Income Polarisation:

An exploratory analysis for Latin America *

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Abstract

This document presents a set of statistics that characterise the degree of income polarisation in Latin American and the Caribbean (LAC). The study is based on a dataset of household surveys from 21 LAC countries in the period 1989-2004. Latin America is characterised by a high level of income polarisation. On average, income polarisation has mildly increased in the region since the early 1990s. The paper suggests that institutions and conflict interact in different ways with the various characteristics of the income distribution. In particular, countries with high income polarisation and inequality are more likely to have high levels of conflict and corruption.

Keywords: polarisation, cohesion, inequality, Latin America, Caribbean, conflict *JEL codes:* 13, D3, D6

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1. Introduction

There is an increasing concern on issues of polarisation and social cohesion arising from the observation that some societies may be separating out into groups internally homogenous and increasingly different among them. That concern is particularly relevant in Latin America and the Caribbean (LAC), a region with traditionally very high levels of inequality, and increasing income disparities over the last two decades.¹

This study documents the levels and trends of income polarisation in LAC by exploiting a large database of household surveys carried out in 21 countries in the period 1989-2004. The document shows evidence suggesting that Latin America is characterised by a high level of income polarisation, compared to other regions in the world. On average, income polarisation has mildly increased in the region since the early 1990s. The country experiences, however, have been heterogeneous. While income polarisation substantially increased in some countries, the income distributions of other LAC economies turned less polarised.

It is argued that when people have access to substantially different sets of opportunities, and enjoy (or suffer) very different living standards, social tensions are likely to emerge. An economically polarised country is more likely to be socially and politically unstable.² In this paper we present a set of correlations between (i) measures of income polarisation and other dimensions of the income distribution, and (ii) measures of institutions, conflict and corruption. Although far from a causality analysis, the paper provides evidence on some interesting links that deserve further analysis.

The rest of the document is organised as follows. In section 2 we discuss the definition and measurement of income polarisation. Section 3 presents empirical evidence on income polarisation in LAC, and discusses the main patterns and trends. In Section 4 we carry out an exploratory analysis of the empirical links between indicators of polarisation, inequality and poverty, and measures of institutions, conflict and corruption. We include some concluding remarks in section 5.

2. Polarisation: concept and measurement

The concept of polarisation is directly linked to the sources of social tension. The notion has its roots in sociology and political science, with Karl Marx arguably being the first social scientist to study it. In Economics its formal analysis has its origins in the 1990s, in the works of Esteban and Ray (1991, 1994), Foster and Wolfson (1992) and Wolfson (1994). Following Esteban and Ray (1994) we rely on what might be called the *alienation-identification* framework. The intuition is simple: given a relevant characteristic such as religion, income, race or education, a population is polarised if there are few groups of important size in which their members share this attribute and feel some degree of identification with members of their own group, and at the same time, members of different groups feel alienated from each other. This three elements (size group, identification and alienation) produce antagonism among the population which may generate a hostile environment.

The concern for differences in economic variables across groups has always been in the Economics agenda. That concern fuelled a large literature on the measurement of inequality. The concept of inequality is closely linked to the principle of Dalton-Pigou: a transfer from an

¹ See IADB (1998), Morley (2000), Ganuza *et al.* (2001), Bourguignon and Morrison (2003) and Gasparini (2004 a) for evidence on inequality in LAC.

² Of course, the causality can go both directions: socioeconomic fragmentation can be the consequence of social and political instability.

individual with higher income to another individual with lower income generates a more equal distribution.

To understand the difference between polarisation and inequality, suppose a country with six persons labelled as A, B, C, D, E, F with incomes equal to \$ 1, 2, 3, 4, 5 and 6, respectively. Assume now two transfers of one peso: the first one from C to A, and the second one from F to D. The two transfers are equalizing (from richer to poorer persons), so all inequality indices complying with the Dalton-Pigou criterion will fall, or at least not increase. The inequality analysis assesses the new situation as "better" than the initial one. Notice, however, that in this example the new income distribution has three persons with \$2 (A, B and C), and three persons with \$5 (D, E and F). The population in this country is divided into two clearly differentiated groups that are internally perfectly homogeneous. Although less unequal, this society has become more polarised. The notion of polarisation refers to homogeneous clusters that antagonize with each other. In the new situation of the example people may identify themselves as part of clearly defined groups which are significantly different from the rest. This polarisation may derive in greater social tension than in the initial distribution, and then in more social and political instability. In fact, the conjecture that motivates research on polarisation is that contrasts among densely homogeneous groups may cause social tension.



The previous example is intended to illustrate a case where polarisation goes in opposite direction to inequality. But it is likely that in most cases the two concepts do not disagree. Suppose that from the initial distribution there is a transfer of \$1 from B to E: the economy is now more unequal and more polarised.

The analysis of polarisation should be viewed as complementary to that of inequality. Both polarisation and inequality are different although related dimensions of the same distribution. Two reasons led us to focus this paper on polarisation. First, polarisation is by far the distributional dimension less studied in the economic literature. While the inequality literature is large in Latin America, we are not aware of studies computing polarisation measures for a large set of countries in the region. Second, polarisation measures may potentially be more relevant than inequality measures to study issues of socio-political instability. We explore this point with LAC data.

Measurement

This paper restricts the analysis of polarisation to the income dimension. Income polarisation measures could be classified into two main sets: polarisation by characteristics and pure income polarization. Although both sets use income as the variable for alienation, they differ in the nature of identification. While the first uses a discrete variable to provide the relevant grouping of the population (*e.g.* race), the latter uses income. In this paper we focus on pure

income polarisation.³ The first approach to implement a pure income polarisation measure is based on the idea of discrete groups, or socioeconomic classes. Following this logic, it is necessary to identify the number and the support interval of each disjoint income group. Wolfson (1994), Esteban and Ray (1994) and Esteban, Gradín and Ray (1999) are the main contributions to this approach. Wolfson's (1994) measure assumes two groups of equal size, while the ER measure (Esteban and Ray, 1994) allows *n* groups of potentially different sizes. Esteban et al. (1999) leaves the determination of the number of groups to the researcher, while implements a methodology to endogenously determine group sizes based on the idea of minimizing income heterogeneity within groups.

Although the framework discussed so far follows an intuitive way to refer to different socioeconomic strata, the division of the income distributions in a finite number of groups is unnatural, due to the fact that income is a continuous variable. This fact implies some drawbacks: (i) there is a degree of arbitrariness in the choice of the number of income groups, and (ii) continuous changes in polarisation are not captured in some cases, given that the population is divided into a finite number of groups.

The Duclos-Esteban-Ray index (DER)⁴ alleviates these problems. In order to do so, they redefine the axioms that must be satisfied by a polarisation index for continuous variables and present a measure of pure income polarisation (see the Appendix for details). This new index allows for individuals not to be clustered around discrete income intervals, and lets the area of identification influence be determined by nonparametric kernel techniques, avoiding arbitrary choices. The authors establish that a general polarisation measure that respects a basic set of axioms must be proportional to

$$P_{\alpha}(F) = \int f(y)^{\alpha} g(y) dF(y)$$

where y denotes income and F(y) its distribution. The function g(y) captures the alienation effect while $f(y)^{\alpha}$ captures the identification effect. The higher the α parameter, the larger the weight attached to identification in the polarisation index.⁵ The value of α should be set by the analyst, the policy maker or in general the person who is evaluating income polarisation in a given economy. In that sense α implicitly captures the value judgments of the analyst.⁶ In the empirical part of the paper we present polarisation statistics for alternative values of the parameter α .

It is possible to account for changes in polarisation through the contribution of alienation, identification and their joint co-movements. Increased alienation is associated with an increase in income distances, while increased identification implies a sharper definition of groups. When taken jointly, these effects may reinforce each other, in the sense that alienation may be highest at the incomes that have experienced an increase in identification, or they may counterbalance each other.

3. Empirical evidence of income polarisation in LAC

This document is based on microdata from a large set of household surveys carried out by the National Statistical Offices of the LAC countries in the period 1989-2004. The database used for this study is a sample of a larger one put together by CEDLAS and the World Bank: the Socioeconomic Database for Latin America and the Caribbean (SEDLAC). The sample covers all countries in mainland Latin America and four of the largest countries in the

³ For further information about other polarisation indices see Gasparini, Horenstein and Olivieri (2006)

⁴ Duclos, Esteban and Ray (2004)

⁵ When α =0 identification within groups is ignored by the index. In that case, the polarisation index coincides with the Gini coefficient. It can be shown that in order to respect the axioms, the parameter α must lie within the interval [0.25, 1]. See Duclos, Esteban y Ray (2004) for details. ⁶ See Atkinson (1970) for a similar discussion regarding inequality indices.

Caribbean (Table 3.1). Most household surveys included in the sample are nationally representative. In each period the sample of countries represents more than 92% of LAC total population. Whenever possible we select three years in each country to characterize the two main periods in the last 15 years: the growth period of the early and mid 1990s when several structural reforms were implemented, and the stagnation and crisis period of the late 1990s and early 2000s. Unfortunately, there is not enough information to characterize the recent recovery of the LAC economies that started around 2003.

For comparability purposes we compute income using a common methodology across countries and years. In particular, we construct a common household income variable that includes all the ordinary sources of income and estimates of the implicit rent from ownhousing.⁷

How polarised are the LAC countries?

We start the analysis of the income polarisation measures by comparing our estimates for LAC countries to those reported for other regions of the world. We make the comparisons in terms of the recently developed DER index. Duclos, Esteban and Ray (2004) compute this measure for a large sample of OECD countries using the Luxembourg Income Study database. Figure 3.1 shows these estimates along with our results for LAC countries for roughly the same period (mostly late 1990s). Although we apply the same methodology as in Duclos *et al.* (2004), there might be some differences in the treatment of the data that may bias the comparisons. Fortunately, Mexico 1996 is in both studies, and the two estimates are pretty close (difference of 2%), a fact that gives us some degree of confidence to take the comparison seriously.

The average DER pure polarisation index in Latin America and the Caribbean is 44% higher than the average for Europe, and 40% higher than the average for the rest of the OECD countries included in the Duclos *et al.* (2004) study. The most polarised country in Europe, Russia, is almost at the same level as the least polarised country in LAC, Uruguay. This small and largely urban South American country, the prototype of social cohesion in Latin America, would be considered a very polarised society in the European context.

The picture of Latin America as a set of highly income-polarised economies does not come at a surprise. It has long been argued that inequality in the region is among the highest in the world. Figure 3.1 suggests that the statement is also probably true when referred to income polarisation.

Which is the income-polarisation ranking across LAC countries?

Figure 3.2 shows the polarisation ranking for the most recent survey in each country (early 2000s) for the DER with α =0.5. Brazil ranks as the most polarised country in the region. Bolivia, Haiti and Colombia are also high income-polarised countries. On the other hand, Uruguay, Venezuela and Costa Rica are the least polarised countries in the region. The rankings are in general robust to the change in the weight to identification. Most of the Spearman rank-correlation coefficients are higher than 0.90 (Table 3.2). Although some rerankings occur (e.g. Uruguay ranks as the least polarised country with all indicators, except DER with α =0.75), they do not modify our general picture of polarisation in the region.

Polarisation measures differ by area. Figure 3.3 illustrates the DER for urban and rural areas for the last survey available for each country in our sample. The income distributions in urban areas have more antagonism than in rural ones in most LAC economies. On average, the DER in rural areas is 2 points lower than in urban areas. Panama, Mexico, Paraguay and

⁷ See the web site of the SEDLAC (<u>www.depeco.econo.unlp.edu.ar/cedlas/sedlac</u>) for details.

Bolivia are the only countries where polarisation is significantly higher in rural areas (for DER with α =0.5).

How has income polarisation evolved during the last 15 years?

Table 3.3 presents several polarisation indices for the distribution of household per capita income in 21 LAC countries. Four main general results emerge from that table: ⁸

(i) Heterogeneity

Experiences have been heterogeneous across LAC countries. On average, 10 out of 16 economies have experienced some increase in polarisation over the period under analysis.⁹ Distributional changes have been large in some countries, and negligible in others. Differences in patterns are noticeable even at the level of subregions. For instance, in the Mercosur, while polarisation went down in Brazil and to some extent in Chile, most indicators of this distributional dimension dramatically increased in Argentina, Paraguay and Uruguay over the last two decades.

This heterogeneity of patterns is striking, since LAC economies share many structural characteristics and were subject to similar shocks. The political cycle is also similar across Latin-American nations. In particular, during the 1990s most countries implemented marketoriented reforms. Despite these similarities economic performances have been substantially different, including changes in income polarisation. The heterogeneity of results provides a useful instrument to identify policies and scenarios under which some countries have managed to grow and/or become more equitable.

(ii) On average, small increase in polarisation and inequality

As mentioned above, more than half of the countries have experienced increases in their levels of polarisation. Anyway, changes in most countries have been rather small. On average polarisation and inequality have mildly increased in the region over the last 15 years. Table 3.4 reports an increase of around 2.5% in the polarisation indicators. The average increase in the Gini was about the same amount.

There is a heated debate in Latin America (as well as in other regions of the world) regarding the effect of globalisation on economic disparities, and hence on social tension. Of course, showing polarisation and inequality patterns during a period of increasing economic liberalisation and globalisation does not prove any causal relationship. However, it helps to feed a debate that many times seems based on weak anecdotal evidence.

Results 1 and 2 above appear to be in contrast to the extreme versions of the globalisation debate. On the one hand, in contrast to some anti-globalisation arguments, polarisation did not increase in all economies subject to economic liberalisation, and in many the increase was rather small. In fact, the inequality story of LAC in the 1990s does not seem significantly worse than that of the 1980s, when globalisation was not a relevant issue. On the other hand, and in contrast to the arguments of some globalisation advocates, polarisation and inequality did increase on average in the region. Moreover, that implied that in some LAC countries, even when economies were growing presumably as a consequence of liberalisation policies, poverty significantly increased. Globalisation may have not benefited the whole population, and may have even harmed the poor, at least in some economies.

⁸ More information on changes in polarisation by country can be found in Gasparini, Horenstein and Olivieri (2006).

⁹ Changes can be studied for a sample of 16 countries. There are not enough comparable surveys to analyze patterns over the 1990s and 2000s in Dominican Republic, Ecuador, Guatemala, Haiti, and Suriname.

(iii) Larger increase in polarisation and inequality in South America in the 1990s

The increase in the LAC average is driven by changes in South America (Table 3.4). In most Central American countries changes have been almost negligible. In contrast, in most (not in all) South American countries inequality and polarisation went significantly up. The increase seems to have been particularly relevant in the early and mid 1990s, a period of relatively fast growth and structural reforms. The described pattern fits to the cases of Argentina, Bolivia, Colombia, Paraguay, Peru, Uruguay and Venezuela, and probably Ecuador. This process may be closely link to the generation of social tension as well as the existence of social unrest.

(iv) Convergence

Changes have implied some sort of convergence across LAC countries: polarisation and inequality have especially increased in the group of less polarised/unequal countries: Argentina, Costa Rica, Uruguay, and Venezuela. The coefficient of variation of the polarisation indicators and the Gini coefficient have declined over the last 15 years (see last row in Table 3.4).

What is the (empirical) difference between inequality and polarisation?

As explained in previous sections income polarisation and inequality are different although related dimensions of the income distribution. The correlation between these two dimensions is positive and significant. Figure 3.4 displays the Gini coefficient and the DER income polarisation index for different α parameters. As α goes up the weight of identification in the polarisation measures is increased and hence the linear relationship between polarisation and inequality looses strength. As Duclos, Esteban and Ray (2004) states, "...the extent to which inequality comparisons resemble polarization comparisons depends on the parameter α , which essentially captures the power of the identification effect". When α =0.25 the linear fit is very precise: the R² is 0.98. Instead for α =1 the R² is 0.45.

Figure 3.5 presents the proportional changes in polarisation and inequality between the first and the last survey available for each country. When α =0.25 (first panel) the signs of the changes in polarisation and inequality coincide. The strength of this relationship weakens as α goes up because the polarisation index attaches more weight to the identification within income groups. In some cases the identification effect shifts the sign of the overall polarisation change. For instance, Brazil exhibits a decrease in polarisation for most indicators in the period 1990-2003, mainly because the decline in alienation outweighs the increase in identification over the period. However, for a large α polarisation stays roughly unchanged.

Who contributes more in income polarisation?

The DER polarisation measure is the sum of all individual antagonism in the society. It is interesting to know how the different income strata contribute to overall polarisation. In order to accomplish this task the population is partitioned in twenty income vintiles so the sum of the antagonism of each vintile is the total DER measure.

Figure 3.6 indicates that the poorer vintiles are the ones that contribute the most to total antagonism because of their high identification. The higher the parameter α , the larger the contribution to total polarisation. The contribution of the richest vintiles is smaller due to their relatively low identification, even though they have a more intense alienation. In other words,

although the richest vintiles are relatively farther away in the income dimension, they are relatively more heterogeneous and thus less identified with their vicinity.

Given a level of total polarisation, a homogeneous distribution of antagonism over the population may lead to lower tension. In contrast, if the lowest vintiles are highly polarised, then a high-level antagonism of this population potentially creates more tension and would disrupts social cohesion. That seems to be the situation in most LAC countries: on average, the first 8 vintiles exceed their theoretical participation of 5% in more than 1 percentual point.

A decomposition

The DER polarisation measure could be decomposed into three multiplicative components: mean identification, mean alienation and the rescaled correlation between individual identification and alienation.¹⁰ This decomposition allows us to explore how these components interact in each income distribution to determine total polarisation.¹¹ Table 3.5 considers the case of α =0.5. Brazil has a lower level of average alienation (Gini coefficient) than Jamaica or Haiti, but the average α -identification (column i) and the correlation (column c) counterbalance the first effect. Consider now two countries with the same level of average alienation (inequality) such as Mexico and Dominican Republic. They end up with different levels of polarisation because of a higher identification in the latter country.

4. Income distribution, institutions and conflicts¹²

It has long been argued that the income distribution of a country is associated to its institutional development and its degree of social cohesion and unrest. An economy where income is more equally distributed is probably characterised by better and more stable institutions, fewer conflicts and a stronger sense of social cohesion. However, although intuitive, the links are theoretically ambiguous and have not been well-established by the empirical literature. The difficulties are enormous: (i) there are not obvious empirical counterparts for concepts like institutions, social cohesion and conflicts; (ii) the theory stresses that causality may go in all directions, (iii) it is not clear which dimension of the income distribution (inequality, polarisation, poverty, mobility) is the most relevant, and (iv) the data at hand is insufficient to implement valid tests for causality. Despite these empirical limitations, the topic is sufficiently important to have attracted the attention of social scientists for decades. The academic community is continuously searching for new datasets and ideas that contribute to the understanding of the links between income distribution, institutions and conflicts. The issue is particularly relevant for Latin America and the Caribbean. This region has arguably the highest levels of inequality in the world, and it is also one of the regions with weaker institutions, and higher levels of unrest and violence. Moreover, the evidence suggests increasing income disparities in several LAC countries over the last two decades. raising questions on the implications for the socio-political instability.

In this section we analyse the interactions between several measures of institutions and conflict with three different dimensions of the income distribution: inequality, polarisation and poverty. Institutions and conflict may interact in different ways with these three characteristics.

Institutions

¹⁰ For further details see Duclos, Esteban and Ray (2004).

¹¹ Of course, it is impossible to move independently these components, because they are all interrelated dimensions of the same distribution. ¹² For further analysis see Gasparini and Molina (2006)

The literature points out that the income distribution may interact with both the broad base institutions of a country and its specific political institutions. More equal or less polarised economies with lower poverty rates are expected to be found in more democratic countries with better institutions. The second link is more subtle as it refers to specific formal institutions that regulate the political process of a country. At that level, the links with the income distribution are more complex and weaker, and hence more difficult to document in the data. For this reason, this section is mainly focused on the relationship between the income distribution and the broad-based institutions. Indices for these institutions typically combine information on formal constraints with measures of the actual functioning of certain institutions and rules. In the Appendix we provide details on the set of indices used in the paper.

At the country level there seems to exist a close link between the income distribution and the institutional strength. The correlations in Table 4.1 and the scatterplot in Figures 4.1 and 4.2 suggest that more polarised/unequal/poor countries are on average also those with weaker institutions. The correlations seem particularly strong with the Rule of Law index, the Voice and Accountability indicator, and the Government Effectiveness index. Poverty is also significantly negatively correlated to the Democracy index. Most of the correlations remain significant when controlling for per capita GDP, although the values are substantially reduced.

There seems to be some relationship between the level of different dimensions of the income distribution and the level of some broad-based institutions indicators. The links become weaker or even vanish when considering changes over the last decade. Have changes in the income distribution experienced by LAC countries since the early 1990s been associated to changes in their institutional situations? Table 4.2 does not offer strong evidence for this hypothesis. Although in most cases the correlations have the expected sign (negative) they are non-significant.

Poverty is the only distributional variable for which some of the institutional indicators are significant in a panel data regression (see Table 4.3). When considering polarisation or inequality as the left-hand-side variables the coefficients of the institutional variables are significant in a cross-section regression, but non-significant when controlling for fixed effects. In contrast, the coefficients remain significant when using poverty as the left-hand-side variable.

Summing up, poverty is the only distributional dimension for which the negative link with institutions holds when considering changes. This result makes sense. An improvement in the institutional environment may be quickly translated into a better business climate and better conditions for investments, which in turn may foster economic growth, which implies lower poverty given a stable income distribution. While some Latin American countries seemed to have experienced this virtuous process (Chile and some Central American countries are the main examples), some others have suffered a similar process but with the opposite sign: Argentina, Colombia, Paraguay and Venezuela are the main examples. Although the income distribution may quickly translate horizontally, reducing or increasing poverty, the shape of the distribution is much more difficult to transform. Both the income distribution and the broad-based institutions change slowly over time, so it is reasonable that we cannot capture a clear pattern of association in a short period of time with noisy measures.

Conflict and corruption

Now we turn to the relationship between conflict and income distribution. As discussed above the available data does not allow disentangling causal relationships. However, in most of the discussions in this section we implicitly tend to view conflicts as caused, among other factors, by different dimensions of the income distribution. We also briefly examine the potential relationship between the income distribution and corruption. In order to capture the level of conflict in the society we use the Political Stability and Absence of Conflict Index (PSAVI) (also named General Conflict indicator) and the Labour Standard Index (LSI). In order to measure corruption we use the Control of Corruption Index (CCI). See the appendix for details.

The correlations in Table 4.4 and the scatterplots in Figures 4.3 and 4.4 suggest that more polarised/unequal/poor countries are on average also those with higher levels of conflicts (both general and labour conflict). The correlations with the General Conflict index remain significant when controlling for per capita GDP. In fact, the values are almost unchanged when including controls. The correlations with the measures of control of corruption have the expected sign (negative), although the relationships do not seem strong, in particular when we control for other variables.

Table 4.5 shows that some of the links become weaker or even vanish when considering changes over the last decade. However, correlations between changes in the General Conflict Index and changes in inequality and poverty remain significant. Table 4.6 shows the results of panel regressions where we control for fixed effects. Changes in polarisation, inequality and poverty seem to be related to changes in conflict. This piece of evidence is consistent with the idea that increasing levels of polarisation, inequality and poverty generate a hostile atmosphere within the society that could imply higher levels of social conflict and political instability. The relationship with corruption, instead, is not clear.

In what follows we include a set of institutional controls to the analysis. It has long been argued that institutions are key features to understand social conflicts. The regression results for the General Conflict index when institutions are included in the analysis are shown in Table 4.7. In the right hand side we include income distribution measures, along with institutional indicators and other controls (basically GDP per capita, although we tried with several variables). The results suggest that both polarisation and inequality are closely related to situations of conflict. The measures of these distributional dimensions are always significant when controlling for different institutional measures. That is not the case with the poverty headcount ratio: coefficients have the expected signs but seem to be non-significant.

The results of the regressions suggest that both income distribution and institutions do matter for social conflict and instability. Polarisation and inequality seem to be the relevant dimensions of the income distribution, while the RLI and the VAI seem to better capture the formal and informal institutions more closely linked to conflict and instability.

6. Concluding comments

It has long been argued that Latin American and Caribbean countries are among the most unequal economies in the world. From the evidence shown in this study the region is also characterised by a high degree of polarisation, *i.e.* a situation of homogeneous groups that antagonize each other. Moreover, there are some worrying signs of increasing, or at least non-decreasing economic polarisation in the region over the last 15 years, which may reinforce the latent sources of social tension.

Income polarisation increased in most of South America, and stayed roughly unchanged in Central America. However, income polarisation and inequality have fallen in some economies. There does not seem that exist a fatal destiny to increasing disparities in the region.

The paper suggests that institutions and conflict interact in different ways with the various characteristics of the income distribution. There is some evidence that in the LAC context institutional development has been associated to lower poverty, but not significantly lower inequality and polarisation. Instead, conflicts seem more related to inequality and polarisation than to income poverty.

Some LAC countries seem to have followed a virtuous path of stronger institutions, sustainable growth, and lower poverty. However, very few countries have managed to reduce income polarisation/inequality. In that scenario, situations of conflict, social tension and instability are always latent. Another group of LAC countries have suffered a cycle of institutional and economic setbacks. The combination of weaker institutions with higher polarisation quickly translated into situations of social tension and conflict.

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Appendix

The measurement of pure income polarisation: the Duclos-Esteban-Ray index (DER)

The following axioms that are satisfied by the DER index are based on a density with finite support (kernel), and symmetric reductions in dispersion that concentrate the density around its mean (squeezes).

Axiom 1: if a distribution is made up of a basic density, then a squeeze cannot increase polarisation.

Axiom 2: *if a symmetric distribution is composed by three basic densities then a squeeze in the outer densities should not reduce polarisation.*

Axiom 3: if we consider a symmetric distribution made up of four basic densities with disjoint supports, then a move of the center distributions towards their outer neighbours, while keeping the disjoint supports, should increase polarisation.

Axiom 4: Given two distributions F and G, if $P(F) \ge P(G)$, being P(F) and P(G) the respective polarisation indexes, it must be that $P(\alpha F) \ge P(\alpha G)$, where αF and αG represent a rescaled version of F and G.

The authors establish that a general polarisation measure that respects the previous axioms must be proportional to:

$$P_{\alpha}(f) \equiv \iint f(x)^{1+\alpha} f(y) |y-x| dy dx$$

where f(y) and f(x) denote the income (or other well-being measure) density function. The formula can be rewritten as

$$P_{\alpha}(F) = \int f(y)^{\alpha} g(y) dF(y)$$

where F(y) denotes the income distribution function, g(y) captures the "alienation" effect, and $f(y)^{\alpha}$ the "identification" effect.

If we have a sample of incomes with independent and identically distributed observations ranked from smallest to highest, the DER operational formula is:

$$P_{\alpha}(\hat{F}) = n^{-1} \sum_{i=1}^{n} \hat{f}(y_{i})^{\alpha} \left[\hat{\mu} + \left(y_{i} \left(\overline{w}^{-1} \left(2 \sum_{j=1}^{i} w_{j} - w_{i} \right) - 1 \right) - \overline{w}^{-1} \left(2 \sum_{j=1}^{i-1} w_{j} y_{j} - w_{i} y_{i} \right) \right) \right]$$

where y_i is the *i*-th individual income, $\hat{\mu}$ is the sample mean, w_i is the weight of individual *i*, and $\overline{w} = \sum_{i=1}^{n} w_i$.

The function $\hat{f}(y_i)$ is a nonparametric kernel estimate of the income density, using a bandwidth that minimizes the mean square error of the estimator h^* , given by

$$h^{*} = \sqrt{\frac{\operatorname{cov}(a_{\alpha}(y), P_{\alpha}^{''}(y))}{\alpha \sigma_{k}^{2} (\int f(y) P_{\alpha}(y) dy)^{2}}} n^{-\frac{1}{2}} + o(n^{-1})$$

with

$$a_{\alpha}(y) = (1+\alpha)P_{\alpha}(y) + y\int f(x)^{\alpha} dF(x) + 2\int_{y}^{\infty} (x-y)f(x)^{\alpha} dF(x)$$

Duclos, Esteban and Ray (2004) provide other formulas that are easier to compute. The first can be used with normal distributions and will not exceed the h^* that minimizes the mean squared error by more than 5%.

$$h^* \cong 4.7 n^{-5} \sigma \alpha^{-1}$$

The second is for distributions with skewness greater than 6:

$$h^* \cong n^{-5} I Q \frac{(3.76 + 14.7\sigma_{ln})}{(1 + 1.09 * 10^{-4} \sigma_{ln})^{(7268 + 15323\alpha)}}$$

where *IQ* is the interquantile range, and σ_{in} is the variance of log-income.

Broad-base institutions indices

DI: Democracy Index. The index is a measure of the degree of institutionalized democracy. The index is measured in units ranging from -10 to 10, with higher values corresponding to a system with a more consolidate democracy. Source: Polity IV Project.

GEI: Government Effectiveness Index. The index is a measure of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. It is measured in units ranging from -2.5 to 2.5, with higher values corresponding to a more effective government. Source: Kaufmann et al (2005).

LSI: Legal Structure and security of property rights index. This index is a measure of the functioning's of the legal system in a country. It is measured in units ranging from 0 to 10, with higher values corresponding to a system with a better working of the legal system. Source: Gwartney and Lawson (2005).

PCI: Political Constraints Index. This index estimates the feasibility of policy change. The index is measured in units ranging from 0 to 1, with higher values corresponding to a system where policy changes are more feasible. Source: Henisz, W. J. (2006).

RLI: Rule of Law Index. The index is measured in units ranging from -2.5 to 2.5, with higher values corresponding, in broad terms, to the respect of citizens and the state for the institutions which govern their interactions. Source: Kaufmann et al (2005).

VAI: Voice and Accountability Index. The index is a measure of the extent to which citizens of a country are able to participate in the selection of governments. It includes a number of

indicators measuring various aspects of the political process, civil liberties and political rights. The index is measured in units ranging from -2.5 to 2.5, with higher values corresponding to a system where the citizenship has more voice and accountability. Source: Kaufmann et al (2005).

Conflict and corruption indices

CCI: Control of Corruption Index. The index is a measure of perceptions of corruption, defined as the exercise of public power for private gain. It is measured in units ranging from about -2.5 to 2.5, with higher values corresponding to less corruption. Source: Kaufmann et al (2005).

LS: Labour Standards index. The index is a composed measure of the worker's freedom to organize themselves, negotiate collectively and to be declared in strike. The index is measured in units ranging from 0 to 76.5, with higher values corresponding to less respect for the worker's rights. Source: Mosley and Uno (2002).

PSAVI: Political Stability and Absence of Violence Index. The index is a measure which try to capture the idea that the quality of governance in a country is compromised by the likelihood of wrenching changes in government, which not only has a direct effect on the continuity of policies, but also at a deeper level undermines the ability of all citizens to peacefully select and replace those in power. It is measured in units ranging from -2.5 to 2.5, with higher values corresponding to a system which is least likely destabilized or overthrown and where conflict plays no part in the society. Source: Kaufmann et al (2005).

Table 3.1				
Household	surveys	used in	the	study

Country	Name of survey	Acronym	Years	Coverage
Argentina	Encuesta Permanente de Hogares Encuesta Permanente de Hogares-Continua	EPH EPH-C	1992-2003 2003-2004	Urban Urban
Bolivia	Encuesta Integrada de Hogares Encuesta Nacional de Empleo Encuesta Continua de Hogares- MECOVI	EIH ENE ECH	1993 1997 2000-2002	Urban National National
Brazil	Pesquisa Nacional por Amostra de Domicilios	PNAD	1990-2003	National
Chile	Encuesta de Caracterización Socioeconómica Nacional	CASEN	1990-2003	National
Colombia	Encuesta Nacional de Hogares - Fuerza de Trabajo Encuesta Nacional de Hogares - Fuerza de Trabajo Encuesta Continua de Hogares Encuesta de Calidad de Vida	ENH-FT ENH-FT ECH ECV	1992 1996-2000 2000-2004 2003	Urban National National National
Costa Rica	Encuesta de Hogares de Propósitos Múltiples	EHPM	1992-2003	National
Dominican R.	Encuesta Nacional de Fuerza de Trabajo	ENFT	1996-2004	National
Ecuador	Encuesta de Condiciones de Vida Encuesta de Empleo, Desemple y Subempleo	ECV ENEMDU	1994-1998 2003	National National
El Salvador	Encuesta de Hogares de Propósitos Múltiples	EHPM	1991-2003	National
Guatemala	Encuesta Nacional sobre Condiciones de Vida Encuesta Nacional de Empleo e Ingresos	ENCOVI ENEI - 2	2000 2002	National National
Haiti	Enquête sur les Conditions de Vie en Haïti	ECVH	2001	National
Honduras	Encuesta Permanente de Hogares de Propósitos Múltiples	EPHPM	1992-2003	National
Jamaica	Jamaica Survey of Living Conditions	JSLC	1990-2002	National
Mexico	Encuesta Nacional de Ingresos y Gastos de los Hogares	ENIGH	1992-2002	National
Nicaragua	Encuesta Nacional de Hogares sobre Medición de Nivel de Vida	EMNV	1993-2001	National
Panama	Encuesta de Hogares	EH	1995-2003	National
Paraguay	Encuesta Integrada de Hogares Encuesta Permanente de Hogares Encuesta Integrada de Hogares	EIH EPH EIH	1997 1999-2003 2001	National National National
Peru	Encuesta Nacional de Hogares	ENAHO	1997-2003	National
Suriname	Expenditure Household Survey	EHS	1999	Urban/Paramaribo
Uruguay	Encuesta Continua de Hogares	ECH	1989-2004	Urban
Venezuela	Encuesta de Hogares Por Muestreo	EHM	1989-2003	National

Table 3.2Spearman rank correlation coefficientsPure income polarisation indices and Gini coefficient

						EGR (2)			EGR (3)	DER			
			Gini	WLF		α			α			(x	
					1	1.3	1.6	1	1.3	1.6	0.25	0.5	0.75	1
Gini			1	0.90	0.95	0.93	0.88	0.99	0.98	0.99	0.97	0.93	0.92	0.85
Wolfson				1	0.90	0.86	0.79	0.89	0.92	0.92	0.96	0.92	0.88	0.84
EGR (2)		1			1	0.99	0.96	0.96	0.97	0.96	0.96	0.95	0.95	0.90
	α	1.3				1	0.99	0.95	0.95	0.94	0.94	0.93	0.94	0.90
		1.6					1	0.91	0.90	0.90	0.89	0.89	0.92	0.88
EGR (3)		1						1	0.98	0.99	0.97	0.94	0.94	0.88
	α	1.3							1	0.99	0.99	0.96	0.94	0.88
		1.6								1	0.99	0.95	0.93	0.87
DER		0.25									1	0.97	0.95	0.90
	α	0.5										1	0.99	0.96
		0.75											1	0.98
		1												1

Source: Own calculations based on household surveys

Table 3.3Pure income polarisationHousehold per capita incomeNational statistics

		Wolfson		EGR (2)			EGR (3)			D	ER	
			1	α 1.2	16	- 1	α 1.2	16	0.25	0.5	α 0.75	4
Argenti	na		1	1.3	0.1	1	1.3	0.1	0.25	0.5	0.75	1
•	15 cities											
	1992	0.410	0.204	0.150	0.107	0.730	0.494	0.339	0.334	0.284	0.269	0.289
	28 cities	0.465	0.220	0.100	0.121	0.603	0.545	0.373	0.355	0.294	0.270	0.272
	1998	0.488	0.230	0.170	0.122	0.808	0.548	0.376	0.359	0.300	0.274	0.277
	2004	0.500	0.233	0.172	0.123	0.828	0.560	0.384	0.363	0.298	0.268	0.261
Bolivia												
Urban	1002	0.477	0.242	0.192	0 127	0.042	0 569	0.207	0.267	0.202	0.070	0.250
	1993	0.477	0.242	0.183	0.137	0.843	0.568	0.387	0.367	0.303	0.272	0.259
	2002	0.485	0.255	0.195	0.142	0.886	0.590	0.406	0.376	0.311	0.282	0.268
Natior	al											
	1997	0.552	0.271	0.205	0.155	0.945	0.635	0.432	0.403	0.331	0.297	0.286
B''	2002	0.578	0.277	0.209	0.157	0.982	0.653	0.450	0.413	0.342	0.314	0.313
Brazii	1990	0.648	0 302	0 233	0 181	0 998	0.666	0.460	0 425	0.363	0 344	0 354
	1998	0.607	0.292	0.226	0.175	0.950	0.651	0.449	0.414	0.356	0.350	0.395
	2003	0.569	0.279	0.214	0.164	0.949	0.639	0.436	0.402	0.344	0.346	0.399
Chile												
	1990	0.501	0.267	0.206	0.160	0.908	0.604	0.415	0.385	0.319	0.289	0.275
	1998	0.518	0.270	0.209	0.161	0.912	0.607	0.418	0.384	0.318	0.289	0.276
Calamb	2003	0.476	0.258	0.199	0.153	0.888	0.590	0.406	0.376	0.312	0.283	0.269
ENH-I	na Irban											
LINE	1992	0.456	0.238	0.181	0.137	0.822	0.555	0.379	0.367	0.310	0.289	0.299
	2000	0.546	0.276	0.212	0.163	0.933	0.628	0.427	0.409	0.343	0.320	0.341
ECH-Ur	ban											
	2000	0.492	0.263	0.203	0.157	0.911	0.605	0.415	0.381	0.323	0.307	0.325
.	2004	0.518	0.263	0.201	0.153	0.905	0.609	0.415	0.396	0.321	0.299	0.316
Costa F	lica	0.400	0.405	0.4.40	0.007	0.745	0.405	0.000	0.000	0.000	0.000	0.400
	1992	0.406	0.195	0.140	0.097	0.715	0.485	0.333	0.326	0.262	0.223	0.199
	2003	0.464	0.223	0.164	0.118	0.723	0.538	0.368	0.345	0.278	0.241	0.219
Domini	can Rep.	0.101	0.220	0.101	0.110	0.101	0.000	0.000	0.010	0.270	0.211	0.210
	2000	0.494	0.240	0.179	0.132	0.853	0.575	0.393	0.365	0.297	0.262	0.243
	2004	0.464	0.238	0.179	0.133	0.841	0.567	0.386	0.360	0.295	0.263	0.246
Ecuado	r											
	1994	0.468	0.243	0.183	0.137	0.873	0.587	0.399	0.377	0.305	0.267	0.248
	1998	0.497	0.253	0.191	0.144	0.905	0.603	0.414	0.379	0.310	0.275	0.258
El Salva	2003 ador	0.464	0.233	0.173	0.126	0.839	0.566	0.386	0.361	0.293	0.258	0.242
LI GUIVE	1991	0.481	0.237	0.176	0.129	0.853	0.575	0.392	0.367	0.297	0.260	0.240
	2000	0.491	0.234	0.172	0.124	0.844	0.567	0.388	0.369	0.295	0.252	0.227
	2003	0.472	0.224	0.164	0.116	0.822	0.556	0.380	0.358	0.286	0.244	0.218
Guatem	ala											
11-14	2000	0.480	0.255	0.194	0.147	0.890	0.592	0.407	0.377	0.309	0.276	0.259
naiti	2001	0.558	0.285	0 221	0 171	0 973	0.646	0.443	0.406	0 334	0 300	0.283
Hondur	as	0.000	0.200	0.221	0.171	0.575	0.040	0.445	0.400	0.004	0.500	0.200
Eph 1												
	1992	0.522	0.247	0.185	0.136	0.873	0.590	0.402	0.372	0.304	0.270	0.251
	1997	0.503	0.249	0.187	0.139	0.890	0.600	0.408	0.379	0.310	0.275	0.257
Eph 2												
	1997	0.476	0.239	0.178	0.131	0.852	0.574	0.391	0.369	0.300	0.263	0.241
Jamaic	2003	0.515	0.256	0.190	0.147	0.003	0.596	0.406	0.363	0.315	0.201	0.203
vaniaio	1990	0.639	0.257	0.189	0.135	0.924	0.624	0.434	0.397	0.311	0.260	0.226
	1999	0.626	0.269	0.200	0.146	0.961	0.650	0.444	0.408	0.334	0.308	0.317
	2002	0.610	0.275	0.205	0.150	0.974	0.658	0.449	0.419	0.345	0.316	0.318
Mexico	1000				A 4 1-			a				
	1992	0.478	0.255	0.195	0.149	0.894	0.600	0.407	0.375	0.308	0.276	0.264
	2002	0.4/4	0.241	0.181	0.135	0.856	0.5//	0.393	0.364	0.297	0.264	0.248
Nicarao	2002	0.407	0.232	0.175	0.120	0.034	0.303	0.304	0.302	0.250	0.230	0.235
	1993	0.548	0.261	0.195	0.144	0.919	0.620	0.422	0.391	0.318	0.281	0.261
	1998	0.475	0.244	0.183	0.136	0.876	0.584	0.401	0.379	0.308	0.271	0.251
	2001	0.478	0.249	0.188	0.142	0.886	0.589	0.404	0.375	0.310	0.279	0.263
Panama	1											
	1995	0.545	0.257	0.192	0.141	0.900	0.609	0.416	0.385	0.306	0.262	0.233
Paraa	∠∪∪3 av	0.572	0.265	0.200	0.149	0.922	0.623	0.426	0.393	0.321	0.285	0.269
aayu	1997	0.557	0.256	0.190	0.138	0 920	0.621	0.425	0 395	0.319	0.281	0.261
	2002	0.557	0.259	0.193	0.141	0.927	0.625	0.426	0.392	0.318	0.281	0.262
Peru												
	1997	0.514	0.243	0.180	0.131	0.871	0.589	0.402	0.378	0.306	0.267	0.243
	2002	0.502	0.247	0.185	0.137	0.885	0.590	0.407	0.382	0.312	0.274	0.251
Surinar	ne											
	1999	0.493	0.253	0.191	0.143	0.849	0.573	0.390	0.370	0.291	0.244	0.212
orugua	y 1020	0.200	0.104	0.120	0.090	0 690	0 450	0.212	0.244	0.252	0.247	0.100
	1909	0.300	0.101	0.130	0.009	0.000	0.459	0.331	0.311	0.252	0.217	0.193
	2003	0.401	0,203	0.140	0.105	0.728	0.495	0.340	0.325	0,265	0,230	0,207
Venezu	ela	0.110	0.200	510		020	5. 155	2.0.0	0.020	5.200	5.200	5.201
	1989	0.376	0.184	0.131	0.090	0.683	0.463	0.316	0.318	0.265	0.243	0.246
	1998	0.433	0.209	0.152	0.107	0.762	0.517	0.355	0.338	0.272	0.233	0.210
	2000	0.408	0.194	0.140	0.097	0.709	0.481	0.331	0.320	0.259	0.222	0.199
	2003	0.430	0.205	0.149	0.104	0.745	0.506	0.347	0.332	0.267	0.229	0.207

Source: Own estimates based on household surveys

Table 3.4 Changes (%) in polarisation measures and Gini coefficient

				DER						
	Wolfson	EGR (2)	EGR (3)	0.25	0.5	0.75	Gini			
Change in index (%)									
South America	4.9	4.8	4.6	2.5	1.1	0.7	4.5			
Central America	0.5	0.6	0.5	0.4	0.8	1.7	-0.3			
Latin America	2.1	3.1	2.9	1.9	1.7	2.5	2.5			
Change in coefficient of variation of index (%)										
Latin America	-35.7	-28.8	-25.4	-17 5	-9.1	43	-24.3			

Source: Own estimates based on household surveys

Table 3.5 **DER decomposition** Alienation (Gini), identification and correlation effects

Country	Year			0	.5	
Country	1 Gui	Gini	i	С	i.c	DER
Uruguay	2003	0.449	0.730	0.808	0.590	0.265
Venezuela	2003	0.462	0.709	0.814	0.577	0.267
Costa Rica	2003	0.490	0.716	0.794	0.568	0.278
El Salvador	2003	0.509	0.703	0.797	0.561	0.286
Suriname	1999	0.528	0.702	0.785	0.551	0.291
Mexico	2002	0.514	0.729	0.780	0.569	0.292
Ecuador	2003	0.517	0.737	0.768	0.567	0.293
Dominican Rep	2004	0.514	0.755	0.760	0.573	0.295
Argentina	2004	0.507	0.733	0.802	0.588	0.298
Guatemala	2000	0.545	0.761	0.746	0.568	0.309
Nicaragua	2001	0.543	0.770	0.741	0.570	0.310
Peru	2002	0.543	0.745	0.770	0.574	0.312
Chile	2003	0.540	0.783	0.738	0.577	0.312
Honduras	2003	0.542	0.757	0.769	0.581	0.315
Paraguay	2002	0.571	0.729	0.764	0.557	0.318
Panama	2003	0.561	0.736	0.776	0.571	0.321
Colombia	2004	0.551	0.772	0.774	0.597	0.329
Haiti	2001	0.592	0.762	0.741	0.565	0.334
Bolivia	2002	0.601	0.749	0.760	0.569	0.342
Jamaica	2002	0.599	0.732	0.788	0.576	0.345
Brazil	2003	0.576	0.799	0.763	0.610	0.351

Notes: a=alienation (Gini coefficient) i=identification

c=correlation Source: Own calculations based on household surveys

Table 4.1 Correlations between indicators of income distribution and institutions

Polarisation (DER 0.5)

		Correlations		controling for
	pooled	period 1	period 2	GDP pc
Rule of Law	-0.5457*	-0.6011*	-0.4523*	-0.4176*
Voice and Accountability	-0.4180*	-0.4317*	-0.3966*	-0.2802*
Legal structure	-0.2688	-0.161	-0.3336	-0.106
Gov't Effectiveness	-0.4704*	-0.5236*	-0.3946	-0.2941*
Democracy	-0.2058	-0.2019	-0.2291	-0.1648
Political constraints	-0.0393	0.0522	-0.114	-0.089
Poverty (headcount ratio)				

		Correlations		controling for
	pooled	period 1	period 2	GDP pc
Rule of Law	-0.6802*	-0.7298*	-0.7071*	-0.3916*
Voice and Accountability	-0.5230*	-0.4888*	-0.5679*	-0.2532*
Legal structure	-0.4992*	-0.5127*	-0.5562*	-0.1814
Gov't Effectiveness	-0.6858*	-0.7065*	-0.6967*	-0.2882
Democracy	-0.3869*	-0.1622	-0.6911*	-0.4336*
Political constraints	-0.3850*	-0.4429*	-0.319	-0.2144

Inequality (Gini)									
		Correlations		controling for					
P	ooled	period 1	period 2	GDP pc					
Rule of Law	-0.6272*	-0.6467*	-0.5831*	-0.4289*					
Voice and A	-0.5136*	-0.5032*	-0.5267*	-0.3303*					
Legal struct	-0.3454*	-0.2393	-0.4468*	-0.1128					
Gov't Effecti	-0.6044*	-0.6702*	-0.5218*	-0.3531*					
Democracy	-0.2772	-0.2623	-0.3264	-0.2358					
Political con	-0.1476	-0.1215	-0.1385	0.025					

* = significant at 10% Note: period 1=1989-1998, period 2=1999-2004

Table 4.2 Correlations between changes in indicators of income distribution and institutions

Poverty (headcount ratio)

			controling for		
	ι	Jnconditional	GDP growth		
Rule of Law		-0.5506*	-0.372		
Voice and Accoun	tability	-0.407	-0.240		
Legal structure		-0.465	-0.318		
Gov't Effectivenes	S	-0.5302*	-0.325		
Democracy		-0.265	-0.244		
Political constraint	ts	-0.6777*	-0.6807*		
Polarisation (DER 0.5)			Inequality (Gini)		
	Unconditional	controling for GDP growth		Unconditional	controling for GDP growth
Rule of Law	0.020	0.141	Rule of Law	-0.195	-0.159
Voice and Accountability	-0.271	-0.251	Voice and Accountability	-0.404	-0.400
Legal structure	0.074	0.146	Legal structure	-0.050	0.009
Gov't Effectiveness	0.039	0.214	Gov't Effectiveness	-0.231	-0.230
Democracy	-0.233	-0.224	Democracy	-0.397	-0.389
Political constraints	-0.019	0.000	Political constraints	-0.297	-0.283

* = significant at 10%

Table 4.3Model of indicators of income distribution on institutional measures

Cross-section				Panel		
Polarisation	Inequality	Poverty	Polarisation	Inequality	Poverty	
DER	Gini	Headcount	DER	Gini	Headcount	
-0.019*	-0.036*	-11.2*	-0.008	-0.027	-9.5*	
-0.024*	-0.044*	-9.2*	-0.006	-0.029*	-10.7*	
-0.007	-0.012	-3.6*	-0.001	-0.003	-1.8*	
-0.019	-0.035	-8.98	-0.001	-0.020	-9.4	
-0.001	-0.002	-2.7*	-0.001	-0.003*	-0.4	
0.015	0.015	-8.3	-0.006	-0.020	-17.3	
	Polarisation DER -0.019* -0.024* -0.007 -0.019 -0.001 0.015	Cross-sec Polarisation Inequality DER Gini -0.019* -0.036* -0.024* -0.044* -0.007 -0.012 -0.019 -0.035 -0.001 -0.002 0.015 0.015	Cross-section Polarisation Inequality Poverty DER Gini Headcount -0.019* -0.036* -11.2* -0.024* -0.044* -9.2* -0.007 -0.012 -3.6* -0.019 -0.035 -8.98 -0.001 -0.002 -2.7* 0.015 0.015 -8.3	Cross-section Polarisation Inequality Poverty Polarisation DER Gini Headcount DER -0.019* -0.036* -11.2* -0.008 -0.024* -0.044* -9.2* -0.006 -0.007 -0.012 -3.6* -0.001 -0.019 -0.035 -8.98 -0.001 -0.001 -0.002 -2.7* -0.001 0.015 0.015 -8.3 -0.006	Cross-section Par Polarisation Inequality Poverty Polarisation Inequality DER Gini Headcount DER Gini -0.019* -0.036* -11.2* -0.008 -0.027 -0.024* -0.044* -9.2* -0.006 -0.029* -0.019 -0.035 -8.98 -0.001 -0.020 -0.001 -0.002 -2.7* -0.001 -0.003* -0.015 0.015 -8.3 -0.006 -0.020	

* = significant at 10%

Table 4.4 Correlations between indicators of income distribution and conflict and corruption

Polarisation (DER 0.5)								
		Correlations		controling for				
	pooled	period 1	period 2	GDP pc				
General Conflict (PSAVI)	-0.4486*	-0.4859*	-0.4120*	-0.4346*				
Control of Corruption (CCI)	-0.1799	-0.0687	-0.2768	-0.0465				
Labor Conflict (LS)	0.3313*	0.1525	0.6848*	0.2155				
Poverty (headcount ratio)	Poverty (headcount ratio)							
		Correlations		controling for				
	pooled	period 1	period 2	GDP pc				
General Conflict (PSAVI)	-0.5123*	-0.5313*	-0.5023*	-0.2747*				
Control of Corruption (CCI)	-0.4766*	-0.4191*	-0.5351*	-0.1593				
Labor Conflict (LS)	0.4211*	0.4318*	0.6251*	0.0949				
* = cignificant at 10%								

Inequality (Gini)				
Correlations			controling for	
p	ooled	period 1	period 2	GDP pc
General Cor	-0.4522*	-0.4417*	-0.4710*	-0.4097*
Control of C	-0.2977*	-0.1892	-0.4273*	-0.0757
Labor Confli	0.4190*	0.2559	0.7682*	0.2536

* = significant at 10%.

Table 4.5 Correlations between changes in indicators of income distribution and conflict and corruption Polarisation (DER 0.5) Inequality (Gini)

		controling for
	Unconditional	GDP growth
General Conflict (PSAVI)	-0.1619	-0.1219
Control of Corruption (CCI)	0.4011	0.567*
Labor Conflict (LS)	-0.2986	-0.28

Inequality (Gini)				
		controling for		
	Unconditional	GDP growth		
General Conflict (PSAVI)	-0.4296*	-0.4478*		
Control of Corruption (CCI)	0.2974	0.4474*		
Labor Conflict (LS)	-0.3422	-0.3233		

Poverty (headcount ratio)

		controling for
	Unconditional	GDP growth
General Conflict (PSAVI)	-0.7269*	-0.6428*
Control of Corruption (CCI)	-0.0953	0.2145
Labor Conflict (LS)	-0.4141	-0.3153
* = significant at 10%.		

Table 4.6

Model of indicators of income distribution on conflict and corruption measures

	PSAVI	LS	CCI
Polarisation (DER)	-14.498*	-29.2583	5.8861
Inequality (Gini)	-8.7571*	6.3265	0.9199
Poverty (Headcount)	-0.0157*	0.0194	-0.0053

Table 4.7

Model of indicators of conflict and corruption on income distribution and institutional measures

		Panel		
		General Conflict		
		PSAVI		
Distribution Polarisation (DER)	12.92611.854-14.614*-13.270*13.820*			
Inequality (Gini)		-7.3356* -6.8553* -8.1770* -8.112	27* -8.2423*	
Poverty (Headcount)			-0.01 -0.01 -0	.01 -0.01 -0.01
Institutions Voice and Accountabili	ity	0.3333*	0.4604*	
Rule of Law	0.5981*	0.5074*	0.6249*	
Gov't Effectiveness	0.3668*	0.1878	0.2	244
Political constraints	0.5461*	0.503	34*	0.494
Democracy	0.0567*		0.0483	0.058

Figure 3.1 Pure income polarisation DER index



Source: Duclos, Esteban and Ray (2004) and own calculations based on household surveys.

Figure 3.2 Pure income polarisation

DER index (α =0.5) for the household per capita income distribution Last survey available for each country



Source: Own calculations based on household surveys

Figure 3.3 Pure income polarisation

DER index (α =0.5) of the household per capita income distribution

Urban and rural areas

Last survey available for each country



Source: Own calculations based on household surveys

Figure 3.4 Inequality and polarisation Gini coefficient and DER with alternative values for parameter α Last survey available for each country



Source: Own calculations based on household surveys

Figure 3.5 Inequality and polarisation changes Gini coefficient and DER with alternative values for parameter α



Source: Own calculations based on household surveys.

Figure 3.6 Decomposition of the DER index: participation in DER by vintiles Mean values across LAC countries Last survey available for each country



Source: Own calculations based on household surveys

Figure 4.1 DER index of polarisation and broad-based institution indices



Figure 4.2 Poverty beadcount ra

Poverty headcount ratio and broad-based institution indices



Figure 4.3 DER index of polarisation and conflict and control of corruption indices



Labour Conflict



Figure 4.4

Poverty headcount ratio and conflict and control of corruption indices



