rugman, and Verbeke (1998) introduce the generalized double diamond (GDD) model as an

¹ The analysis refers to data in Korea International Trade Association (www.kita.net).

extension to the double diamond model and empirically prove the explanatory power of the new model with a case study on the national competitiveness of Korea and Singapore. In the GDD model, they introduce the concept of a ‘global diamond’ by generalizing all the non-domestic, i.e. international, diamonds.

The GDD model corrects the problems in the double diamond model, by incorporating a domestic diamond and a global diamond into a single framework. With the GDD model, a country can comprehensively analyze its national competitiveness in both domestic and international contexts. The domestic diamond assesses a country’s own competitiveness, while the international diamond evaluates the extent to which a country can enhance its competitiveness by aggregating all of the non-domestic diamonds. In the analysis with the GDD model, a country can take into consideration not only the national competitiveness of the triad countries, but also that of other countries with which the country interacts in the global economy. This process of generalization results in a single international diamond and consequently suggests an answer to the problems of the double diamond model. In addition, the GDD model introduces a method of operationalizing the competitiveness paradigm by comparing the sizes and shapes of diamonds. A country can derive a number of strategic implications, when comparing its diamonds with those of other countries. The structure of the generalized double diamond model is illustrated in Figure 3.

Figure 3. Generalized Double Diamond Model



Source: adapted from Moon, Rugman, and Verbeke (1998)

The GDD Model and Inequality in Globalization

Porter (1990) introduces four important variables in understanding national competitiveness: Factor Conditions, Demand Conditions, Related and Supporting Industries, and Firm Strategy, Structure, and Rivalry. Rugman and D'Cruz then extend Porter's single diamond model to the double diamond model, incorporating international contexts. Moon, Rugman, and Verbeke (1998) further extend the double diamond model to the generalized double diamond model, generalizing the international diamonds. Now, the GDD model can analyze variables comprising national competitiveness from both domestic and international perspectives in a single model. This mechanism of the GDD model, in turn, enables us to compare different characteristics between the domestic diamond and the international diamond, therefore allowing us to contrast the benefits from participating in globalization with those from utilizing domestic resources.

Benefits from globalization should be understood in terms of the increase in national competitiveness. In this light, the study of the discrepancy between the benefits acquired from utilizing domestic resources and from participating in globalization should reveal the status of inequality in globalization. Therefore, this article employs the GDD model for the analysis of national competitiveness from both domestic and international perspectives.

HYPOTHESIS

There have recently been a number of studies showing that the global expansion of MNCs is actually regional, not global (Rugman and Verbeke 2004, Rugman and Brain 2004, Grosse 2005, Li 2005). In addition, *World Investment Report*, one of the most prestigious reports in the field of FDI, shows that there are some locations that MNCs are more interested in than others (UNCTAD 2004: 68). OECD (2003) also confirms that production in OECD countries is geographically concentrated to a significant level. These studies imply that MNCs prefer a limited number of locations and, consequently, the benefits from globalization have been concentrated on a limited number of countries. It is more than just coincidence that, despite the overall reduction of global poverty, many regions witness more serious situations (Chen and Ravallion 2001, 2004, Sala-i-Martin 2002). Chen and Ravallion (2001) attribute global inequality to two proximate causes. Firstly, the poorest countries have experienced too little economic growth. Secondly, due to persistent inequalities, they have been inhibited from participating in the growth that did occur.

In this regard, it is worth considering that the benefits of globalization, once piled in a country, are hard to disperse across the national boarder. Kogut (1991) argues that countries are characterized by accumulated capabilities and these capabilities are hard to diffuse across country boarder. As MNCs transfer non-

financial and ownership-specific intangible assets to the host country, those transferred assets, once invested, are turned into the accumulated capabilities of the host country and are hard to disperse to other countries. Those countries with accumulated capabilities, in turn, attract more investments from MNCs, boasting better locational advantages, while other countries keep losing their chances of attracting investments. Consequently, some countries keep accumulating the capabilities through globalization, while other countries are excluded from the benefits of globalization. This vicious circle reinforces the inertia of unequal distribution of benefits from globalization, broadening the gap between the privileged and the unprivileged. In sum, because the capabilities of a country are hard to diffuse over the border, some countries succeed in accumulating the benefits from globalization, while others are excluded from the benefits of globalization. On the basis of this inference, we can derive the following hypothesis.

Hypothesis: There is an asymmetric distribution of benefits of globalization among countries.

DATA AND METHODOLOGY

Data

30 variables comprising national competitiveness of 66 countries in the world are selected in accordance with the GDD model (Moon, Rugman, and Verbeke 1998). Of the 30 variables, 16 variables are domestic variables, while the other 14 variables are international. Statistical data are collected from international or governmental organizations. Table 2 shows the 30 variables in the structure of the GDD model, and Table 3 lists the 66 countries studied in this article. For further information on the sources of the data, refer to the appendix at the end of this paper.

Methodology

In processing the collected data, this article first classifies the variables to be used in measuring national competitiveness into two groups, *the domestic diamond* and *the international diamond*, in accordance with the GDD model, as shown in Table 2. Each variable in both diamonds measures the national competitiveness of 66 countries. Variables in the domestic diamond measure national competitiveness acquired as benefits from utilizing indigenous resources within a country, while those in the international diamond calculate national competitiveness obtained as benefits from participating in globalization. Secondly, the degree of inequality among the national competitiveness of 66 countries in each variable is measured with the globalization inequality index (GII), an extension of the Gini index, to analyze unequal distribution of benefits from globalization. Finally, the t-test statistically analyzes GIIs measured in each of the 30 variables comprising the domestic and the international diamonds to

Table 2. Proxies used in Calculation of GII

Scopes	Factors	Proxies	Units
Domestic	FC*	Annual compensation for manufacturing workers	Annual salary (US\$)
		Working hours	Per week
		Scientists & engineers	Per million people
		Patent applications	Actual number of total patent applications
	DC*	GDP per capita	US\$
		Public spending on education	% of GNP
		Literacy rate	%
		Tertiary enrollment rate	%
	R&S*	Paved road density	% of total roads
		Telephone mainlines	Per 100 people
		Mobile phone subscribers	Per 100 people
		Internet users	Per 10,000 people
		Capital accessibility	1 - Interest rate (prime rate)
	SSR*	Total expenditure on R&D	% of GDP
		Corruption perceptions index (Transparency)	CPI score
International	FC*	Highest marginal tax rate (Corporate)	Top corporate tax rate (%)
		FDI outward, stock	US\$ billion
		FDI inward, stock	US\$ billion
		Portfolio outward, stock	US\$ million
	DC*	Portfolio inward, stock	US\$ million
		Goods: export	US\$ million
		Goods: import	US\$ million
		Services: credit	US\$ million
	R&S*	Services: debit	US\$ million
		International maritime transport	Vessels entered (thousand M/T)
		International call	Minutes per subscriber
		International travel	Thousand people
SSR*	Tourism receipts from abroad	US\$ million	
	Government financing from abroad	% of GDP	
	International reserves	US\$ million	

*FC: Factor Conditions, *DC: Demand Conditions, *R&S: Related and Supporting Industries, *SSR: Firm Strategy, Structure, and Rivalry

Table 3. List of Countries Studied

No	Country	No	Country	No	Country
1	Argentina	23	Hungary	45	Peru
2	Australia	24	India	46	Philippines
3	Austria	25	Indonesia	47	Poland
4	Bangladesh	26	Iran	48	Portugal
5	Belgium	27	Israel	49	Romania
6	Brazil	28	Italy	50	Russia
7	Cambodia	29	Japan	51	Saudi Arabia
8	Canada	30	Jordan	52	Singapore
9	Chile	31	Kenya	53	South Africa
10	China	32	Korea	54	Spain
11	Colombia	33	Kuwait	55	Sri Lanka
12	Croatia	34	Libya	56	Sweden
13	Czech Republic	35	Malaysia	57	Switzerland
14	Denmark	36	Mexico	58	Taiwan
15	Dominican Republic	37	Morocco	59	Thailand
16	Egypt	38	Netherlands	60	Turkey
17	Finland	39	New Zealand	61	U.A.E.
18	France	40	Nigeria	62	Ukraine
19	Germany	41	Norway	63	United Kingdom
20	Greece	42	Oman	64	United States
21	Guatemala	43	Pakistan	65	Venezuela
22	Hong Kong	44	Panama	66	Vietnam

* Countries are listed in alphabetical order.

find out the discrepancy in the degree of unequal distribution of the benefits between two diamonds.

The Gini index was introduced by an Italian statistician Corrado Gini (1912) to measure inequality of distribution, mostly in income inequality. The Gini index is a percentage form of the Gini coefficient that represents a number between 0 and 1, where 0 corresponds to perfect equality and 1 corresponds to perfect inequality.

Though the Gini index was originally developed to measure the unequal distribution of income within a country, it has been extended to the global Gini index to measure unequal distribution of income on a global scale (Chen and Ravallion 2001). In this light, this article further extends the Gini index to the globalization inequality index to measure unequal distribution of benefits from globalization. The extension is based on the following analogy from the original Gini index. An individual in a country participates in economic activities to sustain and develop its economic status, i.e. its capability, through rewards, usually in the form of income. Likewise, a country in the world participates in global economy through globalization to sustain and enhance its capability, i.e. national competitiveness, through benefits from participating in globalization, usually in the form of an increase in national

competitiveness. From these premises, we can deduce that GII is an extension of the original Gini index to the international level, substituting the variables of the cumulated proportion of the population and income in original index to those of the cumulated proportion of countries and national competitiveness, to measure asymmetric distribution of the increase of national competitiveness acquired as benefits from participating in globalization. Table 4 lists the analogous concepts between the Gini index and GII.

Table 4. Gini Index and Globalization Inequality Index

Name	Gini Index	Globalization Inequality Index
Purpose	to analyze the inequality of income distribution in a country	to analyze the inequality of national competitiveness distribution among countries
Measurements	income (benefits from economic activities)	national competitiveness (benefits from globalization)
x-variable	cumulated proportion of the population	cumulated proportion of the countries
y-variable	cumulated proportion of income	cumulated proportion of national competitiveness
Level of analysis	within a country	among countries

In this study, GII is calculated with the Brown formula shown below, where G represents the Gini coefficient, X_i stands for the cumulated proportion of the population variable, and Y_i denotes the cumulated proportion of the income variable (Brown 1994). In calculating GII, the cumulated proportion of the population (X_i) is substituted for the cumulated proportion of the countries and the cumulated proportion of the income (Y_i) is replaced with the cumulated proportion of the national competitiveness.

$$G = 1 - \sum_{i=0}^{n-1} (Y_{i+1} + Y_i)(X_{i+1} - X_i)$$

The t-test is a statistical technique for assessing the statistical significance of the difference between two sample means. It is used as a special case of ANOVA (Analysis of Variance) for two groups of samples (Hair et al. 1998). In this study, the independent t-test is employed to access GIIs calculated in each of 30 variables comprising both the domestic and the international diamonds and to find the statistical differences between these two diamonds in terms of the degree of inequality.

RESULTS

Table 5 lists the results of the GII calculation in the form of a coefficient. A closer look at the coefficient shows that, in general, GIIs in the domestic diamond are lower than those in the international diamond, a trend that implies the variables in the international diamond have greater inequality in their distribution of benefits from globalization.

Table 5. Results of GII Calculation

Scopes	Factors	Proxies	GII (coefficient)
Domestic	FC*	Annual compensation for manufacturing workers	0.546
		Working hours	0.069
		Scientists & engineers	0.521
		Patent applications	0.431
	DC*	GDP per capita	0.539
		Public spending on education	0.219
		Literacy rate	0.074
		Tertiary enrollment rate	0.329
	R&S*	Paved road density	0.280
		Telephone mainlines	0.402
		Mobile phone subscribers	0.363
		Internet users	0.460
		Capital accessibility	0.048
	SSR*	Total expenditure on R&D	0.413
Corruption perceptions index (Transparency)		0.276	
International	FC*	Highest marginal tax rate (Corporate)	0.160
		FDI outward, stock	0.811
		FDI inward, stock	0.692
		Portfolio outward, stock	0.800
	DC*	Portfolio inward, stock	0.779
		Goods: export	0.635
		Goods: import	0.667
		Services: credit	0.670
	R&S*	Services: debit	0.655
		International maritime transport	0.728
		International call	0.551
		International travel	0.614
	SSR*	Tourism receipts from abroad	0.622
		Government financing from abroad	0.980
International reserves		0.706	

*FC: Factor Conditions, *DC: Demand Conditions, *R&S: Related and Supporting Industries, *SSR: Firm Strategy, Structure, and Rivalry

Table 6 and 7 show the results of statistical analysis that demonstrate the difference between the domestic and international diamonds. The GDD model can

measure overall national competitiveness of a country by integrating the indices of four determinants in the domestic and the international diamonds into a single index. The GDD model can also measure domestic and international national competitiveness of a country separately by integrating the indices of four determinants in the domestic diamond or the international diamond, respectively (Moon, Rugman, and Verbeke 1998). In addition, the GDD model can analyze the characteristics of national competitiveness by contrasting the size and shape of the domestic diamond with that of the international diamond. Likewise, the discrepancy in distribution of the benefits between the domestic diamond and the international diamond can be contrasted by comparing the mean GII of each diamond, on the basis that GIIs of these two diamonds are statistically different. Table 6 lists the results of the t-tests. As the *p*-value is less than 0.001, it is proven that GIIs of the domestic diamond and the international diamond are statistically different. Table 7 indicates that the mean GII of the domestic diamond (0.321) is lower than that of the international diamond (0.708). Since the mean GII of international diamond is higher than that of domestic diamond, we can understand that benefits from globalization are more unequally distributed than those from utilizing domestic resources.

Table 6. Results of t-test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	4.287	0.048	-7.368	28.000	0.000	-0.387	0.053	-0.495	-0.280
Equal variances not assumed			-7.584	25.817	0.000	-0.387	0.051	-0.492	-0.282

Table 7. Descriptive Statistics

Groups	N	Mean	Std. Deviation	Std. Error Mean
Domestic	16	0.321	0.169	0.042
International	14	0.708	0.108	0.029

In sum, we found that GIIs of the domestic diamond and the international diamond are statistically different; the mean GII of the international diamond is higher relative to the domestic diamond. Moreover, the mean GII of the international diamond is high enough on an absolute scale to be categorized as a group in which the

benefits are unequally distributed². These findings allow us to arrive at the conclusion that the benefits from globalization are unequally distributed across the countries in the world. Therefore, the hypothesis that “there is an asymmetric distribution of benefits from globalization among countries” is supported.

DISCUSSION

The unequal distribution of the benefits of globalization suggests important implications, especially from the perspective of business and government. Firstly, in the process of selecting a location, MNCs should take into account not only the current status of the locational advantage but also the location’s inertia of accumulating capabilities from globalization. As discussed in much previous literature, the location or the geographical diversification takes an important role in the implementation of a MNC’s global strategy. In the process of geographical decision-making, therefore, MNCs should strategically consider both what has been accumulated in the host country and the inertia of accumulation in that country. A country might seem to be unattractive today, but the same country, with unequal distribution of benefits from globalization, can be a strategic foothold tomorrow.

Secondly, governments should implement a more active strategy to increase the benefits of globalization. MNCs are congenital nomads that travel all over the world to explore better locations. Because it is these nomads that can help a country in enhancing national competitiveness through globalization and the benefits from globalization, as proven in this article, are distributed in an unequal manner, governments should actively provide MNCs with more favorable environments than those of competing countries so that the country can accumulate the assets that MNCs transfer into the country. These accumulated assets eventually enhance national competitiveness through the increase in the capabilities of the country and this increase in national competitiveness, in turn, improves the status of its prosperity.

CONCLUSION

This article studies the unequal distribution of the benefits from globalization. As the benefits from participating in globalization come in the form of enhancement of national competitiveness, this article exhaustively reviews the literature on national competitiveness and employs the generalized double diamond model, which comprehensively and rigorously analyzes national competitiveness in both domestic and international perspectives. The inequality in globalization is statistically proven with the introduction of the globalization inequality index (GII), an extension of the

² It is widely accepted that a Gini coefficient higher than 0.4 represents inequality.

original Gini index to the analysis of unequal distribution of benefits from globalization.

The contribution of this article can be summarized as follows. Firstly, this article proves that there is an unequal distribution of benefits from globalization. Employing the generalized diamond model and extending the Gini index, this article comprehensively measures national competitiveness as benefits from globalization and analyzes the inequality of the benefits from globalization. Secondly, this article introduces a new index of the globalization inequality index (GII) as an extension of the original Gini index to measure the status of the distribution of benefits from globalization. In this era of globalization, GII will be a good yardstick to understand the dynamic landscape of the global economy.

For further studies, the methodology and GII introduced in this paper can be applied to regional sub-groups of countries in the world so that more specific strategies relevant to each region can be derived. In addition, a time-series analysis over GII will show the general trends of how the inequality in globalization develops. An in-depth study on the relationship between the increase in the standard of living in countries and the increase in inequality in globalization will also provide a much clearer picture on the implications of inequality in globalization.

REFERENCES

- Agmon, T. 2003. Who gets what: The MNE, the national state and the distributional effects of globalization. *Journal of International Business Studies* 34: 416-427.
- Barro, R. J. 2000. Inequality and growth in a panel of countries. *Journal of Economic Growth* 5 (1): 5-32.
- Battat, J. and D. Aykut. 2005. A growing phenomenon, *Proceedings of Southern Multinationals: A Rising Force in The World Economy* 9-10 November 2005, Mumbai, India.
- Bhagwati, J. N. 2004. *In defense of globalization*. New York: Oxford University Press.
- Brown, M. 1994. Using Gini-style indices to evaluate the spatial patterns of health practitioners: Theoretical considerations and an application based on Alberta data. *Social Science & Medicine* 38 (9): 1243-1256.
- Cartwright, W. R. 1993. Multiple linked diamonds: New Zealand's experience. *Management International Review* 33 (2): 55-70.
- Chen, S. and M. Ravallion. 2001. How did the world's poor fare in the 1990s? *Review of Income and Wealth* 47 (3): 283-300.
- Chen, S. and M. Ravallion. 2004. How have the world's poorest fared since the early 1980s? *The World Bank Research Observer* 19 (2): 141-169.
- Cho, D. S. and H. C. Moon. 2000. *From Adam Smith to Michael Porter*. Singapore: World Scientific.

- Dollar, D. and A. Kraay. 2002a. Spreading the wealth. *Foreign Affairs* 81 (1): 120-133.
- Dollar, D. and A. Kraay. 2002b. Is inequality decreasing?: Dollar and Kraay reply. *Foreign Affairs* 81 (4): 178-183.
- Dunning, J. H. 1979. Explaining changing patterns of international production: In defense of the eclectic theory. *Oxford Bulletin of Economics and Statistics* 41 (4): 269-295.
- Dunning, J. H. 1981. *International production and the multinational enterprise*. London: George Allen & Unwin.
- Dunning, J. H. 1988. The eclectic paradigm of international production: A restatement and some possible extensions. *Journal of International Business Studies* 19 (1): 1-32.
- Dunning, J. H. 1993. Internationalizing Porter's diamond. *Management International Review* 33 (2): 7-15.
- Dunning, J. H. and A. M. Rugman 1985. In honor of Stephen H. Hymer: The first quarter century of the theory of foreign direct investment. *AEA Papers and Proceedings* May: 228-232.
- Friedman, T. L. 2005. *The world is flat: A brief history of the twenty-first century*. New York: Farrar, Straus and Giroux.
- Garrett, G. 2004. Globalization's missing middle. *Foreign Affairs* 83 (6): 84-96.
- Gini, C. 1912. Variabilità e mutabilità. Reprinted in E. Pizetti and T. Salvemini, editor, *Memorie di metodologica statistica*. Rome: Libreria Eredi Virgilio Veschi (1955).
- Grosse, R. 2005. Are the largest financial institutions really 'global'? *Management International Review* 45 (Special Issue): 129-144.
- Hair, J. F., R. E. Anderson, R. L. Tatham, and W. C. Black. 1998. *Multivariate Data Analysis* (5th edition), Upper Saddle River, N.J.: Prentice Hall.
- Hodgetts, R. M. 1993. Porter's diamond framework in a Mexican context. *Management International Review* 33 (2): 41-54.
- Kogut, B. 1991. Country capabilities and the permeability of borders. *Strategic Management Journal* 12: 33-47.
- Li, L. 2005. Is regional strategy more effective than global strategy in the US service industries? *Management International Review* 45 (Special Issue): 37-57.
- Mazur, J. 2000. Labor's new internationalism. *Foreign Affairs* 79 (1): 79-93.
- Moon, H. C. and K. C. Lee. 1995. Testing the diamond model: Competitiveness of U.S. software firms. *Journal of International Management* 1 (4): 373-387.
- Moon, H. C. and T. Roehl. 2001. Unconventional foreign direct investment and the imbalance theory. *International Business Review* 10 (2): 197-215.
- Moon, H. C., A. M. Rugman, and A. Verbeke. 1998. A generalized double diamond approach to the global competitiveness of Korea and Singapore. *International Business Review* 7: 135-150.
- OECD. 2003. *Geographic concentration and territorial disparity in OECD countries*. Paris: OECD.

- Porter, M. E. 1990. *The competitive advantage of nations*. New York: Free Press.
- Prusak, L. 2006. The world is round. *Harvard Business Review* (April): 18-20.
- Rugman, A. M and A. Verbeke. 1993. Foreign subsidiaries and multinational strategic management: An extension and correction of Porter's single diamond framework. *Management International Review* 33 (2): 71-84.
- Rugman, A. M and J. R. D'Cruz. 1993. The "double diamond" model of international competitiveness: The Canadian experience. *Management International Review* 33 (2): 17-39.
- Rugman, A. M. 1991. Diamond in the rough. *Business Quarterly* (Winter): 61-64.
- Rugman, A. M. and A. Verbeke. 2004. A perspective on regional and global strategies of multinational enterprises. *Journal of International Business Studies* 35: 3-18.
- Rugman, A. M. and C. Brain. 2004. The regional nature of the world's banking sector. *Multinational Business Review* 12 (3): 5-22.
- Ryan, R. 1990. A grand disunity. *National Review* 9: 46-47.
- Sala-i-Martin, X. 2002. The world distribution of income (estimated from individual country distributions). *National Bureau of Economic Research Working Paper* 8933.
- Thain, D. H. 1990. The war without bullets. *Business Quarterly* (Summer): 13-19.
- The Economist*. 2005. Confusing Columbus. (2005.03. 31)
- UNCTAD. 2004. *World investment report 2004: The shift towards services*. New York and Geneva: United Nations.
- Varadarajan, S. 2005. But the world's still round. *The Hindu*. (2005.08.02)
- Wolf, M. 2004. *Why Globalization Works*. New Haven: Yale University Press.

APPENDIX

Table A-1. Sources for Proxies

Proxies	Sources
Annual compensation for manufacturing workers	Yearbook of Labor Statistics 2003, International Labor Organization (ILO), Geneva, http://laborsta.ilo.org/
Working hours	International Statistics Yearbook 2005, National Statistical Office, Republic of Korea; Yearbook of Labor Statistics 2003, International Labor Organization (ILO), Geneva
Scientists & engineers	Statistics of Science & Technology, Institute for Statistics, UNESCO, http://stats.uis.unesco.org ; Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China
Patent applications	World Development Indicators 2005, The World Bank Group, http://www.worldbank.org ; Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China
GDP per capita	World Development Indicators 2005, The World Bank Group, http://www.worldbank.org ; Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China
Public spending on education	Statistics of Education, Institute for Statistics, UNESCO, http://stats.uis.unesco.org
Literacy rate	Yearbook of Labor Statistics 2003, International Labor Organization (ILO), Geneva, http://laborsta.ilo.org/
Tertiary enrollment rate	Statistics of Education, Institute for Statistics, UNESCO, http://stats.uis.unesco.org ; International Statistics Yearbook 2003, National Statistical Office, Republic of Korea
Paved road density	World Development Indicators 2005, The World Bank Group, http://www.worldbank.org
Telephone mainlines	World Telecommunication Indicators 2005 (ITU), http://www.itu.int/ITU-D/ict/statistics/
Mobile phone subscribers	World Telecommunication Indicators 2005 (ITU), http://www.itu.int/ITU-D/ict/statistics/
Internet users	World Telecommunication Indicators 2005 (ITU), http://www.itu.int/ITU-D/ict/statistics/
Capital accessibility	International Financial Statistics (June 2005), International Monetary Fund (IMF); Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China
Total expenditure on R&D	Statistics of Science & Technology, Institute for Statistics, UNESCO, http://stats.uis.unesco.org ; International Statistics Yearbook 2003, National Statistical Office, Republic of Korea; Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China
Corruption perceptions index (Transparency)	Corruption Perceptions Index 2005, Transparency International (TI), http://www.transparency.org
Highest marginal tax rate (Corporate)	World Development Indicators 2005, The World Bank Group, http://www.worldbank.org
FDI outward, stock	UNCTAD Foreign Direct Investment database, http://stats.unctad.org/FDI/
FDI inward, stock	UNCTAD Foreign Direct Investment database, http://stats.unctad.org/FDI/
Portfolio outward, stock	International Financial Statistics (June 2005), International Monetary Fund (IMF)
Portfolio inward, stock	International Financial Statistics (June 2005), International Monetary Fund (IMF)
Goods: export	World Development Indicators 2005, The World Bank Group, http://www.worldbank.org ; Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China
Goods: import	World Development Indicators 2005, The World Bank Group, http://www.worldbank.org ; Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China
Services: credit	International Financial Statistics (June 2005), International Monetary Fund (IMF); Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China

Services: debit	International Financial Statistics (June 2005), International Monetary Fund (IMF); Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China
International maritime transport	International Statistics Yearbook 2005, National Statistical Office, Republic of Korea
International calls	World Development Indicators 2005, The World Bank Group, http://www.worldbank.org
International travel	International Statistics Yearbook 2005, National Statistical Office, Republic of Korea
Tourism receipts from abroad	Facts & Figures, World Tourism Organization (http://www.world-tourism.org)
Government financing from abroad	International Financial Statistics (June 2005), International Monetary Fund (IMF)
International reserves	International Financial Statistics (June 2005), International Monetary Fund (IMF); Taiwan Statistical Data Book 2005, Council for Economic Planning and Development, Republic of China
