Fudan J. Hum. Soc. Sci. (2017) 10:355–380
DOI 10.1007/s40647-016-0164-5

ORIGINAL PAPER

World Governance and Leadership Designs for the Future

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Received: 18 September 2016 / Accepted: 30 December 2016 / Published online: 18 January 2017

Abstract An expanding globalization causes global failures, similar to economy failures encountered in the national economic system. Global failures take other forms and are likely to be more severe in the future because of the entry in the world scene of leading countries that have distinctly different economic systems (for instance, China, India) from leading incumbents (US, EU), and because the new competition (country cum system) is likely to be perceived by newcomers and incumbents as a zero sum game. It is crucial in such circumstances to have a design of world governance that can respond adequately to global failures. The G-20 is one such design, but this is handicapped by its narrow scope (i.e. GDP) and undemocratic composition (selection of individual countries and not regional representation, next to being inconsistent and out of date). The paper formulates and applies an index of influence potential that combines population and GDP, and which is measurable at the region and country levels. The paper projects these applications for the near future, comes up with more representative participations by regions/countries in world governance and explores effects of the changing distribution of influence potential on global development and economic systems.

Keywords World governance · Country dominance · Regional power · Economic growth · Population size

JEL Classification F02 · F42 · F53 · F63 · J11 · O47 · P51

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1 Introduction

In discussions in economic and political forums at the world level, there have been an increasing interest in and lengthy discussions on the prospective major shifts in the economic and political powers of leading countries in the world and their implications for world governance. This discussion has focused on two premises: that the relative size of a country's GDP is the correct indicator of a country's global power and its rank in world leadership and that for running the world affaires it is sufficient to focus on and consult with the few top leading individual countries. The discussion is significant and has serious consequences for the shaping of world governance. These two premises formed the basis for solutions and the shaping of contemporary world governance. The latest development in world governance is the establishment of the G-20, which is a forum of political leaders of the 20 leading economies in the world, whereby qualification for inclusion in the top 20 is based on a county's rank in terms of the country's size of the GDP.

The discussion and the forwarded solutions are flawed in two major respects. One: there is obsession with the size of the GDP as the measure of economic and political influence potential, with no attention to the population factor which is very relevant in understanding global power and in managing world governance. Two: there is the obsession of focusing on individual countries as the unit of analysis in global issues, whereas world regions are more relevant for a better understanding and policy making.

On the first count, the GDP criterion is a poor indication of the influence potential of a particular country in the context of an interactive world of voluminous populations. Interactive influence is not only the result of the relative size of economic transformations but also the result of the relative size of the transforming populations. There is a need to develop and apply a Dominance Index that represents the influence potential more effectively.

On the second count, pronouncing and pushing forward individual countries with the highest GDP as individual leading countries may not command global authority or fair legitimacy because such an identification of individual leading countries does not consider regional power or regional representation. The G-20 approach ignores all the past progress made by mankind in defining constitutional democracy and representational rights. The world cannot be seen as a loose collection of individual countries. Any individual country is allied to other countries and is as such a member of an interest group that has common interests. Responsive actions to global failure would require global governance that is fairly representative of regional and country interests. The division of the world in eight regions, which coincides with the general consensus in international organizations, is our answer in this paper to the representation problem.

This paper defines the problems of global power and world governance in terms of system-based world regions that compete and cooperate in the economic, political and social spheres, and in terms of economic and demographic driving forces that determine the relative weights of competing regions. The outline of the paper is as follows. Section 2 presents an analytical framework for measuring global

dominance via a Dominance Index that combines population size and GDP size and that can measure dominance at the country and regional levels. Section 4 applies the analytical framework to the world at large for the years 2000 and 2012. The Dominance Index will be applied at various levels showing country influence, interregional influence and intraregional influence. Section 5 uses projections and forecasts for exploring future perspectives of global dominance in the few coming decades. Section 5 uses the foregone analysis in discussing designs of global governance. Section 6 ends with concluding remarks.

2 Measurement of Influence Potential by Country and Region

The study of global dominance is highly relevant, important and strategic and has been receiving increasingly more attention. The relative size of the GDP of a leading country has so far been serving as an indicator of global leadership and dominance. The US has become the leading country not only in terms of having the largest GDP, but also in view of its systemic dominance in the commercial, monetary and financial spheres worldwide. Dominance in these spheres tends to increase with a greater GDP. Moreover, global dominance in terms of political, military and technological levels tends to associate with economic power as well. There is thus a tendency for the dominant economy to become the core of the global system, giving its national representatives more leverage in the determination of world governance and the management of world affaires. Dominating countries drive, carry, transport and transplant their own economic system baggage to other countries elsewhere. Fourth, the future economic prospects of countries that are competing for global leadership are crucial for their dominance prospects, may have downgrading effects for the incumbent leaders and can create serious challenges to the adaptation of world governance and management to the new situation.

Current approaches that single the relative size of the GDP of leading countries as an indication of global dominance have been argued above as incomplete and insufficient for two reasons:

(1) The GDP criterion is a poor indication of the influence potential of a particular country in the context of an interactive world of voluminous populations. Interactive influence is the combined result of the relative size of economic transformations and the relative size of the transforming populations. There is a need to develop and apply a Dominance Index that reflects these realities
(2) Pronouncing and pushing forward individual countries with the highest GDP as individual leading countries may not command global authority or fair legitimacy because such an identification of individual leading countries does not consider regional power or regional representation.

In this section an analytical framework is formulated that considers these two issues. First, the GDP is a biased indicator of dominance. Macro economics is more concerned with the size of the transformed value added, i.e. the GDP, than the numbers of agents who are engaged in the value added transformation. In contrast, micro economic theory focuses on the agents (that is the population at large) who

activate the value added transformations, consumption, investment and interactions that eventually result in outcomes and influential patterns. In representing global dominance, population matters at least as much as the GDP. The spectacular rise in the GDP of China and India, which has prepared them to become leading countries, is due for the largest part to the magnitude and growth of labour inputs, cf. Cohen (2015). Each of the two countries has populations of around one billion or more. In a globalizing world with an increasingly free movement of people and communication, population numbers carry influential power and are contribute to global dominance. The influence potential of a unit in the whole is a complex matter and cannot be fruitfully assessed without a systematization of concepts of influence potential. In the study of economic systems, in Cohen (2009, 2015), a distinction is made between two types of influence potential: interactive influence and regulative influence. In both types of influences, it is essential to the jointly consider the GDP factor and the population factor.

Interactive influence emerges from interacting agents and the transactions they generate. Microeconomic foundations support formulating an interactive *Dominance Index* that expresses the interactive influence potential of an entity y among all the entities of the same kind y'. The Domiance Index is denoted by $DI(y/y')$. An entity can be a firm, town, a country or a world region. In this paper we shall apply this index to the contexts of countries and regions.

The index has two arguments as shown in Eq. 1: the relative share of agents, A, in y among all y', that is $(A_y/\Sigma A_{y'})$; and the relative share of value added transformations, V, in y among all y', that is $V_y/\Sigma V_{y'}$. In this equation, ρ_1 and ρ_2 are equal weighting rates applying to these two shares, whereby $\rho_1 + \rho_2 = 1$ and $\rho_1 = \rho_2$. Other weighting rates can be used.

$$DI(y/y') = \rho_1(A_y/\Sigma A_{y'}) + \rho_{\mathfrak{y}}(V_y/\Sigma V_{y'}) \tag{1}$$

The value of DI for an entity y is a proportion, whereby $\Sigma\ DI(y/y') = 1$. An entity that scores a very high value of the index tends to dominate the other entities of the same kind. Once the index for an entity reaches a critical mass the influence potential of that entity can be expected to benefit from network externalities and to become practically the dominant player among all member entities of the same set. There are different views concerning the likely value of the critical mass for becoming the dominant player. A value of 3/4th is among the most quoted in the literature on a critical mass, cf. Simon (1993). There is thus justification for fixing the value of this threshold at 0.8 or thereabout.

Regulative influence is the other type of influence potential. This refers to a situation in which an entity or country y, happens to stand higher in relation to the hierarchy of all countries y'; allowing y to set behavioural rules typical of y that other countries y' should abide with. In this way, the behavioural type of y overrides y', allowing the further spread of behavioural norms of y at the cost of those of y'. It is not feasible to quantify measures of regulative influence along the lines of interactive influence due to mounting difficulties in standardizing diversified measures of regulation. It is likely that there is a positive association between the two notions of influence potential, in the sense that a country powerful in interactive

influence would in the long run become generally powerful in regulative influence. This will add to the importance of the Domiance Index.

While interactive influence represents the results of *horizontal* contacts, regulative influence is a *vertical* relationship. There is ground for speculating that the nature of the horizontal channels makes their effect more endurable as they are generated via experiencing, learning and adoption. The contribution of horizontal channels towards converging behavioural patterns across countries is likely to be more influential and more permanent than that of vertical channels. In the case of vertically accommodated behavioural attitudes, the regulative influence can terminate abruptly if the regulative mechanisms become too demanding due to technological loopholes, or the rationale for the binding restrictions disappears, or the balance of power between y and y' reverses.

In this paper we adapt Eq. 1 towards Eq. 2 to give the Domiance Index of a country c in all countries, that is, the world total, denoted by w. Note that entity y in Eq. 1 is specified as country c in Eq. 2 and the sum of all entities y' is specified as the world, w. Equation 2 combines two share parameters to give the influence potential of a particular country in an interactive world of all countries. The first is the share of the population in country c, with respect to all populations in all countries w. The second is the share of commodities transformed in country c, with respect to all transformed commodities in all countries; in other words, the total GDP of the world, w.

$$DI(c/w) = \rho_1(A_c/A_{w)} + \rho_\mathfrak{y}(V_c/V_w) \tag{2}$$

Equation 2 states that the greater the combined shares of the population and the GDP of a particular country in the world totals, the greater is the influence potential of that country relative to other countries.

While the Domiance Index of a country in the world context cannot pretend to cover all types of influences in the economic domain, not to mention influences in the non-economic domains that have bearings on the economic sphere, it gives a meaningful representation of the generally valid and widely recognized facts that the larger the number of agents and the larger the size of the economic transformation in one subsystem the greater the influence will be of that subsystem in its interactions with other subsystems.

Second, the world cannot be seen as a loose collection of individual countries. Any individual country is allied to other countries in a regional formation and is as such a member of a regional interest group that has common interests. For instance, the US conducts its world affaires and is viewed by others, as part of the western advanced economies. The remedy to the country bias is to study global dominance in an analytical framework that gives attention to interregional and intraregional next to country dominance. It is both logical and realism that in constructing a representative and real global governance the starting point should be the influence potential of the world regions and not individual countries. Once that starting point is resolved, the next step is to descent to regional representation that is indeed at the country level.

Adapting Eq. 1 towards measurement of interregional dominance gives Eq. 3 where entity y is specified as region r and all entities y' are specified as all regions, that is the world w.

$$DI(\mathrm{r/w}) = \rho_1(A_r/A_{w)} + \rho_\eta(V_r/V_w) \tag{3}$$

Similarly, adapting Eq. 1 towards measurement of intraregional dominance gives Eq. 4 where entity y is specified as country c and all entities y' are specified as all relating countries in the same region r.

$$DI\ (\mathrm{c/r}) = \rho_1(A_c/A_r) + \rho_\eta(V_c/V_r) \tag{4}$$

How do the three Domiance Indexes relate to each other? How do Eqs. 2, 3 and 4 combine? The Domiance Index of a country in the world, *DI(c/w)* as in Eq. 2, is decomposable into two parts: the *DI* of leading regions r at the world level w, giving thus *DI* (*r/w*) as in Eq. 3; and the *DI* for leading countries, c, at the regional level, r, giving thus *DI* (*c/r)* as in Eq. 4. The decomposition is laid down in Eq. 5.

$$DI(\mathrm{c/w}) = DI(\mathrm{r/w}) \cdot DI(\mathrm{c/r}) \tag{5}$$

While *DI* (r/w) can be described to stand for interregional dominance, *DI* (c/r) represents intraregional dominance.

Application of Eqs. 3 and 4 would require a relevant and meaningful division of the world, w, into regions r and the classification of countries c along these regions. In Cohen (2015), the world economy is divided into eight regional groups based on their shared type of economic system, common features and regional vicinity. Some regional classification, see annex, should form the basis for composing a constitutionally acceptable platform of a representative world government. The annex distinguishes between two developed regions (the F-group consisting of firm-centred western economies and the S-group consisting of state-centred economies such as Russia and some former ex-Soviet Union countries) and six development regions specified as East Asia and Pacific (EAP), South Asia (SA), Central Asia and Caspian (CAC), Middle East and North Africa (MENA), Sub-Saharan Africa (SSA), and Latin America and Caribbean (LAC). The classification corresponds closely with those operational at the World Bank and United Nations. Comparative indicators on economic structures, conduct and performances of the eight regions and their constituent countries are reported in Cohen (2015). The indicators relate to attitudes towards business and the state, liberalized and discretionary conduct, inward and outward orientations, growth and distribution patterns. These indicators support the proposed classification as they display large differentiations at the interregional level and low differentiations at the intraregional levels. Furthermore, in each of the eight regions, there is evidence over the last two decades of a convergence in indicator values among member countries of a region towards the average values that hold for their specific region.

3 Applications for 2000 and 2012

This section will apply *DI* for leading countries at the world level and will subsequently treat the decomposition of the DI into interregional dominance and intraregional dominance.

3.1 Leading Countries at the World Level

The relevant equation here is Eq. 2. Application of this equation for the years 2000 and 2012 gives the Domiance Index for (c/w) as shown in Table 1. The obtained results can be described in four points. First, while in 2000 the DI of US preceded China by 7 pp (18.3–11.0, column 3), this ranking reversed in 2012 with DI in China at 15.4 and US at 13.7, due to higher growth in China of both the population and GDP. The same applies for the relationship between Japan and India. While Japan was ahead of India in the DI in 2000, this reversed in 2012.

Second, the DI of all F-countries amounted to 48.5 pp in 2000, with 30.4 held by the non-European group (US, Japan, etc.) and 18.1 in the EU group. In 2012, the DI of all F-countries is diminished 8 pp to become 39.3 pp with 23.1 held by the non-European group and 16.2 held by the EU group. These figures show that within the firm-centred countries, European countries have gained and non-European countries have lost in influence potential, over the last decade.

Third, a striking fact is the significantly low influence potential of Russia at the world level, which is only 2.4 pp. This is in the neighbourhood of the DI for countries like France, UK, Indonesia and Brazil.

Fourth, for practically all countries in the years between 2000 and 2012, the relative change in the GDP was greater than the relative change in the population with the exception of the Sub-Saharan African countries where population growth was greater than GDP growth. This means that while the change in a country dominance is less accountable by demographic than economic growth, this is reversed in the case of the African countries where demographic growth was larger than economic growth.

3.2 Interregional Dominance

The relevant equation for this application is Eq. 3 which gives the DI of leading regions r at the world level, that is, DI (*r/w*). Table 2 displays results of DI for the two developed regions and the six development regions as fractions of the whole world. The sum of DI over the eight regions is 100%. The most remarkable development in the periods 2000–2012 is the reduction in the value of DI of the developed regions. The firm-centred western countries (F-countries, i.e. US, EU, Japan) have lost significantly with a reduction in their dominance of 18.7%. The state-centred countries (S-countries, i.e. Russia) gained, mainly due to the recovery after years of recession following the collapse of the communist regime, which does not make it as a real advance. The main gainers and advancers are the development regions. For example, DI for the advanced regions diminished from 50.7 in 2000 to

Table 1 Population shares, GDP shares and Domiance Index of leading countries at world level (%)

	Population share (%)		GDP share (%)		Domiance Index (%)			Population share (%)		GDP share (%)		Domiance Index (%)	
	2000	2012	2000	2012	2000	2012		2000	2012	2000	2012	2000	2012
F total	17.4	16.0	79.5	62.7	48.5	39.4	MENA total	4.02	4.52	2.65	4.09	3.34	4.31
United States	4.9	4.7	31.8	22.7	18.3	13.7	S Arabia	0.33	0.40	0.57	0.98	0.45	0.69
Japan	2.2	1.9	14.6	8.3	8.4	5.1	United Arab Emirates	0.05	0.13	0.32	0.53	0.18	0.33
Canada	0.5	0.5	2.2	2.5	1.4	1.5	Kuwait	0.03	0.05	0.11	0.25	0.07	0.15
Korea, R.	0.8	0.7	1.6	1.6	1.2	1.2	Qatar	0.01	0.03	0.05	0.26	0.03	0.15
Australia	0.3	0.3	1.3	2.1	0.8	1.2	Oman	0.04	0.05	0.06	0.11	0.05	0.08
Germany	1.4	1.2	5.8	4.8	3.6	3.0	Bahrain	0.01	0.02	0.03	0.04	0.02	0.03
France	1.1	1.0	4.1	3.7	2.6	2.3	Egypt, Arab Rep.	0.94	1.15	0.30	0.36	0.62	0.76
UK	1.0	0.9	4.6	3.5	2.8	2.2	Algeria	0.45	0.55	0.17	0.28	0.31	0.41
Italy	1.0	0.9	3.4	2.8	2.2	1.9	Iraq	0.34	0.46	0.19	0.30	0.26	0.38
Spain	0.7	0.7	1.8	1.9	1.2	1.3	Morocco	0.40	0.46	0.11	0.13	0.26	0.30
Poland	0.7	0.6	0.5	0.7	0.6	0.6	Israel	0.09	0.11	0.38	0.35	0.24	0.23
Netherlands	0.3	0.2	1.2	1.1	0.7	0.7	Syrian Arab Republic	0.23	0.32	0.06	0.09	0.15	0.21
Others	2.6	2.3	6.6	7.0	4.6	4.7	Others	0.63	0.80	0.29	0.40	0.46	0.60
S total	3.56	2.98	0.94	3.15	2.25	3.06	SSA total	9.4	13.0	1.05	1.8	5.2	7.4
Russia	2.40	2.04	0.79	2.77	1.60	2.41	Nigeria	1.7	2.4	0.14	0.4122	0.9	1.4
Ukraine	0.81	0.65	0.10	0.24	0.45	0.45	Ethiopia	0.9	1.3	0.02	0.1	0.5	0.7
Others	0.3416	0.28	0.06	0.13	0.20	0.211	Sudan	0.4	0.5	0.04	0.1	0.2	0.3
							Ghana	0.3	0.4	0.02	0.1	0.1	0.2
EAP total	25.7	28.3	5.8	14.7	15.8	21.5	Others (a)	1.7	2.4	0.12	0.2	0.9	1.3
China	17.9	19.1	4.2	11.7	11.0	15.4	S. Africa	0.6	0.7	0.40	0.5	0.5	0.7
Indonesia	2.9	3.5	0.5	1.2	1.7	2.3	Angola	0.2	0.3	0.03	0.2	0.1	0.2
Philippines	1.1	1.4	0.2	0.3	0.7	0.9	Congo DR	0. 7	0.9	0.01	0.0	0.3	0.5

Table 1 continued

	Population share (%)		GDP share (%)		Domiance Index (%)			Population share (%)		GDP share (%)		Domiance Index (%)	
	2000	2012	2000	2012	2000	2012		2000	2012	2000	2012	2000	2012
Thailand	0.9	0.9	0.4	0.5	0.6	0.7	Kenya	0.4	0.6	0.04	0.1	0.2	0.3
Vietnam	1.1	1.2	0.1	0.2	0.6	0.7	Others (b) others	2.4	3.3	0.23	0.3	1.3	1.8
Malaysia	0.3	0.4	0.3	0.4	0.3	0.4							
Others	1.5	1.7	0.1	0.2	0.8	1.0	LAC total	7.46	8.64	6.86	8.00	7.16	8.32
							Mexico	1.47	1.72	2.10	1.62	1.79	1.67
SA total	19.6	23.4	1.9	3.2	10.8	13.3	Guatemala	0.16	0.21	0.06	0.07	0.11	0.14
India	14.8	17.6	1.4	2.6	8.1	10.1	Cuba	0.16	0.16	0.09	0.11	0.13	0.13
Pakistan	2.0	2.5	0.2	0.3	1.1	1.4	Dominican Republic	0.12	0.15	0.07	0.08	0.10	0.11
Bangladesh	1.9	2.2	0.1	0.2	1.0	1.2	Others (c)	0.58	0.67	0.46	0.42	0.52	0.55
Sri Lanka	0.3	0.3	0.0	0.1	0.2	0.2	Brazil	2.48	2.82	1.95	3.09	2.22	2.95
Others	0.6	0.8	0.0	0.1	0.3	0.4	Argentina	0.52	0.58	0.86	0.65	0.69	0.62
							Colombia	0.57	0.68	0.30	0.51	0.43	0.59
CAC total	2.73	3.19	1.25	2.36	1.99	2.78	Venezuela	0.35	0.43	0.36	0.52	0.35	0.47
Turkey	0.90	1.05	0.81	1.09	0.85	1.07	Peru	0.37	0.43	0.16	0.28	0.27	0.35
Iran	0.94	1.08	0.31	0.76	0.62	0.92	Chile	0.22	0.25	0.24	0.37	0.23	0.31
Kazakhstan	0.21	0.24	0.06	0.28	0.13	0.26	Others (d)	0.46	0.55	0.20	0.30	0.33	0.42
Uzbekistan	0.35	0.42	0.04	0.07	0.20	0.25							
Others	0.33	0.39	0.03	0.16	0.20	0.27							

World population = 100%, world GDP = 100%

Others SSA(a) = upper belt. Others SSA(b) = lower belt. Others LAC(c) = Central America and Caribbean. Others LAC(d) = South America

Table 2 World regions: population shares, GDP shares and Domiance Index (%)

	Population (%)		GDP (%)		Domiance Index		
	2000	2012	2000	2012	2000	2012	Change (%)
Developed regions	21.0	19.0	80.5	65.9	50.7	42.4	−16.4
Developing regions	79.0	81.0	19.5	34.1	49.3	57.6	16.8
Developed regions							
F-countries	17.4	16.0	79.5	62.7	48.5	39.4	−18.7
S-countries	3.6	3.0	0.9	3.1	2.2	3.1	36.2
Developing regions							
EAP	25.7	28.3	5.8	14.7	15.8	21.5	36.0
SA	19.6	23.4	1.9	3.2	10.8	13.3	23.5
CAC	2.7	3.2	1.2	2.4	2.0	2.8	39.6
MENA	3.5	4.5	2.6	4.1	3.1	4.3	40.5
SSA	9.4	13.0	1.0	1.8	5.2	7.4	41.0
LAC	7.5	8.6	6.9	8.0	7.2	8.3	16.3
World total	100.00	100.00	100.00	100.00	100.0	100.0	
World total values	6102	7044	32,873	72,682			

42.2 in 2012 (a reduction of 16%, column 7) and the development regions reversed their subordinate position of 2000 and acquired a majority in 2012 (as they moved from 49.3–57.6). The DI of the development regions of EAP, CAC, MENA and SSA increased by between 36 and 41%, and the increase in SA and LAC was lower at 24 and 16%. If Table 2 would be computed for the world situation half a century ago, a totally different picture would come out, with F-countries (i.e. the western countries), S- countries (i.e. Soviet Union and allies) and the developing countries having more or less equal levels of DI at 33% each.

3.3 Intraregional Dominance

The Dominance Index is also computable for individual countries within each region, as in Eq. 4. The sum of the relative shares of population and GDP, when applied to each country within a region, gives the degree of interactive influence of each country in the region. The higher the index of a leading country the greater is its influence in passing its behavioural features to other countries in the same region. Table 3 shows leading country configurations in the two developed and six development regions. In order not to enter into unnecessary details, we limit the presentation to the two most leading countries in each region. Within the F-group, the population is about evenly divided between non-European and European countries. The share of the GDP that goes to non-European is about 10% higher than the European, but this difference is shrinking. The result is a DI in 2012 that gives the non-European a greater influence at 56% against the European at 44%. As the last column shows, this difference shrank over the past 12 years by 2 percentage

Table 3 Leading countries in world regions: population shares, GDP shares and Domiance Index (%)

	Share in total population		Share in total GDP		Dominance Index		
	2000	2012	2000	2012	2000	2012	Change (%)
F-group							
Non-European	50.8	51.9	65.4	60.5	58.1	56.2	−3.3
United States	27.9	29.2	39.9	36.3	33.9	32.7	−3.6
Japan	12.6	11.9	18.4	13.3	15.5	12.6	−18.6
European	49.1	48.1	34.6	39.5	41.9	43.8	4.5
Germany	8.1	7.5	7.3	7.7	7.7	7.6	−2.1
France	6.0	6.1	5.1	5.8	5.6	6.0	6.8
S-group							
Russia	68	68	84	88	75.7	78.3	3.5
Ukraine	23	22	10	8	16.4	14.7	−10.2
EAP							
China	69.5	67.7	71.7	80.1	70.6	73.9	4.6
Indonesia	11.4	12.3	8.6	8.2	10.0	10.3	2.5
SA							
India	75.4	75.0	76.1	80.7	75.8	77.8	2.7
Pakistan	10.4	10.9	11.8	9.8	11.1	10.3	−7.1
CAC							
Turkey	32.9	32.9	65.0	46.1	48.9	39.5	−19.3
Iran	34.3	34.0	24.7	32.3	29.5	33.1	12.3
MENA							
Egypt	26.9	25.5	11.5	8.8	19.2	17.2	−10.5
Saudi Arabia	8.2	8.8	21.7	23.9	15.0	16.4	9.5
SSA							
Nigeria	18.5	18.5	13.5	19.8	16.0	19.1	19.8
South Africa	6.6	5.7	38.6	28.9	22.6	17.3	−29.1
LAC							
Brazil	33.2	32.6	28.5	38.6	30.9	35.6	15.4
Mexico	19.8	19.9	30.6	20.2	25.2	20.0	−20.5

points (pp), suggesting that within the F-group, European countries have gained while non-European countries, i.e. US and Japan, have lost in influence potential, over the last decade.

Computation of the Domiance Index for the S-region shows Russia dominating with a DI of 75.7% in 2000 and increasing to 78.3% in 2012. This is very close to the situation where the threshold of 80% is likely to be passed, allowing an anchored dominance. Other countries in the region have very limited and declining influential powers.[1]

[1] In this paper, the Russian-led S-group includes Ukraine. In updating the classification, and in the light of recent political developments, it would seem justifiable to remove Ukraine from the Russian influence sphere. Because of the small size of Ukraine, exclusion of Ukraine would not significantly affect the obtained empirical results for this region.

In the EAP region, in 2012, China constituted 80.1% of the total population and 73.9% of the total GDP, resulting in a DI of 74%; in 2000, the DI was 71%, a rise by 5 pp. Indonesia follows with a long distance at DI of 10% that is maintained at that level in 2012. The huge size and the positive change of DI in China mean that DI in most other EAP countries is not only tiny, but is shrinking as well.

In the SA region, in 2012, India has about 75% of the total population and stands stable at this share. The ratio of (GDP of India)/(GDP of SA) is 80.7% and had a rising tendency. Taken together, DI for India in 2000 was at 76% in 2000 and rose to 78% in 2012. The next country is Pakistan with a DI index of 11% and has been falling. Other countries show also a decreasing DI, last column.

In the Central Asia and Caspian region, CAC, Turkey and Iran are numbers one and two, with DI at 49 and 30% in 2000, but the gap closed down rapidly to give, respectively, 40 and 33% in 2012. The dominance profile in CAC can be described as that of a majority-based duo leadership, which allows the two leading countries to exercise major influences. The duo leadership can lead to rivalry between Turkey and Iran in acquiring more economic and political influences in this and neighbouring regions.

In MENA, the two leading countries are Egypt and Saudi Arabia; they mastered in 2012 less than one-third of the total population of the region and accounted for only about one-third of the total GDP. Their DI's are limited to 17 and 16%, respectively. The sum of this duo leadership does not go beyond 33%. The dominance profile of MENA is best described as a minority-based duo leadership. Various factors such as the sparsely populated vast space, transport barriers, unequal resource endowments, nationalist sentiments driven by foreign interventions and public approvals of authoritarian governments tended to undermine the otherwise highly unifying factors such as common language, religious and cultural traits.

The sparsely spread distribution pattern of DI among the member countries in SSA is similar to that in MENA and is best described as a minority-based duo leadership. Together, the two leaders, which are Nigeria and South Africa, command a dominance of only 36%. Cultural, religious, political and not least geophysical barriers stand in the way of greater interaction and integration between SSA countries and restrict the eventual enlargement of dominating influences of leading countries.

The LAC region, consisting of 41 countries, has a majority-based duo leadership similar to the case of the CAC region. The two leaders are Brazil with DI at 36% and Mexico at 20%. Together, these two leading countries command a DI of 56%.

Although leadership patterns in the country/region context differ between the regions, some common features are present, significant and meaningful in understanding and managing world development. One feature is that the DI of US as the leading country in the F-region is at 33%, which compares very poorly with DI for leading countries in the S-region, in EAP and in SA, that is, Russia at 78%, China at 74% and India at 78%, respectively. It is directly seen that the degree of influence which US can practice in the F-region is much more limited than what the other three countries can do in their respective regions. The influential power of Russia, China and India in their regional groups is more than twice the influential power of US in the F-group (i.e. $74/33 = 2.2$). Although Russia dominates the

S-region by 78%, it is a special case. The S- region itself has become quite tiny in the total world stage, with a modest DI at 3%.

A second feature is that one can speak of a majority-shared duo leadership in the regions of CAC and LAC (with leading countries Turkey and Iran in CAC, and Brazil and Mexico in LAC). Country leadership in these two regions is highly contested. The leadership pattern is otherwise in the regions of MENA and SSA, which are characterized by minority- shared duo leaderships. The combined DI of leading countries like Egypt and Saudi Arabia in MENA, and Nigeria and South Africa in SSA do not go beyond 33 and 36%. The dispersed DI in these two regions is a reflection of multi-faceted fragmentations. Various intraregional barriers stand in the way of regional integration.

4 Projections into the Future

The future distribution of potential influence among competing regions and leading countries as expressed in the Dominance Index will change, and this can have significant impacts on world development and world governance. In this and the next section, we project the main tendencies in the distribution of DI among regions and countries in the near future and examine world governance in the light of these projections.

To compute the Dominance Index for leading countries in future years, one needs projections of the population shares and the GDP shares of leading countries in the world's total population and GDP, respectively. United Nations Demographic Division is the primary source for population projections. Reference is made to PWC Economics (2013) as our source of projections for the GDP. The projections make use of essentially the same modeling methodology applied in Wilson and Purushothaman (2003). These two types of projections, see "Appendix 2 and 3", are employed to compute DI for leading countries for 2030 and 2050. Results in Table 4 show that sometime between 2000 and 2012, the DI of China surpassed US already, and by 2030 India, is projected to be equal to, and thereafter surpass US. In 2030, China and India are numbers 1 and 2, followed by US, and after a distance, come Brazil, Indonesia, Japan, Nigeria and Mexico. The DI of leading EU countries is in the range 2.0–1.5%. The DI of Russia and Turkey are also in this range. All other countries in the rest of the world, next to Saudi Arabia and South Africa, are projected have the DI at levels lower than 1%. Countries in the rest of the world hold together a DI amounting to 34 pp, which is projected to be stable.

Just as important, and perhaps even more relevant, is the projection of DI by world regions, since the regional leadership dimension adds crucial influential significance to the country leadership dimension. The influence potential of the eight regions as indicated by calculations of DI (r/w) in the years 2012, 2030 and 2050 is projected in Table 5. The same sources as in Table 4 were used to make the projections.

The focus of the presented results is to view the changing world development and influence spheres from the angle of regional influences, hence their reproduction in Fig. 1. While the displacement discussions have been preoccupied with the situation of individual countries, such as China and India versus US, EU and Japan, we

Table 4 Projected changes in the influence potential of leading countries, as measured by the Dominance Index (%)

2012		2030		2050		2012		2030		2050	
China	15.4	china	18.6	China	18.3	Indonesia	2.3	France	1.9	Russia	2.1
US	13.7	India	11.6	India	14.2	UK	2.2	Nigeria	1.9	Germany	1.6
India	10.1	US	11.5	US	10.3	Mexico	1.7	Mexico	1.9	France	1.6
Japan	5.1	Japan	3.4	Brazil	3.3	Nigeria	1.4	UK	1.8	UK	1.5
Germany	3.0	Brazil	3.3	Indonesia	3.0	Turkey	1.1	Turkey	1.4	Turkey	1.5
Brazil	3.0	Indonesia	2.7	Japan	2.3	S. Arabia	0.7	S. Arabia	0.8	S. Arabia	1.0
Russia	2.4	Russia	2.3	Nigeria	2.2	S. Africa	0.6	S. Africa	0.6	S. Africa	0.8
France	2.3	Germany	2.2	Mexico	2.2	Others world	35.0	Others	33.9	Others	34.1

Total = 100.0%

Table 5 Projected distribution of the Dominance Index by world region: 2012, 2030, 2050

2012		2030		2050	
F-group	39.4	F-group	30.6	F-group	25.6
EAP	21.5	EAP	25.0	EAP	24.8
SA	13.3	SA	15.0	SA	18.2
LAC	8.3	LAC	9.2	LAC	9.6
SSA	7.4	SSA	8.5	SSA	9.6
MENA	4.3	MENA	5.3	MENA	6.2
S-group	3.1	CAC	3.4	CAC	3.7
CAC	2.8	S-group	2.8	S-group	2.5
World total	100.0	World total	100.0	World total	100.0

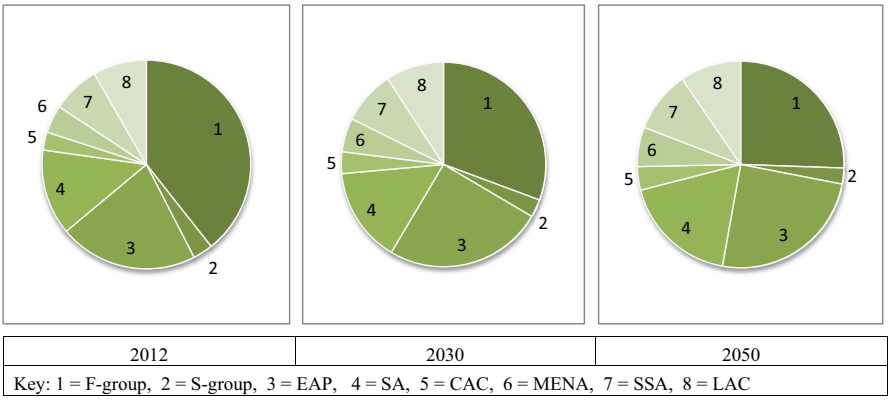


Fig. 1 Projected distribution of the Dominance Index by world region: 2012, 2030, 2050

contend here that deliberations on global governance are better served when the focus is on world groups rather than on individual countries. Figure 1 shows the F-group of countries to be continued dominating in 2012, 2030 and 2050 as well. In 2050, the value of DI for the F-group is projected at 25.6 pp, which is slightly higher but practically equal to the DI of EAP at 24.8 pp. This is a projected future situation of shared leadership that has a trajectory of some 38 years before the shared leadership is to be realized. The lengthy horizon of the trajectory gives ample opportunities for the two leading regional groups to adapt to each other in redesigning global governance and responding collectively to challenges of global failures.

Would intercourse between parties with equal influential powers lead to more confrontation or more understanding? It is generally true that when the contending parties have influential powers that are more or less equal, as suggested in Fig. 1 for 2050, and perceive the situation as such, the parties will be more inclined to use reason and knowledge and adopt cooperative attitudes in managing collective actions and avoiding bilateral frictions. Under a skew distribution of influential

powers, it is more likely that a non-collaborative attitude emerges. Figure 1 predicts a future world in 2050 with a more equal balance of influence than in 2012 and thus feeds the expectation that in the long run the new country/systems competition will be more collaborative. Furthermore, the collaborative scenario is collectively superior to an isolationist, protectionist or a non-collaborative one. The collaborative scenario promotes borrowing, testing and adaptation of successful institutions from one system to another, but also experimenting with new designs and institutions of global governance.

It is worth mentioning that the South Asia region is projected at the third position with DI at 18 pp and LAC at the fourth position with DI at 10 pp. The displacement at the regional level is thus less striking than the displacement at the country level. Figure reveals other interesting features of world development as well. The underdog position of SSA is reversed by 2050, allowing SSA to catch up with LAC with the same influence potential of 10 pp. MENA and CAC secure the sixth and seventh positions with DI at 6 pp and 4 pp, respectively. The S-group, which is practically Russia, reaches no more than 2.5 pp, which is equivalent to one-tenth of the influence potential of either EAP or F-group.

In what ways would the projected displacement of US, EU and Japan by China and India affect the economic systems of the leading incumbent countries and the economic systems of the leading newcomer countries? And how could the projected displacement affect world development and world governance?

In discussing these questions, it is necessary first to sum up the crucial features of the socio-economic systems of US and EU as contrasted to those of China and India. As is well known, profit maximizing firms, markets and supportive institutions are the main driving agents in the US and EU, hence our denotation of countries sharing this system by the F-group. In contrast, institutional behaviour in China and India incorporates greater influences from kinship and household settings when compared to US and EU. There is also greater collaboration between the higher strata of the firm and state subsystems in China and India compared to US and EU; this closer collaboration between firm and state agents at the top is partly due to close kin relationships between leading agents in leading firms and state agencies. Furthermore, persuasion settings seeking consensus are much more active in coordinating and streamlining the social system in China and India than in US and EU, which is logical, given the demographic dynamics and the multi-polar differentiation of the social system in these two giant countries.

As the projections favouring the newcomers on the incumbents become a reality, the established institutions in US and EU are likely to come under pressure in such institutional areas as separation between business and government, free competition, transparent governance, merit goods and social benefits of the welfare state. The fiscal budget may shift in favour of capital and firms at the cost of labour and consumers. The national economies are prone to apply more protectionism, cartelism and state corporatism. The polity may also be affected by a weakening of decision-making in open parliaments and strengthened non-transparencies. The new country/system competition may work otherwise and motivate firms and states in F-countries to come closer, integrate and reorganize with the object of raising performance of their national economies; see Sinn (2002) and Lindbeck (2003) for

elaborations on consequences of the new systems competition and protectionism. The reorganization in F-countries may borrow features of the leading newcomers. Firm-centred countries may let go and replace parts of the profit maximizing institutions with coordination mechanisms that rely on community sharing, politicized rent and persuasive settings. How far would this adaptation go? One view is that fundamental changes in F-countries cannot happen because given the embedded character of firm-oriented institutions; the cost of reorganization is higher than the benefit of breaking away from the embedded institutions and the historical path. The other view, based on interactive influence, allows for open-ended indeterminate courses, dependent on the degree of agent participation across the world regions and across competing regional systems, and if the returns in the competing regional systems are higher agents would either physically move to the better performing regional system or institutionally redirect their own system to incorporate elements from elsewhere. It very much depends on the relative shares of the dissatisfied versus loyalists.

The new country/system competition would have also consequences for leading newcomers. Given their growth premium in the future, there may be less incentive for the newcomer country/systems to incorporate, test or adapt some of the institutions that proved successful in the context of the F-countries such as those of the competitive entrepreneurship, welfare state, medical insurance and parliamentary democracy. This would imply a low degree of interaction between the economic systems that limits their evolution. But if the incumbent leading countries in the F-group would take initiating steps in an adaptation process, this can engage leading newcomers in a mutual process of co-adaptations and co-integration, which would make global governance a lot easier.

Speculation on what will happen in the future, considering the huge uncertainties in world development and the multitudes of intervening factors, is not a worthwhile activity and loses relevance in terms of developing action rationales and policy intentions. What is more relevant in terms of policy is to bolster favourable conditions for all agents in all regional systems so as to allow agents to digest, compare and evaluate what is happening across the regional systems, and so as to allow agents to decide freely on entering, exiting, voicing or reforming across the regional systems. Whatever outcome is realized at the end of the day regarding the prospects of a particular regional system is logical and defendable if the outcome is the result of fair starts, undistorted processes, comparative evaluations and rational choices. These conditions are vital for the natural evolutions of the regional systems and for creating unbiased and fluid world governance that strives towards resolving global failures.

5 Exploring Designs for Global Governance

Technical and behavioural barriers that exist at the national level and that lead to economy failures at the national level are also present at the regional and world levels though in different and more complex forms. Global failures (such as risky finance, economic recessions and trade protectionism; misuses due to tax havens

and divergent monetary and regulatory regimes; global warming, cyber insecurity, war refugees, health hazards, whale protection and so forth) are imminent, thus requiring global governance that fixes indivisibilities, promotes confidence, internalizes externalities and organizes collective actions to attend to newly arising collective needs at the global level. The global failures are even more likely to accentuate as the incumbent and newcomer countries that dominate world development feature different economic systems, institutions and behaviours. The conviction is that there is an urgent need to reset and to redesign global governance so as to fit with the changing distribution of global dominance and influence potentials, so as to address the mounting list of global failures and take responsive global actions to contain these global failures.

The current world governance system was shaped in the advent of WWII and has undergone a few additions changes since then. The United Nations assembly consists of 193 member states. The UN Security Council, UNSC, consists of five permanent members with veto rights: China, France, Russian Federation, the UK, and the United States and ten non-permanent members elected for two-year terms by the General Assembly. These are currently Argentina, Australia, Chad, Chile, Jordan, Lithuania, Luxembourg, Nigeria, Korea and Rwanda. This list of 5 plus 10 members of the Security Council looks obscure and uninformed when evaluated against the background of our findings on the Dominance Index in the world at large.

Next to the UNSC, there are permanent international agencies on trade, finance, law, and major areas of social and economic activities and intermittent conferences on newly rising global challenges. The latest development in world governance is the establishment of the G-20, which is a forum of political leaders of the 20 leading economies in the world, whereby a county's rank is defined in terms of the country's size of the GDP. The members of the G20 are Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the UK, the United States and the European Union. Spain is an honorary member. Together, they represent about two-thirds of the world's population, 85% of global gross domestic product and over 75% of global trade. The president of G-20 rotates annually. Each year the G20 president invites several guest countries to participate in G20 events and contribute to the agenda. The work of G20 members is supported by several international organizations that provide policy advice. The G20 also regularly engages with the non-state sectors. Even though the selection of the G-20 country members is not fully consistent with their GDP figures,[2] the G-20 is an important addition to world governance, but it far from being a fair and effective selection for the two reasons we emphasize in this paper, namely the built-in bias for a country approach instead

[2] This is not the case with G-20, which includes countries that do not qualify for the inclusion criteria and excludes others which do qualify, pointing thus to manipulated selections For instance, Netherlands ranks as number 18 in the world GDP, but it is not included. Latest estimates of the GDP show Nigeria to surpass South Africa, but South Africa is included and Nigeria is excluded. The inclusion of Argentina is also disputed as its GDP does not fall in the top 20. Next to EU individual countries, the EU as a whole is also a member, which involves double counting. Spain is added as a hosing country. The number is actually 22 and not 20.

of the regional approach, and the non-transparent sole reliance on GDP in defining economic and political power instead of applying a rigorous and transparent Domiance Index in terms of the relative sizes of the GDP and population.

The point is reached now to demonstrate how the composition of a world top of presidential leaders (to be entrusted with coordinating global governance and resolving global failure) along the lines of findings in this paper would look like. The alternative list will be very different from that of G-20, for several reasons. First, we employ influence potential based on population and GDP, which is more democratic and more real. Second, our starting point will be regional representation, followed by naming countries, which is more democratic and logical.

"Appendix 4" applies a step-by-step approach in constructing the alternative list. Subject to explicitly set minimum and maximum rules, the outcome regarding representation is transparent and listing of the G-16 leading countries. As the influence potential of countries changes over time, the list would require updating, which implies establishing a scheme of changing membership based on influential power. The alternative list turns to have 16 members, which is less and more compact than the 22 members of the G-20. Application results in the following membership: US, Japan, Germany, France, UK (for F-group), Russia (for S-group), China, Indonesia (for EAP), India, Pakistan (for SA), Turkey (for CAC), Saudi Arabia (for MENA), Nigeria, South Africa (for SSA) and Brazil, Mexico (for LAC). The G-16 allows also for shared/rotating memberships in the case of some regions, as indicated in the bottom line of "Appendix 4".

Notwithstanding, the alternative list of G-16 leading countries accounts only for about two-thirds of the full scale of the world DI, with the rest of the countries, about 180 controlling one-third of the world DI. There is a rationale for supplementing the G-16, which can be called the first chamber, by a second chamber of regional ambassadors who can represent the interests of smaller countries in the region other than those of the leading countries, c. A chamber of eight regional ambassadors (say, the presidents of the such regional organizations as the EU, Asean for EAP, Sarc for SA, Oau for SSA, Arab League for MENA, Mercosur for LAC) can be instituted to that effect, and it can convene on a regular basis in much the same way as the G-16 and cooperate together in fixing global governance and global failures. The notion of two chambers, which is a conventional practice in national governance, is also applicable and adaptable to world governance.

In appraising the G-20 versus the G-16, it is important to emphasize that in both configurations the current top dominant countries, US and EU, are expected to be replaced within a couple of decades by newcomers such as China and India whose political and economic systems are differently orientated than the leading incumbents, and hence the current governance rules of any G-combination need to adapt to different orientations. Functionality requires that world governance should reflect not only the current but also the prospective influential power of the dominating country (ies)/systems; hence, institutions of world governance need to be forward looking in terms of both representation and rules. The G-20, in both its composition and operation, when compared to the G-16, is not sufficiently forward looking and underestimates the pace and magnitude of the leadership replacement tendencies.

6 Conclusion and Discussion

Country dominance can be specified in different ways; some ways more useful than others. We make use of a generalized notion of influence potential, which is expressed in terms of the relative shares of agent interaction and economic transformation, equally weighted, and giving thus the Dominance Index, DI. Displacement of incumbent leading countries by newcomers when measured along comparative DI's of competing countries occurs at a quicker pace than when measured solely in terms of the GDP; this is due to the population effect in DI that favours developing over developed countries. Results of DI indicate that the displacement has already occurred, as the DI of China is higher than that of US in 2012, i.e. 15.4 and 13.7 pp, respectively.

The country Domiance Index at the world level, that is DI of country/world, is decomposable into DI of country/region (this reflects intraregional dominance) and DI of region/world (reflecting interregional dominance). The decomposition adds insights.

Regarding intraregional dominance, US has a low dominance of 33% in its region, when compared to such countries as China, India and Russia that score very high degree of dominance in their regions, i.e. DI around 75%. The results suggest that in relative terms, the influence potential of the US in global matters is hampered by its low intraregional dominance, while the other three countries command more influence in their respective regions.

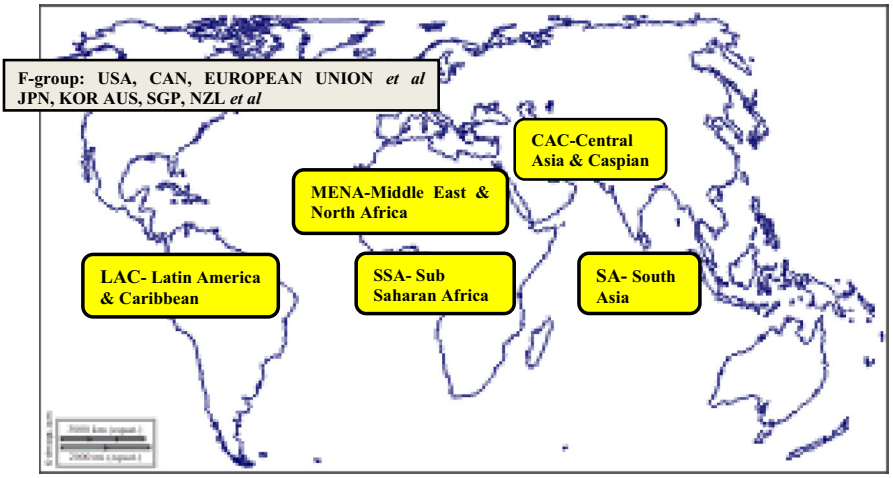
Regarding interregional dominance, leadership displacement of the western industrialized region by the EAP region is projected to take place at a much slower rate than in the case of country displacement of US versus China. The displacement calculus in this paper predicts that the western industrialized region (which we also call the firm-centred region) and the EAP region will have equivalent DI's in 2050, at 25.6 pp and at 24.8 pp, respectively. The interesting thing about this projected equal sharing of influence is that when the contending parties have influential powers that are more or less equal, as suggested in Fig. 1, and perceive the situation as such, the parties will be more inclined to use reason and knowledge and adopt cooperative attitudes in managing collective actions and in avoiding bilateral frictions. Under skew distributions of influential powers, it is more likely that a non-collaborative attitude emerges. The obtained results feed expectations that in the long run the new regional system competition will be more collaborative, a situation that promotes borrowing, testing and adaptation of successful institutions from one regional system to another. With a time span of 38 years to go, the resetting of rules of global governance can be done gradually, and world responses to the mounting global failures can be made more effective and timely.

For democratic and effectively run world governance, the interregional perspective should precede the intraregional and country perspectives. Global governance, in contrast to the more advanced organization of the national polity, is at an early stage of evolvement and is far from being in shape to tackle the list of mounting global failures. By way of demonstration, we applied the DI at the regional and country levels in composing a world top of presidential leaders, to be entrusted with coordinating global governance and resolving global failure. The result was a first chamber with the limited number of 16 leading countries, or G-16, which is more compact, representative and effectively real than the G-20. It was postulated also that there is a rationale for

supplementing the G-16 by a second chamber of eight regional ambassadors, call it R-8, which can represent the interests of *other* countries in the eight regions *other* than those of the leading country.

As world development evolves, partly determined by internal mechanisms, and partly by external events, the outcomes are not predictable. That is the more reason for strengthening global governance based on principles of participatory democracy and interactive influence. The context of the world national polity is very different from that of the world polity. Remarkable advances have been achieved in the past centuries in circumventing and consolidating the institutional set-up of the national polity. Some of these advances can be fruitfully used in programming the institutions of global governance, but the global governance of differentiated and interactive systems/regions/countries is unique and new, and it has to discover its own programme and path.

Appendix 1: The World Regions



Distinguished regions/countries	Specification of countries included	Modifications to WB databank
Firm-centred developed countries (F-group)		
America-high income	USA, Canada. Total 2 countries	None
Europe- high income	EU et al. extended to include next to EU all other European countries not included elsewhere. Total 44 countries and/territories	EU et al. renamed, extended
EAP-high income		None

Distinguished regions/countries	Specification of countries included	Modifications to WB databank
	Japan, Korea, Australia, New Zealand, Brunei Darussalam, French Polynesia, New Caledonia and Singapore. Total 8 countries	
State-oriented developed countries (S-group)		
Russia and Russian tied countries(RRTC)	Russia, Armenia, Belarus, Georgia, Moldova, Ukraine. Total 6 countries	Newly introduced region
Development regions		
East Asia and Pacific (EAP)	All income levels excluding EAP-high income: China, Cambodia, Indonesia, Korea DR, Lao PDR, Malaysia, Micronesia, Myanmar, Mongolia, Papua NG, Philippines, Thailand, Timor-Leste, Vietnam and other Oceania small territories, islands. Total 26 countries	None
South Asia (SA)A	All income levels: India, Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, Pakistan, Sri Lanka. Total 8 countries	None
Central Asia and Caspian (CAC)	Turkey, Iran, Azerbaijan, Kazakhstan, Kyrgyz R, Tajikistan, Turkmenistan, Uzbekistan. Total 8 countries	Newly introduced region
Middle East and North Africa (MENA)	All income levels: Egypt, Algeria, Bahrain, Djibouti, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, UA Emirates, Yemen. Total 19 countries	Malta and Iran deleted and assigned to EU and CAC, respectively
Sub-Saharan Africa (SSA)	All income levels in Africa: Nigeria, South Africa, etc. except Algeria, Egypt, Libya, Morocco and Tunisia, which are included in MENA. Total 48 countries	None
Latin America and Caribbean (LAC)	All income levels in Latin American and the Caribbean: Brazil, Mexico, etc. Total 41 countries	None

Appendix 2: Projections of Population Shares, GDP Shares and Dominance Index

	Population (%)			GDP (%)			DI		
	2012	2030	2050	2012	2030	2050	2012	2030	2050
US	4.68	4.34	4.26	22.75	18.57	16.39	13.7	11.5	10.3
Japan	1.9	1.47	1.17	8.35	5.41	3.48	5.1	3.4	2.3
Germany	1.2	0.94	0.76	4.80	3.47	2.51	3.0	2.2	1.6
France	0.98	0.77	0.67	3.66	3.02	2.46	2.3	1.9	1.6
UK	0.95	0.74	0.63	3.47	2.87	2.41	2.2	1.8	1.5
Russia	2.04	1.48	1.12	2.77	3.20	3.07	2.4	2.3	2.1

	Population (%)			GDP (%)			DI		
	2012	2030	2050	2012	2030	2050	2012	2030	2050
China	19.13	17.88	15.68	11.74	19.34	20.91	15.4	18.6	18.3
Indonesia	3.48	3.42	3.34	1.21	1.96	2.56	2.3	2.7	3.0
India	17.56	16.99	16.86	2.56	6.29	11.60	10.1	11.6	14.2
Turkey	1.05	1.08	1.06	1.09	1.67	1.93	1.1	1.4	1.5
S. Arabia	0.4	0.54	0.64	0.98	1.14	1.28	0.7	0.8	1.0
Nigeria	2.40	2.66	2.99	0.361	1.20	1.49	1.4	1.9	2.2
S. Africa	0.74	0.54	0.51	0.53	0.74	1.01	0.6	0.6	0.8
Brazil	2.82	2.73	2.65	3.09	3.88	3.86	3.0	3.3	3.3
Mexico	1.72	1.63	1.57	1.62	2.25	2.89	1.7	1.9	2.2
Others	38.96	42.78	46.08	31.04	24.99	22.14	35.0	33.9	34.1
world total	100	100.00	100.00	100	100.00	100.00	100.0	100.0	100.0
value	7044	8,214	9322	72,682	125,914	231,871			

Appendix 3: Projections of Regional Distributions of Population, GDP and Dominance Index

	Population share (%)			GDP share (%)			Dominance Index (%)		
	2012	2030	2050	2012	2030	2050	2012	2030	2050
F-countries	16.0	13.6	12.3	62.7	48.6	39.7	39.4	30.6	25.6
S-countries	3.0	2.2	1.6	3.1	3.6	3.4	3.1	2.8	2.5
EAP	28.3	26.7	23.8	14.7	24.2	26.6	21.5	25.0	24.8
SA	23.4	22.6	22.5	3.2	7.9	14.5	13.3	15.0	18.2
CAC	3.2	3.3	3.2	2.4	3.7	4.3	2.8	3.4	3.7
MENA	4.5	6.1	7.2	4.1	4.8	5.4	4.3	5.3	6.2
SSA	13	13.2	14.5	1.8	3.9	5.0	7.4	8.5	9.6
LAC	8.6	8.3	8.0	8	10.4	11.5	8.3	9.2	9.6
World total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
World values	7,044	8214	9322	72,682	125,914	231,871			

Source: the consolidated growth rate of the leading countries within a regional group between t and t + 1 is applied to the initial share of the regional group in t to obtain its projection for t + 1, and similarly between t + 1 and t + 2. This was done for the population shares in columns 2 and 3 and for the GDP shares in columns 4 and 5. The Domiance Index is the average of population shares and GDP shares. The years 2012, 2030 and 2050 are denoted by t, t + 1, t + 2.

Appendix 4: Applying DI in Global Governance: Region/Country Composition of World Top

	F-group	S-group	EAP	SA	CAC	MENA	SSA	LAC	Outcome
1. DI	39.4	3.1	21.5	13.3	2.8	4.3	7.4	8.3	100
2. DI/5	7.9	0.6	4.3	2.7	0.6	0.9	1.5	1.7	20
3. Rounding	8.0	1.0	4.0	3.0	1.0	1.0	2.0	2.0	22
4. Max, min.	8.0	1.0	2.0	2.0	1.0	1.0	2.0	2.0	19
5. Interregional fairness	5.0	1.0	2.0	2.0	1.0	1.0	2.0	2.0	16
6. Leading Countries	US Japan Germany France UK	Russia	China Indonesia	India Pakistan	Turkey	S. Arabia	Nigeria S. Africa	Brazil Mexico	14
7. Intraregional fairness/ rotation					Turkey/Iran	S. Arabia/Egypt			

The interesting thing about the number of 20 is that when the full range of the Domiance Index of 100 pp is divided by 20, this gives right to claim one position in G-20 for a bunch of 5 pp on the Domiance Index. The table below displays regional DI's in row 1 and dividing by 5, the regional are obtained in row 2.

A number of refinements can be applied to this table. The rounding off of the regional claims guarantees the S-region and CAC one position each even though their claim is 0.6 of a position each, but that means that world leadership positions is increased to 22. The rounding off of the claims is in row 3.

The next refinement relates to applying maximum and minimum rules for regional inclusion in the world top. In filling the regional quota with leading countries, it is logical to keep to indivisibility principles, which means that a qualifying country can claim/send one position/president only irrespective of the height of its DI (this can be viewed as fixing a maximum) and that a minor country cannot obtain a position just because it belongs to a region with a high quota that is boosted by membership of a super power. For example, EAP has high quota because of China and Indonesia. This should not give Philippines, Thailand or Vietnam the advantage of inclusion in the world top, unless such a country manifests a high DI of its own. A similar situation applies to SA where India outflanks its neighbours. For inclusion, indivisibility requires thus fixing a minimum DI for country/region, of say 5%. Application of maximum and minimum rules gives row 4.

The application so far reduces the membership positions of EAP and SA below their regional claims, by 3 seats. Interregional fairness would require applying an equivalent reduction of membership positions of the F-group from its regional claim, from 8 to say 5. This results in a total membership of 16 seats as shown in row 5, which is more operational than 20.

The G-16 countries roll out automatically from applying the above accommodations to the DI results for 2012. The outcome is specified in the table below, row 6.

There are instances in some regions where the included country has a DI that is marginally higher but practically equal to that of the next country in line. Turkey is marginally higher than Iran in the CAC region. The same applies for Saudi Arabia and Egypt in MENA. Intraregional fairness may require shared or rotating membership in the G-16, as displayed in row 7.

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