

## Globalization Measurement: Notes on Common Globalization Indexes

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*Globalization is a broad concept casually used to describe a variety of phenomena that reflect increased economic, social and political interdependence of countries. Despite the increasing awareness on globalization, it is interesting to note that there is no any universally accepted definition and there is no standard measurement for globalization. Along with the growing number of countries participating in globalized world, there have been increasing concerns related to the globalization and its impacts on different aspect of life. Looking at the way globalization affects us, there is a need to measure globalization not only to know the effects of it, but also to manage it. A number of globalization measurements have been proposed. In this paper, we provide a taxonomy which categorized recent globalization measurement based on its definition to single and synthetic indexes. We then describe the indicators, method and availability of data, and analyses some of their shortcomings. In addition, we compare the indexes with respect to some criteria. Our survey concludes that selection of a good globalization indexes for the study depends on the objectives and the sample of the study. The findings of this study can help researchers as a guide line to select best index for their studies or develop new and better measurement.*

**Keywords:** Globalization, Measurement, Globalization Indexes

## Introduction

Globalization is not a new phenomenon. Rather, our world has experienced it since many years ago [1-4]. Globalization is a complicated process, which affects different aspects of our lives such as economic, social, environmental and political sphere (Figure 1). Globalization includes flows of goods and services across borders, international capital flows, reduction in tariffs and trade barriers, immigration, cultural transformation, and the spread of technology and knowledge beyond borders.



**Figure 1:** Various effects of globalization

The current wave of globalization is unmatched due to the involvement of a large geographical area, the complexity and different level of communication and relation and the participation of many nations among the developing countries. In fact, over the course of time, many

nations have experienced progressive development processes and profound changes, from simple lifestyle to the lifestyle that is governed by technology gadgets. Through literatures, globalization has become a more shared knowledge and thus, awareness on it and its implications on us have become more eminent.

While increased integration of countries in economic, social, political and environment sphere are often referred to globalization, there is no universally accepted and indisputable definition of globalization. Researchers define globalization from different points of view such as increase in integration of markets and diffusion of technology and idea (Friedman 1999); reducing the role of geographical constraints on social and cultural arrangements [5]; Eliminating the ability of the nation to establish and implement their own policies [6]; increase in the importance of transnational corporations [7]; changing in the political, social, economic and political foundations of countries [8]. Thus, arriving at a universally acceptable definition of globalization is not a difficult task due to the absent of the clear-cut theory.

The broad effects of globalization on different aspects of life grab a great deal of attention over the past three decades. In the new wave of globalization (1980-present), the large numbers of countries, especially developing nations, are speeding up their openness. It is obvious that the concern about the impact of globalization on issues such as economic growth, poverty, inequality, cultural dominance, and environment have been increasing. These debates emphasize on the importance of measuring globalization. In fact, to know these effects, constructing an index that captures all aspects of globalization is necessary. Without doing so, it is impossible to know the benefits or cost of globalization and how to manage it. To measure globalization, the broad and precise definition is needed. Based on the different definition of globalization, researchers have tried to construct an index.

There is variety of globalization measurement and no standard rule for measuring it. This is because of two reasons; the first reason is that globalization is a highly complex and multifaceted process. Finding an index, that capture all aspects of it, is very difficult [9-10]. The second one is that globalization is a wide concept, with no single definition. In fact, what

is globalization actually is, mention as an open question. As a result, finding a standard measure is a hard task [10]. Even though, researchers have constructed various indexes to measure globalization, there is not any standard index to measure this broad concept.

This paper is aimed to provide an updated overview of the recent developments in globalization measurement and to underline the main issues that remain to be solved. This is fundamental for the econometric researcher who wants to investigate effects of globalization or to develop new and better measurement. The remainder of this paper is structured as follows. Taxonomy of globalization measurement according to globalization definition is introduced in Section 2. Then, we present some criteria for synthetic indexes to compare indexes in section 3. We describe critical point about indexes in Section 4. Finally, Section 5 concludes our paper.

## **Globalization measurement**

The measurement of globalization is not an easy task, given that there is lacks of uniform and generally acceptable definition of globalization. There is variety of globalization measurement and no standard rule for measuring it. Many attempts have been done to measure globalization. In this part, common measurements of globalization are reviewed. Based on definition of globalization, these measurements divided in to single index and synthetic index (Figure 2):

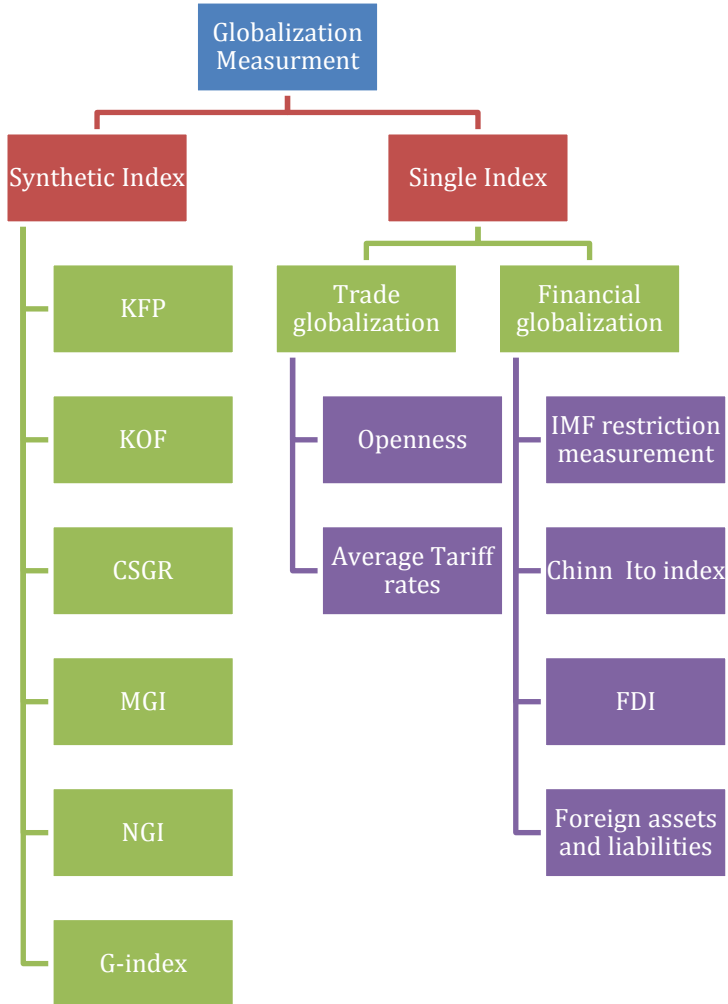
### **Single index**

For some studies, the effect of economic globalization through trade or/and finance is more important than other dimensions of it. The empirical analysis use two groups of proxies; De facto and De jure measurement.

### **De jure globalization index**

Trade and financial globalization capture by the level of restrictions placed on the movement of goods, services and capital. The common

indexes that have been used for measuring restriction on trade and capital of a country are mentioned below:



**Figure 2:** Categorization of globalization measurements

- Average tariff rate:

The restriction on trade is commonly measured by mean of tariff rate on import of goods and services. This index calculated by:

$$T = \sum_i \frac{M_i t_i}{M}$$

Where  $M_i$  and  $t_i$  are import and tariff rate on good  $i$ , respectively, and  $M$  represents total of import. This index has been used in Agénor, (2004) and Jaumotte, (2008).

- **The IMF's restrictions measurement**

Since 1967, the IMF has published an Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) that provides the basis information on the presence of restrictions in the countries. In this report (up to 1997), the controls on international financial transactions are categorized as follow: the existence of multiple exchange rates, regulatory requirements of the surrender of export proceeds, restrictions on capital account transactions, the presence of restrictions on current accounts transactions [13-15]. Despite the fact that the AREAER is widely used as measurement of capital controls, but the basic variables are too aggregated to capture actual capital controls [16].

- **Chinn - Ito index**

Chinn and Ito (2005) introduced an index to measure degree of capital openness that called KAOPEN. This index is the first standardized principal component of the four variables that measured in AREAER. The Chinn-Ito index is normalized between zero and one. A more open country capture higher value. The KEOPEN is calculated for 182 countries for the period of 1970-2006.

## **De facto globalization measurement**

Trade and financial openness are measured by the level of export, import and capital that called de facto measurement. In this part, three common measurements of them are explained.

- **Openness**

The simplest and usual index for measuring trade openness is ratio of trade (sum of export and import) to the Gross Domestic Product (GDP) of country. Easy way to calculate and availability of essentials data are mention as benefits of this index [11-12, 17-18].

The trade openness of countries depends on trade policy (restriction on trade) as well as the geographical and economic characteristics of a country. Therefore, countries with small population will trade (as a proportion of GNP) more than large countries. The main problem of this index is that these elements are not considered in trade openness measurement (sum of export and import to GDP) [19]. An optional approach for measuring trade openness is “structure-adjusted trade intensity” introduced by Pritchett (1996) to correct the outcome measure of trade openness for relevant country characteristics. The trade openness is regressed on some country characteristics that are thought to be relevant in determining trade as a percentage of GNP as well as being exogenous to trade. The resulting residual is an adjusted or corrected measure of trade openness.

- **Gross capital flows**

The sum of gross inflows and outflows as a ratio to national GDP is known as good ratio that can capture two-way flows. It also provides sensible and logical picture of globalization.

- **Foreign assets and liabilities**

The sum of gross stocks of foreign assets and liabilities as a ratio to GDP is corrected for valuation effects. This ratio omits the problems of flow data.

- **Foreign direct investment**

From production standpoint, FDI is an important vehicle of globalization. FDI is the best kind of foreign investment that is non-debt flows. This type of foreign investment is less volatile than other types of foreign investment. It also plays a significant role to transfers of technology and new management knowledge to the host country [17]. Many researchers use FDI as indicator for capture financial openness of a country. FDI shows the ability of countries to attract foreign investment. It would capture only the side of financial integration of a country [20].

## Synthetic index

Recently, researchers have tried to capture all dimensions of globalization in one index. They have selected the variables and indicators according to what they believe globalization is. In the following, these indexes are illustrated:

- **A.T. Kearney/Foreign Policy Globalization (KFP)**

Kearney (2002, 2003) is the first attempt to introduce a multiple measurement for globalization. This index measures not only economic integration but also technological connectivity, personal contact, political engagement. This globalization Index is calculated only for 62 countries (see more in Caselli and Gemelli 2008).

To build the index, four stages have been done like Human Development Index of UNDP:

1. The relevant variables have been selected by careful assessment.
2. By consideration of data availability, a proper measurement for each variable has chosen.
3. These variables are measured in different units that should be normalized. KFP use panel normalization to normalize the individual variables.
4. A weighted sum of the normalized variables is calculated which gives a numerical score for each country in each year to determine country rankings



Weights are assigned based on construction belief. Variables are weighted double or single relative to others. The reason for a priori weights is that they have some normative significance. Some researchers believed that this approach is not reasonable [19, 21]. This index does not adjust the variables for geographical dimension. Therefore, the ranking of countries depends not only on their geographical characteristics but also on their policy stance towards globalization.

- **KOF<sub>1</sub>**

This index was introduced in Dreher (2002) and updated in Dreher, Gaston et al. (2008). Based on this index, globalization defines as a process that erodes national borders, integrates of economies, politics, technologies, and cultural and facilities flows of people, goods, capitals and ideas. KOF index covers the economic, social and political dimensions of globalization [22-25]. The principle components analysis is used to calculate the weight for variables. This index does not adjust for geographic characteristics of countries.

- **The CSGR<sub>2</sub> Globalization Index**

The Index measures the economic, social and political dimensions of globalization for the period of 1982 to 2004 for 62 countries. The index is claimed to be complementary to KFP, as it use optimal statistical weighting known as principal component weighting and controlling for fixed country geographical characteristics. The procedure of constructing index is same as KFP [10, 26-28].

- **Maastricht Globalization Index (MGI)**

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<sup>1</sup> German acronym for 'Konjunkturforschungsstelle'(Economic Research Center)

<sup>2</sup> Center for the study of globalization and regionalization

The MGI index uses seven group of variables include global politics, organized violence, global trade and finance, social and cultural, technology and environment to cover all dimensions of globalization. This index is calculated only for 2000 and 2008 [24, 29]. This index is the only one that capture environmental dimension of globalization. MGI also includes geographical characteristics of countries in adjustment of countries.

- **New globalization index (NGI)**

Vujakovic in 2009 has developed an index with five new variables to measure globalization. These variables are trade-mark applications by non-residents, portfolio investment stock, patent applications by non-residents, and environmental agreements [30]. Based on this index, globalization defines as a process that increases interaction and interdependence between economies, societies and nations beyond large distances. He has used a parameter to control geographical distances between countries. For constructing the globalization dimensions and variable weights, the principal component analysis is used. Dimensions and weights constructed in such manner reflect the statistical characteristics of the dataset.

- **Globalization index (G-index)**

G-index has been introduced by Randolph, 2001 to measure the depth, breadth and richness of the interdependence between the national and the global economy. The major weigh of variables belongs to economic dimension of globalization. The main shortcoming of this index is partially publishing of the data [31].

## **Evaluation of synthetic indexes**

In this section, a comprehensive set of criteria are proposed, to facilitate comparison between different synthetic indexes. Table 1 is based on these criteria that are important in the construction of an index. Such criteria could help in evaluating the existing globalization indexes, serve as the abilities to be considered in implementing new indexes, or facilitate

selection of best index for studying globalization. In the following, each group of these criteria is described and discussed in detail.

## **Structural criteria**

- **Number of indicators**

The synthetic indexes use various numbers of indicators and variables to capture dimensions of globalization. Although, a large number of indicators measure globalization completely, it also causes some problems. For instant, the larger amounts of information are needed to construct an index that decreases the number of countries with complete set of required data. In addition, the exclusive number of indicators reduces the timeliness of such information from different sources [10].

- **Negligible weights to indicators**

The researchers use different method to weight the indicators. Based on their method, some indicators get negligible weight, for example, in CSGR index, phone calls get one-thousandth of the overall value. Considering insignificant weight for the indicators is a weakness of the index.

- **Geographical adjustment**

This criterion indicates that whether the index have adjusted the variables for the geographical characteristics or not. On one side, the adjustment for geographical characteristics of countries is important, as it should be accounted beside other spheres of globalization. Based on their definition, globalization includes interaction of actors across large distances to run the risk of confusing regionalization with globalization [32]. In addition, Controlling for these factors might improve the understanding of the other, more subtle determinants of globalization such as past and present policy choices that might be interesting [24]. On the other side, some believed that the reason for the openness of countries is not matter in

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globalization ranking of countries. It is preferable to control for these factors when analyzing the causes and consequences of globalization.

- **Environment**

This criterion show ecological footprint of countries, whether include in index or not.

## **Dimensions of globalization as criteria**

In the following, the dimensions of globalization that measured by synthetic indexes are mentioned as criteria. This is important to know which sphere of globalization is covered by index.

- **Economic globalization:**

One of the most important and broad dimensions of globalization index is economic one. Therefore, it is important that the index cover this aspect of globalization comprehensively. The economic indicators of indexes are categorized in two groups:

1. Actual flow of trade and foreign capital: These indicators show the level of trade (export + import) and all kinds of foreign capital such as FDI, FPI and cross border bank-lending.
2. Restriction on trade and capital flow: These indicators show the tariff and non-tariff barriers, taxes on trade and other kinds of restriction on export, import and capital.

- **Social globalization**

1. Culture: It shows whether the index cover the culture proximity of the country to the rest of the world.
2. Information and contact: This criteria show whether the index measure easy access of people to the information and people in other countries.

- **Political globalization**

This criterion indicates the political dimension of globalization is measured by index or not.

## Coverage criteria

- Years: It indicate the period that index is calculated.
- Numbers of countries: It shows the number of the countries that the index covers them.

## Discussion

As illustrated in this table, we are able to compare synthetic index with respect to some criteria. If an index supports each of these criteria (except negligible weight to indicators), it is more accurate than the approach which does not. This table can help researchers to choose the best index for their studies based on their globalization definition and objective of studies. In addition, it leads those researchers that have aimed to improve the current globalization indexes, by determining its weaknesses and strengths.

In addition, it can concluded from the table that KOF is the best index for measuring globalization based on some feature of it. The first one is that it measures the level of trade and all types of foreign capital as well as restriction on them. The second one is that it measures social and political dimension of globalization more comprehensive than other indexes (to see detail of indicators Dreher 2005). The last one is that it calculated for large number of countries and longer period. However, it is worth mentioning here that KOF is not suitable for all globalization studies. The objective of a study is an important factor that should be accounted when selecting globalization indexes.

**Table 1:** Existing globalization indexes and criteria for good composite indexes

Index	Criteria												
	Years	Number of Countries	Number of Indicators	Economic globalization				Social Globalization		Political Dimension	Negligible Weight to Indicators	Geographical adjustment	Environment
				Actual Flow		Actual Flow of Trade	Restriction on Trade and Capital	Culture	Information and contact				
				Foreign Capital	FDI								
KFP	1971-2005	62	12	✗	✓	✓	✗	✗	✓	✓	✓	✗	✗
KOF	1970-2008	158	25	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
CSGR	1982-2004	62	16	✓	✓	✓	✗	✗	✓	✓	✓	✓	✗
MGI	2000-2008	117	11	✓	✓	✓	✗	✗	✓	✗	Same weight	✓	✓
NGI	1995-2005	70	22	✓	✓	✓	✗	✓	✓	✗	✗	✓	✗
G-index	2001	185	6	✓	✓	✓	✗	✗	✓	✗	✗	✗	✗

## **Critical view on globalization indexes**

In this section, the main shortcoming of the single and synthetic indexes will be discussed.

### **Problem of single index**

There are also some problems in the single indexes, which only consider globalization as an economic one, as follow:

De jure measurements are not comprehensive and do not accurately reflect the actual degree of trade or financial openness of an economy into international markets. For example, some of them measured restriction on foreign exchange transactions that do not necessarily restrict the capital flows. Furthermore, these measurements do not able to catch the degree of enforcement of restriction on of goods, services and capital [15-16, 33]. The main problem of de facto indexes is measuring globalization indirectly. For example, trade openness -that measured by trade volume as share of GDP -measured indirectly through trade volumes [12, 34-35].

However, it is recommended that, in the case of using de jure and de facto indexes, to capture the degree of economic globalization more precisely, it is better to use them as complements rather than substitutes. For instant, in the countries with low level of trade and foreign capital, it is not obvious that these low rates are because of restriction on the flow of them or the structural shortcoming in these countries.

### **Problem of synthetic Index**

In this type of index, researchers have tried to consider all dimensions of globalization. Despite of the extensiveness of these indexes, some problems still exist and they need to be addressed. The first on is using extremely large number of variables and indicators in constructing them. The excessive use of variables and indicators gives rise to many and different problems, as follow: [10]

- The larger number of variables and indicators need greater amount of data to calculate index. Therefore, the number of countries that

have this amount of data decreases. These countries comprise of the developing countries and some developed ones.

- The need to acquire a large amount of disparate information from diverse sources reduces the timeliness of such information.
- The excessive use of variables restricts the instrument's comprehensibility and thus limits its chances of gaining broad international recognition.

The second one is the weights that imputed to some variables are negligible. For example, the scant value of Phone calls in CSGR index that account for 0.004 in the Ideas sub-dimension, two-thirds of the overall value of the Social globalization sub-index and one-thousandth of the index's overall value of index [19]. The third shortcoming is that these indexes do not consider any measurement of restriction on trade and capital except KOF index. To measure the economic globalization of a country both actual flow and restriction should be consider. The forth is related to the adjustment for geographical structure of countries in some of these indexes like KOF and KFP. This adjustment improve the precisely of indexes that the level of their globalized do not affected by countries characteristics. Finally, some of these indexes do not publish the methodological notes clearly, and an access to the data of these indexes is difficult to gain. This kind of disadvantage is eminent in the index such as the G-index.

## Overall

Further shortcomings of each group of index, globalization measurement, in overall, suffer from some problems. The most robust obstacle is lack of data. Data on FDI, trade barriers or outsourcing is not easily accessible. This problem is highlighted in studies that need disaggregate data, or longer periods. To illustrate, data on trade policy barriers that is published by UNCTAD is available only from 1989 onwards. The lack of data is more obvious in the developing countries [36]. The usual limitation of indices is lack of theoretical foundation or relevance and their low robustness [19, 37-38].



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## Conclusions

Measuring globalization is a difficult task. This is due to the fact that it does not have any universally accepted definition. Furthermore, globalization has different aspects that make it difficult to consider all in just one index [29]. However, by considering the new wave of globalization and the participating developing countries in this process, awareness on its effects on economic, social and political sphere, is critical. In order to explore these effects, it is necessary to construct a new tool. Finding an instrument to measure a phenomenon of such complexity and such significance for humanity is a challenge both fascinating and demanding.

Nevertheless, many researchers try to tackle these difficulties and create various ways to measure it. As mentioned, to construct one index, the variables and indicators have been selected based on how the constructors define globalization. There are some differences in the measurement, weighting, and normalization rules used to construct these indexes.

In this paper, after considering the importance of measuring globalization, we presented the classification of globalization indexes. The current and common indexes are categorized in 'single indexes' that only measured economic dimension of globalization, and 'synthetic indexes' which measured economic, social, political and environmental dimension of globalization. We also proposed a set of criteria which are mainly used in evaluating synthetic globalization indexes. Such criteria could help in evaluating the existing globalization indexes, serve as the abilities to be considered in implementing new indexes, or facilitate selection of best index for studying globalization. Finally, the problems of current measurement of globalization are discussed.

The aim of this paper is to provide an insight on globalization index, by providing a classification of available indexes. This is done so that it can help researchers to select the best index for their studies or develop new and better measurement.

In a nutshell, we cannot conclude that which index is better than the other. In fact, the findings of our study have indicated that there is no single superior index that is suitable for all cases. The proposed list of criteria serves as a guide line for researchers to select the best index for their

studies. Based on these criteria, this paper recommended KOF as the best index that measures more comprehensively all dimensions of globalization than other indexes. Nevertheless, the selection of the globalization index for a study depends very much on the objective of that study, data availability and characteristics of countries under consideration. For instance, if a study aims to show the level of social globalization of a country, NGI and KOF are the best to be chosen. It seems that it is necessary for both qualitative and quantitative researchers to study globalization and hence, develop an accurate index for it. This index is useful in comparing and contrasting the existing indexes so that a more precise measurement of globalization can be attained. This index should be simple, precise and easy to understand.

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