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Strengthening Institutions to Improve Public Expenditure Accountability

Intercultural Bilingual Education Program for Better Performance in Schools: The case of the Indigenous Children of the Amazon

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Contents

Introduction

This study describes the design and the ex-ante evaluation of an Intercultural Bilingual Education[1] Program in the Amazon Region in Peru. The target beneficiaries are the non-Spanish-speaking children from three Amazon ethnic communities: the Awarunas, Ashaninkas and Shipibos-Conibos. They are a small minority; the poorest Peruvians with the lowest level of performance in reading comprehension and basic mathematics, and the lowest level of enrollment, schooling and transition rates.

The program looks to improving the quality of service delivery for this community with bilingual curricula which would trigger the need for appropriate pedagogical bilingual teaching methods in classrooms, with ad hoc instructional materials and teachers with the required expertise and the capability to manage a bilingual setting and culture.[2] At the end, the expected results from this quality improvement exercise are: an increase in enrollment, higher schooling (average of number grades reached), and reduction in dropout and repetition rates. The outcome of such bilingual programs, based on some international experiences points to an improvement in learning and performance levels in children. However, we are unable to work that variable.

The implementation of this policy requires a set of inputs which, if incorporated, will have the desired outcomes at the end. Here, we are targeting the most vulnerable population in the area of education: children who are almost invisible in the priority plan of the State in the past government policies. The issue is very controversial, because while on the one hand Peru was short of funds for education in the past – and serving a dispersed population like in the Amazon is more expensive than working with the urban population – on the other hand, the State is not complying with its responsibility of protecting all its constituents in accordance with the human rights approach. At the same time, the argument of costs is not entirely correct, as previous research has proved that bilingual education for children who do not speak the official language, if properly implemented, has greater potential to improve their learning experience both in terms of speed and quality, and if connected to poverty reduction, it is the right exit route from the state of poverty.

[1] "Mother tongue-based bilingual programs use the learner's first language, known as the L1, to teach basic reading and writing skills along with academic content. The second or foreign language, known as the L2, should be taught systematically so that learners can gradually transfer skills from the familiar language to the unfamiliar one"….Bilingual education considers that the "Use of a familiar language to teach beginning literacy facilitates an understanding of sound-symbol or meaning-symbol correspondence. Learning to read is most efficient when students know the language and can employ psycholinguistic guessing strategies; likewise, students can communicate through writing as soon as they understand the rules of the orthographic (or other written) system of their language. In contrast, submersion programs may succeed in teaching students to decode words in the L2, but it can take years before they discover meaning in what they are "reading" (Benson 2004:2-3).

[2] Quality defined here as the opportunity to have trained teachers and ad hoc inputs or instructional materials that will facilitate the teaching and the learning.

The paper is organized into five sections. To begin the analysis, Section 1 identifies the beneficiaries and describes their educational needs. Section 2 reviews extensive national and international literature to support the IBE program as the one that should ideally be implemented, based on its expected outcomes; this is important because it will help to set the assumptions and expectations with regard to the effectiveness of the program. Section 3 presents the policy objective, description of the program and alternatives with scenarios of the proposed program. Section 4 describes the methodology to be used in the analysis to test the positive returns of the proposed IBE program. Finally, Section 5 elaborates upon the analysis, comparing the alternatives with two techniques: cost effectiveness and private benefits. Section 6 finalizes the report with some ideas to engage the results in the current policy discussions in the Ministry, the rest of the public sector and the academia.

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1. Background

The policy selection has taken into account the current environment in the country's political agenda. The new administration assumed office in August 2011. The winner party *Gana Peru's* approach to improving social services and fighting poverty was through specific targeting and by increasing public funds for social protection network programs, education and health. The campaign bore the "Inclusive Promise" signature of the future government.

In education, specifically, the new Ministry under Patricia Salas is trying to divert the public interest from big urban schools and one-merit high schools *(Colegios emblematicos and Colegio Mayor*), to rural education and bilingual programs. This new approach is very significant, as the team proved – in the PBA and BIA analysis (Alvarado and Muñiz 2010) – that education has some issues to solve, especially with regard to equity.

Moreover, the Minister – in her speech to the National Agreement Forum – has very clearly expressed her interest in supporting education for the minorities, like the Amazon children (Salas, 2011). This Forum, known as *Acuerdo Nacional* is made up of a good number of political parties and unions. Her message called out: "Make reality, equity with quality, with no inclusion there is no quality" (Salas, 2011:6). The main concern presented to the Forum was the widening gap in the students' learning and performance in the rural and urban settings. She presented the results for the period 2007 to 2010 in reading and math; in the first case, the gap increased from 15.4 to 27.9 percent when comparing urban and rural students. Besides, the presentation highlighted the fact that of the fourth graders of Aimaras studying in their mother tongue, only 1 percent reached the desired learning level; in the case of Awajun only 4 percent reached this level; for Quechua from Cusco the figure was 6.9 percent and for Shipibo-Conibo only 4.8 percent. These latter groups are part of our beneficiaries.

Table 1: Percentage of children and youth finishing basic education with normative age. (Net rate of graduation.)

	Primary	Secondary
	2010	**2010**
PERU	77.9	60.8
Urban	86.3	69.8
Rural	60.9	37.9
Spanish (Castellano)	81.2	63.9
Indigenous mother tongue	53.3	37.7
Source: Ministry of Education (MED)		

Another interesting fact explained by the Minister, depicted in Table 1, was the comparative completion rates of Spanish-speaking versus indigenous non-Spanish-speaking kids. Finally, out of seven prioritized policies by the current government, one gives due consideration to "Respect for the Culture in the Learning Process: Quechuas, Aimaras and Amazon girls and boys learn in their own language and in Spanish" (Salas 2011:16).

To change the civil society vision turned out to be more difficult than political intelligence expected. Civil society and families (relatively more educated) were expecting greater investments in urban school *Colegios Emblematicos* to improve quality. However, even though improving quality in education is one of the priorities, there is a gap between the urban and rural kids, and a still wider gap when comparing urban and rural non-Spanish-speaking students, especially the indigenous bilingual children from the Amazon. This gap is measured not only by student performance in standardized tests (Table 2), repetition and dropout rates, and low transition to high school, but also on the basis of enrollment – especially in high school.

Urban, rural and Amazon children

The following statistics bring into focus the differences between urban and rural children, and provide additional information on the beneficiary population. Dropout and repetition rates among rural children more than double those of their urban peers (Tables 3 and 4). There are no significant differences between the genders.

Table 2: Level performance results in reading comprehension, 2008-2010

2nd graders

Resident areas	Below Level 1 Not reaching minimum performance standard	Level 1 Minimum (basic) standard	Level 2 Adequate standard
Urban 2008	21.0	62	17
Urban 2009	15.0	56.1	28.9
Urban 2010	14.3	50.2	35.5
Rural 2008	48.0	45.0	7.0
Rural 2009	39.9	48.5	11.6
Rural 2010	53.1	39.3	7.6
Source: MED, Standardized tests ECE, 2008, 2009, 2010,			

Table 3: Dropouts as percentage of final registration, 2009

	Total	First grade	Second grade	Third grade	Fourth grade	Fifth grade	Sixth grade
Urban	**3.7**	**5.9**	**4.3**	**3.5**	**3.2**	**3.1**	**2.6**
Girls	3.5	5.5	4	3.3	3	2.9	2.4
Boys	3.9	6.2	4.5	3.6	3.4	3.4	2.7
Rural	**7**	**13.4**	**6.2**	**5.7**	**5.6**	**6**	**5.3**
Girls	7	13	6.1	5.6	5.5	6.1	5.4
Boys	7.1	13.8	6.4	5.7	5.6	5.9	5.1

Technical notes: Proportion of students not attending school after registration.
Source: National Student Census 2009

Table 4: Repetition as percentage of overall registration in each grade or level, 2009

Area and gender	Total	First grade	Second grade	Third grade	Fourth grade	Fifth grade	Sixth grade
	2009	2009	2009	2009	2009	2009	2009
Urban	**7.3**	**1.5**	**7.5**	**5.8**	**4.7**	**4.0**	**2.3**
Girls	7.1	1.5	7.0	5.4	4.3	3.6	2.1
Boys	7.6	1.6	7.9	6.2	5.0	4.4	2.5
Rural	**12.8**	**7.7**	**20.8**	**17.4**	**12.1**	**10.4**	**5.6**
Girls	12.6	7.4	20.5	17.2	12.0	10.3	5.6
Boys	13.0	8.1	21.1	17.5	12.1	10.5	5.7

Technical note: Proportion of total registrations in a grade/level that denotes repetition (at least for a second term) at that grade or level.
Source: National Student Census, 2009

Luis Crouch found that the relation between performance (in a standardized test for fourth graders), and the economic quintile in the poorest deciles, "while steep, is also more ambiguous and less predictable.…performance decreases with wealth [but in the poor deciles] …there is a very large variance in results [among the poor], whereas among the wealthier there appears to be less variance in results." One of the explanations given was that the management in schools in poor areas is less effective, or there is absence of reliable pedagogical delivery models for the poor and for those with a linguistic disadvantage (Crouch 2007:44-45).

The People's Ombudsmen Office (*Defensoría*) prepared an extensive report of 500 pages, taking the human rights approach to evaluating the national and sub-national government policies and actions covering bilingual education. The report concluded that the public sector did not have a clear policy towards bilingual education. One of the main problems, identified by the *Defensoría* report and also by other entities, including the same Ministry, was the lack of information from the demand side. The National Census registered the population and the mother tongue, but there was no data to show which schools actually deliver bilingual education because the only source

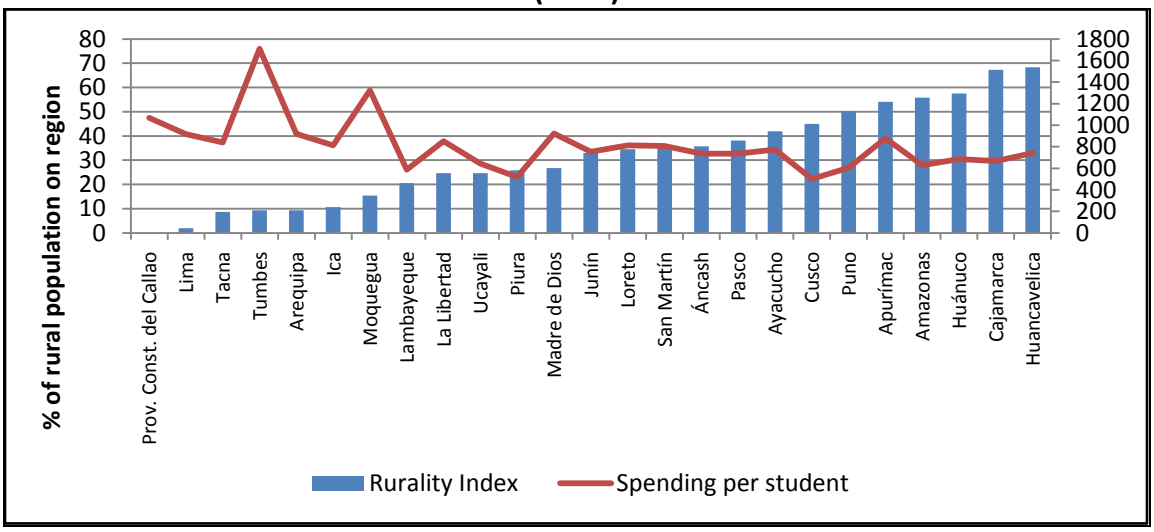
available was the school principal's affidavit, and it is his/her opinion about the nature of the service that marks the statistics. Secondly, there is no official bilingual curriculum, nor sufficient bilingual instructional materials or texts, especially for the Amazon region. Moreover, there are not enough bilingual teachers, or Spanish teachers who could teach Spanish as a second language (Defensoria del Pueblo 2011).

The problem gets more complex given the number of native languages (*lenguas originarias*) in the region, besides the official Spanish language. Table 5 provides the list of languages that have been "normalized", meaning that the alphabet has been approved and norms created for writing and the phonetics, thus facilitating the production of instructional materials for reading and teaching the children to write. In this first set of languages, Quechua and Aymara (from the Sierra-Mountains), besides Spanish, are relatively more developed in terms of the availability of bilingual teachers and instructional materials and have fewer problems than the Amazon language. As you will observe in the table, the alphabet approvals – from Ashaninca to Yine – were enacted only after 2006, while in the case of Quechua and Aymara the same were enacted in 1985. That explains why it is so important to cover this Amazon population which is almost not served at all.

Table 5. Native language with approved alphabet

Quechua language Res Ministerial No 1218 – 85 – ED. (November 18, 1985)
A**ymara** language Resolución Ministerial No 1218 – 85 – ED. (November 18, 1985)
Asháninca language (November 4, 2008):
Awajún language (November 6, 2008)
Ese eja language (September 8, 2006)
Harakbut language (September 8, 2006)
Kakataibo language (November 6, 2009)
Kandozi-chapra language (November 6, 2009)
Matsigenka language (November 6, 2009)
Shipibo - Konibo language (September 13, 2007)
Yine language (August 12, 2008)

Figure 1: Distribution of resources in basic education and in relation to rurality index (soles)



Elaborated by authors (Alvarado and Muñiz 2010)
Source: MEF, SIAF ; INEI, National Census.

As found in the Public Budget Analysis and the Benefit Incidence Analysis (Alvarado and Muñiz 2010), the distribution of resources in the territories and levels of education is very inequitable, and so are the performance outcomes. The budget has been captured by the regions that can negotiate greater number of teacher vacancies, and not by the actual input requirements to increase coverage (attendance) and reduce dropout rates. Figure 1 shows how funds are distributed (per capita per student) and correlated with rurality. If rurality has higher costs, how can this reverse correlation be explained? The latter is a sign of how important this issue was for the previous governments. President Humala's administration has put together a task force with new staff from the Ministry of Education: consultants and donors to evaluate the need, demand and actual supply for intercultural bilingual education. This policy simulation exercise explores the possible measures to expand the supply to bridge the existing gap with the demand and need in the Amazon regions; additionally, it provides a closer look at the amount of resources and the financial flow essential to pursuing policy implementation. The program will consider as beneficiaries *etnias,* with at least 10,000 or more children per language enrolled in primary school, and the language spoken has an approved alphabet which allows the development of instructional materials. The selected ethnic population groups include: Aguarunas (Awajun), Ashaninka and Shipibo/Conibo, totaling 39,037 children in primary, and 10,146 in secondary school. Map- Figure 2 depicts the areas where the beneficiary communities are concentrated. One of the limitations of the paper is that it takes into account the Amazon bilingual population as a block, but since the costs and benefits are the same, it will be useful for forecasting fiscal resources and benefits for the populations. Table 6 shows the number of non-Spanish-speaking children enrolled in the education system. As one can observe, there is a dramatic reduction in enrollment (high dropouts) of Amazon children, mainly at the time of transition to secondary school.

Table 6. Number of enrolled students according to spoken Amazon native tongue

Nº	LENGUA MATERNA	TOTAL GENERAL	EDUCACIÓN PRIMARIA							EDUCACIÓN SECUNDARIA					
			Total	1º	2º	3º	4º	5º	6º	Total	1º	2º	3º	4º	5º
TOTAL GENERAL (PERU)		**672,502**	**427,159**	**65,878**	**79,586**	**77,333**	**71,978**	**69,327**	**63,057**	**245,343**	**60,774**	**55,769**	**49,935**	**42,593**	**36,272**
ANDEAN															
1	QUECHUA	530,515	**332,082**	50,342	59,821	59,481	56,389	55,239	50,810	**198,433**	49,965	45,657	40,330	34,087	28,394
2	AIMARA	59,025	**28,070**	4,266	4,525	4,671	4,734	4,963	4,911	**30,955**	6,187	6,417	6,498	6,027	5,826
AMAZON															
3	AGUARUNA (AWAJUN)	23,554	**19,487**	3,413	4,646	3,924	3,007	2,520	1,977	**4,067**	1,270	916	772	607	502
4	ASHANINKA	14,916	**12,153**	2,017	2,777	2,385	1,964	1,650	1,360	**2,763**	762	661	528	433	379
5	SHIPIBO – CONIBO	10,713	**7,397**	1,177	1,515	1,358	1,346	1,130	871	**3,316**	862	690	690	591	483
6	MACHIGUENGA	1,954	**1,652**	285	393	308	296	194	176	**302**	67	80	60	57	38
7	CANDOSHI – SHAPRA	1,788	**1,787**	327	423	374	272	223	168	**1**	1	0	0	0	0
8	YINE	1,589	**1,156**	153	228	204	224	174	173	**433**	151	98	76	69	39
a) Studied cluster-Amazon language with alphabet 3 to 8		**54, 514**	**43,632**	7,372	9,982	8,553	7,109	5,891	4,725	**10,882**	3,113	2,445	2,126	1,757	1,441
b) % of a)/total bilingual students from Amazon cluster			66.62%	66.73%	66.81%	66.43%	67.05%	66.28%	66.17%	70.71%	69.33%	68.51%	71.01%	73.82%	73.67%
Other Amazon-language-speaking kids (no alphabet approved)			21864	3675	4959	4323	3494	2997	2416	4507	1377	1124	868	623	515

Source: Vivanco 2010a

Figure 2: Geographical distribution of indigenous languages, Peru.

Dotted areas show concentration of program beneficiaries.

2. Literature Review

Diagnoses

Gustavo Yamada and Francisco Castro (2011) analyzed the inequities among the different *etnias* in Peru. Even though enrollment was almost universal at the beginning of the primary level, gaps still remained. They found inequity and lack of opportunities for native and African descendants, 25 percent drop out from primary level and only 60 percent graduates enroll in secondary school; only 40 percent graduate from secondary, and less than 20 percent go for tertiary education. Among the minorities, they found that the *Amazon ethnics* were the most discriminated against group.

Impact evaluations of bilingual education programs vis a vis student performance are limited. According to Dewees, who prepared an annotated bibliography on the issue in 2011, some evaluations concluded that the interventions produced positive economic returns. However, the bilingual teaching method in classrooms was not well documented. On the other hand, those who documented the pedagogical model in the classroom have not done any impact evaluation.

Similarly, the Cost Benefit Analysis of bilingual education is limited. One rough estimation of the benefits is derived from the relation between years of education and the consequential earnings. It is assumed that closing the gap in terms of inequities at the nursery and primary levels, and offering the bilingual children the same conditions as those offered to Spanish-speaking children, with the right bilingual pedagogical methodology – like incrementalism – repetition and dropout rates among non-Spanish-speaking children would reduce, and there would be an increase in their transition to secondary and tertiary education. At the end of the road, the indigenous non-Spanish-speaking population would have better chances of finding a way out of poverty. Dewees' (2011) results indicate that the period of education for a person with non-Spanish mother language in Peru increases from 9.5 to 10.8 years. Hence, the IBE program would lead to an increase in income for a cohort of more than 100 million soles (present value PV) in 10 years and more than 800 million soles (PV) if counted for 10 consecutive cohorts of individuals. In other words, these are the benefits lost in terms of human capital if the program is not implemented. The main assumption is that the bilingual pedagogical model is applied correctly at the primary level, and that it fosters conditions similar to those of the Spanish-speaking children (Dewees, 2011).

Evidence from international cases

Due to the inadequacy of data related to bilingual education, the author has been unable to construct a model to evaluate the effectiveness of bilingual education alternatives in Peru. One reason for this is the lack of documented experiences in the country, from which lessons could be extracted; in addition there is no clarity with regard to the actual bilingual method applied in the classroom, and third, the poor

quality of the data collected.[3] To construct the Peruvian program, the author has reviewed international evidence supporting bilingual or multilingual education and its effects on intermediate indicators, besides some impact evaluation results of applying such a policy. The latter served as a guide to structure the program and its components and to set the goals and targets.

It is important to note Jay Greene's comments, after a meta-analysis, on the availability of reliable studies on the effectiveness of bilingual education. He concluded that children with limited proficiency in English, who are taught using at least one of their native languages perform significantly better in standardized tests than children who are taught only in English. In other words, an unbiased reading of the scholarly research suggests that bilingual education helps children who are learning English. An excerpt from his conclusion is worth citing:

> *"…the vast majority of evaluation of bilingual programs are so methodological[ly] flawed in their design that their results offer more noise than signal…[however]…Despite the relative small number of studies, the strength and consistency of these results, especially from highest quality randomized experiments increase confidence in the conclusion that bilingual program are effective at increasing standardized test scores measured in English."* (Greene 1998)

Goday, R. et al., studying hunters, gatherers, and farmers in the Bolivian Amazon (Tsimane) estimated the returns to language skills while controlling for schooling, math, writing skills, and other confounders and explored the paths through which language skills might affect earnings. They found that fluent speakers of Spanish and the local language earned 36.9–46.9 percent more than the speakers of the local language alone. While moderate fluency in Spanish bore no strong association with earnings, Spanish-Tsimane' bilingualism did, partly because bilingualism bore a positive association with credit access, use of modern production technologies, and labor productivity.

The 2010 report of Kom Experimental Mother Tongue Education Project in Cameroon provided positive findings after introducing the native Kom language as the medium of instruction. The experiment had 12 standard schools with English as an instructional medium and 12 used as controlled group. In the third year of the implementation of the program, Walker and Trammell (2010), reported:

> *"The fact that the children in the experimental schools still scored more than twice as high as those in the Standard program is strongly suggestive of the learning advantage of being taught in the first language…"*

The following table summarizes the findings in reading comprehension.

[3] Definition of 'bilingual school" in the school census was blurred.

Table 7: Progress towards becoming readers in Class 3 in Kom Experimental Program in Cambodia.

	Non readers (zero comprehension)	Possibly incipient readers (greater than zero but less than 50 percent)	Passable to good readers (50 percent or higher comprehension)
English-medium, English test	34.1 percent	56.4 percent	9.6 percent
Kom medium, English test	7.7 percent	51.8 percent	40.5 percent
Kom medium, Kom test	5.3 percent	11.3 percent	74.9 percent

Source: Walker and Trammell (2011)

McEwan and Trowbridge (2007) reviewed the achievement of indigenous students from primary schools in Guatemala. They found a difference of between 0.8 and 1 standard deviation in academic achievement between indigenous and non-indigenous children. A decomposition procedure suggested that a relatively small portion of the achievement gap is explained by the differences in the socioeconomic status of indigenous and non-indigenous families. Other results are consistent with the notion that the school attributes play an important role in explaining the gap in achievement.

Patrinos, H. A. and Velez, E. (2009) discovered that the benefits of bilingual education for a disadvantaged indigenous population as an investment in human capital are significant. Bilingual schools in Guatemala have higher student attendance and promotion rates, and lower repetition and dropout rates. Bilingual students score higher in all subjects, even mastering the Spanish language. The efficiency of bilingual education is confirmed by a rough cost-benefit exercise, indicating that a shift to bilingual schooling would result in considerable cost savings on account of reduced repetition and higher promotion rates, and consequently result in successful completion of primary education by a vast majority of students. The cost savings through implementing bilingual education are estimated at $5 million – the cost of providing primary education to 100,000 students annually.

Fernando Rubio et al. (2005) made an impact evaluation of a USAID bilingual program PAEBI, Guatemala and found that the program produced graduates in any and all grades at lower costs (effective) than in comparison schools, in spite of the higher per-student spending. The relatively higher graduation rates (20 to 33 percent) resulted in savings of close to 650 *quetzales* to produce a third grade graduate. The project considered training for administrators, school directors, teachers, parents, and students in primary schools and teachers' training institutions in intercultural bilingual education strategies. Training included *Diplomados* and workshops, development of contextualized educational materials in Mayan language, among others (Rubio, Vásquez, Rego, and Chesterfield, 2005).

According to literature some piloted bilingual experiences have shown that a bilingual curriculum triggers an increase in attendance, completion of the school term and reduces repetition at the primary level, thereby increasing the transition rate to secondary school. Cummings documented that there are a series of motives to launch a bilingual program; some are more political, others culture-oriented, and some are more performance-oriented. For example, the "experimentation in Mozambique began following a conference on how to reduce the high repetition, failure and dropout rates plaguing basic education." (Benson 2004:5-6). Likewise this was also the principal motivation in the well-documented Six-Year Primary Project in Nigeria (Fafunwa et al. 1989, cited by Benson) whose results clearly supported long-term mother tongue development (Benson 2004).

Some World Bank scholars (Chiswick et al. 1996; Vawda and Patrinos 1998) have been working on cost-benefit analyses that relate the cost of status quo schooling (repetition and dropout as converted into per-pupil expenditure) to the cost of implementing bilingual schooling (teacher training and materials development), given that bilingual schooling greatly reduces student wastage. Applied to bilingual education in Guatemala, they have found that the initially higher cost of implementing mother tongue programs is outweighed by the savings due to more efficient schooling after only two years (Patrinos and Velez 1996).

Dutcher too summarizes the governmental experience in Guatemala, dealing with bilingual schools. As evaluators have found, bilingual schools perform well and better than the traditional Spanish-only schools if the bilingual program is implemented adequately. The evaluations of the expanded official program have shown that the gains of the bilingually educated children continue to hold, but only when the program is well implemented (Dutcher 2004:26-27).

Another case cited by Dutcher is that of Mali, where a 1996 evaluation of the Save the Children community schools revealed that students in Grades 1 through 3 had attained better literacy skills in Bambara than their peers in government-run schools had attained in French, and had done as well as those peers in arithmetic test (Carranza, Chávez, and Valderrama, 2007) (Dutcher 2004:26).

Of the several cited cases on cost benefit is the one of Harry Patrinos and Eduardo Velez in Guatemala, using 1991 government data to check the dropout and repetition rates for Mayan students in the bilingual program and of their peers in the only Spanish traditional schools. The following table is suggestive:

	Bilingual Students	Traditional Students
Repetition Rate	0.25	0.47
Dropout Rate	0.13	0.16

Cited by Dutcher 2004:27.

Impact evaluation of the bilingual education program DIGEBI in Guatemala showed a significant increase in efficiency in schools where it was implemented (more students progressed at normal rate) and also greater cost-effectiveness as compared to other similar schools without the innovative programs. This greater efficiency resulted in lower cost per student who made normal progress to the sixth grade, despite the additional operating cost of the innovative programs (Chesterfield and Rubio 1997) in (Dutcher 2006:27).

Patrinos and Velez (2009) summarized the findings from some interesting empirical studies:

- In Haiti, Creole-speaking students in both public and private schools, who learned in their first language (Creole) for the first four years acquired about as much knowledge in the second language (French) as those who had been exposed only to the second language.
- In Nigeria, Yoruba-speaking students studying in their first language in Grades 1 to 6 outperformed their peers – who studied in their own language only in Grades 1 to 3 – in all tests of achievement in the second language (English).
- In the Philippines, Tagalog-speaking students outperformed the students who did not speak Tagalog in their homes, in the two languages of the bilingual education policy (Tagalog and English).
- In Canada, students from the English-speaking majority language group in bilingual immersion programs outperformed their peers in traditional programs in the learning of the second language (French).
- In the United States, Navajo students learning in their first language (Navajo) as well as second language (English) throughout their primary school outperformed their Navajo-speaking peers who were educated only in English (Dutcher and Tucker 1994; see also Dutcher 1982). (Cited by Patrinos and Velez 2009).

The success of PRONEBI (Guatemala) can be judged by looking at the improvement in attendance and dropout rates, and also promotions as compared to a control group of Mayan children being taught only in Spanish. The bilingual project has had a significant impact on the promotion rates: more than 9 percent higher for bilingual students relative to the control group in the first grade in 1983 (Townsend and Newman 1985, cited by Patrinos and Velez 2009).

In an analysis of 1986 PRONEBI data from 297 communities, Carvajal and Morris (1989/1990) found differences among indigenous groups with respect to grade repetition (30 to 46 percent) and dropout rates (6 to 16 percent). They found that bilingualism reduced grade repetition and dropout rates (see also Carvajal et al. 1993, cited by Patrinos and Velez 2009).

Table 8 shows the calculations made with data from Guatemala. Given the current repetition rates, estimated at 47 percent for traditional schools and 25 percent for PRONEBI schools, unit costs by curriculum, and the number of indigenous students in

1991 – in both traditional and PRONEBI schools – one can derive the number of repeaters and the total cost of repetition. The result is a considerable cost saving, at over 31 million quetzales (US$5 million). The cost savings are equivalent to the cost of providing primary education to about 100,000 students annually.

Table 8. Simulated cost saving from reduced repetition as a result of PRONEBI

	A. PRONEBI	B. TRADITIONAL
1. Repetition rates (1991)	0.25	0.47
2. Annual unit costs (quetzales)	246	235
3. Number of indigenous students (1991)	96,194	653,413
4. Number of repeaters (1*3)	24,049	307,104
5. Total cost of repetition (2*4) (quetzales)	5'916,054	71'464,440
6. Simulated savings due to PRONEBI (5B–6B) (quetzales)		40'184,900
7. Simulated savings due to PRONEBI (5B–6B) (quetzales)		31'279,540

1 quetzal = 5.6 dollars.
Various sources cited by Patrinos and Velez, 2009

Table 9. Simulated benefits of reduced dropout rates due to PRONEBI

	A. PRONEBI	B. TRADITIONAL
1. Number of students (1991)	19,243	130,905
2. Dropout rates (1991)	0.13	0.16
3. Number of dropouts (1*2)	2502	20,945
4. Simulated decrease in dropouts, PRONEBI rates (3B-(2A*1B))		3927
5. Incremental earnings associated with extra year of schooling (1989) (quetzales)		186
6. Simulated combined annual incremental earnings due to PRONEBI (5B*4B) (quetzales)		730,422

Another simulation provides estimates of the private benefit associated with PRONEBI. This time the reduction in dropout and its effect on personal earnings is estimated. Given the data on the number of first grade students in primary schools by curriculum type, the associated dropout rates, which are slightly lower for PRONEBI schools at 13 percent versus 16 percent, one can derive the total number of dropouts associated with PRONEBI and traditional schools. Beyond being a waste for the education system, dropouts realize much lower earnings in the labor market. Assuming that there were fewer dropouts, but that they completed their schooling after the following year, these individuals would increase their labor market earnings by the average amount associated with an extra year of schooling (Psacharopoulos and Patrinos 2004). A

reduction in dropout and its effect on personal earnings is estimated as an increase in individual earnings of an average amount of 186 quetzales. Estimates show that the number of dropouts would decrease by 3927 if the traditional school students received a PRONEBI education for one year. Individual earnings would increase by an average of 186 quetzales per student (Table 9).

An important issue raised is the increase in costs each time the bilingual schools are expanded and serving remote, rural communities. However, the efficiency savings can, to some extent, absorb the cost of further expansion, triggering greater demand at high school and greater private and social benefits.

How much bilingualism?

This too has been a controversial point and affects the level of investment costs, which is important given the shortfalls in public resources.

UNESCO, based on international research points out and promotes,

> "*that at least some five years of instruction in the first language – but preferably throughout the education system – is required to provide a solid foundation for further studies… A strong foundation in the mother tongue is also needed for second language acquisition and successful transfer of the literacy skills from the first to the second language…[several authors cited].*"(UNESCO 2006)

In the same line, Thomas and Collier's work in the US indicated that children receiving as much as six years of instructional support in their mother tongue not only finished their formal education at a higher level than those submerged in English-only programs, they also achieved a greater level of proficiency in English." Cited by Walter (2010). Walter also confirms that data from the developing countries such as Eritrea, Cameroon and Philippines indicate that good to average students read fluently and with good comprehension by the end of Grade 2 and even below-average students are reading well by the end of Grade 3 when being taught to read in their mother tongue (Walter).

From a different perspective, Salvin, Madden and Calderon, in a longitudinal randomized evaluation of the results of two approaches – an English Immersion Program and a Bilingual Education Method, in California – found that the results did not support the superiority of structured English immersion (SEI) over a bilingual program. They recognized that the advocates of transitional bilingual education argue that native-language instruction in beginning reading should ultimately help Spanish-dominant children read better in English, but the data from this study do not find this to be true, at least not in fourth grade. By the fourth grade there were few significant differences in reading scores, concluding that, "schools may choose to teach English language learners in either their native language or in English for many reasons,

including cultural, economic, or political rationales. Yet the claims that this choice is crucial for ultimate learning of English or Spanish reading are not supported by the data from this experiment" (Slavin et. al. 2010).

Nadine Dutcher (2006) prepared an interesting collection of cases and evaluation studies from several countries. Surprisingly only three cases (Guatemala two cases and US) had relevant quantitative data of program evaluation. According to Dutcher, the US case prepared by Thomas and Collier (2002) implemented during several years (1996 to 2001), offered convincing evidence of the effects of initial education through the mother tongue and its impact on learning a second language as well as other subjects, such as mathematics. Examining the achievement of the minority language students at five urban and rural sites in four regions, with concentration of Spanish communities, with 210,054 school records, he differentiated at least five types of programs dealing with bilingualism.

The results indicated:

1. **English mainstream**: Mainstreamed students performed below grade level in Grade 5 and in the 12th percentile at Grade 11. Highest dropout rate.
2. **English as a second language (ESL taught through academic content studies):** Students in the ESL reached the 23rd percentile at the end of Grade 12.
3. **A transitional bilingual program (50 percent mother tongue/50 percent official language followed by English mainstream):** Students were in the 45th percentile at the end of Grade 11.
4. **One way bilingual program beginning the first grades with mother tongue and English towards increasing the ratio of English:** Students in the one-way developmental program with 50 /50 for four years were in the 61st percentile in Grade 7.
5. **Two-way immersion programs:** Students in the two ways 50/50 who were former English learners and who receive 50 percent native language and 50 percent English language were at or above in the state standards in Grade 5.

As Dutcher points out, the study was rich in policy implications, including "finding the strongest predictor of achievement by students educated in a language other than their first language is the amount of formal first language schooling." The one-way or two-way bilingual immersion programs helped students reach the 50th percentile in both languages (Dutcher 2004:114-5).

Table 10. Summary of sample indicators from evidence to set reference goals of a Bilingual Education Program in Peru

Sample/ reference	Local/ International reference of post-evaluated IBE cases
Peru Dropouts and graduation (Yamada and Castro 2011)	**Current** 25% drop out from primary level and only 60% graduates enroll in secondary school; only 40% graduate from secondary and less than 20% go for tertiary education.
Peru Assumption: bilingual children perform with IBE curricula as good as Spanish-speaking kids **1. Years of education** **2. Earnings** (Dewees 2011)	**With IBE program** Move from 9.5 years to 10.8 years schooling Earnings 100 million soles in ten years Present value for a cohort
Bolivia Tsimane IBE program **Personal earnings**	Spanish speakers plus local language earn **36.9 to 46.9%** more than monolingual persons
Cameroon. **Reading** test results comparing language used in class and language in test Passable good readers (50% or higher comprehension) (Walker and Trammell 2011)	1.English curricula, English test **9.6%** 2.Kom curricula, Kom test **74.9 %** 3.Kom curricula, English test **40.5%**
Guatemala **Achievement** (McEwan and Trowbridge 2007)	0.8 to 1 standard deviation in academic achievement between indigenous and non-indigenous children
Guatemala **Graduation rates** PAEBI (Rubio et al. 2005)	**20 to 30%** higher graduation rates
Guatemala. **Savings** PAEBI (Rubio et al. 2005)	Saving 650 quetzales to produce a Grade 3 graduate 1 quetzal = 5.6 dollars
Guatemala. **Cost savings** due to reduction in repetition (Patrinos and Velez 2009)	Costs saving $5 million, equal to the cost of primary education for 100,000 students
Guatemala **Repetition** **Dropout** (Patrinos and Velez)	0.25 bilingual students, 0.47 traditional schools 0.13 bilingual, 0.16 traditional schools

Systematized by author based on literature review.

3. Policy Objective and Alternatives

The proposed policy objective is to increase human capital investment for indigenous non-Spanish-speaking children from the Amazon through improving the quality of education. Here, quality is defined as the provision of ad hoc inputs and curricula resources that will facilitate the teaching process and improve the children's literacy levels and capacity to create human capital. The goal will be measured by the increase in intermediate or process indicators such as enrollment, reduction in dropouts and repetition and increase in transition rates.

A referential goal is the one set by government related to enrollment and coverage of IBE curricula; a public statement declared that at the end of the fourth year (2016), 50 percent of the children (referred to as non-Spanish speakers) are taught in their mother tongue. (Minister Patricia Salas 2012).

The goals have been constructed considering the baseline in Peru (Table 10) and having as a reference the national media indicators and the improvements shown in the reviewed international evidence (see summary – Table 11). Targets will be set according to assumptions in the policy implementation scenarios.

Table 11. Educational performance indicators in Peru, 2011

	Accumulated dropout rates					
	Primary	Secondary	Basic Education	Dropout 6th grade *(retirados)*	Repetition all grades in primary	Rate of graduation / primary/ normative age 13 years
Nation	**1.3**	**8.8**	**15.1**	**1.7**	**32.5**	**79.3**
Urban	1.1	8.4	12.2	1.3	20.9	86.6
Rural	1.7	9.5	20.4	2.9	63.9	64.6
Region						
Amazonas	2.2	15.2	32.3	2.3	61.5	64.1
Junin	…	6.1	7.2	1.8	29.5	83.1
Madre de	1.1	11.0	15.1	2.9	25.5	80.2
Ucayali	3.5	18.7	27.6	3.3	47.5	69.3
Mean	**2.3**	**12.8**	**20.6**	**3.4**	**41.0**	**74.2**

Source: Ministry of Education, Census 2011 data, ESCALE, www,minedu.gob.pe

Alternatives

For this policy simulation, two alternatives are considered for comparison in order to select the best option:

1. The first one assumes that policy makers do nothing and maintains the equivalent of total Spanish immersion program; the non-Spanish-speaking children continue to attend schools which do not have a structured bilingual program or where instructional language is mostly Spanish, as implemented today.
2. The second alternative considers the implementation of the IBE program with a curricula combining two languages in classroom work following a tested model of transition. The main mother tongue from the Amazon is recognized as L1, and Spanish as L2. The program has three main elements or ingredients: teachers trained in bilingual education methodologies, ad hoc instructional material for bilingual settings and in-service training and coaching to support teachers and schools.

   The program is conceptualized as a piloted[4] one, with a transition pedagogical strategy. The alphabet and basic reading and math are taught in Amazon languages (L1) in pre-school and the first three primary grades; Spanish (L2) is introduced as a subject in the third and fourth grade and as an instructional language in the fifth and sixth grade in primary and secondary schools, while maintaining use of the mother tongue in some subjects. The program is structured to enable smooth transition between L1 and L2. As has been pointed out, the "children do poorly when they are abruptly 'dumped' into the L2," and might end up being evaluated as a failure. According to an African educator, "It [bilingual education] does work, but you need a good bridge!" (UNESCO 2006).

Program Components

As per the current country strategies and international case reviews, the program has three main components:

1. **Teachers Trained in Bilingual Education Methodologies:** The program will develop a two-year postgraduate level for Spanish and non-Spanish-speaking teachers. They should be able to speak mother tongue (L1) and the second language (L2).

   If the choice is limited to having two teachers, both equally bilingual (who speak Spanish as well as the mother tongue) the strategy could consider one teacher to teach in the Amazon language (L1) and the other to teach in Spanish (L2) in multi-grade schools.

[4] International cases reviewed in this report.

Ad hoc Instructional Material for Bilingual settings: Books and working notebooks prepared according to context and language. The program will invest in content preparation and material design. The package is made up of materials for Spanish as a second language, and materials in the children's own language.

2. **In-service training and coaching to support teachers and schools:** Involves the selection of the best teachers and a structured body of coachers to teach the methodologies; three months curricula update and methodology to coach other teachers in bilingual settings. This strategy has shown positive outcomes in learning. In the short run, it will hire the available teachers and as of third year, it will hire graduates from the program component 1. Coaching includes one workshop at the beginning of the year and monthly visits.

It is worth noting that the program components also have a positive impact (individually) in the performance indicators. [5]

Other concurrent inputs related to school functioning

Other inputs related to school functioning are: infrastructure, management, and mainly welfare for students (basically feeding programs).[6] This is considered as complementary information.

The discussion as to whether an IBE program should only consider educational inputs is open. One needs to keep in mind that the bilingual or multilingual programs are directed at populations underserved by the State. In Peru, the Amazon children are part of the most vulnerable population, with nutritional concerns that need to be addressed. In fact, in most rural public schools in Peru, there are feeding programs – basically breakfast prepared by the mothers or teachers – with inputs sent by a national feeding program. Currently the government administration is organizing the fragmented feeding programs and concentrating its efforts on a single feeding program. However, the children do not only need complementary feeding programs but a strategy to end malnutrition, beginning with pre-natal care. A multi-sectorial approach is needed, including the health sector.

Benson cited two cases dealing with this concern:

[5] The total costs per student and the incremental cost of the program per student are shown in the cost structure in Table A6 in the Annex.

[6] At this moment, we are leaving these costs unidentified because, together with the direct costs of the IBE program, we have the complete picture of a rural school at the Amazon, and it can be easier to support more investment with the school too being considered as a unit of analysis.

- In Bolivia, preschools and bilingual primaries for remote indigenous populations are also served by school feeding programs, which have significantly raised both school attendance and levels of nutrition (UNICEF 1998).
- Experimental bilingual programs such as those in Guinea-Bissau and Niger (Hovens 2003) included curricular adaptations, adding more relevant subjects like preventive health (Benson 2004:9).

But from a methodological point of view, even if the Amazon children received a larger amount of public resources, it will affect both the alternatives selected in this paper. From a comparison perspective this does not affect the costs if included in the IBE program because all schools will receive it. However, if an observer only checks the performance of the IBE program and looks at the standardized test results, and the children are undernourished, it will be difficult to conclude whether or not the IBE outcome was positive because the children will still have cognitive limitations, unless the observer also makes a comparison with the rest of the schools that have Spanish curricula serving the native non-Spanish-speaking communities.

3. Methodology

To evaluate the proposed policy supporting bilingualism through the implementation of bilingual curricula, the economic returns of the above two alternatives will be compared. Policy makers can choose the alternative 2 if it means higher economic returns than the first alternative, or decide to continue with the status quo. In practical terms, to obtain the economic returns, two techniques will be combined: cost effectiveness and future private benefits.

- With cost effectiveness the analyst will look for budgetary government savings in every repetition and dropout[7] that is avoided, which is also a type of social benefit
- In private benefits one will look for increased earnings of students and graduates from the IBE program resulting in higher levels of education.

The analyst could consider the benefit results either independently or as a single result after adding them up. In both cases, policy makers are able to visualize the monetized returns – a practical tool for decision making. Here, each technique is presented independently as it is rich in itself and can be used as a separate tool in other possible policy, program or project comparisons,[8] and also because this study uses different populations to calculate cost savings and the private benefits.

[7] When a country or a sector does not count with data to construct costs and is unable to monetize some inputs, an alternative to compare two (or more) alternatives is the calculation of internal efficiency measured through the number of years needed to make a graduate. Annex shows the results of this technique applied to a possible IBE program in Peru.

[8] In Peru the National Investment System requires the calculation of cost effectiveness to choose one out of a minimum of two alternatives at the level of pre-feasibility (due to the difficulties to monetize the benefits) and to develop cost benefit if the project or program is at the level of feasibility.

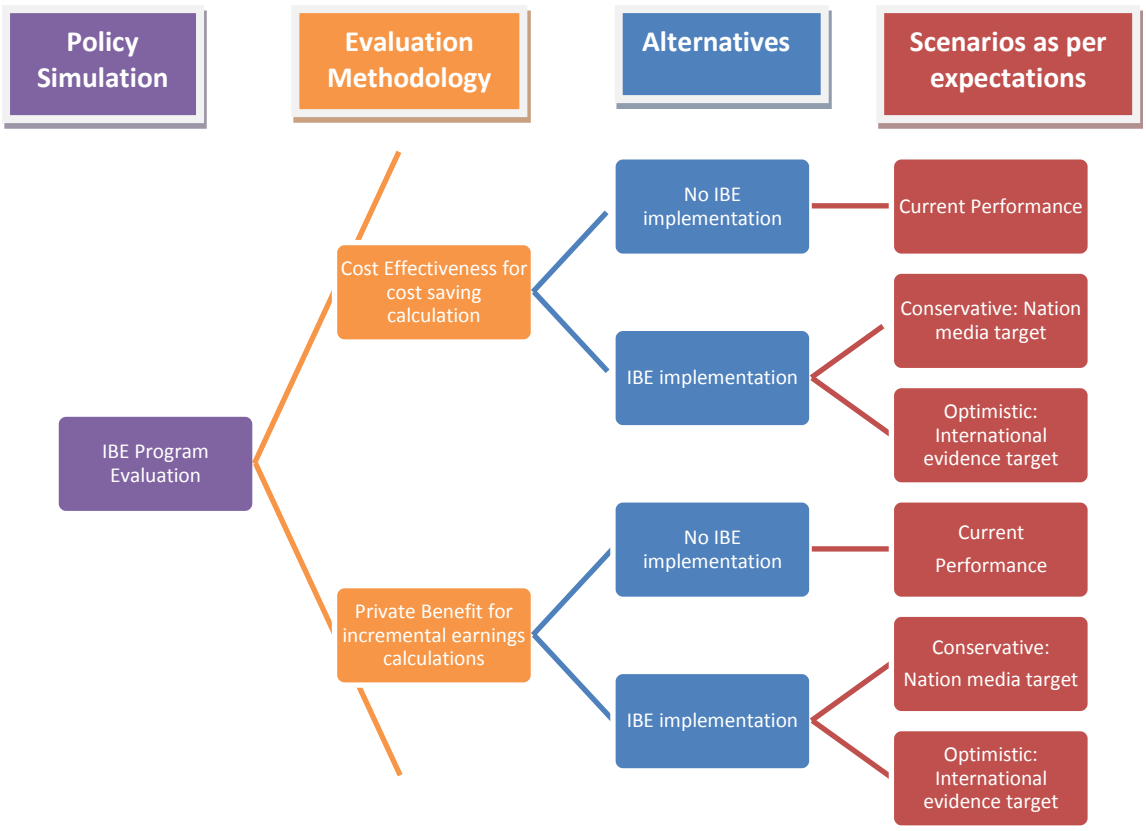
Scenarios for Alternative 2

At the outset, it is important to note that the implementation of a new IBE policy could take place in two scenarios: one, conservative and two, optimistic:

1. Conservative scenario A: The IBE program results equalize the national level in repetition and dropout rates. It is actually a conservative scenario, considering the relative high repetition and dropouts in Peru. Average reduction in repetition (accumulating all grades) is from 41.0 to 32.5 percent; increase in graduation rate, 74.2 to 79.3 percent; reduction in dropouts, 2.3 to 1.3 percent. (See Table 11 for data reference.)
2. Optimistic scenario B: The IBE program results reach the international evidence with an increase in enrollment, and reduction in repetition and dropouts. The graduation rate is increased by 10 percent points, and enrollment is increased by 10 percent over the baseline. See Table 10 with the summary of international evidence from evaluated programs.

Figure 3 depicts the organization of the analysis.

Figure 3: Structure of analysis flow



Cost effectiveness and cost saving

The selected effectiveness indicator was "graduated student". Cost calculations take into consideration the graduation rate and repetition in each alternative (all scenarios) as follows:

1. Calculation of the true cost of each program alternative is converted into cost per student to facilitate analysis and comparisons.
2. Cost of the total program or sector investment is calculated by multiplying the cost per student by the total number of registered children in the six grades from the communities of Awajun, Ashaninkas, Shipibos-Conibos.
3. Calculation of the total number of students graduating to the next grade in school is done by subtracting the dropouts and repetitions from the total number of registered students.
4. The total investment (bullet point 2) is divided by the actual number of graduate students (bullet 3) to obtain the cost per "graduated" student.
5. The cost per graduate student of the two alternatives and scenarios is compared to determine the cost saving – if there is any – achieved by implementing the alternative 2. In this case, the analyst or the decision maker can work only with per graduate cost. The savings arrived at by applying this unit cost to all the graduates of the community in the program will also be considered a benefit.[9]

Private benefits as an increase in earnings

A separate analysis that complements the findings of cost savings is the private benefit of the beneficiaries. This methodology allows the earning students to find out how much they could make on account of the increase in their schooling years. The process can be summarized as follows:

1. A scenario against a horizon of primary-secondary and university years is constructed; it is assumed that a 100 students are enrolled in the first grade and from this year up to the final year at secondary (this could also be done for the university graduates), rates of repetition and dropout are applied to the 100 students for each grade that they complete.
2. The above was done with the values of the two alternatives:
    a. The first one corresponds to the NO IBE program, so the rates of repetition and dropout correspond to the current situation.
    b. The second alternative is program implementation and uses two possible scenarios: one, the nationwide rates as reference to the improvements, and two, the international reference of 10 percent

[9] In Peru the National Investment System requires the construction of a flow of incremental costs and benefits of at least two alternatives. Cost savings are registered as negative costs which later are arithmetically added to the benefits.

improvement in enrollment and 10 percent reduction in repetition and dropouts.

3. A reference to market salaries is considered and applied to students depending on the level at which they are located. The earnings have been calculated from the National Household Survey ENAHO (see Table 12).
4. For this particular case, as the program only covers basic and not university education, calculations only consider the salary level reached after the completion of secondary school.
5. An assumption considers that children up to the fourth grade do not work.
6. Graduates from high school work (or could work) for 25 years after graduation, and receive the same annual salary for the 25 years (only for calculation purposes).
7. Finally a Present Value of all the working years' earnings is calculated.
8. The calculation began with 100 students and is replicated with the actual number of first grade registered students of Awajun, Ashaninkas, Shipibos-Conibos, instead of the 100 students.

Table 12: Potential earnings based on level of education

Years of education	Income per hour	Annual income
None	2.18	3,488
2 years	2.15	3,440
6 years	2.36	3,776
10 years	3.01	4,816
14 years	4.46	7,136

Source: Dewees (2011).

To be able to develop the calculations the following assumptions were set (Table 13).

Table 13: Assumptions used in calculations

Area	Steps / Activities	Comments/ Assumptions
On the policy	Performance	After the implementation of the bilingual curricula, indigenous Amazon kids learn in their mother tongue as good as Spanish-speaking kids. Evidence from literature.
	Definition of policy components	Each had positive impact on evaluation results.
Costing	Total and incremental cost per student	Will not differentiate among languages (so far the three ethnic populations have similar distribution in school classes).
Population		Demographics remain the same, like population and student growth.
Ic	Graduate studies for bilingual specialization for teachers	Same costs as other university careers. Data from PBA 2011.
Benefits	Labor market absorption	All graduates are absorbed by the private market or State. In terms of earnings, one can strongly question this but it could also be considered as an opportunity to earn income corresponding to one's level of education.
Working age	For private benefit calculation	Students begin working at fifth grade of primary; the highest earning capacity of a student is reached on finishing secondary education. This parameter will be applied to all alternatives, so no bias will be placed in a single alternative.
Financing		No reallocation of resources will be done in the education sector; instead the government will provide additional budget resources, or it could be financed with annual budget increase.

4. Calculations and results

Cost Effectiveness

Table 14 shows the results of applying the process explained in the preceding section. In Alternative 1 the cost per student is 1207 soles; in Alternative 2 (both the scenarios) an incremental cost to the basic 1207 soles is included, adding up to 1283 soles per student. For calculations, please see Table A6 in the Annex section. The incremental value is apparently low; however, one should consider that the costs are annualized.

The results in Table 14 can be read in several ways. In the conservative Scenario A, the cost per graduate, after implementing the program is 9 soles less due to the increase in the number of graduates (some fixed costs remain the same) and reduction in repetition.

Table 14: Cost effectiveness of implementing the IBE program

	Alternative 1, now No IBE program is implemented Rural Amazon Sample Regions	Alternative 2, Scenario A, now Simulating the level of IBE with goals and targets (national media reference) With incremental cost due to program	Alternative 2, Scenario B Graduation rate 10 % points Enrollment growth 10% over baseline With incremental cost
Percentage of students who graduated to the next grade, including sixth grade students to high school. Graduation rate normative age up to 13 years.	74.2	79.3	84.2
Number of Students registered Awajun, Ashaninkas, Shipibos-Conibos / primary nationwide - beneficiaries	39,037	39,037	42,941
Cost per student in primary Source: PBA 2011, soles	1,207	1,283	1,283
Total investment = students registered in primary times expenditure per student, soles	47,117,659	50,084,471	55,092,918
Number of students graduating	28,965.45	30,956.34	36,156.07
Actual expenditure per student graduating to the next grade and graduation in sixth grade (secondary) soles	**1,626.7**	**1,617.9**	**1,523.8**

Author's calculations

However, if one considers a more positive view as in Scenario B and also a better sector performance with a growth of 10 percent points in graduation rate, and an increase of 10 percent in enrolled Amazon bilingual students, the cost per student is much less than that in Alternative 1 with no policy implementation. In this second case the sector saves 103 soles per graduate or 3,721,604.50 soles as total, when considering all the graduates. One can also conclude that the savings equal 1,283 years of education for other children. (For cost calculation see Table A6, Annex section.)

Private Benefits

Here we are referring to individual private benefits of having more schooling years. However, higher education is also a consideration in terms of total benefits, and graduates who enter the market with higher earnings will also, additionally, support the program implementation.

In a conservative scenario, if the program is implemented and such a program only yields rates as good as those at the national level, the computed benefits of secondary school graduates in one cohort add up to 208 million soles. This is the present value of the earnings of secondary graduates who work for or could work for 25 years after graduation. The incremental value on account of program implementation is 29.3 million soles (comparing to the current situation with the decision not to do anything). (See Table 15)

If the program performance in terms of repetition, dropouts and graduation reaches the levels equal to the parameters obtained in international experiences, the earnings gained in one cohort climb to almost 236 million soles (NPV of 25 working years), or an incremental value of 57 million soles in comparison to a situation with no program.
Table 15 shows the estimated present value of the earnings of 100 students, and one cohort of current students in first grade. Calculations are shown in Table A7 in the Annex section.

Table 15: Estimated present value of beneficiaries' earnings

	Alternative 1, now No IBE program is implemented Rural Amazon Sample Regions Soles	Alternative 2, Scenario A. Simulating the level of IBE with goals and targets (national media reference) Soles	Alternative 2, Scenario B. Enrollment growth 10% over baseline Repetition and dropout rate 10% less Soles
With 100 students enrolled in first grade	2'706,933.38	3'150,503.77	
With actual number of students enrolled in first grade	178'847,088.46	208'153,783.80	235'944,652.03

Author's calculations.

5. Discussion of Results

There is no question or doubt that the current administration is very interested in "inclusion" and that there is a clear need in the country to begin looking at and working with the most vulnerable sections of the population. The position of the administration is most of the time understood as that of protecting the rights of the population. Politicians are convinced that education is the way out of poverty, but there is a need for well thought out and workable methodologies to facilitate the understanding of the benefits of education in a quantitative manner to enrich the dialogue between the academia, sector education representatives and other authorities. This report offers a series of quantitative parameters to support greater investment in education, and more so in bilingual education.

Decision-making based on comparison of results

International evidence shows that the IBE programs have actually resulted in improvements in process indicators such as registration levels, reduction in repetition and dropouts in bilingual children. Peru's Ministry of Education has already included the prioritization of the IBE curricula but lacks the instruments to provide evidence of the economic returns to the Ministry of Economics under the result-based budget and the national investment system.

IBE programs are expensive because of Peru's low density of population, but it could be concluded by looking at the results that the implementation of a bilingual curricula could generate interesting economic returns for this population, particularly the

children, in the times to come. The results provide a strong evidence of the program's economic feasibility. The benefits are a product of the savings in the public budget due to lowered repetition and dropout rates, shown in the extensive literature, and also because of the increase in earnings due to greater number of years of schooling of the bilingual children.

If the government decides to continue with the current, modest approach, the social cost would be very high, resulting in the loss of savings. If the program in the Amazon reaches the national level in terms of repetition and dropouts, it would be a positive experience, and if it reaches the international goals as tested in other experiences, it would a complete success. Table 16 shows the summary of the two techniques applied which complement each other.[10] The amount of benefits that Alternative 2 generates will depend on the successful implementation of the project; we estimate that the goals set in both the scenarios are reasonable and reachable. To summarize, this paper strongly recommends the implementation of the program for the Awajun, Shipibo and Awarunas children with the three identified components.

Table 16: Summary of results for comparison of the alternatives

Results by technique and group of population (students) used as basis for calculations	**Alternative 1** **Current situation: no IBE program**	**Alternative 2** **IBE program conservative scenario: performance equal to national average**	**Alternative 2** **IBE program optimistic scenario: performance equal to international ratios**
Total cost savings or benefits considering all students registered in six grades, public budget perspective, one year -soles-	0.00	278,607.1 (saving 9 soles per graduate)	3'721,604.50 (saving 103 soles per graduate)
Total private benefits, earnings due to schooling level of cohort registered in first grade, net present value of 25 years -soles-	178'847,088.46	208'153,783.80 (incremental of 29 million soles)	235'944,652.03 (incremental of 57 million soles)

Author's calculations.

[10] Unfortunately in this case we will not be able to add the two benefits because they were calculated using different populations.

Context of possible incidence

The Ministry of Economics and Finance might be interested in reviewing these simple methodologies of cost efficiency and effectiveness for education, to include the same in the investment guidelines to construct the ex-ante evaluation of public projects in education in the National Investment System (SNIP).

Two months ago the government began working on several public projects under the National Investment System, which requires a straightforward methodology following the construction of a logical framework and ending with cost-effectiveness analysis. However, the effectiveness only refers to the number of beneficiaries covered, obtaining a cost per beneficiary per alternative, mostly related to a small technological variation in the project (like different roofs in a school) and not to a real alternative.

Furthermore, the new government is very much interested in rural and bilingual education and has created a trademark *Escuelas Marca Peru*, which would have a series of inputs and services of intermediate bodies and strategies similar to this proposal. Another issue is that the package of inputs reflected in the cost per student should not be shown as a financial forbidden, meaning that the public budget could cover the strategy. The results show that there is still room for more investments and that the project has social returns.

To create a demand and make them attractive to the government, the scenarios and components could be adjusted to reflect as much as they can to the Marca Peru Schools. Likewise, the author thinks that having used internal efficiency (see Annex 2) cost effectiveness and benefits analysis, it could be incorporated in the Ministry methodology to evaluate their projects.

For future impact evaluation one could have a quasi-experimental model having the benefited areas as 'pilot group' and other similar communities with other Amazon language as a 'comparison group'. There is a lot of experience gained, for example in Guatemala, that can be extrapolated to this case. If the implementation is done correctly, not only would it be feasible to evaluate intermediate indicators such as repetition and dropouts and schooling but also outcomes such as learning achievement. Other possibility is to construct several pilots (taking advantage of the fact that the communities are scattered) as the experiences reviewed in the United States, where they differentiated the immersion programs versus the transitional programs.

A few months ago (August 24, 2012) the Minister of Education instituted the National Commission of Intercultural Bilingual Education (CONEIB).

> *"Patricia Salas, ministras de Educación, instaló ayer la Comisión Nacional de Educación Intercultural Bilingüe (Coneib), la cual está*

integrada por líderes de la zona andina, de las organizaciones indígenas amazónicas y de las organizaciones afroperuanas. Durante la ceremonia pidió construir puentes que permitan salvar las enormes brechas educativas que aún existen en el país. La Coneib es un órgano permanente de participación y concertación para canalizar las principales demandas y necesidades de los pueblos indígenas en materia de educación intercultural, indicó Elena Burga Cabrera, titular de la Dirección General de Educación Intercultural, Bilingüe y Rural (Digeibir)." (MED 23/08/12).

http://www.minedu.gob.pe/noticias/index.php?id=18636

Working with two alternatives and two scenarios in Alternative 2, one was able to observe the changes in the costs and benefits. However, in the future one can introduce macro variables that are not controlled by the project implementer and observe how they affect the economic returns of the program. The identified external factors are:

- Economic growth and public budget growth
- Capacity of the market to absorb new labor supply in the Amazon
- Ministry of Education policy of teachers tenure regime under the *Ley de la Carrera Publica Magisterial (CPM*) that increases the human resources costs.

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ANNEX 1. Statistics

Table A 1; Regions with concentration of population of non-Spanish-speaking communities with Amazon mother tongue: Awajun, Ashaninka, Shipino-Conibo

REGION	Ethnic people	Number of communities	TOTAL POPULATION (0 to 25 years old)				
			Total	%Total x Region	Male	Female	Female.
TOTAL GENERAL		**1.786**	**226.605**	**100,0**	**115.074**	**111.531**	**49,2**
AMAZONAS	AGUARUNA (AGUAJUN)	214	31.337	83,7	15.463	15.874	50,7
CAJAMARCA	AGUARUNA (AGUAJUN)	9	711	100,0	341	370	52,0
CUSCO	ASHANINKA	31	2.625	25,1	1.397	1.228	46,8
HUANUCO	ASHANINKA	6	656	38,1	330	326	49,7
HUANUCO	SHIPIBO-CONIBO	2	289	16,8	139	150	51,9
JUNIN	ASHANINKA	209	43.183	86,6	22.239	20.944	48,5
MADRE DE DIOS	SHIPIBO-CONIBO	2	169	6,9	90	79	46,7
MADRE DE DIOS	ASHANINKA	83	7.247	67,3	3.694	3.553	49,0
LORETO	AGUARUNA (AGUAJUN)	42	4.727	6,6	2.322	2.405	50,9
LORETO	SHIPIBO-CONIBO	34	4.875	6,8	2.451	2.424	49,7
SAN MARTIN	AGUARUNA (AGUAJUN)	15	2.842	21,7	1.447	1.395	49,1
UCAYALI	AGUARUNA (AGUAJUN)	1	25	0,1	13	12	48,0
UCAYALI	ASHANINKA	77	6.378	22,9	3.208	3.17	49,7
UCAYALI	SHIPIBO-CONIBO	66	9.899	35,6	5.013	4.886	49,4

Selected regions: Amazonas (Awajun), Junin, Madre de Dios (Ashaninka), Ucayali (Ashaninka y Shipibo -Conibo)

Source: MED Table 7.Demanda de la educación intercultural bilingüe en el Perú , May 2010.

Table A 2: Number of students in classroom (refers to the space classroom). Median 2011

Lengua	Polidocente completo	Multigrado	Unidocente
Total aguaruna (aguajun)	25	25	25
Total asháninka	21	25	25
Total shipibo - conibo	24	24	19
Total aguaruna (aguajun) asháninka shipibo - conibo	25	24	23

Source: MED

Table A 3: Number of schools, 2011

Aguaruna (aguajun) asháninka shipibo - conibo	Polidocente completo	Multigrado	Unidocente
Number of schools	309	342	49

Source: MED

Table A 4: Number of classrooms per school. Median 2011

Lengua	Polidocente completo	Multigrado	Unidocente
Total aguaruna (aguajun)	6	2	1
Total asháninka	6	2	1
Total shipibo - conibo	6	2	1

Source: MED

Table A 5: Number of students enrolled, 2011

Lengua	Polidocente completo	Multigrado	Unidocente	Total
Total Aguaruna (aguajun)	4526	10515	3554	18595
Total Asháninka	2241	7748	3964	13953
Total Shipibo - conibo	1650	4999	1160	7809
Total	**8417**	**23262**	**8678**	**40357**

Source: MED

ANNEX 2. Internal efficiency

For these calculations, one looks for the savings due to the reduction in dropouts and repetition and estimates the number of years of investment needed to have one graduate at the end of primary education, for example.

The process compares both the alternatives, with and without the IBE program. Currently the accumulated average dropout rate for basic education nationwide is 15.1 percent (percentage of the population that has not completed a level); this percentage improves in the urban setting to 12.2 percent, but goes up to reach a high 20.4 percent in the rural areas, which is also close to the 20.6 percent rate of our sample regions The dropout rate in Primary is 2.3 percent.. The referred regions have the highest number of beneficiary population (Awajun, Ashaninkas, Shipibo-Conibo): Amazonas, Junin, Madre de Dios and Ucayali. See Table A1 in Annex.

Repetition rates in all 6 grades in primary are as high as 41.0 percent in the Amazon regions, while nationwide these are almost 10 percent points less, or 32.5 percent. See Table 11.

The calculations are organized in the following steps:

1. With a cohort of 100 students in primary, if each of them finishes this level in 6 years with no repetition, it will be 100 students per 6 years, 600 years of investment.
2. If a group of students repeats each year, these years are added up as a total of extra years (loss of efficiency). The total number of repetitions in the 6 primary grades is added to the 600 years.
3. Additionally, the number of dropouts in the sixth grade is subtracted from the total number of years.
4. Finally, the net total years of investment is divided by the actual number of graduates (100 graduates minus the dropouts in the sixth grade), obtaining the total number of years needed to produce a graduate.
5. Optionally, if one has the costs data one can also calculate the total benefit lost, converting to soles the extra time needed to produce a graduate (adjusted from Dewees, 2011).

With the basic information from Table 11, and applying the methodology explained earlier, the results are shown in Table 12; the first column is self-explanatory.

Two alternatives are compared. Alternative 1 with no policy implementation presents the situation as it is now, with current and actual data from the selected regions. The second alternative assumes that if the program is implemented, the Amazon children taught in their mother tongue will have the same performance level as the rest of the children in the nation.

Not implementing a bilingual program costs the State 0.6 years per graduate in primary in the Amazon non-Spanish-speaking region due to the higher rates of repetition and dropouts. If a student is taught in his/her mother tongue, he/she graduates in 7.95 years, while if the student is taught in a dominant language that is NOT the student's mother tongue, he/she graduates in 8.59 years.

Table A 6: Cost efficiency calculations

	Alternative 1 **No IBE program is implemented Rural Amazon Sample Regions**	**Alternative 2** **Simulating the level of IBE implementation Reference: national mean**
Cohort (1)	100	100
Years per student (2)	6	6
Total number of years (3=1*2)	600	600
Years of repetition in the 6 grades out of 600 (4)	41	32.5
Total number of years (5=3+4)	641	632.5
Years per graduate (6= 674/100)	6.41	6.325
Dropout sixth grade (7) 2011	3.4	1.7
Total number of years (8=5-7)	637.6	630.8
Total number of students graduating after dropouts (9) 2011	74.2	79.3
Years needed per graduate (10= 8/9)	**8.59**	**7.95**

Author's calculations

ANNEX 3. Cost calculation of the IBE program

The common and recurrent inputs that we found in the Peruvian proposals for the *Pedagogical Proposal Model for Intercultural Bilingual Education* prepared by the Ministry of Education, and international cases, focused on teacher development and adequate materials.

The analysis calculated the cost per student per type of school (UNIDOCENTE, MULTIGRADO, POLIDOCENTE). The calculations divide the total annualized cost (prorated to the classroom), by the number of students (median) per classroom. The inputs depend on the structure of the school and the number of students.

Results on costing can be organized as direct costs associated with IBE, and other costs associated with school functioning. This differentiation will help identify the cost of the inputs and action directly linked to the policy IBE and leave the option to see the total costs or the incremental cost of a rural school in the Amazon. (See Table A6.)

Categories:

a. Salaries for trained IBE teacher from the national regulation notes. Human resources is the main cost, and is considered as follows: one bilingual teacher in unidocente schools, one Spanish teacher and one bilingual teacher in multi-grade, and half of the bilingual teachers in multiple teacher schools.
b. In-service training and coaching costs, coaching workshop constructed with information from stakeholders, and salaries for coachers
c. Graduate studies for Bilingual Education for teachers from expenses in public universities per student.
d. Instructional materials and texts IBE from market listed in public biddings and procurement.

The incremental costs are: b, c, and d.

Other costs related to school functioning:

Infrastructure: from the national regulation notes in public investments
Management: from public budget, utilities assumptions, and other minor inputs
Welfare for students: basically feeding programs**.** The schools have feeding programs. Previous impact evaluations have determined that school feeding programs increase attendance too.
The annualized value can also allow structuring a flow for 10 or 20 years if used in a cost benefit analysis.

This cost is used in the cost effectiveness analysis section. The tables that follow present the inputs of the IBE program and its itemized costs. An average weighted cost, considering the three types of school is calculated.

Table A 7: Cost per student, total and incremental (IBE program) per type of school

Category	Costs			Description of inputs
	UNIDOCENTE School	MULTIGRADE School	POLIDOCENTE School	
Human resources	1068.07	355.98	772.25	Teachers salaries under teachers law, Ley del Profesorado (LP)
Direct cost related to IBE policy	407.73	394.11	335.00	
Graduate studies in bilingualism	19.32	18.52	17.78	Graduate studies two years 4000 per year annualized for 18 years, divided by the number of students in class
In-service	226.70	217.25	208.56	In-service training workshop and monthly coaching visits
Instructional Materials and texts	161.71	158.34	108.66	Ad hoc material: books, concrete and fungible material, in mother tongue and in Spanish as second language
Indirect cost related to school functioning	781.84	534.27	661.91	
Equipment	199.39	123.76	206.49	Computers, others
Infrastructure	306.33	197.23	248.61	According to Ministry guidelines
Management	111.10	42.90	48.22	Utilities, internet, phones
Student welfare	165.02	170.38	158.59	Feeding programs
Total	2257.64	1284.36	1769.16	**1283.21**
Incremental	407.73	394.11	335.00	**384.24**
Total net	1849.91	890.25	1434.16	**1207.36**
Factor/weight	0.21	0.58	0.22	

Author's calculations

ANNEX 4: Benefit tables

Table A 8: Benefit calculations: Case for Alternative 2, scenario conservative, with national media reference as parameter

Porcentaje de repitencia a nivel primaria y secundaria

	Repitencia										
	Primaria						Secundaria				
	P1	P2	P3	P4	P5	P6	S1	S2	S3	S4	S5
Amazonas	5.2	18.7	16.2	10.9	7.8	4.6	7.7	8.0	7.9	5.6	2.7
Junín	2.1	9.7	7.2	5.2	3.6	1.8	5.3	5.3	4.9	3.8	2.1
Madre de Dios	1.4	7.4	5.4	4.8	3.7	2.9	5.7	3.6	5.1	2.8	1.2
Ucayali	4.5	13.0	11.5	8.7	6.5	3.3	10.4	8.9	8.4	6.1	3.5
NATION	2.6	8.5	7.8	5.9	4.7	2.3	6.1	5.2	5.1	3.8	2.2

Porcentaje de retirados a nivel primaria y secundaria

	Retirados										
	Primaria						Secundaria				
	P1	P2	P3	P4	P5	P6	S1	S2	S3	S4	S5
Amazonas	7.9	3.3	2.9	2.3	2.7	2.3	8.7	7.2	7.1	6.3	5.3
Junín	4.4	3.1	2.3	2.3	2.4	1.8	4.6	4.2	4.5	4.1	2.7
Madre de Dios	5.2	3.6	2.5	3.1	2.3	2.9	5.7	5.8	6.3	6.0	5.1
Ucayali	7.4	4.6	3.6	4.1	4.0	3.3	8.4	6.3	6.5	6.0	4.4
NATION	4.8	2.7	2.2	2.1	2.2	1.7	2.6	2.6	2.6	2.6	2.6

Actual

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
P1	**6607**	163.5									
P2		**6,435.2**	594.8	55.0	5.2						
P3			**5,823.9**	972.2	122.8	14.8					
P4				**5,369.6**	1,136.5	170.3	24.7				
P5					**5,058.2**	1,177.4	196.5	33.2			
P6						**4,820.4**	1,073.2	184.8	36.8	0.8	
S1							**4,615.4**	1,122.2	208.0	47.5	2.9
S2								**4,333.8**	1,152.1	225.9	57.1
S3									**4,065.1**	1,075.7	217.9
S4										**3,857.8**	978.3
S5											**3,711.2**
U1											
U2											
U3											
U4											
U5											

Ingreso anual y por hora deacuerdo a los años recibidos de educacion

Años de Educacion	Ingresos por hora	Ingreso anual
Ninguno	2.18	3,488
2 años	2.15	3,440
6 años	2.36	3,776
10 años	3.01	4,816
14 años	4.46	7,136

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
P1	**23,045,216**	570,415.2									
P2		**22,446,040.4**	2,074,799.7	191,784.1	18,219.5						
P3			**20,034,120.7**	3,344,529.2	422,544.3	50,927.2					
P4				**18,471,459.3**	3,909,469.6	585,800.6	84,903.7				
P5					**17,400,114.6**	4,050,361.9	676,056.2	114,111.4			
P6						**16,582,309.2**	3,691,852.0	635,860.8	126,547.7	2,910.6	
S1							**17,427,664.6**	**4,237,368.7**	**785,393.0**	**179,253.9**	**10,934.5**
S2								**16,364,577.0**	4,350,448.4	853,094.3	215,459.8
S3									**15,349,973.3**	4,061,912.3	822,827.5
S4										**14,567,124.6**	3,694,027.1
S5											**17,873,244.7**
U1											
U2											
U3											
U4											
U5											
	23,045,216	23,016,456	22,108,920	22,007,773	21,750,348	21,269,399	21,880,476	21,351,918	20,612,362	19,664,296	22,616,493
Beneficios anuales	23,045,216	23,016,456	22,108,920	22,007,773	21,750,348	21,269,399	21,880,476	21,351,918	20,612,362	19,664,296	22,616,493
Numero de alumnos	6,607	6,599	6,419	6,397	6,323	6,183	5,910	5,674	5,462	5,208	4,967
Beneficios por alumnos	**3,488**	**3,488**	**3,444**	**3,440**	**3,440**	**3,440**	**3,702**	**3,763**	**3,774**	**3,776**	**4,553.00**
Valor Pesente Neto estudiante	**S/. 18,133.22**	5TO PRIMARIA HASTA GRADUACION DE SECUNDARIA									
Valor Pesente Neto Cohorte	**$208,153,783.80**										