ISSN: 1576-0162

Assessment of Socio-Economic Development through Country Classifications: A Cluster Analysis of the Latin America and the Caribbean (LAC) and the European Union (EU)

Evaluación del desarrollo socio-económico mediante la clasificación de países: Un análisis cluster de América Latina y el Caribe (ALC) y la Unión Europea (EU)

Rogelio Madrueño Aguilar
Georg-August-Universität Göttingen
rmadrueno@gmail.com

Recibido: marzo de 2017; aceptado: mayo de 2017

IX Premio José Luis Sampedro

Abstract

The aim of this paper is to provide an assessment of socio-economic development through a multi-tiered approach relying both on traditional and modern understanding and the measuring of human development. A systematic approach is adopted to classify countries using a non-hierarchical clustering method. Three macro-scenarios are considered – classical, modern and extended – which contrast information regarding inequality, poverty and the quality of employment with the role of education, health, institutions and environmental sustainability. Our approach is based on new estimates of inequality and poverty that are derived from Atkinson's Pareto interpolation, which bridges the discrepancy between national income accounts and household surveys. This may serve to offset the statistical bias in the estimates of income inequality and poverty, and to better interpret national and regional socio-economic performance. The analysis is carried out in a comparative framework between the Latin America and the Caribbean (LAC) region and the European Union (EU).

Keywords: Sustainable Development; Socio-Economic Change; Human Development; Country Classification; Latin America; Europe

Resumen

El artículo intenta proveer una evaluación del desarrollo socio-económico mediante un enfoque escalonado basado en concepciones y mediciones tradicionales, así como un enfoque moderno del desarrollo humano. Se utiliza el análisis de conglomerados no jerárquico en tres macro escenarios: clásico, moderno y ampliado. En ellos se busca contrastar información relativa a la desigualdad, pobreza y calidad del empleo con el papel de la educación, la salud, las instituciones y la sostenibilidad ambiental. El enfoque se basa en nuevas estimaciones de la desigualdad y pobreza, que se derivan de la interpolación de Pareto de Atkinson, la cual busca acortar la discrepancia entre Cuentas Nacionales y Encuestas de los Hogares. Estas son de utilidad para contrarestar el sesgo estadístico en las estimaciones de desigualdad y pobreza, e interpretar mejor el desempeño nacional y regional. El análisis incluye un análisis comparativo entre América Latina y el Caribe (ALC) y la Unión Europea (UE).

Palabras clave: Desarrollo sostenible; Cambio socio-económico; Desarrollo humano; Clasifiaciones de países; América Latina; Europa.

Clasificación JEL: C10, O15, O52, O54.

1. Introduction

Recent years have seen an intense international debate on the importance of tracking and monitoring progress towards international development goals. Emphasis has been placed on human development, although with differing emphases. The fight against poverty and inequality have clearly dominated the current development concerns, as well as the problem of climate change. One of the key objectives has been to build a clear picture of their causes and the best methods for preventing them. At the heart of this debate lies the challenge of providing adequate and more efficient social protection systems through the implementation of sustainable development policies. Accordingly, the 2030 Agenda for Sustainable Development conceives a three-dimensional approach based on three components: (i) economic development; (ii) social inclusion; and (iii) sustainable development (UN, 2015).

In this context, the paper aims to reconcile some fundamental principles among 'the pioneers in development' with an assessment of the modern process of economic development. The classics of high development theory saw developmental change as a complex transition, which impedes a balanced pattern of development (Meier & Seers, 1984). The legacy of these seminal works helped other prominent development economists to realise that the meaning of development is not disassociated from a joint assessment of poverty, inequality and unemployment and the way they interact with economic growth (Seers, 1969; 1972; Sen, 1976).

Following up on this recommendation, this paper provides an assessment of socio-economic development through a multi-tiered approach relying both on traditional and modern variables for measuring human development. This approach allows us to classify countries using non-hierarchical clustering methods. Three macro-scenarios are considered: (i) a classical approach, in which poverty, inequality and unemployment are the central concerns; (ii) a modern approach, which incorporates into the analysis a broader range of indicators relating to human development, such as education, institutions (corruption) and health; and (iii) an extended approach, which includes the measurement of environmental sustainability and informality. This allows us to provide a comprehensive view of contemporary socio-economic change from a multidimensional perspective. Such an interpretation opens the door to a significant extension of a 'fuller understanding of complex human systems', according to Ostrom (2010). A proper understanding of these issues is a key element in as-

sessing the overall process of human sustainable development that the 2030 Agenda demands.

The paper's aims are as follows: (a) to conduct a cluster analysis to classify countries regarding their potential for sustainable socio-economic development. This analysis is based on new estimates of income distribution among deciles using Atkinson's approach: the Pareto coefficient and the upper tail of the income distribution, according to Atkinson (2007) and Lakner and Milanovic (2016). Atkinson's Pareto interpolation bridges the discrepancy between national income accounts and household surveys, which may serve to offset the statistical bias in the estimates of income inequality and poverty (Atkinson *et al*., 2011; Atkinson, 2007). Likewise, it may help to better interpret national and international socio-economic performance; (b) to offer a broad view of socio-economic change based on key performance indicators regarding human development; and (c) to provide a bi-regional comparison between developing countries and developed ones.

The paper is organised as follows. Section two discusses the shortcomings and challenges in measuring income inequality in developed and developing countries. Section three provides an integrated approach for the assessment of socio-economic change, and describes the methodology and data. Section four discusses the results. Section five concludes.

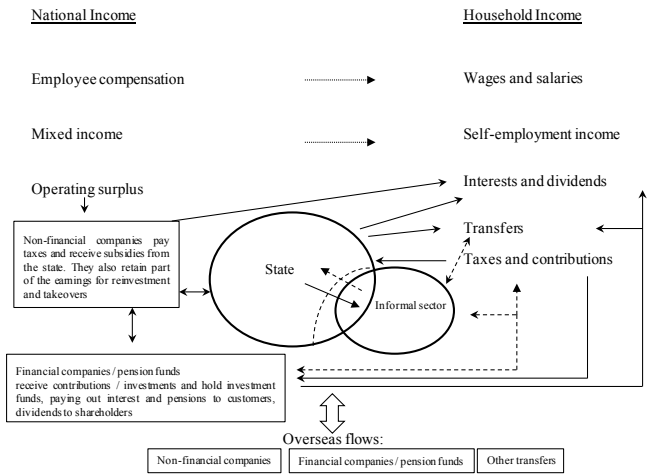
2. From National income to household income: Connecting the dots

Creating a bridge between national accounts and household income has become a necessity due to the challenge posed by a series of limitations that may be found in household surveys. The underrepresentation of top incomes may be regarded as being, possibly, the most pressing concern. In that regard, Atkinson (2015) provides a useful guide to explain how to connect the dots between the two approaches. We use that guide to complement an increasingly more complex framework, which results from the mutual interaction between various economic, social and political structures in an open economy. Figure 1 gives an overview of this complexity by establishing some of the links between the estimates that each source of data offers. They not only reflect the idea that the categories under analysis are not necessarily equivalent, but also introduce structures and agents that affect and influence the main determinants of household income. Likewise, they represent and cover elements that emphasise the importance of having a broad approach when dealing with the problem of income inequality from a global perspective. One important message in this framework is that the linkages between income components and outcomes are not straightforward or even easy to estimate. At best, the estimates of income that arise from the household sector are an imperfect matching of a complex interaction of formal and informal influencing factors.

In this respect, Atkinson (2015) properly identifies recognisable features between national and household income. For instance, the possible links be-

tween employee compensation and wages and salaries (Figure 1). Similarly, his framework of analysis introduces key institutional elements such as the role of the state or financial and non-financial companies. The former is perceived as the main agent of change who serves as a filter through which households receive transfers and pay taxes. In this process the state is able to provide access to fundamental rights, i.e. infrastructure, education, health, among others. Inevitably, these measures involve the creation of assets that are determinant factors in obtaining a more sustainable development path. Obviously, the counterweight to this is the weight of domestic and foreign debt, which constrain the room for manoeuvre and the potential to expand people's choices over time. The latter is the consequence of broader strategic issues in which the connection and interdependence with financial and non-financial services in an open economy operate as a mechanism to limit or stimulate a set of income supplements, i.e. corporate earnings, financial dividends, investments, pensions to customers, etc.

Figure 1. From National income to household income in an interdependent world.



Source: Based on Atkinson (2015).

One aspect on which still further light could be shed is the issue of the state's capability. Its importance as a factor influencing household income should not be underestimated. It is here where the greatest differences emerge between developed and developing countries. In the first case, it is well known that the expansion of income in rich economies is the result of a complex process in which the state has been a fundamental component of national policies, providing institutional structures for high-quality development at both

domestic and international level. In this process, these countries have created more equitable and efficient tax systems, which goes hand in hand with mutually reinforcing interaction between employment and social protection policies. Unlike developed countries, developing and emergent countries accounted for a larger share of the informal sector that performs the tasks and functions incumbent on the state, in particular those related to income redistribution. In part this reflects the structural institutional failure that prevents these economies from taking a qualitative leap towards greater economic and social development. The duality of the network between the state and the informal sector is the institutional cornerstone of developing countries.

Figure 1 shows the complexity of linkages between categories affecting household income. This may be seen through constant flows of transactions – shown by solid and dashed lines – going both ways: through the state or the informal sector, depending on whether or not the households are fully integrated into the formal economy. These two main components receive/pay either transfers, contributions or taxes. Over time, this duality has become much more complex and multidimensional. Not only did informal sectors take a prominent position in developing countries, i.e. through informal employment or illicit activities, but there is also evidence of a closer integration of the informal and formal sector within an international context, which faces difficulties in creating and securing permanent jobs through economic growth. Paradoxically, while in developing countries the informal sector is a basic social protection system in periods of economic turndown, people in developed countries have no such decentralized mechanism, being dependent of the coverage of social protection instruments, such as unemployment insurance benefits. Both types of schemes have advantages and disadvantages for people's choices. In developing countries, the informal sector provides employment in the short term – rather low-productivity jobs combined with low salaries –, and the consequent access to basic services. Certainly, this scheme offers poor coverage in terms of job security, good working conditions and other benefits. At the same time, it has a negative impact on the creation of more just and efficient tax systems, favouring the fragmentation of the internal market or the lack of social and institutional cohesion, among others. In developed countries, the potential gains and opportunities of social protection programmes may be affected by the lack of secure jobs in the short and medium terms. To a large extent, this depends on the absorption capacity of these countries regarding the promotion of better and more effective productive development policies. In the two cases, there is a consistent social coverage policy through traditional family and community support structures.

In any case, it is clear that the formal and informal sectors have a connection with financial and non-financial services. Wherever possible, financial and non-financial institutions provide significant mechanisms through which to energise the circular flow of income in an open economy. That includes not only unilateral transfers of income from abroad, such as remittance transfers and

electronic money, but also the management of a growing pool of developed-and-developing-world retirement savings, or even the transfer of illicit financial flows via the commercial financial system (OECD, 2014).

The landscape of interdependence and uncertainty is fully expressed in the analysis described above. It is unclear, however, how to detect the whole set of aspects and mechanisms that affect household income. In either case, it is shown, as stated by Atkinson (2015: 102), that 'total household income is considerably less than total national income'. In the same way, it is through this approach that the notion of correlation between household income and global income distribution is strengthened. This includes, of course, the issue of concentration of income at the very top and the widening gap between the rich and the poor, in a dynamic and competitive global setting.

3. An integrated assessment of the socio-economic development

Recent studies tend to show that sufficient progress is not being made to counteract the increasing inequality and exclusion. Moreover, inequality experts argue that a core set of policies – taxation, employment, technology, social security, etc. – need to be implemented at different levels in order to bring a genuine shift in the patterns of income distribution (Atkinson, 2015; Piketty, 2014). Remarkably, these interests and concerns echoe the questions posed by pioneers in development in the mid-twentieth century. In that regard, the issue of inequality has once again taken its place in the assessment of the process of development. Broadly speaking, it may be said that a serious assessment of the process of development requires a comprehensive vision that encompasses three main yardsticks – inequality, poverty and unemployment – in which inequality is a cornerstone.

Classical and contemporary development economists provided key insights into the nature and interactions between economics and politics. For them, economic growth was identified as a key measure to achieve economic and social transformation, notably in terms of promoting social inclusion and poverty reduction. Nonetheless, there was also the belief that expanding productive capacities and economic growth potential depended on the specific deployment of policies. From a long-term perspective, an economic context that, for example, only considered an expansion in per capita income with a high concentration of a rich minority might not be considered sufficient to enjoy a high and sustained growth per head rate. A large part of this increase can be explained by a growing number of people staying in poverty or a serious imbalance on the job market (Seers, 1969 and 1972; Sen, 1976). According to Seers (1972: 24) 'if one or two of these central problems have been growing worse, especially if all three have [inequality included], it would be strange to call the result 'development'. Thus, any comprehensive assessment of development should include this perspective as a standard minimum rule for sustainable socio-economic development.

In the same vein, the variety of sources between growth and development outlines a framework where the relationship between them is not straightforward (Figure 2). In fact, the idea of development under this scheme is one in which a complex, even contradictory, set of interacting elements and policy objectives plays a significant role. To illustrate this issue, I would like to refer to the three following possibilities that could be perfectly integrated across the contemporary developing world – although it may also include developed countries:

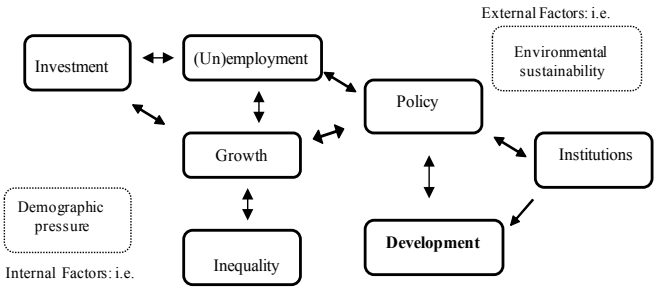
(1) a country that experiences a rapid growth without establishing and strengthening a progressive tax system can expect to increase per head income to only a very limited extent, especially when it is known that there are deficits in important areas such as education or political inclusiveness. Not surprisingly in such an environment, and if the trend continued, it is quite possible that the informal sector would gain ground;

(2) it is possible that a country shows a slowdown in economic growth in which both poverty and unemployment do not increase. However, if, during this period, active policies have not been implemented in order to reshape political institutions and development patterns, it will be difficult to boost economic performance and human development when growth comes (Seers, 1972);

(3) The third possibility is even more common: a country that, in spite of having strengthened their tax regime and social welfare system, shows a generally poor performance in relation to growing productive capacities and stronger institutions (Chang, 2011). In that context, the impossibility of achieving greater potential for developing later – or even moving backwards – is more likely to arise.

The examples provided are described in Figure 2, where some of the key factors behind growth and development reflect the two-way nature of this dynamic process of change. In either case, it should be noted that these relationships are not exhaustive given the complex interplay between socio-economic structures and markets in a rapidly changing geo-economic and geo-political environment, together with an unprecedented environmental change (Cole and Miles, 1984; Seers, 1983).

FIGURE 2. THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND DEVELOPMENT IS NOT STRAIGHTFORWARD.



Source: Author.

From the above it can be concluded that the fulfilment of human potential development is, in principle, strongly determined by the type of macroeconomic and institutional policy applied, from which a variety of criteria and factors help to put the country on the path towards sustainable growth and socio-economic development.

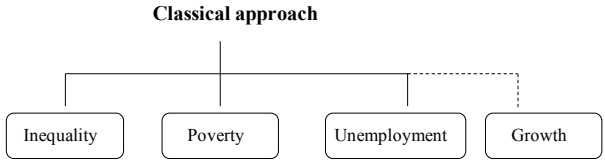
3.1 Methodology and Data

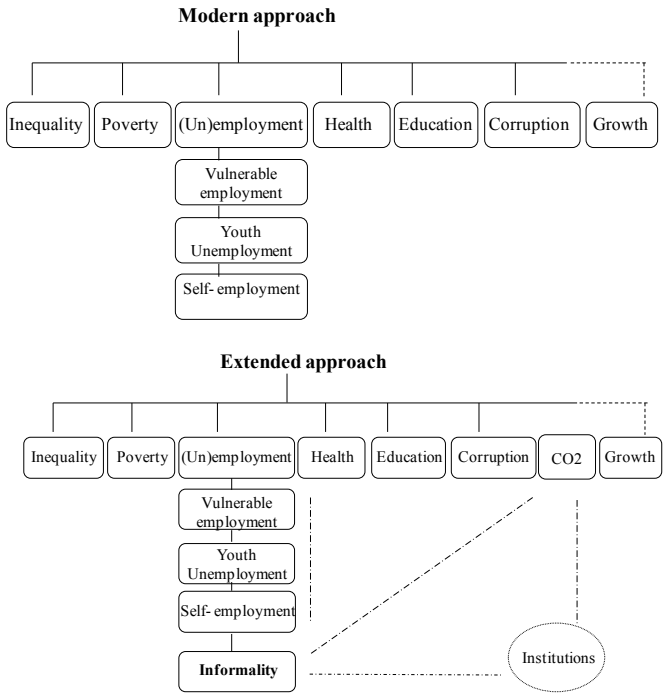
The basic idea behind the proposed assessment is to examine three socioeconomic approaches at the macro-economic level from a multi-tiered and multidimensional perspective. Figure 3 shows the three alternative scenarios. The first considers a classical view, in which aggregate indicators regarding poverty, inequality and unemployment are central concerns of the analysis. Second, there is a new scenario called the modern approach, which incorporates into the former perspective indicators relating to human development and institutional change, in particular education, corruption and health (Sen, 1990). The difference here, however, is that there is also disaggregated information regarding (un)employment, which is an attempt to show the complex peculiarities of the modern labour market across countries. Third, there is an extension of the second approach, which includes the measurement of environmental sustainability and the role of the informal sector. In all of these scenarios the growth of GDP per capita has been included as the main variable to assess the interaction between socio-economic categories and the dynamic of growth in the sample of the Latin America and the Caribbean (LAC) and European countries.

Clustering techniques are applied in this assessment. We follow MacQueen (1967) and his k-means algorithm, which is a non-hierarchical clustering method. K-means clustering solves the following:

$$f(K) = \sum_k \sum_{m \in k}^{n} \sum_j (x_{mj} - \mu_{kj})^2 \rightarrow \min. \quad (1)$$

Figure 3. A multi-tiered approach for development.





where x_{mj} is the value of case m in variable j and is the mean (centre) of cluster k in variable j. The k-means clustering uses the square of the Euclidean distance , in order to estimate the mean (vectors) of a set of K-groups, based on a certain number of clusters fixed a priori. The procedure for allocating objects to clusters is defined through a successive iterative process, which aims at minimising the objective function. The analysis rests on the assumption that the data have similar scale values. This approach has advantages and disadvantages. With regard to the former, we find that it enables a larger number of data to be aggregated. Features of the latter are its extreme sensitivity to outliers and the eventual inability to find optimal solutions. In this respect, it should be noted that we have predefined three seed clusters in order to identify and assign countries to three main socio-economic development performances: low, medium and high. This will facilitate easy comparative analysis between the LAC region and the EU.

Our assessment is based on several indicators. However, there are two core elements in this analysis – the Palma ratio and the relative poverty threshold. Both are part of a new measurement of income disparities that are derived

from the use of a Pareto interpolation posed by Atkinson (2007). This technique allows new estimates of the distribution of income by allocating the discrepancy between national income and household income over the share of top incomes.

The Pareto distribution is computed using the following formula:

$$S_i/S_j = (a-1)/a) \log\ (H_i/H_j) \quad (2)$$

where a / (a-1) is a constant multiple of cumulative total income in range i and above (y_i). If we rearrange the equation to compute the Pareto coefficient, we obtain:

$$a = 1/1 - \left(\log (S_1/S_j / \log (H_1/H_j)\right) \quad (3)$$

The implicit assumption is that the top decile follows a continuous Pareto distribution. Where **Hi** is be the cumulative population share of individuals with incomes greater or equal to yi, and Si is the share of total income received by this group. The proposed analysis assumes that the whole discrepancy is absorbed by the 10th decile.

With this procedure, we calculate the Palma ratio of income and the relative poverty threshold. The Palma 'is a measure of the capture of total income or consumption of the richest decile over the capture of the poorest 40 per cent' (Cobham & Sumner, 2013; Cobham, Schlogl & Sumner, 2015; Palma, 2011). In our case, the ratio is defined as the top 10% of the population's share of gross national disposable income (GNDI), divided by the poorest 40% of the population's share of GNDI (Capelli & Vaggi, 2014). As for the relative poverty threshold, this is defined as the 60% of the country's mean income. These indicators are based on information provided by the European Statistical Data Support (ESDS), EUROSTAT (2015), and the Socio-Economic Database for Latin America and the Caribbean (CEDLAS and the World Bank).

Additionally, the non-hierarchical clustering estimation includes indicators of health, education, corruption, CO2 emissions, GDP per capita and (un)employment. In this last case, the information is disaggregated to the detailed level. To this end, the analysis includes the following indicators: unemployment, total, self-employed, unemployment, youth and vulnerable employment. The information comes from the World Bank Open Data (2016) and the International Labour Organization's statistics database. Finally, the indicators regarding informal employment were obtained from the ECLAC Database (2015), Hazans (2011) and Schneider and Buehn (2012). As we have seen in the doctrinal discussion, the latter subject is particularly relevant because it not only reflects the distinct character of each development process but also the differences in economic structures and institutions that occur across countries.

Table 1 provides additional description of the data used in this multivariate analysis. The study includes the average for each variable from the period 2005–

2014 or the latest available information. The sample was divided into two parts: the first covers the period 2005-2009 and the second goes from 2010 to 2014. This is helpful to analyse the transitional phase of socio-economic change in these economies through the use of a mobility matrix and rotation coefficients.

TABLE 1. DESCRIPTION OF VARIABLES

Indicators	Code	Description	Source
Self-employed, total (% of total employed)	semplym	Workers on their own account or with one or a few partners or in cooperative. It includes four sub-categories of employers, own-account workers, members of producers' cooperatives, and contributing family workers.	World Data Bank (2016)
Informal employment	informality	Urban workers employed in low-productivity sectors (informal sector), according to the ECLAC. For the European economies, informal employment is the sum of three different components: Dependent employment (employees without a contract or who are uncertain of their contract), self-employment (which includes all non-professional self-employed operating solely and employers with 5 or fewer workers), and family workers (persons working without a contract for own family's business). In the cases of Malta and Luxembourg we use information from estimates of shadow economy as a proxy for informality.	ECLAC Database (2015), Schneider and Buehn (2012), Hazans (2011)
Unemployment, total (% of total labour force)	unemplym	This refers to the share of the labour force that is without work but available for and seeking employment (modelled ILO estimate).	World Data Bank (2016)
Unemployment, youth total (% of total labour force ages 15–24) (modelled International Labour Organization (ILO) estimate)	yunemplym	Youth unemployment refers to the share of the labour force ages 15–24 without work but available for and seeking employment.	World Data Bank (2016)
Vulnerable employment, total (% of total employment)	vunemplym	Vulnerable employment is unpaid family workers and own-account workers as a percentage of total employment.	World Data Bank (2016)
Palma ratio (Top 10 / bottom 40)	palma1/4a	This is the ratio of top 10% decile, divided by the income share of the poorest 40%. It is based on the assumption that the whole discrepancy between National Accounts and Household surveys is absorbed by the 10th decile	Author's calculations based on ESDS and CEDLAS and The World Bank

Relative poverty threshold	relpovadj 60%	This is calculated as the 60% of the country's mean income. It derives from the assumption that the whole discrepancy between National Accounts and Household surveys is absorbed by the 10th decile	Author's calculations based on ESDS and CEDLAS and The World Bank
Growth per capita	gpc	Annual percentage growth rate of GDP at market prices based on constant local currency. Based on constant 2005 U.S. dollars.	World Data Bank (2016)
Education index	edui	Calculated using mean years of schooling and expected years of schooling.	World Data Bank (2016)
Health index	healthi	Life expectancy at birth expressed as an index using a minimum value of 35 years and a maximum value of 85 years.	World Data Bank (2016)
Corruption	corrup	Reflects perceptions of the extent to which public power is exercised for private gain, as well as "capture" of the state by elites and private interests.	World Bank (2015)
CO2 emissions (kg per 2005 US$ of Gross Domestic Product (GDP)	CO2	Emissions that stem from the burning of fossil fuels and the manufacture of cement	World Data Bank (2016)

4. Macro-scenarios and empirical results

In this section we present the main findings of our research. Table 2 shows the results of the non-hierarchical cluster analysis regarding the *classical approach*. At this point our main objective is to respond to what extent inequality, poverty and unemployment affect the proper functioning of the socio-economic development of these societies, and how has this socio-economic framewok changed since the mid 2000s? Knowing these effects and transitions is relevant to an understanding of the process of social, economic and political change across countries and regions in these times of widespread slowdown. For the purposes of this analysis, we use the following proxies: the Palma ratio, the relative poverty threshold and the unemployment (% of total labour force).

The multivariate clustering analysis in the period of 2005–2009 shows that the European countries were largely grouped in the cluster of high socio-economic development (HSD). This cluster consists of 25 national economies. However, it is interesting to note that four Latin American countries are located at this level of development. Two noteworthy cases are Guatemala and Paraguay, where, despite the improvements in human development in recent decades, their relative position compared to other LAC countries is constant, remaining at the bottom of the human development index within the region. In part, this is less a reflection of their own social

and economic capabilities than of the worst performance of the rest of the countries. Bolivia and Costa Rica are the opposite. It is well known that both economies have become two of the most successful LAC countries in improving their citizens' standard of living in those years.

The cluster of medium socio-economic development (MSD) consists largely of LAC countries. It is composed of 14 economies. This group includes some Eastern European economies, such as Estonia, Latvia, Lithuania and Slovak Republic, as well as Poland and Romania. The third cluster related to low socio-economic development (LSD) has only one country: Mexico. In principle, this result would hardly be surprising given the fact that the Mexican economy has had a relatively poor economic performance compared with that of the rest of the LAC region in the last two decades, particularly during this critical transitional period (Weisbrot, Lefebvre & Sammut, 2014).

Here, it is important to introduce a comparative assessment of socio-economic development. Table 2 also considers the period 2010-2014. The cluster of HSD increased to 28 countries, while the cluster of MSD reduced to 10 nations. Most of this change was accounted for by an exchange between group members of these two levels of development. On the other hand, the cluster of LSD underwent a substantial amendment with the addition of two new countries, which belonged to the cluster HSD, namely Greece and Spain, and due to Mexico's leap forward into the medium socio-economic level. The latter aspect may be explained by the persistent and atypical deterioration in employment in those two Mediterranean countries as a result of the global economic recession.

The mobility matrix of Table 2 reflects these changes. What clearly emerges is that there is considerable mobility in the high socio-economic level, mainly through the allocation of countries coming from the MSD cluster.

Table 2. Cluster estimation and mobility matrix: Classical approach

2nd mid 2000				1st mid 2010		
	High	Medium	Low	High	Medium	Low
	Cluster 1	Cluster 2	Cluster 2	Cluster 1	Cluster 3	Cluster 3
	BOL	BRA	**MEX**	BOL	BRA	**GRC**
	CRI	CHL		CRI	CHL	**ESP**
	GTM	COL		**HND**	COL	
	PRY	DOM		**PER**	DOM	
	AUT	ECU		PRY	ECU	
	BEL	HND		**URY**	**GTM**	
	BGR	PER		AUT	**MEX**	
	CYP	**URY**		BEL	LVA	
	CZE	**EST**		BGR	LTU	
	DNK	LVA		CYP	ROM	
	FIN	LTU		CZE		
	FRA	**POL**		DNK		
	DEU	ROM		**EST**		
	GRC	**SVK**		FIN		
	HUN			FRA		
	IRL			DEU		
	ITA			HUN		
	LUX			IRL		
	MLT			ITA		
	NLD			LUX		
	PRT			MLT		
	SVN			NLD		
	ESP			**POL**		
	SWE			PRT		
	GBR			**SVK**		
				SVN		
				SWE		
				GBR		
Total	**25**	**14**	**1**	**28**	**10**	**2**

2nd mid 2000			
	High	Medium	low
Nº cases	25	14	1
Total ratios	0.63	0.35	0.03
1st mid 2010			
	High	Medium	low
Nº cases	28	10	2
Total ratios	0.70	0.25	0.05

Mobility matrix			
	High	Medium	low
High		1	2
Medium	4		
low		1	
ratios	0.10	0.05	0.05

Note: Bolivia (BOL), Brazil (BRA), Chile (CHL), Colombia (COL), Costa Rica (CRI), Dominican Republic (DOM), Ecuador (ECU), Guatemala (GTM), Honduras (HND), Mexico (MEX), Peru (PER), Paraguay (PRY), Uruguay (URY), Austria (AUT), Belgium (BEL), Bulgaria (BGR), Cyprus (CYP), Czech Republic (CZE), Denmark (DNK), Estonia (EST), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary (HUN), Ireland (IRL), Italia (ITA), Latvia (LVA), Lithuania (LTU), Luxembourg (LUX), Malta (MLT), Netherlands (NLD), Poland (POL), Portugal (PRT), Romania (ROM), Slovakia (SVK), Slovenia (SVN), Spain (ESP), Sweden (SWE), United Kingdom (GBR).

Source: Author.

An overview of the first approach shows a certain reliability and consistency of the results according to the national circumstances and socio-economic situation of each country. Nonetheless, there are still questions to be answered, which is a good reason for taking the next step in the analysis.

Table 3 provides the country classification after running the k-means cluster analysis regarding the *modern approach*. As we have mentioned before, the idea

behind this stage is to enrich this proposal with other considerations related to human development concerns. That means to include in the analysis three key additional components: health, education and corruption. In this frame the additional disaggregation of labour and unemployment statistics is provided.

There are important differences in the clusters' composition. Our three main socio-economic categories display a more balanced view, in particular between 2005 and 2009. In this period, the HSD cluster consists of 22 countries, all of which are European economies. The MSD cluster is composed of eight LAC countries, and the LSD cluster includes 10 economies: a combination of LAC and EU countries. What is interesting, however, is to compare the mobility of each cluster in the two analysed periods. After the financial crisis and the onset of the global recession, there seems to have been a serious adjustment for socio-economic change in these two regions, which led to a reduction in the composition of the LSD cluster (see mobility matrix in Table 3). As a result, seven countries that belonged to the low socio-economic development succeeded in a full transition towards the upper cluster. We refer to the following economies: Brazil, Chile, Costa Rica, Uruguay, Italy, Poland and Portugal. In the case of the second cluster (MSD), it had remained almost static. Only one country, the Dominican Republic, dropped out of this level and joined the cluster of LSD.

Overall, these clusters show that a more disaggregated approach of human development provides the lens through which socio-economic development can be better evaluated. Moreover, this approach might be a tool to better assess areas of vulnerability, to improve socio-economic change. Compared to the classical approach, it is noted that those cases that were at the top socio-economic level, such as Bolivia, have not succeeded in moving ahead towards the upper segment if a more detailed perspective of human development is taken into account. Only Uruguay and Costa Rica seem to be more consistent with that development aim, which does not mean we are discrediting the social and economic achievements of these countries. On the contrary, there seems to be satisfactory performance according to their position in the MSD cluster. Likewise, it can be argued that countries such as Spain, despite a deterioration in their economic and social conditions, are still located within the group of economies with a solid institutional structure for the protection of human development. The opposite can also be the case. In the two-cluster analysis carried out, Greece and Mexico are those countries that have consistently shown a persistent low level of socio-economic development.

TABLE 3. CLUSTER ESTIMATION AND MOBILITY MATRIX: MODERN APPROACH

	2nd mid 2000			1st mid 2010		
	High	Medium	Low	High	Medium	Low
	Cluster 1	Cluster 2	Cluster 3	Cluster 1	Cluster 2	Cluster 3
	AUT	BOL	**BRA**	BRA	BOL	DOM
	BEL	COL	**CHL**	CHL	COL	MEX
	BGR	**DOM**	**CRI**	CRI	ECU	GRC
	CYP	ECU	MEX	URY	GTM	ROM
	CZE	GTM	**URY**	AUT	HND	
	DNK	HND	GRC	BEL	PER	
	EST	PRY	**ITA**	BGR	PRY	
	FIN	PER	**POL**	CYP		
	FRA		**PRT**	CZE		
	DEU		ROM	DNK		
	HUN			EST		
	IRL			FIN		
	LVA			FRA		
	LTU			DEU		
	LUX			HUN		
	MLT			IRL		
	NLD			ITA		
	SVK			LVA		
	SVN			LTU		
	ESP			LUX		
	SWE			MLT		
	GBR			NLD		
				POL		
				PRT		
				SVK		
				SVN		
				ESP		
				SWE		
				GBR		
Total	22	8	10	29	7	4

	2nd mid 2000			
	High	Medium	Low	
Nº cases	22	8	10	
Total ratios	0.55	0.20	0.25	
	1st mid 2010			
	High	Medium	Low	
Nº cases	29	7	4	
Total ratios	0.73	0.18	0.10	

Mobility matrix			
	High	Medium	Low
High			
Medium			1
low	7		
ratios	0.18	0.00	0.03

Note: Bolivia (BOL), Brazil (BRA), Chile (CHL), Colombia (COL), Costa Rica (CRI), Dominican Republic (DOM), Ecuador (ECU), Guatemala (GTM), Honduras (HND), Mexico (MEX), Peru (PER), Paraguay (PRY), Uruguay (URY), Austria (AUT), Belgium (BEL), Bulgaria (BGR), Cyprus (CYP), Czech Republic (CZE), Denmark (DNK), Estonia (EST), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary (HUN), Ireland (IRL), Italia (ITA), Latvia (LVA), Lithuania (LTU), Luxembourg (LUX), Malta (MLT), Netherlands (NLD), Poland (POL), Portugal (PRT), Romania (ROM), Slovakia (SVK), Slovenia (SVN), Spain (ESP), Sweden (SWE), United Kingdom (GBR).

Source: Author.

Finally, the *extended approach* introduces a long-standing concern raised by Lewis (1954) and one ongoing concern. The first is the role of informality through the inclusion of an informal employment variable.[1] The second adds the CO2 emissions as a way to identify the notion of sustainability. Both have deep implications for our analysis. The cluster analysis establishes a clearer division in the selected sample of countries. According to Table 4, the HSD group includes only those countries that belong to the European continent. Despite recent improvements, those LAC countries that showed strong performance in a variety of eco-

[1] While Lewis (1954: 141) does not explicitly use the notion of job informality, he raised a similar concern by discussing the characteristics of disguised unemployment.

nomic and social issues were unable to take the leap towards the upper segment of socio-economic welfare within this broader development framework. This trend is consistent over the two different time periods. In this respect, the groups two and three – clusters related to MSD and LSD, respectively – provide a familiar pattern, which is very similar to that obtained under the modern approach. Cluster two remained practically unchanged. There we find countries such as Bolivia, Ecuador, Colombia, Peru and Paraguay. Likewise, cluster three provides consistent information. One may say that it is virtually the same country classification as that of the modern approach within the 2nd mid 2000s; nonetheless, it adds two new countries: Ireland and Cyprus. In plain terms, this translates into an extremely low socio-economic mobility during the study period. From the information provided by the mobility matrix (Table 4), only three countries underwent a major transition in their socio-economic change, namely Poland and Portugal, who joined the first cluster, and the Dominican Republic, which moved downwards into the LSD group.

TABLE 4. CLUSTER ESTIMATION AND MOBILITY MATRIX: EXTENDED APPROACH

2ndt mid 2000			1st mid 2010		
High	Medium	Low	High	Medium	Low
Cluster 1	Cluster 2	Cluster 3	Cluster 1	Cluster 2	Cluster 3
AUT	BOL	BRA	AUT	BOL	BRA
BEL	COL	CHL	BEL	COL	CHL
BGR	**DOM**	CRI	BGR	ECU	CRI
CZE	ECU	MEX	CZE	GTM	DOM
DNK	GTM	URY	DNK	HND	MEX
EST	HND	CYP	EST	PER	URY
FIN	PRY	GRC	FIN	PRY	CYP
FRA	PER	IRL	FRA		GRC
DEU		ITA	DEU		IRL
HUN		**POL**	HUN		ITA
LVA		**PRT**	LVA		ROM
LTU		ROM	LTU		
LUX			LUX		
MLT			MLT		
NLD			NLD		
SVK			POL		
SVN			PRT		
ESP			SVK		
SWE			SVN		
GBR			ESP		
			SWE		
			GBR		
Total	**20**	**8**	**12**	**22**	**7**	**11**

2nd mid 2000			
	High	Medium	Low
Nº cases	20	8	12
Total ratios	0.50	0.20	0.30
1st mid 2010			
	High	Medium	Low
Nº cases	22	7	11
Total ratios	0.55	0.18	0.28

Mobility matrix			
	High	Medium	Low
High			
Medium			1
low	2		
ratios	0.05	0.00	0.03

Note: Bolivia (BOL), Brazil (BRA), Chile (CHL), Colombia (COL), Costa Rica (CRI), Dominican Republic (DOM), Ecuador (ECU), Guatemala (GTM), Honduras (HND), Mexico (MEX), Peru (PER), Paraguay (PRY), Uruguay (URY), Austria (AUT), Belgium (BEL), Bulgaria (BGR), Cyprus (CYP), Czech Republic (CZE), Denmark (DNK), Estonia (EST), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary (HUN), Ireland (IRL), Italia (ITA), Latvia (LVA), Lithuania (LTU), Luxembourg (LUX), Malta (MLT), Netherlands (NLD), Poland (POL), Portugal (PRT), Romania (ROM), Slovakia (SVK), Slovenia (SVN), Spain (ESP), Sweden (SWE), United Kingdom (GBR).
Source: Author.

5. Conclusion

The theoretical framework on which the development theory was built has provided intellectual contributions and technical guidance, which assisted us in tracking development aims. Like the classical economists, pioneers in development and their successors developed a set of criteria and categories for an assessment of development progress. They believed that poverty, unemployment and inequality must be treated as a unified and integrated criterion to assess socio-economic development. Different global preoccupations, however, shifted the attention of this assessment from one area to another depending on the needs of the development agendas over the years. On this basis, we recover this primary notion in order to build three main macro-scenarios of analysis, in which a staggered approach has been adopted. A key objective has been to establish an ordered sequence for the empirical assessment of socio-economic development. Starting from a classical base and subsequently enriching this view with a modern scientific perspective, which includes the notion of sustainability and informal institutions, we were able to display our evaluation. Two additional issues were central to this analysis: (i) new measures of inequality and poverty, which derived from the Pareto interpolation posed by Atkinson (2007). The calculation based on reducing the gap between national accounts and household surveys might bring new perspectives and a broader dimension to the issues of income inequality and poverty in an interdependent world. On the other hand, (ii) the use of a non-hierarchical clustering method allowed us to identify three different patterns of socio-economic development in the last decade: high, medium and low. This may be a useful early warning tool that we might well need to detect systematic deterioration of the socio-economic environment.

The empirical results obtained in this paper draw some interesting lessons. The initial estimation makes it clear to us that there are two main groups. On the one hand, the European economies, which are located mainly on the upper cluster of HSD. We are really talking about those countries that have managed to build more cohesive societies over the last decades. On the other hand, we found the group of developing countries, the LAC economies, which are traditionally associated with institutional fragmentation. These economies are distributed among the medium and low clusters. The classical approach, however, is useful to identify the worsening of the socio-economic situation in countries such as Spain and Greece, which in relative terms have faced a far greater decline than their LAC counterparts in recent years. The classical approach also shows the counterface of this process, where, for instance, Bolivia and Costa Rica reflect sustained improvements in this development frame.

The modern approach provided a more nuanced view of socio-economic change. At this point, it is worthy of mention the fact that the existing disaggregation of (un)employment and the inclusion of indicators related

to human development (health and education) and long-term institutional change (corruption) provide a mechanism for testing the effectiveness of the socio-economical change. Under this kind of structure, the socio-economic transition is more demanding. Cases of success in the LAC region are significantly fewer than in the classical approach. Moreover, the overall dynamics of the socio-economic transition enables us to ensure that countries such as Bolivia, despite their improvements, require a more sustained effort to consolidate social and economic achievements. An equivalent process, but in the opposite direction, seems to be the case, to point out a few countries, in Mexico, the Dominican Republic and Greece.

The extended approach is quite revealing of the relatively static nature of complex systems. There was, however, one major novelty. One might even say that the inclusion of the notion of informality is indicative of the different nature –in terms of structure – of European and LAC economies. The fact that no LAC country has become part of the HSD cluster leads us to think that this hypothesis may well be appropriate. The results also tend to confirm the positive trend of a number of emerging LAC countries, which nevertheless still required longer periods of socio-economic ripening. On the other hand, it is likewise visible that some European economies, i.e. Greece and Italy, share common characteristics with the LAC countries, preventing them from creating virtuous cycles of development.

To conclude, this article provides one additional message regarding development assessment. It highlights the need to treat complex categories within development through new indicators and multi-tiered approaches. In doing so, it is clear that it seems to be both unrealistic and outdated to examine the process of economic and social change through unidimensional approaches, given the fact that socio-economic change is inherently complex. Nonetheless, this paper also suggests that this need for multidimensionality in developmental studies should be part of reasoned and reasonable debate, through which it is possible to rethink the scope of multidimensional frameworks in the development process.

REFERENCES

Atkinson, A. B. (2015): *Inequality. What can be Done?* London, Harvard University Press.

Atkinson, A. B. (2007): "Measuring top incomes: Methodological Issues". In: Atkinson, A. B. & Piketty, T. (eds.): *Top Incomes over the Twentieth Century: A Contrast between Continental European and English-Speaking Countries*. Oxford University Press.

Atkinson, A. B., Piketty, T. & Saez, E. (2011): "Top Incomes in the Long Run of History", *Journal of Economic Literature*, 49 (1), 3-71

Capelli & Vaggi (2014): "A Better Indicator of Standards of Living: The Gross National Disposable Income". DEM Working Paper Series Num # 62 (12–13), University of Pavia.

Chang, H-J. (2011): *23 Things They Don't Tell you about Capitalism*. London, Penguin Books.
Cobham, A. & Sumner, A. (2013): "Is It All about the Tails? The Palma Measure of Income Inequality". Center for Global Development Working Paper No. 343. Available from: http://dx.doi.org/10.2139/ssrn.2366974 [Accessed 14 04 2015].
Cobham, A., Schlogl, L. & Sumner, A. (2015): "Inequality and the Tails: The Palma Proposition and Ratio Revisited". DESA Working Paper No. 143. New York.
Cole, S. & Miles, I. (1984): *Worlds Apart. Technology and North-South relations in the Global Economy*. New Jersey, Rowman and Allanheld.
ECLAC (2015): "Databases and Statistical Publications". Available from: http://estadisticas.cepal.org/cepalstat/ [Accessed 19 August 2015].
EUROSTAT (2015): "European Statistical Data Support" available at http://ec.europa.eu/eurostat/data/database
Hazans, M. (2011): "What Explains Prevalence of Informal Employment in European Countries. The Role of Labor Institutions, Governance, Immigrants, and Growth". Policy Research Working Paper 5917, Washington, The World Bank.
Lakner, C. & Milanovic, B. (2016): "Global Income Distribution. From the Fall of the Berlin Wall to the Great Recession". *The World Bank Economic Review*, 30 (2), 203–232, https://doi.org/10.1093/wber/lhv039
Lewis, A. (1954): "Economic Development with Unlimited Supplies of Labour". *The Manchester School*, 22 (2), 139–191. doi: 10.1111/j.1467-9957.1954.tb00021.x
MacQueen, J. (1967): "Some Methods for Classification and Analysis of Multivariate Observations. Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability", Berkeley, University of California Press, 1, pp. 281–297.
Meier, G. & Seers, D. (1984): *Pioneers in Development*. Washington, D.C., World Bank/ Oxford University Press.
OECD (2014): "Illicit Financial Flows from Developing Countries: Measuring OECD Responses". Paris, OECD.
Ostrom, E. (2010): "Beyond Markets and States: Polycentric Governance of Complex Economic Systems". *American Economic Review*, 100, 1–33 doi=10.1257/aer.100.3.1
Palma, J. G. (2011): "Homogeneous Middles vs. Heterogeneous Tails, and the End of the 'Inverted-U'": It's all about the Share of the Rich. *Development and Change*, 42, 87–153.
Piketty, T. (2014): *Capital in the Twenty-first Century*. USA, The Belknap Press of Harvard University Press.
Seers, D. (1983): *The Political Economy of Nationalism*. New York, Oxford University Press.
Seers, D. (1972): "What are We Trying to Measure?" *Journal of Development Studies*, 8 (3), 77–94.

Seers, D. (1969): "The Meaning of Development". IDS Communication, no. 44, Brighton, Institute of Development Studies.
Sen, A. (1990): *Development as Freedom*. Oxford, UK, University Press.
Sen, A. (1976): "Poverty, Inequality and Unemployment: Some Conceptual Issues in Measurement". *Economic and Political Weekly*, 8 (31/33), 1457–1464
Schneider, F. & Buehn, A. (2012): "Shadow Economies in Highly Developed OECD Countries: What are the Driving Forces?" IZA Discussion Paper No. 6891, Bonn, Institute for the Study of Labor.
United Nations (UN): (2015): "Draft Outcome Document of the United Nations Summit for the Adoption of the Post-2015 Development Agenda". A/69/L.85. New York.
Weisbrot, M., Lefebvre, S. & Sammut, J. (2014): "Did NAFTA Help Mexico? An Assessment after 20 Years". Washington D.C., Center for Economic and Policy Research
World Bank (2016): "World Databank". Available from: http://data.worldbank.org, [Accessed 9th January 2016].