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Access to Private Higher Education and Future Savings Scheme: How to Align these Variables?

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Abstract: The purpose if this paper is to outline the prevailing situation in Mexico related to the lack of matriculation in higher education. It discusses the few economic aid alternatives in existence, as well the way to approach them through a savings scheme as a means to enable financing to access higher education in a private institution. The study is conducted in the metropolitan area of Boca del Río, Veracruz. All this with the purpose of showing, on one side the tuition costs in private schools and on the other hand, the actual interest rates in savings schemes given by national financial institutions. As a result, two possibly accessible saving schemes were found. This also more efficiently accomplishes the objective set and with less investment, which is to save in order to cover the cost of higher education in a private school. Within this background, the development of the financial calculations that support this proposal is shown.
Keywords: Savings scheme, future value, private higher education, JEL, G21

INTRODUCTION

The poor availability in public higher education and lack of equal opportunities for enrollment are situations that affect education opportunities for youth in Mexico. In the present day, many of them cannot get a place for their bachelor studies. There are those who take their chances on the same school many times, others try in a number of schools and see which will accept them. However, for more than one that is not accepted, the problem becomes much more serious for their families to be able to give them a higher education in a private school. There is a wide range of private institutions that offer the same academic programs with different tuitions; however, these tuitions are reflected in the quality of the programs making them a questionable option.

As a way of putting this into context, in the port of Veracruz, where the study was carried out, we we found similar higher education academic programs in the following institutions:

The first is Universidad Cristobal Colón (UCC for its Spanish acronym, Cristóbal Colón University) which is of a good academic level and even recognized by the Secretaría de Educación Pública (SEP for its Spanish acronym, Secretariat of Public Education). Following in an intermediate academic level and cost is Jean Piaget University (UJP for its Spanish acronym). Finally, as a third option, is an online degree program, the Online Technological University (UTEL for its Spanish acronym).

The SEP website indicates that enrollment in public education encompasses 69.38% of students in higher education; the remaining 30.61% belongs to private institutions. This number can show us the complexity of handling the total demand as the majority of the population seeks to access public higher education. This is a disturbing number because it reflects the incapacity to handle the applications to public higher education. This is not considering that the numbers for basic education (primary school) are worthy of concern as well since they show there is a 400% higher enrollment rate than in higher education institutions. This number could reflect an underlying possibility for school attrition, possibly the lack of economic fluidity of the family nucleus. All this makes one wonder, is public education really easily accessible? And, what actions can be taken in this situation, taking into account the apparent lack of economic fluidity of the families?

In that respect, some financial institutions offer long-term savings schemes. That is, the savings holder must start the fund at least 6 years prior to beginning university studies. Which brings one to question, are savings schemes custom-made? And are they of easy access to families?

Thus, it is important to state the question guiding this study in the following terms: How to orient

a future savings scheme with private higher education access? The aim is to prove mathematically that a future projections savings fund can be attained to enable the student access to higher education in private institutions.

LITERATURE REVIEW

As a starting point, there are several models that approach the way to organize higher education financing. A study conducted in 35 countries examined and estimated that the majority of the countries are based on a model of negotiation that is interpreted as: "Negotiation by way of political process tends to imprint in the relationship between the State and other institutions a condition of power struggle, negotiation and corporate pressure, limiting public institution's independence and the necessary transparency that public resource procurement processes should have" [1].

However, the study points out that some countries, specifically 11 of them, were using a model based on resources. Such is the case of Canada, China, England, France, Hungary, Indonesia, Japan, Nigeria, Norway, South Africa and Switzerland. Along the same lines, in countries such as Denmark, Finland, Israel and the Netherlands the model is based on results. As an indirect allocation model via students is Chile. In these models the enrollment of the student into higher education and their assignment of loans and scholarships is subjected to the student's socio-economic status [2].

Following the same idea, Albrecht and Ziderman [2] have stated that there are no public university systems that characterize themselves by cost recovery, although there are private universities that finance themselves in this way. In practice, cost recovery is operated in conjunction with existing grants for education. Therein is where we can see in practice a system for cost recovery, which refers to the scope of student coverage in relation to the percentage rate and its size related to costs.

Developing countries have different economic perspectives that relate the increment conditions to satisfy economic needs with participation in the world economy. A presence of strong pressure to balance the public expense risk to an appropriate budget has been observed. This is in spite of constant efforts from the banks that support tax policies by reducing the high costs of education with the objective of facilitating the necessary reassignment of the scarce government resources. This is an example of what is commonly known as "structuring adjustment policies" [3].

On their part, Caucutt and Kumar [4] analyzed the environment in which resources granted by the US are tightly developed, with the aim to find the quality of said resources. It is worth mentioning that by means of a hetero model, a greater effect in the solidity of incomes was found, including the results in increment of higher learning with investments made by the university itself. These result in the reflection of discrepancies mainly in their income, to mention a few: such is the case when prohibiting loans to defray education costs. Meanwhile Keane and Wolpin [5], differ from the aforementioned, being that in their empirical study they found that loans do not affect university matriculation decisions. This allows society to request loans to pay for university tuition, in spite of existing economic limitations in many countries.

Recent studies such as one by Jacobs and Van Wijnbergen [6] analyzed grants given by universities. However, such studies do not add evidence in the way that these affect learning in terms of yield rates or university income.

Other organisms such as the United Nations Educational, Scientific and Cultural Organization [7] and the Organization for Economic Co-Operation and Development (OECD) have emphasized that higher education must be considered as being beyond one's own benefit. It is the fact that acquiring knowledge serves economic and social development, suggesting a social broadening of the whole education system and encouraging the creation of an adequate academic offer in higher education which in turn will promote educational inclusion.

Next, an insight into the efforts being developed in the Mexican context, which is where the empirical study will be conducted in the end.

From its inception, higher education in Mexico has been promoted mainly by the public sector and has taken part in numerous reforms and education policies that have emphasized the complete coverage for the demand of this educational service. This has allowed in later years for the private sector to further their participation in covering such a demand.

Related to the lack of financing perceived in public higher education, there is a limited supply of academic offer for the same. This is a matter for concern for aspiring applicants to higher education and for the families that confront this situation with them.

Regarding higher education and economic growth as variables related to each other Mungaray-Lagarda, and Torres-Preciado [8], have stated in their studies that higher education needs to be considered as a factor for economic change both in the business and in the academic sector. Therefore, a growth in demand for higher education leads to the expectation for a better

future economic wellbeing. This in turn will result in a positive impact on economic activity. A higher income by higher education institutions means that better higher education opportunities could potentially turn into favorable economic activity effects.

It is even possible to consider it an indicator for the national educational system's performance in higher education. In that sense, positive numbers are expected for each of the variables.

According to Guzmán-Gómez, [9] one of the characteristic traits of higher education enrollment in Mexico is inequality in social terms. Because there are different opportunities according to the socioeconomic level of youths, those with a higher income have greater opportunities. The problem of income differences is nothing new; it has been that way for decades in Mexico.

In fact, between 1980 and 1993 enrollment grew on average 2.4% per year, whereas between 1994 and 2007 it grew 4.3%. In the same way, it emphasizes that matriculation evolution for higher education seems to share a long-term tendency with a growth in economic activity in the country [9].

Following the same idea, Mungaray-Lagarda and Torres-Preciado, [8] recount that today's inclusion to private investment in higher education has contributed to an increment from 6.8% in 1980 to 23% in 2007. Within this context, the rise in involvement from the private sector seems to add a supporting function to the delivery of education services in the country.

The information presented prompts an investigation in terms of the possible savings schemes to encourage a viable scenario for families to constitute a future savings fund, as a financial tool to confront the lack of matriculation supply in the public higher education sector. This would provide better opportunities to youths for their inclusion in private higher education.

It is clear that this higher education phenomenon brings with itself a series of questions for Mexican families when confronted with the selection of the institution their children seek to attend and the reduced academic offer. Are parents actually prepared to pay their children a private higher education when and if they cannot obtain higher education services free of charge? It must be mentioned that public education in Mexico is free. Furthermore, taking into account the economic possibilities of the family: Are there investment plans that can guarantee a future private higher education for their children?

To place this phenomenon in a financial reality, questions also arise regarding: Do investment products exist in the market that allow us to obtain better inflation rates with reinvestment options that result in the achievement of our goals with less effort? All of these questions yield elements to justify the need for this study.

Continuing with the rationale for this study, we retake information presented by the Instituto Nacional de Estadística y Geografía (INEGI for its acronym in Spanish, National Institute for Statistics and Geography) [10] which provided a revealing fact: of 4,813,852 youths that finish secondary school, only 3,451,041 finish a higher education degree. In other words, 1,362,838 do not continue with their academic education.

Today's traditional savings options are very limited; there are retail banking institutions that in present day do not offer a long term investment product that guarantees education. The former is due to the instability of financial markets and the country's own economy. In addition, it is due to the differences in active and passive interest rates with which banks operate versus the inflation or exchange rates [11].

Based on these arguments, it is now necessary to point out the type of financial tools available and the evaluation method to be able to submit to financial simulation the object of study. For it we retake what was shown by García-Santillán [11] pertaining to the diverse financial models about future values, due payments and ordinary annuities. Furthermore, it is essential to take as a reference the financial products offered today by the Mexican banking community. To achieve this, it is important to find a financial product whose Total Annual Return (TAR) overcomes inflation at the least, so as to ensure that savings do not lose value over time.

The TAR is an indicator of the total yield rate of passive savings operations or investments, with which it is possible to compare the benefit or financial yield between different products, with the purpose of informing the public and promoting competition.

TAR incorporates all the elements that determine the effective yield of a savings or investment product, such as interest rates, interest payment frequency or period, possible account aperture fee or fees as well as managing fees and any other payments expected from the client during the validity of his investment. TAR does not take into consideration taxes that could apply, so interest rates considered therein are gross rates and the resulting TAR is before taxes.

The TAR must be stated in operations for sums

up to 400,000 UDI (Unidades De Inversión for its Spanish acronym. This is investment units indexed to inflation in Mexico) as an annual percentage both as nominal and actual terms. The calculated TAR based in total yield and costs of a product is called a nominal TAR. The TAR that deducts the expected inflation over the next 12 months from the nominal TAR is called the actual TAR. Therefore, a comparison between different financial products for future values will be sought after. Considering factors such as inflation and up-to-date monetary amounts to prove which would be the better savings choice that gives the larger yield in the least amount of time.

METHODOLOGY

To answer the question on how to balance a savings scheme to guarantee access to a higher education in the future, that is also of easy access to the community that does not have high economic resources available and in this way be able to finance said education, a nine-year scheme is proposed. For this purpose, two financial institutions were taken as a reference, Banco Coppel and Banco Famsa.

Banco Famsa (TAR 4.59%) was elected as the best choice resulting from a comparison with at least four other retail banking institutions; their yield surpasses notoriously the inflation rate (3.51%) giving an actual TAR of 1.08% as a result. However, a limitation was found, which is that an initial investment or down payment of $25,000.00 Mexican pesos is needed. This is where the following question surfaces, how to achieve this initial investment?

For that reason, Banco Coppel was also chosen because it is an easy access alternative and without a required down payment, which accomplishes with our purpose as a stepping-stone to invest in a product with a higher yield.

The investment plans for both institutions are shown below:

Table 1: Characteristic of the Total Annual Return (Banco Coppel)

Loan term from (in days)	Loan term up to (in days)	Gross fixed annual rate	Nominal TAR	Inflation rate	*Actual TAR
14	27	1.50%	1.51%	3.51%	-2.00%
28	59	2.00%	2.02%	3.51%	-1.49%
60	90	2.25%	2.27%	3.51%	-1.24%
91	119	2.50%	2.52%	3.51%	-0.99%
120	149	2.60%	2.62%	3.51%	-0.89%
150	179	2.70%	2.72%	3.51%	-0.79%

*Deducting inflation, for information purposes only

Table 2: Characteristic of the Total Annual Return (Banco Famsa)

Term (in months)	Rate	Inflation	* Nominal TAR	* Actual TAR
6	3.6%	**3.51**	3.66%	0.15%
9	4.0%	3.51	4.07%	0.56%
12	4.5%	3.51	4.59%	1.08%

*Deducting inflation

MATH PROCEDURE

Considering the aforementioned problem statement, the calculations for the monthly savings needed in order to achieve in one year the amount of $25,000.00 Mexican pesos are obtained from the future value formula:

$$FV = Rp\left[\frac{\left(1+\frac{i}{m}\right)^{n/m}-1}{i/m}\right] \quad (1)$$

Where:

FV = Future value; Rp = Periodical rent; i = interest rate; m = compounding; n = time

For the financial simulation for this scenario, we take the nominal interest rate as a reference, which is offered to investments of 28 to 59 days (2.02%). Therefore, to know the total amount for monthly savings required to reach the number of $25,000.00 in a years' time we have the following:

FV = $25,000.00; Rp = ?; i = 2.02% m = 30 days; n = 1 year

From the original formula, we solve for *Rp* and obtain:

$$FV = Rp\left[\frac{\left(1+\frac{i}{m}\right)^{n/m}-1}{i/m}\right] \quad (1)$$

$$Rp = \frac{FV}{\left[\frac{\left(1+\frac{i}{m}\right)^{n/m}-1}{i/m}\right]} \quad (2)$$

We do the required operations and obtain:

$$Rp = \frac{FV}{\left[\frac{\left(1+\frac{i}{m}\right)^{n/m}-1}{i/m}\right]} = \frac{\$25{,}000.00}{\left[\frac{\left(1+\left(\frac{0.0202}{360}*30\right)\right)^{12}-1}{\frac{0.0202}{360}*30}\right]} = \frac{\$25{,}000.00}{\left[\frac{(1.00168333)^{12}-1}{.00168333}\right]} = \ldots$$

$$\ldots = \frac{\$25{,}000.00}{\left[\frac{(1.02038807)-1}{.00168333}\right]} = \frac{\$25{,}000.00}{\left[\frac{.02038807}{.00168333}\right]} = \frac{\$25{,}000.00}{[12.1117487]} = \$2{,}064.11$$

For this reason, with a monthly savings quota of $2,064.12 with an interest rate of 2.02% for one year compounded every 30 days, we can achieve the amount of 25,000.00, which is required to open an investment fund in Banco Famsa.

The mathematical proof is:

$$FV = Rp\left[\frac{\left(1+\frac{i}{m}\right)^{n/m}-1}{i/m}\right] = \$2{,}064.12\left[\frac{\left(1+\left(\frac{0.0202}{360}*30\right)\right)^{12}-1}{\frac{0.0202}{360}*30}\right] = \$2{,}064.12\left[\frac{(1.00168333)^{12}-1}{.00168333}\right]\ldots$$

$$\ldots\$2{,}064.12\left[\frac{(1.02038807)-1}{.00168333}\right] = \$2{,}064.12\left[\frac{.02038807}{.00168333}\right] = \$2{,}064.12[12.1117487] = \$25{,}000.10$$

Up to this point, we have solved the problem for the annual deposit amount as required by Banco Famsa. After the first year, monthly deposits can continue for a certain time, which would generate a surplus or trust fund.

Once this initial deposit is made, we simulate a scenario where a similar amount of *Rp* ($2,064.12) could be deposited monthly for at least the next three or four years previous to the age in which the child is ready to matriculate for higher education. In the case of Mexico, the proximate age for said time is 18 or 19 years old. With this then, the suggested period to engage the savings fund financial activity would be a year before he/she enters middle school (Grades 7, 8 and 9 in Mexico).

In that first year, the required sum of $25,000.00 to open the savings fund would be reached as required by Banco Famsa. In the same way, the next three years approximately would cover the cost for higher education studies.

However, what is the amount required to cover studies in a private higher education institution? Below we take as a reference three institutions in the metropolitan area of Boca del Río, Veracruz to simulate the scenarios. The names of the institutions have been changed because of confidentiality of information rights. The tuition costs are valid up to December 2016.

Table 3: Private Universities

University	Monthly cost in Mexican pesos	Academic degree duration (Months)	Total approx. cost
UNIV Priv 1	$ 1,596.00	48	$ 76,608.00
UNIV Priv 2	$ 1,980.00	48	$ 95,040.00
UNIV Priv 3	$ 5,700.00	48	$ 273,600.00

Taking as a reference the costs for private universities used in the study as an example, we now calculate for a compound future value scenario: With an initial investment of $25,000.00 (This is the amount obtained during the first year) and subsequent deposits of $2,064.12 for the next three years.

From the Future Value formula, we know:

$$FV = Rp\left[\frac{\left(1+\frac{i}{m}\right)^{n/m}-1}{i/m}\right] \quad (1)$$

Where:
FV = Future value; Rp = Periodical rent; i = interest rate; m = compounding; n = time

When there is only an initial payment, to update to a determined time in which we get an interest gain, or in other words, our compound interest, we have:

$$FV_1 = P\left(1+\left(i/m\right)\right)^{n/m} \quad (3)$$

Where:
FV= Future value; P= Principal (initial investment); i = interest rate; m= compounding;
n= time

Next, for the deposits required for the following three years, we have to calculate under the annuity plan:

$$FVA_a = A\left[\frac{\left(1+\frac{i}{m}\right)^{n/m}-1}{i/m}\right] \quad (4)$$

Where:
FVAa = future value of a set of anticipated annuity
A = annuity
i = interest rate
m = compounding
n = time

Therefore, we must integrate both functions into a single formula. Therefore, with formulas (3) and (4) we get:

$$FVA_{a\,2} = FV_1 = P\left(1+\left(i/m\right)\right)^{n/m} + A\left[\frac{\left(1+\frac{i}{m}\right)^{n/m}-1}{i/m}\right] \quad (5)$$

In this manner, we generate the first financial scenario that corresponds to an investment fund, which, during the first year, generates the sum of $25,000.00. This sum represents the initial investment to hold a nominal interest rate of 4.59% offered by Banco Famsa. Consequently, during the next three year,s a deposit of similar amounts of $2,064.12 will continue with a monthly compounding.

$$FVA_{a_2} = FV_1 = P\left(1+(\,{}^{i}\!/_{m}\,)\right)^{n/m} + A\left[\frac{\left(1+\frac{i}{m}\right)^{n/m}-1}{i/m}\right] = \$25{,}000.00\left(1+({}^{0.0459}\!/_{360}*30)\right)^{36} + \$2{,}064.12\left[\frac{\left(1+({}^{0.0459}\!/_{360}*30)\right)^{36}-1}{{}^{0.0459}\!/_{360}*30}\right]$$

$$FVA_{a_2} = \$25{,}000.00\left(1+(0.0038250)\right)^{36} + \$2{,}064.12\left[\frac{(1+(0.0038250)^{36}-1}{0.0038250}\right] = \$25{,}000.00\left(1.14733\right) + \$2{,}064.12\left[\frac{(1.14733)-1}{0.0038250}\right]$$

$$FVA_{a_2} = \$25{,}000.00\left(1.1473300\right) + \$2{,}064.12\left[\frac{(.1473300)}{0.0038250}\right] = \$25{,}000.00\left(1.1473300\right) + \$2{,}064.12\left[38.5176500\right]$$

$$FVA_{a_2} = \$28{,}683.24 + \$79{,}505.06$$

$$FVA_{a_2} = \$108{,}188.30$$

With these results we could consider the first two study options shown in table 3 to be fully covered, not the third university option however, whose tuition is $5,700.00. The estimated cost of the third option is $273,600.00 for the full four years. For this last scenario, it is obvious the investment down payment must increase as well as the following annuities.

Under this assumption, if we take the amount due for the tuition and the total cost for the study program, then we can calculate the exact required time to reach said amount. Assuming that the cost remains constant (this is only a hypothetical case), then from the formula for the amount we solve for "n". The resulting expression is as follows:

$$n = \frac{Log\left[\left(FV/A\right)*{}^{i}\!/_{m}\,1\right]+1}{Log\left(1+{}^{i}\!/_{m}\right)} \qquad (6)$$

The calculations are the following:

$$n = \frac{Log\left[\left({}^{\$273{,}600.00}\!/_{\$5{,}700.00}\right)*(0.003825)\right]+1}{Log(1.00382500)} = \frac{Log\left[(48.0000)*0.003825\right]+1}{Log(1.00382500)}$$

Natural Logarithm

$$n = \frac{Log\left[0.183600\right]+1}{Log(1.00382500)} = \frac{Log(1.1836000)}{Log(1.00382500)} = \frac{0.073204956}{0.001658007} = 44.1523683$$

The resulting 44.1523683 (fixed monthly deposits) corresponds to the time it will take to save the amount of $273,600.00.

Mathematical proof:

$$FV = A\left[\frac{(1+\frac{i}{m})^{n}-1}{i/m}\right] = \$5{,}700.00\left[\frac{(1.00382500)^{44.1523683}-1}{.00382500}\right] = \$5{,}700.00\left[\frac{(1.1836000)-1}{.00625}\right]$$

$$FV = \$5{,}700.00\left[\frac{.1836000}{.00382500}\right] = \$7{,}500.00(48) = \$273{,}600.00$$

Table 4: Calculus in annuity overdue modality

Annuity Due	
Annuity	$5,700.00
i=	0.38%
Future Value	$273,600.00
n=	44.00
Last Deposit for	5,683.16
	43 equal deposits of $5,700.00 and a last deposit of $5,683.16

Monthly installments are as follow:

Table 5: Savings Fund (Annuity overdue)

Deposit	Annuity	Interest	Balance
1	$ 5,700.00	$ 21.80	$ 5,721.80
2	$ 5,700.00	$ 43.69	$ 11,465.49
3	$ 5,700.00	$ 65.66	$ 17,231.15
4	$ 5,700.00	$ 87.71	$ 23,018.86
5	$ 5,700.00	$ 109.85	$ 28,828.71
6	$ 5,700.00	$ 132.07	$ 34,660.78
7	$ 5,700.00	$ 154.38	$ 40,515.16
8	$ 5,700.00	$ 176.77	$ 46,391.94
9	$ 5,700.00	$ 199.25	$ 52,291.19
10	$ 5,700.00	$ 221.82	$ 58,213.00
11	$ 5,700.00	$ 244.47	$ 64,157.47
12	$ 5,700.00	$ 267.20	$ 70,124.68
13	$ 5,700.00	$ 290.03	$ 76,114.70
14	$ 5,700.00	$ 312.94	$ 82,127.65
15	$ 5,700.00	$ 335.94	$ 88,163.59
16	$ 5,700.00	$ 359.03	$ 94,222.62
17	$ 5,700.00	$ 382.20	$ 100,304.82
18	$ 5,700.00	$ 405.47	$ 106,410.29
19	$ 5,700.00	$ 428.82	$ 112,539.11
20	$ 5,700.00	$ 452.26	$ 118,691.37
21	$ 5,700.00	$ 475.80	$ 124,867.17
22	$ 5,700.00	$ 499.42	$ 131,066.59
23	$ 5,700.00	$ 523.13	$ 137,289.72
24	$ 5,700.00	$ 546.94	$ 143,536.66
25	$ 5,700.00	$ 570.83	$ 149,807.49
26	$ 5,700.00	$ 594.82	$ 156,102.30
27	$ 5,700.00	$ 618.89	$ 162,421.20
28	$ 5,700.00	$ 643.06	$ 168,764.26
29	$ 5,700.00	$ 667.33	$ 175,131.59
30	$ 5,700.00	$ 691.68	$ 181,523.27
31	$ 5,700.00	$ 716.13	$ 187,939.40
32	$ 5,700.00	$ 740.67	$ 194,380.07
33	$ 5,700.00	$ 765.31	$ 200,845.37
34	$ 5,700.00	$ 790.04	$ 207,335.41
35	$ 5,700.00	$ 814.86	$ 213,850.27
36	$ 5,700.00	$ 839.78	$ 220,390.05
37	$ 5,700.00	$ 864.79	$ 226,954.85
38	$ 5,700.00	$ 889.90	$ 233,544.75
39	$ 5,700.00	$ 915.11	$ 240,159.86
40	$ 5,700.00	$ 940.41	$ 246,800.28
41	$ 5,700.00	$ 965.81	$ 253,466.09
42	$ 5,700.00	$ 991.31	$ 260,157.40
43	$ 5,700.00	$ 1,016.90	$ 266,874.30
44	$ 5,683.16	$ 1,042.53	$ 273,600.00
	$ 250,783.16	$ 22,816.84	$ 273,600.00

As seen in table 4, the savings fund is built upon by the monthly deposits, which generate an interest over the interest, or compound interest, due to the capitalization effect. Figure 1 shows a comparison between a savings fund with simple interest and compound interest.

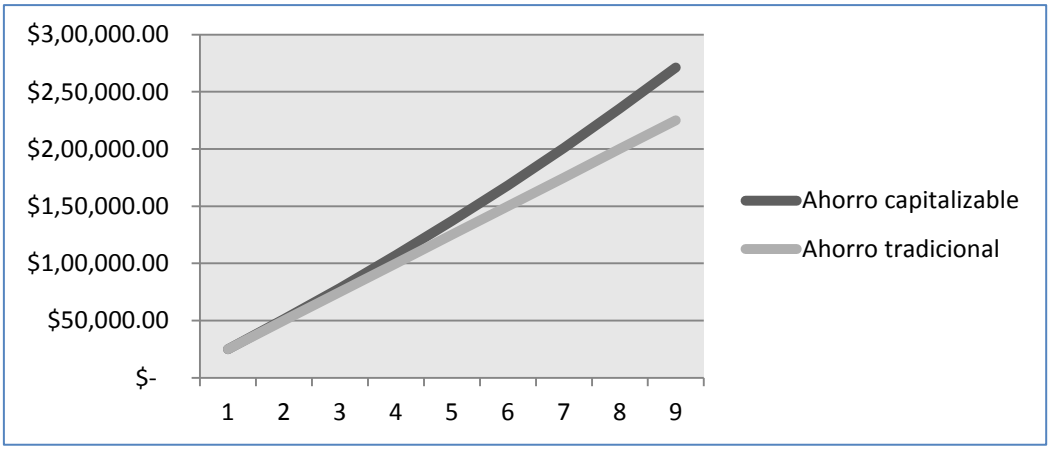

Fig-1: Simple interest savings versus compound interest and its effect

Summarizing, we could say that the time the parent can start with the savings process, will be what determines the approximate time it will take to reach the amount for these two possibilities.

Considering that the savings scheme proposal is with the objective to gather the required amount of money to cover the cost of university studies, then we must take into account the time lapse in which this could possibly occur. In the case of Mexico, undergraduate degree programs last four to five years. With that in mind, the approximate time in which the amount desired could be reached would be of a similar amount of time the savings fund must be started before enrolling to a university. Such a time corresponds when starting high school or even mid-secondary school in the case of Mexico.

In the particular case of Banco Famsa, given that a down payment of $25,000.00 is necessary to get a preferential interest rate (4.59% in this case), it would be advisable to start with a savings account to reach the down payment amount in the event of not having it readily available.

Afterward, it is necessary to continue with fixed monthly deposits, each one of $2,064.12 for the savings fund, which will increase its capital by $25,000.00 each year for the time calculated to cover the tuition costs. This is for universities one and two, but not so for university three. For the scenario of the private university with the greater tuition cost, 44 monthly deposits of $5,700.00 are necessary to reach the total amount required for the cost of a university degree for the private institution option.

Of course, the monthly payments can be somewhat high for some family economies, more so when their income is not enough. For that, reduced monthly deposits are possible, but increasing the time required for the savings fund.

CONCLUSION

It is frequently more difficult to access better rates of return in banking, because they usually require a down payment of amounts not accessible to all savings holders.

This research paper details two feasible options to undertake: first, to be able to access good rates in terms of return interest. Second, in case a down payment is required for a determined amount, a savings account scheme can be created to aid in reaching the required amount to open the savings/investment fund, whichever the case may be.

It is noteworthy that these savings schemes, more than just being a means of future preparedness, constitute an element of financial culture, because they promotes savings habits within families. In addition, we must remind ourselves how the subject of financial literacy has repeatedly been a topic in the G20 global agenda [12]. Specifically, in the national context it has become a necessity to promote such aspects in the Mexican community.

REFERENCES

1. Joaquín, B. J., & Guillermo, B. (1992). "Higher Education in Chile: Effects of the 1980 Reform". En Laurence Wolff & Douglas Albrecht, eds., "*Higher Education Reform in Chile, Brazil and Venezuela*". World Bank Paper LATHR Nº34. Washington, D.C.: The World Bank.
2. Douglas, A., Adrían, Z. (1992). Funding Mechanisms for Higher Education, Document No. 153, Washington, World Bank.
3. Shaikh, H. I., & George, P. (1994). La rentabilidad de las inversiones en la escuela un país en desarrollo Educacionalmente avanzada. *Revista Internacional de la Educación Desarrollo*, vol. 14 (No. 1), pp. 35-42.
4. Caucutt, E., & Kumar, K. (2003). "Higher Education Subsidies and Heterogeneity: A Dynamic analysis.

Journal of Economic Dynamics & Control 27 (2003) 1459 – 1502

5. Keane, M. P., & Wolpin, K. I.(2001). The Effect of Parental Transfers and Borrowing Constraints on Educational Attainment. *International Economic Review, 42*, 1051-1103
6. Jacobs, B., & Van Wijnbergin, S. (2000). *Optimal Financing of Education with Imperfect Capital Markets and Risk (2000)*, Mimeo, University of Amsterdam and Tilburg
7. UNESCO. (1998). *Declaración Mundial sobre Educación Superior en el Siglo XXI, París*
8. Mungaray-Lagarda, A., & Torres-Preciado, V. (2010) *Actividad económica y educación superior en México*, Vol. XXXIX (4), No. 156, Octubre-Diciembre de 2010, pp. 7-18. ISSN: 0185-2760. Retrieved from *http://publicaciones.anuies.mx/pdfs/revista/Revista156_S1A1ES.pdf*
9. Guzmán-Gómez, C. (2012). *La desigualdad en el ingreso a la educación superior en México.* Un análisis desde la perspectiva de los jóvenes que no logran ingresar. Asociación latinoamericana de sociología. Retrieved from http://actacientifica.servicioit.cl/biblioteca/gt/GT25/GT25_GuzmanGomez.pdf
10. INEGI. (2015). Reporte de la Encuesta Nacional de Deserción en la Educación Media Superior. Retrieved from: http://www.sems.gob.mx/work/models/sems/Resource/10787/1/images/Anexo_6Reporte_de_la_ENDEMS.pdf
11. García-Santillán, A. (2014). Matemáticas Financieras para la toma de decisión. Universidad de Málaga ISBN-13: 978-84-16036-61-5 Registro en la Biblioteca Nacional de España Nº 2014/60144. España
12. Zamora-Lobato, T. (2016). Educación financiera de los jóvenes de bachillerato y su influencia en la percepción que tienen de las instituciones financieras. Un estudio empírico en Xalapa, Veracruz. Tesis doctoral UCC *Busines School* Universidad Cristóbal Colón. Veracruz México.