INEQUALITY, WELL-BEING AND INSTITUTIONS IN LATIN AMERICA AND THE CARIBBEAN

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Abstract

This paper focuses on the role of "institutions" in the fight against poverty and inequality. Our view of institutions encompasses formal rules designed by polity (including those in the legal and economics sphere such as rules of property rights, contracts and liabilities) as well as informal rules (usually labelled social capital) that have emerged over the history of one's civilisation. The inclusion of health, nutrition, and literacy indicators in defining well-being (or, non-income poverty à la capability approach of Amartya Sen) allows a rich discussion of policy interventions. While both orientations as to the concepts of poverty, inequality and institutions are expounded on a priori reasoning, empirical analysis with LAC data prove rewarding. Quality of institutions (measured by a composite variable called institutional capital, IC) turns out to be a key factor explaining well-being. Further where the level of income is also important to the explanation, the quantitative role of the institutional factor dominates that of the income variable. Within IC, political stability (or lack of violence) appeared to provide the more precise estimates in every case. Consequently we argue that the foremost policy interventions ought to be in the areas of building both adequate formal institutions, as well as creating an enabling environment for the informal institutions (such as social capital) to flourish and find their own roots. The principal focus of the policy debate must centre on the mutual interaction of market as well as non-market institutions in reducing poverty broadly speaking.

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1. Introduction: Over the past two decades researchers and policy makers have called for an expansion of the idea of poverty going beyond the income/expenditure dimension. The idea of "basic needs" popularised by the World Bank scholars had been a forerunner. A more vigorous effort started with the popularity of the idea of one's capability as being the relevant measure: poverty must be seen as the deprivation of basic capabilities than merely as lowness of incomes (Sen 1999, p.87). Here one attempts to measure how capable is the person to enjoy the kind of life that she cherishes (including basic freedom). Over the decade of the1990s, this concept has led to innovations by the UNDP when it devised the "human development index" in 1993, and finally the "human poverty index" in 1997. Sen believes that this broadening of the concept enables one "to enhance the understanding of the nature and causes of poverty and deprivation by shifting attention away from the means ..to ends that people have reason to pursue, and, correspondingly, to the freedoms to be able to satisfy these ends" (ibid, p90).

In order to apply the capability approach to poverty and well-being analysis, one would select indicators that capture critical aspects of mortality, nutrition, risk/vulnerability, the lack of voice, political participation, etc. This paper develops a simple measure of non-income aspects of poverty (NIP) or well-being along the above lines, which we believe describes one's understanding of general well being quite well.[1] Our analysis focuses both on the aggregate as well as the individual components of well-being. Our stress on the latter dimension of well-being is fully endorsed by Sen. While the measures of HDI and HPI (human poverty index) have been popular, and where Sen himself has materially contributed to the construction, he thinks that the aggregation is not helpful for the design of policies. Instead the substantive pattern of diverse performances is called for in order to pinpoint the areas where ideas and resources may have to be spent. Knowing where a society stands in the aggregate would not reveal much of how to design policies, the latter being of necessity of the targeted variety. Depending on the specific context, public policies may have to target "the financing of health care and insurance, provision of public education, arrangements for local security and so on" (Sen, 1999, p108).

Over and above the policy angle, there are compelling analytical and practical considerations that suggest that the broader measure of poverty ought to be the primary focus in an analysis of poverty. The analytical point is indeed the raison d'être of the capability idea. Capabilities are goals in themselves, regardless of whether or not these also lead to income gains. Thus by directly targeting the broader notions of deprivation is tantamount to maximizing the direct utility function, rather than relying on the indirect utility (defined over income). The practical considerations are many. Klasen (2000) has

[1] In this paper we shall use both the terms *non-income poverty* (NIP) and *well-being* synonymously, where each denotes our concept of broader poverty.

argued that the identification of the worse off in society in terms of the income measure vis-à-vis those pointed out by the capability approach may differ importantly. In large sample for South Africa, he found that 30 percent of the most deprived (NIP driven) would not be so identified by the expenditure headcount method. This makes it difficult for the design of targeted policies. Others point out that the income or the expenditure data typically used for the headcount poverty analysis is unreliable (e.g., Wade, 2002). Indeed there is a presumption here that the available NIP indicators were of better quality.

The primary goal of this paper is to explain the pattern of well-being across nations, and contrast the results in terms of the typical determinants of the *income/expenditure* based measures of poverty (such as the head count statistic). We do this for Latin America and the Caribbean region (LAC). While inequality of income (consumption) has been frequently pointed out as an important moderating force in explaining headcount poverty (e.g., Ravallion, 2001), it would be of interest to examine if a similar pattern may hold for the broader measure of poverty. This is especially relevant in view of the high level of income inequality in many of LAC countries vis-à-vis other regions.

The key focus of the analysis however lies in discerning the role that *institutions* à la New Institutional Economics (NIE) play in determining broader poverty. The presumption is that the quality of institutions has a direct bearing on the NIP indicators, and it would be of interest to examine if these were statistically significant vis-à-vis the impact that income differences have on the same indicators of poverty. It would seem that the nexus between institutions and poverty has also been hinted at by Sen. Even though income may have a direct bearing on the range of capabilities, he went on to say that "the impact of income on capabilities is contingent and conditional" (p88). He further elaborates: "different types of contingencies lead to systematic variations in the 'conversion' of incomes into the distinct 'functioning' we can achieve" (p109). He stresses the role of a "supportive social background" as relevant to the conversion process. In the larger view proposed here, the supportive background might be likened to the totality of institutions as developed below.

We begin by exploring how the selected countries[2] differ in the design, delivery and endowment of "institutions". Here we conceive of *institutions* as the enabling framework that facilitates economic and other exchanges, both *within* and *outside* of the market mechanism. The central focus of new institutional economics is that transactions are costly to execute.[3] Indeed NIE makes a clear break from the Walrasian tradition by asserting that co-ordination of transactions is never as easily accomplished as is implied there. Matthews conceives of institutions rather generally as a "set of rights and obligations affecting people in their economic lives" [1986, p905]. To North, institutions are the "rules of the game" [1997]. Indeed he goes further: "institutions must not only provide low-cost enforcement of property rights, bankruptcy laws, but also provide incentives to encourage decentralised decision making and effective competitive markets" [1997, p4]. Among "formal rules", he enumerates the polity, the judiciary, and the laws of contract and property.

[2] The essential methodology behind the selection of countries is that comparable data exist for the entire set. Out of an initial sample of nearly 40, twenty-one survive. Most of these are from Latin America.
[3] Coase (1984) attributes the origin of the term "new institutional economics" to Oliver Williamson.

These above rules are complemented by what is generally referred to as "informal" ones. For North, the latter are "extensions, elaborations and qualifications of rules that 'solve' innumerable exchange problems not completely covered by formal rules. ..Routines, customs, traditions, and culture are words we use to denote the persistence of informal constraints" [1997, p4]. Williamson defines the concept of "societal embeddedness" as "antecedent to the polity and refers to societal features (norms, customs, mores, religion) which differ among groups and nation states and operate as societal supports, or lack thereof, for credible contracting" [1998, p77]. Indeed von Hayek collectively described conventions, "as part of cultural evolution of mankind" (1945, AER, cited by Kaufer, 1984). The norms and customs are collectively called *social capital*, and have been popularized in the development literature (e.g., see Coleman, [1988] and Collier [1998]. Indeed without labelling it so, Kenneth Arrow may have been the first economist to muse on the possible role of social capital in helping agents allocate resources, and hence overcome the market deficiencies. In a rather illuminating, though short, section of his 1970 paper on the choice of market vs. non-market allocation, he argued: "Norms of social behaviour, including ethical and moral codes", may be interpreted as, "reactions of society to compensate for market failures" (1970, p70). Arrow singled out the norm of *mutual trust* as one capable of serving the non-market allocative power alluded to above. He noted that "in the absence of trust, it would have been very costly to arrange for alternative sanctions and guarantees, and many opportunities for mutually beneficial co-operation would have to be foregone" (ibid. p70).

Further, we note that the use of the somewhat diffused term of *governance* in modern policy discussions also originates in the NIE literature. It relates to institutions that a society must possess in order to *monitor* the "plays of the game". Williamson argues that "transaction is the basic unit of analysis and regards governance as the means by which order is accomplished in relation to which potential conflict threatens to undo or upset opportunities to realise mutual gains" (1998, p76). Conflicts in exchange may occur due to asset specificity of agents ("bilateral dependency") or wherever contractual hazards may arise.

Further, non-governmental organisations (NGOs) and *civil society* groups may be viewed upon as also facilitating exchanges both in the *ex-ante* sense or in the *ex-post* (i.e., governance/monitoring) role, acting directly or reinforcing the existing stock of social capital. Indeed one of the theoretical points that the paper makes is in constructing a hierarchical framework where all the principal institutional elements (both rule making ones as well as those engaged in monitoring) may be arranged and explained. The resulting construct, namely the totality of institutions, would serve as a general framework of "institutional capital" (IC) as relevant for analysing the process of economic development and of economic activities in general.[4] We thus measure how the differences in the "institutional capital" (IC) have affected the poverty profile of the countries in question.

The rest of the paper proceeds as follows. In section 2, we provide a brief outline of the recent literature on growth and poverty, and relate this to the Latin America/ Caribbean

[4] While arguments presented below are brief, a fuller exposition of the idea is contained elsewhere (Ahsan, 2002a).

context. We also probe the kind of testable hypotheses that one may derive from this review. In section 3, we discuss methodological issues of measurement, especially in light of data availability. Section 4 reviews the empirical findings, while section 5 concludes.

2. Growth, Poverty and Institutions

(a) Growth and Poverty: While the focus of the present paper is in explaining the non-income dimensions of poverty, the analytical methods essentially derive from the better-known literature on growth and *income* poverty. It is therefore necessary to dwell on the latter research in order to hypothesise the kind of testable propositions that emerge there. Turning to this task, it indeed appears that we seem to lack a received theory of how growth leads to poverty reduction. Evidently the growth process brings about changes in the underlying income distribution. Since estimating the entire distribution is hard, one focuses on indicators such as Gini or other intuitive measures of dispersion. Head count poverty as stated above, is simply given by $H = F(z)$, where z is the poverty line, and $F(x)$ denotes the cumulative density of income behaviour. Thus H would denote all whose income or consumption falls below z, and hence are treated as "poor".

Most work relating the growth process and income distribution does not typically focus on the headcount measure, instead on measures of inequality, such as the Gini coefficient. Using both cross-section and time series data, Simon Kuznets (1963) had discovered an inverted U-shaped relationship between inequality and growth. At the early stages of growth, he reasoned, as urbanisation and industrialisation get underway, inequality rises with growth. However, as industrialisation gathers pace, vigorous absorption of rural migrants in the urban sector helps reduce income inequality. Indeed Aghion *et al* (1999) suggest that the history of industrial revolution and beyond (especially US, 1770-1970) does bear this out, where over the first hundred years inequality rose, only to moderate over the next hundred.

However this view has been emphatically challenged by new empirical evidence that proceeds along two related angles. Most immediate to the present discussion is the observation that greater equality due to continued growth in the already industrialised world (say OECD) appears to have been reversed in the last 25 years or so. The growth process here operates, Aghion *et al* argue, along trade liberalisation, skill-based technical changes, and organisational changes within the firm. The combined force of these diffusions have impacted on growth such as to render the distribution of *earnings* inequitable, and thus throwing doubt on the plausibility of the Kuznets process under present conditions.

Poverty Elasticity of Growth: Datt and Ravallion (1992), showed that the change in poverty, ΔH, between two points in time can always be decomposed into a *growth component*, and one measuring a change in the *underlying distribution*. This is mere definitional. The growth part is usually represented by a horizontal shift in the density function with an unchanged distribution, while the distributional change is described for the new level of mean (relative) income. Indeed the poverty elasticity of growth highlighted in the empirical literature focuses on the first of these two components. In that context, Kakwani (1993) had analytically derived an elasticity for all poverty

measures that satisfy the Foster-Greer-Thorbecke [FGT, 1984] class of functions.[5] The headcount measure, $H = F(z)$, extensively used in the literature is indeed a simple version of the FGT poverty measure where the index of inequality aversion is set to zero. Since the growth component in the decomposition amounts to a distribution neutral shift (in relative income), the interpretation of the poverty elasticity is simple. The elasticity figure merely yields the relative size of population who would cross the set poverty line due to a one- percent increase in mean income.

Inequality and the Poverty Elasticity: It is an observed fact that growth seldom leaves the underlying income distribution unaffected in the sense implied above. In view of the latter difficulty, Bourguignon (2002) has recently examined the issue on the presumption that income followed a lognormal distribution, which allows a greater degree of tractability. In effect he characterises the Datt-Ravallion decomposition fully:

$$(2.1) \qquad (\Delta H/H) = (-)\varepsilon(DEV,IIQ).GRO + \beta(DEV, IIQ).RIQ.$$

The rhs variables include the level of development (DEV, measured by the ratio of mean income to z, the poverty line) and the change in inequality (RIQ, respectively).[6] The ε-function is the (head count) poverty elasticity, which under the conditions of the Bourguignon model, rises with DEV and decreases in IIQ, the initial level of inequality. Indeed for the lognormal case, the elasticity has a simple closed form solution (eq 3' in Bourguignon). The distributional change (measured by RIQ) is also accompanied by a coefficient (β), which itself is a function of DEV as well as IIQ, non-linearly in the latter case.

Growth-Poverty Empirics: While development theories have been scarce, there has been a proliferation of empirical writings on poverty and growth of late. The standard result from the (cross-section) analysis on the subject suggests that economic growth is necessary, even though not sufficient, for income poverty to decline (Dollar and Kraay, 2001a, and Ravallion, 2001). Indeed these results suggest that the overall share of output going to the poor remains, on average, largely unchanged with growth. Hence given initial inequality, the share of the rich continues to remain disproportionately high vis-à-vis the poor. Consequently, for any incremental growth, the per capita income gains by the rich far outpace that by the poor. Ravallion (2001) also finds that persistent (and rising) inequality may dampen the poverty elasticity of growth. On balance, however, Chen and Ravallion (2001) have described slow growth itself as the "…far more important reason for the low rate of aggregate poverty reduction than rising inequality within poor economies" (p19).

Neither the analytical research on the poverty elasticity of growth nor the empirical growth-poverty literature cited above attempts to explain growth itself. The growth-inequality nexus follow from a related branch. Modern empirical growth literature suggest that higher initial inequality hurts long-run growth [Alesina-Rodrik (1994), Perotti (1993 and 1996), and Persson-Tabellini (1994)], which Aghion et al. (1999)

[5] The FGT index is given by $P_\alpha\ (z,x) = \int[(z - x)/z)^\alpha]f(x)dx$, *for* $z < x < 0$, where α denotes the index of *inequality aversion*.

[6] Bourguignon actually measures inequality by the standard deviation (s.d.) of the logarithm of income, but switches to the Gini coefficient in empirical work for both the initial and the change levels. Evidently the Gini is an increasing function of s.d. However, in this paper we measure inequality by the Gini coefficient.

interpret as repudiating the first arm of the inverted Kuznets-U. The type of inequality one has in mind here is along the wealth dimension. These authors argue that the likely explanation behind the result is that wealth inequality influences individual decisions in human and physical capital, especially in the context of capital market imperfections and moral hazard, and hence hurts aggregate growth. Modern (endogenous) growth theories elaborate on this, and the contribution may be summed up by the following quote: "..the less developed the credit markets and the larger the separation between borrowers and investors, the bigger the scope of redistributive policies aimed at creating opportunities, improving borrower's incentives, and reducing macroeconomic volatility" (Aghion *et al*. p.1631). Thus one would infer that high initial inequality would slow down poverty reduction albeit indirectly, namely by slowing down growth. There also remains a concern that the poor typically fare disproportionately worse over economic cycles.

To the extent one interprets the Kuznets hypothesis as suggesting that inequality would promote growth, as some earlier theories had purported to do, current growth analyses (both theory and estimations) would appear to be in direct contradiction.[7] Initial inequality would appear to exacerbate the consequences of incomplete markets for human, physical and financial capital in terms of the eventual returns accruing to firms and individuals. We would thus expect initial inequality to play a role in the poverty performance and on economic growth. The above reasoning would apply, a fortiori, to the concept of non-income poverty developed below, which is directly related to the human capital outcomes (mainly health and education) during the process of development.

The LAC Experience: Before examining how well the above analysis may relate to the region at focus, let us briefly outline the poverty dynamics in the LAC region. The Latin American region stands out as a region with both very high levels of poverty and inequality. The initial inequality of earnings/expenditure, while significantly higher vis-à-vis OECD countries, still differed a fair bit in the LAC region. While Brazil has the dubious distinction of having the highest Gini in the region (63.4 as of 1990), lower rates prevailed in Argentina, Bolivia, and Uruguay (low 40s). While growth appears to be, on average, neutral with respect to inequality at a global level, the Latin America-Caribbean (LAC) experience is not very different. Research by de Janvry-Sadoulet (2000) and Psacharopoulos et al (1995) both find evidence that growth did reduce poverty, but not inequality, and that further, the poverty reducing effect was muted by the incidence of high inequality and vice versa.

(b) The Non-Income Poverty (NIP): We have already outlined the recent emergence of a broader conceptualisation of well-being that highlights non-income dimensions prominently. Kanbur and Squire (1999) argue that NIP not only expands the set of policies that are relevant to poverty reduction but also requires that the interactions among such policies be recognised. They argue that the various dimensions of poverty interact in important ways, such that "policies do more than simply add up" (p2). For example, improving health of people increases their income-earning potential, and

[7] However, one may interpret Kuznets hypothesis as merely suggesting an empirical regularity, without necessarily being associated with a *unique* causal process. Clearly the rationalisation behind Kuznets process, even if verifiably true over some time period, is surely of an *ad hoc* nature! Also note that Kuznets' inequality is over *all* sources of income (labour and capital).

increasing their education leads to better health outcomes, and so on. Thus poverty-reducing strategies must recognise the interactions among polices.

There is little in the literature that examines whether the growth-poverty (income) hypotheses discussed above also extend to NIP. It would also be important to know if the initial wealth distribution, which surely affects human capital as well as physical capital investment possibilities most directly, plays a part in determining the level of broader poverty. Similarly one would expect that the quality of economic, political and social institutions, (as we measure via the IC concept discussed more fully below) also make for greater access to health, educational, and physical (including public utilities) infrastructure, and further are these effects comparable to that the income level has on these same indicators. Hence we expect that the levelling of the playing field to have a direct bearing in shaping the non-income poverty outcome for a given level of output growth.

(c) Role of Institutions: The new institutional economics makes it very clear that institutions (say, economic and political ones) are generally incomplete in any setting, which implies that transactions are costlier than they ought to be under the full efficiency paradigm. It is often heard that inadequate privatisation, wage-setting regulations, reforms of pensions and transfers, functioning of markets for finance, and importantly on the capacity of the state to collect revenue and carry through reforms are the primary impediments. While the above are potentially significant, our approach to the concept of institutional capital, as suggested above, is entirely different. We agree with the central tenet of the NIE that low cost transacting is essential for economic growth. And the cost of transactions varies a lot between alternative systems of institutions that prevail across societies. Lower transaction costs, both in the economic as well as in the political sphere, should in principle allow faster growth, and therefore affect the (income) poverty outcome.

North makes a further point that the structure of transaction costs vary between political and economic markets in any society whereby "high transaction costs issues gravitate to the polity" (1990b, p362). Insofar as countries (e.g., in transition or developmental mode) suffer from the incompleteness of their democracies, the following quote from North is a useful reminder. "..It is political markets in non-democratic polities that urgently need such transaction cost analysis. The far greater imperfections of such markets ..are the root cause of their economic performance since it is polities which devise and enforce the property rights that are the incentive structure of economies" (1990b, 364). One may extend this further to advance that extensive public control (e.g., via SOEs), cumbersome regulatory framework and weaknesses of the judiciary all combine to render the TC structure obtaining in the developing and the transition world, a fertile ground where the stated pattern of selection (from economic to the political arena) becomes a dominant process.

It may be noted that North's characterisation of the institutional requisites of low cost transacting calls for a large menu. From transparent lawmaking as well as its enforcement, one may articulate the need for political (and fiscal) decentralisation, intervention in factor and capital markets to make them perform more efficiently (i.e., competitive), and seek means of weakening the rent seeking interest groups. Was one to embrace these all as equally desirable, both the range of institutions (rules) and of

governance mechanisms (conduct of the game) widen considerably. By contrast, much of what goes under the rubric of "governance' in current economic development parlance is clearly selective. In principle, the *efficacy* of the entire set of institutional elements aimed at lowering the transaction costs would be the conceptual benchmark for "governance". And it is this totality of institutions (both rules and conduct of the game) that we have decided to call "institutional capital" (IC) of a society. In sum, these are devices that allow co-ordination of exchanges, which is of necessity, a resource using process. The quality of a body of institutions may be gauged both by the relative level of costs, and the relative range of exchanges that become viable at a point in time (*vis-à-vis* other societies). In the next section we would enumerate how precisely one may select and measure the indicators of institutional capital.

An important question then arises: Does IC have an independent influence on poverty over and above the effect on growth? Matthews believes it would be hard to do a Denison type of econometrics and isolate the contribution of institutional capital to growth as distinct from the standard sources. He does note however that in spite of the inherent confounding of formal measurement, the *qualitative* question is more reasonable to pose.

The Implications for Latin America-Caribbean Region: There is not much in the way of an LAC literature that focuses on IC as interpreted here. Explaining the output performance in the region, we note that overall growth was much faster (at 3.4 %) than the OECD average (about 2.3) over the decade of the 1990s. The sample countries did fare about the same as the regional average (indeed at *per capita* growth of 1.83 percent). One can make a case that after years of military rule in much of the region, the foundational institutions necessary to sustain the democratic as well a competitive market mechanism had been struggling to find roots. Economic liberalisation and a move towards freer trade are fairly new for many. Indeed, a central postulate of the present paper is that the recent LAC growth process and the attendant poverty outcome have been fashioned by the policy framework as well as the attendant initial conditions (chiefly, the quality of institutions, political and social). We elaborate on this theme in the next section.

(d) NIP and IC: The direct linkage between poverty and IC especially via gains in income, and directly on the broader dimensions, is intuitive, though possibly poorly documented. Many believe that the peer-monitoring model of micro lending pioneered in Bangladesh and replicated pretty much worldwide succeeds due to the social capital (e.g., trust within the group, and between the group and the lender) that emerges in an NGO type of setting. The essential idea is that group lending allows the lenders to overcome informational asymmetries typical of any credit delivery mechanism. Moral hazard and adverse selection are the usual impediments to the functioning of the market in such a context. The principal devices by which the latter are minimised include peer monitoring and social sanctions within the group (and, possibly within the local community) as safeguards against excessive risk taking, misuse of funds, and default behaviour. The above devices work even when the borrower puts up no formal collateral (as in the case of GB). Such NGO and related voluntary civil society activities, over and above direct income gains (as the former are typically targeted on the very poor), may also allow additional benefits in health and education contributing to the alleviation of non-income poverty.

(e) Testable Hypotheses: We first derive a generic poverty function based on the literature dealing with *income* poverty as cited above. Our preliminary hypothesis is that a similar function would also explain non-income poverty as reasoned above. We begin with the poverty decomposition equation (2.1). Next we suggest that our review of the modern growth literature as well as NIE focus on institutions allow us to hypothesise growth behaviour as follows:

(2.2a) $GRO = f(IC, IIQ)$.

We then invoke the hypothesis explaining the change in inequality, which has an old Kuznetsian history as well as a modern growth connotation as reviewed above, which makes us rewrite RIQ as a function of growth:

(2.2b) $RIQ = g(GRO)$.

Combining (2.1) and (2.2a) and (2.2b), we obtain:

(2.3) $(\Delta H/H) = (-)\varepsilon(DEV, IIQ).f(IC, IIQ) + \beta(DEV, IIQ).RIQ(GRO),$

Or, (2.4) $(\Delta H/H) = g(DEV, IIQ, IC, GRO)$

Thus once we have utilised the growth-poverty identity implicit in (2.1), we only find growth as a separate independent variable as associated with the change in inequality, RIQ. Our empirical specification will often be a linear approximation of (2.4). The implication however is that it would be hard to interpret the specific coefficients exactly. For example, the IIQ variable would affect poverty by influencing growth, but initial inequality also affects the poverty elasticity directly by the decomposition discussed above. Similarly growth would affect poverty via the standard elasticity (even though we are not utilising the analytical elasticity à la Bourguignon), but also possibly by changing the income distribution.

Bourguignon has criticized the use of a naked "growth"-term as an independent variable in an equation explaining poverty. He would rather have the theoretical elasticity as a built-in multiplier in the manner of (2.1). Our defence is essentially that we are not merely testing for the "identity check" behind (2.1). Our principal hypothesis is embodied in (2.2). Secondly, even within the decomposition methodology outlined above, it would be presumptuous to impose a function as the logarithmic on a small sample size as we do (21 observations at this stage).

The above discussion allows us to lay down the following hypotheses as empirically plausible. The primary hypothesis is that the headcount poverty function as derived above (eq 2.4) holds for non-income poverty as well:

(2.5a) $NIP = \varphi(GRO, IC, DEV, IIQ)$;

We wish to contrast the above with a simpler alternative, not necessarily based on the headcount methodology, but one relies directly on the recent literature on growth and NIE. Put simply this states that *initial inequality and poor institutions retard the fight against NIP*, i.e.,

(2.5) $NIP = \theta(IC, IIQ);$

Below we shall attempt an evaluation of these with the available LAC data.

3. Methodology and Data Issues

(a) Operationalization of Non-Income Poverty: Recall that here we would ideally measure the output of the economic game that has a bearing on poverty over and above the income/consumption aspects. In terms of the capability approach, we note that, deeper aspects of voice and freedom are harder to quantify, but access to inputs and information would however be consistent with the goal of maximizing the capabilities.[8] Consequently, we focus on (i) female literacy, health status of very young (particularly, (ii) infant mortality and (iii) birth weight) and (iv) longevity. Literacy and child (or, maternity) health developments may result from deliberate public policy and formal rules of society (e.g., compulsory attendance in school to a certain age or widely available rural health facilities). Or, these may derive from civil and public varieties of social capital (social support and networking) or a combination of both formal as well as informal institutions. In any event, it may be noted that the elements cited above indicate the outcome on the human capital side, and thus the physical capital accomplishment is slighted in this construction. While it is not difficult to provide a conceptual measure of the latter (say the interest rate differential between rural credit and the commercial sector lending rate), observability is the dominant constraint.

Table F of the appendix provides a summary of the performance of the sample countries over the reference period. On female secondary enrolment, we note that there has been sizeable advance in most cases. Judging by the incidence of low birth weight of babies (1992-98), we see that the LAC countries boast of a reasonable record of about ten percent vis-à-vis the South Asian figure of low thirties. The Caribbean countries generally do poorer than the South American countries as a group. Turning to infant mortality figures, again there has been a general reduction (of about a quarter over the decade), and at about 30 per thousand live births, this figure compares well with the average for the *middle*-income countries as a whole.

For our empirical analysis, we have devised a composite index of non-income poverty (NIP) that effectively accords equal weight to the four components cited here. The first component is the life expectancy at birth, which averages at 70.7. In keeping with the principle of equal weights, we actually normalize the remaining components so that the average in each category is also 70.7. However given that two of these (namely infant mortality and low birth weight incidence) are "negative variables" in that lowers values indicate more agreeable outcomes, our NIP aggregate is the sum of {longevity and female secondary enrolment} *less* {infant mortality and the incidence of low birth weight babies}. Hence a higher NIP indicator corresponds to lower poverty! By construction the average NIP index could be close to zero, and it is indeed so (at - 14.7). The range is {-132 (Guyana), 91 (Chile)}. Table F displays the aggregate index of NIP. In our econometric work, we shall attempt to explain the composite indicator, NIP as well as the four components individually.

(b) Operationalization of IC: Here we focus on identifying those elements that help lower transaction costs in exchanges among individuals (or groups, as appropriate). Further we group the former into three categories, i.e., (i) those lowering the costs of information and communication, (ii) those supporting market competition, and, finally (iii) those

[8] See also Rodrik (2000).

strengthening social capital. In doing so, it is imperative to keep in mind that IC is to be taken as an input that leads to poverty outcomes (both income and non-income), and hence one must not confound inputs and outputs, a pitfall one may easily lapse into once confronted with limited data availability.

We note that many of the features cited above are not available for the LAC countries. For future reference, we nevertheless enumerate these in the form of a schema (Figure 1) in the appendix to the paper. Presently, however, we are led to relying on available data, and in that context, select four out of six indicators proposed by the WBI project on "Governance" (WB2001c).[9] The six clusters are motivated to capture three aspects of governance that the authors characterize. First, "voice and accountability" and "political stability" are intended to evaluate the process by which those in authority are selected and replaced (media independence is also included here). The second set, "government effectiveness" and "regulatory quality" represent the "ability of the government to formulate and implement sound policies" (p7). The final set, "rule of law" and "control of corruption" relate to the "respect of citizens and the state for the institutions that govern economic and social interactions" (p6).[10]

For the present, we have chosen (i) control of corruption and the (ii) rule of law as measuring the quality of formal institutions, while (iii) political stability/lack of violence, and (iv) voice and accountability proxy for social capital indicators.[11] We devise the aggregate IC indicator by first assigning a rank (from one to five, the lowest being the normative best) to the individual country score on each of the four elements cited above. The accorded ranks follow wide margins that should allow for a fair degree of measurement errors that may be inherently built in by the manner that these are constructed in the first place (see Kaufmann and Kraay, 2002). The aggregate is then the sum of the ordinal rank attached to the individual country score on each of these four components. We believe that by using ordinals as well as by aggregating the four indicators together overcomes the difficulty in creating confidence intervals using any one indicator. Since a lower value is indicative of higher quality institutions, we name the index, DIC ("decrease in institutional capital").

The institutional capital variable is thus a composite of four indicators, each of which by construction ranges from –2.5 (weakest) to +2.5 (best). A score of -1 or less is assigned the lowest rank of 5, that between -1 and 0 gets 4, between 0 and 0.75 gets 3, between 0.75 and 1.2 gets 2, and all scores above 1.2 get the best score of 1. The summed ordinals may range from the best possible score of 4 (actual closest being 8 for Chile and Costa Rica) to 20 for the country with the weakest IC. Indeed the poorest such score is 17, observed in two cases (Colombia and Guatemala). The construction methodology is evident from Table G in the appendix.

[9] Indeed two papers by Kaufmann et al (1999a, b) elaborate on the ideas and methodology behind the selection.

[10] Note that the sense in which the term "governance" is used in the above construction differs significantly from the NIE concept reviewed above. Indeed one may argue that the WB term captures aspects of all forms of institutions, not merely those engaged in a monitoring capacity.

[11] We have left out of consideration the two remaining WBI indicators, namely, (v) regulatory effectiveness and (vi) government effectiveness for the simple reason that they appear a little too broad in scope.

It may also be noted that indicators such as the Freedom House index of political and civil rights (as used by Rodrik and Persson-Tabellini in related work), as well as Transparency International's corruption index are already incorporated in the construction of WBI indices, although there may be a lag. Hence there may be a case for using one or both of these latter indices in their most recent version as an alternative.

(c) Comparable Data Set: The task here is to compile a comparable data set for the 21 sample countries. While the IC and NIP components have been reviewed above, the remaining data relate to GDP growth, per capita income, trade and (household survey based) poverty/inequality measures. For GDP growth (i.e., the GRO variable), we use annualized growth in real GDP between 1990 and 1999. Income (denoted INC) is taken to measure the level of development (DEV) variable cited in section 2 above. This is 1995 per capita GDP (thousand dollars) in purchasing power parity terms, with the year being towards the middle of the period under consideration, and accounting for a lag in its effects. Also note that the initial inequality variable is based on survey data on income/expenditure as available. Ideally one would want a wealth-based measure, and the extent to which the income data would have tracked the initial wealth distribution for the LAC region is unknown.

The trade to GDP ratio (in PPP terms), denoted TGR, is used as a "globalization" indicator. All these variables are taken from the World Development Indicators 2001 CD-ROM. As noted above, the poverty/inequality measure is obtained from the poverty-monitoring project at the World Bank, which was initially compiled by Chen and Ravallion (2001) and is accessible to all (WB, 2001a).

We should point out that unlike the headcount literature that typically uses spell data, all our NIP data relate to a single point in time (late 1990s, actually 1998 or 1999 according to availability). Similarly for the IC components. However both growth and inequality are treated differently. We do test the hypothesis that sustained growth would have an impact on the alleviation of broader poverty, and thus the GRO variable is the real growth rate over the decade of the 1990s. In a similar vein, the notion of initial inequality (as of late 1980s, 1988/89 as available) suggests that the former would make a difference to the NIP outcome either directly or via growth and income. The DEV (or INC) variable is from the mid-point of the decade of the 1990s, (actually 1995) to allow for a lag as already stated, while the TGR variable is from late 1990s.

4. Empirical Evidence

Before focusing on the poverty results, let us briefly outline a few empirical observations on related issues such as the process of growth, inequality and the evolution of institutions that this limited data set may permit. Focussing on annualized GDP growth rates several observations follow. Over the reference period, 1990-1999, while regional real annualized output growth has been most respectable (at 3.4 %), the 21 countries in the sample had also grown perhaps at a slightly faster pace (1.8% in *per capita* terms). However, the individual experiences have been very mixed. *Per capita* Figures range from *negative* 0.46% for Venezuela to anaemic rates (say, 0.29% in Nicaragua) to a stellar performance in Chile (of 5.07%). Generally the Caribbean countries have done worse as a group vis-à-vis the South American ones within the sample. Indeed manufacturing and industrial growth had picked up in the decade of the 1990s for the

region as a whole, while agriculture had progressed a bit slower (2.3 %, which is the same rate as of the 1980s). The service sector also grew at 3.5 % in the reference period, which is about half that in East or South Asia.

A. Aggregate NIP: Analysing the composite measure, we see that generally neither GDP growth (GRO) nor the initial inequality (i.e., IIQ) is successful in the explanation (see equations 1 and 1A in *Table A.1*). There is also the issue whether the distribution corrected growth (e.g. as measured by the interaction variable, GRO.IIQ) would do any better, a point that that has been highlighted in the income poverty estimation by Ravallion (2001). Modifying equation (1) whereby the variables {GRO, IIQ} are replaced by the interaction term does not provide much of a lead (and not reported in the Table). It is interesting to note that neither of these variables is much correlated with income. Both equations (4) and (5) show that while initial inequality appears not to affect NIP performance of nations, growth (either directly or in the interaction mode) appears to be a significant variable, but appearing with a wrong sign, thus hurting the advances against NIP. We shall argue however that this inference is not very reliable. In both these equations, we also have the institutional capital variable, which is somewhat correlated with both the growth variables (the coefficient being 0.54 for GRO and 0.53 for GRO.IIQ). The political stability measure (PLS) is not so correlated (in the range of 0.32 to 0.35), and indeed equations (4A) and (5A) illustrate that once DIC is replaced by PLS, the growth variables become insignificant (though the negative sign persists). A comparison of eqs (4A) and (5A) also confirms that between {GRO, IIQ} and (GRO.IIQ), there is not much of a choice.

The level of development, as measured by the level of income (INC) is of significance, however. Interestingly, replacing INC by its logarithm (LIN) in equation (1) leads to an improvement (as given by equation 1A) as also captured by a slightly modified specification given in equation (2). Hence the impact of income would appear to be non-linear. Thus in terms of variables conventionally used in the income poverty estimations, namely GRO, IIQ, LIN/INC provides a moderate fit. However, of these only income (either LIN or INC) provides a robust t-statistic. Replacing GRO by GRO.IIQ in eq (1A) does not alter results (in terms of adjusted R-sq, 0.42 in each case, and an F-value of 7, and hence not reported). However the latter specification would be comparable to equation (3) in Bourguignon's Table 1 ("the improved standard model").

The estimated results get much sharper once the IC variables come in. Indeed the institutional capital variables turn out to be key explanators of the evolution of non-income poverty in the LAC region. Both in the aggregate as well as in components (PLS or COC), IC variables are powerful explanators. PLS in isolation does best, explaining 54% of the variation in NIP.[12] However both DIC and COC are each correlated with LIN, the coefficients being (-) 0.58 and 0.67, respectively, while the coefficient between LIN and PLS is merely 0.45. Correspondingly, while eq (4) appears to provide a very good fit to the data, replacing DIC by PLS (as in 4A) improves matters a lot. We have already commented on the possible correlation between GRO.IIQ and DIC. Hence there is a very strong reason for preferring the (4A) specification. Note the very high (heteroskedasticity

[12] While the aggregate IC variable (DIC) is calibrated such that it rises the poorer the quality of institutions, in the case of the components these are measured by their raw score, and higher values indicate an improvement in quality. Hence the sign of the coefficients differ between DIC and its components.

corrected) F-value for (4A), 43.9 vis-à-vis 17.2 for (4). Correspondingly, the adjusted R-sq rises from 0.68 to 0.75. Equation (5a) provides an equally god fit, where the F-value is even higher (at 47.2). It is interesting to note that political stability (PLS) turns out to be the single most important component of DIC in this context, which indeed is one of the areas in which the region is apparently well positioned compared to the rest of the world (Kaufmann-Kraay, 2002).

The relevance of institutional capital is quite evident; elements such as effective control of corruption, rule of law or public accountability do make for greater access to public resources (be in health, education or infrastructure) to all citizens. Lower initial inequality would in principle also play a similar role; it serves to complement the public resources that are available. Correspondingly, where pubic facilities are highly inadequate, personal wealth becomes indispensable thus causing great disparities in access to physical and human capital. However in the LAC context it is intriguing to find its conspicuous absence, and this in a region where the level of inequality is much higher than in many regions.

Given the central role in the estimation results, it would be useful to examine the DIC variable more closely. Presently the manner in which DIC is constructed all four components appear to be mutually correlated which may not allow reliable joint coefficient estimates for strict subsets of these components.[13] Perhaps one may look for alternative indicators, which do not involve such a high correlation with each other (and, vis-à-vis other explanatory variables) and thus allow independent coefficient estimates. From a policy perspective, this would appear to be an urgent research agenda.

The globalization/integration variable (TGR) too appears with a wrong sign in Table A.1. However, unlike growth, here the correlation between TGR and other independent variables are weaker, though at 0.5 for DIC, this is a potential source of worry. However between PLS and TGR the coefficient is a mere 0.31. Indeed like the growth variables, when we replace DIC by PLS, the TGR regression coefficient loses in value, but unlike growth, the estimate remains significant. The coefficient is rather stable in all proper specification (e.g., 4A or 5A). Greater trade success therefore appears to hurt the poverty reduction on the non-income front. The quantitative effect is small however; even a large change (say equalling its standard deviation) of 14.5 points in openness would imply a drop in the NIP index of a similar range, namely 15 points. The DIC or PLS variables by comparison have rather large positive effects. One standard deviation improvement in PLS (which is 0.67) would translate to a change of about 39 points in NIP for the better based on equations 4A or 5A. Interestingly, Rodrik also finds that "once institutions are controlled for, economic integration has no direct effects on incomes.." (2002, p4). He further found that IC has significant effect on institutions, and vice-versa (i.e. bi-directional causality), both are strongly significant (5% level). Consequently, integration has an indirect (positive) effect on incomes by improving IC. However, the direct effect,

[13] Only voice and accountability (VOA) was found to be not significant in any equation.

while insignificant came out negative. The negative coefficient also appears in another recent paper by Dollar-Kraay (2002).[14]

Thus while income does matter robustly, growth itself is at best irrelevant to NIP outcomes. This is intriguing. We note that the correlation between income levels and growth is a mere 0.11, and hence faster growth need not lead to large changes in per capita incomes. While we did not estimate income growth equations, the latter story would be consistent with the hypothesis that high initial inequality does not allow growth to translate to commensurate rises in per capita incomes. Another perspective may be that growth matters only in so far as it augments the quality of IC. If better quality institutions lead to faster growth but growth does not lead to better quality institutions, as Kaufmann and Kraay (2002) find, the above hypothesis would be substantiated. A lot therefore remains to be done.

Thus on the basis of these results, it seems that both eqs (4A) and (5A) provide excellent fits, each explaining about three-fourths of the variation in the dependent variable. A quantitative interpretation of the estimated equation would proceed as follows. The effect of a change in these explanatory variables can only be interpreted to cause an effect on the NIP index as constructed by us. Using equation (5A) as a benchmark, the difference between the predicted values of NIP between Argentina and Peru should be 90.35. The actual difference in the sample is 73.015, with Peru scoring (-12.74), better than its predicted value of minus 33.5 and Argentina scoring 60.33, its predicted value being 56.84.

In sum therefore, we observe that *non-income poverty got worse with the decline in the institutional capital and particularly with the decline in political stability.* This conclusion is similar to a related finding for the Eastern Europe and former Soviet Union (EEFSU) as described in Ahsan (2002a), but there COC played a central role, overshadowing political stability issues. We do not know of other studies that corroborate this sort of evidence, one way or another.

B. Explaining Life Expectancy (LEB): Life expectancy varies in a relatively narrow range from 62.1 (Bolivia) to 76.8 (Costa Rica), the average being 70.7. Reviewing the results in Table B, we note that the traditional income poverty inspired hypotheses do not perform well as exhibited by equation (1) or (2). Neither the {GRO, IIQ}-pair nor the interactive GRO.IIQ term is significant. Income however is strongly significant, and it alone explains all the variability in longevity in equations (1) and (2). Indeed, the logarithm of income appears to be even better in explaining longevity, a point that has been recognised in the development economics literature for a very long time (e.g., Preston, 1975). Indeed, LIN alone explains 37% (i.e., using the adjusted R-squared value) of the variability in longevity differences in the LAC region (equation 3A in Table B).[15] Interestingly, as seen by comparing equation (2) and (3A) that the adjusted R-sq

[14] Dollar-Kraay (2002) explain income growth by using a measure of "real openness" where the denominator is GDP in PPP terms, but they too come up with the negative sign. Rodrik et al point out that the biases in the real openness measure are worse than for the nominal trade/GDP ratio, TGR).

[15] Elsewhere Ahsan (2002b) has examined both cross country as well as time series data (the latter for Indonesia), and found that the logarithmic specification fitted the data rather well (even when compared to the quadratic function).

actually falls when we add {GRO.IIQ} to LIN. In a similar vein, the level of initial inequality appears not to affect the longevity differences among nations.

The institutional variable DIC is again the factor of significance here (compare eqs 3B and 4). Taken by itself it is just as powerful a predictor as LIN. However as noted above, DIC and LIN are mutually correlated which calls into question the reliability of equation (4). It is therefore necessary to disentangle the DIC into its components. Here PLS has the lowest correlation. Looked at this way, equation (4A) perhaps provides the most reliable of estimates in Table B. We note that LIN particularly has a very stable coefficient in all equations; while it is 4.9 (when entered alone), it evidently falls once IC variables come in, but remains steady at about 3.2 or so.

In terms of the remaining components of the IC variable, notwithstanding the multicollinearity potential, corruption (COC) also does well (eq 4B). However, the adjusted R-sq value is the weakest for COC of the three here (i.e., among 4, 4A, and 4B). While overall, PLS performs the best, the quantitative significance is far short of its impact on the aggregate NIP (even allowing for the fact that NIP range was about three times as large as for life expectancy). Using equation 4A (LIN and PLS) to explain longevity, we note the predicted difference between Uruguay and Bolivia comes to 8.74 years (Bolivia 65.97 and Uruguay 74.71) whereas it is actually 12.2 years (Bolivia 62.06 and Uruguay 74.3).

The rationale for the role of PLS in influencing the average longevity is intuitive in that violence and instability takes many unnecessary lives around the world. Many Latin American countries have witnessed both death and debilitation due to political instability over the past two decades.

C. Explaining Infant Mortality (IFM): Table F indicates that average mortality for the sample is 28.3, which is a bit smaller than the regional average as a whole. The lowest (about 10) obtains for Chile while the highest rate is found in Bolivia (about 59). The range is rather large, and correspondingly, infant mortality behaviour happens to have a pretty high variance in the LAC region (standard deviation being 13.4). In terms of the correlation matrix, we see that the incidence of infant mortality correlates well with all income and IC variables.

Here the standard specification does rather well to begin with (see eqs 1 and 2), even though the coefficient on either GRO or the interactive GRO.IIQ term is not statistically significant. Only the income variable (where again the logarithm performs better than the level) is highly significant. What is puzzling, as in the aggregate NIP estimation, is that growth appears to have the wrong sign, namely that higher growth apparently leads to rising mortality. Indeed the coefficient of GRO (or GRO.IIQ) is quite significant whenever the institutional variable is also added in (see eqs. 3 and 4). Focussing on eq (4), which has the highest adjusted R-squared value (of 0.58), the growth effect is perverse and strongly significant (at the one percent level)! We also note that all the exogenous variables save TGR in eq (4), namely GRO, LIN and DIC, are somewhat correlated. While there is no evidence of serious multi-collinearity, replacing DIC by PLS

removes any doubt that one may have in this regard. This leads to equation (4A), which again comes up with a high t-value for the growth variable.

The globalization indicator, TGR, again appears with the wrong anticipated sign, but here at least the coefficients are not statistically significant (unlike the NIP case). While its inclusion appears to improve the overall predictability of the model (compare eqs 4 and 5)! However, by the same token, the above inference is not substantiated once PLS replaces DIC (see 4A and 5A). If anything, (5A) would appear to be a clear improvement over (5). While the last four equations in Table C provide a reasonable explanation of data, we prefer the specification in (4A) and (5A). Based on these last two equations, one may draw several inferences. First we note that quantitative significance of the growth variable is cut by about half (the coefficient dropping from 4.1 in eq (4) to a little over 2 in eqs (4A) or (5A). More importantly the statistical confidence in the precision of this estimate is open to question. Hence one does not really have to dwell on the sign issue cited above.

LIN has the predicted sign and its quantitative impact remains most stable in all specifications, settling down to a value of about -16 in the latter two equations in focus here. A unit change in the LIN variable (which around its mean would imply moving form a per capita income of $3,000 to $8,000 in PPP terms, a huge change indeed) would lower mortality by 16 points, e.g. from 20 to 36 (again taking values around the mean). An example would be Ecuador and Uruguay, since in the former the per capita income is $3,200 and mortality rate is 28.4 (sample average being 28.3) while in the latter case, we have an income of $ 8,000 and a mortality rate of 14.5 per thousand. It is intuitive that income would be expected to serve as a good proxy for both the knowledge of the precaution and care as well as the delivery of the same.

The institutional variable also augments the access to public facilities in the absence of corruption and disorder. In terms of the overall fit, using equation 5A coefficients to predict infant mortality gives predicted values of 40.25 and 25.79 per thousand live births respectively for Guatemala and Jamaica, whereas the actual numbers are 40.2 and 20.4.

D. Explaining Low Birth Weights (LBW): Traditional income/expenditure poverty type of analysis that use variables such as income, GRO or GRO.IIQ does not appear to be especially helpful in explaining the incidence of low birth-weight (LBW) babies. While not significant, both growth and income come out with the correct sign. On the level of development, neither INC nor its logarithm matters much, though INC, unlike the previous cases actually does a bit better than LIN. Further the income term loses whatever predictive power it had (eqs 1 and 2) once institutional variables are allowed in (as in 4).

Of equations (4) - (6), we prefer (5) as providing the best results. Both the adjusted R-sq as well as the F-value are much higher in (5) than in (4). Similarly comparing (4) and (6) we see that including TGR adds both to the adjusted R-sq and the F-statistic. Thus the specifications (5) and (6) are more reliable than in (4), though adjusted R-sq are still low vis-à-vis previous cases. While according to (4), initial inequality appears to have a strong negative influence (significant at the 5% level) on the incidence of low birth-weight babies, the effect gets diluted in equation (6), but remains statistically significant at the 10% level. Is it plausible that more unequal LAC societies deliver better pre-natal

nutrition and care! This is surely intriguing. We do note however that quantitatively the size of the coefficient need not be viewed as small. One standard deviation increase in IIQ (equalling 7.18 percentage points) translates to a decrease of 1.1 percentage points in LBW (i.e., almost ten percent change in the mean incidence, mean being10.18)!

The globalization variable too has a dubious effect, which is statistically significant (compare equations 4 and 6). Taken at face value, this says that higher trade leads to poorer health outcomes as measured by the birth weight of newborns. The latter is most counterintuitive! One observation is that once TGR is there, inequality loses some of its explanatory power, but both variables still remain significant at the 10% level.

From here on we choose eq (5) over (6) to further explore the role of individual IC components. Thus eq (5A), with PLS replacing DIC, does clearly improve upon eq (5) following usual diagnostics. Conversely, using COC instead of DIC, i.e., moving from (5) to (5B), weakens the estimation, although corruption itself remain just as significant as was the case with DIC in (5). Thus all considered eq (5A) would appear to the best-fitted equation in Table D. Here both political stability and the globalization variable come out strongly (and the latter with the wrong expected sign). The quantitative significance of the integration variable is not small either. One standard deviation increase in TGR (i.e., of 14.5 percentage points), which is rather high, would lead to a decrease of 1.16 percentage points in the mean incidence of LBW (at 10.1).

On the role of political stability and lack of violence, one can easily imagine that only under such institutional context expectant mothers may gain access to public facilities and counselling on pre-natal health and nutrition. On the overall fit of LBW equations, using the coefficient estimates of 5A leads us to predict a difference of 4.5 points between Chile and Venezuela, whereas the actual difference is 7 points.

E. Explaining Female Secondary Enrolment:

Table E indicates that that the model analyzed here does not appear to explain female secondary school enrolment behaviour adequately. Two brief observations are in order. First the income variable (indeed the level rather than the logarithm) is the only robust explanator of enrolment in the LAC region. Of all the NIP components analysed in the paper, this is the only case where the IC variables seem quite inept in describing the variations in educational attainment. While the adjusted R-sq of 0.26 is the highest in eq (3A), which has income and the rule of law as the rhs variables, the latter is not statistically significant. In terms of the predictive ability of this equation, we note that the estimated coefficients lead us to expect a difference of 33.88 percentage points between say Argentina and Nicaragua, while the actual difference is 31.51 (with Argentina at 96.9 and Nicaragua at 65.39).

F. A Brief Summary of the Empirical Evidence

Growth: In comparing our NIP results to the standard headcount income poverty studies cited above, we do not find a robust role for growth (either by itself or in the interactive fashion with initial inequality). Between the two forms of the growth variable, there is not really much of a choice. However, the trouble here is that each of these terms appears with a wrong expected sign, sometimes quite significantly, and especially so once we have controlled for the institutional capital variables. This is true of several specifications

devoted to the explanation of the aggregate NIP as well as infant mortality. This is troublesome, and requires further scrutiny. Incidentally, for the birth-weight equations, where growth does have the correct anticipated sign, the coefficient is not statistically significant.

Inequality: Initial inequality does not have much of a role, except in explaining the incidence of low birth-weight babies. Awkwardly, here the sign is opposite of what one would expect. Indeed the sign is mostly wrong in other cases as well, but typically these were not statistically significant. This part of the result is most unexpected especially given the contrary evidence obtained from a similar analysis of NIP for the EEFSU countries (Ahsan, 2002a), and calls for further examination.

Level of Development: In most cases the logarithm of income does much better than income itself, (except however for the low birth-weight and female enrolment equations). It is most significant in explaining the aggregate NIP, expected longevity as well as infant mortality. The level variable is highly significant in explaining the school enrolment, but not so for the low-birth weight equations. Thus, insofar as the latter indicators of well-being are thought to matter to the poor, an income-based measure would fail to capture these dimensions adequately. Measuring the broader poverty elasticity of income, we find these to be all below unity. The higher impact does occur for the aggregate e indicator. We note that a unit change in LIN (which, evaluated around the mean corresponds to a change in per capita income of about 3,000 to 7,700 in PPP terms), result in a 62-point surge in the NIP indicator.[16] This would correspond to an elasticity of about 0.66 using the arc measure. All other elasticities are even smaller. For example, infant mortality also appears to respond in a large way to income changes, but even then here the elasticity (at the mean) comes to about 0.36. The preceding remarks also strengthen the belief that if broader poverty is the criterion of well-being, income gains need not even be a good approximation.

Institutional Capital: Overall we find that the aggregate indicator, DIC, performs very well in all cases, where it is often the most significant variable capable of explaining a fair bit of the overall variability in the dependent variable. Indeed practically all components of the institutional capital variable (possibly with exception of voice and accountability) each have an important role to play, though political stability was by far the more significant of the set. We note that political and economic reforms, both domestic (since the overthrow of several military dictatorships in the region) as well as donor driven, have led to wide differences in the evolution of institutions as construed in this paper. Examining the impact of a unit change in PLS on NIP, the coefficient from eqs 4A/5A of 57.5 amount to a 49 % change at the mean, while the unit change in the PLS indicator may be interpreted to yield a change of 65% (on the arc measure). Hence the elasticity is 0.76. The elasticity is slightly lower for the low birth-weight incidence (0.54) and the infant mortality behaviour (0.44). Clearly elasticities are higher than those for the income variable discussed above. In the birth-weight equation, income was not

[16] These illustrative calculations are based on the best for equations identified above, namely equations 4A/5A (NIP), 4A (longevity), 4A/ 5A (infant mortality), 5A (birth-weight) and 2/3A (school enrolment), respectively. For the NIP indicator we are saying that the income change cited here is 80 percent (using the arc concept), while at the mean, the implied change in NIP (on normalized positive scale) is about 54%, and hence the implied elasticity would be about 0.66.

even a significant force. There is thus a quantitative indication that institutional variables dominate the income variable in terms of impact on broader poverty.

5. Conclusion

This paper set several primary goals. One was to review the LAC broader poverty experience (1989-99/00) for a sample of 21 countries, and attempt to discern the scope of the quality of institutions in affecting poverty. This was to be carried out in terms of the stylised hypotheses of growth-poverty-inequality nexus depicted above (section 2), where we had built in an emphasis on institutional capital. Our key findings, interim as these are, have been restated in the preceding section. In a word, the institutional capital variable appears to have a most emphatic role in explaining *non-income poverty* reduction. However, logarithm of income also appears to be robust in several cases. Indeed, IC variables for the most part overshadow other plausible phenomena, including the role of income. Consequently, we conclude that a deeper investigation into additional variables (beyond the four included in the present construction) in a richer data set (i.e., possibly for a larger set of countries) would be extremely useful from a policy perspective.

How do the above findings relate to existing results in the literature? The literature provides little direct evidence on broader measures of IC, especially as they relate to the issues of poverty and inequality. Closest perhaps to our interests is a paper on Rodrik et al (2002) who analyses income growth of nations and find that institutions (measured by the rule of law) play a crucial role in this explanation. Indeed they find that once IC is controlled for, elements such as economic integration (our TGR variable) or geographical indicators have little to add. The IC variable has been extensively analysed by other authors (cited by Rodrik, et al, 2002), but the latter is the only attempt where geography, globalization as well as IC were all included in one coherent analysis. There is also the finding by Dollar and Kraay (2001a) that *rule of law* has a positive impact on growth. Our approach has been at a more disaggregate level, whereby we experiment with several indicators of IC and find the political stability variable to yield more precise estimators. Somewhat afield, Persson and Tabellini (2001) examined the effects of the democracy type on the fiscal outcome (e.g., size of the public sector and the nature of fiscal interventions). Earlier Rodrik (2001) found that the extent of political participation (as measured by political rights and civil liberties) does make for a more stable pattern (i.e., reduced volatility) of output growth. In terms of non-income poverty, ours appears to be the first effort to explain this behaviour empirically.

How to build better institutions? We have identified the central role of the political stability as perhaps the foremost indicator of IC for the LAC region, possibly followed by the control of corruption. This is the reverse of the order of evidence for EEFSU cited above. Given our views of the institutional forces, such goals are not achievable unless countries strive for participatory rich democracies (with adequate political and fiscal decentralisation) and adopt institutions compatible with competitive markets (in goods and production resources). However the institutional story is still incomplete. The social capital idea tells us that cohesion and networking within communities may be fruitfully harnessed through NGO and civil society intermediation. Public authorities must therefore encourage free and unhindered initiatives by such organisations, which often appear efficient in the low cost provision of goods and services that private markets *alone*

are unable to fully allocate. Indeed the authorities may go farther, and legislate provisions to strengthen the organisational foundations of NGOs by legitimizing their intermediation status, and requiring them to follow adequate accounting principles (via credible audit regimes).

Policy interventions such as the promotion of self-employment (say via group-based micro lending), which over and above direct income generation (and thus help fight income poverty), are widely believed to permit group members more effective utilisation of social capital. The latter externality is believed to lead to advances in non-income dimensions of poverty (e.g., health, sanitation, literacy and numeracy).[17] Of course, deliberate NGO-civil society initiatives in these areas, with or without the contrivance of micro credit, may also speed up these goals by allowing an easier access to the rural people, and thus partly offset historical differences in initial conditions.

[17] See Morduch for a critical review of the arguments.

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APPENDIX

Table A. Explaining non-income poverty

Independent Variable	1	1A	2	3	4	4A	5	5A	6	6A
Constant	-178.60 **	-760.33 ***	-696.49 ***	-23.36 **	-107.72	-505.59 ***	-120.64	-520.82 ***	-464.04 ***	-495.15 ***
Std. error	80.19	173.64	161.72	8.66	171.13	88.48	159.63	101.96	121.99	105.05
t-stat	-2.23	-4.38	-4.31	-2.70	-0.63	-5.71	-0.76	-5.11	-3.80	-4.71
GRO	3.23	0.51					-16.94 ***	-6.97		
Std. error	7.02	6.78					4.77	4.43		
t-stat	0.46	0.07					-3.55	-1.57		
IIQ	1.72	1.10					1.56	0.27		
Std. error	1.39	1.23					1.02	0.76		
t-stat	1.24	0.89					1.52	0.35		
INC	12.83 ***									
Std. error	3.60									
t-stat	3.56									
GRO*IIQ					-0.32 **	-0.13				
Std. error					0.13	0.11				
t-stat					-2.55	-1.26				
LIN		81.01 ***	79.97 ***		52.12 ***	61.44 ***	47.23 **	61.59 ***	51.96 ***	58.17 ***
Std. error		18.03	18.79		16.63	10.38	17.29	10.01	14.28	12.34
t-stat		4.49	4.26		3.13	5.92	2.73	6.15	3.64	4.71
DIC					-19.93 ***		-21.76 ***			
Std. error					3.66		3.11			
t-stat					-5.45		-7.01			
TGR					-2.12 ***	-1.10 **	-1.93 ***	-1.04 **		-0.86 **
Std. error					0.60	0.38	0.54	0.38		0.38
t-stat					-3.51	-2.87	-3.56	-2.74		-2.23
PLS				65.23 ***		57.67 ***		57.27 ***	47.57 ***	51.28 ***
Std. error				14.56		8.35		7.75	10.72	9.96
t-stat				4.48		6.91		7.39	4.44	5.15
Number of Observations	21	21	21	21	21	21	21	21	21	21
Degrees of freedom	17	17	19	19	16	16	15	15	18	17
R-squared	0.4669	0.5068	0.4889	0.5634	0.7415	0.7957	0.8049	0.8057	0.7286	0.7672
Adjusted R-squared	0.3729	0.4197	0.4620	0.5405	0.6769	0.7446	0.7400	0.7409	0.6984	0.7261
F-Statistic	5.0867	7.2225	18.1144	20.0757	17.1741	43.8983	33.7201	47.1490	31.8337	48.2129
p-value of F-statistic	0.0107604	0.0024728	0.000427	0.0002562	1.215E-05	1.971E-08	1.207E-07	1.202E-08	1.227E-06	1.586E-08

Note: Standard errors and F-statistics are heteroskedasticity corrected

*** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 1% level of significance
** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 5% level of significance
* t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 10% level of significance

B. Explaining Life Expectancy

Independent Variable	1	2	3A	3B	4	4A	4B
Constant	65.33 ***	28.66 **	28.92 **	83.01 ***	50.39 ***	41.99 ***	44.33 ***
Std. error	7.52	11.75	11.42	2.05	16.91	9.68	13.62
t-stat	8.69	2.44	2.53	40.49	2.98	4.34	3.25
GRO	0.03						
Std. error	0.47						
t-stat	0.06						
IIQ	0.03						
Std. error	0.13						
t-stat	0.20						
INC	0.70 **						
Std. error	0.27						
t-stat	2.55						
GRO*IIQ		-0.001					
Std. error		0.01					
t-stat		-0.14					
LIN		4.95 ***	4.90 ***		3.25 *	3.33 ***	3.13 *
Std. error		1.39	1.32		1.69	1.14	1.57
t-stat		3.57	3.72		1.93	2.92	2.00
DIC				-0.92 ***	-0.55 **		
Std. error				0.17	0.23		
t-stat				-5.36	-2.36		
PLS						2.68 **	
Std. error						0.95	
t-stat						2.80	
COC							2.15 **
Std. error							0.90
t-stat							2.39
Number of Observations	21	21	21	21	21	21	21
Degrees of Freedom	17	18	19	19	18	18	18
R-squared	0.2947	0.4024	0.4018	0.3744	0.4917	0.5676	0.4659
Adjusted R-squared	0.1702	0.3360	0.3703	0.3414	0.4352	0.5195	0.4066
F-Statistic	2.7528	6.8227	13.8140	28.7553	14.3681	13.1368	11.8158
p-value of F-statistic	0.07456176	0.006232	0.00146289	3.5616E-05	0.00018645	0.00030349	0.00052801

Note: Standard errors and F-statistics are heteroskedasticity corrected

*** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 1% level of significance
** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 5% level of significance
* t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 10% level of significance

C. Explaining Infant Mortality

Independent Variable	1	2	3	4	4A	5	5A
Constant	200.17 ***	201.77 ***	97.04 *	88.48 *	161.02 ***	114.94 **	157.35 ***
Std. error	46.90	48.06	50.93	47.92	31.92	45.02	35.97
t-stat	4.27	4.20	1.91	1.85	5.04	2.55	4.38
GRO	1.34			4.08 ***	2.33 *	2.78 *	2.10
Std. error	1.41			1.36	1.20	1.58	1.27
t-stat	0.95			2.99	1.95	1.76	1.65
IIQ	-0.15	-0.19					
Std. error	0.33	0.33					
t-stat	-0.46	-0.58					
INC							
Std. error							
t-stat							
GRO*IIQ		0.02	0.07 **				
Std. error		0.03	0.03				
t-stat		0.74	2.21				
LIN	-19.58 ***	-19.46 ***	-14.40 ***	-14.05 ***	-16.24 ***	-14.07 **	-15.47 ***
Std. error	4.65	4.58	4.91	4.67	3.96	5.13	4.42
t-stat	-4.21	-4.24	-2.93	-3.01	-4.10	-2.74	-3.50
DIC			3.05 ***	3.33 ***		2.10 **	
Std. error			1.02	0.92		0.83	
t-stat			3.00	3.62		2.54	
TGR			0.26	0.28	0.10		
Std. error			0.20	0.20	0.17		
t-stat			1.28	1.43	0.59		
VOA							
Std. error							
t-stat							
PLS					-8.14 **		-7.55 **
Std. error					3.08		3.26
t-stat					-2.64		-2.32
ROL							
Std. error							
t-stat							
COC							
Std. error							
t-stat							
Number of Observations	21	21	21	21	21	21	21
Degrees of Freedom	17	17	16	16	16	17	17
R-squared	0.5336	0.5221	0.6190	0.6614	0.6431	0.6111	0.6342
Adjusted R-squared	0.4513	0.4378	0.5238	0.5768	0.5539	0.5424	0.5696
F-Statistic	6.4578	6.8715	8.9531	10.9179	7.2958	5.8622	7.3883
p-value of F-statistic	0.0040724	0.0030983	0.00054	0.0001832	0.0015249	0.0061311	0.0022275

Note: Standard errors and F-statistics are heteroskedasticity corrected

*** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 1% level of significance
** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 5% level of significance
* t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 10% level of significance

D. Explaining Low Birthweight Babies

Independent Variable	1	2	3	4	5	6	5A	5B
Constant	19.54 ***	12.42 ***	2.94	9.93 *	-3.02	4.85	8.63 ***	7.70 ***
Std. error	4.88	1.54	3.04	5.57	2.92	5.51	1.14	1.42
t-stat	4.00	8.08	0.97	1.78	-1.03	0.88	7.54	5.43
GRO	-0.51							
Std. error	0.40							
t-stat	-1.28							
IIQ	-0.14			-0.18 **		-0.15 *		
Std. error	0.08			0.08		0.08		
t-stat	-1.73			-2.27		-1.81		
INC	-0.29	-0.23		-0.01		-0.09		
Std. error	0.17	0.16		0.23		0.23		
t-stat	-1.69	-1.42		-0.03		-0.40		
GRO*IIQ		-0.01						
Std. error		0.01						
t-stat		-1.37						
LIN								
Std. error								
t-stat								
DIC			0.53 **	0.69 **	0.79 ***	0.82 ***		
Std. error			0.25	0.28	0.23	0.26		
t-stat			2.17	2.43	3.46	3.20		
TGR					0.09 **	0.08 *	0.07 **	0.08 *
Std. error					0.04	0.04	0.03	0.04
t-stat					2.52	1.80	2.23	1.76
VOA								
Std. error								
t-stat								
PLS							-3.55 ***	
Std. error							0.94	
t-stat							-3.77	
ROL								
Std. error								
t-stat								
COC								-2.99 ***
Std. error								0.87
t-stat								-3.45
Number of Observations	21	21	21	21	21	21	21	21
Degrees of Freedom	17	18	19	17	18	16	18	18
R-squared	0.1758	0.1257	0.1579	0.2826	0.2716	0.3523	0.4189	0.2415
Adjusted R-squared	0.0303	0.0285	0.1136	0.1560	0.1907	0.1904	0.3544	0.1572
F-Statistic	2.0131	2.1521	4.7217	3.6005	8.4487	7.4220	9.4528	6.6729
p-value of F-statistic	0.150205	0.145207	0.042639	0.035239	0.002584	0.001402	0.001562	0.00679

Note: Standard errors and F-statistics are heteroskedasticity corrected

*** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 1% level of significance
** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 5% level of significance
* t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 10% level of significance

E. Explaining Gross Female Secondary School Enrollment

Independent Variable	1	2	3	3A
Constant	73.38 **	51.01 ***	107.55 ***	60.81 ***
Std. error	34.09	8.66	26.83	7.89
t-stat	2.15	5.89	4.01	7.71
IIQ	-0.47			
Std. error	0.72			
t-stat	-0.65			
INC	4.36 ***	4.26 ***		2.79 **
Std. error	1.23	1.31		1.19
t-stat	3.53	3.26		2.34
DIC			-2.84	
Std. error			1.95	
t-stat			-1.46	
ROL				9.54
Std. error				6.73
t-stat				1.42
Number of Observations	19	19	19	19
Degrees of Freedom	16	17	17	16
R-squared	0.3082	0.2769	0.1217	0.3393
Adjusted R-squared	0.2217	0.2343	0.0700	0.2568
F-Statistic	6.3607	10.6378	1.6255	6.3681
p-value of F-statistic	0.009275	0.004596	0.219475	0.009237

Note: Standard errors and F-statistics are heteroskedasticity corrected

*** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 1% level of significance

** t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 5% level

* t-statistic leads to a rejection of the null hypothesis (coefficient=0) at the 10% level

Table F: Non-Income Poverty (NIP) Indicators

Country	Life expectancy at birth, total (years)	School enrollment, secondary, female (% gross)	Mortality rate, infant (per 1,000 live births)	Low-birthweight babies (% of births)	NIP
	A	B	C	D	A+B-C-D (weight adjusted)
Argentina	73.57	96.90	18.40	7.00	60.33
Bahamas, The	73.00	76.52	17.56	9.40	25.70
Bolivia	62.06	75.73	58.80	9.00	-101.34
Brazil	67.15	108.66	32.20	8.00	18.04
Chile	75.51	85.99	9.98	5.00	90.79
Colombia	70.35	74.65	22.76	17.00	-48.85
Costa Rica	76.84	53.94	12.38	6.00	48.07
Dominican Republic	70.69	73.31	39.00	14.00	-74.53
Ecuador	69.23	57.12	28.40	17.00	-82.50
El Salvador	69.53	49.63	30.08	11.00	-50.39
Guatemala	64.89	30.36	40.20	7.60	-77.32
Guyana	63.70	81.71	56.80	15.00	-132.00
Honduras	69.82	76.52	34.40	9.00	-22.86
Jamaica	75.16	82.01	20.40	11.00	13.21
Mexico	72.14	74.85	29.40	9.20	-9.22
Nicaragua	68.63	65.39	34.32	8.00	-26.94
Panama	73.88	70.99	20.28	9.00	16.54
Peru	68.74	78.35	39.20	5.80	-12.74
Trinidad and Tobago	72.63	81.91	15.72	14.00	2.20
Uruguay	74.30	98.96	14.50	8.00	66.90
Venezuela, RB	73.16	64.63	20.20	12.00	-11.70
Average	*70.71*	*74.20*	*28.33*	*10.10*	*-14.70*
Weight equalizer	*1.00*	*0.93*	*2.87*	*7.27*	

Table G: Institutional Capital Indicators (DIC)

Country	Voice and Accountability	Political Stability	Rule of Law	Control of Corruption	Sum of the ordinals
Argentina	0.57 (3)	0.55 (3)	0.22 (3)	-0.36 (4)	13
Bahamas, The	1.15 (2)	0.68 (3)	0.85 (2)	0.74 (3)	10
Bolivia	0.27 (3)	-0.67 (4)	-0.41 (4)	-0.72 (4)	15
Brazil	0.53 (3)	0.47 (3)	-0.26 (4)	-0.02 (4)	14
Chile	0.63 (3)	0.87 (2)	1.19 (2)	1.40 (1)	8
Colombia	-0.41 (4)	-1.36 (5)	-0.77 (4)	-0.39 (4)	17
Costa Rica	1.37 (1)	1.08 (2)	0.61 (3)	0.87 (2)	8
Dominican Republic	0.42 (3)	0.46 (3)	0.01 (3)	-0.20 (4)	13
Ecuador	-0.14 (4)	-0.80 (4)	-0.76 (4)	-0.98 (4)	16
El Salvador	0.21 (3)	0.62 (3)	-0.65 (4)	-0.33 (4)	14
Guatemala	-0.33 (4)	-0.77 (4)	-1.00 (5)	-0.69 (4)	17
Guyana	0.94 (2)	-0.70 (4)	0.13 (3)	-0.45 (4)	13
Honduras	-0.04 (4)	0.25 (3)	-1.06 (5)	-0.63 (4)	16
Jamaica	0.78 (2)	0.35 (3)	-0.38 (4)	-0.06 (4)	13
Mexico	0.12 (3)	0.06 (3)	-0.41 (4)	-0.28 (4)	14
Nicaragua	-0.06 (4)	0.31 (3)	-0.79 (4)	-0.80 (4)	15
Panama	0.77 (2)	0.57 (3)	-0.12 (4)	-0.45 (4)	13
Peru	0.15 (3)	-0.23 (4)	-0.53 (4)	-0.04 (4)	15
Trinidad and Tobago	0.61 (3)	0.27 (3)	0.41 (3)	0.49 (3)	12
Uruguay	1.08 (2)	1.05 (2)	0.63 (3)	0.71 (3)	10
Venezuela, RB	-0.34 (4)	-0.33 (4)	-0.81 (4)	-0.59 (4)	16
Average	0.39	0.13	-0.18	-0.13	

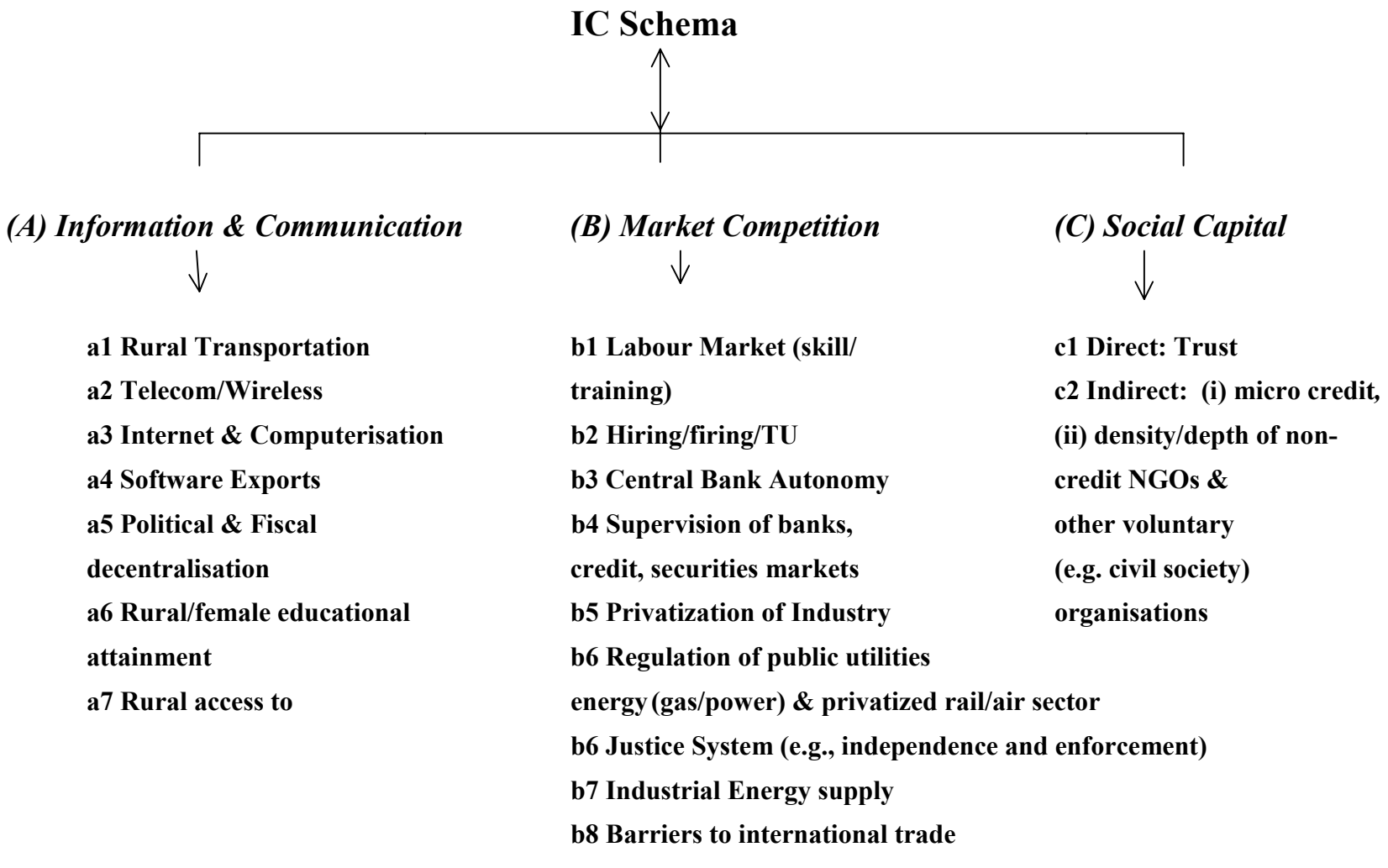
Notes:

1. Source: World Bank - Governance Matters II: Updated Indicators for 2000-01
2. The scores are in a range of about -2.5 to 2.5, with higher values corresponding to better governance outcomes
3. The figures in brackets are ordinal ranks given based on the following scheme: A score of or below -1 is assigned the lowest rank of 5, that between -1 and 0 gets 4, between 0 and 0.75 gets 3, between 0.75 and 1.2 gets 2, and all scores above 1.2 get the best score of 1.
4. The sum of ordinals reflects the sum of the ranks assigned in each of the four coulmns, with a higher absolute number reflecting a poorer governance outcome

Table H: Correlation Chart

	NIP	*LONG*	*INFM*	*FSCH*	*LWGHT*	*GRO*	*IIQ*	*INC*	*GRO*IIQ*	*LIN*	*DIC*	*TGR*	*VOA*	*PLS*	*ROL*	*COC*
NIP	1.00															
LONG	0.82	1.00														
INFM	-0.84	-0.92	1.00													
FSCH	0.46	0.18	-0.16	1.00												
LWGHT	-0.61	-0.21	0.18	-0.13	1.00											
GRO	0.14	0.06	0.03	0.23	-0.25	1.00										
IIQ	0.07	-0.06	-0.03	-0.14	-0.21	-0.11	1.00									
INC	0.65	0.54	-0.62	0.53	-0.22	0.11	-0.19	1.00								
GRO*IIQ	0.20	0.11	-0.03	0.19	-0.30	0.98	0.03	0.10	1.00							
LIN	0.70	0.63	-0.70	0.48	-0.19	0.20	-0.09	0.95	0.21	1.00						
DIC	-0.66	-0.61	0.54	-0.35	0.40	-0.53	0.32	-0.56	-0.54	-0.58	1.00					
TGR	0.15	0.38	-0.27	-0.11	0.09	-0.13	-0.37	0.44	-0.15	0.34	-0.50	1.00				
VOA	0.47	0.42	-0.31	0.43	-0.29	0.45	-0.48	0.49	0.41	0.47	-0.88	0.53	1.00			
PLS	0.75	0.65	-0.56	0.31	-0.58	0.32	-0.05	0.44	0.35	0.45	-0.77	0.31	0.69	1.00		
ROL	0.60	0.51	-0.48	0.51	-0.28	0.58	-0.37	0.68	0.57	0.68	-0.94	0.46	0.83	0.62	1.00	
COC	0.72	0.61	-0.62	0.38	-0.40	0.41	-0.16	0.62	0.45	0.67	-0.90	0.42	0.69	0.65	0.87	1.00

Appendix: ***Figure 1***



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