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Testing Educational System Typologies using Colombian data[1]

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International Lending Institutions (ILIs) and Non-Governmental Organisations (NGOs) continuously design and implement Educational System Typologies (ESTs) in order to evaluate a nation's educational performance in terms of quality of life improvements; Traditional ESTs are therefore constantly put at odds by the advent of new ESTs. This study aims to explore the ways in which traditional and newer EST designs relate to quality of life, using factor analysis on Colombian data for the period 1997-2000. Results for the Colombian case show that level-based non-mechanistic approaches are better at describing and promoting the relationship between educational indicators and quality of life assessments.

Colombia, educational system typologies, quality of life, educational indicators

INTRODUCTION

The relationship between education and the quality of life can be made explicit from numerous perspectives, for example, economical, psychological, historical, and developmental, by means of different data such as primary sources: identical twin and cohort studies; or secondary sources: using surveys, panel and macroeconomic data and a variety of methods of analysis such as linear regression, controlling for certain variables, econometric models, and multilevel or hierarchical approaches. In the twenty-first century this relationship has become a self-evident truth this paper does not plan to contest. On the contrary, this study uses a typological perspective to illustrate this relationship.

In an effort to reduce the variety that emerges when attempting to evaluate an education system's performance and its contributions to quality of life, International Lending Institutions (ILIs) and Non-Governmental Organisations (NGOs) continuously design and implement Educational System Typologies[2] (ESTs). Even though these efforts can easily be regarded as well-intentioned, when the same entities develop new and improved techniques to accomplish the task, as in the novel framework proposed by the World Bank (2002a) to put together educational sections of Poverty Reduction Strategy Papers (PRSP), one is found to wonder about the ways and the extent to which educational indicators associated with previous (traditional) ESTs relate to the quality of life, in comparison with the indicators associated with newer ESTs. This paper intends to explore

[1] This article was extensively edited by Dr B. Matthews of the Flinders University Institute of International Education.

[2] Typologies are defined in this context as constructs that intend to typify a system (in this case an education system) by grouping related indicators (that is, education and quality of life measurements) theoretically or logically in order to provide decision makers with a framework for identifying and analysing relevant aspects that best describe the way the system is performing.

the ways in which educational indicators included in traditional and recent ESTs, particularly those proposed by the World Bank, the Inter-American Development Bank (IDB), and the United States Agency for International Development (USAID) contribute to quality of life assessments, using multivariate statistical techniques on Colombian data for the period 1997-2000. The paper also aims to inquire about the differences between approaches, and identify improvements made in EST designs. To accomplish this task, the remainder of this paper describes the ESTs in question, showing how quality of life variables can indeed be helpful educational indicators. It then considers the variables to be analysed, the methods of analysis and the model. Then the results of the statistical analysis are presented and discussed, and finally some conclusions are drawn from the exercise.

EDUCATIONAL SYSTEM TYPOLOGIES (ESTS)

Traditional ESTs

This section is not an exhaustive presentation of all the different ESTs that have been developed, but a brief review of the most popular ones.

The World Bank's typology developed by Carvalho and White (1994) defines the input, process and impact indicators as ways to promote the simultaneous monitoring and evaluation of programs or projects. In the Latin-American context the International Development Bank (IDB) presents a somewhat different typology that according to Vos (1996) comprises four groups: input, access, and output and outcome indicators. USAID (1997) has adopted a Logical Framework typology, which distinguishes three different groups: activity, output, and goal and purpose indicators. These typologies characterise input indicators as means and resources employed to satisfy educational needs; for example, staffing, teaching supplies, and school facilities. However, the logical framework describes these as activity indicators that refer to program budgets or funding as the basis for identifying the cost of inputs.

The process indicators proposed by Carvalho and White (1994) are meant to measure the extent to which a program or project is delivering materials and resources such as the number of schools built, the number of students trained and the textbook availability per student, while the Logical Framework description ranks these variables as output indicators, in the IDB's (1996) typology, these could either be input or output indicators. In other words, since process indicators serve to monitor the implementation or delivery of projects, then some of these indicators may be informative about the delivery of inputs such as schools or text books for example or about the measurable impact of these inputs in terms of desired outputs such as increased enrolment rates; Ridker's[3] (1997) report on African case studies falls into this category. However, from the development impact perspective adopted by the IDB, the improvement of school buildings or the delivery of teaching materials, which the Logical Framework regards as outputs are, in fact, considered inputs.

Because Vos (1996) uses the development impact perspective as the prime criterion for classifying indicators in the IDB's typology, he defines access indicators as those that identify demand factors of potential users: the socio-economic level of the students and families, and the distance from school. The World Bank and the Logical Framework typologies focus almost exclusively on the delivery of social services or the supply side descriptions while the demand side is in some way encompassed in the IDB's access indicators.

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[3] A study performed in Kenya operated by the Internationale Ghristelijke Stiching (ICS) - Dutch non-governmental organisation – offered textbooks and uniforms to rural primary schools in Busia, Kenya. Increased enrolment, improved attendance and reduced dropout rates were observed after the inception of the project, however, no significant differences in test scores were discovered.

The World Bank defines impact indicators as those markers that "the impact on the living standards of the poor" (Carvalho and White, 1994, p.9) thus confining the definition to a segment of the population. These impact indicators resemble the purpose indicators of the Logical Framework (USAID, 1997) or the output and outcome indicators of the IDB nomenclature that Vos (1996, p.4) describes as measuring "the impact of a particular set of policies or projects on the living standards of the population." However, Vos (1996) distinguishes between output indicators, which try to measure the extent to which immediate objectives are achieved such as increased enrolment and literacy rates, educational attainment, as well as improved quality of achievement in tests, and outcome indicators, which refer to the higher goals of education, for example, better employment, higher productivity, and improved health, in an attempt to approach "externalities" or "indirect impact outcomes" (Vos, 1996, p.5).

In general, stage-based typologies strive to be comprehensive by considering existing inputs and demands that lead to activities, which, in turn, influence demand and accessibility, that together eventually yield project or immediate educational results, as well as indirect impact outcomes (Carvalho and White, 1994). However, stage-based typologies may bring about an underlying ambiguity that gives bureaucrats from aid-recipient countries ample room for political manoeuvring by means of data manipulation.

Inherent ambiguity

The fact that the same indicator, depending on the typology used, can be considered as an input, a process or an output gives government-friendly analysts the chance to praise non-existent achievements, for example: claiming that after four years in government an increase in the number of students being trained is an exceptional output of sound educational policies, when it might only be the provision of necessary inputs for the system to function properly. Conversely, this same ambiguity gives opposing analysts the chance to demean breakthroughs in overall national educational policies, for example: asserting that after a year in government there have been no changes in already high enrolment rates due to the current government's negligence to provide more and better inputs, while this situation may be the result of previous and fortuitous educational policies.

New ESTs - PRSP framework

The World Bank's (2002a) latest contribution in terms of designing education policy components of the Poverty Reduction Strategy Papers (PRSP) provides a comprehensive account of educational and quality of life variables and their inter-relationships. This framework uses what could be called a 'level-based' approach, which proposes a "conceptual framework for understanding educational outcomes in general" (World Bank, 2002a, p.5). This conceptual framework starts with key educational outcomes and works back through the individual, household and community factors influencing these outcomes, to government policies and actions at the sector level, within the educational sector, as well as macroeconomic level policies, including non-educational sectors.

According to the World Bank's (2002a) framework, the key educational outcomes most directly related to poverty reduction are: primary education completion rates, gender disparities in basic education, student learning such as achievement in examinations and adult literacy rates. The factors regarded as relevant in this framework are: (a) in terms of the **individual**, aptitude, motivation, gender, early childhood access to nutrition and stimulation programs; (b) in terms of the **family**, household income and demographics, birth order and parental educational attainment; and (c) with regard to the **community**, infrastructure, for example roads, access to public utilities, schooling costs and distance from schools, availability of health care facilities, regional labour markets and job availability.

Educational sector factors are encompassed in the country's education system performance in terms of efficiency, quality and equity, which are dependent on public and private expenditure. However, the framework warns that key constraints to better system performance may be hindered by pure expenditure analysis and therefore causal factors like supply constraints, weak demand and low learning achievements need to be identified. The two major sources of supply constraints are the shortage of physical infrastructure, or the shortage of teachers both of which relate to community characteristics. On the other hand, weak demand limits enrolment due to household decisions on schooling, household income, parental education, cultural expectations, or high dropout rates in basic education because of more financially rewarding activities which relate mostly to family but also to community characteristics; and high repetition of years at school which can relate to individual, family or community characteristics. These aspects all reflect upon students' learning achievements. Finally, the framework's overall government policies comprise: political stability, labour market conditions, trade policies, and foreign investments (World Bank, 2002a).

There are individual, household and community factors directly related to a country's educational sector performance and this is precisely where the relationships between educational indicators and quality of life variables are most apparent. This is mainly due to the fact that the PRSP Framework, as opposed to traditional ESTs, uses a level-based approach in which the mutual contributions existing among the different levels are clearer.[4] However, the issue concerning the appropriate quality of life measurements for studying these relationships remains. In the Appendix a scrutiny of various qualities of life assessments is given, as well as a justification for considering whether both the Human Development Index (HDI) and the Unsatisfied Basic Needs (UBN) and their components are suitable for the statistical analysis.

VARIABLES, METHODS OF ANALYSIS AND THE MODEL

Analysing the way indicators comprised in ESTs relate to appropriate quality of life measurements (HDI and UBN) from an empirical viewpoint may help by reducing room for political manoeuvring, on the one hand; and exposing the mutual contributions between educational indicators and quality of life assessments from a typological perspective on the other. This section presents the indicators that have been used as variables for different years in Colombia's departments (states, provinces or prefectures)[5] as well as the statistical model and the methods of analysis used.

Variables[6]

The quality of life measurements that are used as variables in the model are HDI and UBN in their component form, so that relationship between the particular characteristics with respect to individuals, their households, or their communities may be identified. This means that HDI is considered as life expectancy (variable name: LIEXHDI), with educational (EDUHDI) and

[4] Traditional ESTs focus on stages pertaining to educational sector performance only, and *a priori* this seems to be a disadvantage because level-based approaches are better at acknowledging interrelations between the educational sector and its surroundings, which provides evidence of how educational indicators can be affecting or be affected by the quality of life of the people in the system.

[5] This study uses Colombia's departments (states, provinces or prefectures) as the unit of analysis. Thirty-two departments plus the Capital (Bogotá D.C.) make up the Republic of Columbia, however, nine of them, namely, Amazones, Arauca, Guainia, Casañare, Guaviare, Putomayo, San Andrés, Vaupes and Vichada have been excluded from the statistical analysis because they did not provide significant information and had missing data, yielding a total of 24 departments (observations).

[6] Data provided by the Socio-Demographic Indicators System of Colombia's National Planning Department (www.dnp.gov.co/01_CONT/INDICADO/Sisd.htm).

income (GDPHDI) components. UBN is used to describe housing (HOUUBN), with accumulation (ACCUBN), public utilities (PUBUBN), economic dependency (ECDUBN) and educational (EDUUBN) as components. In addition, unemployment for the age groups 12-24 years (UNE1224) and 25-54 years (UNE2554) are used partly to account for the community factors affecting dropout rates due to lack of labour market opportunities.

The following indicators considered to be associated with traditional ESTs are the percentage of illiterate adults (ILLITS), state examination result categories[7] (ICFES), educational attainment (ATTAIN), enrolment in age groups: 5-6 years (E56), 7-11 years (E711), 12-17 years (E1217), and 18-25 years (E1825), and the departmental proportion of students attending primary schools (REGPRI) and secondary schools (REGSEC), as well as the departmental proportion of teachers (TEACH) and schools (SCHOOL).

As the PRSP Framework is much broader in scope, its relevance has been verified using the proposed key educational outcomes where: an alternative to primary education completion rates is considered, namely, primary schools' efficiency (EFFPRI), and efficiency in departmental secondary schools (EFFSEC.) Both of these indicators should be interpreted as the difference between the proportion of students enrolled and the proportion of students that should be enrolled at each level, which accounts for the proportion of non-normative students included in the system (UNDP-DNP, 2000.) Consequently, the lower the proportion, the more efficient the system is. In general, these indicators qualify the system's efforts to improve normative access, permanence and time fluctuations through the educational structure, and are, therefore, strong negative correlates of repetition (DNP, 2001), which is why efficiency is considered an adequate replacement for completion rates; adult literacy and student learning as achievement in state examinations are also included in traditional ESTs. Finally, educational gender inequalities are omitted because these are not an issue in Colombia.[8]

Omitted variables

From the traditional ESTs stand point, the only variables that are not accounted for in the models are school supplies and facilities due to lack of relevant data. Higher education efficiency and performance variables are not included in the analysis because this sector's behaviour deserves specific considerations. Even though private and public investment in the educational sector have been regarded as relevant by USAID's typology, because they are related to funding and by the PRSP Framework, they are not considered here because this study aims to explore the relationship between educational and quality of life variables at specific points in time from a typological perspective and checks to see if these relationships are stable throughout the period 1997-2000, without consideration for time lag, which for expenditure and cost-effective analyses, is of crucial

[7] The resulting categories were based on the number of schools in each department that obtained: very high, high, above medium, medium, below medium, low or very low scores in state examinations, so that data are comparable between years. The number of categories was reduced by grouping the proportion of schools in the first three categories into one **high results category**; the proportion of schools with medium scores turned into a **medium results category**; and the proportion of schools in the last three categories were classified into one **low results category**. In order to differentiate between departments with similar proportions in some result categories an ordinal point system was established whereby one point was assigned to departments with the highest proportion of schools in the low results category; two points for those departments with more than 33 per cent of their schools in the medium results category; three points for those schools obtaining medium results; four points for departments in which at least one out of every five schools obtained high results; and finally, in order to reward departments that had the highest proportion of schools in the high results category, five points were assigned.

[8] According to the data considered for the statistical analysis, the percentage of illiterate men is higher than that of women for most years (except 1999) and the average number of schooling years (educational attainment) is almost the same for men and women, and sometimes even higher for the former group (i.e. years 1997 and 2000). In addition, girls' achievement in state examinations is similar to boys' achievement.

importance. Urban-rural differences are also omitted because some of the variables used do not present departmental urban-rural disaggregation.

In total, 23 standardised variables are considered in the models, ten that address quality of life and 13 that refer to education. The distribution of values (whether they are percentages or points) for each of the variables considered is normal or approximately normal among the 24 departments for the years that have been analysed.

Methods of analysis and model estimation

Multivariable statistical techniques allow researchers either to describe or model data and the behaviour of the variables in question according to observed correlations or maximum likelihood, using factor analysis. These techniques help expose relationships that have not previously been anticipated and thereby allow interpretations that would not ordinarily have been considered (Johnson and Wichern, 1998).

Algorithm

The algorithm that is utilised, factor analysis, begins by transforming all categorical or qualitative variables into quantitative variables. According to Castaño and Moreno (1994), exploratory studies that apply traditional methods of multivariate analysis should only use quantitative variables. This means that categorical variables such as. ICFES should be transformed into quantitative ones before carrying out factor analysis. Variable transformations are performed using the PRINQUAL method.

State examination (ICFES) transformations

The PRINQUAL-MAC procedure is used in order to derive quantitative variables from the state examination result categories that have been constructed. This procedure produces quantitative transformations by maximising the average correlations between the variables in the model (Parra and Arellano, 2001), performing calculations that either preserve (Monotone transformations) or change the ordinality of the variables in question (Opscore transformations). In the algorithm designed for this study, the ICFES variable that has been transformed includes all variables considered in the model as OPSCORE transformations, so as to identify variables with negative correlations inside the matrix. These variables plus the variable ICFES have been transformed using the OPSCORE procedure in all models for all years, except 1999[9], the negatively correlated variables were EDUUBN and ECDUBN while the rest of the variables have used MONOTONE transformations.

General factor strategy

Johnson and Whichern (1998) assert that many decisions are made in any factor analytic study; one of the most important decisions is that of the number of common factors retained. Most often, the final choice is based on some combination of the proportion of the sample variance explained, the subject-matter knowledge, and the so-called ‘reasonableness’ of the results. In this study the decision is based on the proportion of the sample variance explained.

Here the factors and the loadings of the variables in these factors for each year were generated using principal component factor solutions, retaining five factors which accounted for most - around 80 per cent for every year - of the total sample variance in the input data.[10] Oblique

[9] ICFES variable was excluded from the 1999 models because it was the best way to increase the data’s overall sampling adequacy without excluding a considerable number of other variables from the analysis.

[10] For year 1999 only four factors were necessary.

rotations, according to Johnson and Whichern (1998), were appropriate for a factor model in which the factors were in some way interdependent, and this was the case, due to the overlapping found in terms of individual, family and community factors and educational sector performance indicators. In order to check the stability of the factors, and the variable loadings within these factors, the algorithm performed maximum likelihood factor analysis with oblique rotations. Finally, if any variable had to be taken out of the analysis for the sake of increasing the model's overall measure of sampling adequacy (MSA), then a variable with low loadings either in the principal component or maximum likelihood solutions was identified and omitted in the next iteration. This meant that new transformations for the categorical variable ICFES were needed, which examined the results for all years considered.

It should be noted that although the proportion of cases to the number of variables involved in the factor analysis is much lower than is generally recommended, the method of analysis employed has been replicated using both principal components (least squares) and maximum likelihood estimation procedures and the factor structure patterns examined to tease out the linkages that are shown in the data. Ultimately the strength of the analysis lies in the meaningfulness of the results recorded and presented.

RESULTS AND ANALYSIS

This section presents the results of applying the algorithm previously described to Colombian data for years 1997, 1998, 1999 and 2000.

For year 1997, four iterations were performed in order to reach a stable solution in the principal component (PC) and maximum likelihood (ML) factor analyses. The overall sampling adequacy, after taking variables EFFSEC and UNE2554 out of the model, was 0.579. Five factors were retained explaining 83.7 per cent of the variance contained in the data. Table 1 shows the factor in which each variable had the highest loading for both methods (PC and ML) every year, and the direction of the loading (positive or negative) for each variable, also whether the variable had to be taken out of that year's model for the sake of sampling adequacy (to see actual factor loadings see Table 4 of the Appendix.) In 1998, six iterations were needed before reaching a stable solution in the principal component and maximum likelihood factor analyses. The overall sampling adequacy, after taking the variables: EFFSEC, UNE1224, UNE2554 and E56 out of the model, was 0.654 and the five factors retained explained 85.3 per cent of the variance. Once again, six iterations were needed for a stable solution in both PC and ML analyses using the 1999 data, the overall sampling adequacy, after taking variables: EFFSEC, UNE2554 and ICFES out of the model, was 0.511 and the four factors retained explained 81.4 per cent of the variance. Finally, for year 2000 two iterations were performed in order to reach a stable solution in both factor analyses, the overall sampling adequacy, after the variables EFFSEC and UNE2554 were taken out of the model, was 0.542 and the five factors retained accounted for 81.7 per cent of the variance in the data.

For the most part, the results show direct and expected relationships throughout the years considered:

- E711 and EDUUBN, have a direct relationship based on the way EDUUBN is calculated. They are always linked together and exhibit opposite loadings because of the way the educational component in the UBN indicator is defined, namely, percentage of households with at least one student aged between 7 and 11 years old not enrolled in school (see the Appendix for an explanation of all variables, the components and indicators). This result corroborates the fact that educational indicators have been developed in the context of quality of life measurements and the basic needs approach (Drewnowski, 1970; Hopkins and Van der Hoeven, 1983).

- ATTAIN is linked with the older age enrolment variables (E1217 and E1825), except in 1997. This makes sense because the higher the proportion of older students enrolled in academic institutions, the more likely a department is to have a higher average number of schooling years for student populations of 15 years and older and, therefore, a higher overall educational attainment. It is interesting to note that maximum likelihood analyses for years 1997 and 1998 linked these variables to state examination results (ICFES), which is also a not unexpected relationship.
- SCHOOLS, TEACH, REGPRI and REGSEC always linked together throughout the years; the departments with the highest proportion of schools also happened to have the highest proportion of teachers and registered students at the primary and secondary levels. This factor, besides emphasising the importance of a department's educational infrastructure, is indicative of the basic educational inputs necessary for a system to work properly.

Table 1. Variables and Factor with highest loadings from Principal Component and Maximum Likelihood Factor Analyses for 1997, 1998, 1999 and 2000

	1997		1998		1999		2000	
Variables	**PC**	**ML**	**PC**	**ML**	**PC**	**ML**	**PC**	**ML**
EDUUBN	-F4	-F4	F4	-F1	-F3	-F1	-F2	-F5
ECDUBN	F5	F1	-F3	-F1	F1	F4	F4	F4
ILLITS	F5	F1	F4	F5	F1	F4	F4	F2
ATTAIN	-F5	-F1	F2	F3	-F1	F2	F5	F1
TEACH	F2	F5	F5	F2	F2	F3	F3	F3
SCHOOLS	F2	F5	F5	F2	F2	F3	F3	F3
REGPRI	F2	F5	F5	F2	F2	F3	F3	F3
REGSEC	F2	F5	F5	F2	F2	F3	F3	F3
E56	F1	F2	Out	Out	F3	F1	F1	F1
E711	F4	F4	-F4	F1	F3	F1	F2	F5
E1217	F1	F3	F2	F3	F4	F2	F1	F1
E1825	F1	F3	F2	F3	F4	F2	F5	F1
EDUHDI	-F5	-F1	-F4	-F5	-F1	-F4	F5	-F2
LIEXHDI	F1	F2	F1	F4	F3	F1	F1	F1
GDPHDI	-F5	-F1	-F4	-F5	-F1	-F4	F5	-F2
ACCUBN	F5	F1	F4	F5	F1	F4	-F5	F2
PUBUBN	F5	F1	F4	F5	F1	F4	F4	F2
HOUUBN	F5	F1	F1	F4	F1	F4	F1	F4
EFFPRI	F5	F1	F4	F5	F1	F4	F4	F2
EFFSEC	Out	Out	Out	Out	Out	Out	Out	Out
UNE1224	F3	F2	Out	Out	F2	F4	-F4	-F2
UNE2554	Out	Out	Out	Out	Out	Out	Out	Out
ICFES	-F5	F3	F3	F3	Out	Out	F3	F3

(For factor loadings see Table 4 in the Appendix)

UNE2554 had to be excluded from all the models for the sake of sampling adequacy, probably because job opportunities for this age group do not really represent an alternative, more rewarding, activity for younger generations enrolled in basic education. However, some variables did present unexpected or ambiguous behaviours; for example: EFFSEC, was also excluded from the models; and UNE1224, did not show clear associations. Finally, ICFES linked with different variables: in 1997 and 1998 it was linked with older age enrolments; in 1999 it was omitted; and in 2000 it was linked to basic educational inputs. The next section approaches groupings of variables addressing non-intuitive relationships.

Relationships between education and quality of life variables

E56 and LIEXHDI, are always linked together, except in 1998 (see Table 1). According to McMahon and Appiah (2002), this relationship refers to an 'individual capacity' because enrolment rates (with a 20 year lag) are key determinants of life expectancy. Frank and Mustard (1994), cited by McMahon and Appiah (2002, p.37), support this by asserting that "education enables individuals to acquire knowledge about nutrition that lowers mortality rates and increases life expectancy," specifically because "children who received better nurturing in early life are healthier and do better in adult life." Even though there is no time lag in the relationship between life expectancy and early enrolment rates considered here, it is logical to assume that individuals with high life expectancies probably have high attainments due to high enrolment rates during their school years. This in turn, shows a 'household dimension' in the relationship because, according to Bernal et al. (1999), high attainment and enrolments in a family are good predictors of high educational achievement in the younger generations of a household, and thus of high enrolment rates for younger age groups. This relationship reveals that high life expectancies, an individual characteristic, are the connection between high attainments and high enrolment rates from generation to generation, a household characteristic.

Variables regarded as educational outcomes such as ILLITS, EFFPRI, and EDUHDI always had high loadings and were located on the same factors in all four years, with EDUHDI exhibiting a negative loading because of the way the educational component of HDI is defined, namely, as adult literacy. GDPHDI and ECDUBN accompanied and accounted for economic performance. These variables exhibited opposite weights because one was derived from individual wealth (GDPHDI) and the other was related to household poverty (ECDUBN) (see Appendix for a description and discussion of the variables used in the analyses). Finally household infrastructure variables such as PUBUBN, ACCUBN and HOUUBN had high loadings on different factors during 1998 and 2000, and are found in Table 1. These variables together comprised a factor that involved educational outcomes, economic performance and household infrastructure in which variables with positive loadings were indicative of a department's poor economic situation whereas variables with negative loadings eluded to the assets a department had. The fact that these variables tended to group together showed that literacy, an individual characteristic, and primary school efficiency, a community characteristic, related to economic performance as both individual and household characteristics, and referred to public infrastructure, a community characteristic. In any case this factor merited a closer look, in terms of sub-grouping loadings, in order to clarify the relationship between the variables in it.

Results of Sub-grouping Analysis

This section discusses the results of applying factor analysis to the eight variables grouped in the educational outcomes, economic performance and household infrastructure factor. Table 2 shows the factor in which each variable had the highest loading for both PC and ML factor analyses, and the sign of the loading (to see actual factor loadings see Table 5 of the Appendix). After evaluation two basic sub-groupings have become apparent.

EFFPRI is always associated with PUBUBN, presenting stable and not unexpected results. This factor indicates that Colombian departments with lower proportions of non-normative students in their schools also have fewer households with inadequate access to public utilities. This information corroborates Cerquera et al.'s (2000) findings in terms of departments with low quality of life showing high percentages of households with at least one UBN, and having higher gross coverage rates in primary schools. Thus "departments with high UBN have higher proportions of students enrolled in primary schools that are 12 and older," (p.24). However, Cerquera et al. (2000) do not identify the specific contributions, in terms UBN components, which

may influence primary education efficiency. Instead, the relationship exposed by the sub-grouping refers to the importance of public infrastructure, a community characteristic, specifically in terms of water and sewerage services, so that departments improve normative access and timely movement of primary level students, a community characteristic.

Table 2. Variables and factor with highest loading from principal component and maximum likelihood factor analyses for sub-groupings in 1997, 1998, 1999 and 2000

	1997		1998		1999		2000	
Variables	**PC**	**ML**	**PC**	**ML**	**PC**	**ML**	**PC**	**ML**
ECDUBN	F3	F2	F1	F3	F2	-F3	F3	F3
ILLITS	F3	F2	F3	F3	F2	-F3	F3	-F1
EDUHDI	-F3	-F2	-F3	-F3	-F2	F3	-F1	F1
GDPHDI	-F1	F1	-F3	-F3	-F2	F3	-F1	F1
ACCUBN	F2	F2	F2	F1	F1	F2	F1	-F1
PUBUBN	F1	-F1	F3	F1	F3	F1	F2	F2
HOUUBN	F3	F2	F1	F2	F2	F2	F3	F3
EFFPRI	F1	-F1	F3	F1	F3	F1	F2	F2

For factor loadings see Table 5 in the Appendix

ILLITS and EDUHDI had high and opposite loadings on the same factors throughout the years considered because of EDUHDI's definition, as mentioned above. However, the high loadings that are presented by GDPHDI relating to EDUHDI, in both factor analyses and all years, except 1997, demonstrate the connection between the individual characteristics of literacy and income. These confirm Colombia's DNP (2001) assertion that the poorest departments as based on the Human Development Index (HDI) and Unsatisfied Basic Needs (UBN) have the highest percentage of illiterate adults. This is also confirmed by ECDUBN's, a household characteristic, high loading in relation to ILLITS, an individual capacity, for most years and methods. Additionally, HOUUBN, a household characteristic, is linked with ECDUBN in 1997 and 2000.

This section has examined the dynamics of three important relationships: life expectancy and early age enrolment; public utilities and primary education efficiency; and income and literacy, and corroborates results from other studies. In particular, the first and last relationships affect individuals and households, while the second refers to community characteristics exclusively. Additionally, the last two relationships mainly account for collective and individual inequalities between Colombian departments, and show how these inequalities have negative effects on educational indicators. In general, the overall results of the exercise are robust in the sense that they have been checked, are stable over time, intuitive and have corroborated other studies' results; therefore, they are used in the following section in order to discuss the relevance of traditional and new ESTs.

Relevance to Colombian quality of life

Traditional ESTs

In general, traditional ESTs use stage-based approaches to education that attribute a mechanistic character to the system, in which some resources such as funding, teachers, schools, supplies, and facilities are fed into a black box, where students being trained, their enrolments, scholastic attainments and achievements are measurable items, all of which at completion are expected to transform individuals by improving literacy, leading to higher productivity, better health and a society with benefits that are regarded as externalities.

Traditional ESTs defined input indicators as the means employed to satisfy the educational system's needs. This definition of inputs and the indicators assessing them was validated by the groupings found with Colombian data; however, the factor analysis also regarded registered students or students being trained, as an indispensable input to the system. This meant that Carvalho and White's (1994) process and USAID's output indicators measured the extent to which projects were actually delivering basic educational inputs. Furthermore, it was not clear how these educational indicators related to Colombian quality of life, and this is why it seemed that they were probably just meant to measure cost-efficiency.

However, educational indicators like attainment, achievement, and enrolment rates, that are regarded as outputs by the IDB and purpose by USAID do have effects on the living standards of Colombians, mainly through life expectancy that has been gained from information on early age enrolment rates. This is considered an impact indicator by Carvalho and White (1994) and an indirect impact outcome indicator by Vos (1996), therefore, this approach is also likely to regard the relationship between literacy and income as an externality. Other educational indicators are instrumental in the sense that they confirm definitions among themselves, for example, ATTAIN accounts for E1217 and E1825. It may be argued that this is due to the selection of variables evaluated, however these variables have been selected on the basis of the theoretical groupings defined by traditional ESTs.

In general, traditional ESTs, because of their stage-based conceptualisation, are designs capturing cost-effectiveness through identifiable items, so that high life expectancy is considered an externality, when, in fact, it embodies the link between intergenerational attainments and enrolment rates.

PRSP framework

Even though this newer EST has only been verified through its key educational outcomes, the results obtained are instructive. They reveal how quality of life variables that are related to educational indicators feedback into the system, specifically when evaluating the household dimension of the relationship between early age enrolment and high life expectancy with regard to other key PRSP outcomes. The fact that educational gender disparities are not an issue in Colombia shows that long-lived Colombian women are the ones who have decided not only to have fewer children (Rofman, 1992), and to provide them with adequate health care, but also to enrol them in schools at an early age.[11] The relationship between public infrastructure and primary school efficiency supports the PRSP framework's approach in the context of strategies and priority programs that stimulate demand and relieve household and supply constraints.[12] Finally, as in traditional ESTs, adult literacy is associated with higher incomes.

The level-based approach that characterises education systems or sectors as an entity that is affected by individual, household and community factors on one side; and by overall government policies on the other, not only allows the mentioned relationships to take place spontaneously, but it also promotes feedback relationships between education and health, education and economics,

[11] According to the World Bank's (2002b) Colombia Poverty Report, women account for most of the increase in the nation's life expectancy. The difference in life expectancy by sex has doubled in the last five decades, reaching 8.3 years in 1995 with a likelihood of increasing, so women, in general, are the ones who live longer. Meanwhile mothers' educational attainment correlates strongly to reduced infant mortality (Behrman and Stacey, 1997), reduced fertility rates (Greenwood, 1992), and enhanced nutritional status of children (Behrman, 1993) – producing healthier children who do better in life (Frank and Mustard, 1994) especially when sent to school at an early age, which completes a virtuous cycle that links intergenerational attainments and enrolments.

[12] Practical examples of this relationship are children, especially girls, who stop attending classes because schools don't have toilets, or adequate sanitary facilities that may also be missing at home.

and education and politics. This approach takes away the mechanistic character imputed by traditional ESTs and replaces it with an organic one, in which the education system depends on its surroundings, and vice-versa. Moreover, it is our contention that this kind of approach will eventually lead to complex views involving education systems that adapt and evolve.

This framework, however, might use a stage-based grouping that has been corroborated by the statistical analysis, which characterises students trained as an indispensable input regardless of considerations for supply constraints or weak demands. Also, the fact that community characteristics (EFFPRI and PUBUBN) group separately from individual and household ones (E56 and LIEXHDI; GDPHDI and EDUHDI; ECDUBN and ILLITS) may indicate that further disaggregation is needed in the factors affecting educational outcomes. On the other hand, the fact that learning achievement is the only key educational outcome that did not show a clear contribution to Colombian quality of life constitutes an unexpected result that deserves a study of its own.

Moreover, future research may help to determine why UNE1224, ICFES, and EFFSEC did not contribute much to the models, for example, secondary school dropout rates may be related to informal labour markets which would explain low participation in state examinations. Nor do they establish the role of other factors such as time-lagged private or public education sector expenditures and investments, urban-rural differences, participation in higher education, as well as public opinion and perceptions of education, graduate employment and earnings as in industrialised countries (OECD, 1995) play in terms of educational outcomes and enhancing the quality of life in a particular society.

CONCLUSION

Theoretically and empirically UBN and HDI appeared to be quality of life assessments that provided adequate accounts of factors affecting education outcomes. Most results were expected and reasonable: registered students were defined as inputs without exception throughout all of the years; enrolment and literacy rates appeared to be the best way to monitor the education system performance in Colombia; and new relationships between early age enrolment and life expectancy, and public utilities and primary education efficiency were identified, giving rise to further disaggregation and to a wider range of ideas and relationships that decision makers should take into account when designing educational typologies and policies. Moreover, by favouring mechanistic stage-based approaches to education systems, and thereby neglecting inter-level contributions where the relationship between education and quality of life is most evident, traditional ESTs proved to be more concerned with the short-term measurability of investments, which in turn links with the overlapping of instrumental definitions such as measuring the same thing more than once.

At the present time it is probably easier to be informed, but increasingly harder to be well informed. Public policy decisions, especially those regarding education need to be taken carefully, following ample debate, and detailed scrutiny of the situations at hand. This paper tested various mechanisms for typifying education systems using Colombian data. Even though the PRSP Framework is relevant and makes important contributions to EST designs and educational policy, in-depth research, considering a wider range of factors such as community perceptions and public opinion is needed in order to redesign continuously the systems that promote education.

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APPENDIX

Quality of life assessments for statistical analysis

This part of the appendix considers a range of quality of life assessments and examines their aptness in accounting for individual, family and community factors affecting education system performance being included in the statistical analysis. Parra and Arellano (2001) approach different quality of life and poverty concepts and revise these concepts' empirical assessments in Colombia classifying them into different categories. The authors of this article classify Unsatisfied Basic Needs (UBN) and Poverty Line (PL) indicators as material poverty indicators, which measure the percentage of the population under certain conditions. Meanwhile, the Human Development Index (HDI)[13] and the Quality of Life Index (QLI)[14] are considered to go beyond goods and services. Both of these indicators assign points to the unit of analysis according to each component and are presented as Table 3. They are calculated as national or departmental averages. Table 3 also shows the quality of life variables such as health, education, housing, public utilities and income encompassed in the indicators' components.

Table 3. Variables and components of Poverty and Quality of Life Indicators

Variables	Components (Assessments)	Indicators
Health	-Life expectancy	HDI
Education	-Enrolment (7-11 year olds)	UBN
	-Education of the head of the household, and of all members 12 and older	QLI
	-Access to schooling cohorts (5-11 year olds) and (12-17 year olds)	
	-Combined educational attainment	HDI
	-Adult literacy	
Housing	-Inadequate housing	UBN
	-A large number of individuals living in the same room	
	-Physical characteristics of the house (ceiling, floor, and walls materials)	QLI
	-Number of children under 6 years of age and room accumulation	
Public utilities	-House with inadequate water and sewerage services	UBN
	-Access to public utilities (sewerage, water supply and garbage disposal)	QLI
Income	-Economic dependency	UBN
	-Income needed to purchase a minimum number of goods and services	PL
	-GDP per capita adjusted by parity in UD$ acquisitive power	HDI

(Source: Parra and Arellano, 2001)

A consideration of the quality of life and poverty indicators presented in Table 3 is advantageous because they provide critical information about the individual (that is, HDI components), the family and the community (that is, UBN components) that is needed to account for factors closely linked to the education sector performance and regarded as relevant by the PRSP Framework, such as: health, early childhood development, parental education, household income and composition. A range of community factors also have an impact on education, for example, roads, public services (World Bank, 2002a), education infrastructure (US-AID, 1997), and distance from schools (Vos, 1996).

Specifically, the HDI assesses an individual's capability to live a long and healthy life with access to basic educational and economic resources, therefore it accounts for individual factors like health, adult education and income. While the UBN accounts for individual factors like early childhood development in terms of the 7-11 year age group enrolment. It also involves components relating to family factors, for example, economic dependency and physical characteristics of the household, and access to public services, which refer to community factors.

[13] Developed by the United Nations Development Program (UNDP, 1990).

[14] Developed by Colombia's National Planning Department (DNP, 1998).

Consequently, these two quality of life indicators, namely, HDI and UBN, are considered the most suitable to examine relationships between education and quality of life from a typological perspective.

Tables With Factor Loadings

Table 4a. Variables and Factor loadings from Principal Component and Maximum Likelihood Factor Analyses for 1997 and 1998

	PC					ML				
1997	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**
EDUUBN	-0.393	-0.519	-0.063	-0.837	0.550	0.415	-0.288	-0.318	-0.875	-0.379
ECDUBN	-0.280	-0.466	-0.144	-0.356	0.888	0.844	-0.258	-0.212	-0.395	-0.295
ANALF	-0.236	-0.487	-0.130	-0.163	0.947	0.974	-0.150	-0.163	-0.188	-0.363
ATTAIN	0.748	0.558	0.169	0.294	-0.786	-0.789	0.549	0.683	0.146	0.451
TEACH	0.543	0.929	0.127	0.459	-0.616	-0.494	0.370	0.496	0.359	0.890
SCHOOLS	0.165	0.916	0.162	0.239	-0.353	-0.174	0.075	0.121	0.279	0.872
REGPRI	0.370	0.982	0.126	0.367	-0.483	-0.331	0.212	0.307	0.334	0.967
REGSEC	0.504	0.963	0.090	0.388	-0.626	-0.498	0.295	0.463	0.308	0.939
E56	0.770	0.316	0.551	0.604	-0.132	-0.156	0.956	0.449	0.363	0.231
E711	0.476	0.470	0.090	0.936	-0.301	-0.149	0.421	0.414	0.943	0.332
E1217	0.869	0.172	0.242	0.352	-0.159	-0.197	0.613	0.704	0.152	0.150
E1825	0.789	0.329	-0.088	0.436	-0.253	-0.145	0.405	0.942	0.294	0.262
EDUHDI	0.446	0.535	0.156	0.408	-0.902	-0.872	0.281	0.427	0.383	0.388
LIEXHDI	0.767	0.123	0.269	0.191	0.090	0.025	0.665	0.400	0.079	0.090
GDPHDI	0.381	0.575	-0.085	-0.039	-0.807	-0.693	-0.024	0.468	0.053	0.454
ACCUBN	-0.035	-0.188	0.368	-0.152	0.666	0.614	0.170	-0.160	-0.199	-0.139
PUBUBN	-0.112	-0.375	-0.160	0.278	0.726	0.691	-0.007	-0.045	0.115	-0.236
HOUUBN	0.249	-0.180	0.057	0.000	0.757	0.715	0.247	0.071	-0.116	-0.063
EFFPRI	0.002	-0.406	0.343	0.390	0.716	0.676	0.330	-0.154	0.218	-0.343
UNE1224	0.395	0.406	0.817	0.229	-0.361	-0.359	0.512	0.206	0.122	0.288
nICFES	0.433	0.455	-0.424	0.299	-0.476	-0.358	0.188	0.522	0.235	0.376
1998	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**
EDUUBN	-0.138	-0.277	-0.549	0.884	-0.193	-0.916	-0.174	-0.397	0.395	0.637
ECDUBN	0.199	-0.215	-0.777	0.753	-0.291	-0.683	-0.278	-0.468	0.649	0.560
ANALF	0.471	-0.342	-0.573	0.929	-0.488	-0.596	-0.435	-0.474	0.816	0.901
ATTAIN	0.021	0.804	0.766	-0.729	0.423	0.668	0.349	0.914	-0.445	-0.477
TEACH	-0.098	0.441	0.584	-0.423	0.969	0.269	0.963	0.404	-0.280	-0.254
SCHOOLS	-0.149	0.027	0.189	-0.216	0.917	0.002	0.907	-0.091	-0.119	-0.222
REGPRI	-0.106	0.323	0.436	-0.344	0.990	0.152	0.996	0.239	-0.198	-0.245
REGSEC	-0.124	0.504	0.597	-0.456	0.960	0.270	0.948	0.464	-0.302	-0.296
E711	0.275	0.251	0.562	-0.698	0.065	0.880	0.055	0.340	-0.275	-0.358
E1217	0.430	0.853	0.163	-0.109	0.010	0.187	-0.019	0.715	0.237	0.067
E1825	0.114	0.863	0.532	-0.202	0.374	0.196	0.301	0.773	-0.024	0.015
EDUHDI	-0.389	0.572	0.648	-0.844	0.524	0.548	0.462	0.658	-0.703	-0.744
LIEXHDI	0.874	0.411	0.219	-0.097	0.067	0.462	0.055	0.380	0.480	0.176
GDPHDI	-0.292	0.502	0.436	-0.780	0.458	0.487	0.381	0.483	-0.559	-0.720
ACCUBN	0.178	-0.172	-0.429	0.706	-0.169	-0.526	-0.165	-0.272	0.443	0.602
PUBUBN	0.127	-0.128	-0.255	0.788	-0.274	-0.583	-0.204	-0.257	0.402	0.782
HOUUBN	0.830	0.071	-0.414	0.556	-0.172	-0.228	-0.156	-0.093	0.968	0.600
EFFPRI	0.365	-0.272	-0.456	0.880	-0.314	-0.573	-0.268	-0.338	0.658	0.789
nICFES	-0.024	0.432	0.863	-0.394	0.402	0.457	0.359	0.524	-0.304	-0.030

Table 4b. Variables and Factor loadings from Principal Component and Maximum Likelihood Factor Analyses for 1999 and 2000

	PC					ML				
1999	**Factor1**	**Factor2**	**Factor3**	**Factor4**		**Factor1**	**Factor2**	**Factor3**	**Factor4**	
ANALF	0.946	-0.587	0.097	-0.091		-0.028	0.004	-0.377	0.976	
ATTAIN	-0.705	0.635	0.302	0.672		0.245	0.667	0.466	-0.612	
TEACH	-0.471	0.964	0.353	0.253		0.346	0.287	0.939	-0.336	
SCHOOLS	-0.309	0.836	0.224	-0.179		0.211	-0.179	0.847	-0.208	
REGPRI	-0.383	0.948	0.326	0.113		0.312	0.137	0.971	-0.243	
REGSEC	-0.494	0.958	0.343	0.278		0.334	0.305	0.944	-0.347	
E56	0.088	0.508	0.783	0.229		0.662	0.347	0.328	0.128	
E711	-0.065	0.553	0.838	-0.149		0.917	-0.034	0.345	0.016	
E1217	0.011	0.018	0.316	0.836		0.132	0.794	0.001	0.143	
E1825	-0.024	0.063	-0.123	0.906		-0.233	0.846	0.115	0.017	
EDUHDI	-0.823	0.680	-0.023	0.434		0.042	0.325	0.462	-0.841	
LIEXHDI	-0.012	0.134	0.892	0.223		0.697	0.360	0.040	0.157	
GDPHDI	-0.787	0.489	-0.008	0.335		0.041	0.224	0.329	-0.691	
EDUUBN	0.336	-0.581	-0.799	0.194		-0.940	0.097	-0.331	0.231	
ACCUBN	0.725	-0.216	0.122	-0.158		0.072	-0.112	-0.178	0.618	
PUBUBN	0.777	-0.223	-0.118	0.233		-0.134	0.209	-0.099	0.701	
HOUUBN	0.662	-0.326	0.511	0.007		0.262	0.152	-0.196	0.752	
ECDUBN	0.810	-0.638	-0.204	-0.198		-0.357	-0.136	-0.370	0.774	
EFFPRI	0.813	-0.172	0.078	-0.067		0.009	0.000	-0.135	0.673	
UNE1224	-0.616	0.680	0.263	0.040		0.335	0.047	0.455	-0.583	
2000	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**
EDUUBN	-0.316	-0.875	-0.398	0.186	-0.464	-0.336	0.216	-0.169	0.082	-0.684
ECDUBN	0.097	-0.310	-0.658	0.769	-0.524	-0.072	0.572	-0.398	0.644	-0.082
ANALF	0.047	-0.126	-0.572	0.877	-0.688	-0.174	0.863	-0.311	0.637	0.041
ATTAIN	0.524	0.259	0.705	-0.426	0.832	0.764	-0.443	0.451	-0.469	-0.041
TEACH	0.066	0.335	0.955	-0.314	0.457	0.230	-0.096	0.897	-0.354	0.048
SCHOOLS	0.050	0.467	0.846	-0.378	0.253	-0.019	-0.292	0.856	0.099	0.212
REGPRI	0.151	0.363	0.968	-0.448	0.444	0.191	-0.328	0.952	-0.101	0.063
REGSEC	0.211	0.374	0.981	-0.478	0.582	0.330	-0.348	0.895	-0.264	0.062
E56	0.693	0.604	0.433	-0.107	0.406	0.610	-0.090	0.176	-0.187	0.457
E711	0.192	0.949	0.369	-0.044	0.174	0.090	0.033	0.196	-0.018	0.953
E1217	0.775	0.176	0.169	0.346	0.517	0.896	0.153	0.076	0.082	0.030
E1825	0.593	0.324	0.269	0.215	0.723	0.838	0.039	0.119	-0.096	0.110
EDUHDI	0.176	0.327	0.618	-0.554	0.910	0.503	-0.637	0.325	-0.580	0.139
LIEXHDI	0.863	0.227	0.160	-0.159	0.286	0.613	-0.213	0.044	0.141	0.098
GDPHDI	0.110	0.207	0.598	-0.567	0.813	0.393	-0.650	0.370	-0.372	-0.034
ACCUBN	0.133	-0.078	-0.045	0.149	-0.645	-0.231	0.325	0.030	0.246	-0.076
PUBUBN	-0.024	-0.062	-0.212	0.861	-0.211	0.106	0.832	-0.079	0.158	-0.028
HOUUBN	0.630	-0.029	-0.294	0.522	-0.364	0.240	0.342	-0.113	0.752	0.078
EFFPRI	0.176	-0.114	-0.411	0.874	-0.278	0.166	0.671	-0.287	0.329	-0.017
UNE1224	0.198	-0.087	0.493	-0.746	0.376	0.158	-0.635	0.376	-0.265	-0.205
nICFES	0.207	0.500	0.587	-0.200	0.408	0.331	-0.025	0.415	-0.256	0.268

Table 5. Variables and factor loadings from Principal Component and Maximum Likelihood factor analyses for Sub-groupings in 1997, 1998, 1999 and 2000

		PC			ML	
1997	**Factor1**	**Factor2**	**Factor3**	**Factor1**	**Factor2**	**Factor3**
ECDUBN	0.638	0.435	0.946	-0.616	0.857	-0.484
ANALF	0.743	0.658	0.953	-0.697	0.989	-0.518
EDUHDI	-0.621	-0.644	-0.904	0.713	-0.865	0.825
GNPHDI	-0.870	-0.547	-0.692	0.974	-0.662	0.388
ACCUBN	0.477	0.982	0.578	-0.494	0.618	-0.358
PUBUBN	0.888	0.315	0.650	-0.713	0.680	-0.102
HOUUBN	0.575	0.555	0.793	-0.506	0.729	-0.176
EFFPRI	0.919	0.480	0.591	-0.765	0.679	0.013
1998	**Factor1**	**Factor2**	**Factor3**	**Factor1**	**Factor2**	**Factor3**
ECDUBN	0.779	0.731	0.620	0.429	0.530	0.739
ANALF	0.860	0.699	0.938	0.667	0.680	0.971
EDUHDI	-0.790	-0.587	-0.881	-0.571	-0.552	-0.905
GNPHDI	-0.610	-0.478	-0.856	-0.640	-0.426	-0.752
ACCUBN	0.478	0.961	0.584	0.646	0.313	0.538
PUBUBN	0.372	0.504	0.845	0.661	0.236	0.667
HOUUBN	0.925	0.411	0.540	0.378	0.997	0.655
EFFPRI	0.679	0.740	0.881	0.961	0.535	0.671
1999	**Factor1**	**Factor2**	**Factor3**	**Factor1**	**Factor2**	**Factor3**
ANALF	0.705	0.951	0.637	0.794	0.801	-0.940
EDUHDI	-0.527	-0.932	-0.426	-0.545	-0.662	0.984
GNPHDI	-0.513	-0.801	-0.572	-0.587	-0.510	0.745
ACCUBN	0.952	0.532	0.510	0.537	0.550	-0.524
PUBUBN	0.509	0.557	0.953	0.983	0.395	-0.575
HOUUBN	0.694	0.780	0.175	0.430	0.990	-0.641
ECDUBN	0.403	0.911	0.530	0.625	0.669	-0.828
EFFPRI	0.719	0.621	0.843	0.776	0.539	-0.602
2000	**Factor1**	**Factor2**	**Factor3**	**Factor1**	**Factor2**	**Factor3**
ECDUBN	0.468	0.657	0.927	-0.488	0.436	0.958
ANALF	0.743	0.823	0.827	-0.731	0.652	0.610
EDUHDI	-0.909	-0.541	-0.660	0.978	-0.259	-0.445
GNPHDI	-0.827	-0.568	-0.629	0.794	-0.349	-0.369
ACCUBN	0.790	0.154	0.190	-0.557	0.129	-0.071
PUBUBN	0.349	0.936	0.390	-0.302	0.869	0.261
HOUUBN	0.396	0.331	0.876	-0.289	0.331	0.640
EFFPRI	0.348	0.864	0.660	-0.202	0.809	0.586