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The Relationship between Income Inequality, Poverty, and Globalization

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Abstract

This paper introduces two composite indices of globalization. The first is based on the *Kearney/Foreign Policy* magazine and the second is obtained from principal component analysis. They indicate the level of globalization and show how globalization has developed over time for different countries. The indices are composed of four components: economic integration, personal contact, technology and political engagement, each generated from a number of indicators. A breakdown of the index into major components provides possibilities to identify the sources of globalization at the country level and associate it with economic policy measures. The empirical results show that a low rank in the globalization process is due, in addition to involvement in conflicts, to economic and technology factors with limited possibility for the developing countries to affect. The high ranked developed countries share similar patterns in distribution of various components. The indices were also used in a regression analysis to study the causal relationships between income inequality, poverty and globalization. The results show evidence of a weak and negative relationship between globalization and income inequality and poverty.

Keywords: globalization, income inequality, poverty, indices, principal component

JEL classification: C23, D63, F15, O57

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Tables and figures are given at the end of the study.

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1 Introduction

Globalization¹ has become the way to describe changes in international economy and in world politics. Economists define it as the free movement of goods, services, labour and capital across borders. Globalization is the result of reduced transportation and communication costs, lower trade barriers, faster communication, rising capital flows, increased competition, standardization, and migration to mention, a few key causal factors. The process has brought the developed economies closer together and made them more-strongly interrelated. In the new era of growing integration of economies and societies, individuals and corporations reach around the world further, faster, and more economically than before. This subjects states and individuals to more intense developed market forces by causing rapid changes in trade relations, financial flows, and the mobility of labour across the world. However, there is a large heterogeneity in the degree of the process of globalization over time and across countries and regions as well as within countries across cohorts and skill groups. This heterogeneity causes disparity in development, especially with regard to negative effects such as rising inequality within and between countries, and points to the need to find the sources of disparity and to quantify its magnitude and impacts on the living conditions of the world population.

In recent years, theoretical research on the link between globalization and world inequality and poverty has been intense. However, comprehensive analysis of the link at the empirical level is scarce. Globalization generally is expected to reduce poverty through faster growth in more integrated economies. Extensive empirical research on the causal connections between globalization and inequality in developing nations during the pre-globalization phase shows that there is no structural relationship between growth and inequality, and income inequality levels were generally immobile and trendless. Despite the great importance placed in the recent decade on the globalization process, its sources, channels and consequences remain poorly understood. The channels through which globalization affects world inequality have been identified as commodity price equalization, factor price convergence, capital mobility and differentials in marginal products and rates of return of capital among countries, and dynamic convergence of per capita income growth.

The objective of this study is to investigate the usefulness of the two indices of globalization (Kearney and principal component analysis based) to compare a large sample of industrialized, transition and developing countries on the basis of their integration in the world economy. The two indices are based on the countries' economic integration, personal contact, technology and political engagement. A decomposition of the indices into underlying four distinct components quantifies the individual factors' contribution to the integration. This attempt to analyse the very diverse aspects of globalization and subsequently the different channels through which it can have effects is a significant contribution to the existing analysis. In addition to investigating the international level of globalization, the indices are used for between- and within-region comparisons. The indices are expected to serve as useful tools in the evaluation of the impact of globalization on the welfare of nations and regions. They are used in

¹ Sklair (1999) and Woods (1998) discuss competing conceptions, main approaches to, definitions, debates and implications of globalization.

regression analysis to study the causal relationship between income inequality, poverty and globalization.

The results suggest that the construction of the index and its breakdown into several distinct components to be useful. However, very little of the variance in inequality and poverty outcomes can be explained by the globalization that operates through these four channels. It is important to recognize what happens across the various channels at the country level and to understand their interaction.² For instance, certain within-country factors such as institutions and weak governance structure seem to explain much of the variance. Therefore, initial endowments and how countries integrate into the international economy determine the distributional effects of globalization. Aggregate static measures such as Gini coefficient fail to capture many of the distributional shifts that result from the opening of trade and capital markets. Graham (2005) suggests that more disaggregated measures are needed to account for distributional shifts and such phenomena as economics of happiness which are not captured by money metric measures within cohorts and across skill groups and regions.

Rest of the paper is organized as follows. In section 2 the literature on the different perspectives of globalization, the links between globalization and inequality and poverty, and measures to reduce its negative impacts are reviewed. In section 3 the Kearney and principal component composite indices of globalization are introduced. The data are described in section 4. Results based on the variations in the two globalization indices, the ranking of countries and regions by the degree of globalization, and the development of globalization over time are discussed in section 5. Results from regression analyses of the impacts of globalization on income inequality and poverty are discussed in sections 6 and 7, respectively. Section 8 summarizes the findings.

2 A review of the literature

Globalization has its roots in the second-half of the eighteenth century. The period 1870-2000 is classified into (i) the first wave of globalization 1870-1913, (ii) the de-globalization period of 1913-50, (iii) the golden age of 1950-73, and (iv) the second wave of globalization from 1973 onwards (see O'Rourke and Williamson 2000; O'Rourke 2001; Maddison 2001; Williamson 2002; and World Bank 2002). Empirical evidence shows that during the first wave of globalization, convergence in per capita income and real wages took place within the Atlantic economy. The de-globalization period is characterized by a widening disparity between the richest and poorest regions as well as within the Atlantic economy. The golden age was a period of rapid growth, relative stability and declining inequality. For more details see also Solimano (2001).

A vast amount of literature on various aspects of the recent wave of globalization is developing. Several special issues on globalization have been published in *Oxford Development Studies*, *Journal of World-Systems Research* and the *Journal of African Economies*. Editorial introductions to these special issues are provided by Woods (1998); Manning (1999); Bergesen and Bata (2002a, 2002b); and Bevan and Fosu (2003). In addition, a number of books on the issue have been published. Dollar and

² I thank Carol Graham for making this point.

Collier (2001) and the World Bank (2002) explore the relationship between globalization, growth and poverty; James (2002) analyses technology, globalization and poverty, while Aghion and Williamson (1998) examine the relationship between globalization, growth and inequality, while Khan and Riskin (2001), focusing on history and policies, limit their study to the development in China. O'Rourke and Williamson (2000) look at the evolution of the nineteenth century Atlantic economy, and Tausch and Herrmann (2002) analyse globalization and European integration.

2.1 The links between globalization and inequality

In recent years, research on the link between globalization and world inequality has been intense. Economic growth has often been given priority as an anti-poverty measure, while the negative links between growth and inequality have been largely ignored by policymakers. Cornia and Court (2001), in a policy brief covering the second wave of globalization, highlight five main issues. First, inequality has risen since the early-mid 1980s. Second, the traditional common factors causing inequality—such as land concentration, urban bias and inequality in education—are not responsible for worsening the situation. Third, the persistence of inequality at high levels makes poverty reduction difficult. Fourth, a high level of inequality can depress the rate of growth (see also Birdsall 2000). Fifth, developments in Canada and Taiwan show that low inequality can be maintained at a fast growth rate. The non-traditional new causes of inequality are identified as liberal economic policy regimes and the way in which economic reform policies have been carried out. Traditional factors such as land reform, expanding education and active regional policy are recommended as measures to reduce inequality. The new development approach called the 'Post-Washington Consensus' (Stiglitz 1998) includes measures to offset the negative impacts of new technologies and trade, macroeconomic stability, financial liberalization and regulation by suggesting innovative tax and transfer policies.

In their studies of the link between globalization and inequality, Lindert and Williamson (2001) and O'Rourke (2001) state that increased world inequality has been driven by between-country rather than within-country inequality. It follows, therefore, that globalization will have very different implications for within-country inequality. The direction of impact on within-country inequality depends on the participating country's policy to exploit it. Instead of globalization, the source of within-country inequality in the lagging countries can be poor governance and non-democracy. In their conclusions, Lindert and Williamson (2001) classify the influence of globalization on inequality into five observations. First, the widening income gaps between countries integrating into the world economy probably have been reduced. Second, within labour-abundant countries, emigration and the opening up to international trade before 1914 did lower inequality. Third, within labour-scarce countries, immigration and the opening up to international trade raised inequality. Fourth, accounting for all international and intra-national effects, a greater degree of globalization has reduced inequality. Fifth, with the integration of countries and economies, inequality has become lower than under segmentation.

Among other studies linking inequality and globalization are Talbot (2002) who argues that a new international inequality has been superimposed on the old form of international inequality, and that this factor, by referring to transnational corporations' control over capital, explains the increasing global inequality. Bergesen and Bata (2002a, 2002b) summarize that the increasing international inequality was one of the

most important consequences of the nineteenth century globalization. Babones (2002) finds evidence of increasing between-nation inequality since the mid-twentieth century. Beer and Boswell (2002) link increased within-nation inequality to greater dependency on foreign investment. Bornschieer (2002) observes stable inequality until 1972, but increasing inequality both within and between nations upto the end of the century. Bergesen and Bata (2002) find that among core countries, the within- and between-nation inequality changes in parallel over time, but that they are unrelated among non-core countries.

2.2 The link between globalization and poverty

Agénor (2003) examines the extent to which globalization affects the poor in developing countries. The focus is on the channels through which trade openness and financial integration may have adverse effects on poverty. In cross-country regression analysis, globalization is related to poverty and Agénor controls for various macroeconomic and structural variables. The results suggest evidence of an inverted U-shape relationship between globalization and poverty, indicating that globalization at low (higher) levels tends to increase (reduce) poverty. However, Collier and Dollar (2001) estimate that poverty in the developing countries will decline by about one-half by 2015. The reduction is contingent on the trend of the 1990s being stable, an improvement in aid effectiveness in lagging regions, the quality of economic policy, and significant policy reforms in these countries to create a better environment for poverty reduction and effective aid. Inefficiency in aid makes the achievements of the poverty reduction goals uncertain. In a comparison of actual aid allocation and poverty-efficient aid allocation, Collier and Dollar (2002) find that the level of poverty and the quality of policies do matter. The results are not sensitive to poverty measures, but the authors find a systematic difference between actual and poverty-efficient aid allocations.

The World Bank Development Research Group (2002) focuses on the impact of economic integration on the poor living in developing countries. Three main findings linked to the globalization debate are presented. First, poor countries like China, India, Bangladesh and Vietnam, which were early exporters of primary commodities, have broken into the global market for manufacturing and services, thereby lowering their poverty. Second, efforts have been increased to include countries like Afghanistan and Congo into the world economy. Third, economic integration results in a standardization or cultural and institutional homogenization. In sum, economic integration has supported poverty reduction efforts, but inclusion should be improved so as not to bypass marginalized and new globalizing countries (see also Dollar and Collier 2001; and Khan and Riskin 2001). The World Bank Development Research Group presents a seven-point plan to help developing countries take greater advantage of the benefits of globalization, and to manage the risks associated with their integration into the world economy.³

³ The seven-point plan includes: (i) a 'development round' of trade talks to bring down the trade barriers, (ii) improving the investment climate in developing countries to encourage inflows of FDI, (iii) improving delivery of education and health services to enable the poor to benefit from growth, (iv) providing social protection to a changing labour market to enable workers to take more risks and to avail themselves of new opportunities, (v) rich nations to increase foreign aid with impact on growth and poverty, (vi) supporting debt relief for reforms in marginalized countries, and (vii) tackling greenhouse gases which have been burdensome to poor countries and poor people.

Yusuf (2003) lists a number of factors that are relevant as a source of growth to both poor and rich countries. These are labour, human capital, research and development investment, technological progress and the increase in total factor productivity resulting from scale economies, agglomeration effects, externalities, as well as institutions that secure rights and minimize transaction costs. Increased welfare in developing countries will depend on their policies addressing these variables. Concerning globalization in Africa, Ajayi (2003) reaches the conclusion that integration into the global economy alone does not enhance growth. Integration must be combined with the maintenance of macroeconomic stability, high investment/GDP ratios and the development of human capital, infrastructure and institutions. Mussa (2003), giving an overview of the challenges faced by the international community because of globalization, emphasizes economic issues related to the distribution of benefits accruing from increased trade and the reduction of the effects of instability in international capital flows.

2.3 Different perspectives on globalization and measures to reduce its negative effects

Globalization has other dimensions than just inequality and poverty. These produce different impacts and can be looked at from different perspectives. James (2002) analyses the causes of globalization in terms of transaction costs. He focuses on the information and communication technologies as well as technical change and foreign investment that derives from globalization and their application to Africa. Bhagwati (2000) focuses on trade and foreign direct investment (FDI) and suggests that appropriate governance is needed to manage globalization and the speed at which it must be pursued. La Porta *et al.*'s (1999) examination shows that from the perspective of promoting development, the performance and quality of governance across countries vary systematically. Milanovic (2002) shows that the effects of openness on income distribution depend on a country's initial income level. Seshanna and Decornez (2003) note that during the last 40 years the world economy has become wealthier, more globally integrated, but also more unequal and polarized. Mahler (2001) finds little evidence of a systematic relationship between any of the three main modes of economic globalization (trade, FDI and financial openness) and either the distribution of disposable income or earnings of households in developed countries.

Several studies address the wage links between globalization and inequality within a country. The effects of globalization on skill premium, unemployment, and the social policies of countries are addressed by Ethier (2002). Empirical literature concludes that in the rise of skill premium, trade has played a smaller role than skill-biased technical change. On the basis declining relative wages of unskilled workers in the US since the late 1970s, Miller (2001) demonstrates that globalization accounts for a significant increase in earnings inequality. Eckel (2003) shows that changes in relative wages are independent of wage rigidities, but wage inequality is affected by capital market integration. Manasse and Turrini (2001) study the effects of globalization on income inequality by looking at trade integration. Globalization, although improving welfare, is likely to raise inequality. Redistribution, rather than protection, should be the appropriate measure to avoid a rise in inequality. In line with Sen (2002), Ravallion (2003) is concerned about the continuing deprivation and rising disparity in standards of living.

Countries need a number of measures to reduce the negative impact of the rapid globalization process, but the current system is incapable of dealing with the surfacing problems. Nayyar and Court (2002) identify ways in which the governance needs of the world economy and policy can be strengthened. A new structure of governance, reforms and new institutions are proposed to protect better the interests of the poorer developing countries. Addison and Rahman (2002) identify the geographical characteristics, institutional and political factors, economic policy and history that can influence an individual country's capacity to globalize. Bordo, Eichengreen and Irwin (1999) conclude that commercial and financial integration was more limited before the First World War but that trade tensions and financial instability have not worsened in recent years; thanks to institutional innovations and their stabilizing role. However, on the issue of the importance of institutional capacity for globalization and openness Chirathivat and Murshed (2001) argue that the domestic institutional capacities of Southeast Asia were inadequate to prevent the 1997/98 Asian economic crisis.

There is a link between exports and inequality. Calderón and Chong (2001) find that an increase in inequality is associated with the primary export countries (developing nations), while a decreasing inequality is linked to manufacturing exporters (developed countries). Despite increased inequality, Mayer (2001) finds that globalization has improved access to new technologies and provides unique opportunities for poor countries to raise their incomes, but that countries differ in technology upgrading and skill accumulation (see also Meyer 1999). Despite the limitations of the existing literature, a majority of empirical studies conclude that the positive impacts of integration outweigh its negative effects.

3 A composite globalization index

Kearney (2002, 2003) is the first attempt to construct a database and to compute a composite globalization index. The index is composed of four major components: economic integration, personal contact, technology, and political engagement, each generated from a number of determinant variables, 13 in total. The globalization index (hereafter denoted as KEARNEY) is based on the normalization of individual variables and the subsequent aggregation using an ad hoc weighting system as follows:

$$KEARNEY_{it} = \sum_{j=1}^J \sum_{m=1}^M \omega_{jm} \{ (X_{jmit} - X_{jmt}^{\min}) / (X_{jmt}^{\max} - X_{jmt}^{\min}) \} \quad (1)$$

where i and t indicate country and time periods, m and j are within and between major component variables, ω_{jm} are the weights attached to each variable, min and max are minimum and maximum values of respective variables across countries in a given year. The index is similar to the commonly used human development index (HDI) which is based on educational attainment, life expectancy and real GDP per capita.⁴

In the calculation of the Kearney index, the component's weights are chosen on an ad hoc basis and are constant across countries and over time. We consider this index to be a benchmark index. In the basic index, each of the 13 determinants of the index is given

⁴ For a review of the HDI, its components, criticisms on the index and alternative indices see Noorbakhsh (1998).

equal weight ($w=1$). In the alternative case, a number of variables are given double weights ($w=2$). Using a smaller set of countries, Lockwood (2001) finds the ranking of countries to be sensitive to the way the indicators are measured, normalized and weighted.

There are two alternative approaches to the Kearney index for computing an index of globalization; using the principal component (Heshmati 2003) or factor analysis (Andersen and Herbertsson 2003).⁵ In this paper we adopt the principal component (PC) approach.⁶ PC analysis is a multivariate technique for examining relationships within a set of variables consisting of several quantitative variables. Recently, Agénor (2003) used trade and financial openness to compute a simple economic globalization index based on PC analysis.

Given a dataset with p numeric variables, at most p principal components can be computed; each is a linear combination of the original variables with coefficients equal to the eigenvectors of the correlation of the covariance matrix. The principal components are sorted according to the descending order of the eigenvalues, which are equal to the variance of the components. PC analysis can be viewed as a way to uncover approximate linear dependencies among variables. This method gives a least square solution to the following model:

$$Y = XB + E \tag{2}$$

where Y is an $n \times p$ matrix of the centred observed variables, X is the $n \times j$ matrix of scores of the first j principal components, B is a $j \times p$ matrix of eigenvectors, E is an $n \times p$ matrix of residuals, n is the number of observations, p the number of partial variables, and j the number of variables or indicators of globalization. Here we minimize the sum of all the squared residuals, which are measured as distances from the point to the (first) principal axis. In the least squares case, the vertical distance to the fitted line is minimized.

The globalization indices indicate the level and progress of globalization for different countries over time. A breakdown of the index into major components provides the possibility to identify the sources of globalization, to quantify their impact on the integration of countries, and the index can be used to study the causal relationship between globalization, income inequality and poverty.

⁵ The data underlying the two studies differ with respect to country coverage, period of observation and selected indicators of globalization. Heshmati (2003) is based on a panel data containing 13 indicators of globalization and 62 industrialized and developing countries observed during 1995-2000, while Anderson and Herbertsson (2003) use data on 9 indicators from 23 OECD countries for the period 1979 to 2000.

⁶ A PC procedure produces standardized or unstandardized PC scores. A factor analysis (FA) produces the same results as PC except that scoring coefficients from FA are normalized to give PC scores with unit variance. For a discussion of each method's advantages over the other, see SAS/STAT Users' Guide (SAS Institute 1993).

4 The data

The database created by Kearney/*Foreign Policy* magazine (2002, 2003)⁷ is used for the computation of the globalization index. These data constitute a small balanced panel covering 62 countries observed for the period 1995-2000, and were originally collected from national sources, international organizations and financial institutions. The data variables on economic integration, personal contacts, technology, and political engagement are expected to proxy the channels through which globalization affects economic growth, inequality and the poverty of nations.

The data on economic integration consist of four variables: trade, FDI, portfolio capital flows, and income payments and receipts. All four variables are given as a share of GDP. The trade variable includes total trade and is measured as the sum of trade of goods and services. FDI is measured as an aggregate of in- and outflows of FDI. Portfolio flows are measured as the sum of portfolio inflows and outflows. Income payments and receipts include the compensation of non-resident employees and income earned and paid on assets held abroad.

The second component for personal contact consists of three variables: international telephone traffic, international travel and tourism, and transfer of payments and receipts. The variable for telephone traffic is defined as the per capita sum of incoming and outgoing calls. The variable for travel and tourism is defined as the share of travellers entering and leaving a country in relation to its population. The variable for transfers and payments is measured as the total of in- and out-transfer payments as a share of GDP.

The technology component builds on three variables: internet users, internet hosts and secure internet servers. This component is very much communication specific and is inadequate to reflect technology in a broad sense. The internet user variable is measured as a share of population, while internet hosts and secured servers are measured per capita.

The last component, political engagement, is based on three variables which include the number of embassies in a country, the number of memberships in international organizations, and the number of UN Security Council missions undertaken during a calendar year.

The supplementary data include population and GDP variables used for normalization purposes. For summary statistics of the variables, see Table 1, where we can observe large variations in the variables underlying the calculation of the index and its components. The distribution of the index components (not reported here) is not uniform. This is particularly evident in the case of the technology component which indicates large dispersion and with the sample mean significantly higher than the median. In the case of the political component, the mean and median values overlap. The range of principal component-based indices differs from those of Kearney-based indices.

Correlation coefficients among the various index components are presented in Table 2. As expected, the various components are positively and mostly significantly correlated

⁷ The data sources can be viewed at web sites: www.foreignpolicy.com and www.atkearney.com.

among themselves. The economic integration component is negatively correlated over time, while technology is positively correlated with time. The remaining personal and political components as well as the two Kearney globalization indices are not correlated with time.

The economic integration consists of four variables, defined largely by trade and capital flows. There was a major East Asian financial crisis in 1997/98 and a crisis in the emerging Russian and Brazilian markets in 1998. These resulted in a major decline in capital flows to the emerging-market countries as well as high volatility in the East Asian financial markets. This could well explain the negative correlation between economic integration and time trend.⁸

The application of different weights does not change the rank of the countries much. The overall Kearney index is dominated by political and economic integration. We have not decomposed the principal component index into its underlying four components. Such decomposition would require, first, the application of PC analysis on each component separately, and then the aggregation of the components into a single globalization index by assigning some weights to each component, or, alternatively, the use of canonical correlation analysis looking at the correlation relationship between two or more sets of variables.

5 Variations in the globalization index

The Kearney and principal component indices of globalization are computed for each of the 62 countries and for six years of observation. A weighted principal component index is obtained by aggregating the first three principal components, where in the aggregation their normalized contribution to the explanation of the total variance is used as weight.⁹ Following Kearney's approach a number of economic, personal and technology factors are given higher weights. For a sensitivity analysis, the Kearney index as a benchmark model is computed with equal weights as well. The summary statistics of the index components are given at the bottom of Table 1.

Table 2 reports the correlation coefficients for the different indices and their components. The economic component is decreasing (-0.14) over time, while technology shows an increasing trend (0.12). The personal and economic components are highly correlated (0.59). Unlike the Kearney indices, the first (PC1) and weighted first three principal component (PCW) indices indicate that the globalization process is increasing over time (0.24 and 0.29, respectively). The within-group correlation among the two Kearney indices is high (0.99), as well as among the two PC indices (0.84). The between index group correlation coefficients are also quite high (0.77-0.88). The numbers in parenthesis are the respective correlation coefficients.

⁸ I thank Carol Graham for making this point.

⁹ For the principal component analysis we identified three eigenvalues exceeding one; 4.5862, 2.6419 and 1.3622. The proportions of the total variance explained by these principal components are: 0.3528, 0.2032 and 0.1048. The cumulative proportion of total variance explained is 0.6608.

4.1 Ranking countries by the level of globalization

The mean of the four globalization indices by country, together with the period mean Gini coefficient and most recent years of Gini coefficient, is reported in Table 3A. The countries are ranked in the descending order of the first principal component index. However, for comparison, the rank numbers by the weighted Kearney index are also given in the same table. The rank of countries according to the degree of globalization differs somewhat, depending on the computation method chosen. The ranking position of the least globalized countries is higher than that of the most globalized ones.

The results based on the first principal component show that Uganda, Iran and Morocco rank as the three least globalized countries versus Ireland, Singapore and Switzerland which are ranked as the most advanced in terms of globalization. Slovenia, Slovak Republic and Nigeria are among the average with regard to globalization. Internal and external conflicts seem effectively to reduce the globalization process of the low ranking countries by affecting their economic and technology components negatively. With few exceptions, the high ranking countries share similar patterns in the distribution of the various components, but several exceptions can be noted. Russia is allocated a very high political factor which crucially affects its rank (34) and France, ranked 15, also has the highest political factor. The same is true in the case of China which, despite its high political engagement, is ranked only 44. The mean unweighted Kearney index decomposed into sub-components by country is given in Figure 1. The mean of each of the four indices by country is shown in Figure 2. The position of the countries, with the exception of the weighted principal component index, is very similar. The difference in the latter is due to normalization prior to aggregation of the three principal components. The three principal components are shifted so that the minimum values are 0 and the sum of variances used as weights in the aggregation adds up to 1.

4.2 Ranking regions by the degree of globalization

The mean level of globalization by regions is presented in Table 3B and Figure 4. The ranking of regions differs depending on whether an identical or different weighting system for the Kearney index is applied, or whether only the first principal component or a weighted index of the first three principal components is used. As a result of attaching a higher weight to the technology factor, Latin America, with a relatively low technology component, shifts its position to a lower rank in the favour of East Asia. Based on equal weights, the South Asian region is identified as the least advanced in terms of globalization, and its low level of globalization is very much determined by the absence of the technology factor. This picture is shared by the Sub-Saharan African and Middle East and North African regions. The ranking based on the first principal component is close to that of the Kearney-based weighted index.

The East Europe and East Asia regions are identified as the medium level of globalization. However, the two regions differ according to index components. For instance, East Asian region has the advantage in technology transfer, while Eastern Europe enjoys better personal contacts. In terms of political engagements they are also different. The East Asian region shows high economic integration and technology transfer, but its level of globalization is limited by relatively low personal contacts and political engagements. The East European region shows progress in all four factors, but

yet it has relatively low technology transfer. West Europe¹⁰ and Southeast Asia constitute the highest globalized economic and geographic regions. Economic integration for the Southeast Asian region is higher, while the remaining three components are higher in Western Europe. There is large heterogeneity in the globalization process of the countries belonging to these two regions.

4.3 The development of globalization over time

The mean indices and their components (based on the unweighted Kearney index) for each year of observation from 1995 to 2000 are reported in Table 3C and Figure 3. Ideally this should be weighted by the countries' share of GDP or population to provide a more accurate picture of the temporal changes in the globalization process. Despite the short period, yet it does provide a partial picture of the development of globalization. In terms of total GDP, size of population and total volume of trade, the small sample provides a satisfactory survey of the coverage of globalization.

Unweighted economic integration increased during 1995-97 from 0.73 to 0.86. It declined sharply to 0.60 in 1998 and remained below this level until 2000. The decline is a consequence of the emerging markets and the East Asian financial crisis. The two principal component indices continuously increased over time. These are preferred as they are not restricted by assumption of the same weights or arbitrarily chosen weights. The technology component continuously increased from 0.27 to 0.44. The political component is constant over time and as expected it does not change over a short period.

The average annual changes in index components and composite indices are reported in Table 3D. Here the changes are based on annual means, neglecting the between-country variation. The between-country variation is quite high as a share of the total variation. Due to the increasing patterns of the technology component and the principal component indices over time, their percentage changes over time are all positive.

4.4 A comparison to previous results

A number of factors distinguish this study from previous ones. First, unlike previous studies which are often based on trade only to proxy globalization, our analysis is based on a general index of globalization that covers various aspects of changes in international economy, technology transfer and in world politics. Thus, it captures better the free movement of goods, services, technology, labour, capital and politics across borders and over time, that result from lower transportation cost, lower trade barriers, faster communication technologies, competition and standardizations. Second, the time period is very short and covers only the last years of the second wave of globalization. Third, the number of countries is limited by data availability.

Despite the limitations of country and time coverage, our results provide a clear picture of the heterogeneity in the process of globalization during its recent revival phase, disparity in development and its possible impacts on rising inequality between and within countries and regions over time. Before turning to the regression analysis, we

¹⁰ In order to reduce the number of regions we have pooled Australia, New Zealand, USA and Canada to the West European region and label the group as industrialized countries.

note that in some studies there are indications that globalization has reduced poverty in several integrated economies through faster growth. In our sample and period, there is a pattern of globalized countries having experienced high growth and reduced poverty. But, inequality can also be linked to poor governance, infrastructure and institutions, and taxes and redistribution policies in lagging countries rather than to fast growth and their degree of globalization.

6 The impacts of globalization on income inequality

6.1 Specification of the relationship

Income inequality from a country perspective may depend on a number of internal and external factors. Globalization is one such main external factor. The link between globalization, income inequality and growth has been the focus of much research attention for years. However, with the exception of a partial view in studies like Mahler (2001) and Agénor (2003) who looked at the relationship between inequality and the economic components of globalization (trade, FDI and financial openness), the lack of a globalization index has not allowed the relationship to be statistically estimated and testing. In this section we aim to address this by means of regression analysis:

$$GINI_i = \alpha_0 + \alpha_1 GINDEX_i + \sum_{j=1}^J \gamma_j REGION_{ji} + u_i \quad (3)$$

where *GINI* and *GINDEX* refer to the Gini coefficient and globalization index, *REGION* is a *J* vector of regional dummies, *u* an error term and the subscript *i* refers to a country. Since the two datasets (Kearney and World Income Inequality Database, WIID), do not fully overlap, we are forced to use a cross-sectional approach as a second best alternative in establishing the inequality-globalization relationship. The Kearney database covers the period 1995-2000, while the WIID covers the period before 1998. The former is a balanced panel data of 62 countries, while in the latter 146 countries are observed non-consecutively on an irregular basis.

The Gini coefficient is a standard measure of income inequality obtained from WIID. It is given as a mean of multiple observations for a given country in a given year. The multiplicity of observations is due to the different definitions of income, area coverage and units of measurement. It is defined here in two different ways. First, the most recent observation (1996 to 1998) is used in the cross-sectional regression analysis. A number of countries (16) are observed prior to 1995. For the second definition instead of the last year of observation, we use the mean Gini by country for all years that a country is observed. For summary statistics of the inequality variables see Table 1.

The globalization index is defined in four ways: the unweighted and weighted Kearney and principal component indices. In the unweighted Kearney case, all 13 indicators are given identical weights ($w=1$). In order to avoid the strong assumption of equal weights, a number of factors in the weighted Kearney case are given double weights ($w=2$) on an ad hoc basis. The unequally weighted factors are FDI, portfolio investment, international telephone traffic, and internet users. The unweighted principal component index is based on the first principal component of the same 13 indicators, while the weighted index is based on the weighted average of the first three principal components.

6.3 Correlation between globalization, inequality, and poverty

Correlation among the different unweighted components of the Kearney globalization index, and the different aggregate globalization indices are reported in Table 4. Calculations here are based on cross-sectional data obtained as multiple period means to be used in the regression analysis. The correlation coefficients and their significance are very similar to those based on non-averaged individual observation reported in Table 2. All coefficients are positive and significantly different from zero indicating a positive within- and between-group correlation among the indices and their decomposition. An exception is insignificant correlation of the political component with the economic and personal components. In general the correlation among the aggregate indices is stronger (0.82 to 0.99) than the correlation among the disaggregated four index components (0.35 to 0.65). The correlation between the components of the two groups varies in the interval of 0.33 to 0.85.

The correlation between globalization, income inequality, and poverty indices, based on the over time mean values, is also reported in Table 4. The two Gini coefficients are highly correlated with each other (0.84). They are negatively correlated (-0.27 to -0.37) with the personal and technology components, negatively and weakly correlated with political component but uncorrelated with the economic component. The same negative but statistically significant relationship holds between inequality and the aggregate globalization indices (-0.28 to -0.33).

The poverty measures representing the percentage of the population below the national poverty line of below US\$1 and below US\$2 per day, are positively correlated with each other (0.45 to 0.83). However, none of these three measures are correlated with the fourth measure which is based on the share of the poor in the lowest 20 per cent of national income or consumption. The first three poverty measures are uncorrelated with inequality, while the last measure is negatively correlated (-0.76 to -0.85). Increased inequality is more damaging to the poorest 20 per cent of the population. Regarding the correlation between our four poverty measures and four globalization indices, the results show that globalization reduces poverty (-0.31 to -0.50) and increases (0.22 to 0.23) the share of the poorest 20 per cent of the national income or consumption, thereby also reducing inequality. The declining poverty is mostly associated with the technology and personal components of globalization. For more details see Table 4.

6.3 Estimation results

The estimation results from a regression of the Gini coefficient on the unweighted Kearney globalization index, when Gini is defined as the most recent year of observation, are reported in Table 5A. Results based on an alternative definition where Gini is defined as mean income inequality over time are reported in Table 5B. Regression results from the two Gini measures on the unweighted (first) principal component measure of globalization are presented in Table 5C. Results based on weighted first three principal components are not reported here due to limited space.

It is worth mentioning that, since we use cross-sectional regression analysis, it has not been possible to identify the unobservable country-specific effects. However, in addition to the globalization index we have added a number of dummy variables to represent the unobservable regional effects. These capture regional heterogeneity in income inequality.

For sensitivity analysis, a number of alternative specifications of the simple relationship (equation 3) are estimated. In the basic model in Table 5A (Model A1) the between-country variations in income inequality are explained by an aggregate unweighted Kearney globalization index. The coefficient is negative and statistically highly significant. It indicates a negative relationship between the level of globalization and income inequality. The same relationship applies when globalization is differently weighted (Model A9). However, globalization explains only 11 per cent of the variations in income inequality among the 60 countries.¹¹ This is in line with Lindert and Williamson (2001) who find the net impact of globalization to be too small to explain the long-term rise in world inequality. The inclusion of the squared globalization indices in Models A1 and A9 was insignificant, indicating the absence of Kuznets U-shaped relationship between inequality and globalization.

Results from a decomposition of the unweighted Kearney globalization index into its four sub-components (Model A2 to A5 of Table 5A) show that economic integration and political engagement individually do not explain any of the variations in income inequality.¹² However, simultaneous inclusion of the four components (Model A6) indicates that personal contacts and technology transfers reduce inequality, while economic integration increases inequality. Political engagement is found to have no significant effect. Personal contact is the single component that contributes the most to the explanation of inequality variations as well as to its reduction. To control for regional heterogeneity, we add a number of regional dummies. Accounting for regional heterogeneity (Model A7) captures most variations in inequality among the countries. The explanatory power of the model increases from 0.11 to 0.64. Similar results are obtained when the weighted globalization index is used (Model A10). However, the weighted globalization index turns out to be insignificant. It should be noted that there is a risk that regional inequality and globalization are correlated biasing the effects of globalization on income inequality. This applies as well to the case where both sub-components of globalization and regional effects are included (Model A8).

Regression results corresponding to Models A1 to A8, based on alternative definitions of income inequality, where the mean Gini coefficient over time is used, are reported in Table 5B and labelled as Models B1 to B8. The signs of coefficients, compared to the previous case where Gini coefficient is from the most recently observed years, do not change. However, their significance and size change in a number of cases. The regional variables play an even more important role in the explanation of variation in income inequality.

In Table 5C we present regression results on the link between income inequality defined in two different ways and globalization computed using the first principal component method. As in the previous cases the results indicate a negative relationship between globalization and income inequality. The squared globalization index is positive and weakly significant (Models C2 and C5) indicating a U-shaped or declining negative relationship. The fit of the model is somewhat lower compared to the two Kearney

¹¹ The income inequality variables for South Africa and Morocco are missing. These two countries are excluded from the regression analysis.

¹² Agénor (2003) finds an inverted U-shape relationship between globalization and poverty. The globalization index was based on trade and financial integration. The index is similar to our economic integration component.

based indices. Adding regional dummies to the relation (Models C3 and C6) produces similar results in terms of signs, significance and the size of effects. Again the globalization index turns out to be statistically insignificant when regional dummies are added to the model.

The results above suggest that the construction of the index and its decomposition are useful, although very little of the variance in inequality is explained by globalization operating through these four channels. Due to the cross-section nature of the data, we have not been able to control for country effects. However, what happens at country level across various channels is important. For instance, within-country factors such as institutions and governance structure seem to explain the differences in the outcome. Therefore, initial endowment and a country's integration determine the distributional effects of globalization. The aggregate Gini coefficient fails to capture many distributional shifts that result from the opening of trade and capital markets. More disaggregated measures are needed to account for the distributional shifts within and between different population subgroups and regions. Furthermore, the current data and study cannot distinguish between the effects from technology, trade or such demographic trends as the increased number of two high-skilled breadwinners and single-headed low-wage earner at the top and bottom of the distribution scale. As suggested by Graham (2005) and Nissanke and Thorbecke (2005), it is important to conduct empirical studies towards understanding better the globalization-inequality-poverty nexus in a country-specific context.

Our results are in line with Mahler (2001). Using the Luxembourg Income Study database, Mahler finds little evidence of a systematic relationship between the three main modes of economic globalization, namely trade, outbound investment and financial openness and either the distribution of disposable personal income or earnings of households. The overall conclusion is that economic integration does not systematically lead to increased income inequality across entire economies.

It is to be noted that the results presented here are primary. The results provide some initial support to the hypothesis of the existence of a (negative) relationship between inequality and globalization, but several essential improvements are still needed to confirm this finding.

6.4 Guidelines to construct a modified index

The index should take an axiomatic approach that sets out its desirable properties and provides a family of indexes that fulfil such properties. The index should fully quantify globalization by including several other relevant components. These could include some measure of cost-benefit ratio of globalization, impacts on standards of living, environmental aspects, wage inequality, skill biased technological change, the volume and direction of foreign trade and movements of skilled labour, and democracy and conflict, shift in power and aspects of cultural uniformity.

The direction of causality, simultaneity and bias due to omitted effects must be investigated. Non-linearity would also shed more light on the Kuznets inverted U-hypothesis on the inequality-globalization relationship that is conditional on growth.

Industrialized countries dominate the current sample, having different relationships between development, redistribution and inequality than the developing countries. The

over-weighting of the advanced industrial countries in the sample results in smaller and slow changes in the mean globalization over time. It negatively biases the overall effects of globalization on inequality and poverty. Furthermore, it also biases the composition of the effects from a developing country perspective. The sample of countries should be expanded to include more developing and transition economies.

The identification of the major determinants of globalization and the quantification of the effects on the ranking of countries are key issues forming the basis on which policy options can be provided. Analysis will help to identify ways to initiate fair treatment of products, services and people that would enable poor countries to benefit from globalization to a greater extent. To reduce the negative effects on inequality and the poor from openness and globalization, these need to be accompanied by redistribution policies and an improvement in social protection.

7 The impacts of globalization on poverty

7.1 Model specification

The relationship between globalization and poverty is examined in several studies. Cornia and Court (2001) find that rising inequality threatens growth and poverty reduction targets, and persistent poverty at high levels makes poverty reduction difficult. Results in Agénor (2003) suggest that globalization at a low level hurts the poor, but at higher levels it reduces poverty. Ravallion (2003) sees the reduction of inequalities through opportunities within the developing countries as crucial for realizing globalization's potential for poverty alleviation. Globalization is one external factor that might affect earnings as well as the distribution of income and poverty. In this section we aim to address the link between globalization and poverty by the means of regression analysis:

$$POVERTY_i = \lambda_0 + \lambda_1 GINDEX_i + \sum_{j=1}^J \eta_j REGION_{ji} + v_i \quad (4)$$

where *GINDEX* refers to globalization index, *REGION* is a vector of regional dummies, *v* an error term and the subscript *i* refers to a country.

The poverty data are prepared by the World Bank's Development Research Group and *Human Development Report* 2003. The *POVERTY* variable is defined in four different ways: per cent of the population below the national poverty line, per cent of the population with income below US\$1.08 and US\$2.15 per day at 1993 international prices,¹³ and share of the poorest 20 per cent of national income or consumption from 1990-2001. National estimates of poverty line are based on population weighted subgroup estimates from household surveys.

To conserve space, the globalization index chosen is the unweighted Kearney index defined previously. Information on the national poverty line is available only for 29 developing and transition countries included in the globalization database, and for 38 countries we have information on the share of population with income below US\$1 and

¹³ This is equivalent to \$1 and \$2 in 1985 prices, adjusted for purchasing power parity.

US\$2 per day. The observation period mainly covers 1993-2000, with a few exceptions dating back to 1989. Information on the share of the poorest 20 per cent of national income or consumption is available for 59 countries.¹⁴ As the Bank does not provide data on poverty in industrialized countries, these are excluded from the poverty regression analysis.¹⁵

7.3 Estimation results

The estimation results from a regression of the poverty on the unweighted Kearney globalization index are reported in Table 6. For a sensitivity analysis, a number of alternative specifications of the relation in equation 4 are estimated. In the basic model (Model C1) variations in poverty defined as the per cent of the population below the poverty line are explained by the aggregate unweighted Kearney globalization index. The coefficient is negative and statistically weakly significant. Globalization explains at most only 9 per cent of the variations in poverty among the countries, indicating a negative relationship between the level of globalization and poverty at the national level. The negative relationship holds even when poverty is measured as the share of poorest 20 per cent of national income or consumption. However, the relationship is not significantly different from zero when poverty is defined as income below US\$1 (Model C3) or US\$2 per day (C5). To control for regional heterogeneity, we add a number of regional dummies. Accounting for regional heterogeneity (Models C2, C4, C6 and C8) captures most variations in poverty among the countries. The explanatory power of the models increases to 0.53 in Model C8.

In both inequality and poverty models, we have noted that when regional variations are controlled for, many of the globalization coefficients in the regression become insignificant. This suggests that the countries within each region are relatively homogenous, indicating the prevalence of variation among the regions. For instance, Africa has very high levels of poverty, low levels of technology and economic integration, while Latin America has the highest inequality level and high volatility in its short-term capital flows. The situation for South Asia in terms of globalization is similar to the one for Africa. This regional divergence in the patterns of globalization components will obviously determine how inequality and poverty are affected by the four components. The small sample size does not allow us to estimate the relationship for separate regions or allowing for parameter heterogeneity in the pooled model.

Again the results presented here must be interpreted with cautious. With the exception of Models C7 and C8, the sample is very small and the periods when poverty and globalization are measured do not overlap in all cases. In Model C8 where the sample is the largest for the Middle East and North Africa regions, the poorest 20 per cent (Southeast Asia, Latin America and Sub-Saharan Africa) have a significantly lower share of income relative to the reference group (East Europe). The shares of the East European countries are insignificantly different from that of the West Europe, an indication of no link existing between globalization and poverty when poverty for the

¹⁴ No data are available for Argentina, Saudi Arabia and Taiwan.

¹⁵ Alternatively one could assign the minimum poverty rate of 2 per cent to the industrialized countries and instead of least squares apply tobit analysis to the censored data to establish the link between poverty and globalization.

poorest is defined as the share of national income and consumption. As mentioned previously, several factors limit the comparability of this study with those found in the literature. The strength of the current study lies in the computation of a multidimensional index for globalization and the use of statistical methods to establish the relationship between globalization, inequality and poverty depending on regional location of countries. The main limitations are the short and partially overlapping time period, and the small number of countries included in our regression analysis.

8 Summary

This study addresses the measurement of two indices of globalization (Kearney and principal component analysis based) that quantify the level and development of globalization for ranking countries. The indices are composed of four main components: economic integration, personal contact, technology, and political engagements, each of which develops differently over time and across countries. Alternative weighted and unweighted versions of the two indices are also computed.

The results show that internal and external conflicts seem to reduce effectively the globalization prospects of the countries. The low ranking position of the country is often associated with economic and technology factors which certain developing countries are unable to address. The high ranking countries share similar patterns in various component distributions. The mean globalization by region shows that personal and technology factors play an important role in determining the ranking position of the regions. This breakdown of the index into major components offers the possibility to identify the sources of globalization and link these to economic policy measures to bring about desirable changes in national and international policies.

When looking at the simple correlation among the indices for income inequality, poverty and globalization, we find the Gini coefficients negatively correlated with disaggregated personal, technology and political components, but uncorrelated with the economic component. The same negative relationship exists between the income inequality and the aggregate globalization indices. We do not find correlation between the share of poor and inequality, but their share of income is negatively correlated with income inequality. This is interpreted as increased inequality being more damaging to the poorest population. Concerning correlation between poverty and globalization indices, results show that globalization reduces poverty and increases the income share of the poorest group, thus reducing inequality. The reduction in poverty is associated mostly with technology component of globalization.

In a regression analysis we investigate the relationship between inequality, poverty and globalization. The results show that the globalization index explains only 7-11 per cent of the variations in income inequality, and 9 per cent of poverty among the countries. By decomposing the aggregate globalization index into four components, the results show that personal contacts and technology transfers reduce inequality, while economic integration increases inequality. Political engagement is found to have no significant effect on income inequality. The results provide weak evidence that globalization reduces poverty. When controlling for regional heterogeneity, we find that the regional variable plays an important role in explaining the variation in inequality and poverty, which makes the globalization coefficient insignificant. This suggests that the variations

among regions are a dominant factor in how poverty and inequality are affected by the four globalization components.

Although the current version of the index quantifies the level of globalization well, it has certain limitations and the results should be interpreted with caution. We have introduced a number of improvements to overcome several of the shortcomings. These include an axiomatic approach to set out the desirable properties of the index, the use of panel data, identification and incorporation of more dimensions or components and the use of estimation methods that avoid the choice of weights attached to each index component on an ad hoc basis. These are important issues in understanding how globalization functions and learning to use the generated information in policy formulation and development evaluations. The index is in its early stage of development but has identified several directions along which future advances can be made. In order to make the regression results on the link between globalization, inequality and poverty more stable, less biased towards industrialized countries, and to cover different phases of globalization one should extend the data both in time and transition and developing country dimensions.

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Table 1
Summary statistics, globalization data, 1995-2000
NT=62x6=372 observations

Variable	Mean	Median	Std Dev	Minimum	Maximum
A. Economic integration					
1. Trade ($w=1$)	0.777	0.6750	0.505	0.157	3.475
2. Foreign direct investment ($w=2$)	0.043	0.0285	0.050	0.000	0.331
3. Portfolio investment ($w=2$)	0.057	0.0229	0.150	0.000	1.669
4. Income payments and receipts ($w=1$)	0.090	0.0604	0.099	0.005	0.782
B. Personal contacts					
1. International telephone traffic ($w=2$)	97.432	44.245	128.910	0.900	707.460
2. International travel & tourism ($w=1$)	0.806	0.348	1.056	0.003	6.361
3. Transfer payments & receipts ($w=1$)	0.033	0.027	0.030	0.000	0.150
C. Technology					
1. Internet users ($w=2$)	0.064	0.018	0.101	0.000	0.594
2. Internet hosts ($w=1$)	0.013	0.002	0.027	0.000	0.295
3. Secure internet servers ($w=1$)	0.011	0.001	0.029	0.000	0.283
D. Political engagements					
1. Embassies in country ($w=1$)	71.613	68.500	34.197	13.000	172.000
2. Membership in intl org. ($w=1$)	48.806	47.800	10.382	6.000	77.000
3. Particip. in UNSC missions ($w=1$)	0.251	0.222	0.205	0.000	0.778
E. Income inequality measures ($n1=n2=60$):					
1. Gini from most recent year	38.349	36.670	9.218	23.702	59.000
2. Mean multiple period Gini	38.342	36.580	9.326	21.990	60.690
F. Poverty measures ($n1=29$, $n2=n3=38$ and $n4=59$):					
1. % population below poverty line	28.348	28.600	14.281	4.600	64.000
2. % population below US\$1 per day	12.826	6.350	18.269	2.000	82.200
3. % population below US\$2 per day	31.853	24.050	27.997	2.000	96.400
4. Share of 20% poorest of national income and consumption	6.583	6.900	2.219	1.400	10.600
G. Kearney globalization indices:					
1. Unweighted Kearney index (K)	2.980	2.437	1.420	1.069	7.978
2. Weighted Kearney index (KW)	3.646	2.825	2.035	1.168	11.055
H. Principal component globalization indices:					
1. First principal component (PC1)	1.029	0.598	1.000	0.000	6.279
2. Second principal component	4.279	4.375	1.000	0.000	8.832
3. Third principal component	6.810	6.853	1.000	0.000	10.530
4. Weighted first three PC (PCW) index	2.945	2.808	0.636	1.613	5.238

Notes: w = weights. UNSC United National Security Council.

Source: Author's calculations.

Table 2
Pearson correlation coefficients, NT = 372.

	Year	Economic	Personal	Technology	Political	K	KW	PCI	PCW
Year	1.0000								
Economic	-0.1380 0.0076	1.0000							
Personal	0.0399 0.4423	0.5871 0.0001	1.0000						
Technology	0.1150 0.0265	0.2906 0.0001	0.3446 0.0001	1.0000					
Political	0.0046 0.9282	0.0312 0.5475	0.0243 0.6403	0.3952 0.0001	1.0000				
K	0.0010 0.9832	0.7119 0.0001	0.6840 0.0001	0.7576 0.0001	0.5523 0.0001	1.0000			
KW	-0.0082 0.8746	0.7630 0.0001	0.6863 0.0001	0.7550 0.0001	0.4738 0.0001	0.9909 0.0001	1.0000		
PC1	0.2946 0.0001	0.6395 0.0001	0.6327 0.0001	0.7127 0.0001	0.3947 0.0001	0.8774 0.0001	0.8842 0.0001	1.0000	
PCW	0.2314 0.0001	0.3759 0.0001	0.3313 0.0001	0.6712 0.0001	0.7975 0.0001	0.8156 0.0001	0.7840 0.0001	0.8392 0.0000	1.0000

Notes: K=unweighted Kearney index, KW=weighted Kearney index, PC1=unweighted (first) principal component index, PCW=weighted principal component index based on the first three principal components. p-values are given under the coefficients.

Source: Author's calculations.

Table 3A
Globalization index by country, ranked by the first principal component (PC1)

Rank 1	Country	Economy	Personality	Technology	Political	K	Rank 2	KW	PC1	PCW	Gini	mgini
1	Ireland	2.477	1.899	0.560	1.510	6.446	1	8.643	3.726	3.887	36.962	36.80
2	Singapore	2.729	1.551	0.920	0.734	5.935	2	8.575	3.181	3.197	38.115	42.49
3	Switzerland	1.545	1.746	0.999	1.689	5.979	3	8.137	3.050	3.996	33.100	33.20
4	Sweden	1.444	0.900	1.346	2.178	5.868	4	7.941	2.735	4.074	33.663	38.14
5	Netherlands	1.892	0.927	0.807	1.577	5.202	6	7.125	2.506	3.725	32.200	32.10
6	Canada	0.872	0.825	1.467	2.434	5.598	5	7.170	2.456	4.101	30.050	30.83
7	USA	0.436	0.275	2.400	2.531	5.641	8	6.739	2.391	4.299	40.425	38.65
8	Norway	0.874	0.836	1.699	1.685	5.094	7	6.881	2.289	3.615	39.422	30.74
9	Finland	0.790	0.731	1.752	1.818	5.091	9	6.586	2.260	3.682	31.500	29.33
10	Denmark	1.242	1.000	0.903	1.925	5.069	10	6.529	2.228	3.666	35.525	34.04
11	Austria	0.890	1.272	0.761	2.081	5.005	11	6.313	2.132	3.793	26.500	25.91
12	UK	1.265	0.545	0.736	2.181	4.727	12	6.030	2.011	4.012	37.275	30.87
13	New Zealand	0.603	0.699	1.311	1.144	3.757	13	4.913	1.681	3.081	30.335	45.61
14	Czech Rep.	0.833	1.281	0.225	1.410	3.749	18	4.346	1.620	3.254	23.900	23.22
15	France	0.683	0.479	0.302	2.564	4.028	14	4.875	1.603	4.061	32.700	38.14
16	Germany	0.712	0.472	0.513	1.960	3.657	16	4.631	1.477	3.679	31.787	31.67
17	Australia	0.535	0.354	1.309	1.396	3.594	17	4.526	1.456	3.242	44.600	37.68
18	Panama	1.943	0.322	0.039	0.642	2.947	22	3.725	1.224	2.508	52.034	49.22
19	Portugal	0.883	1.008	0.335	1.404	3.630	15	4.641	1.199	2.990	35.600	36.26
20	Hungary	0.898	0.690	0.165	1.283	3.036	23	3.650	1.183	3.000	25.300	24.61
21	Malaysia	1.159	0.642	0.145	1.244	3.190	21	3.756	1.182	2.689	48.500	47.71
22	Spain	0.635	0.676	0.297	1.530	3.139	20	3.850	1.132	3.214	23.702	30.93
23	Italy	0.649	0.544	0.210	2.096	3.499	19	4.171	1.102	3.469	31.217	35.68
24	Israel	0.547	0.999	0.536	0.764	2.847	24	3.566	0.927	2.487	38.200	32.70
25	Poland	0.412	0.565	0.124	1.891	2.991	25	3.376	0.925	3.124	32.700	26.60
26	Chile	0.784	0.197	0.106	1.124	2.211	29	2.879	0.763	2.779	55.516	50.93
27	Japan	0.284	0.073	0.549	1.496	2.403	27	2.940	0.763	3.168	24.900	35.53
28	Argentina	0.473	0.091	0.056	1.981	2.600	26	3.024	0.743	3.225	46.660	51.79
29	Greece	0.223	0.861	0.154	1.278	2.515	28	2.919	0.697	2.807	32.700	41.56
30	Slovenia	0.510	0.490	0.514	0.500	2.014	37	2.618	0.670	2.239	29.690	25.66
31	Slovak Rep.	0.631	0.412	0.209	0.875	2.127	38	2.576	0.653	2.378	23.709	21.99
32	Nigeria	0.617	0.305	0.001	1.653	2.576	32	2.781	0.618	2.804	50.300	43.20
33	Croatia	0.547	0.873	0.111	0.594	2.125	34	2.727	0.608	2.242	30.067	25.68
34	Russian Fed.	0.322	0.090	0.032	2.168	2.613	30	2.801	0.585	3.190	39.575	34.14
35	Korea Rep.	0.478	0.258	0.322	1.058	2.116	35	2.698	0.560	2.635	31.600	34.18
36	Mexico	0.550	0.235	0.041	1.122	1.947	40	2.340	0.520	2.750	51.978	51.08
37	Tunisia	0.441	0.507	0.005	1.288	2.241	39	2.407	0.510	2.598	40.410	44.92
38	Botswana	0.811	1.153	0.017	0.477	2.458	36	2.659	0.504	1.966	52.302	53.90
39	Venezuela	0.467	0.102	0.038	1.312	1.919	44	2.226	0.501	2.812	47.248	42.90
40	Philippine	0.802	0.161	0.013	0.876	1.852	49	2.172	0.464	2.454	47.900	46.94
41	Thailand	0.647	0.133	0.021	1.034	1.835	51	2.117	0.460	2.522	41.750	45.03
42	Indonesia	0.451	0.069	0.006	1.492	2.018	47	2.195	0.456	2.759	35.270	36.36
43	Egypt	0.242	0.496	0.005	1.904	2.647	33	2.747	0.447	2.946	28.900	33.72
44	China	0.393	0.043	0.009	1.577	2.022	42	2.289	0.412	2.887	40.300	29.35
45	Romania	0.345	0.303	0.044	1.207	1.899	50	2.128	0.404	2.623	36.378	26.38
46	Brazil	0.258	0.045	0.059	1.464	1.825	53	2.078	0.400	2.887	58.846	54.99

Table 3A continues

Table 3A (con't)
Globalization index by country, ranked by the first principal component (PC1).

Rank 1	Country	Economy	Personality	Technology	Political	K	Rank 2	KW	PC1	PCW	Gini	mgini
47	South Africa	0.507	0.123	0.145	0.985	1.759	45	2.215	0.393	2.607	59.000	54.89
48	Taiwan	0.530	0.372	0.427	0.010	1.339	55	1.977	0.382	1.766	31.700	33.04
49	India	0.166	0.215	0.004	1.697	2.082	46	2.208	0.362	2.898	35.457	34.55
50	Turkey	0.260	0.278	0.036	1.301	1.875	54	2.026	0.362	2.696	45.625	49.21
51	Pakistan	0.186	0.378	0.001	1.674	2.238	41	2.307	0.354	2.760	31.200	34.26
52	Saudi Arab.	0.518	0.959	0.009	0.979	2.464	31	2.799	0.347	2.308	–	–
53	Senegal	0.350	0.535	0.003	1.263	2.151	43	2.279	0.344	2.483	41.300	49.96
54	Colombia	0.347	0.133	0.031	0.962	1.472	59	1.770	0.297	2.592	57.100	51.79
55	Ukraine	0.349	0.240	0.010	1.033	1.632	60	1.766	0.278	2.353	32.941	28.43
56	Peru	0.342	0.159	0.021	0.899	1.422	61	1.668	0.274	2.527	49.006	49.46
57	Bangladesh	0.076	0.414	0.000	1.609	2.099	52	2.116	0.260	2.595	38.800	37.68
58	Kenya	0.196	0.495	0.003	1.459	2.153	48	2.173	0.255	2.511	51.000	60.69
59	Sri Lanka	0.406	0.597	0.006	0.721	1.730	56	1.872	0.178	2.138	34.400	40.40
60	Morocco	0.234	0.599	0.003	0.953	1.789	57	1.841	0.166	2.313	–	–
61	Iran	0.085	0.049	0.002	1.055	1.191	62	1.203	0.076	2.532	42.900	45.59
62	Uganda	0.221	0.824	0.001	0.619	1.664	58	1.799	0.036	2.008	39.200	37.19

Notes: K=unweighted Kearney index, KW=weighted Kearney index, PC1=unweighted (first) principal component index, PCW=weighted principal component index based the first three principal components. Gini and mgini are the recent period and mean multiple period Gini coefficients. Rank 1 and Rank 2 are rank orders by PC1 and KW.

Source: Author's calculations.

Table 3B
Globalization index by region, ranked in descending order of the first principal component index, NT=372

Region	Economic	Personal	Technology	Political	K	KW	PC1	PCW
West Europe ¹	0.982	0.845	0.940	1.841	4.607	5.927	2.007	3.652
South East Asia	1.158	0.511	0.221	1.076	2.966	3.763	1.149	2.724
East Europe	0.539	0.549	0.159	1.218	2.465	2.887	0.770	2.712
Latin America	0.645	0.161	0.049	1.188	2.043	2.464	0.590	2.760
East Asia	0.421	0.167	0.327	1.035	1.970	2.947	0.529	2.614
Middle E&N Africa	0.374	0.640	0.099	1.198	2.311	2.564	0.460	2.558
Sub-Saharan Africa	0.450	0.572	0.028	1.076	2.127	2.318	0.359	2.396
South Asia	0.184	0.331	0.003	1.351	1.868	1.941	0.246	2.585

Note: ¹ Equivalent of industrialized countries. It includes West Europe and Australia, New Zealand, USA and Canada.

Table 3C
Development of globalization index over time, NT=372

Year	Economic	Personal	Technology	Political	K	KW	PC1	PCW
1995	0.726	0.522	0.266	1.380	2.893	3.546	0.689	2.767
1996	0.760	0.576	0.316	1.374	3.026	3.725	0.749	2.815
1997	0.861	0.522	0.349	1.359	3.091	3.841	0.872	2.869
1998	0.595	0.543	0.404	1.388	2.929	3.553	1.050	2.945
1999	0.545	0.612	0.441	1.380	2.978	3.595	1.264	3.079
2000	0.577	0.566	0.438	1.381	2.961	3.614	1.550	3.179

Table 3D
Percentage change in globalization index over time, NT=372

Year	Economic	Personal	Technology	Political	K	KW	PC1	PCW
1995/6	10.07	18.80	63.45	-0.02	5.43	6.15	8.56	1.73
1996/7	16.93	-8.05	31.21	-0.33	2.53	3.77	22.85	1.88
1997/8	-28.19	3.27	55.97	2.20	-5.23	-7.17	18.18	2.40
1998/9	-9.41	16.96	52.00	0.67	1.82	0.80	16.94	4.14
1999/2000	9.06	-6.79	29.17	0.62	-0.55	0.41	21.32	3.32

Notes: K=unweighted Kearney index, KW=weighted Kearney index, PC1=unweighted (first) principal component index, PCW=weighted principal component index based the first three principal components.

Source: Author's calculations.

Table 4
Pearson correlation coefficients, N=60

	Economic	Personal	Technology	Political	K	KW	PCI	PCW	Gini	mgini	PBPL	PB\$1	PB\$2	IS20
economic	1.000													
personal	0.648 0.001	1.000												
technology	0.365 0.003	0.350 0.005	1.000											
political	0.039 0.762	0.024 0.851	0.407 0.001	1.000										
Kearney(K)	0.729 0.001	0.690 0.001	0.782 0.001	0.562 0.001	1.000									
Kearneyw(KW)	0.774 0.001	0.698 0.001	0.786 0.001	0.487 0.001	0.992 0.001	1.000								
princom1(PC1)	0.803 0.001	0.689 0.001	0.765 0.001	0.452 0.001	0.978 0.001	0.989 0.001	1.000							
28 princomp(PCW)	0.444 0.001	0.332 0.008	0.689 0.001	0.852 0.001	0.859 0.001	0.828 0.001	0.820 0.001	1.000						
Gini	-0.065 0.619	-0.373 0.003	-0.267 0.038	-0.224 0.084	-0.326 0.011	-0.314 0.014	-0.302 0.018	-0.289 0.024	1.000					
mgini	-0.082 0.530	-0.298 0.020	-0.273 0.034	-0.208 0.110	-0.305 0.017	-0.298 0.020	-0.292 0.023	-0.279 0.030	0.841 0.001	1.000				
PBPL	-0.148 0.440	0.032 0.868	-0.302 0.110	-0.216 0.258	-0.314 0.096	-0.322 0.088	-0.329 0.081	-0.337 0.073	0.202 0.300	0.211 0.281	1.000			
PB\$1	-0.210 0.204	0.056 0.737	-0.345 0.033	0.041 0.803	-0.135 0.415	-0.220 0.183	-0.323 0.047	-0.208 0.208	0.189 0.261	0.146 0.387	0.511 0.005	1.000		
PB\$2	-0.369 0.022	-0.103 0.537	-0.574 0.001	0.206 0.212	-0.247 0.133	-0.392 0.014	-0.505 0.001	-0.184 0.266	0.117 0.490	0.162 0.335	0.455 0.014	0.831 0.001	1.000	
IS20	-0.037 0.777	0.262 0.044	0.239 0.067	0.214 0.102	0.234 0.074	0.216 0.099	0.195 0.137	0.199 0.129	-0.850 0.001	-0.760 0.001	-0.102 0.604	-0.093 0.578	0.019 0.908	1.000

Notes: p-values are given under the coefficients. K and KW are unweighted and weighted Kearney globalization indices. The PC1 and PCW are the unweighted (first) and weighted (first three) principal component globalization indices. Gini and mgini are the recent period and mean multiple period Gini coefficients. PBPL is per cent population below national poverty line, PB\$1 is per cent population below \$1 per day, PB\$2 is per cent population below \$2 per day, and IS20 is share of 20 per cent poorest of national income or consumption.

Source: Author's calculations.

Table 5A
Least squares parameter estimates of the impact of the Kearney globalization index on the most recent years of income inequality (Gini)

Explanatory variables	Unweighted Kearney globalization index (K)								Weighted Kearney (KW)	
	Model A1	Model A2	Model A3	Model A4	Model A5	Model A6	Model A7	Model A8	Model A9	Model A10
Intercept	45.8642 *	37.5410 *	34.2443 *	34.9793 *	38.4699 *	33.4670 *	34.1586 *	32.4668 *	45.2898 *	39.4501 –
Log K globalization index	-7.4923 *					–	-0.6478 ****	–	–	–
Log KW globalization index						–	–	–	-6.9937 *	-3.4690
Log economic integration		-1.2966 ****				3.7486 **	–	2.1313	–	–
Log personal contact			-4.2817 *			-4.5780 *	–	-3.3735 *	–	–
Log technology				-1.3914 *		-1.2066 **	–	0.9879 ***	–	–
Log political engagement					-0.6328 ****	-0.4883 ****	–	0.3044 ****	–	–
Middle East & North Africa						–	4.6848 ****	9.3241 *	–	3.4092 ****
East Asia						–	0.7517 ****	0.1785 ****	–	-5.8351 ****
Southeast Asia						–	8.7789 *	8.5782 *	–	7.5161 **
South Asia						–	2.7820	8.1049 **	–	0.8502 ****
Latin America						–	18.5843 *	17.5835 *	–	13.2485 *
Sub-Saharan Africa						–	15.1725 *	21.0475 *	–	12.7544 *
East Europe						–	-3.1218 ****	-1.0605 ****	–	-9.1353 *
Industrialized countries (reference)						–	–	–	–	–
R-square adjusted	0.1119	-0.0068	0.1804	0.0998	-0.0145	0.2274	0.6381	0.6834	0.0952	0.6870
F-value	8.4300 *	0.6000 ****	13.9800 *	7.5400 *	0.1500 ****	5.3400 *	14.000 *	12.5800 *	7.2000 *	17.1900 *
RMSE	8.6873	9.2495	8.3457	8.7460	9.2851	8.1027	5.5458	5.1870	8.7734	5.1599
Number of observations	60	60	60	60	60	69	60	60	60	60

Notes: Significant at less than 1% (*), 1-5% (**), 5-10% (***), and greater than 10% (****) level of significance. The square of weighted and unweighted Kearney globalization indices in Models A1 and A9 are insignificant indicating absence of U-shaped relationship between inequality and globalization. RMSE is root mean square error.

Source: Author's calculations.

Table 5B
Least squares parameter estimates of the impacts of unweighted Kearney globalization index (K) on periods mean income inequality (mgini)

Explanatory variables	Model B1	Model B2	Model B3	Model B4	Model B5	Model B6	Model B7	Model B8
Intercept	45.3279*	37.0677*	35.1122 *	34.7682 *	38.4625 *	33.7618 *	40.4570 *	34.4889 *
Log K globalization index	-6.9450 *					–	-3.9352****	–
Log economic integration		-2.0444****				2.0001 ****	–	-0.9609 ****
Log personal contact			-3.3687 *			-2.8938 **	–	-1.5141 ****
Log technology				-1.4755 *		-1.2950 **	–	0.5202 ****
Log political engagement					-0.6325 ****	-0.4388 ****	–	-0.7727 ****
Middle East & North Africa						–	3.0800 ****	5.6964 ***
East Asia						–	-5.9775 ****	-5.7022 ****
Southeast Asia						–	7.0789 **	8.8086 *
South Asia						–	0.4034 ****	2.7974 ****
Latin America						–	12.5126 *	13.8832 *
Sub-Saharan Africa						–	12.5341 *	16.1924 *
East Europe						–	-10.7333 *	-8.8150 *
Industrialized countries (reference)						–	–	–
R-square adjusted	0.0918	0.0082	0.1023	0.1114	-0.0146	0.1303	0.7129	0.7082
F-value	6.9600 *	1.4900 ****	7.7200 *	8.4000 *	0.1500 ****	3.2100 **	19.3200 *	14.0200 *
RMSE	8.8877	9.2877	8.8363	8.7912	9.3939	8.6974	4.9966	5.0377
Number of observations	60	60	60	60	60	60	60	60

Notes: Significant at less than 1% (*), 1-5% (**), 5-10% (***), and greater than 10% (****) level of significance. The square of the unweighted Kearney globalization index (K) in Model B1 is insignificant indicating absence of U-shaped relationship between inequality and globalization. RMSE is root mean square error.

Source: Author's calculations.

Table 5C
Least squares parameter estimates of the impact of the first principal component globalization index (PC1) on income inequality

Explanatory variables	Dependent variable is last year's Gini			Dependent variable is multiple period mean Gini		
	Model C1	Model C2	Model C3	Model C4	Model C5	Model C6
Intercept	41.6658 *	45.0123 *	32.9088 *	41.5862 *	45.3190 *	37.1401 *
PC1 globalization index	-3.1456 **	-10.5145 **	0.2568 ****	-3.0770 **	-11.2968 **	-1.2632 ****
Squared PC1 globalization Index	–	2.3479 ***	–	–	2.6190 ***	–
Middle East & North Africa	–	–	5.4308 ****	–	–	3.7066 ****
East Asia	–	–	1.7087 ****	–	–	-4.3802 ****
Southeast Asia	–	–	9.3033 *	–	–	8.0168 *
South Asia	–	–	3.7795 ****	–	–	1.6664 ****
Latin America	–	–	19.4381 *	–	–	13.8757 *
Sub-Saharan Africa	–	–	16.0495 *	–	–	13.2845 *
East Europe	–	–	-2.4331 ****	–	–	-9.8667 *
Industrialized countries (reference)	–	–	–	–	–	–
R-square adjusted	0.0758	0.1030	0.6380	0.0697	0.1063	0.7053
F-value	5.8400 **	4.3900 **	14.0000 *	5.4200 **	4.5100 **	18.6500 *
RMSE	8.8622	8.7305	5.5466	8.9951	8.8166	5.0630
Number of observations	60	60	60	60	60	60

Note: Significant at less than 1% (*), 1-5% (**), 5-10% (***), and greater than 10% (****) level of significance.

Source: Author's calculations.

Table 6
Least squares parameter estimates of the impact of unweighted Kearney globalization index (K) on poverty

Explanatory variables	% population below poverty line		% population below \$1 per day		% population below \$2 per day		Share of 20% poorest of national income or consumption	
	Model C1	Model C2	Model C3	Model C4	Model C5	Model C6	Model C7	Model C8
Intercept	45.9115 *	42.8558 *	18.9551 ***	0.6690 ****	48.9832 *	12.4765 ****	5.2204 *	8.3772 *
Log K globalization index	-23.4127 ***	-20.7256 ***	-8.1328 ****	2.0192 ****	-22.7321 ****	-1.6524 ****	-1.3508 **	0.1029 ****
Middle East & North Africa	-	-12.1044 ****	-	0.0962 ****	-	8.3839 ****	-	-1.7002 **
East Asia	-	-23.6639 ***	-	8.1132 ****	-	16.5746 ****	-	-1.5520 ****
Southeast Asia	-	-3.7445 **	-	4.2234 ****	-	19.6980 ****	-	-2.6117 *
South Asia	-	5.8022 ****	-	18.5577 **	-	45.9763 *	-	-0.6390 ****
Latin America	-	3.3624 ****	-	8.3663 ****	-	12.6077 ****	-	-5.4438 *
Sub-Saharan Africa	-	13.7536 ***	-	36.5491 *	-	53.3331 *	-	-3.8369 *
East Europe (reference)	-	-	-	-	-	-	-	-
Industrialized countries (reference)	-	-	-	-	-	-	-	-1.1481 ****
R-square adjusted	0.0914	0.2979	-0.0153	0.3707	0.0138	0.4104	0.0540	0.5231
F-value	3.8200 ***	2.7000 **	0.4400 ****	4.1100 *	1.5200 ****	4.6800 *	4.3100 **	8.9500 *
RMSE	13.6133	11.9663	18.4079	14.4924	27.8032	21.4981	2.1579	1.5322
Number of observations	29	29	38	38	38	38	59	59

Note: Significant at less than 1% (*), 1-5% (**), 5-10% (***), and greater than 10% (****) level of significance. RMSE is root mean square error.

Source: Author's calculations.

Figure 1
Unweighted Kearney globalization index (K) decomposed by its components

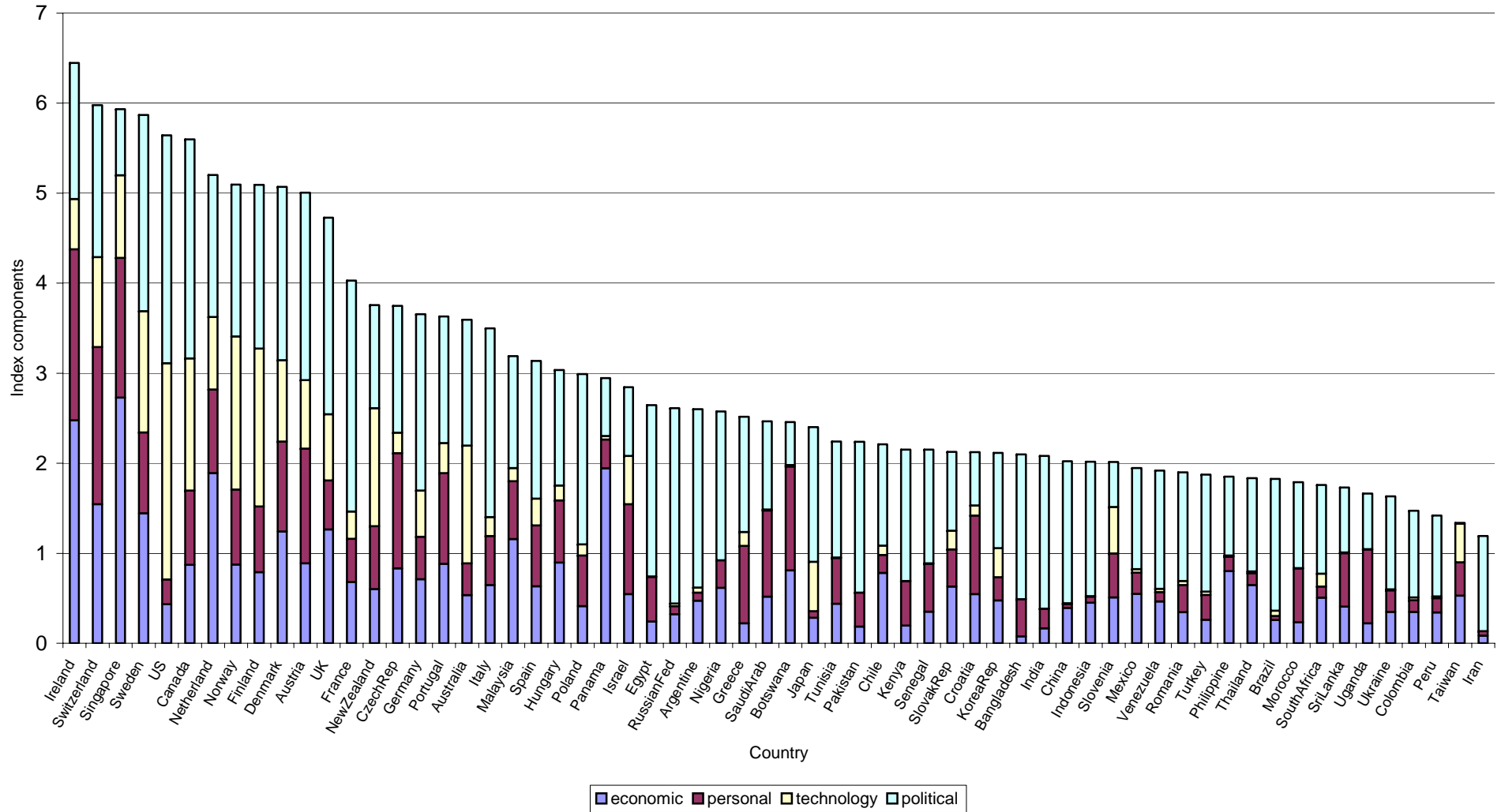


Figure 2. Globalization indices by country.

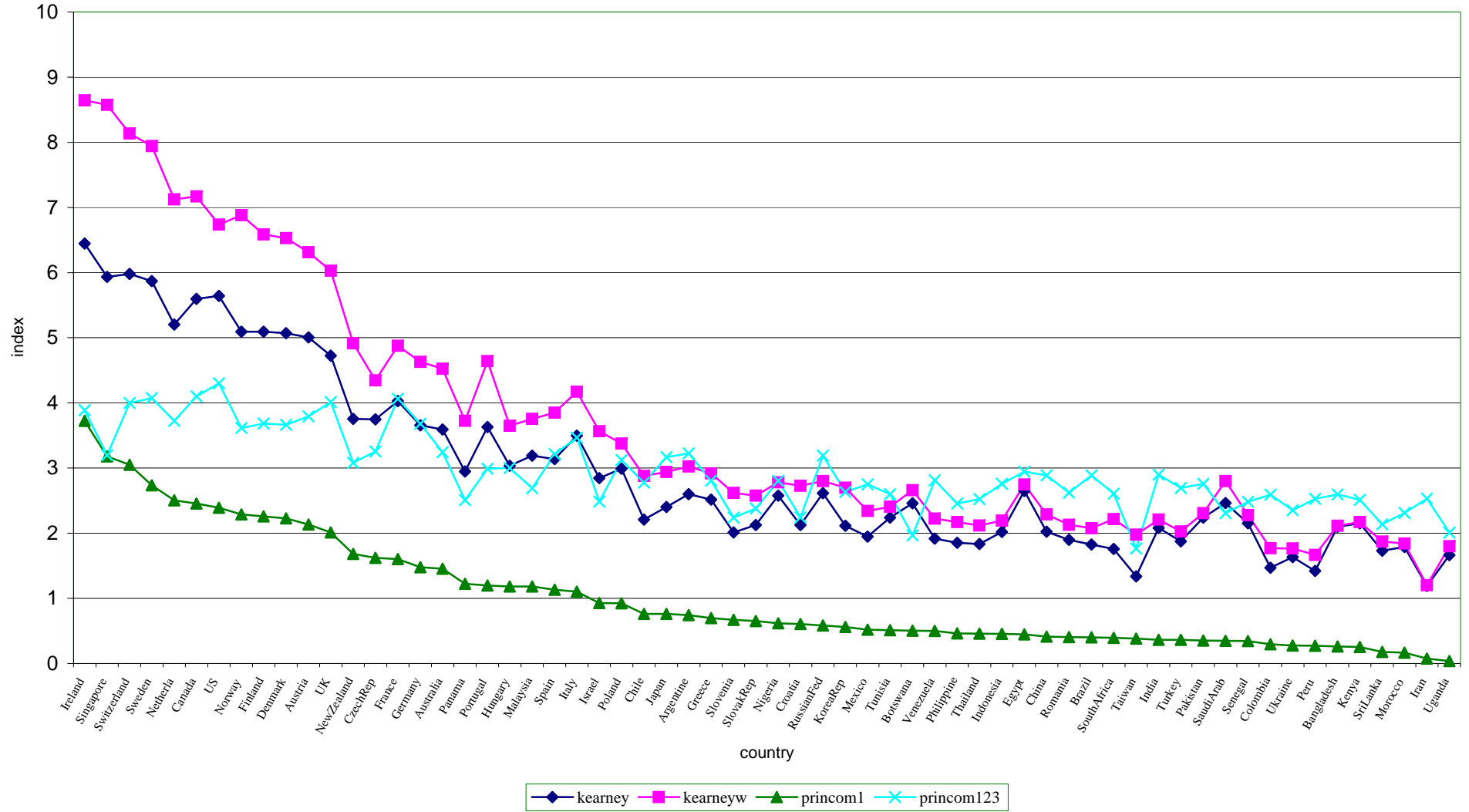


Figure 3. Development of unweighted Kearney index of globalization (K) over time.

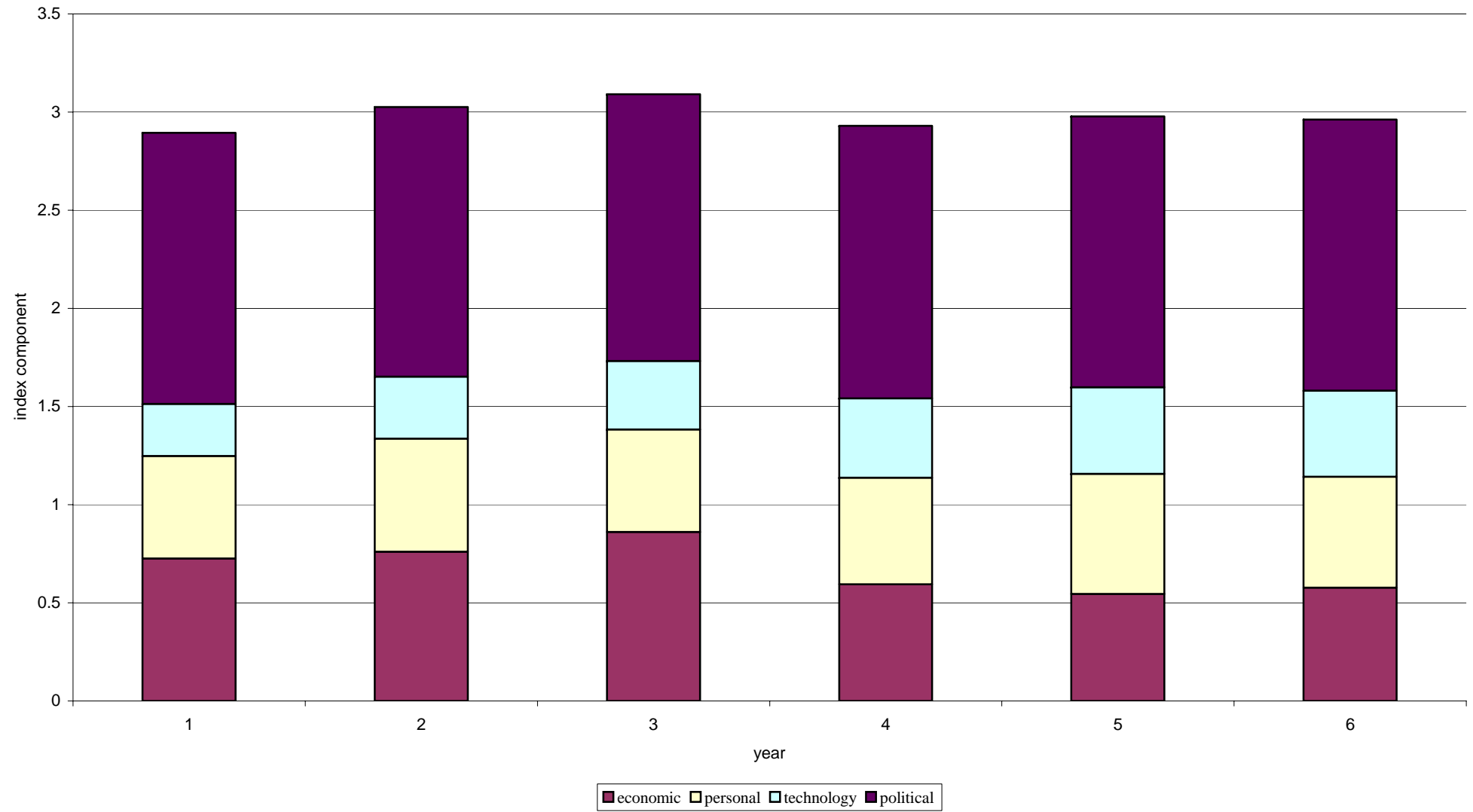


Figure 4. Globalization indices by regions.

