Abt

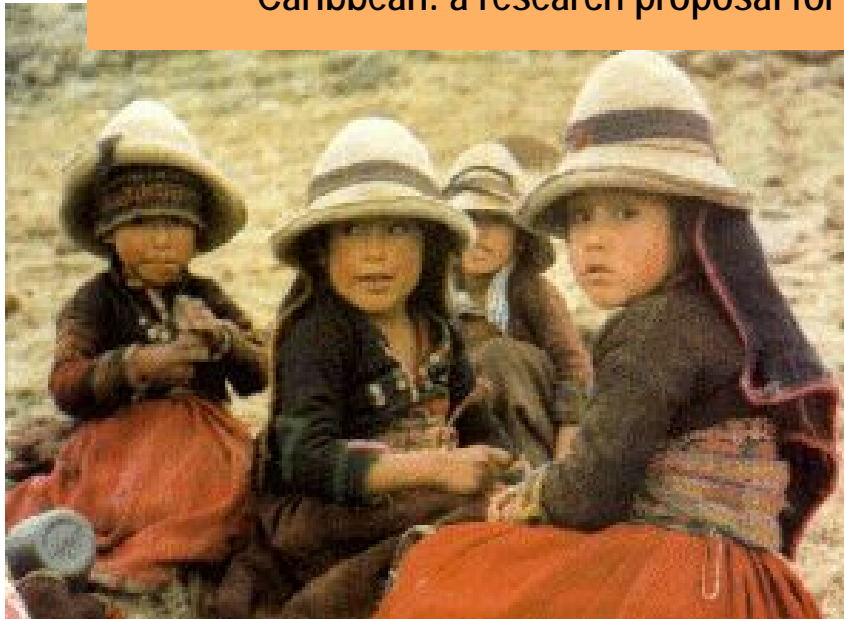## The Quality of Education in Latin America and the Caribbean: a research proposal for Peru

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1. Introduction: Understanding Education Quality in Peru

General opinion of school quality in Peru is that students are not achieving the desired standards and that there is a wide dispersion in educational outcomes. This view has been ratified by different international studies in which Peru has participated, in the national "sample" assessments performed by the Ministry of Education and in last year's census-evaluation in reading skills of second graders. A general consensus has emerged regarding the country's need to improve its educational outcomes, a that education quality has to increase to boost productivity and foster growth and at the same time that the country needs to reduce the education gap between top-bottom achievers as a way to reduce income inequality among Peruvians.

The government's intervention in education has been focused on supply side factors, such as building new schools and hiring new teachers; this type of interventions has traditionally been demanded by general public opinion. As a result of those policies, Peru has achieved almost universal enrollment in primary school, one of the highest enrollments in the Latin American and Caribbean (LAC) area. Other educational policies have included providing central planned training to teachers, equipping schools with computers, giving teachers non-result based salaries raises, among other. However, evidence shows that the quality has remained the same or has even decreased. Existing literature points out that, even though teachers and schools are very important, standard policy interventions (reducing class size, compulsory supply side training to teachers and the like) have little impact on education outcomes in terms of quality.

Furthermore, research is presenting strong evidence that education quality has important public and private returns. International comparable data has shown that those returns may be higher in developing countries.

In this study, we will assess the variance that derives from unobserved individual characteristics of teachers and school principals. Education policy is giving a higher importance to control for unobserved characteristics in the design of mechanisms (e.g. merit pay) to promote effort of all the involved agents. For example, almost all states in the USA have accountability systems in place. Are these systems possible in developing countries or should we keep our attention on traditional policy interventions? Our research will provide quantitative evidence of the expected gains from reducing teacher (improving bad performers) and school (related to principals) dispersion, and offer us elements to compare these possible outcomes with the ones that may emerge from traditional policy interventions. Comparisons among countries in LAC and regions in Peru with different income levels will give us elements to judge if these policies are applicable in poor countries.

We will assess the evolution of education quality through time and through schooling years. If public intervention is reducing education inequality, the impact of socioeconomic characteristics should decrease through time. Other type of family interventions is through private schooling, we will give estimates of the effect of private schooling.

Finally, we will estimate the impact of education quality on some key outcomes such labor market and health related outcomes. This analysis will give us estimates of how important is to focus on quality to improve well-being of the population and economic growth.

One important aspect of our research project is that it considers interviews with key agents in the education process. This interaction will help us to validate our results and policy recommendations and discuss their implementation feasibility.

Our guiding research questions will be:

▲ What has been the performance trajectory of education quality in and within Peru?

▲ What are the factors that explain the education results in term of cognitive achievement?

o Are observable or non-observable characteristics (e.g. teachers' degrees against teachers' effort) determinants of education quality?

▲ Which is the impact of education quality on market and non-market outcomes?

2. Research strategy and data sources

2.1   Research strategy

The project will have two separate stages. In the first one, a formal analysis of the education quality in Peru will be performed. This analysis will include:

▲ Benchmarking of education quality in Peru (comparisons with other Latin American countries and within Peru).

▲ Assessment of the determinants of education quality in primary and secondary education (schools, teachers, families and communities).

▲ Impact of education quality on key variables (labor market outcomes, health related issues and school attendance).

In a second stage, we will construct policy recommendations, based on our results and the interaction with key agents on the education process (other researchers, policy makers and parents).

2.1.1   Analysis of education quality

2.1.1.1 Benchmarking of education quality in Peru

Since 1996, there have been 4 educational testing rounds in Peru, which represent a total of 24 different tests. Additionally, Peru has participated in the Program for International Student Assessment (PISA) 2000, and the Latin America Laboratory for the Assessment of Education

Quality (LLECE) 1997[1]. To make databases comparable, first, we will sort databases by age group and then adjust the method proposed by Hanushek and Woessman (in process)[2]. Therefore, differences across countries, regions, socioeconomic groups, school types and estimated coefficients of the econometric analysis will have a common interpretation.

Box 1

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Standardization method proposed Hanushek and Woessman (in process)

They design a method to make the level of the differently measured international test with their different sets of participating countries comparable across test. They had three key steps:

1. *Comparable level*. They need information on educational performance that is comparable over time. To do so, they employ USA data, given that the USA is the only country that has participated in all international tests they report, and there is information on education performance comparable through time for that country. They estimate standardized deviations of US performance across time in the National Assessment of Educational Progress (NAEP) from the 1999 test, and present them in standard deviations of the US in the international PISA study.

2. *Comparable variation*. There is no explicit external information available on trends in the cross-country performance variation. They assume that variance of results in a group of selected countries have not varied substantially since test have been implemented. They standardize results for all countries in terms of the selected group mean and standard deviation, and present it in terms of standard deviations of the international the PISA study (of the selected group of countries).

3. They adjust the comparable variation standardization wit the information coming from the comparable level for the US. As a result, they get results of all the tests they considered on a common scale that is comparable across the different international test. Their exercise projects the PISA scale onto all other tests.

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Even though results from tests in Peru are not directly comparable, there is some information about the evolution of the national mean through time[3]. However, there is no information on the dispersion of the results, which is a key element to assess the evolution of education inequality. Here, we plan to standardize the variance based on the assumption that it should not register significant variations in certain metropolitan areas that have not experienced significant socioeconomic or demographic changes (such as urban Moquegua) or type of schools (wealthy, private schools in Lima). We will validate our methodology with data from countries with consistent testing systems (Chile and the USA)[4].

Once the data for the Second Comparative Study of the Latin American Laboratory for Assessment of Education Quality, SERCE becomes available, it will be incorporated in the study, if provided by the second month of the study. It will give us extraordinary information on the evolution of means and dispersion for 3rd graders, and complement our analysis of other age groups.

Furthermore, to assess the evolution of quality from primary to secondary education, we will improve the method employed by Hanushek and Luque (2003). They pooled together two standardized test results and performed regression analysis to assess if the negative impact socioeconomic characteristics on test scores decrease through time. However, this method does

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[1] In next section there is a list of participating countries.
[2] Hanushek and Woessman (2006) employ this standardization.
[3] Only 1998 tests are comparable with 2004 tests.
[4] The Sistema de Medición de la Calidad de la Evaluación (SIMCE) from Chile and the National Assessment of Education Progress (NAEP) for the USA provide time consistent evolution of means and variances.

not control for changes in the dispersion through time. To obtain a more consistent estimate of the evolution of education through time, we will benchmark our results to the evolution of results in some other selected LAC countries. [5]

Presenting the test data on a standardized way will help us to assess evolution of quality. However, the true education quality of an age group requires an estimate of the education quality of the dropouts. We will adjust our estimates taking into account the schooling achievement per age groups, when we present means for regions in Peru, so we will not overestimate education quality for some regions in Peru.[6] This analysis will be also important to compare Peru with countries that low levels of school enrollment.

2.1.1.2 Assessment the determinants of education quality in primary and secondary education

Education results derive from the interaction of students (with their families), teachers, and schools. Outcomes will also be affected by student peers. Furthermore, the institutional set up, e.g. decentralization schemes, competition, charter schools, accountability systems and the like, have impact on the final education quality outcome.

As a first step, we will reproduce the analysis performed by Ravela (2004) with data coming from Uruguay in the PISA context. This analysis presents the relationship between outcomes in terms of quality and socio-economic conditions, comparing Uruguay with countries from Latin America, other countries in PISA, and at the same time different schools in Uruguay. One key element of his analysis is the construction of socioeconomic groups. We will construct the same analysis to compare Peru with other countries in primary education (employing data from LLECE) and secondary education (employing data from PISA). Furthermore, employing the standardized data from Peru, we will perform a similar analysis, comparing results at a regional level.

2.1.1.2.1. Econometric Analysis

Even though the previous analysis will give us important insight of the relationship between education outcomes and certain key inputs of the education process (socioeconomic characteristics of families and communities, school type, and teacher characteristics), we will need to use econometric techniques to assess the true magnitude of those effects. We will employ econometric analysis at the country level, and compare the results between countries, and at the region level, and comparing results across regions.

First, we will assess the impact that schools have explaining the variance of school results. We will perform the analysis comparing countries in LLECE for primary education and in PISA for secondary education, and regions in Peru with the Peruvian data sets. Previous research, e.g. Hanushek (2006), finds significant differences between schools; however it is not clear which is the source of that variance.

To analyze the source of variance, we will employ the traditional framework of analysis of educational performance that considers a general production function such as[7]:

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[5] Results in term of proficiency of students may be an alternative.
[6] Poorer regions usually have a higher number of school dropouts.
[7] Econometric issues related to this formulation will be described in next section.

Equation. 1:

$$O_{it} = f\left(F_i^{(t)}, P_i^{(t)}, S_i^{(t)}, A_i\right) + \upsilon_{it}$$

Where:

O_{it} : performance on test scores of student i at time t,
$F_i^{(t)}$: family inputs cumulative to time t,
$P_i^{(t)}$: cumulative peer inputs,
$S_i^{(t)}$: cumulative school inputs,
A_i : innate ability,
υ_{it} : stochastic term

We will follow Hanushek and Luque (2003) to assess the importance of school inputs in comparison of student socioeconomic characteristics. We will perform two analyses; (i) among LAC countries; (ii) among Peruvian regions (or cluster of regions).

Box 2

<table>
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Explanatory power of school inputs (Hanushek and Luque, 2003)

Education results are consequence of family, teacher, schools and community characteristics, and these factors are usually positively correlated. The authors employ two different methods to assess the importance of school inputs on the education outcomes:

1. First, they estimate the marginal explanatory power of school inputs on the variance of education outcomes after having estimated the explanatory power of school inputs. [like Coleman et al (1966), and Heyneman and Loxley (1983)]. The importance of school inputs is very limited.

2. Second, they estimate percentage of the variance explained just by school inputs. The results are reversed, and school factors appear to explain the majority of the total explained variance.

Both estimates represent a lower and upper bound for the true impact of school resources.

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Additionally, we will report the results of econometric analysis of school level characteristics. Furthermore, in some particular cases we will be able to construct proxies for value added[8]. In those cases, we will assess the evolution of the value added based the exogenous variables presented in equation 1. We will complement traditional estimation techniques with quintile regressions that focused on the median result, rather than on the mean result.

To assess teachers' impact, first we will present evidence on the magnitude of teacher differences on student performance. Previous research has found that teacher effects can be impressive. Hanushek (1992) finds "that teachers near the top of the quality distribution can generated an entire a year's worth of additional learning out of their students compared to those near the bottom". Research also finds that the relationship between observable teacher characteristics and teacher effects is very weak (Luque, 2003).

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[8] Value added controls student performance, in order to get the marginal impact. Value added models, as a general rule, are superior to the level formulations.

In order to assess true teacher effects, we will need to control for school effects. Those effects will be controlled by the introduction of school fixed effect in the regression analysis (when we have more than one classroom per school), or controlling by schooling characteristics.

We will employ the econometric techniques based on Hanushek and Luque (2003) adding teacher characteristics, to assess how much of the variance is explained by observable teacher characteristics, and if their impact is higher in poorer areas[9]. Additionally; we will perform regression analysis, comparing regressions with and without school fixed effect to control for non random sampling of teachers among schools.[10] As in the school case, we will perform quintile regressions.

Impact of student socioeconomic characteristics: The analysis for the school and teacher effects will give us a clear understanding of the impact of socioeconomic characteristics, as we will control for them in the analysis. Our focus here will be to assess if the negative impact of socioeconomic characteristic increases through time -if education systems fulfill the expectations of reducing the impact of economic inequality on education inequality-. Following Hanushek and Luque (2003) –on the equity section of part of the paper-, we will assess if the relationship between scores and socioeconomic characteristics decrease through time. We will complement the econometric analysis with clarifying graphs.

Finally, we will assess the difference between private and public schools. In this part of the analysis, we will document the rapid growth on enrollment in private schools in Lima, and the factors that may be driving it. As a reference work, we will have Neal (1997) on how to estimate the impact of private school quality, and Calonico and Nopo (forthcoming), on the impact of private education on labor markets. Here, we will employ both parametric and non-parametric econometric techniques from the evaluation literature.

2.1.1.3 Impact of school quality on other key economic variables.

Research has found that education quality is a key factor in economic growth (Hanushek and Kimko, 2000) and that private returns of education quality are high –and maybe higher in developing countries- (Psacharopoulos (1973), Hanushek and Zhang, 2006). Furthermore, education quality has impact on health related issues (Hanushek, Jamison and Jamison, forthcoming), and that education quality may be a key determinant of school dropout. (Hanushek, Lavy, Hitomi, 2006). In the study we will assess the impact of education quality on labor market outcomes, health related practices and school dropout. We will not cover economic growth, given that there is not reliable data on growth for different regions.

To measure the impact of education quality on labor market outcomes, we will adapt the general Mincer equation[11]:

Equation 2:

$$\ln(y_i) = a_0 + \rho S_i + \gamma T_i + a_1 Exp + a_2 Exp^2 + X_i \beta + \varepsilon_i$$

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[9] See Hanushek and Luque (2003), Table 3.
[10] This analysis will control for non random sampling of students and teachers.

Where:

yi   : earnings
Si   : years of schooling,
Expi : labor market experience
Xi   : a vector of other individual attributes
Ti   : individual cognitive skill
εi   : error term.
γ   : return to quality (measured on cognitive skills).

Even though there is no published data with links between earnings and cognitive skills, we will employ the information on the region where the individual attended school and the labor market outcome in the same economic environment: earning of immigrants in Lima [12].

A similar modeling strategy will be employed to assess the impact of education quality on adult and child health related variables. Previous analysis (for a comprehensive survey see Grossman 2006) has employed school quantity as an index of school quality. Some recent studies find that quality of education is a bigger predictor than quantity [Hanushek, Jamison and Jamison (2006) in case of Infant mortality rate]. We will adapt equation 2, and have as a dependent variable the health related outcome, instead of the wage[13].

Once data on the 2006 Census Evaluation on reading becomes available, we will assess the relationship between school dropout and school quality at a district level. And between the education quality, socioeconomic characteristics at the district level and the human development index reported by the UNDP.

Summing up, our research strategy will try to construct standard databases, which may be comparable through time (to check evolution of student quality for a given age cohort) and through different cohorts (to check if education systems are making a difference). After that, we will assess the impact of different factors in the education process, concentrating on heterogeneity of school and teacher effects. We will compare the heterogeneity of teachers and schools, relate it with observable characteristics, and verify if observable characteristics are more important in poor areas. Finally, we will assess the impact of education quality on several key economic variables.

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[11] In labor economics, research has tried to find instruments to control for possible bias on the return of years of schooling. It has employed several specifications with instrumental variables. We will try to control in a similar way once we assess the returns of quality.

[12] This analysis will be similar to the one performed by Hanushek and Kimko (2000) in the second part of their paper.

[13] Note that some issues of reverse causality will arise. For example see Van Doorslaer (1987), Bolin, Jacobson and Lidgreen (2002), and Case, Fertig and Paxson (2005).

Box 3

Core Questions and Products from the Project

CORE RESEARCH QUESTIONS	PRODUCTS FROM THE PROJECT	KEY ACADEMIC REFERENCES
Benchmarking of education quality Benchmarking of education quality in Peru Peru compared to other LAC countries and within Peru.	Description of international tests in which Peru has participated, and of testing efforts in Peru. Standardization of results in different tests in for a age group. Method to compare results across different age groups.	Hansuhek and Woessman (2006) Hansuhek and Woessman (in process)
Factors related to education quality School factors	Assessment of the importance of schools. The impact of observable school characteristics. Comparison of results across LAC countries and within regions in Peru.	Hanushek and Luque (2003) Rivkin, Hanushek and Kain (2005)
Teachers	Assessment of the importance of teachers. The impact of observable teacher characteristics. Comparison of results across LAC countries and within regions in Peru.	Hanushek and Luque (2003) Luque (2007) Rivkin, Hanushek and Kain (2005)
Family characteristics	Assessment of the importance of family characteristics Evolution through time of the impact of family characteristics Family intervention through private schooling Assessment of the impact of private schools.	Hanushek and Luque (2003) Ravela (2004) Heckman, Ichimura, Smith, Todd (1998) Neal (1997)
Impact of quality on selected variables Market outcomes	Return of quality on wages.	Hanushek and Kimko (2000) Hanushek and Zhang (2006)
Non Market outcomes	Impact of quality on some key health issues	Grossman (2006)

2.1.2 Policy recommendations and interaction with key agents in the education process

We will give special attention to the feasibility of the policy recommendations that may emerge from our analysis. We are considering interaction through workshops with other academic researchers, officials from the Ministry of Education, and parents. The initial results of the study and implication for policy-making for educational quality improvement will be presented to different key actors in order to validate the study's conclusions and feasibility of policy recommendations. In this sense, we propose organizing three dialogue sessions prior to the elaboration of the final report:

First Session: Meeting with experts in order to discuss the methodology and quantitative results as well as to suggest a research agenda for the future. Experts will be selected from research institutions, universities and the academia in general.

Second Session: Meeting with policy makers: national authorities and officials, members of the Technical Secretariat of the Regional Presidents and representatives of civil society organizations involved in education with the purpose of discussion the emerging policy recommendations and their institutional feasibility.

Third Session: Meeting with parents and representatives of parents associations with the aim of validating and prioritizing the policy strategies from the point of view of the direct users of the educational system.

The results of these meeting will inform the final report and will provide valuable information about:

- ▲ Research agenda

- ▲ Policy recommendations and their feasibility

- ▲ Most desirable strategies from the users´ point of view.

2.2   Data Sources

The analysis will benchmark education quality in Peru and assess its determinants. We will employ the data coming from the Minister of Education's Quality Measurement Unit (UMC), and from international test in which Peru has participated. Furthermore, to check consistency of our test adjustment procedures, we may employ data coming from international test for other countries in the region that have participated in international collections and have a tradition of national tests.

The UMC has produced 4 national tests (1996, 1998, 2001 and 2004), plus a census-evaluation in reading for second graders of primary school. Unfortunately, these tests are not directly comparable, having different testing strategies, different samples and the reported results have different national means (not reflecting a gain or loss on education quality),

Table 1

Peru Tests

Year	Representatitivity				Test		Grades
	National	Regional	Rural/ urban	Private/ Public	Math	Reading	
1996	Yes	Yes		Yes	Yes	Yes	Primary: 4th
1998	Yes	Yes		Yes	Yes	Yes	Primary: 4th and 6th Secondary: 4th and 5th
2001	Yes	Yes 1/ 2/	Yes	Yes	Yes	Yes	Primary: 4th and 6th Secondary: 4th
2004	Yes	2/	Yes	Yes	Yes	Yes	Primary: 2th and 6th Secondary: 3rd and 5th

1/ Only for secondary school.
2/ The UMC from the Ministerio de Educacion reports results at this level for primary and secondary schools.

In 2007, the Ministry of Education performed a census test for second graders in primary school (previous test were based on samples that were national representative). Once they become available, we will employ in the analysis [14].

International datasets to be employed are LLECE and PISA. LLECE was carried out in 1997 and supported by UNESCO/OREALC. LLECE applied standardized exams in language and math to third and fourth graders in 13 countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica,

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[14] The Unidad de Medicion de Calidad reports that the data at the district level may become available in mid July.

Cuba, the Dominican Republic, Honduras, Mexico, Paraguay, Peru and Venezuela. On the other hand, PISA tests 15 year-olds. It looks for factors related to education and employability. Six Latin American countries have participated in the 2000 and 2003 PISA tests: Argentina, Brazil, Chile, Mexico, Peru and Uruguay. Peru participated in PISA 2000, however to validate our procedures to standardize variables, we may compare results for other countries that participated in both PISA rounds. Once the Second Comparative Study of the Latin American Laboratory for Assessment of Education Quality, SERCE becomes available, it will be incorporated in the analysis.

Additionally, we will compare the evolution of results in national tests and international test of countries with more mature testing systems. This will also help us to validate our data management procedure. Selected countries may be Chile (with data from SIMCE) and USA.

Additionally, we will employ the data from the Ministry of Education on school enrollment (ESCALE) for 2005 and 2006. This data provides information of all schools in Peru, with number of students, teachers, and some observable characteristics in terms of services. This data will be helpful to study the relationship between school quality and drop out behavior, we will be able to follow enrollment at a district level.

2.2.1 Other data relevant data base

Socioeconomic characteristics and labor market outcomes will come from the Encuesta Nacional de Hogares (ENAHO) performed annually by the Instituto Nacional de Estadística e Informática (INEI). To find regional poverty index, we will employ secondary analysis coming from this data performed by INEI [15].

Information at the district level will come from the national census data (1993, 2005), and from the Human Development Index published by the UNDP.

Economic indicators will come from the World Bank, IMF, PENN World Tables for international comparisons. For domestic data, the sources will be Central Reserve Bank of Peru and Instituto Nacional de Estadistica.

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[15] Those are the official figures.

3. Previous research and motivating discussion

In Peru, the Ministry of Education has implemented four different national assessments on education quality (1996, 1998, 2001, 2004) based on samples, These tests covered different grades, both of primary and secondary education. Additionally, in 2007 a national census test on reading for second grades was implemented.

Each test had its own implementation strategy, and there are no clear definitions on what results represent over time.

Figure 1 Different Test Peru-Math or Logic Math 4th grade of primary school
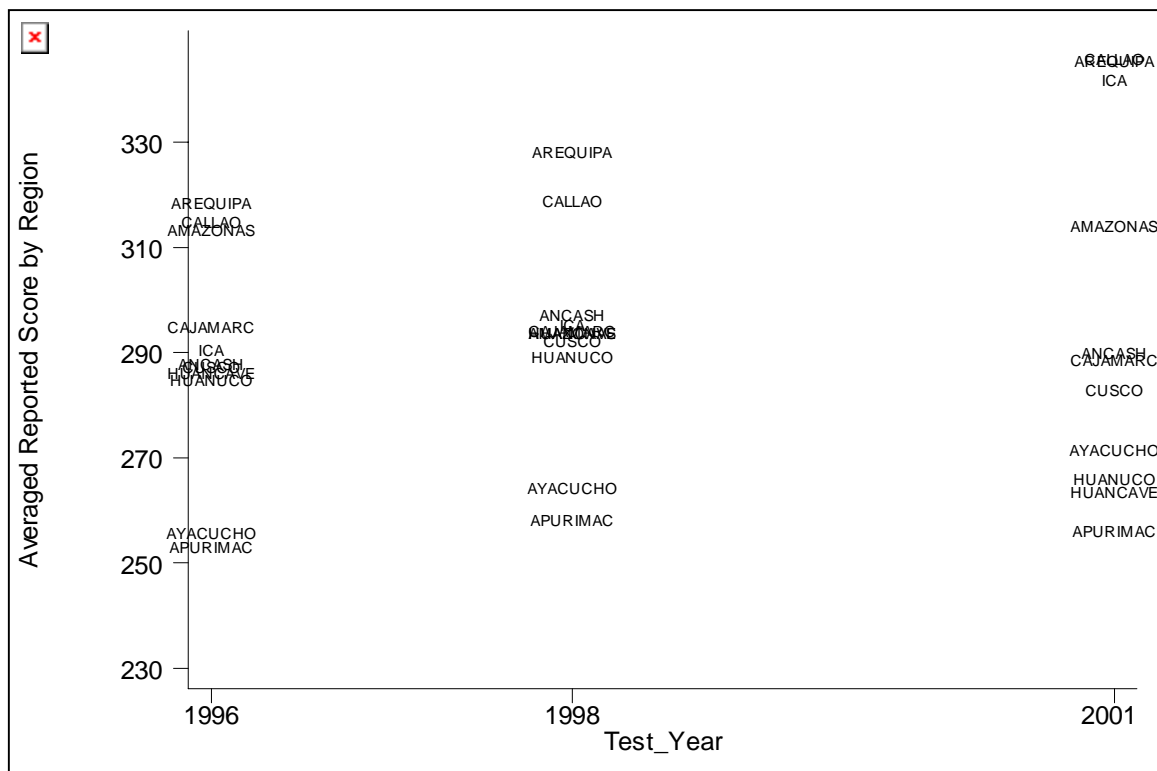
In Figure 1, we observe the Math (or Logic Math) results for the tests to 4th graders of primary school. From the Figure we observe:

▲ National average seems to be the same through tests. However, tests were not necessarily comparable.

▲ Apurimac is the worst performing region, or close to the worst, independent of the test.

▲ Arequipa, Moquegua and Lima are among the top performers. However, there is some

degree of uncertainty on which is the top performer.

▲ The reported gap between the first and last performers increases through time. This development could respond to the actual evolution (which implies increasing education inequality), or the test design with different difficulty levels, or different imputed variance to the tests.

In Figure 2, we observe the Math (or Logic Math) results for the tests in which 6th graders participated.

Figure 2 Different Test - Math or Logic Math Reports 6th graders primary school
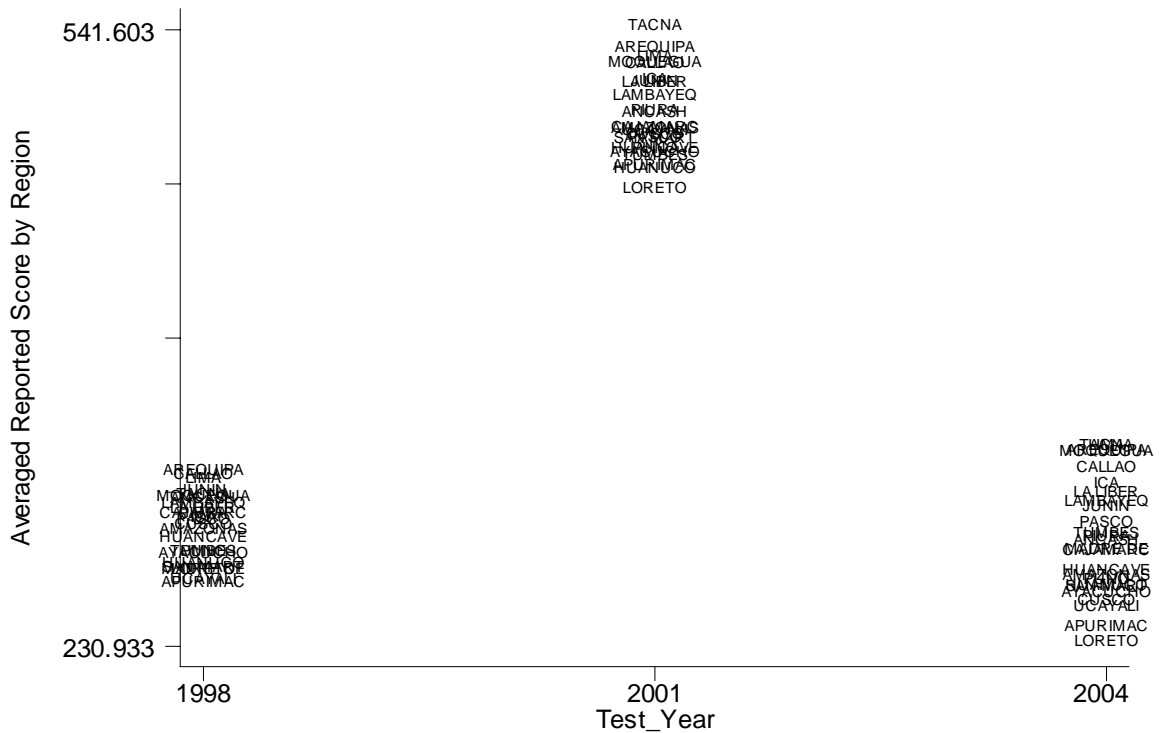
National averages are clearly different between 1998, 2001 and 2004. At the same time, the gap between the best and worst region increases between 1998 and 2004.

Figure 1 and 2 point out the need to standardized results, in terms of mean of variance. Different approaches have been employed to do so. For example, Luque (2003) transforms test scores for Houston School districts into a normal standard distribution, a procedure similar to the employed by Rivkin, Hanushek and Kain (2005). In this case, mean differences and regression coefficients can be interpreted as standard deviations. However, there is important information about the dispersion that is lost in that procedure. Hanushek and Woessman (2006 and in process, described above) referred a superior adjustment.

Preliminary analysis of the data also presents significant differences across regions that seem to be smaller than differences within regions. In Figure 3 we observe the distribution of results for the 5th graders of secondary school in Math for 2004.

Figure 3 Distribution of Math Results among regions – 5th graders Secondary – 2004
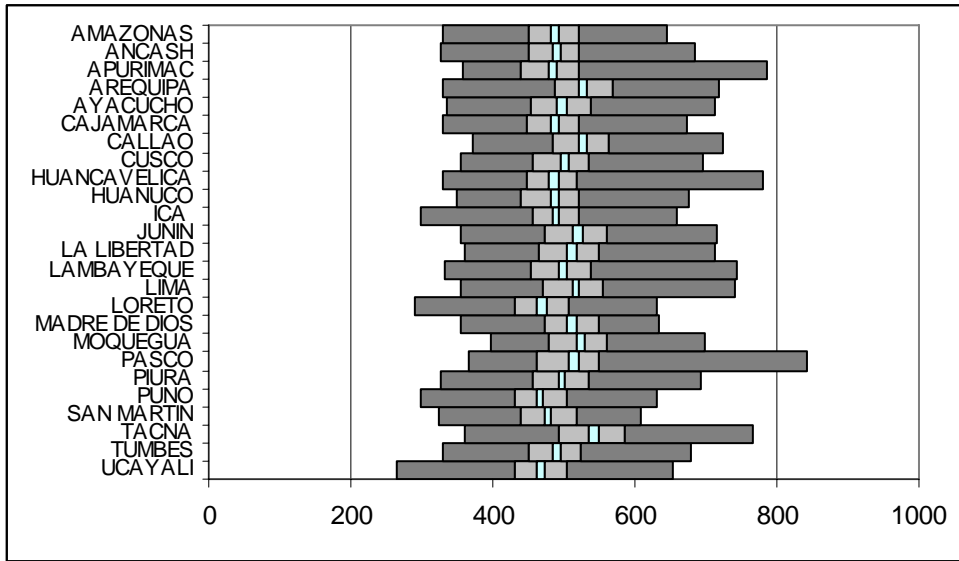
We need to link result numbers to proficiency levels. The tests of 2001 and 2004 give us results in terms of sufficient results. However, there is no certainty if the sufficiency criteria employed are similar. In Figure 4, we observe results in terms of sufficiency for the 2004 test.

Figure 4 2004 Primary Math Test in a sufficient base scales
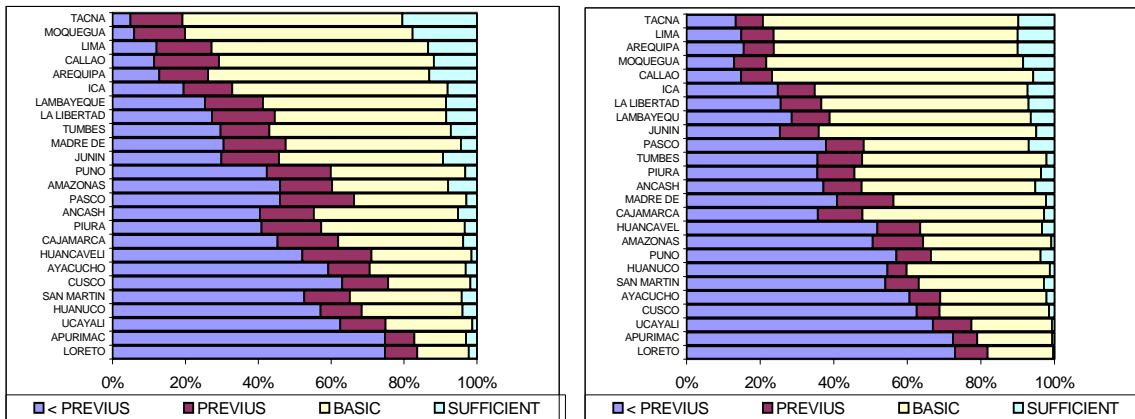
(2nd grade on the left, 6th grade on the right)

The results in terms of sufficiency for 5th grade of secondary school are presented in Figure 5. The results show a strong decline in the percentage obtaining basic results. The number of students performing below previous year increases dramatically in every region in Peru.

Figure 5 2004 Math Results in Sufficient Scale for 5th grade of Secondary School
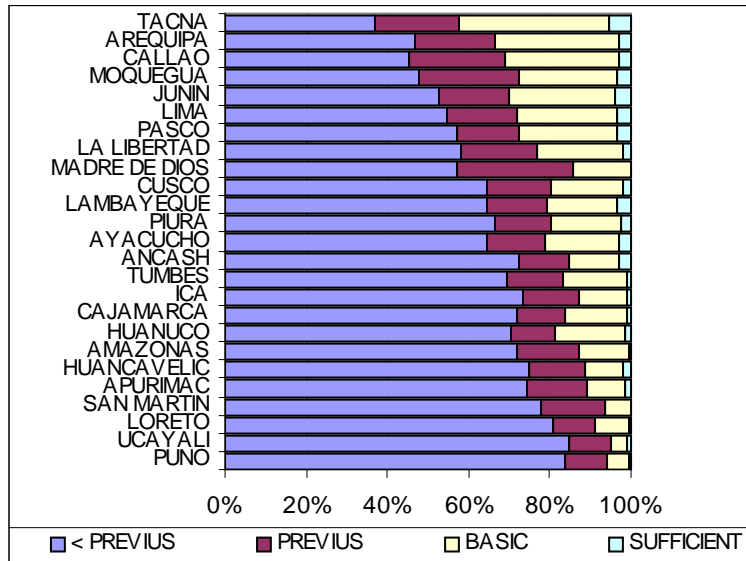
Figure 4 and 5 clearly present that the education system is not able to keep some minimal standards through time. This inability is present both in wealthy and not wealthy regions.

In term of international tests, Peru has participated in the LLECE organized by the UNESCO and PISA 2000 organized by the OECD. The results of those tests give an important benchmark to compare with other countries, and to verify the results of national test.

Figure 6 Results LLECE Math- 3rd and 4th grade
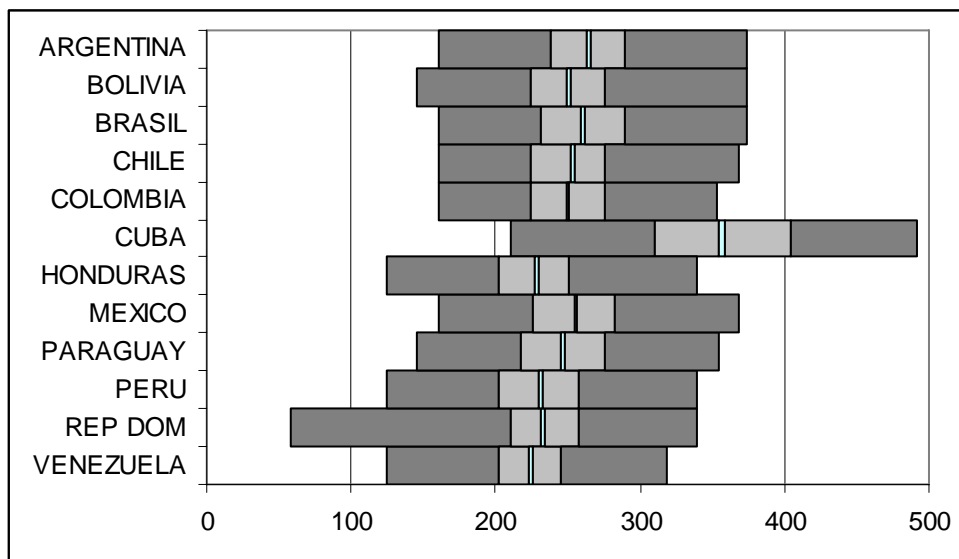
The target population for this test is 3rd and 4th graders of primary school. In Figure 6 we observe the results in the LLECE for Math. Cuba is a clear out performer. Peru is among the worst performers. One important characteristic of LLECE is that it allows evaluation of gains between 3rd and 4th grades.

In figure 7 we observe the results from PISA 2000. Peru is the worst performing country.

Figure 7 PISA 2000 Math – 15th graders
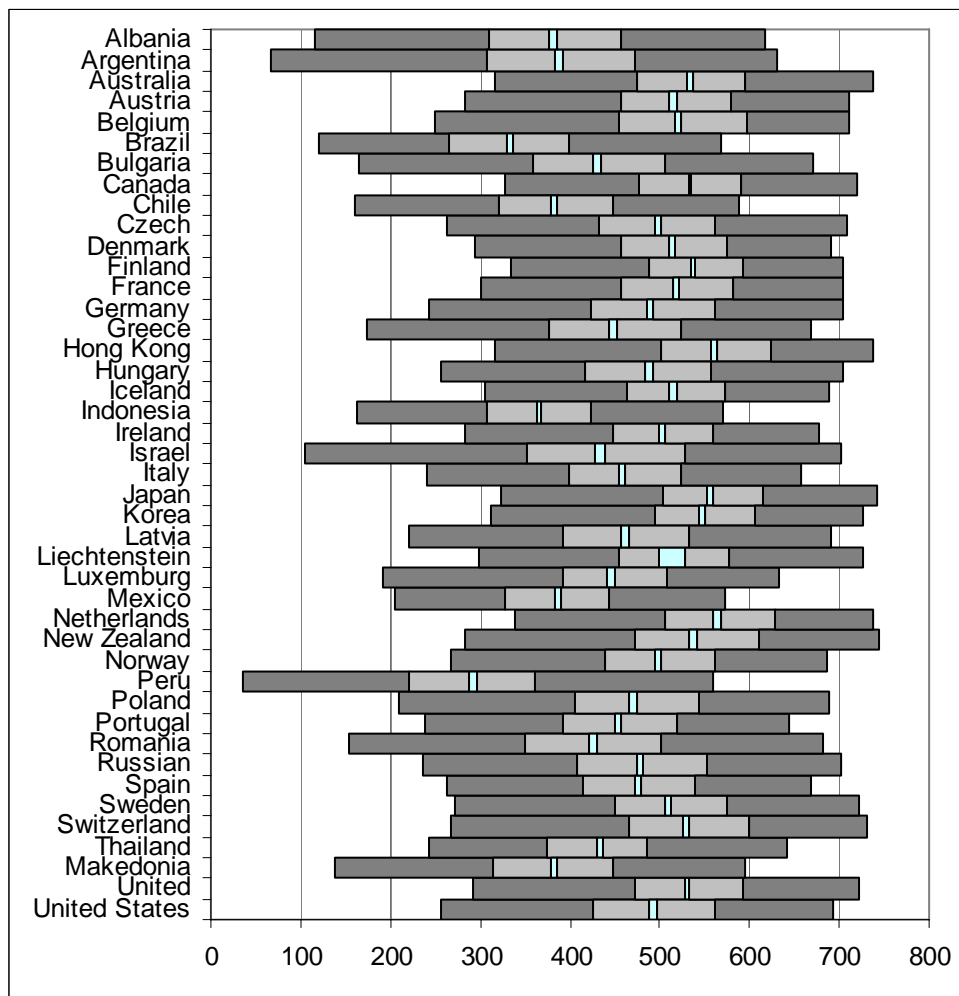
3.1   Factors Associated with education quality

Education outcomes are the result of a many factors, among them we have the interaction of innate ability, socio-economic characteristics at the family level, peers at the school and at the community, schools and teacher characteristics and institutional set up. Ravela (2004) present the positive relationship of education outcomes with socioeconomic characteristics. Cueto (forthcoming) finds a positive correlation between average raking on regions on past test scores and poverty indexes. However, this evidence is inconclusive: as observed in Figure 3, there is a lot of within-region variance. Regions only explain 12 percent of the variance in that particular test.

There is a clear relationship between socioeconomic characteristic of parents and education results. In Figure 8 we observe the relationship between schooling levels of parents and test scores for Latin American Countries in PIA 2000.

Figure 8 PISA 2000 Results and Education Level of Parent
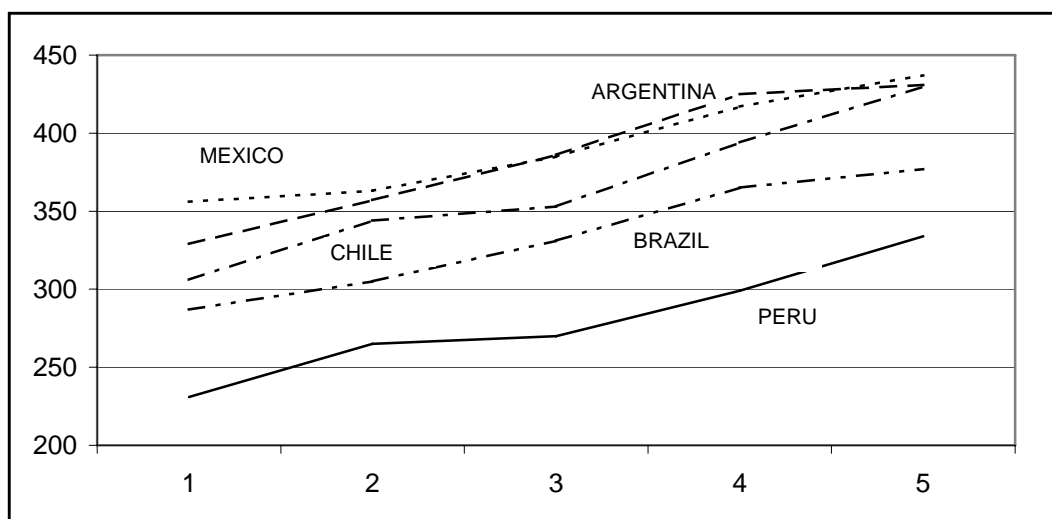
(1) No Primary (2) Primary (3) SEC 1 (4) SEC 2 (4) Post-Secondary

In figure 9, we have the same analysis for National Evaluation of 2001. The analysis is for 4th grade of secondary level. The positive relationship is not clear, for some regions it turns into a U shaped relationship.

Figure 9 National Evaluation 2001 –Math Results and Education Level of Parents
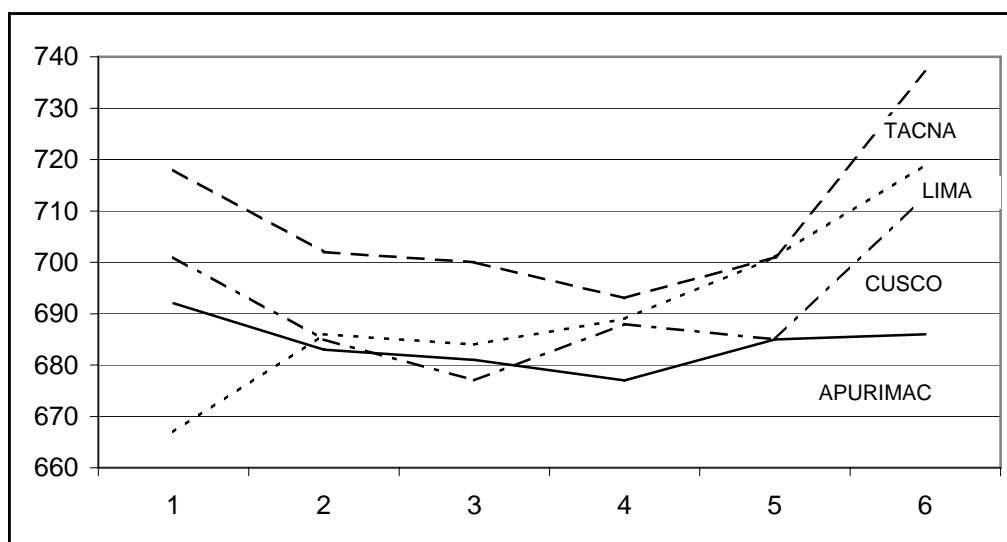
(1) No School (2) Inc.Prim. (3) Com.Prim. (4) Inc.Sec. (5) Com.Sec. (6)Tertiary

3.2   Econometrics and factors associated with school quality

Starting with the Coleman Report [Coleman et al. (1966)], there has been a discussion on what are the relative importance factors that influence education outcomes in terms of quality. The

general structure of the production function estimation, designed to pinpoint causality has focused on a model such as:

Equation 3

$$O_{it} = f(F_{it}, P_{it}, T_{it}, S_{it}, A_i) + \upsilon_{it}$$

Where:

O_{it} : performance of student i at time t,
F_{it} : vector of family inputs cumulative for student i at time t,
P_{it} : cumulative peer inputs for student i at time t,
T_{it} : teacher inputs for student i at time t
S_{it} : cumulative school inputs for student i at time t,
A_i : innate ability of student i,
υ_{it} : stochastic term.

In general, models to estimate the different impact of different characteristics have been employed, with a structure like:

Equation 4

$$O^c_{ij} = a^c_o + a^c_F F^c_{ij} + a^c_T T^c_{ij} + a^c_S S^c_{ij} + \varepsilon^c_{ij}$$

Where:

i : individual student,
j : classroom
c : country of the student.
F, T, S: multidimensional measures of family, teacher and school characteristics, respectively.

The estimation of these equations has been subject to different econometric problems analyzed in the literature. Two important problems are:

- Tibout sorting across schools (Tibout, 1956). Students are not assigned to schools randomly. The school reflects the socioeconomic characteristics of the parents and usually wealthy parents will "buy" better schools and give a greater importance to education. For example, wealthy schools may have smaller classes, because more resources are devoted to those schools, and they may have better results because of the higher preference of those parents to schooling. However, an unaware econometrician may infer a relationship between smaller classes and better results (that may not be present). In econometric terms, there will be a bias in estimated coefficients given that there will be a school level, or teacher level error term. One way to deal with this problem is to estimate regressions with fixed effects, or to perform within group estimations.[16]

- Value added. The education process is cumulative. It is important to find what the marginal impact of education inputs on quality is. If we compare two schools in terms of their final result in terms of quality, we may be missing the fact that students may have

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[16] Hierarchical regressions are common in the literature too.

started the school year with great differences of achievement.

Data on international test does not allow us to solve all the estimation problems described above (we will be able to construct student value added, or to control for teacher fix effects only for some particular cases). However, we will make some assumptions to validate the power of our econometric results[17].

3.3   Impact of Schools

Peru is a highly unequal country in terms of income distribution, and in terms of education inequality. Furthermore, some authors (Crouch, 2006) have noticed that education inequality is greater than the one expected just in terms of income inequality. Therefore, there should be other factors explaining inequality in education.

Figure 10 Inequality of Education: Best and Worst Performing Schools
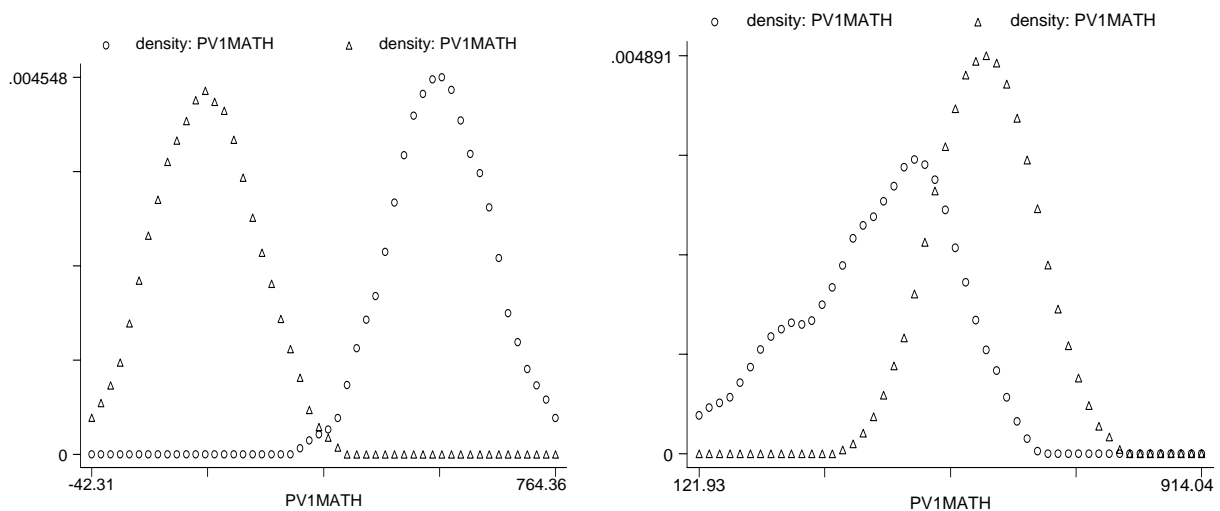
(Peru-left; Korea –right)

Figure 10 presents the dimension of school inequality. In Peru, best students in worst performing schools are inferior than worst performers in best schools. However in Korea, there is a significant overlap: best students in worst schools are better than worst students in best schools. (see Luque (2006)).

In Figure 11 we observe how much of the school variation is explained by school effects. We observe that in Peru, Argentina and Cuba schools explained around 40 per cent of the variance in student test scores, and that dispersion of results is bigger in Peru and Cuba. However, the source of school variance may be very different between Peru and Cuba: Figure 11 does not give us explanations on what may be causing variance.

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[17] For example, estimation in levels on inputs in period t assumes that inputs were similar in periods before t.

Figure 11 School importance and variation of results for UNESCO 1997
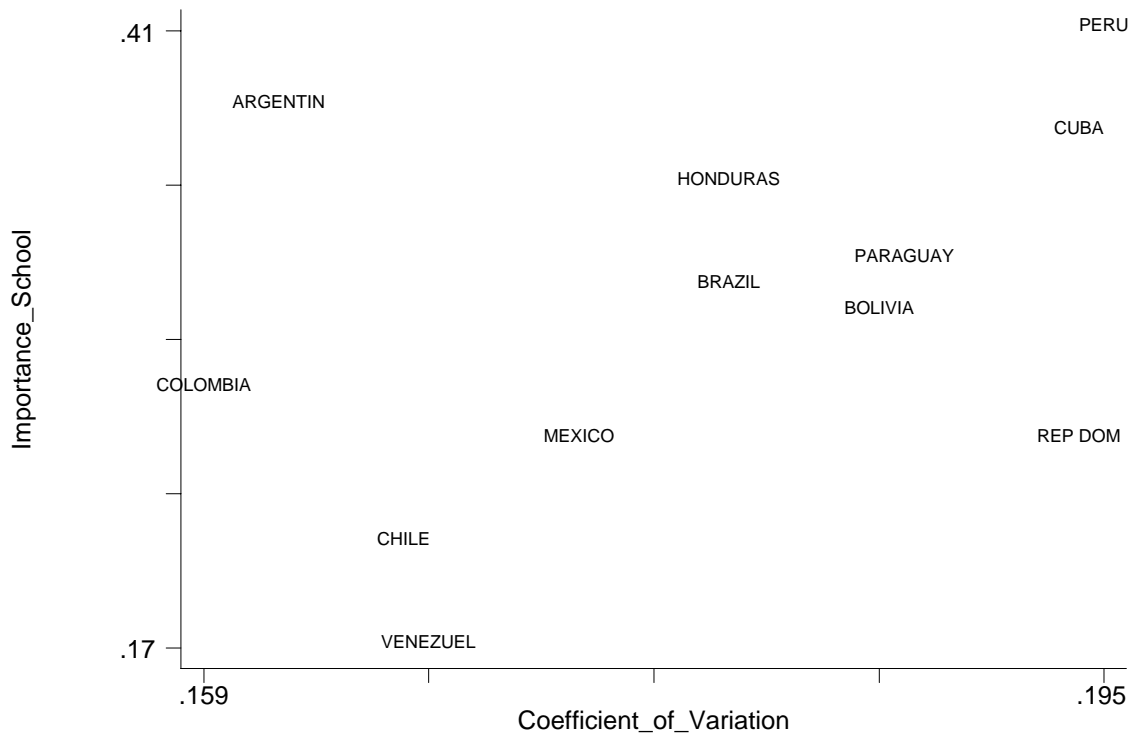
Should schools reduce education quality dispersion?[18]. Hanushek and Luque (2003) assess the impact of schooling inputs compared with socioeconomic characteristics to explain the variance of test scores employing data from TIMSS. Economic theory should suggest that resources are more important in developing countries (given that resources are limited they should have bigger marginal productivity), however they do not find evidence of it in their analysis.[19]

Once we focus on specific school characteristics, Hanushek (1987) presents evidence that school resources are not related (or weakly related) to school performance. In the following table, we observe Hanushek and Luque (2003) results of regression analysis on some school and teacher characteristics. Results show that resources are not strong predictors of student performance.

[18] Luque (2006) classify countries between the ones that promote convergence of results and those that do not.
[19] Heyneman and Loxley (1983) found the opposite result. However, they use data from different sources, and different testing procedures.

Table 2

Distribution of estimated production function parameters across countries and age groups, by sign and statistical significance (10 percent level)

Dependent variable: classroom average TIMSS math score (age 9 population)

	Negative		Positive		Number
	Significant	Not significant	Not significant	Significant	of Countries
Class size	3	5	6	0	14
Teacher with at least a bachelor's degree	0	6	6	2	14
Teacher with special training	1	6	3	0	10
Teacher experience	0	4	8	2	14
Total enrollment in school					

Source: Hanushek and Luque (2003)

3.4   Impact of Teachers

Previous literature finds significant differences in the impact of teacher quality. For example, Hanushek (1992) finds that the difference could account for one grade level per academic year (in poverty schools of Gary, Indiana). In another study, Rivkin, Hanushek and Kain (2005) find that one standard deviation in teacher quality is equal to one-fifth of the average gap in performance between low income and higher income students (lower bound). These differences can not be explained by school and observable teacher characteristics such as: college attendance, schooling, and experience or teacher test results in certification tests. Results come basically from teachers' heterogeneity.

The estimation of teacher effects will allow us to measure the differences in teacher quality; however, they will give little explanation on how the gaps arise. But if these effects are a suitable proxy for teacher quality, this may help principals in the teacher selection process. Are school principals able to identify these differences in teacher quality? Murnane (1975) and Armor et al. (1976) give evidence that school principals are able to estimate these variations in teacher quality. However, it is important to notice that Ballou and Podgursky (1997) raise doubts on the ability of school districts to hire the best available candidates, even suggesting that instructional quality could be improved at little or no cost in terms of higher salaries.

Luque (2007) documents heterogeneity in education in teachers in Peru. He finds that the mean difference in student outcomes within schools between good and bad teachers is 0.3 standard deviations. Furthermore, he finds that in 40 percent of schools those differences are

statistically significant[20] In the same document, he presents estimates of the impact of teacher test scores on student achievement. The results differ strongly if we have school fixed effects or not, reflecting not random sorting of teachers. Once school fixed effect are considered, teacher test scores have no impact on student achievement.

3.5   Impact of family

Family characteristics have an important role explaining variation in education outcomes. Regression results usually find the expected signs: kids from more wealthy, trained, with higher human capital parents tend to perform better. In the next table, we observe the results for TIMSS 1995 data from Hanushek and Luque (2003)

Table 3

Distribution of estimated family background parameters across countries and age groups, by sign and statistical significance (10 percent level)
Dependent variable: classroom average TIMSS math score (age 9 population)

Percent of students	Negative		Positive		Number
	Significant	**Not significant**	**Not significant**	**Significant**	**of Countries**
disadvantaged background	7	6	1	0	13
parents without parent education	5	5	1	1	12
one parent families	3	4	4	2	13
attended preschools	0	2	7	4	13
different first language	7	3	4	0	14
learning problems	6	3	3	1	13
health probles	4	3	3	1	11

Source: Hanushek and Luque (2003)

Note that family effects are also dynamic. In regression with student level value added, socioeconomic characteristics have positive effects, usually smaller than in regression with the level of achievement as dependent variable (see Luque (2003)).

There are other aspects of family intervention, usually not observable to the econometricians. Parents more involved in the education process probably look for better schools for their kids [21]. Luque (2005) finds a positive relationship between travel time to attend school and school performance in Lima.

Another key intervention of parents is when they choose to send their kids to private schools. In Lima, more than 30 per cent send their kids to private schools.

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[20] He performs the analysis with second graders and controls for some observable characteristics that may be affecting student performance and school fixed effects.
[21] In Peru there is free-enrollment in public schools.

Table 4

School Enrollment in Metropolitan Lima

	Primay School			Secondary School		
	Students	Private	Public	Students	Private	Public
San Juan de Lurigancho	102030	38.9%	61.1%	71698	32.6%	67.4%
Comas	56614	34.4%	65.6%	44854	31.0%	69.0%
Ate	57259	36.2%	63.8%	39810	27.1%	72.9%
San Martin de Porres	56309	47.3%	52.7%	37891	35.8%	64.2%
Villa Maria del Triunfo	44110	33.5%	66.5%	30526	22.9%	77.1%
Villa El Salvador	44122	29.5%	70.5%	29815	18.7%	81.3%
Los Olivos	38200	44.9%	55.1%	33971	38.4%	61.6%
San Juan de Miraflores	40674	31.4%	68.6%	30358	21.1%	78.9%
Lima	32254	36.6%	63.4%	31186	31.1%	68.9%
Chorrillos	31026	37.6%	62.4%	22294	29.5%	70.5%
Puente Piedra	30498	36.4%	63.6%	19367	31.4%	68.6%
Carabayllo	25857	34.1%	65.9%	15025	30.3%	69.7%
Santiago de Surco	22741	64.3%	35.7%	15960	59.2%	40.8%
Santa Anita	21383	39.2%	60.8%	15460	33.6%	66.4%
La Victoria	19682	38.6%	61.4%	13775	28.7%	71.3%
Rimac	18802	32.1%	67.9%	14049	26.7%	73.3%
Independencia	19654	26.8%	73.2%	12737	24.4%	75.6%
Lurigancho	18702	29.6%	70.4%	13499	28.0%	72.0%
El Agustino	17699	25.7%	74.3%	10804	28.2%	71.8%
La Molina	14524	61.3%	38.7%	12295	57.2%	42.8%
San Miguel	11340	73.2%	26.8%	11684	59.4%	40.6%
Brena	11058	57.1%	42.9%	10981	52.5%	47.5%
Miraflores	9241	70.7%	29.3%	11343	65.2%	34.8%
Barranco	8275	35.2%	64.8%	8689	26.5%	73.5%
Jesus Maria	5377	73.1%	26.9%	9011	53.5%	46.5%
Lurin	8273	24.8%	75.2%	5831	24.1%	75.9%
Magdalena Vieja	7654	52.1%	47.9%	5157	56.0%	44.0%
San Borja	6695	48.5%	51.5%	5897	47.7%	52.3%
Pachacamac	7827	28.9%	71.1%	4744	21.1%	78.9%
San Isidro	5952	82.5%	17.5%	5875	71.1%	28.9%
San Luis	6847	31.8%	68.2%	4056	44.2%	55.8%
Surquillo	6019	34.3%	65.7%	4362	27.2%	72.8%
Chaclacayo	5194	31.8%	68.2%	5175	16.3%	83.7%
Magdalena del Mar	5095	43.3%	56.7%	4297	53.5%	46.5%
Lince	4456	55.2%	44.8%	4481	47.9%	52.1%
Ancon	4838	32.8%	67.2%	3607	23.5%	76.5%
Other	5430	22.9%	77.1%	3629	16.6%	83.4%
Total	837141	39.1%	60.9%	627822	33.4%	66.6%

Source: Ministerio de Educacion - ESCALE 2006

In Figure 12, we observe the mean results of private versus public schools in Lima, according the education achievement of their parents. Private schools outperform public schools for every parent education level. Furthermore, the difference seems to be constant across groups. Previous research, especially research related to Catholic Schools in the USA (Neal, 1987) has found we have to go further than just comparing means, that selection may play an important role explaining results.

Recent research on labor market outcomes from attending private institutions (Calonico and Nopo, forthcoming) finds a plus from attending private schools, but raises the question about variation of that premium[22]. We will assess if the returns on terms of test scores reflect that result.

Figure 12 Private public school differences in Lima (4th grade sec school –2001)
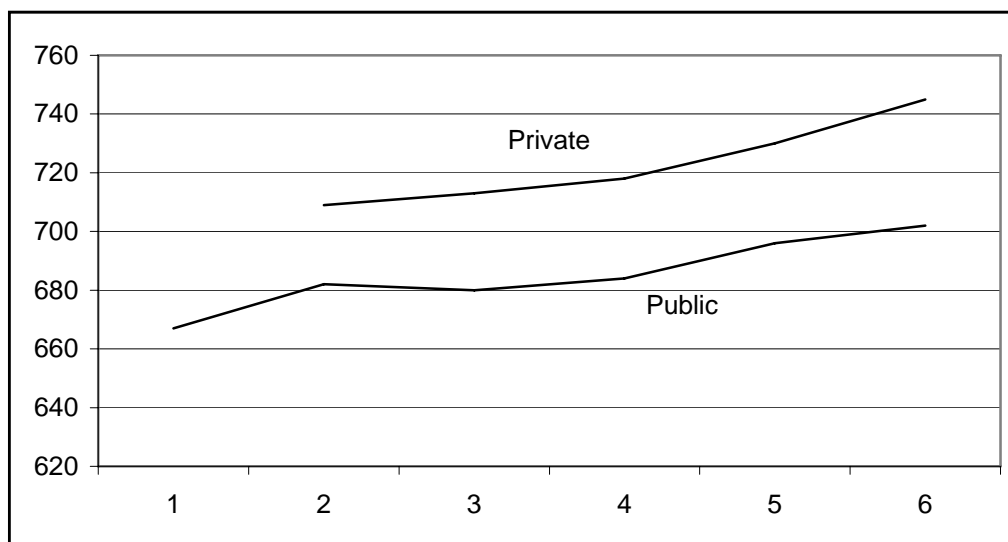
(1) No School (2) Inc.Prim. (3) Com.Prim. (4) Inc.Sec. (5) Com.Sec. (6)Tertiary

3.6   Other previous analysis in Peru

The availability of test data in Peru has motivated a substantial number of research studies. Cueto (forthcoming) presents a summary of previous research.

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[22] They do not control for selection into private schools.

Table 5

Production function estimations: Math Peru

Associated factor:		Number of studies	Statistical significant		Not significant
			+	-	
Student	Gender (boys)	13	13	0	0
	Over aged/grade retention	4	0	4	0
	Working student	4	0	4	0
	Speaks spanish	4	3	0	1
	Mother tongue spanish	4	4	0	0
	Attended pre-school	3	0	0	3
	Live with both parents	5	2	0	3
	Socioeconomic level	10	6	0	4
	Mother's education level	8	4	0	4
	Father's education level	7	3	0	4
Teacher	Mother tongue (native)	2	0	1	1
	Years of experience	6	2	1	3
	Education "Title"	4	1	0	3
School	Class size	5	1	1	3
	School resource index	6	1	0	5

Source: Cueto (2006)

Previous research produces estimates that point out that socioeconomic factors are important, and teacher and school factors not. These results are in line to results found elsewhere. The estimation techniques employed frequently are hierarchical regressions to solve for school fixed effects, and usually results are expressed in term of points in tests, which makes hard to assess the true impact of the estimated parameter.

3.7 Education quality and labor market outcomes

Different researchers have tried to assess the relationship between education quality and labor market outcomes. First studies employed input related characteristics, like teacher pupil ratio, or average spending at the state level (Card and Kruger, 1992) as a proxy of education quality. However, this type of analysis has several problems, and may overstate the relationship of education output with inputs. (see Speakman and Welch, 2006), and in many cases could have been misleading for policy implementation.

More general approaches have assessed the relationship between labor market outcomes and schooling in term of years of schooling. This analysis relies on the assumption that the impact of years of schooling is homogeneous. Traditional Mincer equation estimations relied on this assumption.

In Peru, Rodriguez (1993) and Saavedra and Maruyama (1999) had performed previous analysis estimating returns of education in Peru. Calónico and Nopo (forthcoming) find positive results of education, but they point out the issue of dispersion in results, this dispersion may come

from heterogeneity in quality of education. It is important to notice that Luque and Saavedra (forthcoming) document a list of factors that may affect the labor market evolution in Peru. They present evidence that the expected capital-skill complementary may not be present in several economic sectors in Peru.

Recently, as data on cognitive skills is becoming available, some direct results from the relationship between wages and cognitive skills are appearing (Hanushek and Zhang, 2006). Our research strategy will link outcomes and cognitive skills[23].

3.8   Education quality and non market outcomes

Education and health are the two most important sources of human capital. There is a interaction between them. Nevertheless, research has tries to find casual relationship from education to health outcomes. Researchers have worked on adult health issues, including fertility; and the child health. They find a positive relationship. However, until recently, they have not included quality measures of education in their analysis (Hanushek, Jamison and Jamison, 2006).

3.9   Summary

In the last fifteen years, there has been an extraordinary effort to measure education quality across many countries. Previously, countries and regions did not have a clear assessment of where they stand on education outcomes. Researchers interested in human capital have tried to proxy for it with measures of years of schooling or resources devoted to schools. The research on education employing measures of quality tells us that:

- Inputs on education process, which tend to be the standard policy interventions, have little effect explaining variations in education outcomes. However, there is significant variance coming from teachers and schools.
- Education quality has big effects on growth, earning levels, health outcomes, even after controlling for years of schooling. This clearly implies that returns on terms of quality are heterogeneous within and between countries.

In Peru, the testing effort has produced tests since 1996. Researchers have employed them to assess the impact of traditional inputs on the education process, finding results similar to international evidence. However, this research has put little attention to issues relating Tibout Sorting or the cumulative characteristics of the education process. At the same time, test data suggest high levels of education inequality in Peru, inequality that seems to be bigger than the suggested by income inequality. That extra dispersion must be coming from variance in results originating similar schools. Private schooling has been steadily rising in Lima in the last years. It clearly represents an alternative to public schooling, and general public from wealthy and not wealthy neighborhoods are taking it. However, there is no evaluation in terms of school quality.

Policy implications are clear: control for heterogeneity of schools and teachers and focus on quality as the result of the education process, not only from policy makers, but all the agents involved in the education process.

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[23] The link will be at an aggregate level.

4. Dissemination strategy

The final report will be presented in a Conference with the attendance of:

- Members of Congress (social development and budget committees)

- Authorities and officials of the Ministry of Education, Health. Humans Development and Finance

- Officials of Social Programs such as Crecer and Juntos

- Authorities and officials of Regional and Local Governments (selected)

- Universities and research institutions

- Representatives of leading NGO's dealing with social development

- Members of parents associations and youth organizations

Regarding the Regional Governments, the newly constituted Assembly of Regional Presindets has identified 5 top priorities, including education. The results of the study will be presented to the Technical Secretariat so as to promote the adoption by the Regional Governments of specific education quality enhancement strategies, as by December 2007 the transference of education competencies and functions will have been completed.

Additionally, communicable summaries (policy briefs) containing the main results and policy implications will be provided to the media (newspapers, radio and TV) for dissemination to the public opinion.

Finally, the approved report will be disseminated through Abt Associates web pages and other institutional dissemination materials.

5. Research team

Recommended position: Project coordinator

Name: : Javier Luque Gianella PhD.

Title: : Economist, PhD in Economics

Dr. Javier Luque is an economist with extensive experience both in academic research and policy design. He has done research on education economics, labor markets, growth determinants, among other applied economics fields on Peru and at the international level. He has strong command of up-to-date econometric techniques. Dr. Luque has held senior positions in the public sector. He has participated in international conferences on the field of economics of education, and has an extensive research network on the field. He was among the first international researchers to employ data coming from the micro data from international tests, realizing the big opportunity of having similar data with similar collection procedures for the correct interpretation of results and the analysis between countries. He holds teaching positions at the Catholic University of Peru and the Universidad Nacional de San Marcos.

Dr Luque is convinced that education is a key for economic growth and to reduce inequality. And that good policy has to be based on solid economic research.

Recommended position: Associated researcher

Name: : Flormarina Guardia Aguirre

Title: : Sociologist

Flormarina Guardia Aguirre has a Licenciature and M.A (candidate) in Sociology. She has twenty years of experience in technical assistance and project management in the areas of education and health. She has been working in the Ministry of Education in the last years in the Area of Decentralization, Multicultural Education, and Educational Management, in particular in the design of quantitative and qualitative research, and elaboration of educational materials in a context of cultural diversity, poverty, and social exclusion. She also has experience in developing, managing, and implementing maternal health programs in the Ministry of Health. She gave technical assistance for the implementation of national programs related to quality of public health centers. Strong communication skills and successful networking.

Recommended position: Research Assistant

Name: : José Carlos Saavedra

Title: : Economist

Jose Carlos Saavedra is an economist from the Catholic University of Peru. He has broad experience in data management, both in design of data bases and analysis. He has an extensive knowledge of the information available in diverse micro data sets available in Peru, and possible ways to merge information from them. He has done research in the economic growth, labor markets, among other topics. He has solid economic fundamentals, and strong command of statistical/econometric packages.

Name:	Javier Luque
Profession:	Economist
Languages:	Spanish and English

Key Qualifications

Experience in quantitative and public policies analysis. Solid economic fundamentals. Strong communication skills and successful networking.

Education

PhD, University of Rochester (NY-USA), Economics
MSc, University of Rochester (NY-USA), Economics
B.A., Pontificia Universidad Catolica Del Peru (Lima, Peru), Economics.

Relevant Professional Experience

Professional Experience

2006— present	**Senior Advisor. Ministry of Economics and Finance.** Design of economic policies in the areas of education, reform of the state, labor, and tax policy.
2005-2006	**Manager. Real Sector Policies Department. Central Reserve Bank of Peru.** Evaluation of economic policies related to economic growth and competition. Special reports on determinants of economics productivity, free trade agreements, and labor market reforms. Research on Economics of Education.
2001-2005	**Senior Analyst, Economic Studies Division. Central Reserve Bank of Peru.** Research with strong policy implications. Among them, the Framework for the Inflation Targeting Implementation, Impacts of Decentralization, Evaluation of the Peru-USA Free Trade Agreement, Evaluation of possible impacts of changes to the Private Pension Funds managements. Research on Economics of Education.
2000-2001	**Visiting Fellow, Center For Research on Education Outcomes. Hoover Institution. Stanford University.** Evaluation of the impact of the Teach for America program in Houston – Texas.
1999 (summer)	**Summer Assistant – The World Bank.** Development of econometric techniques to evaluate the EDUCO program in El Salvador.
1993-1999	**Analyst, Economic Studies Division, Central Reserve Bank of Peru.** Member of the team in charge of economic forecast and economic publications.
2001-present	**Professor, Catholic University of Peru.** At the graduate and undergraduate levels. Courses in Economic Growth, Microeconomics , Political Economy.
2001-present	**Professor, Universidad Nacional Mayor de San Marcos.** At the Doctoral level. Courses in Microeconomics , Political Economy, Macroeconomics.

Computer Experience

Word, Excel, Powerpoint, SPSS, Stata, E-views, MATLAB, GAMS.

Papers, Publications, Presentations

Luque, J. (2003). Essays on Economics of Education, Doctoral Thesis. University of Rochester, Rochester, NY.

Luque, J (2004). Assessing the Impact of Bilingual Education. Mimeo Banco Central de Reserva del Peru.

Luque, J (2005). Choice and Accountability in Education: The Case of Peruvian primary schools. Mimeo. Banco Central de Reserva del Peru.

Luque, J (2006). Institutions in Education. Mimeo. Banco Central de Reserva del Peru. Available at: http://www.u-bourgogne.fr/colloque-iredu/posterscom/communications/Luque.pdf

Luque, J (2007). Evaluation of Teachers: The Case of Peru. Mimeo. Ministerio de Economía y Finanzas.

Hanushek, E.A. and J.Luque (2003). "Efficiency and equity in schools around the world." Economics of Education Review 22, no 5 (August): 481-502

Luque, Javier and Jose Carlos Saavedra. *Rotación laboral, remuneraciones e informalidad en Lima Metropolitana. Una primera aproximación.* II Conferencia de Economía Laboral. Ministerio de Trabajo y Promoción del Empleo. Lima, 2007. Forthcoming.

Hanushek, E.A and J. Luque (2000). *Smaller Classes, Lower Salaries? The Effects of Class Size on Teacher Labor Markets,* in Sabrina W.M. Laine and James G. Ward (ed.), Using What We Know: A Review of the Research on Implementing Class-Size Reduction Initiatives for State and Local Policymakers (Oak Brook, Ill.: North Central Regional Educational Laboratory, 2000), pp. 35-51

Fletcher, S. J. Luque and M.Raymond (2001). Evaluation of Teach For America Program (CREDO, Hoover Institution, July 2001)

Presentations

Americas Competitiveness Forum (organized by the USTrade Department) – Atlanta, GA, 2007
Contribution of Education to Economics (organized by World Bank and the University of Bourgogne) – Dijon, France, June 2006 (paper accepted for presentation)
the GDNet), Praga, Check Republic. 2005
CEMLA- Lima, Perú (2005)
Lacea Annual Meeting – San Jose de Costa Rica, Costa Rica (2004)
Lacea Annual Meeting – Puebla, México (2003)
Latin American Econometric Society- Panama (2003)
Lacea – PEG-NIP joint conference- Lima (2001)
International Conference on Skills Measurement and Economic Analysis – University of Kent at Canterburry, England, (2000)

Name:	Flormarina Guardia Aguirre
Profession:	Sociology
Languages:	Spanish and English

Key Qualifications _____

Flormarina Guardia Aguirre has a Licenciature and M.A (candidate) in Sociology. She has twenty years of experience in technical assistance and project management in the areas of education and health. She has been working in the Ministry of Education   in   the   last   years   in   the   Area   of Decentralization, Multicultural Education, and Educational Management, in particular in the design of quantitative and qualitative research, and elaboration of educational materials in a context of cultural diversity, poverty, and social exclusion. She also has experience in developing, managing, and implementing maternal health programs in the Ministry of Health. She gave technical assistance for the implementation of national programs related to quality of public health centers. Strong communication skills and successful networking.

Education _____

M.A. (candidate), Pontificia Universidad Catolica del Peru (Lima, Peru), Sociology.
Licenciature. Universidad Nacional Mayor San Marcos (Lima, Peru), Sociology.

Relevant Professional Experience _____

2002 – present	**Ministry of Education – Oficina de Apoyo a la Administración de la Educacion, Consultant.** Responsible for the coordination, development, and implementation of public policies linked to the decentralization of the educational system. June 2005- present
	Ministry of Education – Oficina de Apoyo a la Administración de la Educacion, Consultant. Proyecto de Educación en Áreas Rurales –PEAR –MED Responsible for the coordination and development of the Institutional Strengthening Plan of the Ministry of Education. January 2005- May 2005.
	Ministry of Education, Advisor to the Vice-Minister. Responsible for the coordination and development of the decentralization of the educational system. Member of the Secretaria Técnica de la Comisión de Transferencia Sectorial del Ministerio de Educación in the Consejo Nacional de Descentralización-CND May-December 2004
	Ministry of Education, Chief of the Area of Gestión, Participación Social and Interculturalidad, Dirección Nacional de Educación Bilingüe Intercultural-DINEBI del MED. May 2001-April 2004
February- March 2006	**Konrad Adenauer Foundation and Centro de Estudios- Proyecto de Políticas Económicas Sociales-Brasil,** Responsible of the following study "Descentralización de la Educación Pública en el Perú"
May- June 2005	**OREALC-UNESCO, Chile, Consultant.** Responsible of the following study "Politicas publicas de atención a la diversidad cultural: Balance de la Educación Bilingüe Intercultural en el Perú"
2000 – 2001	**Project Component Coordinator. Project Vigía,** under USAID contract to provide technical assistance to the Ministry of Health of Peru. Responsible for the coordination and development of the following studies: "Diseño de estrategias para el fortalecimiento de las capacidades del personal de los servicios de salud" and "Fortalecimiento de los procesos mejora de la calidad en la atención de los servicios de salud". Responsible for the design, technical assistance and development of qualitative research. Project developed in 8 states in Peru.
1996 – 1999	**Project Component Coordinator. Project 2000 — Pathfinder International-Development, CARE under USAID contract** to provide technical assistance to the Ministry of Health of Peru. Responsible for the coordination and development of: "Estrategias para el mejoramiento continúo de calidad en la atención en los servicios de salud materno infantil: en la comunicación interpersonal y satisfacción del usuario(a) bajo un enfoque intercultural". Responsible for the evaluation of qualitative research. Project developed in 12 states in Peru.
1995	**Ministerio de Salud. Dirección de Salud Lima IV. Lima Este. Advisor to provide technical asístanse.** Responsible for the coordination and development of: "Investigaciones

sociales y cualitivas para la mejora de la calidad de la atención en los servicios de salud." Responsible for the development of a proposal for the Institutional Strengthening Plan of the Ministry of Health.

1994	**Project Salud y Nutrición Básica- Ministerio de Salud y BIRF.** Responsible for the coordination and development of the study: "Rol de las ONGs y Modelos de Salud Desarrollados" under the Centro Nacional de Estudios y Asesoría Popular- CENEAP
1992- 1993	**Project Private Agencies Collaborating Together-PACT-PERU** (Proyecto de apoyo a las ONGs-USAID-Perú) Responsible for the coordination and development of the study: "Diagnóstico Situacional de las ONGs en el Perú" with emphasis in health, education, and agriculture.
1986-1994	Centro Nacional de Estudios y Asesoría Popular, CENEAP. **Investigadora principal** Responsible for the coordination and development of the following projects: "Descentralización y Potencialidades de Desarrollo. "Promoción y Capacitación para la autogestión vecinal" and "Modalidades de gestión, promoción para la Autogestión Vecinal"

Computer Experience _____

Word, Excel, PowerPoint, SPSS, ATLAS.T.

Papers, Publications _____

Guardia, F. and M Azcueta (2006) *"Descentralización de la Educación Pública en el Perú. En Descentralización de la Educación Pública en América Latin.* Fernado Filgueira y Michael Fritsche (ORGS) Konrad Adenauer Stiftung.Rio de Janeado-Brasil.

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Calidad en los servicios de salud. Segundo Taller Binacional Perú –Ecuador Integrando la Fronteras. Tumbes. 2000

Name: Jose Carlos Saavedra
Profession: Economist
Languages: Spanish and English

Key Qualifications

Experience in quantitative and public policies analysis. Record of reliability, responsibility and adaptability. Strong communication skills and successful networking.

Education

B.A., Pontificia Universidad Catolica Del Peru (Lima, Peru), Economics.

Relevant Professional Experience

Professional Experience

2006— present	Specialist in Economic Growth Policies. Department of Economic Policies. Central Reserve Bank of Peru. Studies in the following areas: competitiveness, trade policies, labor market policies, productivity, economic growth policies, regulation. Data bases analysis (*Encuesta Nacional de Hogares, Endes, Encuesta Permanente de Empleo, Base de datos de aduanas, Encuesta Económica Anual).*
2003-2006	Senior Analyst. APOYO Consultoria. Responsible of macroeconomic, econometric and data bases analysis (*Encuesta Nacional de Hogares, Endes, Encuesta Permanente de Empleo*). Publication of periodic reports and studies in the following areas: macroeconomic forecasts, business environment, regulation, economic impact evaluation, public policies.

Computer Experience

Word, Excel, Powerpoint, SPSS, Stata, E-views, GAMS.

Papers, Publications, Presentations

Luque, Javier and Jose Carlos Saavedra. *Rotación laboral, remuneraciones e informalidad en Lima Metropolitana. Una primera aproximación.* II Conferencia de Economía Laboral. Ministerio de Trabajo y Promoción del Empleo. Lima, 2007. Forthcoming.

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