

## **The Relationship between Income Inequality and Globalization**

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### **ABSTRACT**

In this paper we present two composite indices of globalization. The first one is based on the Kearney/Foreign Policy Magazine and the second one is obtained from principal component analysis. They indicate which countries have become most global and show how globalization has developed over time. The indices are composed of four components: economic integration, personal contact, technology and political engagement each generated from a number of variables. A break down of the index into major components provides possibilities to identify sources of globalization and associate it with economic policy measures. The empirical results show that the low rank of globalization process is due to the political and personal factors with limited possibility for the developing countries to affect. The highly ranked developed countries are sharing similar patterns in the various components distribution. The indices were also used in a regression analysis to study the causal relationship between income inequality and globalization. Globalization indices explain only 7 to 11 percent of the variations in income inequality among the countries.

Keywords: Globalization, income inequality, growth, indices, principal component,

JEL Classification Numbers: C23, D63, F15, O57,

## 1. INTRODUCTION

Globalization is defined as the free movements of goods, services and capital across borders. It is a contentious process by which the western market economies have effectively spread across the globe. Although it does not constitute a new phenomenon, it is viewed as an inexorable integration of markets, nations and technologies to a degree never witnessed before in a way that is enabling individuals, and corporations to reach around the world further, faster, deeper and more economically than ever before. By contrast, some groups of scholars and activists view globalization as an ideological project of economic liberalization that subjects states and individuals to more intense market forces.

Globalization causes rapid changes in trade relations, financial flows, and mobility of labour across the world. The development has brought the (developed) national economies closer together and more strongly interrelated. However, there is a large heterogeneity in the degree of globalization process over time and across countries and regions. This heterogeneity causes disparity in development and urges the need for research to find sources of disparity and quantification of its magnitude and impacts.

In recent years, theoretical research on the link between globalization and world inequality has been intense. However, analysis of the link at the empirical level is scarce. The causal connections between globalization and inequality in developing nations are best understood by building on what we have learned about inequality change during the pre-globalization phase. Extensive empirical research points to two stylized facts. First, there is no structural relationship between growth and inequality. Second, income inequality levels in the pre-globalization phase were generally immobile and trendless.

There is a comprehensive body of literature on the historical perspective and a descriptive nature of globalization and its impacts on for instance inequality among nations. Despite the great importance that is placed on the globalization process of the world economy, its sources and consequences remain poorly understood. The relationship between inequality and number of channels through which globalization affect world (in)equality have been investigated. The channels identified are: commodity price equalization, factor price convergence due to international migration and capital mobility reducing wage inequality and differentials in marginal products and rates of returns of capital among countries, and dynamic convergence in per capital income growth where the growth rate is positively related to the distance to the steady state.

The objective of this study is to investigate the usefulness of the recently created database by Kearney in the development of an index of globalization. The index is based on countries' economic integration, personal contact, technology and political engagement. The main features of this study are as follows. First, using the same data reproduce the globalization index introduced by Kearney. Second, an alternative globalization index is obtained using principal component analysis. Third, the countries are compared by their integration in the world economy. A decomposition of the indices into underlying components quantifies individual factors' contribution to the integration. Fourth, the indices in addition to international are further used for between and within regional comparisons. The indices are expected to serve as useful tools in evaluation of the impact of globalization on the welfare of nations and regions.

Hopefully it will generate interest and research on an important issue like analysis of the globalization process and evaluation of its impacts on the developing economies. Fifth, the indices are used in regression analysis to study the causal relationship between income inequality and globalization. However, globalization indices explain only 7 to 11 percent of the variations in income inequality among the countries. Finally, given our experience, provide guidelines for the creation of a globalization database based on national data and a modified globalization index incorporating more relevant determinant factors.

This study is organized as follows. Following the introduction and a brief review of the literature in Section 2 on the link between globalization and world inequality provide a brief description of how the index of globalization have been constructed in Section 3. In Section 4 the data is described and variables used in the analysis are defined. This is followed in Section 5 by the discussion of the results. In Section 6 the link between globalization and income inequality are discussed and guidelines on possible extensions and for future research are presented. Section 7 is the summary and conclusion.

## **2. A REVIEW OF THE LITERATURE**

In reviewing the literature on globalization we have identified a number of directions. The recent two centuries is classified into different periods of globalization. A number of approaches linking globalization to convergence/divergence, inequality/equality issues are introduced. Globalization is also linked to poverty and traditional and non-traditional factors causing inequality. Globalization has different dimensions and impacts. The economic modes of globalization are more frequently looked at than other dimensions. The impacts on wage inequality at micro level are more often investigated. Implications of globalization for within and between country inequality and how globalization influences the world inequality are found to be important. In order to take advantage of globalization and to reduce the negative impacts better governance is discussed. Some disciplines find globalization being misinterpreted and its quantitative (economic and financial) extend exaggerated. In the following we report main findings on each of the directions in the above from a selection of studies.

### *Globalization periods and main approaches:*

Globalization is not a new phenomenon. The process has its roots in the second half of the eighteenth century. In O'Rourke (2001), O'Rourke and Williamson (2000) and Maddison (2001) and Williamson (2002) the period of 1870-2000 is classified into: the first wave of globalization 1870-1913, the de-globalization period of 1913-1950, the golden age of 1950-1973, and the second wave of globalization of 1973 onwards.

In recent years, research on the link between globalization and world inequality has been intense. Three main approaches are distinguished by Wade (2001). First, the neoclassical growth theory predicts that national economies will converge in their average productivity levels and average incomes because of increased mobility of capital. Second, the endogenous growth theory predicts that diminishing returns to capital is offset by increasing returns to technological innovation in the developed countries. In short the neoclassical theory predicts convergence (equality) while the endogenous theory predicts less convergence or divergence (inequality). Third, the dependency approach predicts that convergence is less likely and divergence more

likely, because of differential benefits from economic integration and trade, restricted free market relations, and locked developing countries to produce certain commodities.

*Globalization and convergence/divergence issues:*

The empirical evidence shows that during the first wave of globalization convergence in per capita income and real wages took place within the Atlantic Economy due to an increase in international trade and massive international migration. The de-globalization period is characterized as widening disparity between the richest and the poorest regions and among the Atlantic Economy reverting the convergence trend of the previous period. The golden age period was a 25 years period of rapid growth, relative stability and declining inequality. There was considerable convergence among western European economies and the OECD and a decline in the GDP gap in per capita income between the poorest and the richest regions (see Solimano 2001). It is argued that neoclassical effects of trade and factor supplies changes provide more insight. Increased trade, stimulated by falling transportation costs, and factor movements caused prices of locally scarce factors to fall and promoted factor price convergence.

*Globalization-inequality-poverty links:*

Economic growth has often been given priority as an anti-poverty measure. But, the negative link between growth and inequality has been ignored by policymakers. Rising inequality threatens growth and poverty reduction targets calling for more distributionally favourable pro-growth policies. Cornia and Court (2001) in a policy brief using the WIID database, covering the second wave of globalization, reports changes in within-country income inequality and on the link between poverty, inequality and growth. The analysis highlights five main issues. First, inequality has risen since the early-mid 1980s. Second, the traditional common factors causing the 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. There is a negative relationship between inequality and the poverty alleviation elasticity of growth (Cornia and Kiiski, 2001). Fourth, a high level of inequality can depress the rate of growth and have undesirable political and social impacts (see also Birdsall 2000). Fifth, the developments in Canada and Taiwan show that low inequality can be maintained at fast growth.

The non-traditional new causes of inequality identified are liberal economic policy regimes and the way in which economic reform policies have been carried out. Land reform, expanding education and active regional policy are recommended as measures to reduce inequality among areas, gender and regions. Policies offsetting the inequality impact of new causes designed and incorporated in a revised development approach, called by Stiglitz (1998) 'the Post-Washington Consensus'. These policies include measures to offset the impacts of new technologies and trade, macroeconomic stability, careful financial liberalisation and regulation, equitable labour market policies, and innovative tax- and transfer policies. International community should include distribution issues in their policy advice, avoid distributive distortions, support to reduce output volatility and increase external budgetary support.

Agénor (2003) examines the extent to which globalization affects the poor in developing countries. The focus is the channels through which trade openness and

financial integration may have adverse effect on poverty.<sup>1</sup> In cross country regression analysis relate globalization to poverty and control for various macroeconomic and structural variables. 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. Globalization and trade liberalization makes consumer price subsidies directed to reduction of poverty inefficient calling for removal or their reduction. Results from Tunisian food policy evaluation indicate that gradual subsidies removal would increase the relative position of non-subsidy products and affecting the low income groups (Dhehibi and Gil, 2003).

*Modes of globalization:*

Globalization has different dimensions with different impacts and can be looked at with different perspectives. James (2002) analysis the causes of globalization in terms of transaction costs and focuses on information and communication technologies and technical change and foreign investment deriving globalization and their application to developing problems in Africa. Bhagwati (2000) focuses on the trade and foreign direct investment. Globalization is both economically and socially benign, i.e. they can produce beneficial consequences for a variety of social objectives as a general tendency. Appropriate governance is needed to manage globalization and the speed at which must be pursued. There is disagreement about the effects of globalization on income distribution of countries. International trade theory implies that increased trade and foreign investment should make income distribution more equal in poor countries and less equal in rich countries. La Porta *et al.* (1999) examination shows that from the perspective of promoting development the performance and quality of government across countries varies in a systematic ways. Common law countries have better governments than French civil law or socialist law and protestants have better governments than Catholic or Muslim countries. Milanovic (2002) attempts to discern the effects of trade and foreign investment on relative income shares of low and high deciles using household budget surveys. The results show that the effects of openness on income distribution depend on the country's initial income level. At the very low levels the rich benefit, but the situation changes as income levels rises. Seshanna and Decornez (2003) find that during the last 40 years the world economy has become wealthier, more globally integrated but unequal and polarized sharpening the division between the rich and the poor countries.

The issues of economic globalization, domestic politics and income inequality in the developed countries is studied by Mahler (2001). The results from regression analysis show little evidence of a systematic relationship between any of the three main modes of economic globalization (trade, foreign direct investment and financial openness) and either of the distribution of disposable income or earnings of households. The overall conclusion is that integration into the world economy does not systematically lead to an integralitarian distribution of income or earnings across entire economies. The modes of globalizations are weakly and positively related to the fiscal redistribution in the countries studied. Empirics show that politics continues to play a critical role in determining distributive outcomes in the developed world. Economic globalization is compatible with a wide variety of political interactions leading to a wide range of distributive outcomes.

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<sup>1</sup> For another comprehensive analysis of globalization, growth and poverty see Dollar and Collier (2001).

*Influences of globalization:*

In their study 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. Theory suggests that globalization will have very different implications for within-country inequality, depending on the dimension of globalization involved, on the country concerned, and on the distribution of endowments. The world economy has become more globally integrated that can be interpreted as globalization has raised inequality between-nations. The direction of impacts on the within-country inequality depends on participating country's changes in their policy to exploit it. In their view, the net impact of globalization is too small to explain the long-run rise in world inequality since 1800. The source of inequality in a globalized world with vast regions with inferior education and chaotic institutions could be poor government and non-democracy not globalization. See also Aghion and Williamson (1998) on the link between inequality and growth focusing on the causes of wage and income inequality in developed economies.

Based on exploring the components of inequality, the sources and degree of globalization, and the historical time path, Lindert and Williamson (2001) classified the influence of globalization on inequality into five conclusions. The conclusions are in part based on regression of normalized inequality for unskilled workers on real wage, migration impact, and trade variables. First, the widening income gaps between countries that integrated into the world economy have probably been reduced. Second, within labour-abundant countries, emigration and opening up to international trade before 1914 lowered inequality. Third, within labour-scarce countries, immigration opening up to international trade raised inequality. Fourth, accounting for all international and intra-national effects, more globalization has reduced inequality. Fifth, a complete global integration does not make inequality vanish, but inequality is lower under integration than segmentation. The source of future inequality would be poor government and non-democracy in lagging countries, rather than globalization. Williamson (1996) concludes that evidence shows that globalization had the same impact on income distribution in the late nineteenth and in the late twentieth centuries, inequality rose in rich countries and fell in poor countries.

*Wage inequalities:*

Several scholars studied the wage links between globalization and inequality. The effects of globalization on the skill premium, unemployment, and countries social policies are addressed by Ethier (2002). Empirical literature concludes that trade has played a minor role than skill-biased technical change in the rise of skill premium. Here it is assumed that outsourcing and unskilled labour are highly substitutable and that the capital equipment and skilled labour complementary. Globalization offers a possible explanation to stylized facts in the above. Miller (2001) demonstrates that globalization explains a significant increase in earnings inequality from declining relative wages of unskilled workers in the US since the late 1970s. Most of the increase in wage inequality results from changes in the structure of production, in part by outsourcing involving moving unskilled-intensive production process to low-income countries. Miller finds that halting globalization will do little to offset the rising inequality that has already occurred. Eckel (2003) in analysing the role of wage rigidities in labour market

adjustment to international trade and biased technological progress show that changes in relative wages are independent of wage rigidities, but wage inequality is affected by capital market integration. Manasse and Turrini (2001) studies the effects of globalization on income inequality by looking at trade integration in the form of lower transportation costs, and improved production and communication technologies improving the quality of products and rising consumer satisfaction. In the first case, redistribution from non-exporting to exporting firms and changing demand for skill results in income inequality. In the latter, the effect is ambiguous. Globalization although welfare improving, is likely to raise inequality. Redistribution, rather than protection should be the answer.

*Governing globalization:*

A number of measures could reduce the negative impacts of the rapid globalization process. The current system is incapable of dealing with the problems surfaced. Nayyar and Court (2002) in their policy brief summarize the results from a major WIDER project on governing globalization, where they identify the main ways in which the governance needs of the world economy and policy can be strengthened. A new created structure of governance, reform of existing and new institutions are proposed to better protect the interest of the poorer developing countries. Addison and Rahman (2002) identify that geographical characteristics, institutional and political factors, economic policy and histories matter for individual country's capacity to globalize. Chirathivat and Murshed (2001) argue that in addition to globalization and openness, the domestic institutional capacities in Southeast Asia were inadequate to cope with the influx of capital to prevent the recent Asian crisis.

*Critiques on globalization:*

Bordo, Eichengreen and Irwin (1999) in their comparison of economic integration today and pre 1914 for trade and finance conclude that the world today is different. Commercial and financial integration before the First World War was more limited but trade tensions and financial instability not worsened in recent years. This is explained by the institutional innovations and their stabilizing role. However, the threats are real and pressing especially for smaller, more open and lower-income countries. In a critical paper Sutcliffe and Glyn (1999) finds globalization widely misinterpreted and its quantitative extent and novelty exaggerated. They criticize the research on the basis of the use of inappropriate statistical measures, and conclusions drawn from little data, failure to make historical comparisons and to see counter-globalization tendencies. Analysis based on trade, direct investment, multinational corporations activities, national and global production volumes suggests that globalization is neither new nor so great as is often supposed.

The recent literature on Economic Geography considers globalization as the catalyst for structural change (Peri 2003). Decrease in transport costs triggers the emergence of agglomeration economies generate increasing returns by factor relocation, concentration of production in one sector, or in one location a source of within country inequality. Transportation plays a dualistic role as a pro-active agent of globalization and as a beneficiary of its development. However, regional inequalities in accessibility, standardization and multi-modal transport and governance of global transportation limits the globalization opportunities (Janelle and Beuthe, 1997). The growth of information technology service sector (Zagler 2003) and reduced manufacturing sector

in the new economy also affects productivity growth, and inequality within and between countries. Pieterse (2000) argues that globalization involve a trend towards human integration, but that this is a long-term, uneven and paradoxical process. In the global human condition, widening human cooperation and deepening inequality go together. Ravallion (2003) offers a non-technical commentary of the conceptual and methodological differences underlying the debate on globalization. In line with Sen (2002) the concern is the continuing deprivations and rising disparities in levels of living. Ravallion suggests that before the quantification of the effects one must first be clear about the concept to be measured and the measurement choice does matter. The conceptual differences carry considerable weight for the position one take in the debate. Lack of distinction between inequality between and within countries, differences in underlying assumptions made in measurement, and data are among sources of conflicting claims.

In studying the link between the type of export and inequality Calderón and Chong (2001) finds that primary export countries, of which most are developing ones, are associated with an increase in inequality, while manufacturing export ones, of which most are developed, are linked with decreasing inequality. Despite the increasing inequality, Mayer (2001) finds that globalization has improved access to new technologies and provide unique opportunities for low income countries to raise their incomes. The countries differ by technology upgrading and skill accumulation of the domestic labour force (see also Meyer, 1999).

*Summary:*

In summary, theoretical research on the link between globalization and world inequality and channels through which it affects inequality has been intense. Three main approaches are distinguished. The Neoclassical growth theory predicts convergence because of increase mobility of capital. The endogenous growth theory predicts less convergence or divergence because of increasing return to technological innovation in developed countries. The dependency approach predicts that divergence is more likely because of differential in benefits from economic integration and trade and locked production structure in less developed countries. Based on LIS data there is little evidence of a systematic relationship between three modes of globalization namely trade, FDI and financial openness and either the distribution of disposable income or earnings of households. Integration into the world economy does not lead to integralitarian distribution of income or earnings across entire economies. Globalization has increased the between country inequality, but it does not explain the long-run rise in the world income inequality. Inequality is lower under integration than segmentation. The within country distributive outcome can not fully be linked to globalization. Rising the within country inequality can be explained by the countries inferior education, chaotic institutions, poor governments and non-democratic domestic (re)distributive politics.

### **3. A COMPOSITE GLOBALIZATION INDEX**

An important research issue could be along the lines with creation of a comprehensive globalization database and the construction of a composite but also decomposable index of globalization.

### 3.A The Kearney index

Kearney (2002 and 2003) is the first attempt to construct a database and to compute a composite globalization index. The index is a simple combination of forces driving the integration of ideas, people, and economies worldwide. It is composed of four major components: economic integration, personal contact, technology and political engagement, each generated from a number of determinant variables. The total number of variables used in computation of the globalization index is 13.<sup>2</sup>

The index quantifies economic integration by combining data on four key variables namely trade, foreign direct investment, portfolio capital flows, and income payments and receipts. It gauges technological connection by accounting for internet users, internet host, and secure servers. The index assesses political engagement by taking stock of the number of international organization and UN Security Council missions in which each country participates and the number of foreign embassies that each country hosts. Personal contact is charted by looking at a country's international travel and tourism, international telephone traffic, and across-borders money transfers. The globalization index (GINDEX) is based on normalization of individual variables and subsequent aggregation using an ad hoc weighting system as follows:

$$(1) \quad GINDEX_{it} = \sum_{j=1}^J \omega_j \sum_{m=1}^M \omega_m \frac{X_{jmit} - X_{jmt}^{\min}}{X_{jmt}^{\max} - X_{jmt}^{\min}} \quad || \quad ||$$

where  $i$  and  $t$  indicate country and time periods,  $m$  and  $j$  are within and between major component variables,  $\omega_m$  are the weights attached to each contributing  $X$ -variable within a component,  $\omega_j$  are weights attached to each component,  $min$  and  $max$  are minimum and maximum values of respective variables across countries in a given year. The index is similar to a commonly used human development index. The human development index is based on educational attainment, life expectancy and real GDP per capita.<sup>3</sup>

### 3.B The Principal Component index

In calculation of the Kearney (2002 and 2003) the globalization index described above, the component's weights are chosen on an ad hoc basis. We consider this index as a basic or benchmark index. In the basic index each of the 13 determinants of the index are given equal weight ( $w=1$ ). In the alternative case, a number of variables were given double weights ( $w=2$ ). Ideally the weights should differ by countries and over time.

An alternative approach could be to use principal component ( $PC$ ) or factor analysis to compute an index of globalization. In this paper we adopt the principal component approach.  $PC$  analysis is a multivariate technique for examining relationships among several quantitative variables. It was originated by Pearson (1901) and further developed by Hotelling (1933).  $PC$  analysis has been used in many areas such as computation of environmental index (Kang 2002). Recently, Agénor (2003) used trade

<sup>2</sup> The total number of variables is 36 including year of observation, country and country codes. The remaining variables reflect the direction of: trade, FDI, travel, portfolio investment and international calls.

<sup>3</sup> For a review of the Human Development Index, its components, criticisms on the index, alternative indices and suggestions for some improvements, see Noorbakhsh (1998).

and financial openness to compute a simple globalization index based on principal component analysis.

Given a data set 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 covariance matrix. The eigenvectors are taken with unit length. The principal components are sorted by descending order of the eigenvalues, which are equal to the variance of the components. The first (last) component has the largest (smallest) variance of any unit length linear combination of the determinant variables. This method gives a least square solution to the following model:

$$(2) \quad Y_{it} = X_{1it}\beta_1 + X_{2it}\beta_2 + \dots + X_{Jit}\beta_J + e_{it}$$

where  $X$  is the matrix of  $J$  factor scores,  $\beta_j$  is the factor pattern and  $e$  residuals. Here we minimize the sum of all the squared residuals, distances from the point to the first principal axis. In the least squares case the vertical distance to the fitted line is minimized.

The two globalization indices indicate which countries have become most globalized and quantifies the state of inequality in globalization among countries and regions. It shows how globalization has developed for different countries and regions over time. A breakdown of the index into major components provides possibilities to identify sources of globalization. This information is valuable to be associated with economic policy measures to bring about desirable changes in the national and international policies. The indices as shown later can also be used to study the causal relationship between globalization, inequality, growth and a number of other (macroeconomic) variables frequently found in the inequality and growth literature like poverty, openness, wages and liberalization.

#### 4. THE DATA

The database created by the A. T. Kearney/Foreign Policy Magazine (2002, 2003)<sup>4</sup> is the first and unique database of this kind to serve as a basis for computation of a Globalization Index. This data is a small balanced panel data covering 62 countries observed for the period of 1995-2001. The data originally has been collected from national sources and is obtained from international organizations and financial institutions such as World Bank (WB), International Monetary Fund (IMF) and International Telecommunication Union (ITU). Several variables are prior to their receipt normalized by the source. Existing gaps in the data in forms of missing observations or units are filled by Kearney from other sources like the Economist Intelligence Unit (EIU) and Netcraft.com. All data on Taiwan is obtained from the EIU.

The data contains a number of variables on economic integration, personal contacts, technology, political engagement and supplemental data. These are expected to proxy the channels through which globalization affects world inequality. As indicated earlier

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<sup>4</sup> The data sources are available at Web sites: [www.foreignpolicy.com](http://www.foreignpolicy.com) and [www.atkearney.com](http://www.atkearney.com).

these channels are identified by commodity price equalization, factor price convergence and dynamic convergence in per capital income growth towards the steady state.

The data on economic integration consists of 4 variables: trade, foreign direct investment, portfolio capital flows, and income payments and receipts. The data is originated from the IMF and International Financial Statistics (IFS) Database. All four variables are given as share of Gross Domestic Products (GDP). The trade variable includes total trade and measured as sum of goods (imported and exported) and services (credits and debits). Foreign direct investment (FDI) is measured as aggregate in and outflows of FDI. Portfolio flows is measured as the sum of portfolio inflows and outflows. The last variable income payments and receipts include compensation of non-resident employees and income earned and paid on assets held abroad.

The second component on personal contact consists of 3 variables: international telephone traffic, international travel and tourism, and transfer payments and receipts. The telephone traffic variable is defined as per capita sum of in and outgoing calls. It is obtained from ITU and World Telecommunication Indicators Database. The travel and tourism variable is defined as the sum of travellers in and out from a country as a share of its population. It originates from World Development Indicators and World Tourism Organization. The receipts of transfer and payments are obtained from IMF. It is measured as the sum of in and out-transfers payments as a share of GDP produced.

The technology component builds on three variables: internet users, internet hosts and secure internet servers. This component is very much of internet specific and not reflecting technology in a broad meaning. The first two variables are obtained from ITU and World Telecommunication Indicators Database, while secure internet servers are obtained from Netcraft.com surveys. Internet user variable is measured as a share of population, while internet hosts and secured servers are measured in per capita.

The last component on political engagement is based on three variables including the number of embassies in the country, number of membership in international organizations, and number of participation in UN Security Council missions during a calendar year. These are obtained from the Europe World Yearbook, Central Intelligence Agency and UN sources. In similarity with the technology component, the political component is to be considered as a poor proxy of political perspectives of globalization.

The supplementary data on population and GDP are taken from World Development Indicators and the US Census Bureau, International database. A summary statistics of the variables is given in Table 1.

From the Table 1 we observe large variations among variables underlying calculation of the index and its components. The distribution of the index components is not uniform. This is in particular evident in the case of technology component with large dispersion and the sample mean is significantly higher than the median. In the case of political component the mean and median values overlap. The range of principal-component-based index differs from those of Kearney-based weighted and unweighted indices.

Correlation coefficients among various index components are presented in Table 2. As expected the various components are positively and mostly significantly correlated 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 weighted and unweighted globalization indices are not correlated with time. Application of different weights does not change much the rank of the countries. The overall index is much dominated by political and economic integration.<sup>5</sup>

## 5. VARIATIONS IN THE GLOBALIZATION INDEX

### 5.A Country heterogeneity in globalization

Using the formula in equations (1) and (2), the two globalization indices are computed for each of the 62 countries and 6 years of observation. Following the Kearney's approach a number of economic, personal and technology factors are given higher weights than others (see Table 1). The countries are ranked by the heterogeneously weighted index in descending order. For matters of sensitivity analysis the Kearney index as a benchmark model is computed with equal weights as well. In order to conserve space we have reported the mean of the three indices by country and these together with mean Gini and most recent years of Gini coefficient in Table 3.A.

The results show that Iran, Peru, Ukraine, Colombia and Uganda are ranked at least globalized countries compared to Ireland, Singapore, Switzerland, Sweden and Canada ranked as the five most globalized countries. Croatia, Egypt and Nigeria are among the averaged globalized countries. Iran's low rank is due to the consequences of the long period of engagement in war with Iraq and the ongoing economic embargo, resulting in a very low economic, personal and technology components contributions to the overall index. Internal and external conflicts seem effectively reducing countries' globalization process. Taiwan is ranked as the 55<sup>th</sup> globalized country despite its high economic development. The low rank is due to political and personal factors with limited possibilities for the country to affect. The highly ranked countries are sharing similar patterns in the various components distribution. Minor deviations are the low economic factor in the case of Canada and low political factor in the case of Singapore. Several exceptions can be found like Russian Federation. Russia is allocated a very high political factor which is crucial for its rank (30) and France ranked as 14 has also the highest political factor. The same is true in the case of China by their participation in Security Council missions and a high number of embassies round the world but ranked at 42<sup>nd</sup> position.

Unlike the Kearney-based indices the principal-component-based index is positively correlated (0.29) over time. It is highly correlated with weighted technological (0.73) and personal (0.72) components and with the other two Kearney unweighted (0.88) and weighted (0.88) indices. For details please see Table 2.<sup>6</sup>

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<sup>5</sup> Personal and technology variables very likely cause the economic component. Alternative combinations of the factors into economic and non-economic components should be possible. Investigation of the nature of their causality relationship is outside the scope of this study.

<sup>6</sup> For the principal component analysis we identified three eigenvalues exceeding one; 4.5862, 2.6419 and 1.3622. The proportion 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. In order to conserve space the results from principal component analysis for each component separately are not reported here. Those can be obtained from the author open request.

The rank of countries by their degree of globalization changes somewhat based on the method of principal component analysis (Table 3.A). Among the 10 most globalized countries Canada 5 (6) and Netherlands 6 (5) switch their positions. The same applies to Norway 7 (8) and US 8 (7). The number after the countries indicate their positions based on the Kearney weighted index, while the number in parenthesis indicates positions based on the principal component index. Transition of the least globalized countries is somewhat higher than the most globalized ones. Ideally one should report the transition steps over time for the selected index in forms of a transition matrix. Later we will discuss changes in the indices over time. Here the focus is on comparing mean ranks of different indices.

### **5.B Regional heterogeneity in globalization**

The mean globalization by regions is presented in Table 3.B. The ranking of regions differs by whether identical or different weighting system is applied. As a result of attaching a higher weight to technology factor, the sub-Saharan Africa with relative low technology component switches its position with East Asia to a lower rank. Based on equal weights, the South Asian region is identified as the least globalized region. The low level of globalization is very much determined by the absence of technology factor. This picture is shared with the sub-Saharan African region.

The ranking based on the principal component analysis is similar to that of the Kearney-based weighted index. An exception is switching position between the Middle East and North Africa (-0.569) and Latin American (-0.438) regions.

The Latin America and Middle East and North Africa regions are allocated a medium average level of globalization. However, they differ by index components. For instance, the Latin American's are advantageous in economic integration, while the Middle East and North African countries are enjoying better personal contacts and a higher technology transfers. In terms of political engagements they share however a very close position.

The East Asian region shows a high economic integration and technology transfer, but countries' globalization found to be limited by their relatively low personal contacts and political engagements. The East European region is showing progress in all four factor fronts, but yet low technology transfer. They have not been able to attract foreign investors or benefits from relocation of plants and production in response to their low wages despite a relatively highly educated labour force.

The West European and South East Asian regions are taking the positions of the highest globalized economic and geographic regions. The economic integration component for the South East Asian region is higher, while the remaining three (in particular technology and political) components is higher in the West European case. The South East Asian countries differ by the degree of globalization. The index for Singapore is four times that of Thailand caused mainly by the economic integration component. Similar large dispersion is found among countries in the West European region,<sup>7</sup> where Ireland receives a score that is 10 times higher than that of lowest ranked Greece.

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<sup>7</sup> In order to reduce the number of regions to a manageable level given the small sample size, Australia, Japan, USA and Canada are included as part of the West European region.

Surprisingly Japan is placed next lowest. Its score is determined by the low levels of economic integration and personal components.

### **5.C The development of globalization over time**

Based on the individual country and time-varying index observations we have computed the mean index and its components for each year of observation from 1995 to 2000. These are reported in Table 3.C. Ideally this should be weighted by the countries share of aggregate GDP (or population) to provide a more accurate picture of the temporal changes in the global globalization process and the changes from selected index be shown in a transition matrix. Despite the weighting limitation and the short period of observation yet it provides a partial picture of the development and distribution of the globalization index. In terms of total GDP produced, size of population and total trade, the included countries provide a satisfactory coverage of the globalization. Major economies and countries are included in the relatively small sample.

The unweighted economic integration component is increasing during 1995 to 1997 from 0.73 to 0.86. It declines sharply to 0.60 in 1998 and remains below this level until year 2000. The principal-component-based index is continuously increasing over time. It is to be preferred as it is not restricted by assumption of same weights or different weights chosen arbitrarily. The personal contact picks in 1999. It varies in the interval 0.50 and 0.61 with no systematic trend. The technology component is continuously increasing over time from 0.27 to 0.44. The political component is constant over time and as expected does not change over the short period of time.

The unweighted aggregated four components increase between 1995 and 1997. It declined in 1998 and remained at the low level rest of the time. The time pattern of the index is largely influenced by the economic integration. Similar patterns is found when the economic integration, personal contact and technology transfer sub-components are given different weights.

The average annual changes in the index components and composite indices reported in Table 3.D confirms the discussion in the above about the temporal development of the variables. However, the mean percentage annual changes calculated for each country and over time are much higher than percentage changes calculated based on annual means. In the latter case the variations among countries is neglected. The neglected between country variation is quite high as share of the total variation. Presence of extreme observations<sup>8</sup> increases the percentage changes and the discrepancy between the two measures. Due to the increasing patterns of the principal component index over time, its percent changes over time are all positive. The highest rates are found to be associated to 1995/96 and 1997/98.

## **6. THE LINK BETWEEN GLOBALIZATION AND INCOME INEQUALITY**

Income inequality from a country perspective may depend on a number of internal and external factors. Globalization is one main external factor.

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<sup>8</sup> Outlier or extreme observations include some transition countries (Czech Republic), countries engaged in war (Iran) or countries with unstable economies (Turkey).

## 6.A Specification of the relationship

The link between globalization, income inequality and growth has for years been the focus of many researchers attention.<sup>9</sup> 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 main modes of globalization (trade, FDI and financial openness) the lack of a globalization index has not allowed estimation and testing of the relationship statistically. In this section we aim to do that by the means of simple regression analysis. The model is written as:

$$(3) \quad GINI_i = \beta_0 + \beta_1 GINDEX_i + \sum_j \gamma_j REGION_{ji} + u_i$$

where *GINI* and *GINDEX* refer to Gini coefficient and Globalization index, *REGION* is a *J* vector of regional dummies, *u* an error term and the subscript *i* refers to country. Since the two data sets, Kearney and WIID, do not overlap we were forced as a second best alternative to use a cross sectional approach in establishing the 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 later 146 countries are observed non-consecutively on an irregular basis. With the exception of a number of industrialized countries the WIID sample countries are observed with long interruption in the individual country time series.

The Gini coefficient is a standard measure of income inequality. It is given as a means 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 in two different ways here. First, the most recent observation (often 1996 to 1998) is used in the cross sectional regression analysis. A number of countries (16) are observed prior to 1995. The second definition is used to avoid non-overlapping inequality and WIID data sets and averaging out possible measurement errors. Here instead of the last year of observation we use the mean Gini by country for all years a country is observed as part of the WIID database. The degree of over and underestimation of income inequality due to trends in individual countries inequality over the long period is against the use of this approach.<sup>10</sup>

The globalization index is defined in three different ways, the unweighted and weighted Kearney-based indices and principal-component-based index. In the unweighted case all 13 underlying factors are given identical weights ( $w=1$ ). The assumptions of equal weights are very strong and have major implications for the index, its interpretation and ranking of countries. In order to avoid the assumption of equal weights, a number of factors on an ad hoc basis are given double weights ( $w=2$ ). Here we follow the Kearney's approach. These include foreign direct investment, portfolio investment, international telephone traffic and internet users. The principal component index is

<sup>9</sup> This study is limited to the relationship between inequality and globalization. However, the model can be extended to incorporate simultaneous inequality-growth-globalization relationship.

<sup>10</sup> A third possible measure could be a population-weighted measure of inequality. In such case all variations among countries are eliminated. There is no use of such adjustment in cross sectional analysis. The adjustment of Gini is based on the country's share of total population of all countries observed in a given year. Non-consecutive observation of countries with extremely large population makes the aggregate population to fluctuate largely making the population adjustment not accurate or probably less meaningful.

based on the first principal component of the same 13 factors. It varies across countries and over time.

Since we use a cross sectional regression analysis, it has not been possible to identify unobservable country specific effects. However, in addition to the globalization index we have added a number of dummy variables representing unobservable regional effects.<sup>11</sup> These capture regional heterogeneity in income inequality. If income inequality differs systematically among the regions or it is affected differently as consequences of the globalization, then the dummies will pick up such effects. We observe similar patterns regardless of the type of globalization index and whether any weights are used or not.

## 6.B The empirical relationship

The estimation results from regression of Gini coefficient on globalization index, when Gini is defined as the most recent year of observation is reported in Table 5.A. Results based on alternative definition where Gini is defined as mean income inequality over time is reported in Table 5.B. The Gini data are taken from the WIID database. Regression results from the three Gini measures on principal component measures of globalization are presented in Table 5.C.

For the matters of sensitivity analysis a number of alternative specification of the simple relationship (equation 3) is estimated. In the basic model in Table 5.A (Model A1) variations in income inequality is explained by aggregate unweighted globalization index. The coefficient is negative and statistically highly significant. It indicates a negative relationship between the level of globalization and income inequality. However, due to the cross sectional nature of the sample it does not show how globalization as process affects inequality among countries. The same relationship applies when globalization is differently weighted (Model A9). F-test values indicate that aggregate globalization index as relevant explanatory variable. However, globalization explains only 11 percent of the variations in income inequality among the 60 countries.<sup>12</sup> This is in the line with Lindert and Williamson (2001) who found the net impact of globalization too small to explain the long-run rise in world inequality.

A decomposition of the composite globalization index into its four ( $m$ ) sub-components results in the following model formulation:

$$(4) \quad GINI_i = \beta_0 + \sum_m \beta_m GINDEX_{mi} + \sum_j \gamma_j REGION_{ji} + u_i.$$

The results (Models A2 to A5) show that economic integration and political engagements individually do not explain any of the variations in income inequality.<sup>13</sup> However, simultaneous inclusion of the four components (Model A6) indicates that

<sup>11</sup> The countries are grouped into the following 8 regions: Middle East & North Africa, East Asia, South East Asia, South Asia, Latin America, sub-Saharan Africa, East Europe & former Soviet Republics, and West Europe. The latter with minor exceptions is equivalent of the OECD.

<sup>12</sup> The income inequality variable for South Africa and Morocco is missing. These two countries are excluded from the regression analysis.

<sup>13</sup> Agénor (2003) found significant inverted U-shape relationship between globalization and poverty. The index of globalization was based on trade and financial integration. The index is similar to our economic integration component.

personal contacts and technology transfers reduce inequality, while economic integration increases inequality. Political engagement is found to have no significant effects. Personal contact is the single component contributing mostly to the explanation of inequality variations. Economic integration and personal contacts are correlated (Table 4) causing difficulties in separating the two effects.

To control for regional heterogeneity we added 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 globalization index is weighted (Model A10) but the coefficient of determination increases to 0.69. However, the globalization index turns out to be insignificant. Inferior education, chaotic institutions, poor government and non-democracy could be main sources of inequality, than globalization (Lindert and Williamson, 2001). It should be noted that there is a risk that regional (effects) inequality and globalization are correlated biasing the effects of globalization on income inequality.

A further decomposition of the globalization index by its components (Model A8) shows that personal contact is a main contributing factor to the negative relationship. In a cross sectional case it is difficult to separate the effects of globalization from regional specific effects not necessarily associated with the inequality impacts of the globalization process. A possible solution to the confounded effects could be in the use of panel data to better be able to separate time and regional-invariant and time and regional-variant effects from each other.

Regression results corresponding to Models A1 to A8, based on alternative definition of inequality, where mean Gini over time is used are reported in Table 5.B and labelled as Models B1 to B8. The signs of coefficients are not changed. However, their significance and sizes in a number of cases are changed. The regional variables play even a more important role in the explanation of variation in inequality.

Regression results on the link between income inequality defined in two different ways and globalization computed using principal component method are presented in Table 5.C. As in the previous cases the results indicates a negative relationship between globalization and income inequality. The fit of the model is somewhat lower compared to the two Kearney indices. Here we cannot show differences in the direction of the impacts from a decomposition of the index into its four underlying components as the index is obtained from a simultaneous analysis of all 13 factors. Adding regional dummies to the relation produces similar results in terms of signs, significance and the size of effects. Again the globalization index turns out to be insignificant when regional dummies are added.

Our results are in the line with Mahler (2001) who using LIS data did found little evidence of a systematic relationship between the three main modes of economic globalization namely trade, outbound investment and financial openness and either of 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. The relationship between globalization and fiscal redistribution must be established and modelled to make such inference. Economic policy at country level continues to play an important role in redistributive outcomes. As noted by Lindert and Williamson (2001), the increased world income

inequality has been driven by between-nations inequality rather than within-country inequality.

### **6.C Guidelines to possible extensions**

It is to be noted that the results presented here are to be considered as primary and tentative. The results provide some initial support to the hypothesis on the existence of a (negative) relationship between inequality and globalization but several essential improvements are still necessary to confirm this finding. The first improvement should be along the globalization index itself. In current form it is just a partial index. The index should fully quantify globalization. Such index in addition to economic integration, personal contact, political engagement and technology transfer should incorporate several other relevant components. Among new components it is required to add some measure of cost-benefit ratio (analysis) of both micro and macro aspects of globalization effects, its impacts on standards of living in countries, environmental aspect of globalization, wage inequality, skill biased technological change, foreign trade volume and its direction, democracy and conflict, financial markets, access to information and flow and directions of movement of skilled labour between countries.

A specification, though based on a complete and representative index, still suffers from a number of problems like the directional of causality, simultaneity and bias due to omitted variables. Testing for poolability of the data and application of switching and non-linear regressions would be desirable to group countries into different classes of globalization levels. The current sample is dominated by industrialized countries with different relationships between development, redistribution and inequality than developing countries. The switching regression is important to account for differences in responsiveness by level of development, as there is indication that globalization enriches rich countries, at the expense of poor countries. Additional tests will have to focus in particular on: tackling the simultaneity problem and to control for growth issues as well as other left out components of globalization index. Non-linearity would also shed light on the inverted U-hypothesis about inequality-growth relationship conditional on globalization or inequality-globalization relationship.

The sample of countries should be expanded to include more developing and transition countries and ideally a panel data static and dynamic estimation approaches could be used. This will enable researchers to control for unobservable country specific effects and to model the temporal patterns of key variables like inequality, growth and globalization, country-specific rate of (skill-biased) rate of technological change. Access to panel data will also enable identification of globalization effects by comparison of performance of countries over time, before and after globalization and probably by the use of matching techniques. This will provide valuable information on globalization, its consequences and redistributive policies to counteract the negative impacts of globalization

Quantification of globalization is a new field and rather scarce. There is need to account for several dimensions and identify new ones and to test for their relevance in computation of an index of globalization. Measurement issues play an important role in empirical research. A new index would differ from the ones presented in the above in a number of ways. First, it would differ by incorporating more components and be modelled non-parametrically as well as parametrically where the weights are estimated rather than chosen on an ad hoc basis. Second, to compute disaggregated principal

components analysis and time-varying. Third, the index should be designed such that it can further be used for international, regional and within regional comparisons and in evaluation of the impact of globalization on the welfare of nations and sub-groups of population within countries and regions. Fourth, to perform sensitivity analysis of the composite index by examining functional forms and assessment and consistency of weights. These are important issues in the understanding of how globalization functions and as a guide to policy formulation and evaluations.

Identification of major determinants of globalization, quantification of their effects on countries ranking are key issues based on which policy options could be provided. Since rich countries benefit mostly from the fruits of globalization, developing countries need advantageous and non-protectionistic policies to effectively compete with developed countries. A careful analysis will help in identifying ways for a fair treatment of products, services and people that makes poor countries to a higher extent benefit from globalization.

Given our experience and discussion above a new database should be created. This new database could serve as a source for researchers conducting empirical research on globalization and its relation with other macro variables such as inequality in wages, income or health, poverty and economic growth. The modified composite globalization index will differ from the one above by incorporating more components like financial markets, institutions, environment, democracy and conflict and modelled non-parametrically as well as parametrically where the weights are estimated rather than chosen on an ad hoc basis. This will improve analysis of the determinants of globalization by paying more attention to measurement problems, data issues and data sources.

## 7. SUMMARY AND CONCLUSIONS

This study is concerned with the globalization index introduced by Kearney that quantifies the level and development of globalization process to rank countries by their degree of globalization. The index is composed of four components each generated from a number of variables identified as underlying causes. The components are economic integration, personal contact, technology and political engagements. The components show different developments over time. The economic integration component is increasing during 1995 to 1997. It declined sharply in 1998 and remained below the 1998 level until the year 2000. The personal contact picks in 1999 but with no systematic trend. The technology component is continuously increasing over time, while the political component is constant over time.

The results show that internal and external conflicts seem effectively reducing countries globalization perspectives. The low rank of countries is often associated with political and personal factors with limited possibilities for several developing countries to affect. The highly ranked countries are sharing similar patterns in the various components' distribution. The mean globalization by regions shows that technology factors play an important role in the ranking of regions. This breakdown of the index into major components provides possibilities to identify sources of globalization and associate it with economic policy measures to bring about desirable changes in the national and international policies.

In a regression analysis we investigate the relationship between inequality and globalization. The results show that our globalization index explains only 7-11 percent of the variations in income inequality among the countries. By decomposing the aggregate globalization index into four sub-components, results show that personal contacts and technology transfers reduce inequality, while economic integration increases inequality. Political engagement is found to have no significant effects on income inequality. In controlling for regional heterogeneity, we find that the regional variable plays an important role in the explanation of variation in inequality.

Although, the current version of the index quantify the level of globalization it has certain limitations. It is to be considered as a simple and partial measure. We have indicated a number of extensions to overcome several shortcomings. Those limitations concern incorporation of more components and the use of non-parametric and parametric estimation of the index to avoid the choice of weights attached to each index component on an ad hoc basis. The use of panel data will certainly shed light on the temporal patterns of globalization and its regional variability. These are important issues in the understanding of how globalization functions and how to use the generated information in policy formulation and development evaluations.

In view of all this, it must be noted that the simpler approach adopted here was mainly due to problems of data availability and at this stage difficulties in the interpretation of the results of a more complex specification. Globalization is considered as a possible source and deriving force of inequality differences across countries and over time. Identification and quantification of its effects will have values to policy-makers resource allocation. This research not only measures but also empirically links globalization to inequality. It is in an early stage of development but yet it has identified several directions along which future advances to be made.

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

Variable	Mean	Median	Std Dev	Minimum	Maximum
<u>A. Economic integration:</u>					
Trade	0.7774	0.6750	0.5053	0.1570	3.4750
Foreign direct investment (w=2)	0.0426	0.0285	0.0501	0.0000	0.3307
Portfolio investment (w=2)	0.0575	0.0229	0.1498	0.0000	1.6693
Income payments and receipts	0.0899	0.0604	0.0986	0.0055	0.7821
<u>B. Personal contacts:</u>					
International telephone traffic (w=2)	97.4325	44.2450	128.9096	0.9000	707.4600
International travel and tourism (w=1)	0.8056	0.3480	1.0561	0.0030	6.3610
Transfer payments and receipts (w=1)	0.0335	0.0266	0.0298	0.0000	0.1504
<u>C. Technology:</u>					
Internet users (w=2)	0.0639	0.0178	0.1011	0.0000	0.5944
Internet hosts (w=1)	0.0126	0.0016	0.0272	0.0000	0.2950
Secure internet servers (w=1)	0.0111	0.0010	0.0294	0.0000	0.2830
<u>D. Political engagements:</u>					
Embassies in country (w=1)	71.6129	68.5000	34.1968	13.0000	172.0000
Membership in intl org. (w=1)	48.8065	47.8000	10.3816	6.0000	77.0000
Particip. in UN SC missions (w=1)	0.2512	0.2220	0.2051	0.0000	0.7780
<u>1. Unweighted Kearney index components:</u>					
Economic integration	0.6770	0.5330	0.5850	0.0560	3.6580
Personal contacts	0.5570	0.4800	0.4270	0.0140	2.3470
Technology	0.3690	0.0880	0.5450	0.0000	2.6050
Political engagements	1.3770	1.3610	0.5400	0.0060	2.7010
Unweighted Globalization index	2.9800	2.4370	1.4200	1.0690	7.9780
<u>2. Weighted Kearney index components:</u>					
Economic integration	1.0070	0.7710	0.9130	0.0600	5.6580
Personal contacts	0.7240	0.5760	0.6160	0.0240	3.2780
Technology	0.5370	0.1480	0.7620	0.0000	3.2090
Weighted Globalization index	3.6460	2.8250	2.0350	1.1680	11.0550
<u>3. Principal Component Analysis:</u>					
First principal component index	0.0000	-0.4310	1.0000	-1.0290	5.2500
Second principal component index	0.0000	0.0950	1.0000	-4.2790	4.5530
Third principal component index	0.0000	0.0430	1.0000	-6.8100	3.7200

Table 2. Pearson Correlation Coefficients, N = 372.

	year	econom	economw	person	personw	techno	technow	politi	gindex	gindexw	princomp
year	1.0000										
economic	-0.1380 0.0076	1.0000									
economic_w	-0.1653 0.0014	0.9886 0.0001	1.0000								
personal	0.0399 0.4423	0.5871 0.0001	0.5589 0.0001	1.0000							
personal_w	0.0351 0.4992	0.6584 0.0001	0.6352 0.0001	0.9756 0.0001	1.0000						
technology	0.1150 0.0265	0.2906 0.0001	0.3151 0.0001	0.3446 0.0001	0.4524 0.0001	1.0000					
technology_w	0.1444 0.0053	0.2991 0.0001	0.3223 0.0001	0.3578 0.0001	0.4632 0.0001	0.9927 0.0001	1.0000				
political	0.0046 0.9282	0.0312 0.5475	0.0893 0.0854	0.0243 0.6403	0.0836 0.1073	0.3952 0.0001	0.3817 0.0001	1.0000			
gindex	0.0010 0.9832	0.7119 0.0001	0.7303 0.0001	0.6840 0.0001	0.7700 0.0001	0.7576 0.0001	0.7572 0.0001	0.5523 0.0001	1.0000		
gindex_w	-0.0082 0.8746	0.7630 0.0001	0.7852 0.0001	0.6863 0.0001	0.7832 0.0001	0.7550 0.0001	0.7607 0.0001	0.4738 0.0001	0.9909 0.0001	1.0000	
princomp	0.2946 0.0001	0.6395 0.0001	0.6420 0.0001	0.6327 0.0001	0.7227 0.0001	0.7127 0.0001	0.7283 0.0001	0.3947 0.0001	0.8774 0.0001	0.8842 0.0001	1.0000

Note: ...\_w indicates weighted index component. Principal component index (princomp) is based on the first principal component. p-values are given under the coefficients.

Table 3.A Globalization index by country, ranked by weighted index (gindexw).

Rank	country	econom	econow	person	persow	techno	technw	politi	gindex	gindexw	pccomp	pccrank	gini	mgini
1	Ireland	2.477	3.615	1.899	2.738	0.560	0.779	1.510	6.446	8.643	2.697	1	36.96	36.80
2	Singapore	2.729	3.947	1.551	2.530	0.920	1.365	0.734	5.935	8.575	2.152	2	38.11	42.49
3	Switzerland	1.545	2.432	1.746	2.677	0.999	1.339	1.689	5.979	8.137	2.022	3	33.10	33.20
4	Sweden	1.444	2.394	0.900	1.310	1.346	2.059	2.178	5.868	7.941	1.706	4	33.66	38.14
5	Canada	0.872	1.348	0.825	1.361	1.467	2.027	2.434	5.598	7.170	1.428	6	30.05	30.83
6	Netherlands	1.892	3.098	0.927	1.323	0.807	1.127	1.577	5.202	7.125	1.477	5	32.20	32.10
7	Norway	0.874	1.410	0.836	1.205	1.699	2.581	1.685	5.094	6.881	1.260	8	39.42	30.74
8	US	0.436	0.750	0.275	0.486	2.400	2.973	2.531	5.641	6.739	1.362	7	40.42	38.65
9	Finland	0.790	1.253	0.731	0.991	1.752	2.524	1.818	5.091	6.586	1.231	9	31.50	29.33
10	Denmark	1.242	1.825	1.000	1.421	0.903	1.359	1.925	5.069	6.529	1.199	10	35.52	34.04
11	Austria	0.890	1.372	1.272	1.733	0.761	1.126	2.081	5.005	6.313	1.104	11	26.50	25.91
12	UK	1.265	1.924	0.545	0.875	0.736	1.050	2.181	4.727	6.030	0.983	12	37.27	30.87
13	New Zealand	0.603	0.907	0.699	1.133	1.311	1.729	1.144	3.757	4.913	0.652	13	30.33	45.61
14	France	0.683	1.131	0.479	0.708	0.302	0.473	2.564	4.028	4.875	0.574	15	32.70	38.14
15	Portugal	0.883	1.435	1.008	1.203	0.335	0.598	1.404	3.630	4.641	0.170	19	35.60	36.26
16	Germany	0.712	1.162	0.472	0.716	0.513	0.793	1.960	3.657	4.631	0.449	16	31.78	31.67
17	Australia	0.535	0.883	0.354	0.535	1.309	1.712	1.396	3.594	4.526	0.427	17	44.60	37.68
18	Czech Rep.	0.833	1.189	1.281	1.400	0.225	0.347	1.410	3.749	4.346	0.591	14	23.90	23.22
19	Italy	0.649	1.048	0.544	0.694	0.210	0.333	2.096	3.499	4.171	0.073	23	31.21	35.68
20	Spain	0.635	1.051	0.676	0.825	0.297	0.444	1.530	3.139	3.850	0.104	22	23.70	30.93
21	Malaysia	1.159	1.500	0.642	0.751	0.145	0.261	1.244	3.190	3.756	0.153	21	48.50	47.71
22	Panama	1.943	2.607	0.322	0.415	0.039	0.061	0.642	2.947	3.725	0.196	18	52.03	49.22
23	Hungary	0.898	1.320	0.690	0.794	0.165	0.253	1.283	3.036	3.650	0.154	20	25.30	24.61
24	Israel	0.547	0.757	0.999	1.306	0.536	0.739	0.764	2.847	3.566	-0.101	24	38.20	32.70
25	Poland	0.412	0.639	0.565	0.632	0.124	0.214	1.891	2.991	3.376	-0.103	25	32.70	26.60
26	Argentina	0.473	0.829	0.091	0.124	0.056	0.090	1.981	2.600	3.024	-0.286	28	46.66	51.79
27	Japan	0.284	0.419	0.073	0.119	0.549	0.906	1.496	2.403	2.940	-0.266	27	24.90	35.53
28	Greece	0.223	0.310	0.861	1.075	0.154	0.256	1.278	2.515	2.919	-0.331	29	32.70	41.56
29	Chile	0.784	1.326	0.197	0.251	0.106	0.178	1.124	2.211	2.879	-0.266	26	55.51	50.93
30	Russian Fed	0.322	0.461	0.090	0.115	0.032	0.056	2.168	2.613	2.801	-0.444	34	39.57	34.14
31	Saudi Arab-	0.518	0.737	0.959	1.065	0.009	0.018	0.979	2.464	2.799	-0.682	52	.	.
32	Nigeria	0.617	0.819	0.305	0.307	0.001	0.001	1.653	2.576	2.781	-0.410	32	50.30	43.20
33	Egypt	0.242	0.321	0.496	0.511	0.005	0.010	1.904	2.647	2.747	-0.582	43	28.90	33.72
34	Croatia	0.547	0.788	0.873	1.164	0.111	0.180	0.594	2.125	2.727	-0.421	33	30.06	25.68
35	Korea Rep.	0.478	0.730	0.258	0.313	0.322	0.597	1.058	2.116	2.698	-0.469	35	31.60	34.18
36	Botswana	0.811	0.930	1.153	1.224	0.017	0.029	0.477	2.458	2.659	-0.524	38	52.30	53.90
37	Slovenia	0.510	0.634	0.490	0.717	0.514	0.767	0.500	2.014	2.618	-0.359	30	29.69	25.66
38	Slovak Rep.	0.631	0.820	0.412	0.512	0.209	0.370	0.875	2.127	2.576	-0.376	31	23.70	21.99
39	Tunisia	0.441	0.554	0.507	0.556	0.005	0.010	1.288	2.241	2.407	-0.519	37	40.41	44.92
40	Mexico	0.550	0.835	0.235	0.314	0.041	0.068	1.122	1.947	2.340	-0.508	36	51.97	51.08
41	Pakistan	0.186	0.247	0.378	0.385	0.001	0.001	1.674	2.238	2.307	-0.675	51	31.20	34.26
42	China	0.393	0.647	0.043	0.047	0.009	0.017	1.577	2.022	2.289	-0.617	44	40.30	29.35
43	Senegal	0.350	0.456	0.535	0.555	0.003	0.006	1.263	2.151	2.279	-0.685	53	41.30	49.96
44	Venezuela	0.467	0.713	0.102	0.133	0.038	0.067	1.312	1.919	2.226	-0.528	39	47.24	42.90
45	SouthAfrica	0.507	0.844	0.123	0.155	0.145	0.230	0.985	1.759	2.215	-0.635	47	59.00	54.89
46	India	0.166	0.286	0.215	0.216	0.004	0.008	1.697	2.082	2.208	-0.667	49	35.45	34.55
47	Indonesia	0.451	0.619	0.069	0.072	0.006	0.012	1.492	2.018	2.195	-0.572	42	35.27	36.36
48	Kenya	0.196	0.209	0.495	0.500	0.003	0.005	1.459	2.153	2.173	-0.774	58	51.00	60.69
49	Philippine	0.802	1.086	0.161	0.185	0.013	0.025	0.876	1.852	2.172	-0.564	40	47.90	46.94
50	Romania	0.345	0.503	0.303	0.339	0.044	0.079	1.207	1.899	2.128	-0.624	45	36.37	26.38
51	Thailand	0.647	0.898	0.133	0.149	0.021	0.036	1.034	1.835	2.117	-0.569	41	41.75	45.03
52	Bangladesh	0.076	0.092	0.414	0.414	0.000	0.000	1.609	2.099	2.116	-0.769	57	38.80	37.68
53	Brazil	0.258	0.467	0.045	0.056	0.059	0.091	1.464	1.825	2.078	-0.629	46	58.84	54.99
54	Turkey	0.260	0.345	0.278	0.318	0.036	0.062	1.301	1.875	2.026	-0.667	50	45.62	49.21
55	Taiwan	0.530	0.740	0.372	0.502	0.427	0.725	0.010	1.339	1.977	-0.647	48	31.70	33.04
56	Sri Lanka	0.406	0.528	0.597	0.612	0.006	0.011	0.721	1.730	1.872	-0.851	59	34.40	40.40
57	Morocco	0.234	0.249	0.599	0.634	0.003	0.005	0.953	1.789	1.841	-0.863	60	.	.
58	Uganda	0.221	0.354	0.824	0.824	0.001	0.002	0.619	1.664	1.799	-0.992	62	39.20	37.19
59	Colombia	0.347	0.590	0.133	0.163	0.031	0.056	0.962	1.472	1.770	-0.732	54	57.10	51.79
60	Ukraine	0.349	0.444	0.240	0.273	0.010	0.017	1.033	1.632	1.766	-0.750	55	32.94	28.43
61	Peru	0.342	0.547	0.159	0.182	0.021	0.039	0.899	1.422	1.668	-0.754	56	49.00	49.46
62	Iran	0.085	0.087	0.049	0.057	0.002	0.005	1.055	1.191	1.203	-0.953	61	42.90	45.59

Note: w at the end of a variable indicates weighted index component. The principal component index (pccomp) is based on the first principal component. Gini and mgini are the last period and mean period Gini coefficients.

Table 3.B Globalization index by region, ranked by descending order of weighted globalization index.

Region	Econo. weighted	Econo. weighted	Person. weighted	Person. weighted	Techn. weighted	Techn. weighted	Political	GIndex	GIndex	Principal
West Europe	0.947	1.488	0.806	1.156	0.921	1.309	1.824	4.497	5.778	0.916
South East Asia	1.158	1.610	0.511	0.737	0.221	0.340	1.076	2.966	3.763	0.120
East Europe	0.539	0.755	0.549	0.661	0.159	0.253	1.218	2.465	2.887	-0.259
Middle E&NAfrica	0.374	0.494	0.640	0.732	0.099	0.141	1.198	2.311	2.564	-0.569
Latin America	0.645	0.989	0.161	0.205	0.049	0.081	1.188	2.043	2.464	-0.438
East Asia	0.467	0.706	0.225	0.287	0.253	0.446	0.881	1.826	2.321	-0.578
sub-Saharan Africa	0.450	0.602	0.572	0.594	0.028	0.045	1.076	2.127	2.318	-0.670
South Asia	0.184	0.248	0.331	0.337	0.003	0.005	1.351	1.868	1.941	-0.783

Table 3.C Globalization index over time.

Year	Econo. weighted	Econo. weighted	Person. weighted	Person. weighted	Techn. weighted	Techn. weighted	Political	GIndex	GIndex	Principal
1995	0.726	1.120	0.522	0.682	0.266	0.364	1.380	2.893	3.546	-0.340
1996	0.760	1.156	0.576	0.745	0.316	0.450	1.374	3.026	3.725	-0.280
1997	0.861	1.313	0.522	0.677	0.349	0.492	1.359	3.091	3.841	-0.157
1998	0.595	0.865	0.543	0.715	0.404	0.585	1.388	2.929	3.553	0.021
1999	0.545	0.762	0.612	0.790	0.441	0.662	1.380	2.978	3.595	0.235
2000	0.577	0.828	0.566	0.736	0.438	0.669	1.381	2.961	3.614	0.521

Table 3.D Percentage change in globalization index over time.

Year	Econo. weighted	Econo. weighted	Person. weighted	Person. weighted	Techn. weighted	Techn. weighted	Political	GIndex	GIndex	Principal
1995/1996	10.07	11.51	18.80	15.70	74.23	74.20	-0.02	5.43	6.15	45.08
1996/1997	16.93	19.52	-8.05	-8.05	32.25	27.12	-0.33	2.53	3.77	18.90
1997/1998	-28.19	-30.18	3.27	3.99	56.89	59.28	2.20	-5.23	-7.17	28.85
1998/1999	-9.41	-13.53	16.96	14.81	52.85	55.74	0.67	1.82	0.80	19.48
1999/2000	9.06	13.07	-6.79	-6.52	29.65	30.95	0.63	-0.55	0.41	19.54

Table 4. Pearson correlation coefficients, N=60-62.

	gini	mgini	econom	person	techno	politi	gindex	gindexw	princomp
gini	1.0000								
mgini	0.8411 0.0001	1.0000							
economic	-0.0654 0.6193	-0.0825 0.5306	1.0000						
personal	-0.3736 0.0033	-0.2981 0.0207	0.6482 0.0001	1.0000					
technology	-0.2249 0.0385	-0.2731 0.0347	0.3658 0.0035	0.3506 0.0052	1.0000				
political	-0.2249 0.0840	-0.2082 0.1103	0.0392 0.7620	0.0243 0.8510	0.4074 0.0010	1.0000			
gindex	-0.3261 0.0110	-0.3053 0.0177	0.7294 0.0001	0.6909 0.0001	0.7826 0.0001	0.5622 0.0001	1.0000		
gindexw	-0.3141 0.0145	-0.2982 0.0206	0.7741 0.0001	0.6989 0.0001	0.7866 0.0001	0.4876 0.0001	0.9921 0.0001	1.0000	
princomp	-0.3024 0.0189	-0.2924 0.0234	0.8031 0.0001	0.6894 0.0001	0.7652 0.0001	0.4525 0.0002	0.9786 0.0001	0.9899 0.0001	1.0000

Note: p-values are given under the coefficients. Gindexw indicates weighted globalization index. The principal component index (princomp) is based on the first principal component. Gini and mgini are the last period and mean period Gini coefficients.

Table 5.A Least squares parameter estimates of the link between most recent years of Gini coefficient and Kearney globalization index.

Explanatory variables	Unweighted globalization index								Weighted globaliz. index	
	Model A1	Model A2	Model A3	Model A4	Model A5	Model A6	Model A7	Model A8	Model A9	Model A10
Intercept	45.8642 a	37.5410 a	34.2443 a	34.8352 a	38.4699 a	33.1074 a	34.1586 a	32.4836 a	45.2898 a	39.4501 a
Log globalization index	-7.4923 a						-0.6478 .	-	-	-
Log global. index weighted							-	-	-6.9937 a	-3.4690 .
Log economic integration		-1.2966 .				5.6459 a		2.2652 .	-	-
Log personal contact			-4.2817 a			-4.9815 a		-3.4258 a	-	-
Log technology				-1.4236 a		-1.5797 a		0.9266 .	-	-
Log political engagement					-0.6328 .	-0.5762 .		0.2540 .	-	-
Middle East & North Africa							4.6848 .	9.2010 b	-	3.4092 .
East Asia							0.7517 .	-0.0385 .	-	-5.8351 .
South East Asia							8.7789 a	8.3152 b	-	7.5161 b
South Asia							2.7820 .	7.7295 c	-	0.8502 .
Latin America							18.5843 a	17.3636 a	-	13.2485 a
sub-Saharan Africa							15.1725 a	20.7833 a	-	12.7544 a
East Europe							-3.1218 .	-1.1671 .	-	-9.1353 a
West Europe(reference)							-	-	-	-
R-square adjusted	0.1119	-0.0068	0.1804	0.1026	-0.0145	0.2650	0.6381	0.6823	0.0952	0.6870
F-value	8.4300 a	0.6000 .	13.9800 a	7.6300 a	0.1500 .	6.2300 a	14.000 a	12.3200 a	7.2000 a	17.1900 a
RMSE	8.6873	9.2495	8.3457	8.8074	9.2851	7.9709	5.5458	5.2403	8.7734	5.1599
Number of observations	60	60	60	59	60	59	59	59	60	60

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

Table 5.B Least squares parameter estimates of the periods mean Gini coefficient and Kearney unweighted globalization index.

Explanatory variables	Model B1	Model B2	Model B3	Model B4	Model B5	Model B6	Model B7	Model B8
Intercept	45.3279 a	37.0677 a	35.1122 a	34.6584 a	38.4625 a	33.5454 a	40.4570 a	34.4025 a
Log globalization index	-6.9450 a					-	-3.9352 .	-
Log economic integration		-2.0444 .				3.1425 .	-	-1.6489 .
Log personal contact			-3.3687 a			-3.1366 b	-	-1.2446 .
Log technology				-1.5000 a		-1.5194 b	-	0.8357 .
Log political engagement					-0.6325 .	-0.4916 .	-	-0.5138 .
Middle East & North Africa						-	3.0800 .	6.3293 c
East Asia						-	-5.9775 .	-4.5869 .
South East Asia						-	7.0789 b	10.1603 a
South Asia						-	0.4034 .	4.7272 .
Latin America						-	12.5126 a	15.0133 a
sub-Saharan Africa						-	12.5341 a	17.5498 a
East Europe						-	-10.7333 a	-8.2671 a
West Europe (reference)						-	-	-
R-square adjusted	0.0918	0.0082	0.1023	0.1128	-0.0146	0.1427	0.7129	0.7118
F-value	6.9600 a	1.4900 .	7.7200 a	8.3700 a	0.1500 .	3.4100 b	19.3200 a	14.0200 a
RMSE	8.8877	9.2877	8.8363	8.8593	9.3939	8.7086	4.9966	5.0492
Number of observations	60	60	60	59	60	59	59	59

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

Table 5.C Least squares parameter estimates of the link between the Gini and principal component globalization indices.

Explanatory variables	Dep. variable is Last year Gini		Dep. variable is period mean Gini	
	Model C1	Model C2	Model C3	Model C4
Intercept	38.4299 a	32.9729 a	38.4209 a	35.8406 a
Principal component globalization index	-3.1456 b	0.2568 .	-3.0770 b	-1.2632 .
Middle East & North Africa	-	5.4308 .	-	3.7066 .
East Asia	-	1.7087 .	-	-4.3802 .
South East Asia	-	9.3033 a	-	8.0168 a
South Asia	-	3.7795 .	-	1.6664 .
Latin America	-	19.4381 a	-	13.8757 a
sub-Saharan Africa	-	16.0495 a	-	13.2845 a
East Europe	-	-2.4331 .	-	-9.8667 a
West Europe (reference)	-	-	-	-
R-square adjusted	0.0758	0.6380	0.0697	0.7053
F-value	5.8400 b	14.0000 a	5.4200 b	18.6500 a
RMSE	8.8622	5.5466	8.9951	5.0630
Number of observations	60	60	60	60

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