

# DOES REGIONAL INTEGRATION MATTER FOR INCLUSIVE GROWTH? EVIDENCE FROM THE MULTIDIMENSIONAL REGIONAL INTEGRATION INDEX

*Cyn-Young Park and Racquel Claveria*

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# Does Regional Integration Matter for Inclusive Growth? Evidence from the Multidimensional Regional Integration Index

Cyn-Young Park and Racquel Claveria

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## ABSTRACT

This paper employs a multidimensional approach to gauge the degree of regional integration and analyze impact on growth, inequality, and poverty. It constructs a multidimensional regional integration index (MDRII) series that embodies six key facets of regional integration: (i) trade and investment, (ii) money and finance, (iii) regional value chains, (iv) infrastructure and connectivity, (v) movement of people, and (vi) institutional and social integration. The MDRII confirms that regional integration is most advanced in the European Union which scores high in all six dimensions; Asia comes second with the largest contribution from infrastructure and connectivity. Empirical analysis suggests significant and positive development impact of regional integration even when trade and financial openness is controlled. The regional value chain, movement of people, and institutional and social integration dimensions have been significant drivers of economic growth. Infrastructure and connectivity improve income distribution. Overall integration alongside the dimensions of trade and investment, money and finance, and institutional and social integration appear to significantly and robustly reduce poverty.

*Keywords:* composite index, economic growth, inequality, poverty, regional integration

*JEL codes:* C38, C43, F15, O11

## I. INTRODUCTION

Regional integration has been pursued as a useful development strategy to promote economic growth and reduce poverty and income inequality for more than half a century in many parts of the world. In Europe, the history of regional integration can be traced to the creation of the European Coal and Steel Community in 1952 and has since gradually and steadily progressed to build the European Union (EU) with the Maastricht Treaty in 1993. In the 1960s, a wave of regionalism led to the establishment of various regional institutions across developing regions, with the founding of the Central African Customs Union in 1964 in Africa, the Association of Southeast Asian Nations in 1967 in Asia, and, in Latin America, the Central American Common Market in 1960 and the Andean Pact in 1969.

There is substantial literature, both theoretical and empirical, that has investigated the role that regional integration plays in advancing development goals. The mechanisms through which regional integration influences growth, inequality, and poverty have often centered on the advantages of economies of scale in common markets and production networks, as well as technology diffusion and knowledge spillovers, which free trade and investment flows are deemed to generate. In addition, the impact of regional integration on income inequality and poverty may rest on whether higher growth brought about by greater regional integration is accompanied by jobs for low-skilled labor and economic opportunities for low-income groups. Traditional trade theory (Heckscher–Ohlin and Stolper–Samuelson) suggests that for lower-income countries, which tend to have abundant unskilled labor, greater market integration through trade liberalization raises the wages of unskilled workers relative to those of skilled workers.

Empirically, a number of studies have tried to estimate the impact of regional integration on growth, poverty, and inequality. These studies typically either employed proxies/dummies or constructed measures of regional integration, such as participation in trading blocs, share of intraregional trade to total trade and reduction, or elimination of tariffs. For instance, some studies used membership in regional trade agreements, intraregional trade share, or average tariffs based on most-favored-nation status as measures of regional integration to find the statistical link between regional integration and growth to be either significantly positive (such as in DiCaprio, Santos-Paulino, and Soklova 2017; Bong and Premaratne 2018; Mann 2015; and Kamau 2010) or inconclusive (Vamvakidis 1998, Tumwebaze and Ijjo 2015, and Te Velde 2011). DiCaprio, Santos-Paulino, and Soklova (2017) constructed indexes for internal and external exposure to specific regional groupings based on membership in regional trade agreements and found that regional integration leads to lower within-country inequality in member countries. Similarly, both Beckfield (2006) and Piotrowska (2008) utilized intraregional trade share as a measure for regional economic integration in Europe to investigate the relationship between regional economic integration and inequality. However, the former obtained a significant positive link between regional economic integration and inequality, while the latter found that regional integration did not considerably explain the variation in income distribution in the region.

More broadly, earlier studies have attempted to establish a link between trade openness and economic growth. Although it is rather widely believed that international trade promotes economic growth, empirical evidence on the openness and growth nexus has been elusive. While quite a few studies showed a positive relationship between trade openness and economic growth (Dollar 1992; Dollar and Kraay 2004; Edwards 1992, 1993; Frankel and Romer 1999; Harrison 1996; Harrison and Hanson 1999; and Sachs and Warner 1995), their results were often subject to serious econometric (often endogeneity or missing variables) issues and data problems. Many also adopted some openness

measures, often based on trade volumes and policies, to test the relationship between openness and growth. Harrison (1996) employed seven different measures of openness using proxies for trade and exchange rate policies and showed a positive relationship between openness and growth. Sachs and Warner (1995) also constructed a composite index to measure openness based on trade reforms. However, these indexes were questioned for their robustness. Admittedly, there is no perfect measure of openness that captures “true” openness independent of other economic policies and reforms.

To the best of our knowledge, this is the first paper to explore the impact of regional integration on growth, inequality, and poverty using a broad-based index of regional integration and its subindexes, while comparing the role of regional integration with that of trade openness. We seek to contribute to the literature on the link between regional integration and the attainment of development goals of higher growth, and lower poverty and inequality by employing a composite index as well as six dimensional subindexes that capture the multidimensional nature of regional integration.

Our approach to regional integration is different from the usual openness measure. Regional economic integration is a multidimensional process extending beyond the efforts to liberalize trade. There are various facets of regional integration process, including promoting trade and investment, facilitating movement of capital across borders, building and developing regional value chains, enhancing infrastructure and connectivity, improving people’s mobility, strengthening the provision of regional public goods, and providing the legal and institutional basis for international policy cooperation. Considering only one dimension in empirical analysis, such as trade, may not fully capture the impact of regional integration in promoting economic growth and reducing poverty and inequality. Moreover, better understanding of the dimensions of regional integration and how they impact development goals provides meaningful policy advice on what dimensions to focus on in pursuing regional integration as a development strategy.

This paper therefore constructs a composite index of regional integration that captures its dynamic and multifaceted nature to investigate how various aspects of regional integration, individually and collectively, have evolved and impacted on economic growth, income inequality, and poverty. Our multidimensional regional integration index (MDRII) comprises six dimensional indexes based on 26 indicators to capture the contributions of six different aspects of regional integration: (i) trade and investment, (ii) money and finance, (iii) regional value chains, (iv) infrastructure and connectivity, (v) movement of people, and (vi) institutional and social integration. Albeit not exhaustive, the MDRII embodies the key facets of regional integration.

The rest of the paper is structured as follows: Section II details the construction of the MDRII. Section III lays out the empirical methodology to estimate the impact of regional integration on growth, inequality, and poverty using MDRII. Section IV presents and discusses the empirical results. Section V shows robustness checks. Section VI concludes with policy implications.



## II. CONSTRUCTION OF THE MULTIDIMENSIONAL REGIONAL INTEGRATION INDEX

In this section, we detail the construction of the multidimensional regional integration index (MDRII) that captures the multifaceted nature of regional integration. The MDRII embodies six socioeconomic dimensions that are fundamental to regional integration. Our methodology draws on Huh and Park (2017, 2018) as extended by Park and Claveria (2018) to cover panel data (the Appendix details the imputation methodology for missing variables). We apportion 26 indicators to measure different aspects of regional integration across these six dimensions in two steps: (i) to compute six dimensional subindexes and (ii) to utilize these subindexes to construct the overall index.

Table 1 lays out the indicators by dimension and provides data sources. In general, we make use of bilateral data to compile ratios of intraregional activity to total activity. There are three exceptions: II-d (pairwise correlation of equity returns) takes the difference between the regional and global averages of pairwise correlations of equity returns, and IV-c (Logistic Performance Index) and IV-d (Doing Business Index) are based on national rather than bilateral data.

The MDRII covers 156 economies from Asia, the EU, Latin America, and Africa for 2006–2016 (see Table 2). The treatment of missing data is described in the Appendix.

### A. Normalization

Because measurement units differ across indicators, normalization is required prior to aggregation of the indicators. We employ panel min–max scaling to maintain time consistency of the index. Specifically, each individual indicator  $x_{qc}^t$  of type  $q$  for a country  $c$  and time  $t$ , is transformed into:

$$I_t = \frac{x_{qc}^t - \min_{t \in T} \min_c(x_q^t)}{\max_{t \in T} \max_c(x_q^t) - \min_{t \in T} \min_c(x_q^t)}$$

where the minimum and maximum values for each indicator are calculated across countries and time. The values of  $I_t$  range from 0 to 1, with higher values denoting greater integration. For indicators where higher values of the original variable imply lower integration, such as II-c (pairwise dispersion of deposit rates), III-b (average trade concentration ratio) and IV-a (average trade cost ratio), the transformation is given as:

$$I_t = 1 - \frac{x_{qc}^t - \min_{t \in T} \min_c(x_q^t)}{\max_{t \in T} \max_c(x_q^t) - \min_{t \in T} \min_c(x_q^t)}$$

Hence, the minimum and maximum for each indicator are calculated across countries and time to account for the evolution of the indicators and the resulting composite index. This is also referred to as worldwide normalization.

One of the drawbacks of min–max scaling is that extreme values could distort the distribution of normalized values. This could also understate/overstate the resulting composite index. To prevent outliers from exerting undue influence over the normalized indicators and the composite index, we adjusted the normalized indicators according to the inclusive percentile ranking of the raw values of the indicators.

Table 1: Multidimensional Regional Integration Index, Indicators and Data Sources

Dimension	Indicator		Data sources
I. Trade and investment integration	I-a	Proportion of intraregional goods exports to total goods exports	International Monetary Fund (IMF). Direction of Trade Statistics. <a href="http://www.imf.org/en/Data">www.imf.org/en/Data</a> .
	I-b	Proportion of intraregional goods imports to total goods imports	
	I-c	Intraregional trade intensity index	
	I-d	Proportion of intraregional foreign direct investment (FDI) inflows to total FDI inflows	fDi Market (Greenfield FDI); and Zephyr Merger and Acquisitions Database.
	I-e	Proportion of intraregional FDI inflows plus outflows to total FDI inflows plus outflows	
II. Money and finance integration	II-a	Proportion of intraregional cross-border equity liabilities to total cross-border equity liabilities	IMF. Coordinated Portfolio Investment Survey. <a href="http://cpis.imf.org">http://cpis.imf.org</a> .
	II-b	Proportion of intraregional cross-border bond liabilities to total cross-border bond liabilities	CEIC; Haver Analytics; and IMF. International Financial Statistics. <a href="http://www.imf.org/en/Data">www.imf.org/en/Data</a> .
	II-c	Pairwise dispersion of deposit rates averaged regionally relative to that averaged globally	
	II-d	Pairwise correlation of equity returns averaged regionally minus that averaged globally	Bloomberg; Bourse Régionale des Valeurs Mobilières <a href="http://www.brvm.org">http://www.brvm.org</a> ; CEIC; Eastern Caribbean Securities Exchange. <a href="http://www.ecseonline.com/">http://www.ecseonline.com/</a> ; Haver Analytics; South Pacific Stock Exchange. <a href="http://www.spse.com.fj">http://www.spse.com.fj</a> ; and USZE Exchange (Uzbekistan). <a href="https://www.uzse.uz/">https://www.uzse.uz/</a> .
III. Regional value chain	III-a	Ratio between average trade complementarity index over regional trading partners and average trade complementarity index over all trading partners	United Nations Conference on Trade and Development (UNCTAD). UNCTADstat. <a href="http://unctadstat.unctad.org/EN/">http://unctadstat.unctad.org/EN/</a> .
	III-b	Ratio between average trade concentration index over regional trading partners and average trade concentration index over all trading partners	
	III-c	Proportion of intraregional intermediate goods exports to total intraregional goods exports	United Nations. Commodity Trade Database. <a href="https://comtrade.un.org/">https://comtrade.un.org/</a> .
	III-d	Proportion of intraregional intermediate goods imports to total intraregional goods imports	
IV. Infrastructure and connectivity	IV-a	Ratio between average trade cost over regional trading partners and the average trade cost over all trading partners	World Bank and United Nations Economic and Social Commission for Asia and the Pacific. Trade Costs Database. <a href="http://www.databank.worldbank.org">www.databank.worldbank.org</a> .
	IV-b	Ratio between average liner shipping connectivity index over regional trading partners and average liner shipping connectivity index over all trading partners	UNCTAD. UNCTADstat. <a href="http://unctadstat.unctad.org/EN/">http://unctadstat.unctad.org/EN/</a> .
	IV-c	Logistics Performance Index (overall)	World Bank. Logistics Performance Index. <a href="http://ipi.worldbank.org">ipi.worldbank.org</a> .
	IV-d	Doing Business Index (overall)	World Bank. Doing Business 2016. <a href="http://www.doingbusiness.org">http://www.doingbusiness.org</a> .
V. Movement of people	V-a	Proportion of intraregional outbound migration to total outbound migration	United Nations Department of Economic and Social Affairs Population Division. International Migration Stock 2015. <a href="http://www.un.org/en">http://www.un.org/en</a> .
	V-b	Proportion of intraregional tourists to total tourists (inbound plus outbound)	World Tourism Organization. 2016. Tourism Statistics Database.
	V-c	Proportion of intraregional remittances to total remittances	World Bank. Migration and Remittances Data <a href="http://www.worldbank.org">http://www.worldbank.org</a> .
	V-d	Proportion of other Asian countries that do not require an entry visa	International Air Transport Association. <a href="http://www.iata.org">www.iata.org</a> ; national sources; Wikipedia. <a href="https://en.wikipedia.org">https://en.wikipedia.org</a> .
VI. Institutional and social integration	VI-a	Proportion of other Asian countries that have signed free trade agreements	Design of Trade Agreements (DESTA). <a href="http://www.designoftradeagreements.org">www.designoftradeagreements.org</a> .
	VI-b	Proportion of other Asian countries that have an embassy	The Europa World Yearbook 2016. Europa Publications.
	VI-c	Proportion of other Asian countries that have signed business investment treaties	DESTA. <a href="http://www.designoftradeagreements.org">www.designoftradeagreements.org</a> ; UNCTAD. Bilateral Investment Treaties. <a href="http://investmentpolicyhub.unctad.org">http://investmentpolicyhub.unctad.org</a> .
	VI-d	Proportion of other Asian countries that have signed double taxation treaties	UNCTAD. 2016. Country specific list of double taxation treaties. <a href="http://investmentpolicyhub.unctad.org">http://investmentpolicyhub.unctad.org</a> .
	VI-e	Cultural proximity with other Asian countries relative to that with all other countries	Centre d'Etudes Prospectives et d'Informations Internationales. <a href="http://www.cepii.fr">www.cepii.fr</a> .

Source: Authors' compilation.

Table 2: Multidimensional Regional Integration Index Economy Coverage

Asia (48)	European Union (27)	Latin America (32)	Africa (49)
<b>Central Asia</b>	Austria	Antigua and Barbuda	Algeria
Armenia	Belgium	Argentina	Angola
Azerbaijan	Bulgaria	Bahamas, The	Benin
Georgia	Cyprus	Barbados	Botswana
Kazakhstan	Czech Republic	Belize	Burkina Faso
Kyrgyz Republic	Denmark	Bolivia	Burundi
Tajikistan	Estonia	Brazil	Cameroon
Turkmenistan	Finland	Chile	Cape Verde
Uzbekistan	France	Colombia	Central African Republic
<b>East Asia</b>	Germany	Costa Rica	Chad
China, People's Rep. of	Greece	Dominica	Comoros
Hong Kong, China	Hungary	Dominican Republic	Congo, Democratic Republic of
Japan	Ireland	Ecuador	Congo, Republic of
Korea, Rep. of	Italy	El Salvador	Cote d'Ivoire
Mongolia	Latvia	Grenada	Djibouti
Taipei, China	Lithuania	Guatemala	Equatorial Guinea
<b>Southeast Asia</b>	Luxembourg	Guyana	Eritrea
Brunei Darussalam	Malta	Haiti	Ethiopia
Cambodia	Netherlands	Honduras	Gabon
Indonesia	Poland	Jamaica	Gambia, The
Lao People's Democratic Rep.	Portugal	Mexico	Ghana
Malaysia	Romania	Nicaragua	Guinea
Myanmar	Slovak Republic	Panama	Guinea-Bissau
Philippines	Slovenia	Paraguay	Kenya
Singapore	Spain	Peru	Lesotho
Thailand	Sweden	St. Kitts and Nevis	Liberia
Viet Nam	United Kingdom	St. Lucia	Madagascar
<b>South Asia</b>		St. Vincent and the Grenadines	Malawi
Afghanistan		Suriname	Mali
Bangladesh		Trinidad and Tobago	Mauritius
Bhutan		Uruguay	Morocco
India		Venezuela	Mozambique
Maldives			Namibia
Nepal			Niger
Pakistan			Nigeria
Sri Lanka			Rwanda
<b>Pacific</b>			Sao Tome and Principe
Cook Islands			Senegal
Fiji			Seychelles
Kiribati			Sierra Leone
Marshall Islands			South Africa
Micronesia, Fed. States of			Sudan
Nauru			Swaziland
Palau			Tanzania
Papua New Guinea			Togo
Samoa			Tunisia
Solomon Islands			Uganda
Timor-Leste			Zambia
Tonga			Zimbabwe
Tuvalu			
Vanuatu			
<b>Oceania</b>			
New Zealand			

Note: Number of countries in parentheses.

Source: Authors' compilation.

Table 3: General Data Availability and Imputation of Missing Values of Indicators

Dimension	Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
I. Trade and investment integration	I-a Proportion of intraregional goods exports to total goods exports											
	I-b Proportion of intraregional goods imports to total goods imports											
	I-c Intraregional trade intensity index											
	I-d Proportion of intraregional foreign direct investment (FDI) inflows to total FDI inflows											
	I-e Proportion of intraregional FDI inflows plus outflows to total FDI inflows plus outflows											
II. Money and finance integration	II-a Proportion of intraregional cross-border equity liabilities to total cross-border equity liabilities											
	II-b Proportion of intraregional cross-border bond liabilities to total cross-border bond liabilities											
	II-c Pairwise dispersion of average regional deposit rates relative to average global deposit rates											
	II-d Pairwise correlation of average regional equity returns minus average global equity returns											
III. Regional value chain	III-a Ratio between average trade complementarity index over regional trading partners and average trade complementarity index over all trading partners											
	III-b Ratio between average trade concentration index over regional trading partners and average trade concentration index over all trading											
	III-c Proportion of intraregional intermediate goods exports to total intraregional goods exports											
	III-d Proportion of intraregional intermediate goods imports to total intraregional goods imports											
IV. Infrastructure and connectivity	IV-a Ratio between average trade cost over regional trading partners and average trade cost over all trading partners											
	IV-b Ratio between average liner shipping connectivity index over regional trading partners and average liner shipping connectivity index over all trading partners											
	IV-c Logistics Performance Index (overall)											
	IV-d Doing Business Index (overall)											

continued on next page

Table 3 continued

Dimension	Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
V. Movement of people	V-a Proportion of intraregional outbound migration to total outbound migration	Blue	Blue	Blue	Blue	Light Green	Blue	Blue	Blue	Blue	Light Green	Yellow
	V-b Proportion of intraregional tourists to total tourists (inbound plus outbound)	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Yellow
	V-c Proportion of intraregional remittances to total remittances	Red	Red	Red	Red	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
	V-d Proportion of other Asian countries that do not require an entry visa	Red	Red	Red	Red	Red	Red	Light Green	Light Green	Light Green	Yellow	Yellow
VI. Institutional and social integration	VI-a Proportion of other Asian countries that have signed free trade agreements	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
	VI-b Proportion of other Asian countries that have an embassy	Red	Red	Red	Red	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Yellow
	VI-c Proportion of other Asian countries that have signed business investment treaties	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
	VI-d Proportion of other Asian countries that have signed double taxation treaties	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
	VI-e Cultural proximity with other Asian countries relative to that with all other countries	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green

Legend: ■ Data available ■ Used latest available data ■ Used earliest available data ■ Used average of available data for even years before and after ■ Linearly interpolated  
 Source: Authors' compilation.

## B. Weighting and Aggregation

Panel principal component analysis (PCA) is performed to compute the weights for each component to aggregate them into a single composite index. PCA is particularly appropriate when each indicator measures different aspects of a composite index. It is also recommended when each dimension is based on a small number of indicators (that is, 3–10). Several tests, as suggested in OECD (2008), König (2017) and Ye and Mikic (2016), indicate the appropriateness of using PCA in constructing a multidimensional composite index. In particular, the Cronbach coefficient alpha (or c-alpha), a coefficient of reliability based on correlation among individual indicators, is computed as 0.81, higher than the acceptable reliability threshold of 0.7. A high c-alpha indicates that the individual indicators are measuring the same underlying phenomenon. Moreover, the Kaiser–Meyer–Olkin measure of sampling adequacy is estimated at 0.74, well above the prescribed value of 0.5, showing that our individual indicators share enough common factors. Finally, the results of the Bartlett’s sphericity test (Chi square: 3,145.9; p-value: 0.00) rejects the null hypothesis that the individual indicators are uncorrelated, that is, the correlation matrix is an identity matrix.

Panel PCA is carried out as follows: Let  $X_{TxQ} = (x_1^t, x_2^t, \dots, x_Q^t)$  be a multidimensional data vector,  $t \in T$ , where  $T$  is the total number of periods and  $Q$  is the number of indicators (dimensions). Let  $\Sigma_{Q \times Q}$  be the correlation matrix of  $X_{TxQ}$ . The principal component (PC),  $Z_i^t, i = 1, 2, \dots, Q, t \in T$ , is defined as:

$$\begin{aligned} Z_1^t &= a_{11}x_1^t + a_{12}x_2^t + \dots + a_{1Q}x_Q^t \\ Z_2^t &= a_{21}x_1^t + a_{22}x_2^t + \dots + a_{2Q}x_Q^t \\ &\dots \\ Z_Q^t &= a_{Q1}x_1^t + a_{Q2}x_2^t + \dots + a_{QQ}x_Q^t \end{aligned}$$

Or in matrix form,  $Z = A'X_{TxQ}$  where  $A = (a_1, a_2, \dots, a_Q)$ . The coefficient matrix  $A$  maximizes the variance of  $Z = E(ZZ') = A' \Sigma A$  subject to the following constraints:

$$a_1'a_1 = a_2'a_2 = \dots = a_Q'a_Q = 1 \text{ (unit vector length) and}$$

$$\text{cov}(a_i'x, a_j'x) = 0, i \neq j \text{ (orthogonality condition)}$$

The solution to the eigenvalue–eigenvector problem resulting from the above constrained maximization problem is  $\lambda_i$ , which is equal to the variance of  $Z$ . Moreover,  $\lambda_1 > \lambda_2 > \dots > \lambda_Q$ .

Using the loadings obtained from the panel PCA, we compute for the weights to be apportioned to the indicators in each dimension to construct the six dimensional subindexes.<sup>1</sup> Then, panel PCA is applied again to weight the subindexes to compile the overall index. Table 4 summarizes the weights derived from panel PCA for each region.

<sup>1</sup> Huh and Park (2017, 2018) details the weighting scheme using the loadings derived from the panel PCA.

Table 4: Multidimensional Regional Integration Index Panel Principal Component Analysis-Derived Weights—  
Asia, European Union, Latin America, and Africa

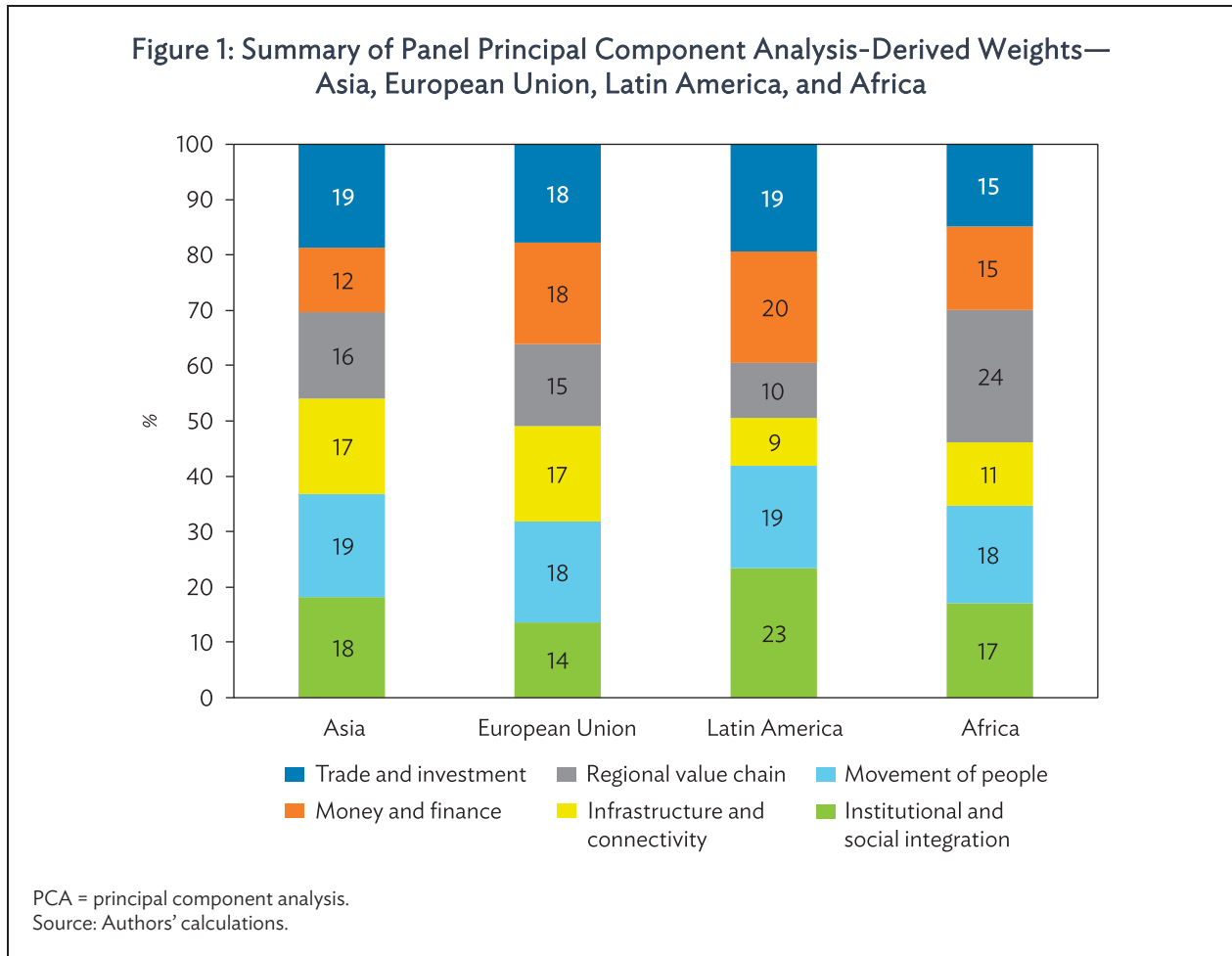
Dimensions and Subdimensions		Asia	EU	LA	Africa
<b>I. Trade and investment integration</b>		<b>0.187</b>	<b>0.177</b>	<b>0.194</b>	<b>0.148</b>
I-a	Proportion of intraregional goods exports to total goods exports	0.180	0.163	0.174	0.149
I-b	Proportion of intraregional goods imports to total goods imports	0.188	0.176	0.185	0.148
I-c	Intraregional trade intensity index	0.219	0.224	0.218	0.231
I-d	Proportion of intraregional foreign direct investment (FDI) inflows to total FDI inflows	0.208	0.221	0.212	0.236
I-e	Proportion of intraregional FDI inflows plus outflows to total FDI inflows plus outflows	0.206	0.216	0.211	0.236
<b>II. Money and finance integration</b>		<b>0.116</b>	<b>0.183</b>	<b>0.201</b>	<b>0.151</b>
II-a	Proportion of intraregional cross-border equity liabilities to total cross-border equity liabilities	0.237	0.275	0.221	0.285
II-b	Proportion of intraregional cross-border bond liabilities to total cross-border bond liabilities	0.258	0.237	0.291	0.298
II-c	Pairwise dispersion of deposit rates averaged regionally relative to that averaged globally	0.245	0.329	0.264	0.247
II-d	Pairwise correlation of equity returns averaged regionally minus that averaged globally	0.260	0.159	0.224	0.170
<b>III. Regional value chain</b>		<b>0.156</b>	<b>0.148</b>	<b>0.099</b>	<b>0.239</b>
III-a	Ratio between the average trade complementarity index over regional trading partners and the average trade complementarity index over all trading partners	0.243	0.285	0.264	0.272
III-b	Ratio between the average trade concentration index over regional trading partners and the average trade concentration index over all trading partners	0.226	0.218	0.235	0.266
III-c	Proportion of intraregional intermediate goods exports to total intraregional goods exports	0.316	0.247	0.207	0.291
III-d	Proportion of intraregional intermediate goods imports to total intraregional goods imports	0.215	0.250	0.294	0.170
<b>IV. Infrastructure and connectivity</b>		<b>0.172</b>	<b>0.172</b>	<b>0.086</b>	<b>0.115</b>
IV-a	Ratio between the average trade cost over regional trading partners and the average trade cost over all trading partners	0.225	0.256	0.264	0.260
IV-b	Ratio between the average liner shipping connectivity index over regional trading partners and the average liner shipping connectivity index over all trading partners	0.216	0.258	0.192	0.221
IV-c	Logistics Performance Index (overall)	0.286	0.234	0.259	0.245
IV-d	Doing Business Index (overall)	0.273	0.252	0.285	0.274
<b>V. Free Movement of people</b>		<b>0.186</b>	<b>0.182</b>	<b>0.185</b>	<b>0.176</b>
V-a	Proportion of intraregional outbound migration to total outbound migration	0.248	0.229	0.242	0.218
V-b	Proportion of intraregional tourists to total tourists (inbound plus outbound)	0.244	0.199	0.297	0.354
V-c	Proportion of intraregional remittances to total remittances	0.209	0.271	0.158	0.270
V-d	Proportion of other Asian countries that do not require an entry visa	0.299	0.300	0.303	0.158
<b>VI. Institutional and social integration</b>		<b>0.182</b>	<b>0.136</b>	<b>0.234</b>	<b>0.171</b>
VI-a	Proportion of other Asian countries that have signed free trade agreements	0.173	0.200	0.230	0.097
VI-b	Proportion of other Asian countries that have an embassy	0.199	0.200	0.224	0.129
VI-c	Proportion of other Asian countries that have signed business investment treaties	0.199	0.200	0.206	0.273
VI-d	Proportion of other Asian countries that have signed double taxation treaties	0.213	0.200	0.141	0.255
VI-e	Cultural proximity with other Asian countries relative to that with all other countries	0.216	0.200	0.199	0.246

EU = European Union, LA = Latin America, PCA = principal component analysis.

Source: Authors' calculations.

### C. Key Regional Integration Trends from the Multidimensional Regional Integration Index Series

Key trends in regional integration emerge from the constructed MDRII series. Figure 1 compares the panel PCA-derived weights for Asia, the EU, Latin America, and Africa. The EU appears to have the most evenly distributed shares for the six dimensions of its regional integration index. For Asia, the highest weight is allocated to trade and investment and the lowest to money and finance. Meanwhile, institutional and social integration and regional value chain account for the largest weights in the regional indexes of Latin America and Africa, respectively.



The series clearly shows that regional integration is most advanced in the EU, and this is also consistent over time. Asia comes second and close to the global average (Figure 2). Latin America places third overall, albeit overtaken by Africa in 2009.



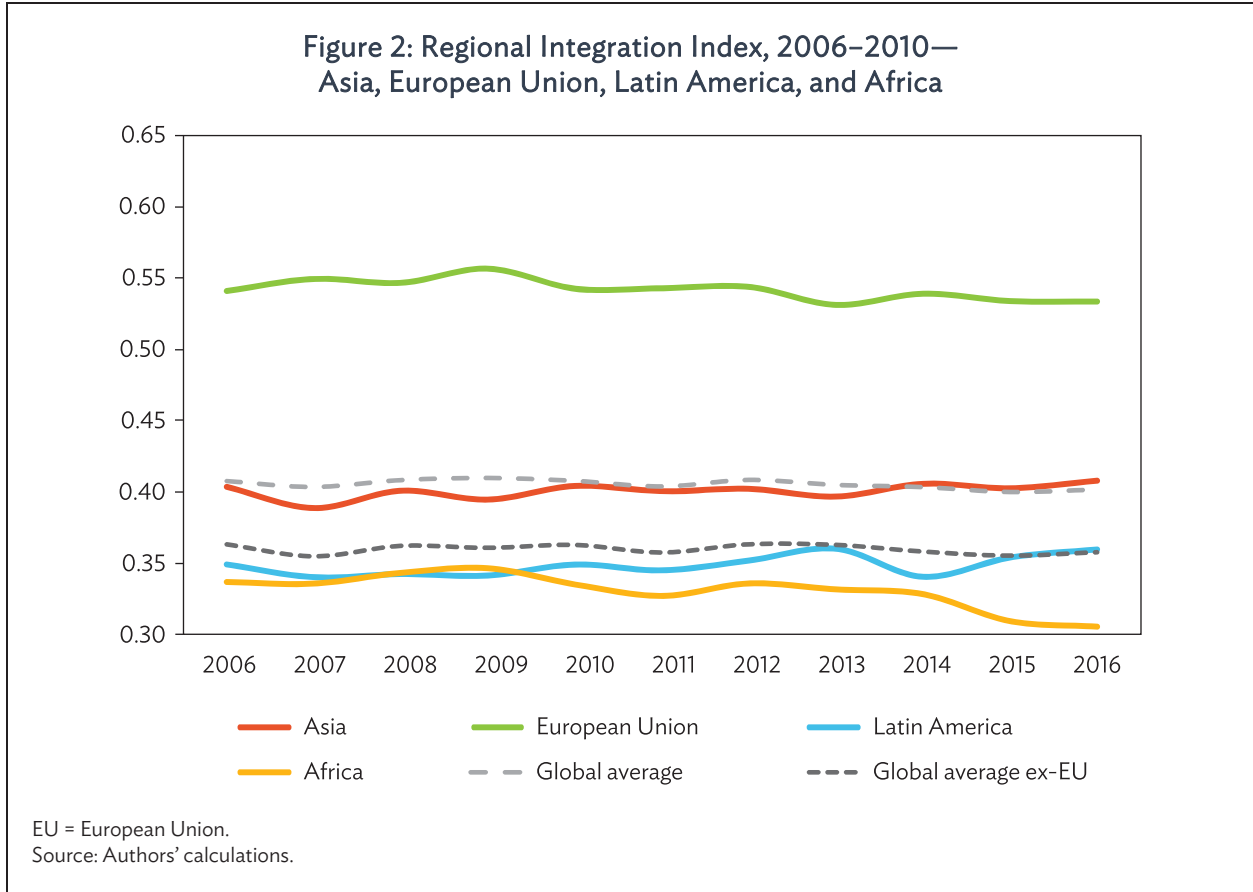


Figure 3 indicates that, over the years, the EU has consistently scored the highest on all dimensions of regional integration, except for trade and investment, on which Asia caught up with the EU beginning in 2010. The EU's money and finance integration has also visibly weakened since its peak in 2009, reflecting the impact of the euro crisis.

In terms of dimensional contribution to overall regional integration, infrastructure and connectivity appears to be the most forceful and stable foundation for regional integration in Asia. But, over time, trade and investment have strengthened as a major contributor to regional integration, compensating for a modest weakening in movement of people (Figure 4). In the EU, the contributions of all dimensions are broadly balanced, although money and finance, infrastructure and connectivity, movement of people, and institutional and social integration contribute a bit more than the other two remaining dimensions. Institutional and social integration support regional integration the most in Latin America, while regional value chain contributes the most to regional integration in Africa.

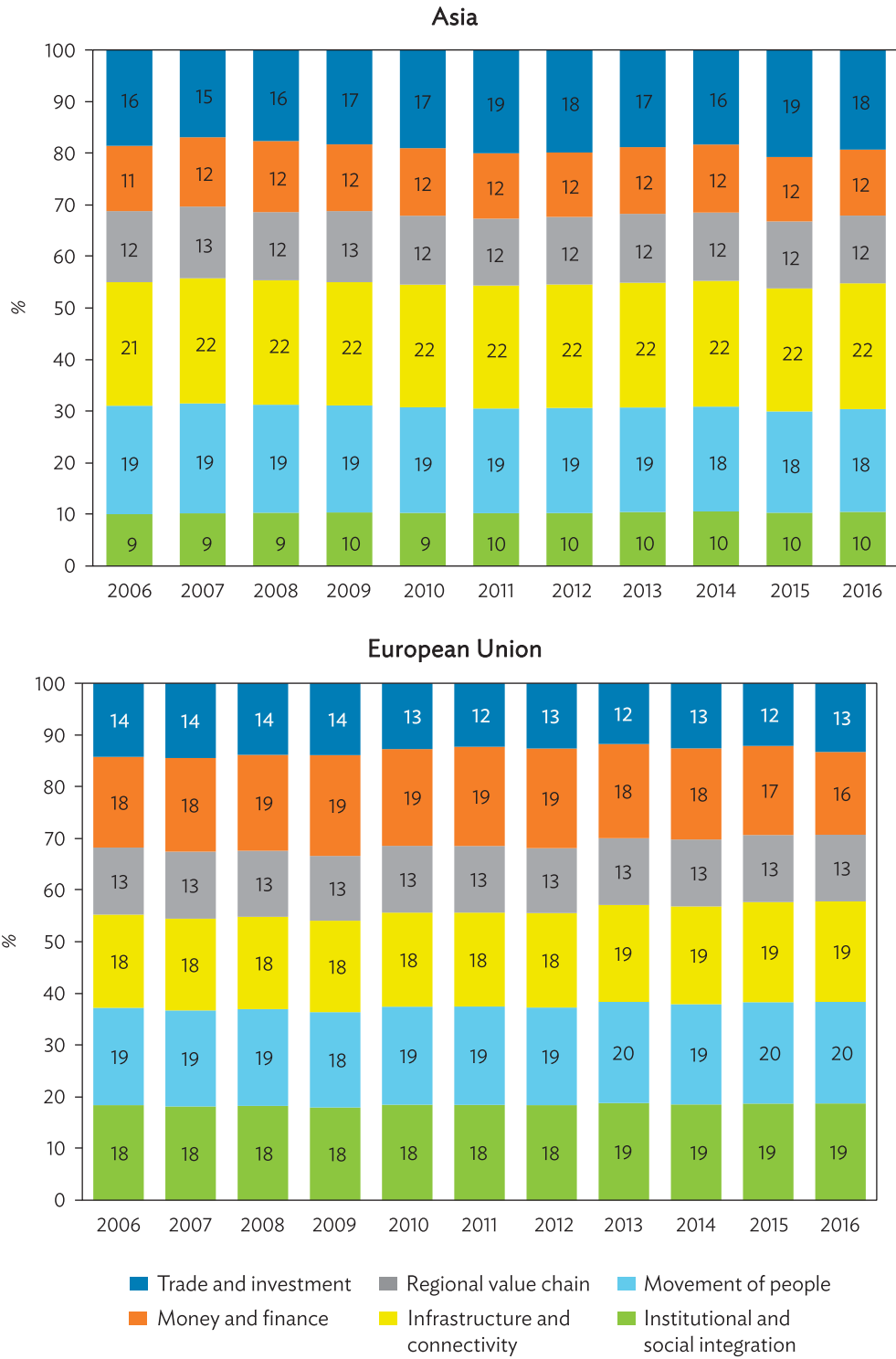
Table 5 summarizes the rankings in the regional integration index for individual economies from 2006 to 2016, with shading according to the region in which they belong. While most EU economies congregate at the top spots across the years, Asian economies, particularly Malaysia and Singapore, have climbed the international rankings and are breaking through the ranks dominated by the EU.

**Figure 3: Dimensional Subindexes, 2006–2016—  
Asia, European Union, Latin America, and Africa**



EU = European Union, LA = Latin America.  
Source: Authors' calculations.

Figure 4: Dimensional Contribution to Overall Regional Integration Index, 2006–2016—Asia, European Union, Latin America, and Africa



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Figure 4 continued

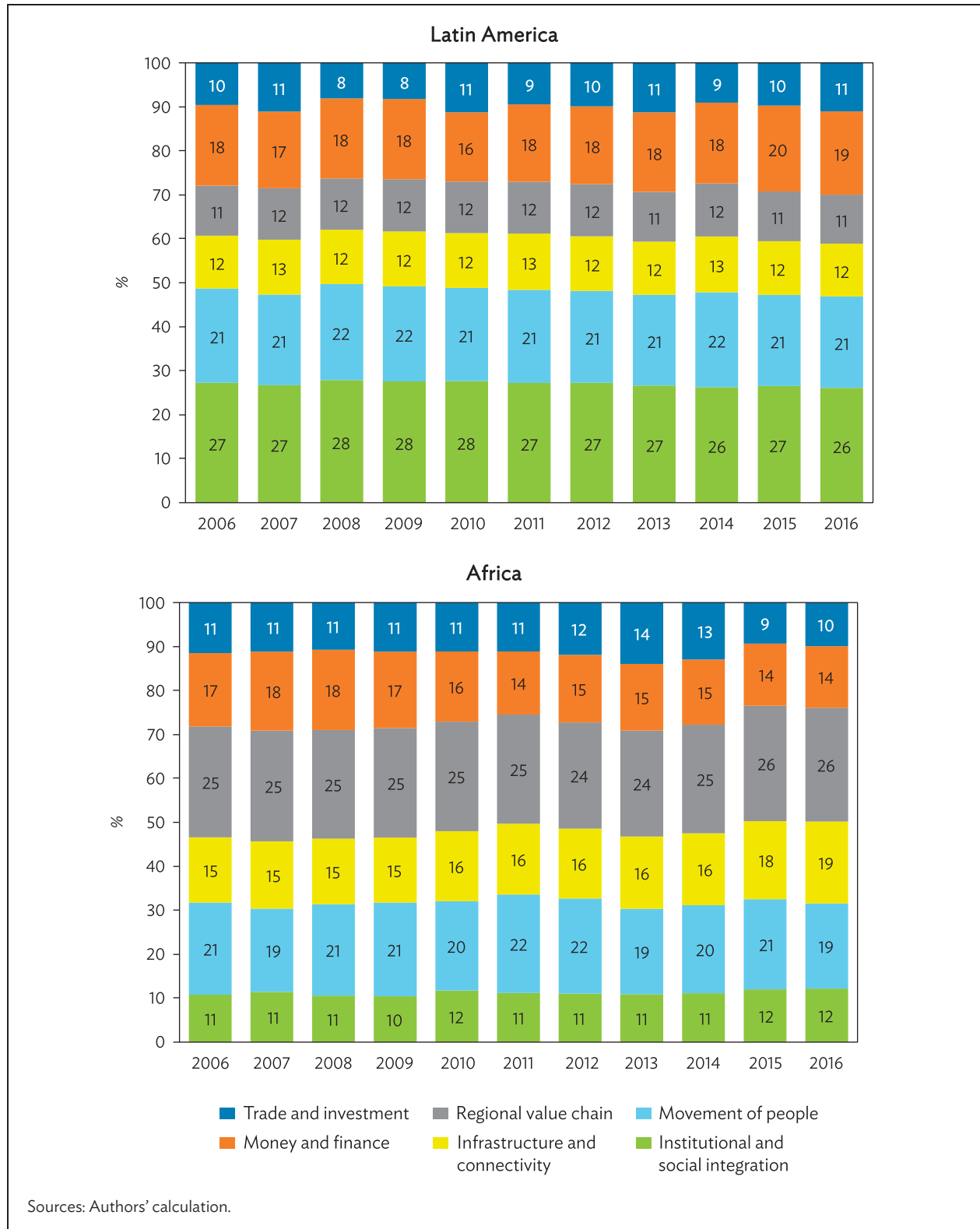


Table 5: Economy Rankings, 2006–2016—Regional Integration Indexes

Rank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
1	Slovak Republic	0.615 Czech Republic	0.617 Czech Republic	0.614 Slovak Republic	0.623 Czech Republic	0.616 Romania	0.614 Czech Republic	0.624 Slovak Republic	0.599 Czech Republic	0.610 Slovak Republic	0.600 Czech Republic	0.617
2	Czech Republic	0.597 Slovak Republic	0.607 Slovak Republic	0.602 Romania	0.613 Slovak Republic	0.606 Czech Republic	0.612 Slovak Republic	0.610 Romania	0.599 Slovak Republic	0.597 Romania	0.590 Slovak Republic	0.616
3	Poland	0.594 Belgium	0.594 Poland	0.599 Poland	0.608 Poland	0.599 Slovak Republic	0.601 Poland	0.598 Poland	0.596 Poland	0.592 Poland	0.589 Poland	0.599
4	Hungary	0.591 Hungary	0.589 Hungary	0.594 Czech Republic	0.607 Romania	0.593 Poland	0.600 Hungary	0.593 Czech Republic	0.586 Romania	0.581 Czech Republic	0.589 Belgium	0.587
5	Luxembourg	0.579 Poland	0.586 Romania	0.594 Belgium	0.597 Hungary	0.578 Hungary	0.581 Belgium	0.589 Portugal	0.562 Slovenia	0.572 Belgium	0.574 Romania	0.568
6	Romania	0.575 Romania	0.584 Luxembourg	0.573 Hungary	0.583 Luxembourg	0.563 Belgium	0.578 Romania	0.585 Luxembourg	0.561 Luxembourg	0.571 Austria	0.573 Luxembourg	0.562
7	Belgium	0.573 Austria	0.574 Sweden	0.567 Portugal	0.581 Portugal	0.561 Austria	0.571 Luxembourg	0.575 Hungary	0.557 Austria	0.570 Hungary	0.562 Hungary	0.560
8	Portugal	0.566 Finland	0.566 Belgium	0.561 Luxembourg	0.572 Finland	0.556 Finland	0.571 Slovenia	0.571 Austria	0.552 Hungary	0.561 Finland	0.551 Lithuania	0.553
9	Lithuania	0.563 Portugal	0.565 Austria	0.561 Sweden	0.567 Belgium	0.555 Portugal	0.555 Finland	0.558 Latvia	0.549 Estonia	0.555 Luxembourg	0.546 Estonia	0.552
10	Sweden	0.553 Luxembourg	0.558 Portugal	0.559 Slovenia	0.565 Austria	0.545 Luxembourg	0.552 Portugal	0.554 Bulgaria	0.541 Bulgaria	0.555 Slovenia	0.544 Sweden	0.547
11	Austria	0.545 Latvia	0.558 Estonia	0.556 Estonia	0.562 Latvia	0.544 Latvia	0.550 Austria	0.551 Bulgaria	0.537 Latvia	0.554 Sweden	0.542 Finland	0.538
12	Slovenia	0.542 Sweden	0.554 Lithuania	0.554 Finland	0.554 Sweden	0.543 Slovenia	0.548 Estonia	0.549 Germany	0.536 Sweden	0.554 Latvia	0.540 Portugal	0.538
13	Finland	0.538 Lithuania	0.553 Netherlands	0.551 Netherlands	0.552 Lithuania	0.541 Estonia	0.544 Sweden	0.549 Denmark	0.536 Belgium	0.552 Estonia	0.537 Austria	0.537
14	Netherlands	0.527 Ireland	0.544 Lithuania	0.554 Lithuania	0.552 Ireland	0.538 Netherlands	0.543 Germany	0.541 Slovenia	0.535 Finland	0.550 Germany	0.529 Italy	0.537
15	Greece	0.527 Germany	0.546 Germany	0.540 Denmark	0.551 Estonia	0.538 Germany	0.543 Lithuania	0.528 Finland	0.534 Germany	0.545 Netherlands	0.522 Bulgaria	0.537
16	Estonia	0.527 Slovenia	0.540 Denmark	0.538 Austria	0.551 Germany	0.538 Sweden	0.541 Netherlands	0.526 Lithuania	0.523 Lithuania	0.533 Lithuania	0.521 Slovenia	0.526
17	Germany	0.524 Spain	0.533 Slovenia	0.537 Bulgaria	0.546 Netherlands	0.536 Ireland	0.525 Estonia	0.525 Estonia	0.521 Portugal	0.530 Spain	0.518 Netherlands	0.524
18	Latvia	0.521 Estonia	0.533 Latvia	0.535 Ireland	0.542 Bulgaria	0.534 Bulgaria	0.530 Bulgaria	0.525 Netherlands	0.516 France	0.529 Greece	0.517 Germany	0.524
19	Denmark	0.521 Denmark	0.532 Finland	0.532 Germany	0.540 Spain	0.532 Greece	0.526 Greece	0.521 Italy	0.515 Spain	0.527 Bulgaria	0.517 France	0.523
20	Bulgaria	0.517 Italy	0.527 Spain	0.530 Spain	0.539 Denmark	0.531 France	0.520 Spain	0.520 France	0.513 Netherlands	0.524 Portugal	0.516 Latvia	0.515
21	Italy	0.515 France	0.526 Bulgaria	0.523 Greece	0.536 Slovenia	0.526 Spain	0.522 Denmark	0.518 Sweden	0.513 Ireland	0.513 Italy	0.515 Spain	0.512
22	France	0.513 Greece	0.522 Greece	0.519 Italy	0.533 Greece	0.520 Italy	0.513 France	0.516 Spain	0.511 Italy	0.512 France	0.515 Malaysia	0.510
23	Ireland	0.508 Netherlands	0.514 France	0.519 France	0.529 France	0.513 Denmark	0.511 Ireland	0.513 Ireland	0.510 Denmark	0.509 Denmark	0.509 Denmark	0.497
24	Spain	0.504 Malta	0.503 Italy	0.510 Latvia	0.524 Italy	0.506 Malaysia	0.492 Malaysia	0.503 Malaysia	0.497 Malaysia	0.503 Malaysia	0.505 Greece	0.495
25	Cyprus	0.498 Bulgaria	0.503 United Kingdom	0.497 Malta	0.508 Malta	0.492 Thailand	0.485 Malta	0.503 Greece	0.480 Greece	0.489 Ireland	0.495 Singapore	0.493
26	United Kingdom	0.497 Cyprus	0.500 Cyprus	0.479 Cyprus	0.500 Singapore	0.487 Lithuania	0.484 Latvia	0.493 PRC	0.470 United Kingdom	0.475 Singapore	0.484 PRC	0.484
27	Malaysia	0.491 United Kingdom	0.495 Malaysia	0.478 United Kingdom	0.491 Malaysia	0.484 Singapore	0.479 Cyprus	0.477 United Kingdom	0.469 Singapore	0.473 Cyprus	0.476 Ireland	0.481
28	Singapore	0.480 Malaysia	0.488 Singapore	0.477 Singapore	0.478 New Zealand	0.474 PRC	0.474 Thailand	0.476 Thailand	0.467 PRC	0.470 Thailand	0.475 United Kingdom	0.480
29	Malta	0.473 Singapore	0.472 Malta	0.469 Malaysia	0.475 Cyprus	0.473 Cyprus	0.473 Singapore	0.473 Singapore	0.465 Thailand	0.467 United Kingdom	0.473 Hong Kong, China	0.475
30	Korea, Republic of	0.452 Namibia	0.454 PRC	0.463 Korea, Republic of	0.462 PRC	0.470 United Kingdom	0.471 United Kingdom	0.472 Korea, Republic of	0.457 Cyprus	0.462 PRC	0.472 Thailand	0.473
31	Thailand	0.451 Thailand	0.450 Korea, Republic of	0.460 Swaziland	0.462 United Kingdom	0.468 Korea, Republic of	0.470 PRC	0.466 Swaziland	0.456 Korea, Republic of	0.461 Lao PDR	0.468 Japan	0.456
32	Hong Kong, China	0.445 PRC	0.447 Hong Kong, China	0.457 PRC	0.462 Korea, Republic of	0.464 Malta	0.464 Hong Kong, China	0.457 Hong Kong, China	0.452 New Zealand	0.459 Korea, Republic of	0.460 Korea, Republic of	0.443
33	PRC	0.442 Korea, Republic of	0.438 Thailand	0.453 Thailand	0.455 Thailand	0.461 New Zealand	0.458 Korea, Republic of	0.455 New Zealand	0.448 Lao PDR	0.456 Malta	0.455 Cyprus	0.442
34	New Zealand	0.442 New Zealand	0.427 Indonesia	0.445 New Zealand	0.448 Hong Kong, China	0.458 Hong Kong, China	0.445 Indonesia	0.438 Malta	0.447 Hong Kong, China	0.454 Indonesia	0.437 Malta	0.438
35	Malawi	0.427 Hong Kong, China	0.426 New Zealand	0.440 Hong Kong, China	0.447 Namibia	0.451 Japan	0.428 Japan	0.431 Cyprus	0.444 Indonesia	0.437 Japan	0.432 New Zealand	0.435
36	Indonesia	0.427 Nicaragua	0.423 Japan	0.426 Japan	0.433 Japan	0.431 Indonesia	0.427 Lao PDR	0.421 Lao PDR	0.439 Malta	0.429 Nicaragua	0.426 Viet Nam	0.428
37	Nicaragua	0.427 Indonesia	0.420 Viet Nam	0.423 Paraguay	0.418 Indonesia	0.427 Venezuela	0.409 New Zealand	0.420 Indonesia	0.436 Japan	0.428 Viet Nam	0.415 Indonesia	0.428
38	Japan	0.424 Japan	0.415 Swaziland	0.418 Indonesia	0.417 Viet Nam	0.420 Swaziland	0.405 St. Lucia	0.415 Japan	0.431 Viet Nam	0.420 New Zealand	0.410 Nepal	0.426
39	Uruguay	0.421 Colombia	0.389 Namibia	0.412 Namibia	0.405 Australia	0.408 Namibia	0.403 Viet Nam	0.411 Panama	0.409 Nepal	0.415 Hong Kong, China	0.409 St. Lucia	0.423
40	Australia	0.419 Costa Rica	0.387 Malawi	0.411 Viet Nam	0.403 Paraguay	0.407 Uruguay	0.402 Australia	0.408 Colombia	0.407 Australia	0.397 Australia	0.408 Mongolia	0.420
41	Viet Nam	0.403 Uruguay	0.386 Australia	0.399 Australia	0.397 Uruguay	0.393 Bangladesh	0.399 Panama	0.399 Viet Nam	0.397 Philippines	0.395 Costa Rica	0.400 Nicaragua	0.417
42	Paraguay	0.400 Argentina	0.384 Nicaragua	0.388 Uruguay	0.386 Chile	0.388 Australia	0.395 Costa Rica	0.394 Venezuela	0.397 Costa Rica	0.391 Cambodia	0.400 Australia	0.411
43	Venezuela	0.396 Viet Nam	0.384 Argentina	0.385 Philippines	0.385 India	0.385 Viet Nam	0.395 Swaziland	0.392 Australia	0.397 Benin	0.391 Argentina	0.395 Cambodia	0.403
44	Argentina	0.390 Australia	0.383 Costa Rica	0.383 Chile	0.383 Nepal	0.381 Philippines	0.392 Namibia	0.391 Paraguay	0.396 Mongolia	0.389 Philippines	0.392 Trinidad and Tobago	0.401
45	Costa Rica	0.390 Venezuela	0.383 Paraguay	0.382 Venezuela	0.380 Colombia	0.378 India	0.392 Niger	0.390 Niger	0.395 Nicaragua	0.389 India	0.391 Philippines	0.397
46	Tanzania	0.384 Zimbabwe	0.380 Bangladesh	0.381 Argentina	0.376 Bangladesh	0.376 Nepal	0.390 India	0.389 Benin	0.393 Cambodia	0.387 Chile	0.389 India	0.397
47	Philippines	0.378 Nepal	0.377 Venezuela	0.376 Togo	0.378 Costa Rica	0.375 Colombia	0.377 Argentina	0.388 Cambodia	0.390 Argentina	0.387 Nepal	0.389 Colombia	0.395
48	Uganda	0.372 Philippines	0.373 Chile	0.376 India	0.378 Philippines	0.368 Paraguay	0.376 Colombia	0.387 Argentina	0.389 Rwanda	0.386 Peru	0.388 Paraguay	0.392
49	Chile	0.370 Chile	0.371 India	0.376 Nicaragua	0.367 Panama	0.368 Costa Rica	0.372 Bangladesh	0.386 Namibia	0.387 Burkina Faso	0.385 Ecuador	0.384 Uruguay	0.390
50	India	0.366 India	0.368 Uruguay	0.374 Tanzania	0.366 Uganda	0.365 Argentina	0.368 Cambodia	0.386 Philippines	0.386 Ecuador	0.384 Malawi	0.384 Bangladesh	0.382
51	Colombia	0.362 South Africa	0.347 Colombia	0.374 Uganda	0.365 Argentina	0.365 Peru	0.367 Philippines	0.383 India	0.385 India	0.383 Namibia	0.383 Costa Rica	0.382
52	Namibia	0.362 Bangladesh	0.346 Philippines	0.373 Colombia	0.363 Tanzania	0.364 Chile	0.366 Nicaragua	0.377 Costa Rica	0.384 Panama	0.381 Panama	0.377 Chile	0.381
53	Sri Lanka	0.361 Uganda	0.345 Nepal	0.363 Costa Rica	0.362 Venezuela	0.359 Uganda	0.359 Chile	0.377 Rwanda	0.383 Swaziland	0.380 Paraguay	0.375 Panama	0.373
54	Trinidad and Tobago	0.350 Peru	0.342 Kenya	0.360 Kenya	0.359 Kenya	0.353 Panama	0.350 Uruguay	0.371 Chile	0.380 Uruguay	0.376 Colombia	0.370 Namibia	0.370

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Table 5 continued

Rank	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
55	South Africa	0.347 Panama	0.342 Uganda	0.352 Bangladesh	0.352 Peru	0.347 Trinidad and Tobago	0.348 Mongolia	0.369 Nicaragua	0.380 Chile	0.375 Trinidad and Tobago	0.368 Argentina	0.365
56	Bangladesh	0.335 Dominica	0.341 Peru	0.347 Panama	0.352 South Africa	0.346 Togo	0.343 Venezuela	0.367 Uruguay	0.379 Venezuela	0.373 Bangladesh	0.367 Sri Lanka	0.360
57	Kenya	0.333 Nigeria	0.337 Sri Lanka	0.345 South Africa	0.350 Sri Lanka	0.331 South Africa	0.338 Mozambique	0.364 Mongolia	0.368 Paraguay	0.370 Uruguay	0.365 Rwanda	0.359
58	Niger	0.328 Trinidad and Tobago	0.337 Mali	0.343 Sri Lanka	0.347 Mexico	0.324 Nigeria	0.337 Uganda	0.360 Ghana	0.367 Colombia	0.365 Rwanda	0.363 Venezuela	0.350
59	Peru	0.326 Kenya	0.335 South Africa	0.342 Peru	0.346 Nigeria	0.321 Mexico	0.331 Paraguay	0.358 Nepal	0.365 Venezuela	0.365 Venezuela	0.359 Ghana	0.349
60	Nigeria	0.326 Sri Lanka	0.327 Panama	0.340 Benin	0.330 St. Lucia	0.320 Sri Lanka	0.330 Benin	0.354 Bangladesh	0.356 Niger	0.364 St. Lucia	0.353 Burkina Faso	0.349
61	Panama	0.325 Mongolia	0.318 Mexico	0.327 Malawi	0.330 Mali	0.319 Kenya	0.327 South Africa	0.346 Peru	0.354 Namibia	0.361 Mongolia	0.353 Barbados	0.343
62	Burkina Faso	0.325 Mexico	0.314 Niger	0.327 Zambia	0.330 Trinidad and Tobago	0.315 St. Kitts and Nevis	0.325 Malawi	0.343 Togo	0.354 Pakistan	0.357 Sri Lanka	0.346 Uganda	0.341
63	Mexico	0.321 Tanzania	0.310 Tanzania	0.325 Senegal	0.323 Mongolia	0.311 Malawi	0.322 Ecuador	0.340 Grenada	0.354 Mali	0.355 Mozambique	0.345 Peru	0.340
64	Zimbabwe	0.319 Senegal	0.308 Trinidad and Tobago	0.317 Nepal	0.320 Jamaica	0.309 Mali	0.315 Peru	0.339 Malawi	0.353 Mozambique	0.350 Mexico	0.336 Mexico	0.338
65	Brazil	0.306 Brazil	0.303 Zambia	0.315 Mexico	0.319 Niger	0.306 Kyrgyz Republic	0.313 Mexico	0.338 St. Lucia	0.351 Sri Lanka	0.346 Niger	0.335 Mozambique	0.337
67	Zambia	0.298 Zambia	0.290 Brazil	0.310 Trinidad and Tobago	0.313 Brazil	0.303 Mauritius	0.308 Tanzania	0.334 Mexico	0.337 Botswana	0.342 Benin	0.323 Pakistan	0.322
68	Senegal	0.290 Jamaica	0.283 Mongolia	0.305 Niger	0.313 Bahamas, The	0.285 Niger	0.308 Trinidad and Tobago	0.325 Uganda	0.336 Peru	0.341 Kazakhstan	0.322 Botswana	0.321
69	Kazakhstan	0.286 Georgia	0.266 Jamaica	0.290 St. Lucia	0.311 Mauritius	0.283 Mongolia	0.305 Kenya	0.323 Trinidad and Tobago	0.331 Trinidad and Tobago	0.341 Kyrgyz Republic	0.318 South Africa	0.313
70	Mauritius	0.269 Kazakhstan	0.259 Georgia	0.287 Brazil	0.309 Kazakhstan	0.280 Brazil	0.300 Mali	0.316 Zambia	0.331 Kyrgyz Republic	0.334 Uganda	0.317 Brazil	0.307
71	Georgia	0.257 Antigua and Barbuda	0.252 Senegal	0.286 Antigua and Barbuda	0.302 Senegal	0.275 St. Lucia	0.285 Georgia	0.310 Ecuador	0.327 Uganda	0.334 Zambia	0.315 Nigeria	0.306
72	Bahamas, The	0.255 Mauritius	0.251 Kazakhstan	0.265 Mongolia	0.296 Georgia	0.264 Tanzania	0.279 Senegal	0.303 South Africa	0.325 Zambia	0.332 South Africa	0.315 Jamaica	0.306
73	Antigua and Barbuda	0.247 Bahamas, The	0.249 Bahamas, The	0.262 Nigeria	0.293	Senegal	0.277 Brazil	0.302 Pakistan	0.322 Ghana	0.326 Ghana	0.315 Zambia	0.305
74			Mauritius	0.257 Kazakhstan	0.279	Jamaica	0.276 Jamaica	0.297 Georgia	0.322 Bahamas, The	0.322 Botswana	0.314 Grenada	0.305
75			Antigua and Barbuda	0.247 Mauritius	0.275	Georgia	0.276 Togo	0.293 Sri Lanka	0.321 South Africa	0.320 Brazil	0.313 Senegal	0.302
76				Jamaica	0.265	Zambia	0.273 Zambia	0.289 Mali	0.320 Brazil	0.315 Nigeria	0.301 Togo	0.301
77				Georgia	0.263	Bahamas, The	0.267 Mauritius	0.287 Mozambique	0.318 Bangladesh	0.314 Senegal	0.295 Mauritius	0.293
78				Bahamas, The	0.246	Kazakhstan	0.263 Nigeria	0.286 Jamaica	0.316 Togo	0.309 Togo	0.293 Bahamas, The	0.290
79							St. Kitts and Nevis	0.285 Brazil	0.315 Nigeria	0.307 Mali	0.292 Kazakhstan	0.289
80							Bahamas, The	0.274 Nigeria	0.307 Senegal	0.303 Morocco	0.284 Kenya	0.286
81							Kazakhstan	0.264 Senegal	0.300 St. Lucia	0.303 Tanzania	0.284 Morocco	0.283
82							Kyrgyz Republic	0.263 Mauritius	0.296 Algeria	0.303 Barbados	0.283 Georgia	0.278
83								Kazakhstan	0.294 Kazakhstan	0.303 Antigua and Barbuda	0.282 Tanzania	0.274
84								Kenya	0.294 St. Vincent	0.297 Bahamas, The	0.282 Algeria	0.260
85								Morocco	0.274 Grenada	0.287 Mauritius	0.281 Kyrgyz Republic	0.260
86								Bahamas, The	0.274 Tanzania	0.284 Jamaica	0.279 Seychelles	0.232
87								Kyrgyz Republic	0.266 Georgia	0.282 Georgia	0.272 Cape Verde	0.222
88								Tanzania	0.260 Jamaica	0.282 Kenya	0.266	
89								Algeria	0.252 Barbados	0.281 Algeria	0.261	
90								Seychelles	0.243 Kenya	0.279 Seychelles	0.228	
91									Morocco	0.273		
92									Mauritius	0.273		
93									Antigua and Barbuda	0.246		
94									Seychelles	0.227		
No. of economies	73	73	75	78	72	78	82	90	94	90	87	

Sources: Authors' calculation.

### III. EMPIRICAL METHODOLOGY

This section empirically investigates the impact of regional integration on growth, poverty, and inequality. We utilize an unbalanced panel dataset for 156 countries for 2006–2016 to run separate regressions for growth, inequality, and poverty that include MDRII as another explanatory variable, in addition to other control variables. In particular, we estimate the following equation:

$$y_{i,t} = \beta_0 + \beta_1 y_{i,t-1} + \beta_2 X_{i,t} + \beta_3 MDRII_{i,t} + \mu_i + \varepsilon_{i,t} \quad (1)$$

where  $y_{i,t}$  is the logarithm of our dependent variable of interest (growth, inequality, and poverty) for country  $i$  at time  $t$ ,  $y_{i,t-1}$  is the lagged dependent variable,  $X_{i,t}$  is a vector of control variables,  $MDRII_{i,t}$  is our constructed multidimensional regional integration index,  $\mu_i$  is the unobserved country-specific effect, and  $\varepsilon_{i,t}$  is the error term.

It is important to note that using a panel dataset in estimating closely interrelated development variables such as economic growth, income inequality, and poverty raises a number of econometric challenges. These include the observed heterogeneity across countries, persistence of the dependent variable, potential endogeneity, and long lagged effects of the regressors on the dependent variable (particularly in the case of economic growth).

To address these issues, we employ the system generalized method of moments (GMM) procedure widely used in the empirical growth, inequality, and poverty literature. System GMM employs fixed effects (a dummy for each country) to capture time-invariant country heterogeneities.

Meanwhile, our dependent variable of interest may also display persistence. For instance, income inequality tends to change slowly over time, with very minimal within-country variation over time, reflecting some unobserved state-dependent factors (Coady and Dizioli 2017). To control for persistence, lagged values of the dependent variable are included as additional independent variables in system GMM estimation. Doing so in fixed effects estimation would violate the exogeneity assumption, leading to a panel data estimation (or otherwise known as Nickell) bias. On the other hand, system GMM addresses the endogeneity of the regressors by instrumenting them with their own lagged values (Swiston and Barrot 2011). This is implemented with a system of two equations: (1) difference equation with lagged independent and dependent variables as instruments, and (2) levels equation with lagged differences of independent and dependent variables as instruments.

To illustrate, the estimating equation (1) is first-differenced as:

$$y_{i,t} - y_{i,t-1} = \beta_1 (y_{i,t-1} - y_{i,t-2}) + \beta_2 (X_{i,t} - X_{i,t-1}) + \beta_3 (MDRII_{i,t} - MDRII_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (2)$$

To address the endogeneity of  $X_{it}$  and the correlation between the dependent variable and new error term in equation (2), the second and higher-order lags of  $y_{it}$ ,  $X_{it}$ , and  $MDRII_{it}$  are used as instruments on the assumption that in equation (2), the error terms are serially uncorrelated ( $E[\varepsilon_{i,t} - \varepsilon_{i,s}] = 0$ ,  $t \neq s$ ) and the explanatory variables are weakly exogenous ( $E[X_{it}\varepsilon_{is}] = E[MDRII_{it}\varepsilon_{is}] = 0$  for all  $s > t$ ). However, this approach in constructing the difference GMM estimator has some drawbacks. Firstly, differencing the equation removes the long-run, cross-country information present in the levels

of the variables. Second, when explanatory variables display persistence over time their lagged levels will become weak instruments of their differences (Guiliano and Ruiz-Arranz 2005). To overcome these issues, we employ a system GMM estimator that utilizes lagged differences of  $y_{it}$ ,  $X_{it}$ , and  $MDR_{it}$  in the levels equation as instruments, in addition to the lagged levels of  $y_{it}$ ,  $X_{it}$ , and  $MDR_{it}$  in the difference equation.

Key diagnostics for system GMM are the Arellano–Bond second-order autocorrelation test and the Hansen test for overidentifying restrictions. In these, failure to reject the null hypothesis of each test indicates, respectively, the desired results of correlation of instruments with instrumented variables and the exogeneity of instruments.

### Choice of Control Variables

Our choice of control variables for each separate set of regressions for growth, inequality, and poverty is guided by economic theory and relevant empirical literature, as elaborated below. Table 6 summarizes the description and sources of data for control variables employed in the growth, inequality, and poverty regressions.

**Table 6: Growth, Inequality, and Poverty Regressions—Variables, Description, and Sources**

Variable	Description	Source
Real gross domestic product (GDP) per capita	GDP per capita based on purchasing power parity (PPP), constant 2011 international US\$	World Bank. databank.worldbank.org.
Secondary school enrollment	School enrollment, secondary (% gross)	World Bank. databank.worldbank.org.
Investment (% of GDP)	Gross capital formation (% of GDP)	World Bank. databank.worldbank.org.
Government consumption (% of GDP)	General government final consumption expenditure (% of GDP)	World Bank. databank.worldbank.org.
Inflation rate	Inflation, consumer prices (annual %)	World Bank. databank.worldbank.org.
Control of corruption	Control of corruption, estimate	World Bank. databank.worldbank.org.
Log(M2/GDP)	Logarithm of money supply M2 divided by nominal GDP (both US\$ million)	CEIC. insights.ceicdata.com.
International openness	Exports plus imports (% of GDP)	World Bank. databank.worldbank.org.
Social benefit incidence	Benefit incidence of social insurance programs to poorest quintile (% of total social insurance benefits)	World Bank. databank.worldbank.org.
Gini	Gini index (World Bank estimate)	World Bank. databank.worldbank.org.
Poverty gap	Poverty gap at \$1.90 a day (2011 PPP) (%)	World Bank. databank.worldbank.org.
Poverty headcount ratio	Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)	World Bank. databank.worldbank.org.

GDP = gross domestic product, PPP = purchasing power parity.  
Source: Authors' compilation.



## 1. Economic Growth

In determining the variables to be included in our regional integration index-augmented growth regression, we refer to the following Solow growth accounting framework that assumes a Cobb-Douglas production function expressed in per capita terms:

$$y = Ak^\alpha \quad (3)$$

where  $y$  is income per capita,  $A$  is technological progress, and  $k$  is physical capital over total population.

Following Barro (2003), the per capita growth rate of a country at time  $t$  is given by

$$Dy_{it} = F(y_{t-1}, l_{t-1}, \dots) \quad (4)$$

where  $D$  is the difference operator,  $y_{t-1}$  is the initial per capita income and  $l_{t-1}$  is initial human capital per person and ... pertains to an array of policy variables and country-specific characteristics. These include, among others, fiscal variables, indicators of macroeconomic stability, and measures of maintenance of rule of law and institutional quality.

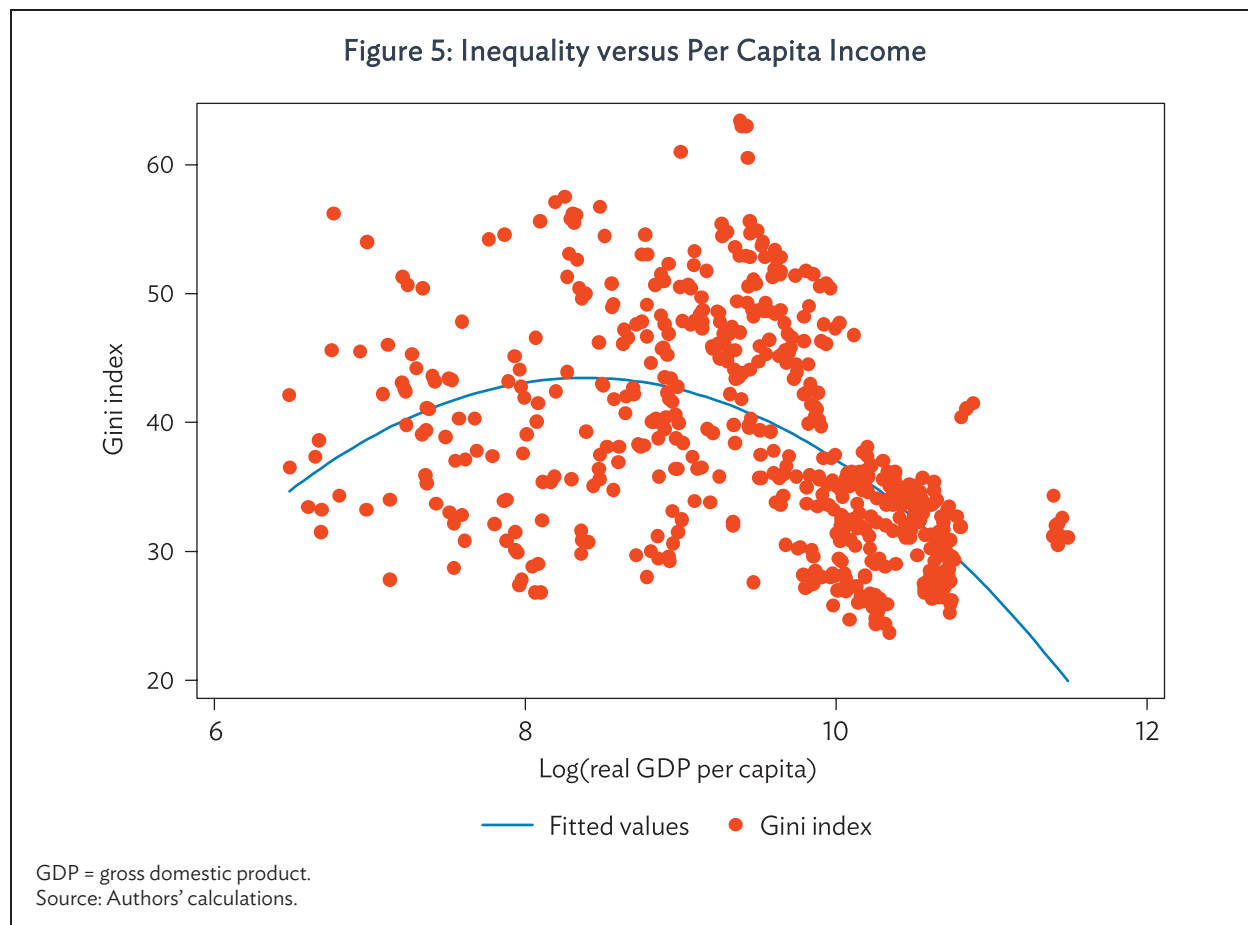
Hence, our baseline per capita growth regression includes variables that measure human and physical capital, government expenditure, and governance and institutional quality. Accordingly, we employ real gross domestic product (GDP) per capita based on purchasing power parity as an indicator of per capita income. Moreover, we utilize secondary school enrollment and gross fixed capital formation (as percentage of GDP) as measures of human and physical capital, respectively. We also use general government consumption expenditure (as percentage of GDP) as our fiscal variable and inflation rate as an indicator of macroeconomic stability. The control of corruption index from the World Bank Governance Indicator database is utilized as a measure of governance and institutional quality. Finally, we include year dummy variables to control for factors that affect growth across countries, such as the global business cycle. We extend our baseline model to include the logarithm of ratio of M2 and GDP and sum of exports and imports as a percentage of GDP as proxies for financial openness and trade openness, respectively.

## 2. Income Inequality

For our inequality regressions, we refer to Kuznet's theory, which postulates that income inequality initially increases before it decreases during the development process. Hence, the relationship between income inequality and per capita income may be described by an inverted U-shaped curve (known as the Kuznet's curve), with an upward phase during which inequality rises with per capita income and downward phase during which inequality declines with per capita income (Iradian 2005). Figure 5 plots inequality vis-à-vis per capita income (measured by the Gini index and real GDP per capita, respectively) from our panel dataset and broadly depicts the Kuznet's curve). For this reason, we include the logarithm as well as the square of the logarithm of real GDP per capita in our inequality regressions. Meanwhile, the vector of control variables includes secondary school enrollment; social

benefit incidence (both in logarithms and serve as proxies for investment in human capital and expenditures on social transfers, respectively); population growth; and inflation rate.<sup>2</sup>

The overall MDRII and its dimensional subindexes enter the income inequality regressions twice: by themselves and as interaction terms with the logarithm of GDP per capita. The latter would be useful to determine if regional integration leads to lower (higher) inequality for poor (rich) countries, as predicted by Heckscher–Ohlin and Stolper–Samuelson theories.



### 3. Poverty

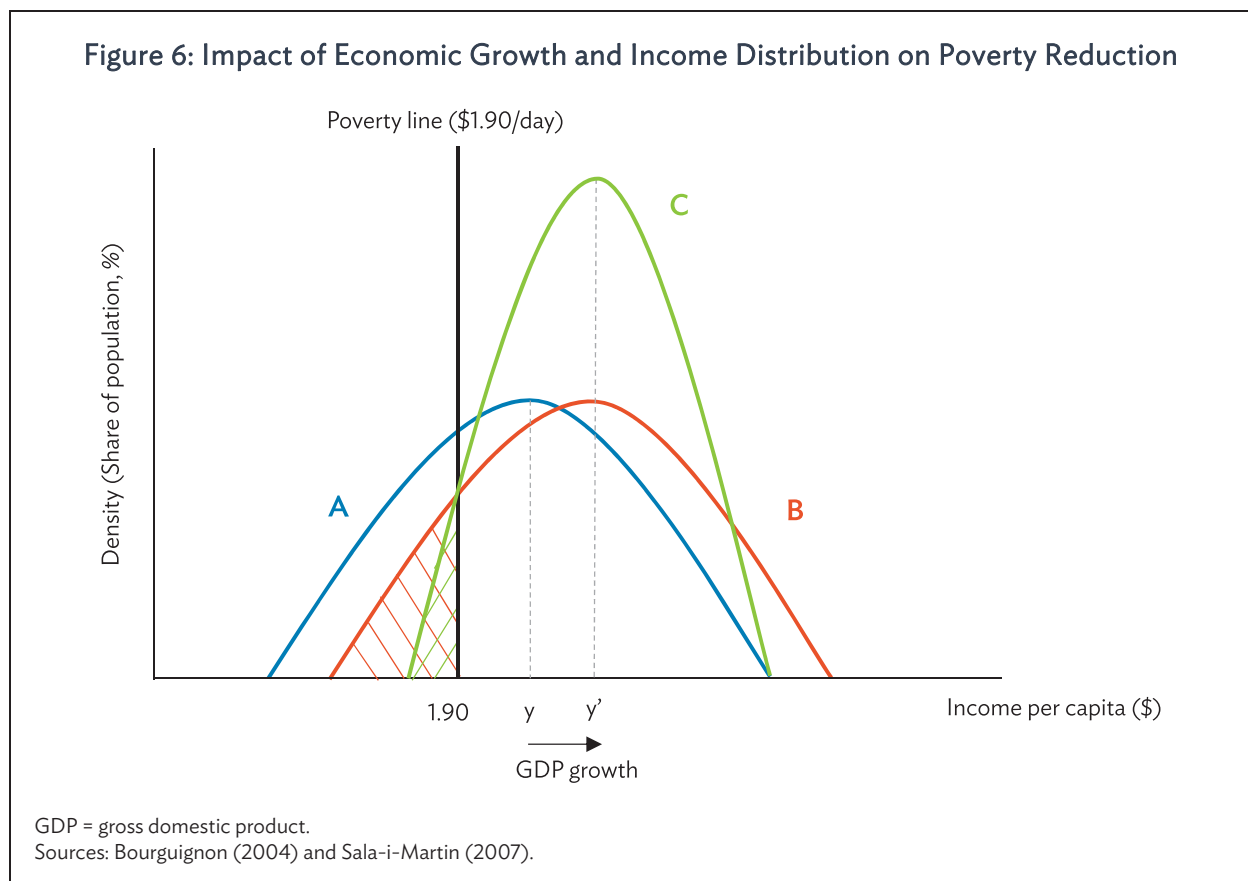
If income distribution improves as a result of trade (or equivalently income inequality declines), poverty will consequently decline. The reverse can also occur for high-income countries. If sectors that employ unskilled labor collapse—reducing demand for these workers and their wages—low-skilled labor can suffer without proper redistribution policies and social safety nets, which can increase poverty. At the same time, sectors that utilize human and physical capital can expand, raising the wages of relatively wealthy capital owners and highly educated workers, leading to greater income inequality. However, it has been argued that trade liberalization may also lead to increased trade in

<sup>2</sup> Social benefit incidence refers to the benefit incidence of social insurance programs to poorest quintile which according to the World Bank World Development Indicators include “old age contributory pensions (including survivors and disability) and social security and health insurance benefits (including occupational injury benefits, paid sick leave, maternity and other social insurance). Estimates include both direct and indirect beneficiaries.”

technologically advanced goods that are complementary to skilled labor, raising relative demand for educated and trained workers (Sala-i-Martin 2007). In this case, trade would lead to greater wage dispersion and higher poverty.

In order to assess the full development impact of regional integration, it is necessary to understand how regional integration figures in the growth–poverty–inequality nexus. Higher growth generated by greater regional integration could reduce poverty if the distribution of income remains more or less constant. Hence, the distributional outcome of economic growth arising from regional integration matters for poverty reduction. To illustrate, if postgrowth income distribution does not change, the poverty rate—the area under the distribution and to the left of the poverty line (as the curve shifts from A to B in Figure 6)—automatically declines (Sala-i-Martin 2007). Meanwhile, the reduction in poverty is greater if the growth episode is accompanied by improved income distribution or lower inequality (as curve shifts instead from A to C). Hence, for our poverty regressions, we include real GDP per capita and the Gini index (both in logarithms). We also include trade openness as an additional control variable. We employ the poverty headcount ratio as the measure of poverty.

Similar to the inequality regressions, the overall MDRII and its dimensional subindexes augment the poverty regressions as stand-alone variables and as interaction terms with the logarithm of GDP per capita to reckon if the impact of regional integration on poverty is attenuated at higher or lower income levels.



## IV. ESTIMATION RESULTS

In this section, we present the results of system GMM regressions for growth, inequality, and poverty.<sup>3</sup>

### A. Impact of Regional Integration on Growth

Results of our growth regressions (Tables 7 to 9) show nine alternative specifications: first, only the control variables are included (column 1), then the overall regional integration index is added as a regressor (column 2), after which the six dimensional subindexes enter the regression simultaneously (column 3). To analyze the impact on growth of each dimension of regional integration, we add the dimensional subindex separately in the fourth through the ninth specifications (columns 4 to 9).

Table 7 summarizes the results of our baseline model, which include control variables such as secondary school enrollment, investment (represented by gross fixed capital formation) as percentage of GDP, government consumption as percentage of GDP, inflation rate, and control of corruption index. We find from column (1) that education and good governance, in accord with theoretical expectations, impact positively on growth, as indicated by the significant positive coefficients of secondary school enrollment and the control of corruption index. Government spending seems to dent economic growth. As suggested by the literature, the impact of government consumption is not obvious *a priori*. Dreher (2006) notes that a large government sector may induce inefficiencies and crowd out the private sector investment, while government provision of efficient infrastructure and a proper legal framework may enhance growth. Our result indicates that the crowding out effect of government consumption may dominate its growth-enhancing impact. This is also in line with the negative impact of government consumption that eliminated spending on productivity-enhancing sectors such as defense and education in Barro (2003).

Column (2) indicates that augmenting the baseline specification with the overall MDRII index renders all the explanatory variables insignificant. Similarly, all dimensional subindexes show no significance when they are included simultaneously in the growth regression (column 3). This could reflect that some dimensions may have offsetting effects on growth, while correlation among the subindexes generate potential multicollinearity issues.<sup>4</sup>

However, when the dimensional subindexes enter the growth regressions separately, three dimensions of regional integration show significant positive impact on economic growth: regional value chain (column 6), infrastructure and connectivity (column 7), and institutional and social integration (column 9). Moreover, secondary school enrollment and control of corruption retain their significance in these specifications. On the other hand, the significance of government consumption vanishes when infrastructure and connectivity is included as a separate regressor.

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<sup>3</sup> For the model diagnostics, the p-values of the Arellano–Bond test for second-order serial correlation and the Hansen test for overidentifying restrictions indicate the validity of the instruments used in all system GMM estimations.

<sup>4</sup> The pairwise correlation between dimensional subindexes average 0.41, ranging from 0.18 (regional value chain and infrastructure and connectivity) to 0.77 (regional value chain and institutional and social integration).

Table 7: MDRII-Augmented Growth Regressions—Baseline

Dependent variable: Log(real GDP per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log(real GDP per capita), previous period	0.0961 (0.301)	0.584 (0.414)	0.489 (0.388)	0.109 (0.402)	0.477 (0.546)	0.0836 (0.259)	0.0557 (0.327)	0.213 (0.319)	-0.0837 (0.185)
Secondary school enrollment	0.0235** (0.00945)	0.00830 (0.00891)	0.00711 (0.00671)	0.0234* (0.0127)	0.0111 (0.0137)	0.0234*** (0.00851)	0.0224** (0.0104)	0.0204** (0.00913)	0.0235*** (0.00623)
Investment (% of GDP)	-0.00520 (0.00543)	-0.00746 (0.00810)	-0.00861** (0.00413)	-0.00461 (0.00526)	-0.00853 (0.00743)	-0.00368 (0.00580)	-0.00428 (0.00604)	-0.00422 (0.00527)	0.000993 (0.00633)
Government consumption (% of GDP)	-0.0110** (0.00499)	-0.0146 (0.0124)	-0.0251** (0.0116)	-0.0102 (0.00643)	-0.00835 (0.0144)	-0.0106** (0.00478)	-0.00867 (0.00988)	-0.0117** (0.00563)	-0.00814* (0.00486)
Inflation rate	-0.00422 (0.00836)	0.000728 (0.0111)	0.00275 (0.00871)	-0.00627 (0.00925)	4.10e-05 (0.0118)	-0.00488 (0.00854)	-0.00390 (0.00920)	-0.00367 (0.00860)	-0.00122 (0.00754)
Control of corruption	0.337*** (0.114)	0.136 (0.139)	0.192 (0.139)	0.301** (0.127)	0.168 (0.169)	0.313*** (0.101)	0.242** (0.105)	0.270** (0.116)	0.380*** (0.0915)
Log(overall MDRII index)		0.371 (0.357)							
Log(trade and investment)			-0.0200 (0.0507)	-0.00950 (0.0370)					
Log(money and finance)			0.0525 (0.123)		0.162 (0.195)				
Log(regional value chain)			-0.321 (0.390)			0.462* (0.254)			
Log(infrastructure and connectivity)			0.354 (0.457)				1.079** (0.468)		
Log(movement of people)			0.0164 (0.147)					0.167 (0.145)	
Log(institutional and social integration)			0.406 (0.316)						0.501*** (0.139)
Constant	0 (0)	3.962 (3.752)	5.140 (3.383)	0 (0)	4.506 (4.337)	0 (0)	0 (0)	6.070** (2.388)	8.699*** (1.347)
Observations	948	606	606	879	648	924	921	886	929
Number of countries	128	85	85	121	88	126	125	124	126
Number of instruments	25	26	31	26	26	26	26	26	26
AR(2) test p-value	0.300	0.317	0.278	0.409	0.322	0.198	0.330	0.288	0.124
Hansen test p-value	0.344	0.408	0.328	0.131	0.221	0.341	0.334	0.666	0.456

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

It is important to recall that our regional integration index measures a regional bias in economic integration relative to integration with the world. That is, the index may be higher for some countries that have just begun regional rather than global economic integration, while it may be lower for some countries that are very open and integrated with the world but not necessarily inclined toward integration, that is, only regionally oriented. Hence, to control for such an open-integration component in the regional integration index, we include the financial and trade openness variables. The impact of financial openness on growth can be either positive or negative. While it can positively influence growth by improving the allocation of capital, advanced financial integration may also negatively affect economic growth through an increase in the probability of financial crisis (Kose, Prasad, and Terrones 2008; Kose, Prasad, and Taylor 2009; Osada and Saito 2010). On the other hand, trade openness is often said to enhance economic growth through various channels as exploitation of comparative advantage, transmission, and adoption of new technologies, and diffusion of knowledge, scale economies, and exposure to competition (Tumwebaze and Ijjo 2015).

Table 8 presents the results when we control for financial openness. Column 1 shows that the logarithm of M2/GDP as proxy for financial openness turns out to be significantly positive. This indicates that financial openness, perhaps by improving the allocation of capital, can foster economic growth. In addition to financial openness, regional value chain and institutional and social integration continue to show a significant positive impact on growth (columns 6 and 9). Movement of people also turned significant (column 8) as infrastructure and connectivity lost its significance (column 7). The results suggest regional orientation in regional value chain, institutional and social integration, and movement of people, in particular, contribute to growth for regional economies. It is also noteworthy that secondary school enrollment, inflation rate, control of corruption, and the logarithm of M2/GDP remained significant and with the correct signs, while government consumption lost its negative significance to the inflation rate.

Table 9 shows the results when we add the control for trade openness, as proxied by the sum of exports and imports over GDP. While the effect of trade openness appears to be statistically insignificant, regional value chain, movement of people, and institutional and social integration show a significant positive impact on growth. At the same time, macroeconomic stability and governance (as proxied by the inflation rate and control of corruption index, respectively) turned out to be significant drivers of growth.

## **B. Impact of Regional Integration on Inequality**

Table 10 presents the results for the impact of regional integration on income inequality. Column 1 shows the significant positive coefficient of the Gini index (in logarithm, lagged one period), suggesting that higher inequality leads to greater poverty. Likewise, the estimated coefficients of the logarithm of real GDP per capita and its square are highly significant and of the expected signs and in accordance with Kuznet's theory. This indicates that at the early stages of development, inequality tends to increase as income rises until a certain threshold level of income. Thereafter, inequality declines as income increases. The results also show that higher population growth and inflation are associated with greater inequality.

Table 8: MDRII-Augmented Growth Regressions—with log(M2/GDP)

Dependent variable: Log (real GDP per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log(real GDP per capita), previous period	-0.0339 (0.205)	0.436 (0.314)	0.285 (0.282)	0.199 (0.326)	0.242 (0.254)	0.000983 (0.135)	-0.0499 (0.156)	-0.0669 (0.313)	-0.124 (0.103)
Secondary school enrollment	0.0189** (0.00761)	0.00853 (0.00833)	0.00906* (0.00524)	0.0124 (0.00817)	0.0147* (0.00795)	0.0180*** (0.00601)	0.0198*** (0.00641)	0.0190*** (0.00720)	0.0198*** (0.00530)
Investment (% of GDP)	-0.00752 (0.00675)	-0.00905 (0.00886)	-0.00808* (0.00469)	-0.0115 (0.0102)	-0.0147** (0.00611)	-0.00505 (0.00631)	-0.00719 (0.00566)	-0.00706 (0.00686)	-0.00323 (0.00487)
Government consumption (% of GDP)	-0.00855 (0.0151)	-0.0157 (0.0167)	-0.0290*** (0.00941)	-0.00458 (0.0170)	-0.0161 (0.0130)	-0.0217 (0.0186)	-0.00778 (0.0146)	-0.00845 (0.0152)	-0.0268 (0.0171)
Inflation rate	-0.0188* (0.0108)	-0.00926 (0.00813)	-0.00664 (0.00590)	-0.0155 (0.00977)	-0.0171 (0.0111)	-0.0190* (0.0108)	-0.0189* (0.0102)	-0.0215* (0.0122)	-0.00995 (0.0107)
Control of corruption	0.383*** (0.114)	0.176 (0.113)	0.275*** (0.0906)	0.216** (0.105)	0.226* (0.125)	0.360*** (0.100)	0.402*** (0.126)	0.302*** (0.0844)	0.393*** (0.0750)
Log(M2/GDP)	0.338*** (0.111)	0.130* (0.0766)	0.131 (0.0942)	0.271** (0.136)	0.168* (0.0930)	0.299*** (0.0989)	0.357*** (0.100)	0.304** (0.135)	0.319*** (0.0908)
Log(overall MDRII)		0.494 (0.383)							
Log(trade and investment)			-0.0265 (0.0426)	0.0703 (0.0704)					
Log(money and finance)			-0.0569 (0.111)		0.332 (0.228)				
Log(regional value chain)			-0.0998 (0.338)			0.871** (0.371)			
Log(infrastructure and connectivity)			0.187 (0.429)				-0.301 (0.614)		
Log(movement of people)			0.0898 (0.206)					0.545** (0.271)	
Log(institutional and social integration)			0.464** (0.233)						0.467*** (0.136)
Constant	(0.0980) 8.787*** (1.378)	(2.970) 0 (0)	(2.436) 0 (0)	(2.425) 0 (0)	(0.112) 7.113*** (2.216)	(0.853) 0 (0)	(0.0846) 8.649*** (0.973)	(0.0984) 9.555*** (2.567)	(0.672) 0 (0)
Observations	506	416	416	493	440	492	497	473	497
Number of countries	63	54	54	62	56	62	62	60	62
Number of instruments	26	27	32	47	27	27	27	27	27
AR(2) test p-value	0.687	0.462	0.369	0.455	0.364	0.778	0.724	0.275	0.566
Hansen test p-value	0.267	0.150	0.446	0.140	0.114	0.187	0.357	0.356	0.530

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 9: MDRII-Augmented Growth Regressions—with log(M2/GDP) and log(Trade Openness)

Dependent variable: Log(real GDP per capita)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log(real GDP per capita), previous period	-0.0835 (0.210)	0.641** (0.268)	0.217 (0.378)	0.0838 (0.370)	0.318 (0.208)	-0.0556 (0.138)	-0.119 (0.121)	-0.0694 (0.348)	-0.179** (0.0798)
Secondary school enrollment	0.0200** (0.00850)	0.00447 (0.00709)	0.0103 (0.00629)	0.0204* (0.0106)	0.0152** (0.00743)	0.0197*** (0.00657)	0.0218*** (0.00650)	0.0192** (0.00827)	0.0218*** (0.00541)
Government consumption (% of GDP)	-0.0115 (0.0150)	-0.0112 (0.0247)	-0.0299*** (0.0103)	-0.00653 (0.0136)	-0.0171 (0.0143)	-0.0235 (0.0179)	-0.0111 (0.0146)	-0.0134 (0.0148)	-0.0279 (0.0182)
Investment (% of GDP)	-0.00690 (0.00678)	-0.00981 (0.0151)	-0.00738 (0.00623)	-0.0112 (0.00883)	-0.00903* (0.00540)	-0.00464 (0.00596)	-0.00585 (0.00522)	-0.00742 (0.00693)	-0.00273 (0.00450)
Inflation rate	-0.0189 (0.0116)	-0.0110* (0.00657)	-0.00608 (0.00636)	-8.89e-05 (0.0138)	-0.0252** (0.00985)	-0.0200* (0.0118)	-0.0197* (0.0110)	-0.0203* (0.0123)	-0.0112 (0.0120)
Control of corruption	0.410*** (0.109)	0.0953 (0.0956)	0.273** (0.122)	0.204 (0.132)	0.182** (0.0884)	0.379*** (0.0958)	0.429*** (0.110)	0.315*** (0.0854)	0.394*** (0.0822)
Log(M2/GDP)	0.319** (0.129)	0.0789 (0.0741)	0.0599 (0.0963)	0.258** (0.121)	0.0605 (0.0639)	0.271** (0.115)	0.332*** (0.123)	0.273* (0.141)	0.263** (0.112)
Trade openness	0.000755 (0.00107)	0.000199 (0.000396)	0.00154 (0.00114)	0.00137 (0.00139)	0.00161* (0.000956)	0.000872 (0.000948)	0.000950 (0.000904)	0.000635 (0.000696)	0.00119 (0.000765)
Log(overall MDRII)		0.297 (0.275)							
Log(trade and investment)			-0.0127 (0.0504)	0.0883 (0.104)					
Log(money and finance)			-0.160 (0.174)		-0.121 (0.164)				
Log(regional value chain)			-0.291 (0.391)			0.871** (0.419)			
Log(infrastructure and connectivity)			0.389 (0.582)				-0.317 (0.628)		
Log(movement of people)			0.109 (0.269)					0.525* (0.284)	
Log(institutional and social integration)			0.567* (0.290)						0.494*** (0.170)
Constant	0 (0)	3.829 (2.829)	0 (0)	0 (0)	5.660*** (1.525)	0 (0)	9.016*** (0.724)	9.528*** (2.766)	0 (0)
Observations	506	416	416	493	440	492	497	473	497
Number of countries	63	54	54	62	56	62	62	60	62
Number of instruments	27	38	33	55	55	28	28	28	28
AR(2) test p-value	0.774	0.402	0.341	0.449	0.423	0.999	0.941	0.382	0.705
Hansen test p-value	0.245	0.175	0.211	0.166	0.101	0.206	0.378	0.342	0.511

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.



Table 10: MDRII-Augmented Inequality Regressions—Baseline

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Gini index), previous period	0.0147*** (0.00445)	0.0162*** (0.00362)	0.0169*** (0.00428)	0.0190*** (0.00473)	0.0131*** (0.00337)	0.0154*** (0.00497)	0.0102** (0.00413)	0.0129*** (0.00351)
Log(real GDP per capita)	2.768*** (0.821)	3.736*** (0.969)	1.713 (1.342)	2.049*** (0.620)	2.260** (1.070)	3.047*** (0.687)	1.360 (1.820)	1.214 (1.375)
Log <sup>2</sup> (real GDP per capita)	-0.149*** (0.0447)	-0.189*** (0.0491)	-0.0950 (0.0690)	-0.111*** (0.0345)	-0.134*** (0.0510)	-0.153*** (0.0366)	-0.0842 (0.0918)	-0.0758 (0.0707)
Log(secondary school enrollment)	-0.0593 (0.0491)	-0.0523 (0.0539)	-0.0593 (0.0581)	-0.0420 (0.0629)	-0.0286 (0.0424)	-0.0542 (0.0639)	-0.0688 (0.0792)	-0.00102 (0.0572)
Log(social benefit incidence)	-0.00580 (0.0129)	-0.00976 (0.0113)	-0.000164 (0.0139)	0.00248 (0.0112)	-0.00598 (0.0113)	0.000566 (0.0148)	0.000348 (0.00845)	-0.00369 (0.0113)
Population growth	0.0533** (0.0263)	0.0106 (0.0145)	0.0365 (0.0251)	-0.00590 (0.0175)	0.0590*** (0.0206)	0.0544* (0.0283)	0.0851*** (0.0272)	0.0594*** (0.0224)
Inflation rate	0.00367** (0.00165)	0.00414** (0.00169)	0.00221 (0.00144)	0.00330** (0.00149)	0.00364*** (0.00128)	0.00352* (0.00194)	0.00333*** (0.00125)	0.00397*** (0.00152)
Log(overall MDRII)		-2.153 (1.949)						
Log(overall MDRII) x log(real GDP per capita)		0.208 (0.210)						
Log(trade and investment)			0.357 (0.375)					
Log(trade and investment) x log(real GDP per capita)			-0.0381 (0.0405)					
Log(money and finance)				-0.129 (0.553)				
Log(money and finance) x log(real GDP per capita)				0.00395 (0.0618)				
Log(regional value chain)					2.393 (2.079)			
Log(real value chain) x log(real GDP per capita)					-0.256 (0.222)			
Log(infrastructure and connectivity)						-2.809** (1.364)		
Log(infrastructure and connectivity) x log(real GDP per capita)						0.314** (0.156)		
Log(movement of people)							1.838 (1.591)	

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Table 10 *continued*

<b>Dependent variable: Log(Gini index)</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>
Log(movement of people) x log(real GDP per capita)							-0.193 (0.173)	
Log(institutional and social integration)								1.817 (1.133)
Log(institutional and social integration) x log(real GDP per capita)								-0.188 (0.126)
Constant	-9.519*** (3.617)	-15.35*** (4.907)	-4.448 (6.250)	-6.441** (2.551)	-6.110 (5.657)	-11.73*** (3.101)	-1.760 (8.844)	-1.513 (6.614)
Observations	88	60	88	61	88	88	87	88
Number of countries	25	19	25	20	25	25	24	25
Number of instruments	15	17	17	17	17	17	17	17
AR(2) test p-value	0.977	0.393	0.686	0.461	0.989	0.850	0.680	0.972
Hansen test p-value	0.335	0.413	0.297	0.260	0.522	0.370	0.674	0.427

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

On the other hand, of all the dimensions of regional integration, only infrastructure and connectivity turned out significant (column 6). In particular, its negative coefficient implies that infrastructure and connectivity improve income distribution. Meanwhile, the significant positive sign of the interaction term between infrastructure and connectivity and real GDP per capita (in logarithm) indicates that the effect of infrastructure and connectivity will be positive on the Gini index (that is, it will lead to greater inequality) at higher income levels. Moreover, infrastructure and connectivity and its interaction with real GDP per capita retains its significance even when controlling for trade openness and governance as proxied by control of corruption (column 6 of Tables 11 and 12).

Infrastructure and connectivity could lower inequality plausibly through the trade channel. The infrastructure and connectivity dimension of the MDRII covers trade costs and shipping connectivity, which form part of transaction technology, the type of technology that matters for trade. The transactions technology could lead to a “virtuous trade cycle” through which opening up for trade increases efficiency, which in turn leads to more trade (Sala-i-Martin 2007). With greater trade, as predicted by Heckscher–Ohlin and Stolper–Samuelson traditional trade theories, wages of unskilled workers that abound in low-income countries tend to rise, while those of unskilled workers in high-income countries would likely decline. This results in lower inequality for poor countries and higher inequality for rich countries. This could account for the positive sign of the interaction term of infrastructure and connectivity and real GDP per capita.

### C. Impact of Regional Integration on Poverty

The first column of Table 13 presents the results for the baseline specification of our poverty regression. The results show that higher income reduces poverty, while greater inequality and increased government consumption are associated with higher poverty.

The overall MDRII index yielded a significant and negative coefficient, which indicates that broad-based regional integration could help reduce poverty (column 2). The significant positive coefficient of its interaction with the logarithm of GDP per capita implies that the poverty-increasing impact of regional integration tends to be greater at high income levels. Moreover, the dimensions of trade and investment, money and finance, and institutional and social integration and their interactions with real GDP per capita turned out significant and similarly signed as the overall MDRII index and its interaction with real GDP per capita (columns 3, 4, and 8). The significance and the signs of the coefficients of overall MDRII and the dimensions of money and finance, trade and investment, and institutional and social integration were retained even after controlling for trade openness (columns 2, 3, 4, and 8 of Table 14).

In addition, the greater magnitude (in absolute value) of the coefficient of the overall MDRII indicates that regional integration efforts would be more effective in reducing poverty when undertaken in an integrated rather than piecemeal fashion.

Table 11: MDRII-Augmented Inequality Regressions—with log(Trade Openness)

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Gini index), previous period	0.0155*** (0.00385)	0.0168 (0.0327)	0.0168*** (0.00451)	0.0155** (0.00689)	0.0137*** (0.00368)	0.0161*** (0.00417)	0.0130*** (0.00501)	0.0137*** (0.00350)
Log(real GDP per capita)	2.645*** (0.779)	3.760 (12.56)	1.694 (1.330)	2.621** (1.188)	2.229** (1.063)	3.008*** (0.665)	1.227 (2.009)	1.243 (1.498)
Log <sup>2</sup> (real GDP per capita)	-0.142*** (0.0425)	-0.189 (0.600)	-0.0939 (0.0685)	-0.143** (0.0642)	-0.130*** (0.0504)	-0.146*** (0.0331)	-0.0714 (0.102)	-0.0765 (0.0759)
Log(secondary school enrollment)	-0.0858 (0.0627)	-0.202 (0.757)	-0.0913 (0.0766)	-0.119 (0.141)	-0.0604 (0.0631)	-0.113* (0.0684)	-0.171 (0.131)	-0.0240 (0.0649)
Log(social benefit incidence)	-0.00368 (0.0116)	-0.00197 (0.117)	0.000317 (0.0134)	-0.00181 (0.0118)	-0.00413 (0.0111)	0.00395 (0.0129)	0.000523 (0.0112)	-0.00149 (0.00974)
Population growth	0.0478* (0.0246)	0.0163 (0.0630)	0.0346 (0.0262)	-6.63e-05 (0.0250)	0.0548** (0.0231)	0.0516** (0.0249)	0.0644** (0.0327)	0.0556*** (0.0214)
Inflation rate	0.00384** (0.00183)	0.00415 (0.0148)	0.00235 (0.00151)	0.00365** (0.00164)	0.00367*** (0.00141)	0.00365 (0.00228)	0.00299** (0.00145)	0.00396** (0.00169)
Log(trade openness)	-0.0204 (0.0225)	-0.0480 (0.155)	-0.0275 (0.0236)	-0.0184 (0.0377)	-0.0161 (0.0265)	-0.0352 (0.0277)	-0.0463 (0.0306)	-0.0114 (0.0312)
Log(overall MDRII)		-2.444 (23.06)						
Log(overall MDRII) x log(real GDP per capita)		0.249 (2.377)						
Log(trade and investment)			0.355 (0.356)					
Log(trade and investment) x log(real GDP per capita)			-0.0371 (0.0383)					
Log(money and finance)				0.0354 (0.452)				
Log(money and finance) x log(real GDP per capita)				-0.0147 (0.0487)				
Log(regional value chain)					1.954 (2.364)			
Log(real value chain) x log(real GDP per capita)					-0.213 (0.252)			
Log(infrastructure and connectivity)						-3.855** (1.563)		
Log(infrastructure and connectivity) x log(real GDP per capita)						0.426** (0.173)		
Log(movement of people)							0.994 (1.558)	

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Table 11 *continued*

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(movement of people) x log(real GDP per capita)							-0.102 (0.170)	
Log(institutional and social integration)								1.694 (1.402)
Log(institutional and social integration) x log(real GDP per capita)								-0.175 (0.156)
Constant	-8.793*** (3.402)	-14.63 (62.58)	-4.105 (6.057)	-8.441* (4.532)	-6.035 (5.620)	-11.58*** (3.092)	-1.102 (9.445)	-1.605 (7.124)
Observations	88	60	88	61	88	88	87	88
Number of countries	25	19	25	20	25	25	24	25
Number of instruments	16	18	18	18	18	18	18	18
AR(2) test p-value	0.920	0.905	0.646	0.323	0.936	0.736	0.664	0.896
Hansen test p-value	0.351	0.175	0.322	0.230	0.496	0.481	0.403	0.412

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 12: MDRII-Augmented Inequality Regressions—with log(Trade Openness) and Control of Corruption Index

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Gini index), previous period	0.0156*** (0.00361)	0.0149** (0.00676)	0.0170*** (0.00419)	0.0141** (0.00678)	0.0146*** (0.00357)	0.0161*** (0.00420)	0.0135** (0.00625)	0.0134*** (0.00329)
Log(real GDP per capita)	2.656*** (0.835)	3.784** (1.560)	1.612 (1.111)	2.767*** (1.066)	2.237* (1.225)	3.133*** (0.841)	0.619 (1.927)	1.237 (1.454)
Log <sup>2</sup> (real GDP per capita)	-0.143*** (0.0457)	-0.194** (0.0806)	-0.0907 (0.0579)	-0.154** (0.0605)	-0.127** (0.0571)	-0.153*** (0.0407)	-0.0403 (0.0956)	-0.0777 (0.0753)
Log(secondary school enrollment)	-0.0749 (0.0671)	-0.235* (0.122)	-0.0820 (0.0684)	-0.144 (0.146)	-0.0680 (0.0770)	-0.119* (0.0674)	-0.180 (0.128)	-0.00715 (0.0653)
Log(social benefit incidence)	-0.00425 (0.00999)	-0.00402 (0.0160)	0.000375 (0.0108)	-0.00317 (0.0117)	-0.00494 (0.00950)	0.00313 (0.0123)	-0.00234 (0.0124)	-0.00144 (0.00822)
Population growth	0.0510** (0.0250)	0.0234 (0.0262)	0.0399 (0.0296)	0.00167 (0.0207)	0.0509** (0.0221)	0.0532** (0.0249)	0.0634* (0.0365)	0.0597** (0.0254)
Inflation rate	0.00404** (0.00188)	0.00399** (0.00196)	0.00273* (0.00148)	0.00329 (0.00205)	0.00399** (0.00168)	0.00402* (0.00226)	0.00273 (0.00168)	0.00431** (0.00174)
Log(trade openness)	-0.0210 (0.0269)	-0.0579 (0.0370)	-0.0272 (0.0246)	-0.0214 (0.0370)	-0.0195 (0.0316)	-0.0393 (0.0347)	-0.0494 (0.0329)	-0.0137 (0.0321)
Control of corruption	0.0248 (0.0214)	0.0334 (0.0401)	0.0255 (0.0239)	0.0344 (0.0327)	0.0195 (0.0190)	0.0313 (0.0225)	0.0336 (0.0310)	0.0239 (0.0267)
Log(overall MDRII)		-1.957 (2.601)						
Log(overall MDRII) x log(real GDP per capita)		0.196 (0.278)						
Log(trade and investment)			0.416 (0.322)					
Log(trade and investment) x log(real GDP per capita)			-0.0436 (0.0346)					
Log(money and finance)				0.528 (0.867)				
Log(money and finance) x log(real GDP per capita)				-0.0685 (0.0947)				
Log(regional value chain)					1.204 (2.580)			
Log(real value chain) x log(real GDP per capita)					-0.132 (0.276)			
Log(infrastructure and connectivity)						-4.082** (1.942)		

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Table 12 *continued*

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(infrastructure and connectivity) x log(real GDP per capita)						0.454** (0.211)		
Log(movement of people)							1.198 (1.820)	
Log(movement of people) x log(real GDP per capita)							-0.126 (0.200)	
Log(institutional and social integration)								1.814 (1.167)
Log(institutional and social integration) x log(real GDP per capita)								-0.187 (0.129)
Constant	-8.842** (3.742)	-14.11* (7.531)	-3.658 (4.996)	-8.597** (3.861)	-6.371 (6.593)	-12.10*** (4.110)	1.890 (9.265)	-1.492 (6.777)
Observations	88	60	88	61	88	88	87	88
Number of countries	25	19	25	20	25	25	24	25
Number of instruments	17	19	19	19	19	19	19	19
AR(2) test p-value	0.993	0.623	0.701	0.398	0.969	0.836	0.843	0.991
Hansen test p-value	0.248	0.414	0.315	0.233	0.323	0.374	0.369	0.353

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 13: MDRII-Augmented Poverty Regressions—Baseline

Dependent variable: Log(poverty headcount ratio)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(poverty headcount ratio), previous period	0.555*** (0.124)	0.364** (0.154)	0.523*** (0.137)	0.454*** (0.129)	0.515*** (0.133)	0.499*** (0.142)	0.499*** (0.140)	0.381*** (0.127)
Log(real GDP per capita)	-0.458*** (0.151)	1.714** (0.708)	-0.0677 (0.183)	0.906** (0.392)	-0.0308 (0.708)	-0.394 (0.594)	-0.0771 (0.279)	0.00803 (0.275)
Log(Gini index)	1.052** (0.518)	2.834*** (0.755)	1.436** (0.591)	1.588** (0.659)	1.268** (0.551)	1.286** (0.551)	1.604** (0.639)	2.292*** (0.607)
Log(overall MDRII)		-25.06*** (8.317)						
Log(overall MDRII) x log(real GDP per capita)		2.656*** (0.878)						
Log(trade and investment)			-2.645** (1.095)					
Log(trade and investment) x log(real GDP per capita)			0.284** (0.121)					
Log(money and finance)				-15.48*** (4.540)				
Log(money and finance) x log(real GDP per capita)				1.613*** (0.471)				
Log(regional value chain)					-5.181 (7.541)			
Log(real value chain) x log(real GDP per capita)					0.639 (0.775)			
Log(infrastructure and connectivity)						-2.337 (7.921)		
Log(infrastructure and connectivity) x log(real GDP per capita)						0.349 (0.826)		
Log(movement of people)							-4.088* (2.376)	
Log(movement of people) x log(real GDP per capita)							0.441* (0.249)	
Log(institutional and social integration)								-9.422*** (2.747)
Log(institutional and social integration) x log(real GDP per capita)								1.050*** (0.297)

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Table 13 *continued*

<b>Dependent variable: Log(poverty headcount ratio)</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>
Constant	0.690 (1.578)	-26.54*** (8.109)	-4.398 (2.701)	-14.57*** (4.350)	-3.378 (7.522)	-0.130 (5.998)	-4.902 (3.349)	-8.014** (3.899)
Observations	294	233	293	235	294	294	292	294
Number of countries	43	35	43	37	43	43	41	43
Number of instruments	13	15	15	15	15	15	15	15
AR(2) test p-value	0.0980	0.213	0.105	0.0720	0.152	0.0896	0.117	0.150
Hansen test p-value	0.255	0.143	0.148	0.149	0.254	0.335	0.320	0.525

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 14: MDRII-Augmented Poverty Regressions—with log(Trade Openness)

Dependent variable: Log(poverty headcount ratio)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(poverty headcount ratio), previous period	0.549*** (0.123)	0.362** (0.148)	0.526*** (0.137)	0.455*** (0.123)	0.515*** (0.131)	0.495*** (0.141)	0.499*** (0.136)	0.374*** (0.128)
Log(real GDP per capita)	-0.465*** (0.153)	1.806*** (0.648)	-0.0739 (0.179)	0.895** (0.352)	-0.102 (0.770)	-0.490 (0.612)	-0.0940 (0.292)	0.0714 (0.284)
Log(Gini index)	1.109** (0.513)	2.841*** (0.731)	1.385** (0.573)	1.628*** (0.591)	1.249** (0.541)	1.293** (0.546)	1.616*** (0.607)	2.341*** (0.644)
Log(trade openness)	0.0505 (0.122)	0.0461 (0.157)	0.0252 (0.133)	0.104 (0.163)	0.0205 (0.135)	0.0106 (0.113)	0.0377 (0.134)	-0.0483 (0.111)
Log(overall MDRII)		-26.61*** (7.314)						
Log(overall MDRII) x log(real GDP per capita)		2.828*** (0.768)						
Log(trade and investment)			-2.737** (1.088)					
Log(trade and investment) x log(real GDP per capita)			0.296** (0.120)					
Log(money and finance)				-15.62*** (4.155)				
Log(money and finance) x log(real GDP per capita)				1.624*** (0.431)				
Log(regional value chain)					-4.507 (8.101)			
Log(real value chain) x log(real GDP per capita)					0.573 (0.828)			
Log(infrastructure and connectivity)						-0.986 (8.292)		
Log(infrastructure and connectivity) x log(real GDP per capita)						0.218 (0.859)		
Log(movement of people)							-3.837 (2.475)	
Log(movement of people) x log(real GDP per capita)							0.413 (0.261)	
Log(institutional and social integration)								-10.48*** (3.013)

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Table 14 *continued*

<b>Dependent variable: Log(poverty headcount ratio)</b>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(institutional and social integration) x log(real GDP per capita)								1.162*** (0.325)
Constant	0.314 (1.554)	-27.61*** (7.907)	-4.273 (2.611)	-15.10*** (4.231)	-2.689 (7.919)	0.777 (6.034)	-4.977 (3.268)	-8.600** (4.204)
Observations	293	233	292	235	293	293	291	293
Number of countries	42	35	42	37	42	42	40	42
Number of instruments	14	16	16	16	16	16	16	16
AR(2) test p-value	0.101	0.222	0.108	0.0744	0.152	0.0886	0.117	0.153
Hansen test p-value	0.270	0.168	0.139	0.199	0.247	0.331	0.327	0.534

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

## V. ROBUSTNESS CHECKS

We have run a battery of robustness tests. First, for the growth regressions, we excluded one region at a time in the system GMM estimations.<sup>5</sup> Table 15, top panel, summarizes the results of excluding one region at a time. Regional value chain, movement of people, and institutional and social integration are relatively more robust to the exclusion of regions than other dimensions.<sup>6</sup>

Second, for the inequality regressions, we run alternative regressions that employ government consumption spending as proxy for social transfers in lieu of social benefit incidence. Using government consumption spending allows us to include substantially more countries in the regression, but it is likely that government consumption spending would contain some part of the infrastructure and connectivity component. The results also show that infrastructure and connectivity are no longer significant in the alternative regressions (Tables 16 to 18). Instead, the money and finance dimension and its interaction with real GDP per capita turned significant.

Finally, for our poverty regressions, we employed poverty gap in lieu of poverty headcount ratio. As shown in Tables 19 and 20, the coefficients of the overall index and the dimensions subindexes of trade and investment, money and finance, and institutional and social integration and their interactions with real GDP per capita remained significant and of the same sign. This indicates that the results remain robust to the different measures of poverty and underscores the poverty-reducing impact of overall regional integration and the dimensions of trade and investment, money and finance, and institutional and social integration.

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<sup>5</sup> Running GMM regressions including only one region is not computationally feasible for some regions due to the drastic decline in the degrees of freedom from full sample to regional subsample. For regions where GMM can be estimated, instruments tend to proliferate (that is, the number of instruments far exceed the number of countries) which can overfit endogenous variables and fail to expunge their endogenous components (Roodman 2009). Meanwhile, excluding one region at a time is not possible for inequality and poverty regressions due to the already low degrees of freedom in the pooled sample as many countries do not have data on the Gini index and poverty headcount ratio.

<sup>6</sup> As a further robustness check, we also estimated fixed effects growth regressions by taking the average of the variables for two nonoverlapping periods, 2006–2011 and 2012–2016. Averaging over 5-year periods (at the least), as is typical in the empirical growth literature, helps control for business cycle fluctuations. Results show that regional value chain turned out to be the only significant dimension of regional integration. To address endogeneity, we also instrumented investment, government consumption, and inflation by their initial values in averaged periods. Again, of all the dimensions of regional integration, only regional value chain remained significant.

Table 15: Summary of Significance of Overall Multidimensional Regional Integration Index and Dimensional Subindexes in Growth Regressions

	Excluding Africa	Excluding LA	Excluding EU	Excluding Asia
<b>Baseline specification</b>				
Composite index	**	-	-	-
Trade and investment	-	-	-	-
Money and finance	-	-	-	-
Regional value chain	-	-	-	-
Infrastructure and connectivity	-	-	**	-
Movement of people	-	*	-	-
Institutional and social integration	-	**	***	*
<b>Baseline specification + financial openness</b>				
Composite index	-	-	-	-
Trade and investment	-	-	-	-
Money and finance	-	-	-	-
Regional value chain	***	**	-	**
Infrastructure and connectivity	-	-	-	-
Movement of people	-	**	-	***
Institutional and social integration	*	-	-	*
<b>Baseline specification + financial openness + trade openness</b>				
Composite index	-	-	-	-
Trade and investment	-	-	-	-
Money and finance	(-)**	-	-	-
Regional value chain	**	**	-	**
Infrastructure and connectivity	-	-	-	-
Movement of people	-	*	-	***
Institutional and social integration	-	***	-	*

EU = European Union, LA = Latin America.

Notes: \*\*\*, \*\*, \* indicate positive significance at 1%, 5%, and 10% level, respectively. Negative significance is indicated by “(-)”. Source: Authors’ calculations.

Table 16: Alternative MDRII-Augmented Inequality Regressions—Using Government Consumption as Proxy for Social Transfers

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Gini index), previous period	0.000136 (0.00895)	0.00289 (0.0111)	0.0100 (0.00726)	0.0137*** (0.00524)	0.00666 (0.00820)	0.00460 (0.00894)	0.00135 (0.00791)	0.00497 (0.0104)
Log(real GDP per capita)	1.575 (1.098)	-0.00651 (1.129)	0.505 (0.563)	1.198*** (0.448)	0.0397 (0.942)	1.083 (0.920)	-0.102 (0.935)	-0.878 (0.900)
Log <sup>2</sup> (real GDP per capita)	-0.0889 (0.0577)	-0.0147 (0.0543)	-0.0329 (0.0288)	-0.0575** (0.0230)	-0.0227 (0.0433)	-0.0639 (0.0488)	-0.0122 (0.0475)	0.0257 (0.0366)
Log(secondary school enrollment)	0.0495 (0.194)	-0.0460 (0.0761)	-0.0169 (0.0754)	0.00464 (0.0538)	0.00968 (0.102)	0.0161 (0.126)	0.0286 (0.144)	0.0380 (0.0855)
Log(government consumption as % of GDP)	-0.174** (0.0779)	-0.138 (0.0936)	-0.0928 (0.0617)	-0.0650 (0.0516)	-0.121 (0.0815)	-0.175** (0.0768)	-0.151** (0.0673)	-0.0813 (0.0853)
Population growth	0.0573* (0.0312)	0.0268 (0.0225)	0.0316 (0.0235)	0.00358 (0.00964)	0.0388 (0.0248)	0.0554 (0.0365)	0.0525* (0.0315)	0.0309 (0.0242)
Inflation rate	-0.000774 (0.00144)	-0.00133 (0.00131)	-0.000470 (0.00120)	-0.000231 (0.00122)	-0.000656 (0.00127)	-0.000595 (0.00154)	-0.000321 (0.00144)	9.80e-05 (0.00123)
Log(overall MDRII)		2.122 (1.563)						
Log(overall MDRII) x log(real GDP per capita)		-0.240 (0.168)						
Log(trade and investment)			0.351 (0.242)					
Log(trade and investment) x log(real GDP per capita)			-0.0390 (0.0256)					
Log(money and finance)				-1.437** (0.704)				
Log(money and finance) x log(real GDP per capita)				0.137* (0.0703)				
Log(regional value chain)					3.320 (2.282)			
Log(real value chain) x log(real GDP per capita)					-0.343 (0.230)			
Log(infrastructure and connectivity)						0.787 (1.988)		
Log(infrastructure and connectivity) x log(real GDP per capita)						-0.0746 (0.205)		

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Table 16 *continued*

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(movement of people)							1.893 (1.320)	
Log(movement of people) x log(real GDP per capita)							-0.190 (0.140)	
Log(institutional and social integration)								3.317* (1.880)
Log(institutional and social integration) x log(real GDP per capita)								-0.344* (0.193)
Constant	-3.028 (5.118)	5.407 (5.821)	1.742 (2.650)	-3.046 (2.101)	5.395 (5.288)	-0.585 (4.319)	6.046 (4.533)	9.601* (5.621)
Observations	367	317	366	319	367	367	365	367
Number of countries	47	40	47	42	47	47	45	47
Number of instruments	17	19	19	19	19	19	19	19
AR(2) test p-value	0.576	0.872	0.829	0.208	0.973	0.448	0.669	0.692
Hansen test p-value	0.408	0.853	0.454	0.787	0.381	0.190	0.352	0.154

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 17: Alternative MDRII-Augmented Inequality Regressions—Using Government Consumption as Proxy for Social Transfers and with log(Trade Openness)

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Gini index), previous period,	0.00857 (0.00833)	0.0145** (0.00652)	0.0108* (0.00603)	0.0144*** (0.00423)	0.0107 (0.00763)	0.00862 (0.00855)	0.0132** (0.00627)	0.0152** (0.00628)
Log(real GDP per capita)	0.921 (0.696)	0.181 (0.864)	0.226 (0.567)	0.953** (0.372)	-0.0444 (0.853)	0.670 (0.659)	-0.324 (0.566)	-0.362 (0.621)
Log <sup>2</sup> (real GDP per capita)	-0.0512 (0.0365)	-0.0136 (0.0408)	-0.0179 (0.0280)	-0.0450** (0.0192)	-0.0121 (0.0391)	-0.0404 (0.0335)	0.00825 (0.0271)	0.00950 (0.0282)
Log(secondary school enrollment)	-0.0191 (0.0847)	-0.0308 (0.0753)	-0.0230 (0.0682)	0.00387 (0.0505)	-0.0166 (0.0855)	0.00704 (0.0867)	-0.0197 (0.0769)	0.00860 (0.0502)
Log(government consumption as % of GDP)	-0.144 (0.0974)	-0.104 (0.0870)	-0.111* (0.0652)	-0.0908 (0.0557)	-0.122 (0.0925)	-0.163* (0.0953)	-0.0973 (0.0635)	-0.0487 (0.0517)
Population growth	0.0317 (0.0256)	0.00730 (0.0158)	0.0236 (0.0210)	-0.00136 (0.00954)	0.0204 (0.0207)	0.0362 (0.0304)	0.0188 (0.0226)	0.00756 (0.0175)
Inflation rate	-0.000489 (0.00145)	-0.000926 (0.00116)	-0.000407 (0.00117)	-0.000305 (0.00103)	-0.000578 (0.00128)	-0.000386 (0.00148)	-0.000289 (0.00111)	-0.000110 (0.00113)
Log(trade openness)	-0.0392 (0.0317)	-0.0396 (0.0304)	-0.0375 (0.0258)	-0.0331 (0.0206)	-0.0377 (0.0323)	-0.0376 (0.0338)	-0.0416 (0.0255)	-0.0275 (0.0228)
Log(overall MDRII)		0.534 (1.097)						
Log(overall MDRII) x log(real GDP per capita)		-0.0632 (0.115)						
Log(trade and investment)			0.379 (0.250)					
Log(trade and investment) x log(real GDP per capita)			-0.0411 (0.0263)					
Log(money and finance)				-1.236** (0.594)				
Log(money and finance) x log(real GDP per capita)				0.119** (0.0600)				
Log(regional value chain)					2.435 (1.937)			
Log(real value chain) x log(real GDP per capita)					-0.257 (0.196)			
Log(infrastructure and connectivity)						0.657 (1.724)		

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Table 17 *continued*

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(infrastructure and connectivity) x log(real GDP per capita)						-0.0630 (0.178)		
Log(movement of people)							1.117 (0.899)	
Log(movement of people) x log(real GDP per capita)							-0.115 (0.0960)	
Log(institutional and social integration)								1.690 (1.095)
Log(institutional and social integration) x log(real GDP per capita)								-0.177 (0.114)
Constant	-0.164 (3.076)	3.140 (4.534)	3.250 (2.861)	-1.634 (1.801)	5.311 (4.727)	1.218 (3.320)	6.034** (3.063)	5.884 (3.700)
Observations	367	317	366	319	367	367	365	367
Number of countries	47	40	47	42	47	47	45	47
Number of instruments	18	20	20	20	20	20	20	20
AR(2) test p-value	0.504	0.514	0.920	0.217	0.834	0.445	0.601	0.634
Hansen test p-value	0.0967	0.239	0.306	0.726	0.187	0.0859	0.0713	0.0423

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 18: Alternative MDRII-Augmented Inequality Regressions—Using Government Consumption as Proxy for Social Transfers and with log(Trade Openness) and Control of Corruption Index

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Gini index), previous period	0.00789 (0.00782)	0.0152*** (0.00541)	0.00906 (0.00565)	0.0146*** (0.00389)	0.00918 (0.00713)	0.00692 (0.00856)	0.0141** (0.00567)	0.0139** (0.00683)
Log(real GDP per capita)	1.155* (0.697)	0.144 (0.752)	0.350 (0.605)	1.110*** (0.402)	0.276 (0.932)	0.871 (0.665)	-0.194 (0.534)	-0.244 (0.650)
Log <sup>2</sup> (real GDP per capita)	-0.0654* (0.0374)	-0.0138 (0.0359)	-0.0271 (0.0302)	-0.0546** (0.0215)	-0.0302 (0.0436)	-0.0542 (0.0356)	0.00155 (0.0258)	0.000806 (0.0299)
Log(secondary school enrollment)	-0.00969 (0.0910)	-0.0155 (0.0613)	-0.0105 (0.0864)	0.00623 (0.0496)	-0.0155 (0.0952)	0.00920 (0.0947)	-0.0234 (0.0699)	0.0141 (0.0539)
Log(government consumption as % of GDP)	-0.165* (0.0968)	-0.107 (0.0717)	-0.140* (0.0717)	-0.102* (0.0546)	-0.149 (0.0949)	-0.182* (0.0997)	-0.0976* (0.0550)	-0.0707 (0.0624)
Population growth	0.0367 (0.0255)	0.00687 (0.0132)	0.0301 (0.0208)	0.000230 (0.00919)	0.0245 (0.0209)	0.0442 (0.0314)	0.0176 (0.0207)	0.0126 (0.0205)
Inflation rate	-0.000544 (0.00143)	-0.000908 (0.00116)	-0.000728 (0.00130)	-0.000322 (0.00105)	-0.000779 (0.00127)	-0.000522 (0.00140)	-0.000325 (0.00111)	-0.000151 (0.00121)
Log(trade openness)	-0.0394 (0.0305)	-0.0395 (0.0257)	-0.0392 (0.0269)	-0.0334* (0.0196)	-0.0397 (0.0335)	-0.0406 (0.0349)	-0.0406* (0.0213)	-0.0278 (0.0224)
Control of corruption	0.0343 (0.0266)	0.0164 (0.0194)	0.0292 (0.0215)	0.0171 (0.0187)	0.0329 (0.0269)	0.0329 (0.0296)	0.0151 (0.0198)	0.0285 (0.0280)
Log(overall MDRII)		0.821 (0.995)						
Log(overall iMDRII) x log(real GDP per capita)		-0.0934 (0.105)						
Log(trade and investment)			0.468* (0.244)					
Log(trade and investment) x log(real GDP per capita)			-0.0506** (0.0256)					
Log(money and finance)				-1.081* (0.570)				
Log(money and finance) x log(real GDP per capita)				0.103* (0.0579)				
Log(regional value chain)					2.303 (2.034)			
Log(real value chain) x log(real GDP per capita)					-0.246 (0.206)			

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Table 18 *continued*

Dependent variable: Log(Gini index)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(infrastructure and connectivity)						1.021 (1.897)		
Log(infrastructure and connectivity) x log(real GDP per capita)						-0.102 (0.196)		
Log(movement of people)							0.990 (0.840)	
Log(movement of people) x log(real GDP per capita)							-0.101 (0.0895)	
Log(institutional and social integration)								1.750 (1.133)
Log(institutional and social integration) x log(real GDP per capita)								-0.180 (0.117)
Constant	-1.056 (2.986)	3.426 (4.016)	3.007 (2.921)	-2.242 (1.890)	4.019 (5.062)	0.659 (3.135)	5.384* (2.893)	5.650 (3.850)
Observations	367	317	366	319	367	367	365	367
Number of countries	47	40	47	42	47	47	45	47
Number of instruments	19	21	21	21	21	21	21	21
AR(2) test p-value	0.376	0.482	0.972	0.200	0.700	0.306	0.555	0.537
Hansen test p-value	0.142	0.253	0.514	0.706	0.303	0.152	0.0716	0.0558

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 19: Alternative MDRII-Augmented Poverty Regressions—Using Poverty Gap as Measure of Poverty

Dependent variable: Log(poverty gap)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(poverty gap), previous period	0.393** (0.176)	0.292** (0.145)	0.409*** (0.152)	0.298* (0.178)	0.393** (0.164)	0.377** (0.168)	0.340* (0.187)	0.308** (0.145)
Log(real GDP per capita)	-0.301** (0.150)	1.717*** (0.518)	0.170 (0.152)	1.090*** (0.354)	-0.137 (0.622)	-0.290 (0.605)	0.0983 (0.379)	0.417 (0.313)
Log(Gini index)	1.621** (0.671)	3.089*** (0.817)	1.915*** (0.632)	2.349** (0.923)	1.654*** (0.554)	1.796*** (0.687)	2.192*** (0.665)	2.881*** (0.753)
Log(overall MDRII)		-22.16*** (6.209)						
Log(overall MDRII) x log(real GDP per capita)		2.388*** (0.651)						
Log(trade and investment)			-3.049** (1.188)					
Log(trade and investment) x log(real GDP per capita)			0.334** (0.131)					
Log(money and finance)				-15.97*** (4.719)				
Log(money and finance) x log(real GDP per capita)				1.688*** (0.508)				
Log(regional value chain)					-2.072 (5.911)			
Log(real value chain) x log(real GDP per capita)					0.315 (0.600)			
Log(infrastructure and connectivity)						-0.985 (8.721)		
Log(infrastructure and connectivity) x log(real GDP per capita)						0.229 (0.890)		
Log(movement of people)							-3.804 (2.472)	
Log(movement of people) x log(real GDP per capita)							0.415 (0.257)	
Log(institutional and social integration)								-9.230*** (2.348)
Log(institutional and social integration) x log(real GDP per capita)								1.009*** (0.242)

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Table 19 *continued*

Dependent variable: Log(poverty gap)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-3.301* (1.990)	-27.71*** (6.586)	-8.739*** (3.267)	-19.34*** (5.684)	-4.183 (6.028)	-3.297 (7.053)	-9.147** (3.566)	-14.76*** (4.901)
Observations	266	205	265	207	266	266	264	266
Number of countries	40	32	40	34	40	40	38	40
Number of instruments	13	15	15	15	15	15	15	15
AR(2) test p-value	0.519	0.659	0.867	0.930	0.562	0.516	0.590	0.644
Hansen test p-value	0.536	0.837	0.537	0.534	0.616	0.558	0.522	0.605

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 20: Alternative MDRII-Augmented Poverty Regressions—Using Poverty Gap as Measure of Poverty and with log(Trade Openness)

Dependent variable: Log(poverty gap)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(poverty gap), previous period	0.391** (0.186)	0.290** (0.148)	0.414*** (0.157)	0.290* (0.173)	0.391** (0.183)	0.392** (0.173)	0.336* (0.193)	0.318** (0.149)
Log(real GDP per capita)	-0.297* (0.153)	1.648*** (0.546)	0.158 (0.147)	1.056*** (0.318)	-0.244 (0.698)	-0.374 (0.672)	0.123 (0.375)	0.421 (0.370)
Log(Gini index)	1.610** (0.746)	2.936*** (0.889)	1.836*** (0.676)	2.243** (0.918)	1.608** (0.642)	1.666** (0.712)	2.202*** (0.733)	2.796*** (0.824)
Log(trade openness)	-0.0313 (0.118)	-0.0733 (0.109)	-0.0627 (0.0969)	-0.120 (0.121)	-0.0220 (0.126)	-0.0927 (0.104)	-0.0273 (0.130)	-0.0798 (0.105)
Log(overall MDRII)		-21.90*** (6.661)						
Log(overall MDRII) x log(real GDP per capita)		2.366*** (0.694)						
Log(trade and investment)			-2.970** (1.225)					
Log(trade and investment) x log(real GDP per capita)			0.327** (0.134)					
Log(money and finance)				-15.95*** (4.576)				
Log(money and finance) x log(real GDP per capita)				1.694*** (0.489)				
Log(regional value chain)					-0.935 (6.461)			
Log(real value chain) x log(real GDP per capita)					0.198 (0.650)			
Log(infrastructure and connectivity)						0.399 (9.816)		
Log(infrastructure and connectivity) x log(real GDP per capita)						0.0895 (0.998)		
Log(movement of people)							-3.953 (2.491)	
Log(movement of people) x log(real GDP per capita)							0.431* (0.261)	
Log(institutional and social integration)								-9.593*** (2.904)

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Table 20 *continued*

Dependent variable: Log(poverty gap)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(institutional and social integration) x log(real GDP per capita)								1.053*** (0.296)
Constant	-3.174 (2.324)	-26.12*** (7.633)	-8.057** (3.456)	-18.04*** (5.637)	-2.869 (6.431)	-1.565 (7.503)	-9.304*** (3.587)	-14.10** (5.959)
Observations	265	205	264	207	265	265	263	265
Number of countries	39	32	39	34	39	39	37	39
Number of instruments	14	16	16	16	16	16	16	16
AR(2) test p-value	0.518	0.660	0.868	0.956	0.548	0.501	0.593	0.628
Hansen test p-value	0.536	0.822	0.508	0.507	0.612	0.582	0.537	0.622

GDP = gross domestic product, MDRII = multidimensional regional integration index.

Notes: Windmeijer robust standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

## VI. CONCLUSION

In this paper, we employed a multidimensional approach in gauging regional integration and analyzing its impact on attaining development goals of higher growth, lower inequality, and reduced poverty. First, we constructed an MDRII series for 2006–2016. The MDRII embodies six dimensions that reflect the core socioeconomic components integral to the dynamic regional integration process. These include: (i) trade and investment, (ii) money and finance, (iii) regional value chains, (iv) infrastructure and connectivity, (v) movement of people, and (vi) institutional and social integration. The MDRII confirms that the EU is the most advanced (and consistently highest) in regional integration. Asia comes second, while showing an upward trend. Importantly, in recent years, the region's trade and investment dimension has surpassed that of the EU and several Asian economies have broken into the top tier in overall regional integration, dominated by the EU economies. Latin America follows while Africa comes last (albeit surpassing Latin America in 2009). The EU likewise scores highest on all dimensional subindexes, with only Asia's trade and investment integration comparable in magnitude to the EU's. The most significant contributors to regional integration have been infrastructure and connectivity for Asia, institutional and social integration for Latin America, and regional value chain for Africa, while dimensional contributions are broadly balanced for the EU.

The MDRII permitted us to explore how the different dimensions of regional integration, individually and collectively, impact on key development variables such as growth, inequality, and poverty. Our empirical analyses revealed that the dimensions of regional value chain, movement of people, and institutional and social integration have been significant drivers of economic growth. Throughout a series of robustness tests, regional value chain continues to show significant and positive impact on growth. Our results also show that infrastructure and connectivity lead to improved income distribution with its inequality-reducing effect stronger at low income levels.

Regional integration appears to hold greatest promise in reducing poverty. We find that overall integration and the dimensions of trade and investment, money and finance, and institutional and social integration are significant and robust drivers of poverty reduction. Their impact in curbing poverty is even more pronounced for lower-income countries. In addition, the overall degree of regional integration seems to exert more influence on poverty alleviation compared to more functionally and structurally focused regional integration efforts.

While regional integration proves to be an important factor for economic growth and development, the role of country-specific institutional and governance factors should not be overlooked. Our regression results likewise show that in conjunction with certain dimensions of regional integration and with overall integration, investment in human capital, macroeconomic stability, and institutional quality (as measured by secondary education, inflation, and control of corruption index, respectively) impact significantly on economic growth, income distribution, and poverty reduction.

In summary, the development impact of regional integration is significant and positive. Our empirical findings support that regional integration can be an effective development strategy. The findings are in line with the recognition by the United Nations of regional integration as an important tool to support national efforts in implementing the 2030 Agenda for Sustainable Development. Yet, they also highlight the importance and significance of national efforts to promote growth, narrow inequality, and reduce poverty. Continued structural reforms and institutional improvements at the country level would maximize the potential of regional integration in achieving sustainable development goals.



## APPENDIX

### Imputation of Missing Data

The majority of indicators (17 of 26) have available data for most countries, as shown in Table 3. To fill in missing data, we utilize various imputation methods. In particular, we linearly interpolate indicator V-a (proportion of intraregional outbound migration to total outbound migration) using bilateral migration data published every 5 years. For indicator V-c (Logistics Performance Index), we average available data in even years to impute missing data for the odd years in between.

Furthermore, we employ regression imputation for several indicators that lack data for specific countries, such as IV-a (regional and global average trade cost ratio), IV-c (Logistics Performance Index), and IV-c (Doing Business Index).

Meanwhile, instead of linear extrapolation, missing observations at the beginning or end of a series are substituted by the closest observation available. In effect, we carry the last nonmissing observation backward (forward) in the case of missing observations at the beginning (end) of a series. This is similar to the technique adopted by Gygli, Haelg, and Sturm (2018) in their updated methodology for the KOF Index of Globalization.



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## **Does Regional Integration Matter for Inclusive Growth? Evidence from the Multidimensional Regional Integration Index**

This study constructs a multidimensional regional integration index series that embodies six key facets of regional integration: trade and investment; money and finance; regional value chains; infrastructure and connectivity; movement of people; and institutional and social integration. The index confirms that regional integration is most advanced in the European Union with highest scores in all six dimensions. Asia comes second with the largest contribution from infrastructure and connectivity. Empirical analysis suggests regional integration exerts significant and positive influence on economic growth, income distribution, and poverty reduction, even when trade and financial openness is controlled.

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