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Trends in globalization of select Asian countries

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Abstract. In this study we have constructed a composite index of globalization of select Asian countries during 1970-2014 by minimizing the Euclidean norm of Shapley values of indicator variables contributing to the overall index. As a consequence, the mean expected marginal contributions of constituent variables to the overall index are approximately equal and thus, the overall composite index represents the constituent variables optimally. We call this index the Almost Equal Marginal Contribution (AEMC) index. We find that AEMC index and the KOF index of globalization are highly correlated (Pearson's r=0.982). We find that Singapore, Cyprus, Israel, Qatar, Malaysia, Jordan, Lebanon, Turkey, Kuwait, Bahrain and Japan have done very well and scored above 0.7. At the other end, Yemen, Tajikistan, Bangladesh, Bhutan, Iran, Nepal and Myanmar have scored below 0.5. Trends in globalization are increasing in general, but the rate of globalization, which accelerated after 1991, lost its momentum after 2007. Disparities in globalization, as measured by Gini coefficient over the countries under study, were more or less constant up to 1985 but after that they started declining. We have found that the index of globalization goes well with other socio-economic measures such as Economic Freedom Index, International Innovation Index, Social Progress Index, Human Development Index and Corruption Perception Index, showing high values of Kendall's Tau and Spearman's Rho. Its association with Democracy Index is rather weak but positive. It is almost uncorrelated with the Gender Gap Index. We observe, therefore, that globalization index is moving well with the indices of socio-economic condition in the Asian countries.
Keywords. Globalization, Synthetic index, Asian countries, Shapley values, Equi-marginal contribution.
JEL. C43, C71, F02, F60, O53.

1. Introduction

Asia is a continent of heterogeneous climate, geography, population, culture, religion and politico-economic systems. It has 50 nation states, population and area wise heterogeneous. It also includes several partially recognized countries with limited to no international recognition and no membership of the UN. On the one hand it has very large countries with over 1.3 billion population such as China and India while on the other it has very small countries such as Bhutan, Maldives and Brunei with below million population. It has countries with very high population densities such as Maldives, Singapore, Hong Kong, Bahrain, and Bangladesh while it has countries like Mongolia, Kazakhstan, Bhutan and Oman with low population densities (Table 1).

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Table. 1. *Area, population, density of population, net migration and urbanization in Asian*

Country*	Populn	Density	Area	Migrn	Urb	Country*	Populn	Densit	Area	Migrn	Urb
China	1409517	150	9388211	-339690	0.57	Azerbaijan	9828	119	82658	0	0.54
India	1339180	450	2973190	-515643	0.32	Jordan	9702	109	88780	195057	0.68
Indonesia	263991	146	1811570	-167000	0.53	Und. Arab Emir	9400	112	83600	96000	0.89
Pakistan	197016	256	770880	-236384	0.38	Tajikistan	8921	64	139960	-20000	0.27
Bangladesh	164670	1265	130170	-505297	0.35	Israel	8322	385	21640	3899	0.89
Japan	127484	350	364555	71627	0.93	Hong Kong*	7365	7014	1050	14978	N.A.
Philippines	104918	352	298170	-130000	0.44	Laos	6858	30	230800	-35498	0.41
Viet Nam	95541	308	310070	-40000	0.34	Lebanon	6082	595	10230	250000	0.73
Iran	81163	50	1628550	-80000	0.73	Kyrgyzstan	6045	32	191800	-27580	0.34
Turkey	80745	105	769630	325434	0.71	Turkmenistan	5758	12	469930	-10000	0.48
Thailand	69038	135	510890	33463	0.50	Singapore	5709	8155	700	67586	N.A.
Myanmar	53371	82	653290	-94856	0.35	Palestine	4921	817	6020	-8750	0.72
South Korea	50982	524	97230	33927	0.81	Oman	4636	15	309500	163500	0.73
Iraq	38275	88	434320	92733	0.67	Kuwait	4137	232	17820	134000	0.87
Afghanistan	35530	54	652860	89601	0.25	Georgia	3912	56	69490	-61054	0.59
Saudi Arabia	32938	15	2149690	318000	0.77	Mongolia	3076	2	1553560	-3000	0.70
Uzbekistan	31911	75	425400	-13294	0.34	Armenia	2930	103	28470	-6107	0.64
Malaysia	31624	96	328550	156330	0.74	Qatar	2639	227	11610	120400	0.91
Nepal	29305	204	143350	-74474	0.19	Bahrain	1493	1964	760	8400	0.82
Yemen	28250	54	527970	-15002	0.33	Timor-Leste	1296	87	14870	-10001	0.31
North Korea	25491	212	120410	-5403	0.61	Cyprus	1180	128	9240	4502	0.67
Taiwan*	23626	667	35410	34000	0.77	Bhutan	808	21	38117	2000	0.38
Sri Lanka	20877	333	62710	-96954	0.19	Macao*	623	20752	30	8470	0.95
Syria	18270	99	183630	-831579	0.72	Maldives	436	1454	300	4383	0.39
Kazakhstan	18204	7	2699700	31961	0.50	Brunei	429	81	5270	406	0.78
Cambodia	16005	91	176520	-30000	0.21	Total	4504428	145.14	3103313	-109690	0.48

Note: Countries* = This table includes independent countries as well as dependencies. Population in 000 persons; Area in Sq. Kilometres; Density in population per sq km; Urb* = Unban population as % to total population; Migrn = Net migration No. of people

2. Income and inequalities

In the economic realm, Asia is no less heterogeneous. Per capita income in Qatar is very high, making it the richest country in the world. The main source of income in Qatar is petroleum and gas which accounts for more than 70 percent of the Govt. revenue, more than 60 percent of GDP and about 85 percent of the export earnings. Qatar has progressed towards establishing petrochemicals based industries along with steel and other construction materials. The second richest country (as to per capita GDP, see Table-2) is Singapore, a conglomeration of almost completely urbanized small islands, considered as a global commerce, finance and transport hub. Its standings include: the most "technology-ready" nation, top International-meetings city, the city with "best investment potential" on account of being a 'tax heaven', second-most competitive country, third-largest foreign exchange market, third-largest financial centre, third-largest oil refining and trading centre and the second-busiest container port. The third in the list is Brunei, an industrialised country that amassed wealth from extensive petroleum and natural gas fields. It has very high Human Development Index (among the Southeast Asian nations) and is classified as a "developed country". Brunei is not a democratic country. Its political system is governed by the constitution and the national tradition of the Malay Islamic Monarchy. Kuwait, Saudi Arabia, Bahrain, Oman and Japan are other rich countries. However, on the bottom side of the list, there are several poor countries such as Bangladesh, Cambodia, Kyrgyzstan, Tajikistan, Nepal and Yemen with per capita income less than Int$4000.

Table 2. *Select Asian countries by GDP(PPP) per capita (in Int$)*

SL#	Country	GDP_PC	SL#	Country	GDP_PC	SL#	Country	GDP_PC
1	Qatar	127660	14	Russian_Fed.	26490	27	Armenia	8621
2	Singapore	87855	15	Kazakhstan	25145	28	Bhutan	8227
3	Brunei	76884	16	Turkey	24912	29	Philippines	7728
4	Kuwait	71887	17	Lebanon	18525	30	India	6616
5	United_Arab	67871	18	Iran_Isl_Rep.	18077	31	Vietnam	6429
6	Saudi_Arabia	55158	19	Azerbaijan	17439	32	Myanmar	5832
7	Bahrain	50704	20	Thailand	16888	33	Pakistan	5106
8	Oman	46698	21	China	15399	34	Bangladesh	3891
9	Japan	41275	22	Jordan	12278	35	Cambodia	3737
10	Korea_Rep.	37740	23	Mongolia	12275	36	Kyrgyzstan	3521
11	Israel	35179	24	Sri Lanka	12262	37	Tajikistan	3008
12	Cyprus	34970	25	Indonesia	11720	38	Nepal	2479
13	Malaysia	27267	26	Georgia	10044	39	Yemen	2375

Table 3. *Income Inequality in Select Asian Countries as measured by Gini Coefficient*

Country	Gini Coeff	Year	Country	Gini Coeff	Year	Country	Gini Coeff	Year
Malaysia	46.26	2009	Sri Lanka	38.58	2012	Japan	32.11	2008
Philippines	43.04	2012	Iran	37.35	2013	Bangladesh	31.98	2010
Israel	42.78	2010	Yemen	35.89	2005	Armenia	31.54	2013
China	42.06	2010	Arab Rep	35.77	2004	Tajikistan	30.77	2009
Russia	41.59	2012	Indonesia	35.57	2010	Cambodia	30.76	2012
Turkey	40.17	2012	Cyprus	34.31	2012	Pakistan	29.59	2010
Georgia	40.03	2013	India	33.90	2009	Kyrgyzstan	27.37	2012
Thailand	39.26	2012	Mongolia	33.75	2012	Kazakhstan	26.35	2013
Vietnam	38.70	2012	Jordan	33.66	2010	Azerbaijan	16.64	2005
Bhutan	38.65	2012	Nepal	32.75	2010	*Median Gini*	34.31	2012

Source: [Retrieved from].

Table 4. *Population living below national Poverty Line in Select Asian Countries*

SL#	Country	% Ppn	Year	SL#	Country	% Ppn	Year	SL#	Country	% Ppn	Year
1	Tajikistan	46.7	2009	10	India	22	2015	19	Indonesia	12.5	2011
2	Yemen	34.8	2005	11	Bangladesh	18.5	2010	20	Sri Lanka	8.9	2010
3	Kyrgyzstan	33.7	2010	12	Turkey	18.1	2009	21	Kazakhstan	8.2	2009
4	Cambodia	30.1	2007	13	Georgia	17.7	2011	22	Azerbaijan	7.6	2011
5	Mongolia	27.4	2012	14	Pakistan	17.2	2006	23	Malaysia	3.8	2009
6	Nepal	25.2	2011	15	Vietnam	17.2	2012	-	Estimated with % Pn Living under		
7	Philippines	25.2	2012	16	Jordan	14.4	2010		$3.10 a day (Not Poverty Line)		
8	Bhutan	23.2	2007	17	Thailand	13.2	2011	24	China	2.5	2013
9	Armenia	22.6	1995	18	Russia	12.7	2011	25	Iran	1	2013

Note: (1). Data not available for other countries under study. (2) Source - Wikipedia: List of countries by percentage of population living in poverty.

Nevertheless, high per capita income at the country level does not imply the well-being of people in the lower income brackets. Although much quantitative information is not available on the income distribution in all Asian countries, telling inequalities are pervasive. It is reported that Qatar's income per person is among the World's highest. But income is unequally distributed: the richest Qataris receive over 13 times as much as the poorest (The Economist, 2011). Singapore has acute inequalities. It is reported (The Economist, 2015) that as measured by Gini coefficient, Singapore is among the world's most unequal countries, although the figure may not be fully comparable with those of the other countries because of the facts that first, Singapore is almost wholly urban, secondly that the inequalities are computed there by excluding shorter-term foreign workers and non-working families and lastly that income includes employers' CPF contributions also, which are capped for higher-paid workers. If the Gini coefficient for Singapore is adjusted for these factors, it could be lesser in magnitude. Interestingly, elsewhere (States Times Review, 2017) we find that Singapore has the Gini coefficient 0.458 in 2016. In that case it is comparable to Malysia (Table-3) unless income inequality figure for Malaysia has dropped since 2009 or the statistics are not much reliable for either country. For Brunei it is reported (Reddit.com, 2014) that the level of inequality in household income distribution has dropped significantly over the last two decades. The Gini coefficient value decreased from 0.534 in 1987-1988 to 0.413 in 1997-1998 and to 0.355 in 2005. The share of income for 40 per cent of the poorest households increased from 11.3 per cent in 1997-1998 to 14.6 per cent in 1997-1998 and to 17.4 per cent in 2005. The share of income for 40 per cent of middle-income households also increased from 29.6 per cent to 37.2 per cent and to 40.7 per cent in the same years. In line with the increase, the share of income for the 40 per cent of the richest households has decreased over the period. In Hong Kong it is reported that in 2011 the Gini coefficient of income distribution was as high as 0.537 (Wikipedia: List of countries by income equality) and according to the UN estimate the ratio of the average income of the richest 10% to the poorest 10% was 17.8 while the ratio of the average income of the richest 20% to the poorest 20% was 9.7. It is also important to look into the statistics on poverty (Table 4). In the countries such as Tajikistan, Yemen and Kyrgyzstan over 1/3rd of the population lives below poverty line as defined by the respective countries.

3. GDP growth rate

In Table-5 we present the countries under study in a descending order of growth rate in the real GDP (2016). While the leading countries are Nepal, India, Bangladesh, Thailand, Philippines, China, etc., the trailing countries are Armenia, Azerbaijan, Russia, Brunei and Yemen. However, it may be pointed out that GDP growth rates are very volatile and little reliable indicators. Most of the countries in Asia have a large income from agriculture sector that depends on vagaries of nature. They also have a large unorganized (or informal) sector in manufacturing and service sectors. Moreover, the reliability of real GDP statistics depends on accuracy of accounting and this accuracy depends on the level of development of a country. Underdeveloped economies are generally poor at accounting. Morgenstern (1962) referring to Kuznets remarks that average error in income (GDP) estimates could not be less than 10 percent (in case of USA, a developed country). While error in basic manufacturing and public utilities sector could be less than 10 percent, in agriculture, mining, trade, banking, insurance, etc. it could be between 10 to 30 percent and in the sectors such as direct services, construction, real estate, etc. error could be above 30 percent. As to growth rates of GDP over the years, say t_0 and t_1, the range $[\min(Y_1)/\max(Y_0)]$ and $[\max(Y_1)/\min(Y_0)]$, where Y_0 and Y_1 are the income figures for the years t_0 and t_1 respectively, would determine the range in which the income ratios of the two years would lie. To illustrate, suppose in t_0 GDP is \$100±10 and in t_1 it is \$110±10. Then growth rate will lie between (100/110-1) and (120/90-1) or $-9.09 \leq g \leq 33.33$ percent. Furthermore, different countries have different ways to estimate their GDP. In this regard it is pertinent to consider the observation made by Morgenstern (1962, p. 42): "International comparisons are constantly being made. .... Yet we need only to look at numerous United Nations publications to see that this is being done for the whole world without any further excuse. The most startling use - or rather abuse - is for determining allegedly comparable growth rates for different countries, on the basis of which far-reaching policy decisions are made."

Secondly, the growth rates in GDP are indicative of neither development nor welfare. Most of the rich/developed countries, which also have better welfare status of their people, have low real GDP growth rate. Some examples are: Sweden and Netherland have 3.30% real GDP growth rate (in 2016) and the countries such as Germany, U.K., U.S., Canada, Belgium, France, Denmark, Japan and Norway have 1.8% Real GDP growth rate or even less than that.

Table 5. *Select Asian countries by GDP Growth Rate in the Year 2016*

Sl#	Country	RGDPGR	Sl#	Country	RGDPGR	Sl#	Country	RGDPGR
1	Nepal	7.56	14	Pakistan	4.71	27	Jordan	2.1
2	India	7.1	15	Sri Lanka	4.3	28	Singapore	2
3	Bangladesh	6.92	16	Malaysia	4.2	29	Kyrgyzstan	2
4	Thailand	6.9	17	Israel	4	30	Saudi_Arabia	1.4
5	Philippines	6.8	18	Bahrain	4	31	Tajikistan	1.4
6	China	6.7	19	Oman	4	32	Kazakhstan	1.1
7	Iran	6.54	20	Turkey	3.2	33	Lebanon	1
8	Bhutan	6.5	21	United_Arab	2.9	34	Japan	1
9	Vietnam	6.4	22	Cyprus	2.8	35	Armenia	0.2
10	Myanmar	6.3	23	Korea_Rep.	2.8	36	Azerbaijan	0
11	Mongolia	5.5	24	Qatar	2.7	37	Russian_Fed.	-0.2
12	Cambodia	5.5	25	Georgia	2.7	38	Brunei	-1.2
13	Indonesia	5	26	Kuwait	2.5	39	Yemen.	-28.1

Whatever be the status of economic prosperity of a few rich countries in Asia that have geological fortune and location advantages, they jointly house not more than 2.5 or at most 3 percent of total population in Asia. Other countries have to prosper by being industrious as well as by exploitation of comparative advantages. Some counties have exhibited such efforts and hence Japan, Israel, South Korea and Russia have developed and, China, Philippines, Cyprus, Turkey, India, Thailand, Vietnam, etc. have made significant progress. On the other hand, there

are many countries yet to make any significant headway to fast economic development.

4. Issues in economic development of Asian countries

Economic development is based on four fundaments: (1) availability of natural resources, (2) availability of physical, financial and human capital, (3) technology and innovativeness, and (4) favourable institutions. Most of the development theories have stressed on the one or the other fundamental, undermining the role of the other fundamentals, taking them for granted. It may be noted that, first of all, many less developed countries may not have abundant natural resource and secondly, even if they have, they may simply export them without developing any processing industries or the industries that have strong backward linkage to the available resources. This is because the rest of the three fundamental factors may not lend support to development of such industries.

The theories that stress on physical/financial capital suggest to enhancing domestic savings or permitting foreign capital to flow in either by way of loan or investment. It is assumed that the investment would be made to utilize natural resources in accordance with the comparative advantage. It is also assumed that technology and skilled manpower to apply that technology would readily be available and institutions are all favourable to allow the capital/investment to operate with considerably high efficiency. However, there are catches in the logic. Inflow of foreign capital to the less developed countries is constrained, which is known as the Lucas paradox (Lucas, 1990) and Feldstein-Horioka puzzle (Feldstein & Horioka, 1980; Alfaro et al., 2005), due to uncertainties as well as issues such as technological incoherence, unavailability of infrastructure and human resources, institutional factors and government policies at the destination countries. This has been widely experienced in African as well as in Asian countries. In absence of inflow of foreign capital, domestic savings and investment become highly correlated. When income is low, efforts to raise domestic savings by curtailing consumption may adversely affect human capital and its efficiency (Myrdal, 1972: p. 54) offsetting the benefits of investment based on domestic savings. This interlocking is difficult to break.

Financing development activities through borrowing from the international organizations also has not borne much fruit except that the burden of debt kept on escalating over time. It created a sort of dependency on financers, dictating the path of development a country could choose. It is well known how India had to go in for reforms and restructuring in 1991 (Mishra & Kumar, 2013).

Technology is relatively easy to bring in, but the management and the availability of skilled human resources to adopt the technology to its full efficiency are constrained by other factors. Such technologies are also capital intensive and it has its bearing on the low level technology prevailing in the less developed countries. This brings about social dissatisfaction and political resistance. Education system is not in coordination with the technologically modern industrial requirements, nor is it easy to restructure education system on account of unavailability of trained manpower. Hence, educational expansion is often leading to deterioration of quality and further divergence from the industrial requirements. Innovativeness is choked by social circumstances, unsupportive government policies, unavailability of institutional finance, poor infrastructure and uncertainty of market conditions. As to human capital, literacy and education is quality-wise poor and unhelpful in imparting skill and employability, not to mention an ability to carry out critical evaluation. The intelligentsia is either incapable or indifferent, if not opportunistic or supporting the coalition (Rudra, 1989) that thrives on the mass poverty and perpetual underdevelopment. Due to poor health infrastructure, deplorable sanitation facilities, deficient waste disposal system and poverty a large part of the population also has poor health conditions.

Many Asian countries (such as Saudi Arabia, Tajikistan, Yemen, Iran, Azerbaijan, Bahrain, Oman, Kazakhstan, China, Qatar, Russia, Vietnam, Kuwait,

Armenia, and Jordan) are authoritarian. Some of them (such as Pakistan, Lebanon, Thailand, Bhutan, Kyrgyzstan, Turkey, Bangladesh and Georgia) are hybrid regimes (hybrids of authoritarian and corrupt democracies) where consequential irregularities exist in elections regularly preventing them from being free and fair, where governments apply pressure on political opponents, judiciaries work under govt. pressure, where there is widespread corruption, media are not permitted to act independently, political culture is underdeveloped, and there are issues in the functioning of governance. Only a few (Singapore, Hong Kong, Malaysia, Mongolia, Philippines, Indonesia, Taiwan, India, Israel, South Korea) are democracies, although flawed democracies. Flawed democracies are nations where elections are fair and free and basic civil liberties are honoured but may have issues (e.g. media freedom infringement). Nonetheless, these nations have significant faults in other democratic aspects, including underdeveloped political culture, low levels of participation in politics, and issues in the functioning of governance (The Economist, 2015). Most of the Asian countries are 'soft state' of Gunnar Myrdal whether the Asian countries hate, like or exhibit an indifference to that qualification. These countries, observes Myrdal (1970, p. 211), cannot impose the right development policies. Soft state signifies a country wherein the various types of social indiscipline which manifest themselves by deficiencies in legislation and, in particular, law observance and enforcement, a widespread disobedience by public officials and, often, their collusion with powerful persons and groups. It also refers to widespread practices of rent-seeking and corruption not taken much seriously or pro-actively by the society, administration or even the legal system. Their political system is often corrupt, or it supports corruption and is unwilling to act against corruption at all levels. This state may be attributable to the past colonial rule and the vacuum created by their departure which could not properly be filled afterwards due to many reasons including vested interests. This was also due to the persistence, even after independence, of an attitude of disobedience to any authority which was historically central to the nationalist politics against the colonial powers. These observations of Myrdal are often overlooked. As Maharatna (2010) opines, it is "a misfortune that the notion of 'soft state' as pioneered by Gunnar Myrdal had received at its advent unduly harsh and certainly very hasty criticisms from the then influential scholars and political leaders of India and elsewhere. Consequently, profusely insightful and useful suggestions and advices emanating from the Asian Drama, particularly towards a more effective functioning of the state, had been summarily flouted by the then dominant leaderships and governments—albeit at colossal peril of many countries' subsequent development trajectories. Similarly costly should have been the callous neglect and indifference on the part of academics and political leaders alike towards Myrdal's incisive analysis and understanding of the growing phenomenon of corruption in many newly independent countries in Asia." Overall, most of the Asian countries have deficient social capital (Putnam, 1995; 2000). It is important to note that social capital can neither be borrowed nor imported. It cannot easily be cultivated due its complexity, non-material nature and its being housed in the mind of the people or the social psyche (*obshchestvennaia psikhika*) that regulates people's attitudes and conducts often without their being conscious of its influence.

5. Recent thrust to development through globalization

After the dissolution of the USSR, many countries in Asia resolved to try with 'globalization-led development' (Mishra, 1917a). This is partly because 'planning-led development' or 'borrowing-led' development did not bear much fruit for several decades. In the globalization program the economic part relates to promoting the flow of goods and services, financial resources and investment across the national borders and reduction in restrictions on such flow by means of tariff, taxes and other barriers. The social part of the globalization is concerned with movement people, information, ideas and culture and connecting the people across the national boundaries. To facilitate these two types of flows and to reduce

restriction on them, it is required that necessary political connectivity and functionality should be there for which embassies, membership in international organizations, international treaties, etc. are needed. It is expected that while economic part would stimulate flow of goods, services, finance, capital and technologies in which sphere decision-making will not be limited on the basis of nationality. The socio-cultural aspect of globalization would inculcate modernization ideals, innovativeness, openness of mind, awareness to opportunities, cosmopolitanism and knowledge capital as well as it would reduce many biases that are caused by a closed mindset.

It is not that such flow of goods, finance, capital, technology, people, ideas, culture, etc. was not there before 1991. Colonization of the countries in Africa, Asia and elsewhere did connect the colonized countries for transfer of material resource, technologies, people, ideas and culture. However, the motive force of establishing such connections and transfers were exploitation and imperialism rather than development. Moreover, such transfers were not based on a wilful exchange among the parties. After the Second World War, when many colonies became sovereign states, such interactions were there. By way of exports and imports goods crossed boundaries. Ideas and innovations originating in developed countries did percolate to less developed countries. Technology transfers and adaptations did take place. Yet, such interactions were not considered as an engine of growth or development.

After the fall of the USSR, the 3-Worlds picture was reduced to the 2-Worlds picture in which there are developed countries and underdeveloped (developing) countries, most of them managing their economies on the market principle. Now, development of underdeveloped countries is not a 'white man's burden', but a transformation based on wilful exchange among the parties involved that may turn out to be in the interest of all the parties. Development (economic, social and political) of the Asian, African or Latin American countries is necessary for the developed countries so that the capital of the latter find destinations where they can be more productive (and overcome Lucas paradox) as well as the market for the products that the latter produces. This development is necessary for the developed countries so that their capital finds natural as well as human resources cheaper to operate upon, beyond their own national boundaries and they also find the markets to dispose the produce off, beyond their own national boundaries, and bring home only the profits. The underdeveloped countries are interested in such a program because they have failed to find enough capital (at home or borrowed from elsewhere), entrepreneurs and skilful management to operate on their natural resources for generating sufficient income and employment in order to bring themselves out of the vicious circle of underdevelopment. It is also expected that such an arrangement would transform the domestic business environment in the underdeveloped countries.

6. Measurement of the degree of globalization

A number of indices have been devised that may be used to assess the extent of globalization of different countries and also study the trends in globalization over time. Since globalization is a multifaceted concept, such indices of globalization are often obtained by a weighted aggregation of several indicators of globalization in different dimensions. Samimi (2011) reviews a number of such indices among which Vujakovic (2010) and KOF (Dreher, 2006; Dreher *et al.,* 2008) indices of globalization are noteworthy.

The KOF index of globalization has been constructed for many countries for 45 years (1970-2014) on an annual basis and, thus, greatly facilitating a study on the trends of globalization for a large number of countries. It visualizes three aspects of globalization; economic, social and political. The economic dimension (E) of globalization takes into account: (1). E1 - actual economic flows such as trans-border trade, direct investment and portfolio investment, and (2). E2 - restrictions on trans-border trade as well as capital movement by means of taxation, tariff, etc.

They are synthesized to make E. The social dimension (S) takes into account: (1) S1 - trans-border personal contacts such as degree of tourism, telecom traffic, postal interactions, etc., (2) S2 - flow of information, and (3). S3 - cultural proximity. They are synthesized to make S. The political dimension has only one aspect, P. At the second stage, E, S and P are synthesized (by a weighted aggregation) to give the KOF Index of globalization (Mishra, 2017b).

However, the enterprise of construction of composite indices by a weighted aggregation of indicators in varied dimensions is vexed with the problem of choice of weights to be assigned to different indicator variables. When weights are assigned subjectively (based on expert opinion) it faces the criticism of inducing subjective biases. Yet, when weights are assigned by any so-called objective method (that derives them from the data itself through some statistical/ mathematical method) they may not fall in line with the pre-conceived (theoretically sound or otherwise) notion of importance that the analyst holds. Even if the importance of different indicators assessed by the analyst is correct, it is not necessary that the data and the method that operates on them to derive weights would fulfil the expectations of the analyst. The reasons for this divergence are varied. Data are the figures emanating from facts. Data are collected by following some concepts and they are constrained by many factors. There can be a great gap between concepts and facts. Of what sort and how much of information on facts, filtered by what sort of precepts, gets converted to quantitative data ultimately determines the extent to which figures can stand for facts.

Popularly, different indicators are assigned weights such that they are some function of Pearson's correlation coefficient or covariance among different indicator variables. The Principal Component Analysis (PCA) is based on such correlation (or covariance). It maximizes the Euclidean norm of correlation coefficients between the composite index and the indicator variables. On this account two questions can be raised; first how to measure correlation, and the second why the Euclidean norm? There are many measures of correlation including Pearsonian correlation, Bradley's absolute correlation, Spearman's rank correlation and so on up to Szekely's Distance (Brownian) correlation (Mishra, 1914). Similarly, among the many possible norms, one may choose absolute, Euclidean or Chebyshev norm. Accordingly, the composite index would vary.

There are other two methods that deserve mention here. The first of them is Pena's method (Somarriba & Pena, 2009) and the second is the one proposed by Becker *et al.,* (2017). Pena's method sequentially finds the explanatory power (R^2) of each leading indicator variable net of the other trailing indicator variables and assigns weights to the indicator variables accordingly. Becker *et al.,* (2017) use the correlation ratios and optimize its function to obtain weights.

Table 6. *Different Dimensions and Synthetic Indices of Globalization in Select Asian Countries*

Country	Year*	E1	E2	S1	S2	S3	P	KOF	AEMC
Singapore	2009	99.01	95.35	92.18	88.25	96.12	71.77	88.27	88.27
Cyprus	2008	93.50	84.06	88.10	95.69	93.84	78.36	87.32	86.04466
Israel	2010	71.59	83.51	75.06	67.25	90.37	80.29	78.15	80.09249
Qatar	2014	77.52	84.43	78.83	72.34	89.65	72.57	78.49	79.1897
Malaysia	2010	89.03	69.62	64.71	75.92	87.52	83.17	79.12	77.38491
Jordan	2005	80.57	60.04	68.99	67.45	40.71	84.27	70.17	72.86044
Lebanon	2006	86.92	62.30	70.38	81.04	43.26	74.55	70.50	71.16785
Turkey	2014	51.09	66.13	50.76	72.49	81.59	91.88	71.33	70.66232
Kuwait	2009	59.15	77.58	79.06	76.88	90.41	59.79	70.99	70.34469
Bahrain	2007	95.39	82.72	87.67	69.57	43.66	43.80	67.85	70.3223
Japan	2014	50.41	76.54	43.39	75.59	87.91	88.10	72.26	70.15894
Saudi_Arabia	1993	48.19	76.19	71.10	29.62	75.95	71.77	62.50	70.13246
Thailand	2012	83.87	59.54	42.90	72.93	80.93	81.22	72.06	67.57002
Brune	2014	75.84	81.56	72.23	84.52	43.51	54.05	67.60	67.20363
Korea_Rep.	2014	62.52	63.76	43.81	73.55	42.42	89.58	67.03	66.91502
Russian_Fed.	2013	61.73	45.75	43.65	73.80	81.93	91.62	68.88	65.27114
Georgia	2013	78.44	85.96	56.84	75.82	39.20	49.37	64.21	62.73205
Oman	2014	78.55	82.90	59.43	72.22	39.42	45.74	62.66	61.32702
Indonesia	2014	56.25	71.79	20.40	49.92	33.89	86.83	59.65	60.54658
Armenia	2014	64.89	71.54	48.41	77.23	1.68	66.99	58.89	59.72001

Kazakhstan	2012	81.17	54.03	53.77	70.97	1.86	68.59	58.97	59.67099
Philippines	2004	65.02	58.69	31.13	49.26	39.90	81.03	59.20	59.47478
China	2014	43.49	62.19	18.71	65.65	78.37	84.26	62.02	57.46764
Kyrgyzstan	2013	65.70	61.89	39.43	75.43	2.48	65.90	55.79	54.82688
Mongolia	2014	84.88	65.73	16.76	59.40	1.43	71.89	56.91	54.78246
Azerbaijan	2013	58.58	64.16	38.63	78.75	35.07	60.22	57.50	53.84511
Pakistan	2002	29.82	50.40	31.51	41.45	32.38	84.27	50.65	53.50246
Sri Lanka	2007	47.08	46.86	35.64	54.40	33.50	74.53	52.60	52.51512
India	2014	43.78	44.93	14.10	45.12	32.98	91.23	52.38	52.26477
Vietnam	2014	80.26	49.28	16.43	63.78	31.92	71.13	56.69	51.4205
Cambodia	2014	85.86	50.76	29.52	48.48	1.31	62.36	50.69	50.98426
United_Arab	2011	53.48	55.43	51.94	65.49	1.00	52.73	48.93	49.79375
Yemen	2009	46.31	63.83	25.35	42.40	1.31	64.78	46.15	48.55389
Tajikistan	2012	42.12	57.24	26.44	53.65	1.00	61.87	45.26	45.55294
Bangladesh	2013	29.79	41.19	25.78	42.07	1.56	76.18	42.43	45.12315
Bhutan	2014	60.64	56.77	46.83	45.54	6.87	38.85	43.58	44.96274
Iran	2013	25.33	34.55	29.99	69.07	1.12	67.69	42.35	40.79011
Nepal	2013	13.26	39.95	24.97	44.85	2.79	70.69	38.18	40.36511
Myanmar	2014	56.93	56.33	11.89	42.07	1.00	44.74	39.03	37.29294

Note: Year* = Year in the span 1970-2014 for which AEMC obtains largest value representing highest globalization attained

7. The present study

In this study we construct a composite index of globalization by a method proposed by Mishra (2016). It obtains weights for indicator variables such that the Euclidean norm of their Shapley values in explaining the composite index is minimized. Thus we get almost 'equi-marginal contribution' solution of weights to construct the composite index. Shapley values (that have uniqueness, efficiency, symmetry, linearity and anonymity properties) are mean expected marginal contributions to the value of a coalition game (Roth, 1988).

Table 7. *Shapley Value of Constituent Variables in KOF and AEMC Indices and their Euclidean Norm*

Globalization Aspect	E1	E2	S1	S2	S3	P	Norm
Shapley Value (KOF)	0.17952	0.15176	0.11351	0.21295	0.19581	0.14613	0.41616
Shapley Value (AEMC)	0.16556	0.16578	0.16584	0.17065	0.16612	0.16605	0.40827
AEMC Weights	0.33639	0.52417	0.67645	0.00186	0.15866	0.82650	-

We have used the indicators of different dimensions of globalization from the KOF study-1917: economic (E1 and E2), social (S1, S2 and S3) and political (P) for 45 years, 1970 through 2014, and for 39 countries in Asia. For some Asian countries, data were deficient and thus such countries were dropped out from our analysis. Unlike the KOF study that constructs the composite index at two stages (at the first stage making E from E1 and E2, S from S1, S2 and S3 and then at the second stage obtaining the final index by synthesizing E, S and P), we have synthesized E1, E2, S1, S2, S3 and P at one go. It may be noted that in making the index at two stages, we lose the information content of E_iS_j, PS_i and PE_i. After all, economic, social and political indicators are not orthogonal to each other.

The main findings of our study are presented in Table-6 and Table-7. In Table-6 we present values of E1 through P, the KOF index and the best value of AEMC indices of globalization in 1970-2014. In Table-7 we present the Shapley values obtained by the constituent variables (E1, E2, S1, S2, S3 and P) for the Almost Equi-marginal Contribution (AEMC) index and their Euclidean norm. For comparison the corresponding Shapley values and their Euclidean norm for the KOF index of globalization also are presented. We observe that the AEMC norm is a little less than the KOF norm and the Shapley values for the former are more equitably distributed than those of the latter. The weights obtained by S2 (flow of information) is the least although its Shapley value is the largest (0.17065). On the other hand, although P (political dimension) gets the largest weight, its Shapley value is comparable to others.

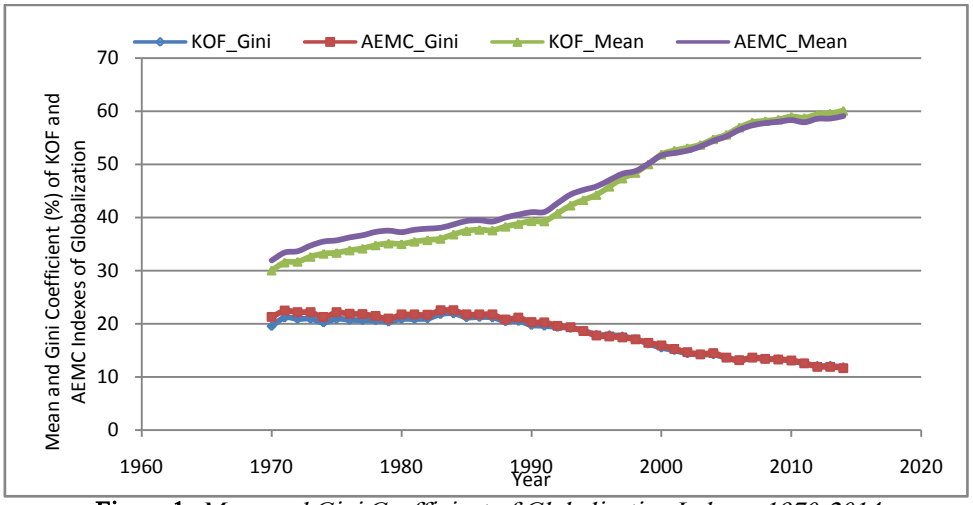

Figure 1. *Mean and Gini Coefficient of Globalization Indexes 1970-2014*

8. Trends in growth and disparities in globalization

Over the years since 1970, the mean level of globalization in Asian countries has increased. Its growth rate accelerated after 1991 but started tapering off since 2007 or so. Disparities in globalization over the Asian countries were more or less constant up to 1985 but after that they started declining (vide Fig-1 and Table-8). We have measured disparities by the Gini coefficient (scaled up to lie between zero and 100).

Table 8. *Trends in the Measures of Globalization in Asian Countries – 1970-2014*

Year	Gini Cefficient (Per Cent) Over Countries of Measures					Arithmetic Mean Over Countries of Measures				
	ECO	SOC	POL	KOF	AEMC	ECO	SOC	POL	KOF	AEMC
1970	25.839	32.772	22.914	19.542	21.283	35.082	24.364	31.081	30.022	31.906
1971	28.603	34.061	25.074	21.137	22.468	37.809	26.704	29.847	31.514	33.391
1972	28.372	34.181	24.616	20.891	22.179	37.646	26.635	30.714	31.669	33.640
1973	28.950	34.352	23.156	20.908	22.166	38.448	26.564	33.149	32.598	34.704
1974	28.503	34.547	22.237	20.210	21.274	38.597	26.497	35.143	33.176	35.462
1975	28.489	34.841	22.739	20.904	22.151	38.813	26.389	35.627	33.348	35.680
1976	28.400	34.812	22.678	20.712	21.879	38.854	26.498	37.101	33.809	36.246
1977	28.233	34.806	22.586	20.658	21.827	38.904	26.599	38.115	34.142	36.641
1978	28.542	35.944	21.529	20.632	21.436	38.988	27.146	39.513	34.761	37.271
1979	27.841	36.312	20.760	20.351	20.955	38.806	27.367	40.695	35.104	37.507
1980	28.065	36.310	19.367	20.859	21.731	39.365	27.426	39.526	35.002	37.230
1981	27.686	35.392	19.004	20.873	21.732	40.176	27.840	39.547	35.448	37.675
1982	27.499	35.270	18.481	20.967	21.699	40.530	28.336	39.465	35.734	37.886
1983	27.525	35.327	19.815	21.782	22.513	40.491	28.984	39.565	35.988	38.052
1984	27.177	36.198	22.203	21.910	22.538	41.463	30.747	38.907	36.802	38.677
1985	26.866	35.678	21.307	21.199	21.754	41.822	31.310	40.108	37.470	39.332
1986	26.946	35.612	20.840	21.235	21.780	41.832	31.651	40.411	37.681	39.464
1987	26.479	35.814	19.887	21.150	21.737	42.084	31.666	39.650	37.566	39.228
1988	26.060	35.296	22.033	20.423	20.815	42.507	32.054	41.123	38.266	39.993
1989	25.400	35.127	22.669	20.489	21.130	43.168	32.206	41.963	38.788	40.532
1990	25.346	33.719	22.154	19.729	20.299	42.928	32.783	43.384	39.308	40.995
1991	22.880	31.524	28.741	19.576	20.268	44.213	32.630	41.810	39.273	41.035
1992	21.593	31.910	26.853	19.361	19.610	44.787	33.318	45.502	40.749	42.686
1993	20.840	32.201	26.353	19.173	19.323	45.480	34.395	48.593	42.246	44.307
1994	20.324	32.507	25.953	18.688	18.617	46.419	35.730	49.326	43.273	45.174
1995	19.849	31.466	24.239	17.905	17.762	47.512	37.027	49.696	44.243	45.834
1996	19.590	30.685	23.808	17.871	17.596	49.009	39.053	50.702	45.801	47.043
1997	19.002	30.184	23.026	17.626	17.405	50.889	40.566	51.840	47.339	48.221
1998	18.177	28.410	21.940	17.071	17.044	52.008	42.237	51.989	48.395	48.725
1999	17.594	26.907	21.428	16.226	16.416	53.752	43.844	53.463	50.015	50.113
2000	16.898	25.710	21.154	15.467	15.939	55.974	45.314	55.336	51.862	51.664
2001	15.523	25.743	20.912	14.998	15.272	55.840	46.552	56.538	52.603	52.124
2002	15.113	25.136	20.234	14.393	14.643	55.824	47.075	57.613	53.087	52.563
2003	15.155	25.239	18.966	14.200	14.258	56.513	46.913	59.084	53.677	53.352
2004	15.494	24.571	18.981	14.199	14.465	58.116	47.827	59.644	54.738	54.414
2005	14.953	24.239	18.122	13.576	13.632	59.436	48.141	60.607	55.589	55.256
2006	14.388	23.512	16.727	13.069	13.123	60.130	49.216	63.183	56.942	56.497
2007	14.964	23.653	15.577	13.567	13.654	60.512	49.926	65.209	57.899	57.338
2008	15.438	23.629	14.196	13.317	13.391	59.692	49.892	67.282	58.166	57.755

2009	15.502	23.384	13.908	13.300	13.296	59.921	49.927	67.900	58.431	58.000
2010	15.521	23.086	13.824	12.997	13.100	60.751	50.316	68.286	58.975	58.313
2011	15.512	22.592	13.833	12.516	12.571	60.298	50.301	68.078	58.753	57.911
2012	14.793	22.495	13.017	12.061	11.910	60.887	50.552	69.203	59.364	58.571
2013	14.249	22.866	13.116	12.092	11.863	61.421	50.876	68.825	59.568	58.607
2014	14.832	22.352	12.051	11.809	11.647	62.082	51.131	69.523	60.091	59.077

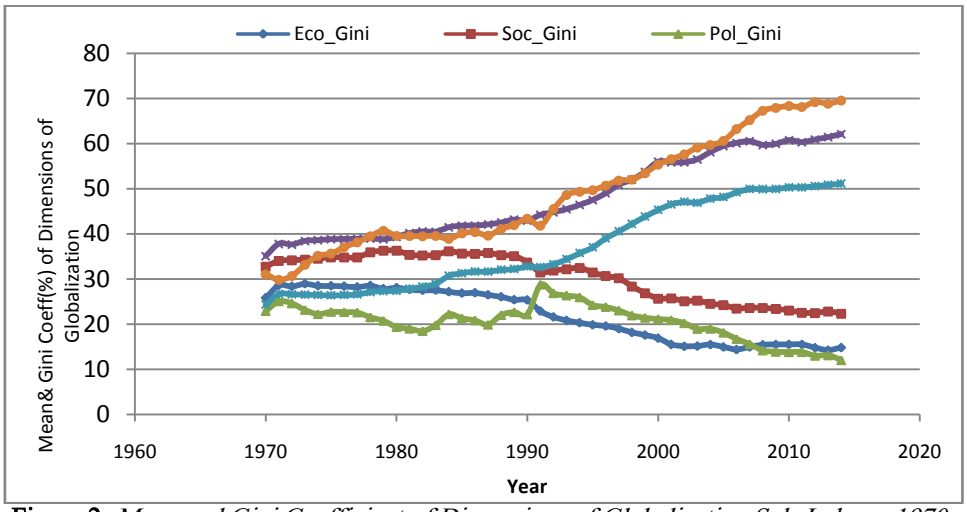

Figure 2. *Mean and Gini Coefficient of Dimensions of Globalization Sub-Indexes 1970-2014*

Table 9. *Trends in Dispersion (Absolute Distance) of Globalization in Asian Countries-1970-2014*

Year	ECO	SOC	POL	KOF	AEMC	Year	ECO	SOC	POL	KOF	AEMC
1970	9.065	7.985	7.122	5.867	6.791	1993	9.478	11.076	12.806	8.100	8.561
1971	10.814	9.096	7.484	6.661	7.502	1994	9.434	11.615	12.802	8.087	8.410
1972	10.681	9.104	7.561	6.616	7.461	1995	9.431	11.651	12.046	7.922	8.141
1973	11.131	9.125	7.676	6.816	7.693	1996	9.601	11.983	12.071	8.185	8.278
1974	11.001	9.154	7.815	6.705	7.544	1997	9.670	12.245	11.937	8.344	8.393
1975	11.057	9.194	8.101	6.971	7.903	1998	9.454	12.000	11.406	8.261	8.305
1976	11.035	9.224	8.414	7.003	7.930	1999	9.457	11.797	11.456	8.115	8.227
1977	10.984	9.258	8.608	7.053	7.998	2000	9.459	11.650	11.706	8.021	8.235
1978	11.128	9.757	8.507	7.172	7.989	2001	8.668	11.984	11.823	7.890	7.960
1979	10.804	9.938	8.448	7.144	7.860	2002	8.437	11.833	11.657	7.641	7.697
1980	11.048	9.958	7.655	7.301	8.091	2003	8.564	11.840	11.206	7.622	7.607
1981	11.123	9.853	7.516	7.399	8.188	2004	9.005	11.751	11.321	7.772	7.871
1982	11.145	9.994	7.293	7.493	8.221	2005	8.888	11.669	10.983	7.547	7.532
1983	11.145	10.239	7.840	7.839	8.567	2006	8.652	11.572	10.568	7.442	7.414
1984	11.268	11.130	8.638	8.063	8.717	2007	9.055	11.809	10.157	7.855	7.829
1985	11.236	11.171	8.546	7.943	8.556	2008	9.215	11.789	9.551	7.746	7.734
1986	11.272	11.271	8.422	8.001	8.595	2009	9.289	11.675	9.444	7.771	7.712
1987	11.143	11.341	7.885	7.945	8.527	2010	9.429	11.616	9.440	7.665	7.639
1988	11.077	11.314	9.061	7.815	8.325	2011	9.354	11.364	9.417	7.353	7.280
1989	10.964	11.313	9.512	7.947	8.564	2012	9.007	11.372	9.008	7.160	6.976
1990	10.880	11.054	9.611	7.755	8.322	2013	8.752	11.633	9.027	7.203	6.953
1991	10.116	10.286	12.017	7.688	8.317	2014	9.208	11.429	8.378	7.096	6.880
1992	9.671	10.632	12.219	7.889	8.371	Medi	9.671	10.632	12.219	7.889	8.371

Here it will be pertinent to note that the Gini coefficient is like the coefficient of variation (CV), the expected distance with respect to arithmetic mean. In case of the Coeff. of Variation (CV) the distance is Euclidean while in case of the Gini coefficient the distance is absolute. Stated explicitly, $CV = [\sum_{i=1}^{n} \sum_{j=1}^{n} (x_i - x_j)^2 / (2n^2)]^{0.5} / \bar{x}$ and $Gini = [\sum_{i=1}^{n} \sum_{j=1}^{n} | x_i - x_j | / (2n^2)] / \bar{x}$. While mean values are increasing over time, CV as well as Gini coefficient may fall fast even when the measure of dispersion $D = \sum_{i=1}^{n} \sum_{j=1}^{n} | x_i - x_j | / (2n^2)$ is not so fast decreasing. This has been shown in Fig-3 (Table-9). It may be seen that fall in D started only since 1998 and its magnitude is not very different than what it was about 1976 or so. Furthermore, in social dimension of globalization much significant decline has not been there, while in political dimension there was a steep rise during 1988-1993, followed by a fast decline after 1994, trailing the

dissolution of the USSR. As to the economic globalization, it started faltering after 2006 onwards.

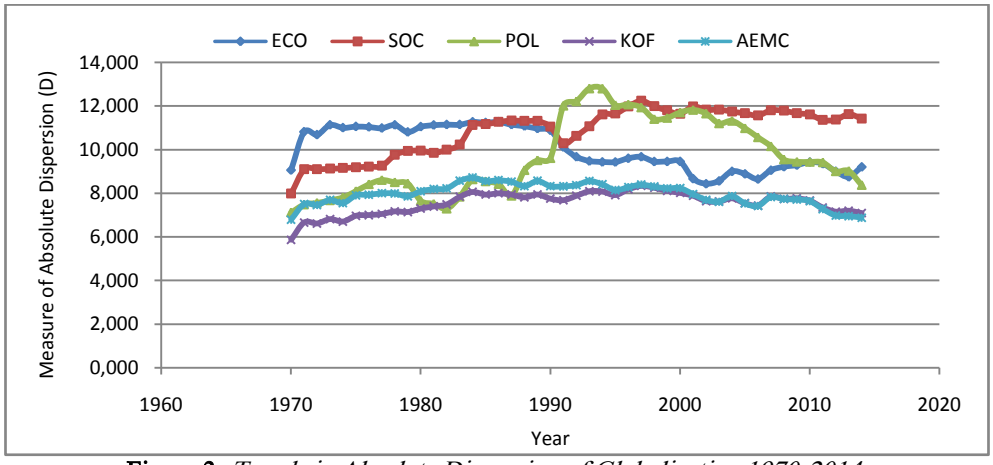

Figure 3. *Trends in Absolute Dispersion of Globalization 1970-2014*

9. Relationship of AEMC and KOF indices of globalization with other socio-economic indices

Now let us look into the association of globalization with some important socio-economic indicators (Table-10). These indicators are as follows.

(i). *Economic Freedom Index*: Economists have always argued that freedom of individuals to pursue their self-interest results into the social good and therefore economic development. In constructing this index (EFI) property rights, freedom from corruption, fiscal freedom, lesser govt. spending, business freedom, monetary freedom, labour freedom, trade freedom, investment freedom and financial freedom are accounted for. It is obvious that such freedom is congenial to globalization. Indeed we find that globalization indices are highly correlated with the index of economic freedom (Table-11 and Table-12).

(ii). *International Innovation Index (INV)*: This is a global index measuring the level of innovation of a country, considering the business outcomes of innovation and government's ability to encourage and support innovation through public policy. It is expected that this index should be positively correlated with the index of globalization. Indeed we find that it is so (Table-11 and Table-12).

(iii). *Social Progress Index*: measures the extent to which countries provide for the social and environmental needs of their citizens. The index is based on a large number of indicators in the areas of basic human needs, foundations of well-being and opportunity to progress. This index (SPI) is strongly and positively correlated with the index of globalization (Table-11 and Table-12).

Table 10. *Globalization Indices and Some Other Important Socio-economic Indices*

Country	KOF	AEMC	EFI	INV	SPI	HDI	CPI	DEMI	GGP
Singapore	88.27	88.27	87.8	2.45	60	0.925	84	6.38	0.712
Cyprus	86.045	87.32	67.9	0.63	77.45	0.856	55	7.65	0.684
Israel	80.092	78.15	70.5	1.36	72.6	0.899	64	7.85	0.719
Qatar	79.19	78.49	70.8	0.52	60	0.856	61	3.18	0.643
Malaysia	77.385	79.12	70.8	1.12	69.55	0.789	49	6.54	0.666
Jordan	72.86	70.17	69.3	-0.15	63.31	0.741	48	3.96	0.603
Lebanon	71.168	70.5	59.3	-	61.85	0.763	28	4.86	0.598
Turkey	70.662	71.33	63.2	-0.21	66.24	0.767	41	5.04	0.623
Kuwait	70.345	70.99	62.5	0.06	69.19	0.8	41	3.85	0.624
Bahrain	70.322	67.85	73.4	0.21	57	0.824	43	2.79	0.615
Japan	70.159	72.26	73.3	1.79	83.15	0.903	72	7.99	0.66
Saudi_Arabia	70.132	62.5	62.1	-0.12	64.27	0.847	46	1.93	0.583
Thailand	67.57	72.06	62.4	0.12	66.34	0.74	35	4.92	0.699
Brunei	67.204	67.6	68.9	-	-	0.865	58	-	0.669
Korea_Rep.	66.915	67.03	71.5	2.26	77.7	0.901	53	7.92	0.649
Russian_Fed.	65.271	68.88	52.1	-0.09	63.64	0.804	29	3.24	0.691
Georgia	62.732	64.21	73	-0.75	65.89	0.769	57	5.93	0.681

Oman	61.327	62.66	66.7	-0.15	70	0.796	45	3.04	0.612
Indonesia	60.547	59.65	58.1	-0.57	60.47	0.689	37	6.97	0.682
Armenia	59.72	58.89	67.1	-0.66	65.7	0.743	33	3.88	0.669
Kazakhstan	59.671	58.97	63.3	-0.23	61.38	0.794	29	3.06	0.718
Philippines	59.475	59.2	62.2	-0.15	65.46	0.682	35	6.94	0.786
China	57.468	62.02	52.7	0.73	59.07	0.738	40	3.14	0.676
Kyrgyzstan	54.827	55.79	61.3	-0.77	58.58	0.664	28	4.93	0.687
Mongolia	54.782	56.91	59.2	-0.89	61.52	0.735	38	6.62	0.705
Azerbaijan	53.845	57.5	61	-0.54	62.62	0.759	30	2.65	0.684
Pakistan	53.502	50.65	55.6	-0.82	45.66	0.55	32	4.33	0.556
SriLanka	52.515	52.6	58.6	-0.56	60.1	0.766	36	6.48	0.673
India	52.265	52.38	54.6	0.06	53.06	0.624	40	7.81	0.683
Vietnam	51.421	56.69	51.7	-0.65	55	0.683	33	3.38	0.7
Cambodia	50.984	50.69	57.5	-	53.96	0.563	21	4.27	0.658
United_Arab	49.794	48.93	72.4	-	72.79	0.536	66	2.75	0.639
Yemen	48.554	46.15	53.7	-	40.3	0.482	14	2.07	0.516
Tajikistan	45.553	45.26	52.7	-0.99	56.49	0.627	25	1.89	0.679
Bangladesh	45.123	42.43	53.9	-	53.39	0.579	26	5.73	0.698
Bhutan	44.963	43.58	57.4	-	60	0.607	65	4.93	0.642
Iran	40.79	42.35	41.8	-	56.82	0.774	29	2.34	0.587
Nepal	40.365	38.18	51.3	-1.05	55.33	0.558	29	4.86	0.661
Myanmar	37.293	39.03	46.9	-	46.12	0.556	28	4.2	-

Sources:
CPI (2016): [Retrieved from].
HDI (2015): [Retrieved from].
EFI (2014): [Retrieved from].
DEMI (2016): [Retrieved from].
SPI (2015): [Retrieved from].
INV (2009): [Retrieved from].
GGP (2016): [Retrieved from].

(iv). *Human Development Index*: It is a well-known index (HDI) that measures a country's achievement on life expectancy, education, and per capita income indicators. AEMC and KOF globalization indexes are strongly and positively correlated with the HDI (Table 11 and Table 12).

(v). *Corruption Perception Index*: Corruption discourages inflow of capital. It impedes economic functions either by delays or by increasing the cost. It introduces several types of system-made risks and resistances. Transparency International publishes the Corruption Perceptions Index (CPI) - score and ranking of countries - by their perceived levels of corruption, as determined by expert assessments and opinion surveys. The CPI generally defines corruption as "the misuse of public power for private benefit". The values of this index lie between 0 and 100; higher for less corrupt and lower for more corrupt. Kendall's tau between AEMC index and CPI is 0.4493 and that between KOF index and CPI is 0.4547 (Table-11 and Table-12). The corresponding values for Spearman's Rho are 0.5835 and 0.5939. Thus, less corrupt countries are more globalized.

Table 11. *Kendall's Tau of AEMC and KOF indices of globalization with other socio-economic indices*

	Globalization Indices			Other Socio-Economic Indices					
Indices	KOF	AEMC	EFI	INV	SPI	HDI	CPI	DEMI	GGP
KOF	1.0000	0.8758	0.5527	0.6213	0.5018	0.6077	0.4547	0.2236	0.0869
AEMC	0.8758	1.0000	0.5770	0.5566	0.4619	0.5969	0.4493	0.2066	0.0100
EFI	0.5527	0.5770	1.0000	0.4560	0.5339	0.4949	0.5617	0.1869	-0.0014
INV	0.6213	0.5566	0.4560	1.0000	0.3792	0.5965	0.5495	0.1871	0.0139
SPI	0.5018	0.4619	0.5339	0.3792	1.0000	0.4950	0.4648	0.2198	0.0572
HDI	0.6077	0.5969	0.4949	0.5965	0.4950	1.0000	0.4673	0.1140	0.0428
CPI	0.4547	0.4493	0.5617	0.5495	0.4648	0.4673	1.0000	0.2473	-0.0345
DEMI	0.2236	0.2066	0.1869	0.1871	0.2198	0.1140	0.2473	1.0000	0.2904
GGP	0.0869	0.0100	-0.0014	0.0139	0.0572	0.0428	-0.0345	0.2904	1.0000

Notes: CPI = Corruption Perception Index; HDI = Human Development Index; EFI = Economic Freedom Index; DEMI = Democracy Index; SPI = Social Progress Index; INV =International Innovation Index; GGP = Gender Gap Index.

Table 12. *Spearman's Rho of AEMC and KOF indices of globalization with other socio-economic indices*

	Globalization Indices			Other Socio-Economic Indices					
Indices	KOF	AEMC	EFI	INV	SPI	HDI	CPI	DEMI	GGP
KOF	1.0000	0.9753	0.7116	0.7953	0.6701	0.7915	0.5939	0.3148	0.1112
AEMC	0.9753	1.0000	0.7400	0.7301	0.6347	0.7840	0.5835	0.2884	0.0253
EFI	0.7116	0.7400	1.0000	0.5862	0.6898	0.6316	0.7423	0.2734	-0.0080
INV	0.7953	0.7301	0.5862	1.0000	0.4840	0.7427	0.7172	0.2914	-0.0076
SPI	0.6701	0.6347	0.6898	0.4840	1.0000	0.6147	0.6246	0.3026	0.0659
HDI	0.7915	0.7840	0.6316	0.7427	0.6147	1.0000	0.5834	0.1743	0.0602
CPI	0.5939	0.5835	0.7423	0.7172	0.6246	0.5834	1.0000	0.3572	-0.0393
DEMI	0.3148	0.2884	0.2734	0.2914	0.3026	0.1743	0.3572	1.0000	0.4207
GGP	0.1112	0.0253	-0.0080	-0.0076	0.0659	0.0602	-0.0393	0.4207	1.0000

Notes: CPI = Corruption Perception Index; HDI = Human Development Index; EFI = Economic Freedom Index; DEMI = Democracy Index; SPI = Social Progress Index; INV =International Innovation Index; GGP = Gender Gap Index.

(vi). *Democracy Index (DEMI)*: This index is based on a large number of indicators grouped in five different categories measuring pluralism, civil liberties and political culture. In addition to giving score and ranking the countries accordingly, this index categorises the countries into four categories namely full democracies, flawed democracies, hybrid regimes and authoritarian regimes. It may be noted that democracies (full or flawed) and authoritarianism can both go in for or against globalization depending on many socio-economic and political considerations. There have been plus points as well as minus points with globalization that governments have to weigh since the political parties in opposition and the press bring them to the public view. A reference to Lee thesis may also be made which hypothesizes that democracy hurts economic growth and development. Knutsen (2010) finds that there is no significant, average effect of democracy on growth, possibly due to nonlinearity that may give the relationship a U shape (Libman, 2008). It is likely, therefore, that the relationship of globalization indices may not be as strong with DEMI as with other indicators that are closely connected with economic development. We find weak positive relationship (although statistically significant) with the indices of globalization and DEMI.

(vii). *Gender Gap index (GGP)*: This index summarizes equality in economic participation and outcomes, educational attainment, health and survival, and political empowerment of women vis-à-vis those of men. We find that this index has very poor or no relationship not only with globalization indices but also with other indices such as CPI, HDI, EFI, SPI, INV. Democracy Index (DMI) only has a considerable positive association (Spearman's Rho = 0.4207, see Table-12) with GGP.

Overall, we find that economic indicators (EFI, SPI and INV) and socio-economic indicators (HDI and CPI) are more strongly correlated with globalization index while political indicator (DEMI) and gender equality indicator (GGP) are weakly associated with the globalization index.

10. Concluding remarks

In this study we have constructed a composite index of globalization of Asian countries during 1970-2014 by minimizing the Euclidean norm of Shapley values of indicator variables contributing to the overall index. As a consequence, the mean expected marginal contributions of constituent variable to the overall index are approximately equal and thus, the overall composite index represents the constituent variables optimally. We call this index the Almost Equal Marginal Contribution (AEMC) index. We compare this index with the KOF index of globalization and find that they are highly correlated (Pearson's r=0.982). We find that Singapore, Cyprus, Israel, Qatar, Malaysia, Jordan, Lebanon, Turkey, Kuwait, Bahrain and Japan have done very well and scored above 0.7. At the other end, Yemen, Tajikistan, Bangladesh, Bhutan, Iran, Nepal and Myanmar have scored

only below 0.5. Trends in globalization are increasing in general, but the rate of globalization, which accelerated after 1991, lost its momentum after 2007. Disparities in globalization, as measured by Gini coefficient over the Asian countries, were more or less constant up to 1985 but after that they started declining.

We have found that the index of globalization fares well with other socio-economic measures such as Economic Freedom Index, International Innovation Index, Social Progress Index, Human Development Index and Corruption Perception Index, showing high values of Kendall's Tau and Spearman's Rho. Its association with Democracy Index is rather weak but positive. It is almost uncorrelated with the Gender Gap Index. We observe, therefore, that globalization index is moving well with the indices of socio-economic condition in the Asian countries.

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