Asymmetric Convergence in Globalization? Findings from a Disaggregated Analysis

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Using the KOF index of globalization that allows for the multidimensionality of the process, the paper sets out to examine the presence of convergence among countries in the three dimensions of the globalization process: economic, social, political. The sample used in the empirical investigation consists of 111 countries and covers the period 1971–2011. To allow for differences in the speed of convergence, countries were clustered into four income groups: high, upper middle, lower middle and low income in line with the World Bank's classification. The results yielded and reported herein point to an asymmetric process of convergence with different speeds both between groups as well as in the different dimensions of globalization.

Key Words: globalization; convergence; unit roots
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Introduction

Spurred by the seminal theoretical contributions of Solow (1956) and Swan (1956) as well as the studies by Barro (1991) and Barro and Sala-i-Martin (1992), there is a steadily and rapidly expanding large body of literature, examining a diverse array of issues associated with the theoretical treatment as well as the empirical investigation of the presence (or not) of convergence among countries on various spheres (Heichel, Pape, and Sommerer 2005; Islam 2003; Holzinger 2006; Abreu, de Groot and Florax 2005; Galor 1996). Originally, convergence analysis focused on the question of whether over time the growth process is an equalizing one, tending to promote inter-country or inter-regional convergence with

regards to various characteristics such as per capita income, labor productivity, labor force structure etc. (Özgüzer and Oğuş-Binatlı 2016; Novak 2011; Artelaris, Arvanitidis, and Petrakos 2011; Mazumdar 2003; Borsi and Metiu 2015). This, often heated debate, has rapidly spilled-over into other spheres where convergence could be taking place (Ezcurra and Rios 2013; Cao 2012; Arvanitidis, Kollias, and Anastasopoulos 2014; Schmitt and Starke 2011; Heckelman and Mazumder 2013; Anagnostou, Kallioras, and Kollias 2015; Jordá and Sarabia 2015).

In the broader spirit of such studies, this paper sets out to examine international convergence in terms of globalization, a process that creates complex, multilevel links and interdependencies between countries and through them leads to an increasing international integration (Dreher, gaston, and Martens 2008; De 2014; Caselli 2008; 2012). The sample used in the empirical investigation consists of 111 countries and covers the period 1971–2011. The structure of the paper is as follows. The next section offers an epigrammatic literature survey of the issues associated with the multifaceted process of globalization. The third section presents the data used and contains a descriptive analysis of it. The steps of the empirical methodology adopted are described in the fourth section, and the findings are presented and discussed in the fifth section. Finally, the sixth section concludes the paper.

Globalization: An Epigrammatic Literature Review

As Mukherjee and Krieckhaus (2012) note, the multidimensional character of globalization is probably one of the few rare instances where a universal consensus exists among scholars and researchers from a cohort of different perspectives and disciplines. The economic, political and social outcomes of this dynamic process have come under growing empirical scrutiny. However, given the wide divergence of opinions and reported findings in the relevant theoretical and empirical discourse, quite the opposite assertion is the case when it comes to its effects. On balance, it could tentatively be argued that most studies focus on the various economic effects of the growing global economic interdependence while a particular strand of the expanding globalization literature, addresses the possible effect this deepening process has on national democratic governance (Chang, Lee, and Hsief 2015; Gurgul and Lach 2014; Potrafke 2013; Salvatore and Campano 2012; Zhou et al. 2011; Dreher and Gaston 2007; Chang and Lee 2010).

Keohane and Nye (2000) and Sahlberg (2004) point out that the mul-

tifaceted process of globalization essentially involves three major dimensions: the economic, the social and the political. The first is probably the most dominant feature of globalization and has understandably attracted most of the attention in the relevant literature. Essentially, it refers to the steadily growing flows of goods, capital and services between countries. The second and the third dimension of this dynamic and multidimensional process are perhaps less overt, but nevertheless also having substantial effects. The social dimension of globalization includes the spread of ideas and information as well as cultural and consumer habits. The political, involving the diffusion, harmonization, emulation and even imposition of government policies across countries. Hence, the intensifying flows generated by the process of globalization are not, as Clark (2000) observes, limited to goods and capital but include among others information, human mobility, diffusion of ideas and norms. As a result, the bonds that it creates are not limited to the economic realm but it nurtures the cross-fertilization between countries and societies in many and varied spheres, including governance and institutions, economic policies and organization, societal structures and norms, cultural and consumer habits (Bezemer and Jong-A-Pin 2013; Eichengreen and Leblang 2008; Gartzke and Li 2003; Decker and Lim 2009; Kirby 2006; Avelino, Brown, and Hunter 2005; Drezner 2005).

The globalization convergence issue is empirically investigated for all the aforementioned three dimensions – i.e. economic, social and political (Sahlberg 2004; Keohane and Nye 2000). The reason being that it is possible for countries to present an asymmetric behavior in terms of convergence and integration. For example, a country may be more integrated in the economic aspect of this process but less so in the social or political side. In other words, integration and convergence in this process may be taking place in any one or all of these three dimensions albeit with different speeds. Countries can be converging faster in one of the three globalization dimensions and at a lower speed in another. For example, convergence in the economic dimension of globalization as depicted by things such as trade flows, FDI, portfolio investment etc. could be much more prominent and empirically traceable compared to the political or social dimension. Convergence in the latter two spheres may be proceeding at a slower pace given that it involves changes that usually take place more gradually and over comparatively longer time spans. Furthermore, the speed and degree of convergence may differ depending on a country's traits (Lenschow, Liefferink, and Veenman 2005; Obinger, Schmitt, and

Starke 2013). To this effect, it was decided to conduct the empirical analysis both with the entire sample of 111 countries as well as different subsamples. We opted to use the level of development as a criterion of grouping the countries together in more homogenous groups. Again, the postulated idea is that it is possible that the degree and speed of convergence could be influenced by a country's developmental level and standards of living. Once again, convergence may not be uniform and balanced across all three globalization dimensions and may very well depend on their development level.

The Data: A Descriptive Presentation

As already noted above, globalization is a multifaceted process. A number of globalization indexes such as the CSGR Globalization Index; the Maastricht Globalization Index (MGI); the KOF Index of Globalization; the New Globalization Index (NGI); the G-Index; the Global Index, have been constructed in order to capture and quantify this multidimensionality. A critical survey of these indexes can be found in Martens et al. (2015), Samimi, Lim, and Buang (2011; 2012), Caselli (2008; 2012) and hence we refrain from repeating a similar exercise which in any case is well beyond the scope of this paper. For our purposes here, we use the KOF[1] index of globalization from where all the data is drawn (Dreher 2006; Dreher, Gaston, and Martens 2008). This choice is driven by data availability considerations. Some of the aforementioned indexes are not updated to recent years or are not available on an annual. Just as other indexes, the KOF index, is a composite index that encapsulates the multifaceted characteristics of globalization, allowing for the three main dimensions of the process (Sahlberg 2004; Keohane and Nye 2000). To this effects, it is made up by three sub-indices that quantify the economic, social and political aspects of globalization. The three sub-indices have a weighted contribution towards the construction of the overall composite KOF globalization index: 36% for the economic, 38% for the social and 26% for the political dimension. The aggregate KOF globalization index as well as the three sub-indices are measured in a 0–100 scale with higher scores indicating a greater degree of integration by a country in the globalization process and in each of the three dimensions quantified by the sub-indices. A number of metrics are employed to this effect.[2] For instance, among others they include international trade and FDI flows, restrictions on trade and capital controls for the economic globalization sub-index. The social dimension is captured by things such as for example international tourism,

TABLE 1 Average Globalization Scores in Selected Countries, 1971–2011

Algeria	(a)	41.22	China	(a)	33.20	Paraguay	(a)	39.83
	(b)	23.31		(b)	25.18		(b)	30.13
	(c)	70.22		(c)	57.97		(c)	52.12
	(d)	41.98		(d)	36.60		(d)	39.35
Belgium	(a)	85.60	Luxemburg	(a)	94.10	Philippines	(a)	45.47
	(b)	71.91		(b)	70.72		(b)	30.99
	(c)	93.73		(c)	61.21		(c)	61.57
	(d)	82.53		(d)	76.71		(d)	44.18
Brazil	(a)	46.79	Myanmar	(a)	38.79	Singapore	(a)	92.99
	(b)	31.95		(b)	5.96		(b)	80.69
	(c)	78.00		(c)	24.77		(c)	51.67
	(d)	49.28		(d)	22.73		(d)	77.60
Bulgaria	(a)	52.28	Norway	(a)	72.81	Tanzania	(a)	28.63
	(b)	37.36		(b)	71.29		(b)	16.51
	(c)	68.69		(c)	88.47		(c)	43.19
	(d)	50.90		(d)	76.31		(d)	27.83
Burundi	(a)	19.35	Pakistan	(a)	28.59	Turkey	(a)	45.12
	(b)	14.75		(b)	21.54		(b)	38.97
	(c)	34.46		(c)	69.63		(c)	75.82
	(d)	21.53		(d)	36.59		(d)	50.77

NOTES Row headings are as follows: (a) economic, (b) social, (c) political, (d) KOF index. Based on data from http://globalization.kof.ethz.ch.

foreign population in the country, trade in books, information flows, internet users while for the political dimension sub-index the number of foreign embassies, membership of international organizations and participation in UN peace missions and treaties are used to construct it. The sample of countries used here present a quite varied picture in terms of the scores each country gets either in the overall KOF globalization index or the three constituent sub-indices that contribute towards its construction.

Table 1 presents the average scores for a group of countries over the period 1971–2011 as these are estimated from the KOF database. Although it cannot be claimed that the countries included in it are strictly speaking representative examples, they were nevertheless selected in such a way as to depict and highlight the quite diverse picture presented by the coun-

tries in our sample. For instance, the sample includes countries such as Belgium that score quite high in terms of their level of integration into the globalization process both in the overall KOF index as well as the economic, social and political dimensions. The same applies for Norway and Luxemburg. In other words, they are countries that exhibit a fairly balanced and symmetric integration into the three dimensions of globalization. On the other end of the spectrum, countries such as Burundi or Myanmar, chosen as examples, score fairly low in all the indices and present a symmetric but very shallow integration. Others, such as for instance the Philippines, Turkey or Bulgaria fare better in their average scores. Also interesting to observe is that fact that in a number of cases the average scores in each of the sub-indices countries achieve can differ substantially in terms of magnitude. Singapore for instance scores a fairly high average in terms of the economic and social aspect of globalization but appreciably lower in terms of the political dimension. In broad terms, Algeria presents an opposite picture if one compares the score in the political dimension with those for the economic and social. Others present a more homogenous picture. As a general observation however, it would appear that in terms of the political dimension countries on the whole tend to score comparatively higher that the economic and social ones. Needless to point out that the picture emerging from the random examples contained in table 1 is essentially a static one. It does not allow for a broader perspective in terms of how the integration of the countries into the globalization process evolved through time, nor can one draw inferences with respect to the presence or not of a convergence process either in terms of the overall globalization index or in terms of each one of the three sub-indices.

In order to chisel out differences in the degree of integration in the globalization process owed to the development level of the countries contained in the sample, they were clustered into separate development groups. To developmentally categorize the countries, we adopted the World Bank's groupings at the time of the estimations that are based on per capita GDP: high income with 35 countries in this subsample, upper middle income containing 22 countries, lower middle income with 28 countries and low income countries with the remaining 26 countries of the total sample of countries. For each of the three subsamples the convergence question is empirically examined using both the overall KOF globalization index as well as the three sub-indices reflecting the multi-dimensionality of the process.

TABLE 2   Average Globalization Score per Income Group

Globalization score	(1)	(2)	(3)	(4)
KOF	30.58	40.74	49.76	67.70
Economic	31.72	41.32	51.05	68.13
Social	18.12	29.59	40.08	64.24
Political	47.14	56.15	62.06	72.15

NOTES   Column headings are as follows: (1) low income, (2) lower middle income, (3) upper middle income, (4) high income. Based on data from http://globalization.kof. ethz.ch.

As can be seen in table 2, the groups present a fairly diverse picture in terms of the average score per income group per index over the entire sample period. Perhaps not surprisingly the High income group exhibits the most homogenous picture as far as the integration of the countries in this group in terms of each the sub-indices (economic, social, political) and achieves the highest scores vis-à-vis the other three groups with an overall average for the KOF globalization index of 67.7 compared to 49.76 for the Upper Middle income group, 40.74 for the Lower Middle and 30.58 for the Lower income one. The Upper Middle, Lower Middle and Low income groups show a comparatively greater diversity in each of the sub-indices (table 2). The lowest score in all three cases is the one achieved in terms of the Social globalization sub-index and the highest in terms of their integration in the Political dimension of the globalization process. Again, this is a static picture and does not reveal a convergence process if present nor the speed at which is taking place. In the sections that follow we first briefly discuss the empirical methodology adopted and then we proceed with the presentation of the findings yielded by the empirical analysis.

Methodology and Empirical Strategy

A number of sequential steps are used in order to probe into the globalization convergence question addressed here. In line with previous studies on convergence (De 2014; Arvanitidis, Kollias, and Anastasopoulos 2014), we start by estimating the coefficient of variation (CV) across the entire sample as well as the four income sub-samples for all the globalization indices i.e. for the overall globalization index as well as the three sub-indices. In the presence of convergence, these coefficients should decline significantly over time. Following the estimation of the coefficients of variation we will proceed to test for stationarity using the ADF test

(Dickey and Fuller 1979; 1981) which involves the estimation of the following regression equation:

$$\Delta Glb_t = \alpha + \beta \cdot t + \gamma \cdot Glb_{t-1} + \sum_{j=1}^{p-1} \delta_j \Delta Glb_{t-j} + e_t, \tag{1}$$

where Glb_t is the corresponding globalization index (i.e. the KOF aggregate index or the economic, social, political sub-indices) at time t. The inference is based on the Dickey-Fuller t-statistic of coefficient γ.

In order to allow for further insights into the dynamics of the convergence process and enhanced robustness with respect to the ADF unit roots analysis, it was decided to take two further steps. The first, involves the re-estimation of the ADF test statistic using recursive and rolling regressions on the first differences of the selected indexes for the entire sample. Then, a number of further unit root tests will also be conducted. These include the ADF-GLS modification of the ADF test proposed by Elliott, Rothenberg, and Stock (1996), the Ng and Perron (1995; 2001) test as well as the Phillips and Perron (1988) one and the KPSS unit root test by Kwiatkowski et al. (1992). Finally, the next step in the empirical investigation that follows in the next section will be to estimate the trend coefficients and their significance using the following OLS regression:

$$LnY_{it} = a + bt + e_{it}, \tag{2}$$

where Y_{it} is the coefficient of variation for each group of countries and each individual globalization index.

Findings: Presentation and Discussion

Given the steps of the empirical methodology outlined in the previous section, we now turn to the presentation and discussion of the findings. We start with the ADF unit root test conducted for the estimated coefficients of variation for the aggregate KOF globalization index and the three sub-indices per income group. The results of the ADF test are presented in table 3, where, as can be seen, the level series have a unit root but not so in their first differences. This finding suggests the presence of convergence in all the cases examined i.e. for the whole sample as well as the sub-samples across in all the sub-indices that make up the aggregate KOF index of globalization. Noteworthy, however, are the differences among the estimated coefficients, pointing to different speeds of convergence. These differences are present both between the four income groups as

well as within each group in terms of the three different dimensions of globalization. For the entire sample of countries, the highest coefficient is estimated in the case of the economic globalization index (–0.874), followed by the political one while the coefficient for the social globalization index is appreciably lower (–0.185) suggesting a lower rate of convergence in this dimension of globalization. A finding that accords with the earlier descriptive presentation. Indeed, with the exception of the Lower Middle income group, the social globalization coefficient is the lowest among all the other income groups. Focusing on the aggregate KOF globalization index the highest coefficient is that of the Lower Middle income group of countries (–1.144) followed by the Low (–0.992) and Upper Middle (–0.980) income groups while the lower value is found in the case of the High income group (–0.532). In terms of economic globalization, the highest coefficient is that of the Low income group (–1.615) followed by the High income sample of countries (–0.850). The Lower Middle group has the highest coefficients both in terms of social (–0.852) as well as political globalization (–1.041) and one could tentatively suggest that in comparative terms it is the fastest converging group of countries (table 3). The faster speed of convergence in the economic dimension of globalization should not come as a surprise given that this is by far the most dominant feature of globalization (Caselli 2012; Dreher, Gaston, and Martens 2008). Indeed, a tentative inference would be that integration into the economic dimension of globalization precedes convergence in the other spheres of this process.

As pointed out in the previous section where the methodology adopted was presented, the next step is to re-estimate the ADF test statistic using recursive and rolling regressions. In figures 1–4 the plots of the recursive and rolling regressions are presented. They include both the aggregate KOF index of globalization as well as the economic, social and political sub-indexes for the entire sample of countries.[3] For the estimation of the rolling regression we start with a fixed sample of 10 years. The same number of observations is the starting point for the recursive regression estimation and we proceed by adding for each year the corresponding index value. As can be seen in the relevant figure, at the end of the sample the same value as the one reported in table 3 for each index for the entire ample of countries above is depicted.

Then, a buttery of further unit root tests is conducted as described in the previous section. The findings for the entire sample of the DF-GLS, PP, KPSS, and Ng and Perron unit root tests as well as for the sub-sample

TABLE 3   ADF Test for Stationarity of CV of the Globalization Indexes

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Levels	KOF	0.010	0.023	−0.214	−0.023	0.022
		(0.571)	(0.988)	(−2.099)	(−0.485)	(0.556)
	Economic	0.022	−0.017	−0.043	−0.007	0.034
		(1.401)	(−1.067)	(−1.100)	(−0.298)	(1.170)
	Social	−0.024	0.006	−0.111	0.008	0.043
		(−1.477)	(0.230)	(−2.183)	(0.341)	(1.707)
	Political	−0.015	−0.041	−0.104	−0.061	−0.037
		(−0.844)	(−2.062)	(−2.533)	(−0.890)	(−0.543)
First diff.	KOF	−0.438	−0.532	−0.980	−1.144	−0.992
		(−3.209)*	(−2.323)*	(−5.988)*	(−6.474)*	(−6.055)*
	Economic	−0.874	−0.850	−0.764	−0.814	−1.615
		(−5.330)*	(−5.075)*	(−4.784)*	(−4.506)*	(−6.138)*
	Social	−0.185	−0.322	−0.481	−0.852	−0.410
		(−1.958)**	(−1.836)**	(−3.427)*	(−5.368)*	(−1.857)**
	Political	−0.869	−0.692	−0.716	−1.041	−0.755
		(−4.897)*	(−4.360)*	(−4.580)*	(−6.077)*	(−4.739)*

NOTES   Column headings are as follows: (1) form, (2) globalization indexes, (3) entire sample, (4) low income, (5) lower middle income, (6) upper middle income, (7) high income. * and ** indicate that the coefficient is significant at the 5% and 10% level respectively; *t*-statistics in parentheses.

FIGURE 1   Plots of the Recursive (light) and Rolling Regressions (dark)
for the KOF Aggregate Index (Entire Sample)

of the income groups – High, Upper Middle, Lower Middle and Low – are presented in table 4. On the whole, the results of these unit root tests seem to confirm and support the earlier ones presented in table 3. They also reveal an asymmetric convergence process both between income groups
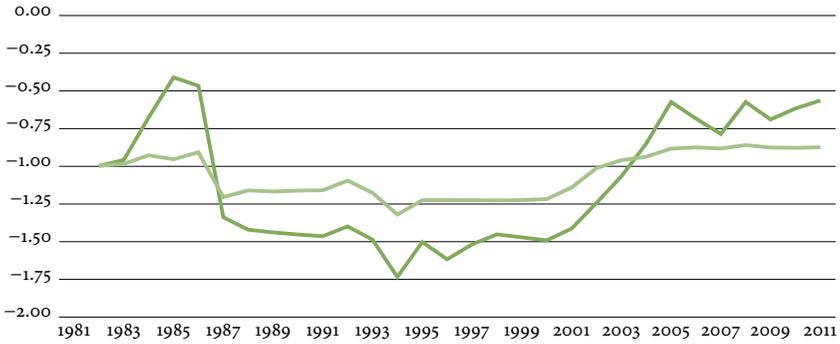
FIGURE 2   Plots of the Recursive (light) and Rolling Regressions (dark)
for the Economic Sub-Index (Entire Sample)
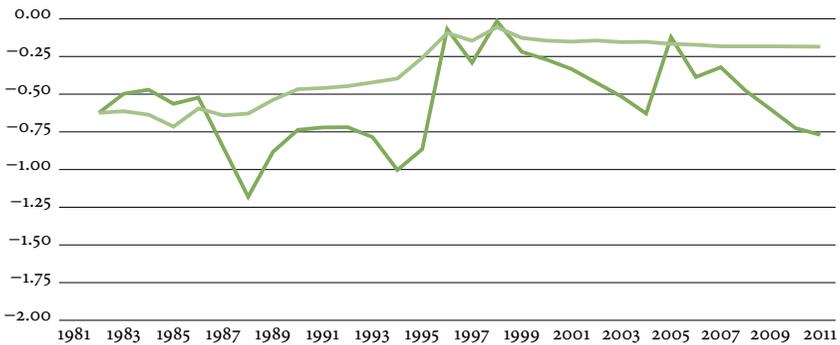
FIGURE 3   Plots of the Recursive (light) and Rolling Regressions (dark)
for the Social Sub-Index (Entire Sample)

FIGURE 4   Plots of the Recursive (light) and Rolling Regressions (dark)
for the Political Sub-Index (Entire Sample)

as well as within each income group with respect to the speed of convergence in each of the three dimensions of globalization. For instance, just as before, the coefficients of the Social dimension of globalization are

TABLE 4　Unit Root Tests for Stationarity of cv of the Globalization Indexes

(1)	(2)	(3)	DF-GLS		PP		KPSS		Ng and Perron	
			(4)	(5)	(4)	(5)	(4)	(5)	(4)	(5)
Entire sample	Levels	(a)	−1.408	−2.688	1.134	−1.016	0.627*	0.199*	−58.60*	−469.0*
		(b)	−0.043	−1.256	1.127	−1.978	0.741*	0.192*	−0.015	−1.780
		(c)	−1.437	−1.863	−0.825	−2.044	0.361**	0.194*	−5.254	−6.266
		(d)	0.879	−1.585	−1.723	−2.681	0.784*	0.107	1.319	−5.445
	First differ.	(a)	−3.220*	−3.777*	−3.081*	−3.735*	0.478*	0.127**	−13.44*	−16.11**
		(b)	−2.823*	−5.873*	−5.456*	−5.849*	0.380**	0.092	−8.923*	−19.92*
		(c)	−1.909*	−2.350	−1.880	−2.315	0.458**	0.144**	−5.999**	−8.838
		(d)	−4.642*	−4.183*	−3.668*	−3.812*	0.196	0.124**	−23.13*	−17.29**
High middle income	Levels	(a)	−2.133*	−2.133	−2.231	−2.185	0.096	0.093	−7.661**	−7.662
		(b)	−0.786	−0.773	−1.166	−0.610	0.608*	0.124**	−0.965	−2.065
		(c)	−2.028*	−3.238*	−1.407	−2.172	0.493*	0.086	−9.695*	−21.70*
		(d)	−0.576	−1.979	−2.062	−2.809	0.635*	0.096	−0.096	−9.040
	First differ.	(a)	−5.821*	−5.998*	−5.988*	−5.910*	0.067	0.066	−24.79*	−20.76*
		(b)	−4.794*	−4.957*	−4.727*	−4.761*	0.272	0.190*	−18.66*	−19.08*
		(c)	−3.457*	−3.468*	−3.157*	−3.101*	0.066	0.064	−14.55*	−14.60**
		(d)	−4.094*	−4.690*	−4.348*	−4.506*	0.215	0.092	−15.84*	−17.80*
Upper middle income	Levels	(a)	−0.718	−2.337	0.512	−1.963	0.683*	0.166*	−6.805	−22.82*
		(b)	0.199	−2.935*	−1.041	−1.356	0.775*	0.130**	0.669	−66.34*
		(c)	−1.678**	−2.608	−0.429	−2.629	0.617*	0.125**	−9.582*	−14.80**
		(d)	0.969	−2.090	−2.062	−3.301**	0.800*	0.115	1.574	−4.895
	First differ.	(a)(a)	−1.631**	−2.911**	−5.552*	−5.871*	0.339	0.116	−3.945	−33.71*
		(b)	−5.118*	−5.226*	−5.130*	−5.116*	0.150	0.085	−21.78*	−19.66*
		(c)	−1.658**	−1.577	−4.764*	−5.181*	0.273	0.166*	−1.790	−2.561
		(d)	−4.419*	−4.611*	−4.348*	−4.506*	0.274	0.117	−20.28*	−18.22*

the lowest vis-à-vis the rest of the dimensions. This offers further evidence supporting the assertion that converging in terms of social traits is a relatively slower process hindered by more entrenched factors in each individual society compared to the economic and political dimension. The former, by far the most salient feature of the globalization process, is where convergence is faster, closely followed by the political dimension a process probably also spurred by the collapse of bipolarity and the concomitant divisions during the bipolar era.

TABLE 4 *Continued from the previous page*

(1)	(2)	(3)	DF-GLS		PP		KPSS		Ng and Perron	
			(4)	(5)	(4)	(5)	(4)	(5)	(4)	(5)
Lower middle income	Levels	(a)	−0.381	−1.694	−0.308	−1.813	0.604*	0.195*	−0.635	−4.496
		(b)	0.459	−1.661	−0.420	−2.117	0.736*	0.160*	0.769	−4.405
		(c)	0.723	−1.864	0.241	−3.047	0.740*	0.182*	0.914	−3.644
		(d)	−0.651	−2.118	−0.818	−2.190	0.585*	0.173*	−1.479	−7.479
	First differ.	(a)	−6.131*	−6.305*	−6.469*	−6.667*	0.189	0.157*	−18.42*	−20.48*
		(b)	−4.036*	−4.416*	−4.636*	−4.494*	0.110	0.097	−16.31*	−18.70*
		(c)	−3.484*	−4.876*	−5.327*	−5.157*	0.277	0.149*	−11.13*	−16.87**
		(d)	−6.039*	−6.038*	−6.113*	−6.151*	0.133	0.093	−20.40*	−20.89*
Low income	Levels	(a)	0.822	−1.616	1.496	−1.456	0.706*	0.200*	1.660	−4.644
		(b)	0.746	−2.076	−0.420	−2.117	0.748*	0.175*	1.100	−5.285
		(c)	−0.770	−1.631	1.325	−1.101	0.615*	0.201*	−14.45*	−11.94
		(d)	−0.719	−1.777	−0.789	−2.719	0.524*	0.190*	−1.647	−3.894
	First differ.	(a)	−5.855*	−6.499*	−6.201*	−11.41*	0.424**	0.258*	−19.02*	−44.57*
		(b)	−6.212*	−8.124*	−8.464*	−8.266*	0.391	0.074	−14.81*	−17.50*
		(c)	−1.682**	−2.313	−5.076*	−5.800*	0.526*	0.083	−3.670	−6.226
		(d)	−4.802*	−5.164*	−4.560*	−5.833*	0.360**	0.223*	−21.47*	−19.06*

NOTES Column headings are as follows: (1) income group, (2) form, (3) globalization index, (4) no trend, (5) trend. Row headings are as follows: (a) KOF, (b) economic, (c) social, (d) political. * and ** indicate statistically significant coefficients at the 5% and the 10% level respectively. The null hypothesis of KPSS test is that the variable is stationary. If the KPSS test statistic is higher than the critical value, the null hypothesis is rejected and the variable is not stationary. The 5% (10%) critical value for the null hypothesis in the KPSS test without trend is 0.436 (0.347) and with trend is 0.146 (0.119).

As the final step in the empirical analysis the trend coefficients were estimated (see equation (2) in the preceding section). The results are reported in table 5 and overall seem to be confirming the previous findings. All coefficients are statistically significant with the single exception being that of the Upper Middle income group of countries when it comes to the aggregate globalization index in which case the estimated coefficient is not statistically significant. Given this exception, the general conclusion is that all income groups appear to be converging across all three globalization dimensions over time as the negative trend coefficients indicate. Again, this convergence process is found to be taking place at different speeds across income groups and globalization dimensions and is more

TABLE 5   Least Square Regression on Time

Globalization score		(1)	(2)	(3)	(4)	(5)
KOF	a	3.746	3.125	2.654	2.995	3.431
		(161.7)*	(111.8)*	(107.4)*	(133.6)*	(108.2)*
	b	−0.009	−0.015	−0.000	−0.008	−0.015
		(−9.872)*	(−12.94)*	(−0.421)	(−8.693)*	(−11.59)*
	R^2	0.714	0.811	0.004	0.659	0.775
Economic	a	3.899	3.336	3.344	3.644	4.011
		(225.6)*	(326.4)*	(100.1)*	(136.9)*	(164.9)*
	b	−0.012	−0.018	−0.011	−0.017	−0.019
		(−17.91)*	(−42.85)*	(−8.651)*	(−16.09)*	(−19.02)*
	R^2	0.891	0.979	0.657	0.869	0.902
Social	a	4.059	3.434	3.310	3.753	3.910
		(146.9)*	(77.74)*	(125.6)*	(227.9)*	(110.4)*
	b	−0.004	−0.019	−0.007	−0.013	−0.013
		(−3.823)*	(−10.34)*	(−6.462)*	(−19.21)*	(−9.181)*
	R^2	0.272	0.732	0.517	0.904	0.683
Political	a	3.875	3.751	3.568	3.427	3.638
		(203.6)*	(249.3)*	(98.18)*	(158.4)*	(68.91)*
	b	−0.019	−0.019	−0.015	−0.007	−0.012
		(−24.39)*	(−30.35)*	(−10.11)*	(−7.726)*	(−5.887)*
	R^2	0.938	0.959	0.723	0.604	0.470

NOTES   Column headings are as follows: (1) entire sample, (2) high income, (3) upper middle, (4) lower middle, (5) low income. * Indicates that the coefficient is significant at the 5% level; t-statistics in parentheses.

pronounced when it comes to the political and economic spheres with the social dimension lagging behind. This finding simply reaffirms the previous observation that the social dimension of globalization is the sphere where the pace of convergence is the slowest vis-à-vis the other two dimensions.

Concluding Remarks

Globalization is a multidimensional process that affects many spheres. Its multidimensional character is perhaps one of the rare instances where a universal consensus exists among scholars and researchers from many different and diverse disciplines since it is considered to be creating a web of multifaceted and interwoven ties between countries in many different spheres and levels (Mukherjee and Krieckhaus 2012; Dreher, Gaston, and

Martens 2008; Caselli 2012). Using the KOF composite index that allows for this multidimensionality, the paper examined the presence of convergence among countries in the three dimensions of the globalization process: economic, social, political. To allow for differences in the speed of convergence that depend on the development level, countries were clustered into four income groups. Furthermore, we also allowed for the fact that integration and convergence in the globalization process may not be uniformed across all the dimensions and could very well be asymmetric and taking place with different speeds in each of the three dimensions that the KOF index allows for. The results from the empirical analysis offered evidence in support of this hypothesis. The findings reported herein indicate: i) An asymmetric process of convergence that proceeds at different speeds; ii) The asymmetric process of convergence appears to be the case between the four different income groups; iii) Asymmetric speed of convergence also appears to be the case between the different dimensions of globalization and iv) In broad terms the economic and political dimensions of this process emerge as the ones where integration and convergence are most pronounced. Finally, it should be pointed out that splitting the countries and grouping them in terms of their income level is but one criterion of categorizing them. Other criteria, such as for instance geographic regions, can be introduced in order to probe further into the issue at hand.

Notes

1 Konjunkturforschungsstelle, see http://globalization.kof.ethz.ch/.

2 A detailed analysis of how both the aggregate composite KOF globalization index is estimated as well as the individual metrics that are used for the construction of three sub-indices can be found at http://globalization.kof.ethz.ch/.

3 For reasons of brevity the figures for the income sub-samples are not presented.

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