Costa Rica’s Secondary Education Futures

Final Deliverable

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Executive Summary

Education has been regarded as one of the main contributing factors for the development of human capital and to achieve subsequent economic growth. Even though Costa Rica is considered to be an exception to many problems that trouble most of Latin American countries and an example of a welfare state in the region, the country appears to have a considerable debt with the provision of secondary education. As a matter of fact, in Costa Rica’s adult population, only 35.27% have completed high school, a number that is less than half the estimate for developed countries.

Given this significant lag in completion of upper secondary education, and the derived consequences for the economic development of the country, the Ministry of Public Education is in need of a forecast that estimates the time it will take the country to reach a level of attainment for secondary education in the adult population that is comparable to the current 74% of OECD states. To produce this forecast, the causal model focuses mainly on the flows of enrollment and completion rates for upper secondary and how they affect attainment. A careful review of previous educational forecasts and of the current situation of secondary education in Costa Rica, the study identifies five drivers linked to enrollment and completion flows. The model considers dropout and public spending as drivers with more proximity to enrollment flows; whereas repetition has a greater influence over completion. The list of drivers is completed by incomes of households and quality of education that have strong effects over both flows.

Therefore, the forecast explores with variations in the rates of these key drivers with the purpose of producing a list of possible policy recommendations to reduce the time necessary for the adult population with secondary education to reach the benchmark of 74%. In the quest for alternatives and guidelines to accelerate the growth in secondary education attainment, the study employs a complimentary set of research and forecasting tools that comprise: scenarios analysis and IFs, with the auxiliary contribution of narratives for expansion of upper secondary inspired by the evolution of lower secondary in Costa Rica.

The forecast produced through IFs revealed that increases in educational investment have significant impact over enrollment and completion rates, helping also to abridge the time required to reach a 74% of secondary educational attainment in the adult population. In this sense, even the most conservative scenario, which implies an increment of 15% in the educational budget, accelerates the achievement of the benchmark by 6 years. This is considered a conservative scenario as the required growth represents the upsurge necessary to deliver the 8% of the GDP to education. This method also allows suggests that the higher the investment in education, the faster the enrollment rates will growth. Likewise, the greater the educational budget, the faster the government will reach the 74% benchmark, as for instance, the increment in 30% of the educational investment will cause the country to reach the goal by 2066. Regardless of the case, increasing investment in the educational sector seems to yield significant improvement in economic indicators measured by GDP at Purchase Power Parity and GDP Annual Growth rate.

Although quality considerations are excluded from the analysis with IFs, the creation of four alternative narrative scenarios based on an analogy with the expansion of lower secondary, allowed to factors in considerations regarding possible dynamics between the main political actors
and the necessary actions required to achieve such outcome. The analysis combined high and low levels of educational investment and priority into four scenarios: “Catching up with the Myth”, “Full of Good Intentions”, “The Costs of Indifference” and “Death End Road”.

“Catching up with the Myth” is the most optimistic scenario. In this narrative, is high availability of funds for education is met with high commitment of the government to improve the quality of secondary education. Completion of secondary education becomes a priority in the agenda of the government which lead to improvements in quality and conditions associated with upper secondary education. Repetition and dropout contract, increasing completion. The time horizon necessary to achieve the 74% of the adult population with complete high school degrees is reduced by at least 20 years.

In “Full of Good Intentions” there is a high priority in the government agenda to enlarge the base of the adult population with completed secondary education and the resources available for education are constrained. This is thought to be the most likely scenario due to its similarities with the current context. Under the constrained budget, the government engages in small low-cost qualitative changes to the curriculum mostly hoping to increase enrollment and graduation rates. Enrollment and graduation grow at a similar pace to the present and then it stabilizes. This may accelerate the achievement of the benchmark by a couple of years.

“The Costs of Indifference” is characterized by abundant levels of resources for secondary education, matched by disinterest and low ranking of the educational reform in the government agenda because other social, political and economic problems that are perceived as urgent by the authorities. This situation leads to a waste of the high inversion of the State in education. Under this model, enrollment may increase, but performance of the system in terms of graduation and repetition will not see significant improvements. Likewise, the goal of 74% of the adult population with completed secondary education around 2076, as it was predicted by the Ifs base case.

“Death End Road” represents the most pessimistic scenario and it is decay of the current situation of upper secondary in Costa Rica. This deterioration is caused by a reduction in the amount of resources available for education and the expansion of upper secondary education, matched by a very low priority of the topic in the government agenda. Investment in secondary education remains in 25% of the national budget which limits the capacity of the system to respond to catch up with student demand. Enrollment and completion rates slow down and, as a consequence, the time required to reach the 74% benchmark is prolonged.

Under the current circumstances, the most likely scenario is that Costa Rica will reach the 74% benchmark in the first half of the 2060s, this is faster than the base case scenario presented by IFs. This is explained by recent policy decisions of making upper secondary compulsory and for the mandatory upsurge in the budget that will take place during the next years. Given the significant impact of education, the government’s priority should be fulfilling the budget promise of 8% of the GDP in the next four years, as it will have dynamic effect over enrollment and completion of upper secondary, contributing to MEP’s ultimate goal.
I. Introduction

The Ministry of Public Education (MEP) is in charge of designing and executing educational policies in Costa Rica. The institution is mandated by law to guarantee that all citizens are able to access free and compulsory education, from kindergarten to the completion of upper secondary. Their institutional mission also highlights their specific responsibility in creating educated manpower to raise the country’s competitiveness.

However, despite considerable public investment in education and sustained economic growth, Costa Rica has advanced very slowly toward goals for the universalization of secondary education. The country is lagging countries with similar Human Development Indexes in Latin America in in two key indicators of educational attainment: enrollment in upper secondary and the proportion of the adult population that has successfully concluded high school. In this sense, the Programa Estado de la Nación (PEN)’s bi yearly review of Costa Rican Education, found that the coverage of upper secondary was 47% in 2012. Beyond problems related to capturing the age population, the country has issues associated with performance as less than half of the population enrolled in upper secondary is able to graduate. Graduation rates from secondary increased from 25.9% of the total population in the 2000 Census to 45.1% in the 2011 Census. Likewise, the annual National Survey of Homes (INEC, 2012) revealed that 35.27% of the overall population has at least completed high school.

The client’s main organizational objective is to create skilled and educated human capital that works as a development engine for Costa Rica. Therefore, its main interest is to raise the levels of educational attainment in the adult population. In order to respond to the informational needs of the MEP, this forecast will address the percentage of the adult population (above 15 years old) that has completed high school. The main research question is: when will the adult population with at least upper secondary high school degrees reach 74%? This percentage represents the overall average for State members of the Organization for Economic Co-Operation and Development (OECD, 2014). The 74% is used as a benchmark for the study because Costa Rica is current candidate to join the organization and has significantly lower educational indications when compared with OECD countries.

Through the analysis of dynamics that have contributed to raise or hinder the levels of high school completion across time, this study also aims to identify critical underlying factors that influence secondary completion. For instance, graduation and dropout rates will be critical factors with direct influence in the educational attainment levels of the overall population. These and other keys areas identified will provide guidance for policy-makers to formulate possible interventions to reduce that may reduce the time required to achieve developed world levels of high school attainment.

II. Developing an Educational Model

This section presents the main findings and methodological implications of the extensive academic literature addressing secondary education and improvement of educational attainment. The content is organized into five different categories. The first segment provides key theoretical assumptions regarding secondary education and how to expand it in the adult population. The
following section conveys relevant data for Costa Rica, including relevant trends and changes in educational policies, enrollment, graduation and other possible influential factors. The third section presents some forecasts for educational attainment and identifies independent variables that may be relevant for the construction of an educational model for Costa Rica. The review also provides an analysis of the methodologies employed in educational attainment forecasts, paying special attention to what tools may prove useful for this case study. The last section is a reflection on what variables and methodologies will best fit the desired forecast for Costa Rica.

a. General Knowledge about Educational Attainment at Secondary Level

It is possible to notice that secondary education has become more and more important in educational policies over the last years due to research that approaches the positive social, political and economic consequences derived from a population largely educated. From an almost neglected area, increasing the number of people with secondary education has emerged as a pillar goal to improve a nation’s human capital and boost economic development.

The World Bank (WB) has been one of the biggest contributors and promoters of this new and changing vision of secondary education, especially at the upper level. Its World Development Report (2007) defends that investments in young people have the potential to accelerate growth and reduce poverty in developing countries. Batin et al (2000) also emphasize the importance of extending the educational process as long as possible during the ages of 14 to 18 years old, since at this age humans have a bigger capacity to acquired new skills and reach their full potential. On this topic, Lloyd (2007) acknowledges that the report builds a solid case for expanding the basic compulsory state-financed school cycle through lower secondary level and diversifying options upper secondary to effectively respond to global demands for highly skilled workers.

This vision is shared by Crespo et al (2014) that improvements in educational attainments are drivers of enhanced productivity and income growth in many countries, finding a strong relationship between productivity and older workers with secondary education. Their analysis incorporates the concept of educational dividend, suggesting that the more popular demographic dividend is an opportunity to intensify and raise the benefits of investments in education. This outlines the reinforcing and positive interactions that education and population growth may reach under correct policy interventions.

Although many of the reviewed authors accept that increasing access in secondary education must be a priority or developing and transitioning economies, the overall educational trends indicate that the expansion of secondary education in the adult population has occurred very slowly compared with the explosion of primary education worldwide. As a matter of fact, the low coverage of secondary education is thought to be “the bottleneck to increased educational attainment in most developing countries” (WB, 2007). In Latin America, the main reasons behind these low levels of achievement at this level are thought to be associated with high repetition levels and perceptions of low quality of education, both key targets for educational policy-makers.
The WB suggests that universalization of high school education should be addressed as a policy objective that pays special attention to the more excluded groups, since ignoring the larger problems of access of particular segments of the population will affect the effectiveness of strategies and investments. In this regard, the research team considers that “demand-side interventions such as conditional transfers” may be effective to achieve higher school enrollment and retention levels that will lead in the long run to higher levels of education in the adult population.

Another strong argument in favor of increasing the levels of participation in secondary education is that traditionally the level of education of the parents serves as the best predictor for the educational attainment of children. This theory was deemed true by Rolf (2003) in evaluating the probability of matriculating in upper secondary in Germany, while Batin et al (2000) proved this assumption in the different models they constructed to determine high school dropout. Likewise, they considered that the probability to complete secondary education is a complex issue in which factors such as academic achievement and structural strains play a role. Lehr et al proposed that age, gender, ethnicity, socioeconomic background and region are all significant variables to explain high school dropout, supporting the idea that interventions to increase participation and completion of secondary cannot be blind to these differences and vulnerabilities.

b. Specific Knowledge about Secondary Education in the Costa Rican Case

After identifying the global trends and accepted knowledge regarding secondary education, it is important to establish how Costa Rica is placed in connection with those findings and what particular elements can affect outcomes in education attainment at secondary level. The Programa Estado de la Nación (PEN) publishes every two years the more comprehensive analysis of the situation of Costa Rica education, while providing insights about strengths, weaknesses and opportunities for the expansion of secondary education.

PEN (2013) determined that the trend has been to expand coverage of secondary education, a task in which the State has been somewhat successful. However, the completion rates for upper secondary have grown very slowly. According to the report, the net enrollment at this level only improved from 37.4% in 2002 to 46.9% in 2012. Moreover, the average growth for the last six years, when government policies have been more consistent about raising enrollment, has been of only 0.6% percentage points per year. Likewise, high school completion rates went from 37% to 43% of the students enrolled, which places the country very far from the relative universalization that exists in OECD states. The adult population with at least secondary education is also at least 20% lower than the 65% average of regional leaders such as Chile, Peru, Venezuela, Colombia and Bolivia.

The report also confirms that for the Costa Rican case factors such as income, region in which a student resides (rural or urban spaces) are still determining factors to model the probability of graduating from high school. The educational attainment of parents is the most significant variable. With all other conditions remaining equal, a teenager with parents with primary education or no education has a 28.4% likelihood of completing upper secondary compared to 77.5% of a teenager whose parents have completed or have some years of higher education.

In regards to government behavior has given some encouraging signs that may translate into opportunities to increase the adult population with secondary education. The most relevant
educational policy has been the Constitutional Amendment that mandates that 8% of the GDP shall be assigned to education, which brings Costa Rica’s investment in education above average. Nonetheless, the fiscal deficit that the country faces prevented this constitutional mandate from being fulfilled in 2014. This unresolved economic situation threatens to continue depriving education from necessary funds to expand the coverage of upper secondary. Despite financial problems, the commitment of the government to education has been proved by the continuous increment of the educational budget. Support for education is also evident in the continuation of the cash transfer program “Avancemos” that currently reaches 20% of the high school population. Furthermore, another Constitutional Amendment in 2011 expanded upper secondary by declaring it compulsory. This is a first step to reverse a trend in which primary and tertiary education have been the priority of access. As a matter of fact, data from the World Bank (2007) reveals that Costa Rica has issues with universalization and expansion of secondary education. When considering the highest level of educational attainment of the population, statistics show that a larger proportion of adults have completed tertiary education (18%) than those who had only completed secondary education (16%).

In addition, it is important to factor in the demographic transition that Costa Rica is undergoing. Fertility rates have decreased and are slightly above replacement rates. PEN (2014) stressed how this change has caused primary education to lose weight in the educational model and budget, while secondary education has stabilized.

c. Forecasts for Levels of Educational Attainment

The level of educational attainment for the working population of a country or region is often the subject of forecasts. These studies usually aim to provide information to better prepare for future educational demands and to guide decision makers regarding allocation of funds or needed interventions to achieve fixed goals. This section presents a summary of some case-relevant forecasts.

In the field of education, the Frederick S. Pardee Center for International Futures (2010) provides guidelines of how to utilize the International Futures (IFs) tool to produce a desired future and assess the likelihood of attaining that outcome. The modelling software also allows identifying elements that are key to reach that outcome or to accelerate the path towards it. According to its educational model, the dominant relationships that intervene in education will be connected with changes or patterns in enrollment, transitions and costs per student. In general terms, this model assumes that there is a gradual expansion of educational participation and attainment. For education attainment, in specific, the IFs assumes that the structures of the population by age, sex, and level of education will be sustained. Among the relevant dynamics the model also lists demographic change, economic development and public expenditure in education as possible independent variables.

The theoretical contributions of the forecast for 183 countries realized with the IFs software have two important conclusions for forecasts regarding secondary education forecasts (Pardee Center, 2010). In the first place, it suggests that high school level education will not grow as fast as primary education has. Secondly, it proposes that the benefits of investments in education surpass the costs of these policies.
Moreover, as the IFs permits to evaluate country-specific growth rate projections for education, the software provided a base case of Costa Rica’s forecast for adult secondary education attainment at different points. This permitted to determine the time it will take the country to reach the desired level of education for people 15 years or older. The results presented in the annexes demonstrates that without any intervention, and following the current trends, the desired levels of secondary education among the adult population will only be reached in 2075.

On the other hand, Hulík and Hulíková (2012) designed a model to forecast the education level of the population in the Czech Republic for the year 2050, based on the population structure (age, sex, educational level) described by the 2001 census. Their forecast proposes that that the proportion of the population with only primary education will decrease rapidly, while higher levels, especially tertiary education, will grow. They connect these changes with demographic shifts that started in the 1980s, particularly declining birth rates. This study then uses population growth and its composition as the main variable to explain changes in education attainment. Likewise, changes in the population, specifically in the 18 year old group, over the projected period are considered the explanatory factor for variations in enrollment and graduation rates from high school in a midterm forecast conducted by Hussar and Bailey (2011). This second analysis poses an interesting question of whether to include or not graduation an enrollment rates for upper secondary as indicators of the level of educational attainment of the adult population and at which point (or lag) may this correlation become significant.

In terms of the relationship between population and educational attainment, Wolfgang Lutz has provided some seminal contributions to understand better this interaction. Lutz (2010) identifies increasing the stock of human capital (composed by education and health) as the ultimate resource for sustainable development. He also defends that education should be included by default in any demographic analysis, just as age and sex already are. One of the findings from his analysis of over 120 countries is that is difficult to regress to lower levels of education attainment once improvements become embedded in the population structure. Nevertheless, rapid population is considered to have a negative effect on educational expansion.

In a similar manner, Lutz warns that when the dependent variable is the levels of education of the adult population, especially of those who are 25 years or older, “the time lag of expected causality can be very long,” taking up to three decades for increases in enrollment to be measured and perceived in the overall adult population. However, this long term effect should not
necessarily discourage policy makers. Forecasts may still be useful to set plausible and appropriate targets and to improve the efficiency of short and midterm planning toward these goals.

In a previous study, Lutz et al (2005), also made a fundamental distinction. They classified education as a process or flow in which particular arrangements translate into a stock of educated adults, known as human capital. In this framework, accounting indicators such as enrollment or completion rates of high school are considered both measurements of the process and contributors to the stock (the level of the educational attainment of the adult population). Therefore, change in the educational composition of the total population is caused by the gradual substitution of older cohorts by the educational attainment of younger and better educated cohorts. Here the key underlying factors are migration, fertility, mortality and transition rates from primary to secondary education. These elements at rates will produce different outcomes or scenarios for educational attainment in the adult population.

Lastly, Dragomirescu-Gaina and Weber (2013) proposes simple econometric models to forecast the progress of targets on early leavers and educational attainment for Europe through the year 2020. The panel series analysis shows that current students are sensible to the educational levels of the adult population in the age groups corresponding to the parental cohort, confirming other theories of the importance of parental educational attainment as a predictor of high school dropout. The academics emphasize how the models can only calculate forecasts if policies do not change, which indicates certain capacity of interventions to influence these results. They also pay special attention to employment and earning prospects as the main factors driving education attainment over time.

The analysis of previous forecasts clearly identified demographic structures and changes, graduation and enrollment rates at upper secondary, public investment in education and the educational background of parents as relevant factors to model the educational attainment level of the future adult population.

d. Observations about Methodologies Used in Forecasts for Levels of Educational Attainment

The most popular methods for forecasting educational attainment levels are quantitative. Researchers generally turned to statistical modelling, but the software and complexity of statistic forecast vary greatly from simple econometrics models like exponential smoothing to sophisticated, multilayered, integrated models like IFs. Each of these methodologies has particular strengths and limitations summarized in this section.

The IFs is a large-scale, long term, integrated global modeling system (Pardee Center, 2010) that represents demographic, economic, energy, agricultural, sociopolitical and environmental subsystems for 186 countries. The main advantage of this analytical tool is that factors in dynamics, behavior patterns of major agents and contributions of accounting systems specific to education, while evaluating and projecting the impacts of interventions not only on levels of educational attainment for the adult population, but also on other aspects of the country’s life such as demography and economic development. The major advantages of this approach are the evaluation and plausibility of different scenarios based on policy interventions and its ability to connect the desired future with benefits in other spheres, highlighting the benefits of proactive
attitudes toward education expansion and investment. As conceded by the Pardee Center, the primary weakness of the IFs is the parsimonious underestimation of adult education attainment as a consequence of not representing mortality rates associated with different levels of education attainment.

The scenario methodology developed by Lutz (2010) and IIASA share many similarities with the IFs. In this approach, however, the weight of analysis and forecasting of educational attainment is in the population composition by age and gender. The author, who is also the Program Director for World Population at the International Institute of Applied Systems Analysis, produces a global educational trend (GET) simulation, which is considered the most likely scenario for every country. This implies an assumption that the positive movement towards higher levels of education attainment will continue due to the embedded educational levels by age in the current population. Although the analysis favors the GET alternative, Lutz still presents three other possible scenarios, distinguished by different weights of the three education categories: primary, secondary and tertiary.

Since human capital is relevant to the workforce of a country, Lutz et al (2005) emphasize that the average educational level of the people aged 25-35 is more relevant for economic growth than that of people aged 65-75. This indicates that is problematic to use the average of the overall population as an indicator of human capital like the IFs does, because the average may be misleading. By including the elderly population, who are not relevant for the work force and usually have lower levels of education than younger cohorts, the average of educational attainment is affected negatively. For this reason, the decomposition of educational forecasts by group age is a better analytical tool. Precisely, their methodology seeks to disaggregate data and forecasts of the population by age, sex, and different levels of educational attainment for different points in time, using IIASA software. The modelling is complemented again by different scenarios that consider dissimilar dynamics between migration, fertility, mortality and transition rates from primary to secondary education.

Regarding methodology, Hulík and Hulíková (2012) proved the consistency of their model based on the 2001 census by making a projection for the years 2002-2010 in accordance to numbers of graduates according to sex and age in regional structure, before extending the projections to the 2050 target. By conserving the structure of the population created by the census, they are able to determine that, ceteris paribus, the huge regional differences in educational attainment will persist in the future. However, their approach ignores the possibility of interventions that transform those previous patterns.

Hussar and Bailey (2011) faced a similar limitation. They employed different methods to forecast statistics about education in different regions of the United States for the year 2020. Using an exponential smoothing method, the study forecasted accounting indicators such as secondary enrollments, and the number of high school graduates in regions of the United States. For their modeling, they employed data on enrollment and graduates of the past 15 years. On the other hand, to forecast levels of enrollment, researchers decided to follow grade progression grade rates. This method is problematic since it assumes that future trends affecting participation in secondary education will follow patterns of the past. Thus, the assumption neglects significant exogenous factors, such as government behavior and demographic changes.
Finally, Dragomirescu-Gaina and Weber’s panel data approach first shows low trust in the hypothesis since the researchers chose fairly large confidence intervals to test their assumptions. Moreover, it focuses mostly on accounting matrices and indicators associated with education. However, it has the merit of trying to operationalize qualitative aspects or dimensions associated with dropout and low levels of educational attainment.

II. Causal Model for Costa Rica’s Secondary Education Futures

Past forecasts regarding educational attainment and information regarding the current situation of upper secondary in Costa Rica, provides guidelines to create a model for the forecast of educational attainment in the adult population. The first step to define the forecasts’ causal model is to specify the main stocks, flows, and drivers that intervene to produce a given outcome for adult’s secondary education attainment.

The object of forecast of this study will be the main stock in this model, since the level attainment of secondary education of the Costa Rican adult population will be the result of the accumulation of other elements. In this sense, enrollment in upper secondary and the completion rates will be the two principal and direct contributors to build up the percentage of the adult population that has completed secondary education, who are considered skilled workers.

The historically low levels of enrollment in upper secondary education may be one of the main factors to explain the poor levels of educational attainment in the Costa Rican adult population. Graph 4 illustrates that up to 2001 the Gross Enrollment Rate (GER) for Upper Secondary was below 50% of the student population. However, it is also important to note and to factor in to the forecast the remarkable and rapid growth in enrollment from 2002 to 2010. It is necessary to identify what events drove that exponential increase.

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1 The enrollment rates used in the introduction of this study correspond to Net Enrollment Rates (NER) for Upper Secondary, the IFs software does not have historic data regarding this exact indicator, reason why the author uses GER to illustrate the example. NER are generally lower than GER, since the indicator does not account for older children or adults who are enrolled.
Since enrollment rates have increased, the percentage of the adult population with complete secondary education has also raised. However, it is important to note that there appears to be a considerable lag between the enrollment rates and the levels of educational attainment of the adult population in Costa Rica. A change that may positively influence the historic trends for upper secondary enrollment, it is the decision in 2011 of turning upper secondary education from an optional educational process into a part of the compulsory step. If properly enforced, this policy can accelerate the rate of the transition from a low to a high proportion of the population enrolled in upper secondary education. The surprising jump in enrollment during the first decade of the 2000s, it is also explained by the process of expansion of access that took place during that period of time, with the majority of high schools in the country being constructed from 2000-2006. This suggests that improving access and the number of schools, haves a significant impact over enrollment.

On the other hand, Graduation Rates will be also a significant factor to increase or reduce the levels of educational attainment in the adult population. At present, slightly less than half of the students enrolled in 11th grade are able to graduate from upper secondary. The completion of secondary comprises two aspects: passing every class and approving national tests for seven subjects. Thus, a student that passes all his classes, but fails one of the seven tests will not be able to graduate from high school. The low performance, mainly in national tests, suggests issues regarding the quality of education that students received. As a matter of fact, there are also great gaps in quality and completion rates by region, type of institution (public, private or semiprivate) and level of income.

It is important to consider that positive changes in graduation rates influence the educational attainment of the adult population faster than increases in enrollment. Also, a thought-provoking characteristic of this causal model is that the two main flows are not completely independent of each other. Graduation rates are likely to influence enrollment; however, as quality intervenes as a driver, enrollment may not necessarily improve graduation rates. Illustration 1 summarizes the causal model for secondary education attainment in the Costa Rican adult population.
As studies used to build the theoretical framework of this forecast indicate, there is a clear positive feedback loop between the levels of completion of secondary education and the educational attainment of the adult population. This is explained because multiple positive correlations have been found between the level of education of the parents and the possibilities of children of graduating from high school. In a similar manner, theory also suggests that younger generations tend to be better educated than the older cohorts of the population and help to increase the general levels of attainment. As attainment is a stock, increases in enrollment in upper secondary have a cumulative effect over the percentage of the population with secondary education, creating another positive feedback loop in this relationship. Nevertheless, enrollment by itself it is not enough to significantly raise attainment of secondary education in the population, as it is still necessary increase in parallel completion rates.

There are a large number of underlying elements that can affect enrollment and completion rates in upper secondary. However, for practical reasons, this study will look at five specific drivers that directly affect flows and indirectly change the level of secondary attainment in the adult population: income, dropout rate, quality of education, public spending and repetition rates. Dropout and public spending in secondary education are more relatable and likely to affect enrollment; whereas repetition is a driver more connected to graduation or completion. Incomes of the household and quality of education have strong effects over the two main flows.

Normative Public Policies are at the center of the diagram because interventions have the capacity to affect almost every other driver and flow in the model. Nevertheless, connection between this element and other factors in the moderns lacks a positive or negative flow, because they have the capacity of either improving or deteriorating the performance of indicators. Therefore, interventions in different drivers are critical to accelerate the positive drivers of enrollment and graduation flows and to reduce or minimize the negative feedback of elements.
such as dropout and repetition, in order to raise the stock of Costa Rican adults with upper secondary education.

The diagram emphasizes that also many of the drivers have either positive or negative affect over each other. Although, this may seem problematic at first glance, it may also represent an opportunity to identify the driver with the highest potential to positively affect the whole system and its outcomes. Under this logic, improving quality of education and the performance of students in upper secondary should be a top priority for interventions due to its capacity to multiply the flow of completion and enrollment. This driver also appears to boost positive drivers and to reduce the contribution of negative drivers to the system, such as repetition. A second factor for intervention is public spending. Since Costa Rican law establishes that the governments should assign an 8% of the GDP towards education, stabilizing the amount of resources available, it is necessary to consider how resources can be allocate in a way that contributes to the expansion of upper secondary and improves quality.

III. Methodology for the Costa Rican Forecast

The forecast for secondary education attainment in the adult population of Costa Rica has a normative character. Therefore, the methods of analysis should permit to focus and evaluate the impact of policy interventions and variations in the key drivers of the causal model. This premise implies that the main product of this forecast should be a list of policy recommendations to reduce the time necessary for the adult population with secondary education to reach the benchmark of 74%.

This perspective and desire outcome premise excludes simpler econometric models of forecasting that extrapolate trends without accounting for exogenous elements and not quantifiable elements such as government behavior. For instance, normative changes such as the designation of upper secondary as compulsory education or the implementation of free transportation for high school students residing in rural areas are harder to account in a regression model but are significant to improve the drivers and flows of variables such as enrollment and completion. For this reason and due to relevancy of normative policies in the causal model, it is necessary to turn to more complex modelling systems to produce the forecast.

Scenario analysis permits the exploration of the consequences of key decisions and events, mostly through narrative. In this sense, it will permits us to construct plausible alternative futures for secondary education attainment in the Costa Rican adult population by experimenting and justifying different trends in the flows and drivers. In terms of policy, this method may provide alternative plans for MEP and governments interventions connected to differentiate financial scenarios that account for the current uncertainty posed by the fiscal crisis. The scenarios will also render different potential benefits that justify the expenditure the government is willing to make or trade-off.

For this project, and based on the domain knowledge of the Costa Rican case, this study will ponder the following possible scenarios for secondary educational attainment
High priority in government agenda and high resources: fiscal crisis is solved, economic growth continues, and policy makers are committed to increasing enrollment and graduation rates through key policies.

High priority in government agenda and constrained resources: the situation of fiscal deficit continues to carry on due to lack of agreement in Congress regarding reforms or economic growth contracts diminishing available resources for education, meanwhile the government tries to implement qualitative changes but it is unable to fund expansion of high school or reforms.

Low priority in government agenda and high resources: Policy makers are concentrated on other political, social and economic issues. Despite available resources, the allocation of funds follows a similar pattern to the present structure.

Low priority in government agenda and low resources: the lack of resources of political slows the rates of the drivers and flows in the model.

The IFs modelling system will be of use to explore scenario alternatives, while also providing quantifiable forecasts for the different driver, flows, and, of course, stock as a result of variations occurred within those scenarios. The software does a remarkable job in recording changes in the overall system and registering dynamics between drivers that simpler econometric models ignore. Furthermore, makes manageable the stock and flow accounting structure of the causal model, allowing to focus attention mostly on the assumption about scenarios and the best interventions or policy decisions to achieve MEP’s goal. Likewise, comparing the historical evolution and expansion of lower secondary in Costa Rica during previous decades may also prove a useful tool to identify patterns for upper secondary.

Although theoretical models for educational attainment suggest that it is likely that increased educational spending and enrollment in upper secondary will take a long time reflect on the level of education of the adult population, the biggest contribution of this forecast may be precisely to help Costa Rican authorities to set more appropriate and realistic goals for its situation. At the same time, it will allow the government to prepare and plan better for a future in which the country may be unable to fully respond to a demand of more skilled and educated labor.

IV. Forecasting for Attainment of Secondary Education in the Adult Population of Costa Rica with IFs

The IFs is a valuable tool to model and estimate how different interventions can affect the whole range of drivers and flows involved in educational attainment, affecting MEP’s ultimate goal of reaching 74% of the population with completed secondary education. Nonetheless, some of the drivers included in the causal model for educational attainment cannot be modify through an intervention as they are not available on the scenario tree, although it is possible to find and use proxies for some of the drivers. In the case of the Costa Rican model, funding for education and quality standards are considered the two most important drivers given their capacity to affect the highest amount of drivers and flows in the model. IFs scenario tree testing interventions in two areas relevant for secondary education and for the forecasting goals: government expenditure in education and survival in upper secondary. Transition rates from lower to upper secondary were
also available, but inside the model the forecast already reaches 100% which does not allow to apply any other intervention.

Funding for education is represented by the indicator Government Expenditures by Destination Multiplier (gdsm) for Education. Likewise, the analysis utilizes the Survival of Upper Secondary Multiplier (edsecupprsm) as a proxy for completion rates for upper secondary. Based on these two indicators, the study proposed two different scenarios for attainment of secondary education in the adult population. The first is a conservative projection with moderate increases to both funding and survival. The second scenario is an optimistic one, where both drivers have significant increments. In both cases, the analysis considered the changes that such interventions may have over: completion, enrollment and the overall adult population with complete secondary education. The cases also included data regarding the projected shifts in GDP annual growth and GDP at Purchase Parity Power (GDP at PPP) to understand the potential benefits of such interventions.

a. The Conservative Scenario

In this scenario, the IFs models the impact of an increase of 15% in the budget dedicated to education in Costa Rica over the next 12 years and an improvement of 25% in survival of upper secondary over the next 20 years. The output is presented by individual intervention, with the purpose of determining the contribution of each element to the flows of completion and enrollment and to the stock of attainment of secondary education. The last section of each scenario represents the forecasted results of the two interventions occurring at the same time.

An upsurge in the budget of 15% spread over 12 years proved to have as significant effect over the flows of enrollment and graduation of secondary education. The increase is thought to be conservative because Costa Rica has consistently enlarged the budget by a similar amount every 12 years for at least the last two decades. Likewise, if the government delivers the promise of assigning 8% of the GDP to education, this increase will likely occur.

Thus, the 15% increase starts to change gross enrollment of upper secondary as early as the second year of the intervention, although by a small amount. At the of the 12 years established for growth in the budget destined to education, enrollment is 6.8% higher in the intervened case than in the base case given by IFs. Even though the gap between the two scenarios reduces over time, by 2050 the difference is still of 3.62%, with the estimated enrollment being 93.96% in the base case and 97.58% in the intervened. In a similar manner, graduation rates start to go up very soon after the intervention. By the year 2023, when the 15% is reached, the difference in completion between the base and the intervene examples is of 6.11%. For this flow, the difference between the forecast for the two models also decreases with time to 3.15%.

In regards to or main object of forecasting, the intervention of the educational budget, as well as subsequent increase in enrollment and completion do have an effect over the overall secondary educational attainment of the adult population. This stock surpasses the 74% benchmark by 2069 with budget upsurge, an event that the base case has not reached yet by 2075. Therefore, this intervention accelerated the fulfillment of this goal by at least 7 years.
Although this improvement in performance may not appear very dramatic, other long term benefits derived from it should be considered. In this sense, the growth in educational budget seems to yield also improvements in the forecasted GDP growth rate and GDP at PPP. In 2015, the forecasted growth rate for the intervened scenario starts to top the rate forecasted for the base case by 0.046%. The most relevant information may be that this gap keeps increasing through time, reaching 0.091% by 2075. This number may be significant as economic growth for Costa Rica contracts to less than 2% from 2059 forwards. However, this shift occurs earlier, by 2056, in the base model. Likewise, GDP forecasts are significantly higher for the scenario in which the government has a higher expenditure in education. The gap in wealth also increases across time, representing a USD$14 Billion annual difference by 2075.

The second step of this scenario implied an increment on the survival rate of upper secondary. The change was of 25% over 20 years. This increment affected survival, accelerating growth by 6% in just 5 years. Nonetheless once survival reached 78%, it stabilizes and stays at this level for the remaining of the time horizon. The same happens for the base case, although it takes 16 years more to reach the same rate.

This upgrade represents a small improvement over enrollment in upper secondary for nine years (2012-2021), period after which the effect disappears. The highest difference between the intervened and base case is 0.92%. The behavior of upper graduation rates are similar to enrollment, the intervention has a positive effect during the first 12 years and fades away after that. Nevertheless, the increment for this flow is higher. For instance, the growth caused by the increment in survival represents an upsurge of more than 2% during the peak of the intervention.

In terms of the forecasting object, there is a very small improvement when comparing the base case with the intervened. However, at its highest point the improvement represent 0.40%. With this increment in survival, it is still not possible to reach the 74% benchmark by 2075. In addition, there are no perceivable changes to projections for grow rate or GDP at PPP.
The analysis also combined these two interventions to determine if their interactions modify drivers more rapidly than either of the changes by themselves. The forecasting suggests that results for enrollment are not higher when combining the two interventions than the projections provided by the 15% increase in the budget. As a matter of fact, the outcomes are actually smaller by a couple of decimals when the two drivers are altered. The same behavior takes place regarding graduation rates. Nonetheless, when compared with the budget intervention, the overall educational attainment of the adult population improves slightly when the two measures are enforced together from 2011 to 2036. This may be explained because survival reaches a ceiling and stops growing after 16 years when the survival rate stagnates.

b. The Optimistic Scenario

In this setting, the two drivers are assigned a very high change with the purpose of determining how a fast approach could alter the proportion of the population with completed secondary education. The investment in education was increased by 30% across 20 years, whereas the survival for upper secondary was augmented by 40% across 20 years.

The intervention on survival offered the same result given by the moderate intervention. Once again, the shift in the driver is of 6% and it stabilizes as it reaches 78%. The subsequent effects over enrollment are positive, as the rate for this policy change is higher than for the base case, or the moderate intervention. Nevertheless, this improvement represents only some decimal points. In what respects to graduation rates, the intervention seem to work during the first 12 years, however, after that point it fails to deliver higher results than the base case.

The educational attainment of the population increases slightly when compared with the conservative scenario and the base case. However, the growth is not enough to raise the stock of the population with completed secondary above 74% before 2075. There are no changes over annual economic growth or GDP at PPP.
In contrast, the upsurge in the educational budget yielded more significant outcomes. This intervention raises the enrollment rates to a 100% by 2047, compared with 2057 for the 15% increased, and the maximum of 98.55% by 2075 for the base case. The difference between the budget increased by 15% and by 30% is of more than 4 percentage points during the steepest increment in the graph for both interventions. At the same time the gap with the base case is of more than 8 percentage points. Likewise, graduation rates grow under a higher budget. The maximum value reached for this flow is 90.92% in 2075. An example can provide further guidance above the gaps between the different models. In this sense, for year 2050 the graduation rates for budget increased by 30% is 89.70%, for budget increased by 15% is 86.80% while the base case is 83.65%.

The effect of a dramatic budget growth over the secondary educational attainment is again very positive. The benchmark of 74% is surpassed in 2066, reducing the necessary time by at least 10 years. The improvement ranks between 1% and 2% when compared with the intervention in which the budget increased by 15%. There are positive consequences for the annual economic growth rate for the GDP at PPP. For the first indicator, the contraction of the annual growth to levels below 2% is retarded by 10 years when compared to the base case. Likewise, GDP at PPP will increase in the long term. In this case, the projected difference between the base model and the budget increased by 30% is of US$26.9 billion.
The analysis also tested the combined effect of these two high interventions to determine if the effectiveness is higher under these circumstances. The results of this dual policy over enrollment are not as high as when just the budget increases. As a matter of fact, the enrollment rate is either equal to or some decimal smaller than when the funding is increased by 30%, but it is considerably higher than the base case. The same outcome was observed regarding upper graduation rates. Therefore, it is not surprising that the effect over the adult population with completed secondary education is similar to the behavior of enrollment and graduation. The difference between the combined and the budget increased by 30% scenario is of about 0.20%, with the latter being higher. However, they both reached the 74% benchmark by 2066.

The analysis with IFs showed that investment in education has a significant effect over educational drivers, flows and outcomes. Thus, increasing investment education accelerates the rates of enrollment and graduation. The intervention also contributes to shorten the time required for having 74% of the adult population with completed high school. This results help to validate the causal model in which higher flows of enrollment and completion of upper secondary help to increase the educational stock of the overall population. It also suggest that higher investment in education, regardless on high or small increases, does not only raise the levels of educational attainment in the population but also contribute in the long run to foster rates of economic development.

Nonetheless, the biggest limitation of IFs method for forecasting Costa Rica’s Secondary Education Futures is the lack of mechanisms of indicators to test the impact of qualitative reforms. It is unknown, for instance, how graduation, enrollment, and the percentage with completed secondary education will change as a consequence of an upgrade in the training of teachers. It is obvious to see how more resources will positively affect drivers. However, it is not possible to infer if quality will bring significant improvements. The following section addressing narrative scenarios uses an analogy between the expansion of lower and upper secondary in Costa Rica to deliver information regarding reforms that may raise the performance of upper secondary students.
V. A Qualitative Approach to Scenario Analysis

The causal model for secondary education in the adult population of Costa Rica provided us with a list of drivers that can interact with each other to either slow or accelerate MEP’s desired outcome. Since government behavior, expressed by policies, and funding are the two major uncertainties when thinking about forecasting adult attainment of secondary education, this study created four possible scenarios for 2028. This time horizon was selected because it represents the completion of three cycles for the government. It was also noted that 12 years is the usual time required to enforced and meet changes in the educational budget. In addition, secondary education in Costa Rica also experienced cycles of approximately 12 years in which enrollment and completion stagnated or expanded, initiating a new period in 2014.

It is important to highlight that in the development of these four scenarios, the author relied mostly on historical and present trends for the drivers and flows involved in the causal model. Extrapolation and analogies were drawn between the past expansion of lower secondary and the futures of upper secondary as a resource to build the plot and enhance the narrative associated with possible outcomes. Likewise, the existence of similarities between different stages and turning points in the process of universalization of lower secondary and the present situation of upper secondary allows checking the plausibility of suggested events.

The greatest limitation of this qualitative or narrative approach to scenario building is that by wanting to include considerations for all of the drivers in the model, and not having access to historical data for each on them, it is somewhat difficult to quantify the individual specific contribution of each driver to changes in the stock of adults with secondary education. Likewise, the lack of statistical data hampers the understanding of how much changes in flows and drivers are contributing to improve the educational attainment of the adult population or other social and economic indicators. Despite these restrictions, scenarios rooted on a thoughtful review of historic trends, theories and domain knowledge about the role of upper secondary, as well as the changes that other countries have experienced as a consequence of improvement on this indicator, can still provide relevant insights about the future Costa Rica may face.

a. The Present Scene

A quick overview of the country’s situation suggests that upper secondary in Costa Rica had a very low priority until very recently. Secondary education enrollment and completion were completely stagnant during the 1980s and early 1990s. Nonetheless, once economic development started to require more skilled population, enrollment rates initiated an ascent. During the following years, and until current times, educational policies have focused mostly on access, by creating new high schools. In this sense, 35% of the 792 public high schools were built between 2000 and 2006 (PEN, 2011). However, this policy of expansion has concentrated primarily in lower secondary and has also ignored quality standards. Meanwhile, upper secondary staled during the wave of expansion of the early 2000s and started to receive more attention in the last eight years. This change has run parallel to Costa Rica’s upgrade to an upper middle income country and interest to attract more advanced and technological investment and companies, thus, increasing demand for labor with completed high school.
Regarding government spending in education, during the last two administrations (2006-2010, 2010-2014) the trend was to slowly increase the available resources for education. For 2012, the investment in education represented 7.0% of the GDP (PEN, 2013), a number below the Constitutional mandate of 8%. In the context of a sustained fiscal deficit, that is projected to reach 6% of the GDP by the end of this year (Rodriguez, 2014), the government announced that in 2014 the mandate will be once again disrespected. When in 1997 the Legislative Assembly fixed the investment in education in 6% of the GDP (Román, 2012), it took the Costa Rican government close to 12 years to deliver this promise, even under circumstances of economic prosperity. There are also issues regarding the distribution of the budget by educational level. Primary education, which is thought have universal participation, gets the higher share of the budget: 27.7%, although it has decreased about 8% in the last 14 years (PEN, 2013) due to demographic shifts. Nonetheless, investment in secondary education has not grown during the 2000s and has remained at 22% of the budget.

Above all other drivers, quality exhibits some of the biggest issues and represents a significant obstacle to increasing both enrollment and completion rates for upper secondary. It is fair to state that expansion of secondary education has occurred without being matched by improvements in quality. There are several qualitative and quantitative elements that can serve as proxies for the poor or, at best, mediocre performance of the system at secondary level. For instance, the compulsory national exams at the end of 11th grade are a requirement to graduate. The average score for the exams among students from public schools for 2012 was 66.58% (MEP, 2013), below the passing grade. In the MEP’s ranking of high schools by the result of national exams, among the bottom 100, 40 schools have a zero approval rate among its students. This suggests lack of familiarity of students with basic knowledge related to each subject. If we used instead the results of PISA scores, scores for 2009, the first year Costa Rica participated in the evaluation, placed country in 44th position (MEP, 2013), considerably below OECD standards. Across time, disinterest in the educational offer and problems learning are also among the main reasons for why students desert high school according to surveys carried out by PEN (2005, 2008, 2011, 2013).

Teachers’ qualifications and conditions may also be another useful indicator to explain low performance of students in upper secondary. In this regard, PEN (2005, 2008, 2011, 2013) has showed that the number of teachers who are on temporary contracts, which entitles lower paid and requires lower qualifications, has increased during the past 9 years. Likewise, MEP uses no aptitude test to select candidates for a teaching position and there is no monitoring over the quality of contents of the more than 100 different college degrees offered in the country for primary and secondary teachers.

Many studies have indicated that repetition, besides being an expression of issues of quality, is also a risk factor for dropout and an obstacle for completion of upper secondary. In this sense, repetition in secondary education in Costa Rica has been somewhat high. In 2004, for instance, it affected 20% of the student population enrolled in high school (PEN, 2005) and it grew to 21.6% in 2006 (PEN, 2008). More recently, repetition has diminished as a result of reforms that eliminated national exams at the end of lower secondary and the possibility of students of moving up a grade even when they failed a subject, which now they can drag and compensate for during the following year. However, these reforms tiptoe around the problem of quality instead of tackling the underlying cause of repetition. As a matter of fact, high school dropout remains at
9.9% (Soto, 2014) despite the reforms to reduce repetition and dropout and the increased in the budget for conditional transfers through the “Avancemos” program, which reaches 34 % of the population enrolled in secondary (IMAS, 2013). The highest dropout and repetition rates are in 7th grade, the begging of lower secondary, and 10th grade, the beginning of upper secondary.

In the Costa Rican case, there are components or structures unlikely to change, just as some events are considered to be inevitable. The trend towards increasing the average years of schooling of the population falls into this category. The trend for the past three decades has been towards improvement, although the rates at which this change takes place have varied. It is very unlikely that enrollment will decrease significantly or that the percentage of the adult population with secondary education will shrink. This is supported also by the law that now makes upper secondary compulsory. When it comes to funding, it is also unlikely that the percentage of the GDP dedicated to education will drop lower than 5%, independently of the economic context. This is assumed because of the institutional mandate to assign 8% of the GDP and by historic records that showed that even during the worst economic crisis the country has experienced, as well as during the 2008-2009 recession, the educational budget never fell lower than 2 or 3% of the number fixed by law. Furthermore, as MEP is also the largest employer in the nation which implies that significant funds will continue to be poured into the ministry. However, since the budget is dependent on economic development, a reversed economic situation can severed the real impact of this 8%. The other external situation to consider is that the two unions of teachers in the country are fairly large and strong and will remain an important actor with whom the government should negotiate any relevant reform.

Now that is clear the context in which Costa Rica’s education is immersed, it is possible to focus on examining the possible paths that the country may follow regarding educational attainment. In a similar manner, the following sections will also consider the events and interventions needed to achieve such outcomes.

**Scenario 1: Catching up with the myth.**

Costa Rica has been thought to be a country with an educated population. Although this premise may be true when you compare this nation with the rest of the region, particularly Central America, evidence suggests otherwise. Costa Rica has a more educated population than the average for Latin America, however completion of upper secondary is still significantly low. This scenario explores decisions and events that can help the country live up the myth of an educated adult population. Two assumptions are made in order to achieve this optimistic future. In the first place, there is high availability of funds for education and, secondly, there is a high commitment of the government to improve the quality of secondary education.

The first significant event that allows for this scenario to occur is solving the fiscal crisis. Under a new fiscal reform and higher efficiency to capture revenue, the State is able to fulfill its obligation to assign 8% of the GDP to education, which significantly increases the amount of resources by 2018. As a consequence, the government is also able to continue with the cash in transfer program “Avancemos” and is able to expand it to reach more students living under poverty. Given the increase of funds, and taking advantage of the demographic transition the country is able to enlarge the budget for upper secondary from 22% to the OECD standards of 41%. The surplus of resources is used to improve physical conditions of public high schools,
including supplying the necessary number of classrooms, restrooms, and desks to satisfy demand. Likewise, the number of laboratories and libraries grows, focusing on providing these services to schools that lack these facilities.

Completion of secondary education becomes a priority in the agenda of the government in order to keep the country competitive and foster economic development. With the purpose of improving the skills of the labor force, MEP carries out a serious of substantive reforms to improve quality, enrollment and graduation rates. As the government enjoys high popular support as result of social policies and improve economic situation, they are able to engage in discussions with teachers unions from an advantageous position. The authorities also have the support of the Ministry of Economy, the Ministry for Foreign Investment and business sectors.

Among these policies, the MEP gives a priority to reduce is committed to address disproportionate repetition and dropout in the cantons with and schools with the higher rates with additional funds and interventions. Improved conditions in these regions helps to raise the secondary educational attainment of the population with lower levels: urban and poor-urban groups. Low performance on national exams is used as one of the main indicators for special interventions. The overall general quality of secondary education progresses due to changes in teachers training and recruitment methods. This is achieved with the application of an entry exam for candidates to join the MEP and by introducing the requirement of a completed college degree before obtaining an appointment. Although the teachers’ unions have opposed some of these reforms in the past they are willing to compromise as long as the changes are not retroactive and are accompanied by a positive salary adjustment.

These alterations to improve quality and conditions associated with upper secondary education help to reduce repetition and dropout and improve completion. At the same time, the contents of secondary education, especially English and technological education, are considered more relevant and connected with daily life. These skills are also perceived as necessary to find good jobs. Thus, enrollment and completion rates grew at accelerated rates towards universalization. This chain of events also reduces the time horizon necessary to achieve the 74% of the adult population with complete high school degrees.

As a consequence, Costa Rica experiences economic growth base on the expansion and improvements of its human capital stock. This growth is also based on quality and skilled employment that also represent higher revenues for the State and creates a positive feedback loop with educational investment. Therefore, the country is not only able to raise the levels of educational attainment, turning the myth into reality, but is also able to remain competitive and a leader in the region.

**Scenario 2: Full of Good Intentions**

This is the most likely scenario for Costa Rica given current and historical patterns of investment and government behavior. The two assumptions involved in this scenario are: 1) there is a high priority in the government agenda to enlarge the base of the adult population with completed secondary education and 2) the resources available are constrained. This situation also resembles the most the current situation, although in the projection the interest and commitment of the authorities is greater.
The limited funding is a result of problems to solve the fiscal deficit and to improve the efficiency in the recollection of revenues. The Solis administration (2014-2018) was able to pass a fiscal reform by 2016 and starts reducing deficit by the end of its period. Nonetheless, bureaucracy complicates and slows implementation and efficiency of recollection, while the piled debt represents considerable part of the GDP. The next two presidential administrations focus mainly on paying the accumulated internal debt. Thus, the educational budget is compromised and recedes to a similar situation of that of the economic crisis in the 1980s. The investment in education recedes to 6% of the GDP during the worst moment of the crisis and starts to grow after its resolution. It remains under the Constitutional 8% for at least two administrations, what is to say 2023. The country misses the opportunity to expand secondary education during the years of major decline in population growth, which significantly reduces the number of people in school age.

The small improvement in funding for secondary education is linked partly to the increased interest of the country in elevating the educational attainment of the population and partly to the opportunity represented by the reduction of the population with primary school age. This allows for MEP to reallocate funds from primary to secondary education increasing its share on the budget to 30%. This improvement, far from ideal, allows to respond mostly to the growth in enrollment that has been occurring. Nonetheless, resources are not sufficient to upgrade conditions and facilities in high schools. Rural students and young people from low urban socio-economic backgrounds continue to suffer in a higher degree than their peers from dropout, repetition and low levels of completion. Since these groups have the lower contribution to the educational attainment of the overall adult population, growth in this stock will continue, but at rates similar to the present. This will translate into a horizon similar to the IFs base case presented on the domain knowledge section, making the 74% goal a very distant event.

Under the constrained budget, the government engages in small low-cost qualitative changes to the curriculum mostly hoping to increase enrollment and graduation rates. The lack of popularity of the government and the country’s recuperating economy makes difficult for the authorities to defy the strong teacher unions whom are concerned with reforms reducing the benefits of their members. Changes include curricular reforms and some minor protocols to refine the hiring of teachers. There is no increase in teachers’ ratios and the majority of them continue to work under temporary contracts. There are not foreseeable changes in graduation or repetition rates, even though enrollment may grow and then stabilize.

In the long run, this situation has negative consequences for Costa Rica. The country starts being perceived as less competitive to foreign investors and companies. It also faces stronger rivalry with Panama, who has rapidly increased its human capital under conditions of fast economic growth. The country’s economy also slows down, the population ages, and the government struggles to find a niche in the global market. Issues to develop a specific industry are caused by a not enough educated population for an innovative and technology based economy such as Singapore or Finland, and by an expensive semi-qualified labor, due to the country’s social regulations, that disinterest sectors such as the manufacturing that takes place in Southeast Asia. Thus, with slow levels of growth for attainment of secondary education the country faces moderate growth, lower than in the current situation.
Scenario 3: The Costs of Indifference

The two assumptions involved in this prospective panorama are: abundant levels of resources for secondary education, matched by disinterest and low ranking of the educational reform in the government agenda because other social, political and economic problems that are perceived as urgent by the authorities. This scenario is considered the least likely of the four alternative futures, given the heritage, institutional framework and political culture of Costa Rica. The country has showed for over 70 years features of Welfarism and public provision of goods. Even during the Structural Adjustment Programs (SAP) policies, promoted at the end of the 1980s and beginning of the 1990s, the population has strongly resisted the wide privatization of certain sectors such as provision of utilities and health care. Therefore large cuts and complete abandonment of the educational system would not be supported or received with indifference by the Costa Rican middle class, especially as the levels of education of the population increase.

In this context, the government is successful at solving the fiscal crisis and through efficient mechanisms is able to improve revenue collection and initiate payments of public debt by 2014. This is also accompanied by continuous economic growth at an initial phase. However, due to the lack of prioritization regarding education, no significant reforms or improvements are carried out to secondary education. The government delivers 8% of GDP to education in accordance with the Constitutional mandate. Nonetheless, this budget is not efficiently managed to develop a stronger and more democratic secondary system. If measured by positive changes to completion rates and quality upgrades, the abundance of resources is wasted. The share of secondary education in the national budget stays around 25%. Increases in enrollment as a consequence of natural flows put a lot more stress on the system.

With the surplus of resources, MEP increases the number of high schools, but continues to ignore issues of quality. Dropout and repetition aggravate in vulnerable regions and schools, as the content and quality of lessons makes it impossible to compete with students with English and computer proficiency. Moreover, teachers unions demand higher salaries, but improvements in working conditions are not accompanied by minimal standards of qualifications for their members. The only significant improvement associated with quality is the increase of teachers’ ratios and more permanent contracts, as resources stop being a concern.

This scenario represents a waste of the high inversion of the State in education. Under this model, enrollment may increase, but performance of the system in terms of graduation and repetition will not see significant improvements. Although, at first this indifference towards universalization of upper secondary may not have immediate negative repercussions, in the long run it will have high costs for development. The adult population with secondary education is not likely to increase more rapidly in this context, making the labor more inefficient and less competitive when compared with other countries with similar incomes. Therefore, the Costa Rican economy is likely to take a hit when its human capital cannot attract large and relevant industries, eventually costing it the resources that could have been able to improve education and the network of social goods provided by the State.
Scenario 4: Death End Road

This is the most pessimistic scenario, as it represents a deterioration of the current situation of upper secondary in Costa Rica. The two assumptions are: there is a reduction in the amount of resources available for education and the expansion of upper secondary education has very low priority in the government agenda.

The fiscal crisis is not resolved rapidly, and the fiscal reform to increase revenues is enforced until 2018. However, due to compromises made in the Legislative Assembly to reach a resolution, the changes are not significant enough to rapidly increase revenues for the State. The government is forced to enforce austerity measures to manage public debt. Social sectors are more severely affected, including the cash-in transfer program “Avancemos” which is cut by half. This negatively impacts and reduces enrollment and completion of secondary education in groups from lower socio-economic background.

Investment in secondary education remains in 25% of the national budget. This does not allow for improvements to the physical condition of high school, the quality of the curriculum, or teachers’ situation. It is more likely that the levels of all of those indicators deteriorate, which resembles the stagnation of lower secondary during the 1980s and early 1990s. Likewise, as education is not among the main goals of the government agenda, no significant changes are carried out to improve quality. Middle and upper class students are more likely to favor private education, increasing the gap in skills between them and poorer students. As a consequence, enrollment and graduation rates slow down, the adult population with completed secondary will continue to increase by inertia, but the time required to reach the 74% benchmark is prolonged.

In this context, Costa Rica losses advantage in comparison to other countries in Latin America in regards to educational attainment and economic development. Annual growth of the GDP decreases because the country is not capable of attracting investment or competitive sectors since a great part of the labor force is still not able to complete high school. Investment in education recedes to 5%, similar to the levels of the 80s during the economic crisis, although it is unlikely to go lower. Nevertheless, the constitutional mandate continues to be disrespected.

The title of this scenario it is an allusion to how Costa Rica has been regarded as an exemption in the region for democracy and social justice. However, under the previous circumstances, the country loses its leadership in these fields and starts to resemble more its neighbors in Central America.

The narratives of these four scenarios validate the idea that educational investment is crucial to improving drivers and flows of enrollment and completion, an idea proposed by the IFs modelling methodology. Likewise, it suggests that higher investment can help to reduce the time horizon to reach the 74% goal of attainment of secondary education. However, this method, and the historical patterns for Costa Rica, also proposes that an enlarged budget by itself is not an enough to improve the quality of education. Upgrades to advance the universalization of upper secondary, also requires considerations about how to spend the surplus on the budget. It is necessary to enlarge also the budget for secondary education and to continue to support cash in transfers that help to retain students from lower socioeconomic conditions, who faced the biggest
obstacles to increase their level of educational attainment. In addition, it is also necessary to expend resources to close gaps regarding the conditions and facilities between high schools.

The other consideration derived from this analysis is that reforms to improve quality are also relevant. Underpaid teachers without proven aptitude in the subjects they teach will continue to have poor performance and will impact negatively the performance of their students. As long as repetition and dropout, which are not caused only by lack of funds, continue to be large and drastically over average for certain regions, those students will have great problems to complete high school and raise their educational attainment. Therefore, interventions should seek to even the playing field for this group of students. Furthermore, improvement to the content of secondary education, emphasizing English proficiency and technology are essential to retain or increase the country’s competitiveness.

VI. Conclusions and Policy Recommendations

The results of both forecast methodologies suggest that funding is a key factor to improve enrollment and graduations rates. Increases in the educational budget in the past have contributed to raise educational attainment of the population and will help to reach the 74% benchmark faster than predicted. In this sense, delivering the 8% of the GDP should be one of the priorities of policy makers, since as seen in the conservative scenario of the IFs, model will have positive consequences for educational attainment and economic growth in the long term. Although an 8% for education may seem high and unrealistic, when compared with the average expenditure of other developed nations, Costa Rica already had a positive experience when in 1997 the country fixed the investment in 6% in the Constitution. The country was successful in reaching this goal, even when the promise was reached in 12 years. Since the decision of the 8% is already institutionalized as a Constitutional Amendment, it is very unlikely that it will be reversed. Thus, the country will continue to advance towards a greater educational investment, although the speed to fulfill this promise is still not known. However, it is clear from historic trends that the longer the budget is stalled, the slower the growth will be for associated drivers.

However, Costa Rica’s secondary futures are dependent not only of the budget, but how those resources, especially if they are raised, are spend. The stability of the secondary education budget in 22% for the past two decades represents a risk. The system is already in stress, being unable to fulfill requirements for classrooms, desks and materials. A significant increase in enrollment isolated from adjustments in the weight of secondary education in the budget will worsen already existing problems associated with the incapacity of the State to respond to demand. This is also likely to affect quality as larger classroom and poorer resources will impact performance. Therefore, even under the current budget, it is urgent that the MEP readjusts its internal weight to increase funding for upper secondary and make it closer to OECD standards. In addition, it is important to maintain the resources currently assigned for schemes such as cash-in transfers and transportation subsidies, as they contribute to eliminate situations of inequality that caused students from lower socioeconomic backgrounds to dropout. Improving the performance of this group in terms of enrollment and completion is crucial to reduce the time horizon necessary to reach the 74% benchmark, as they represent the cohort of the population with the lowest educational attainment and keeps pushing the national average down.
The MEP is also currently at a crossroads in which they may choose to continue ignoring the problem of quality, as it has been the tradition, or to tackle it with relatively low cost reforms. The costs of poor quality education are high, but not only for enrollment, completion and educational attainment. On the contrary, it represents a problem of inefficiency when considered from the perspective of investment, since large amounts of resources (8% of the GDP) are being poured into an institution that is not delivering students with the necessary skills to remain competitive. In this sense, completion of secondary may increase as long with educational attainment, but if those adults lack competency in relevant areas as English and technology use, the country will continue to have problems to supply educated manpower and retain the competitiveness of their economy. Basic adjustments such as including a competency test for candidates to a teaching position can yield great payoffs and improve quality. It may also help to reduce inequalities in the performance of schools.

Under the current circumstances, the most likely scenario is that Costa Rica will reach the 74% benchmark in 2060s, this is faster than the base case scenario presented by IFs. The basis to make this forecast is that the system cannot account for the policy decision of making upper secondary compulsory, or for the upsurge in the budget that will take place during the next years (as a matter of fact IFs foresees a contraction of the educational expenditure as the population in school age decreases). Both policies will likely accelerate the rates of enrollment and secondary education attainment in the adult population. Hence, the governments priority should focus in fulfilling the budget promise and, secondly, on improving monitoring mechanisms to enforce the compulsory mandate. However, any other State intervention that results in increase in enrollment and completion rates will continue to shorten the time required to reach this benchmark and will certainly represent economic and human capital advantages for Costa Rica.
Bibliography


IMAS. 2013. Personal Communication [8 October, 2013],


