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The Short-Term Effects of School Types in Mexico——General, Technical, Particular and Tele-secondary Schools

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ABSTRACT
Typically, there are mainly four secondary schools in Mexico, including general, technical, particular and, tele-secondary schools. Every year, millions of students enroll in different types, and their academic performances turn out to be quite different. This paper estimates the academic outcomes of adolescents in different types of schoolsand explores the impact of some chosen factors on the math scores and Spanish scores the estimated coefficients obtained are facilitated to explain the effect of school type. Although the estimates suggest that the tele-secondary studentsperform the best in math tests, and particular students score the best in Spanish tests when holding other influential factors accounted, there is no specific evidence that depicts the advantages of different schools, therefore the cause of estimated difference in test scores cannot be explained here.

Keywords: *educational attainment, academic achievement, OLS model.*

1. INTRODUCTION

In the second half of the twentieth century, comprehensive social assistance programs have been designed or adopted in many developing countries to help impoverished people solve dilemmas, such as food subsidies and children education fund [1]. The results of these programs were mixed, and unfortunately, many of these costly programs were less effective for the lives of impoverished people. Some people argue that those programs are ostensibly designed, as they cannot help the poor people climb out of poverty permanently. Especially the fund for children's education, the poor families would rather to spend the money on the cattle without the prerequisite of using that fund, than support their children to school (lit). In the 1990s, Mexico launched a social program in an entirely new approach—PROGRESA/Oportunidades/proproera. which is revolutionary ,for the following reasons. Firstly, it does not only focus on one aspect, but also takes education, health and nutrition simultaneously into account, based on the understanding of these interdependent factors both consequences of poverty [2]. Secondly, it is a conditional cash transfer (CCT) program that earmarks the fund for its specified purpose only. Thirdly, at the very beginning of the PROGRESA it was designed to be a continually improved program, and this property makes it a more effective program in improving the poverties of Mexico. Moreover, this program attracts hundreds of researchers in health and economics to explore based on the data of PROGRESA.

All the paraphernalia of PROGRESA are worth to study, and fruitful research results involved have been published, especially the impact of the program on the poverties. Over the last few decades, primary school enrollment rates across developing countries have been raised prominently [3]. Furthermore, as the education levels in most of these countries continually increased, the next move is to provide more post-primary educational opportunities. The World Bank figures indicate that the worldwide secondary school enrollment rate has stagnated since 2013 [4] due to the resource scarcity in the rural and marginalized areas, such as advanced teachers in the remote mountainous regions [5]. Several empirical studies examined whether PROGRESA could have a positive impact on these issues. For example, one of the research results shows that the program improves the project participants' schooling attainment through reduced the dropout rate during middle school. Besides, it also effectively increases the

school enrollment rate of adolescents, a 21% increase in the proportion of the participants attending to high school [6]. However, whether the program could be prevented from retreating to an ostensible program, simultaneously improve the academic achievement and benefit the children from a longstanding perspective remains a nonnegligible issue.

In Mexico, children in primary school are from grade 1-6 and seem to reach a ceiling associated with schooling dynamics [7]. However, in the post-primary stage (grade 6-9 and grade 9-12), the student could decide school type and school attendance through the Nationwide standardized administrative test (called ENLANCE), which causes a limitation on the available database, as the data is collected from schools, parents and surveys. The test score only includes children who have attended school test. According to the attributes of the CCT program, it aims to provide opportunities to the needy children to go to school, who would otherwise drop out from schools. Moreover, the children who fail twice from the same grade would lose the eligibility of assistance, making whether staying in the previous grade an essential and inherent issue. On the other side, due to the increased school enrollment, children from very different backgrounds can attend the test, which reduce the average test result. Therefore, different types of school may have different levels of scores after the increase of school enrollment. The ENLANCE dataset could not only help to exploit the educational attainment, but also exploit the academic achievement by the Math and Spanish test results to find out school effectiveness.

In order to explore the difference of the academic achievement in different schools, the first part of this paper estimates causal effects of different types of school at the secondary level on the academic achievement, as the secondary level reveal more significant effect by different types of school [4].

The second part of the paper hypothesizes that other factors, such as previous test score in prior grades, family background and physical problems, affect the academic results in the base year, based on the prior studies, and build linear regression models to find out and analyze the result of the empirical study. Moreover, the result falls in the expectation. To examine the effect of school type on the academic achievement of the base year, we explicitly control all the paraphernalia that may affect the academic achievement, such as score from previous grade, family background and health problems arising from available sources.

As this paper aims to investigate and evaluate the impact of different types of school on academic achievement with the CCT program, data set from the standardized National Evaluation of Academic Achievement in School Centers (ENLACE) is used in this paper which derivates from census design [8].

The contribution of this paper is to construct an empirical study on different types of school results and estimate the parameters of affecting variable via maximum likelihood where the outcome is the academic results (math and Spanish test scores). The findings of this paper provide school construction policy suggestions for policymakers in the relevant department.

2. THE LITERATURE REVIEW

2.1 Local Educational Conditions

The Mexican government has extended the compulsory schooling policy several times [9], as the result of the rapid demographic growth slowed down up to the beginning of the twenty-first century. The first time was in 2001, when the government decided to extend the length from 9 to 11 years, and then in 2012 from 11 to 14 years (education through grade 9 is compulsory). However, although it was stipulated in the laws and policies that the children shall not drop out until grade 9, the realistic situation was that some children from poverty families did drop out before grade 9, as they had to become the home labor force and work to support the family.

The fundamental part of education is primary school, which is free for children in Mexico. For public education, the Secretariat of Public Education standardizes the curriculum content, and math and Spanish were included in the curriculum content [10].

2.2 Previous Studies on PROGRESA and Elance

Mexico, one of the pioneers to introduce the CCT program, firstly introduced PROGRESA program in 1997. It was interruptive because it had different property compared to the previous or contemporaneous programs. The support grants base on the school attendance and academic performance, and correlated prerequisites [11].

Bastagli et al. (2016) evaluated the RCT program in Latin America, and the result showed a prominent expansion after the success of the PROGRESA program in Mexico [12]. Furthermore, the authors also summarized and complied with more than 50 similar programs in over 30 countries, and the results were all positive and significantly increased school attendance. Molina-Millan et al. (2016) conducted a review of the long-term effects of CCT programs in Latin America and concluded the same conclusion of the effect on school attendance. However, the authors found that the correlation between school attainment and program participation was not significant [13].

Acevedo, Ortega, and Székely (2018) used the ENLACE standardized test to track a generation of students who were supported by the PROGRESA grants and stated that there was a positive correlation between

time length of participating the project and the probability of completing the trajectory of secondary school [14]. What's more, they also found that the probability of finishing secondary school would increase by 12.2-12.5 percentage after one year participation in the project.

Behrman, Parker and Todd built a panel of students based on the ENLACE data set and keep tracking the group of beneficiaries from grade 6 to grade 12 so as to study the trajectories of these students [6]. The authors found that the effect of the program on school attendance in lower secondary schools was the most significant and increased by 10%.

2.3 Literature Review on Academic Achievements

Marsh et al. assessed 559 5th grade students in multiple dimension and found that female students had significantly higher academic achievement than male students in both reading and math [15].

Caldas. S J. and Bankston. C examined the relationship between the socioeconomic status of peers' student academic attainment, found that there was a significant effect of socioeconomic status on the academic results [16]. The parental educational and occupational background were used to be the indicator of family social status and it was found that peer family social status had a significant and substantive independent effect on the test scores.

Hoyos, Estrada, and Vargas used the longitudinal datasets of students' test scores in a national standardized exam in Mexico [17]. During this process, the authors track students from grade 6 through grade 12. The result showed that the effect of test scores in grade 6 had a more significant effect on academic achievement than family background.

3. ELANCE DATA AND MODEL

The outcome data used obtains from an extensive dataset that recorded the students' different types of information under the PROGRESA program. There are mainly two study phase in Mexico, which are primary school and secondary school. In the primary stage, there are two types of schools, that is, general school and particular school, while four types of school including general school, particular school, technical and telesecondary school. are involved in the secondary stage, of which general school and technical school are two types of public schools, with the latter focusing more on the practical skills which might be helpful for future careers, while particular school is the private school.

Moreover, telesecondary school refers to a form of distance learning due to the widespread PROGRESA program, which aims to assist the poverty.

We mainly use the dataset of 136136 samples after omitting the observations containing missing values in our chosen variables. The relevant variables we use to build the linear model are mainly one in 2011, in which students were at grade seven attending four different types of schools. The test scores we desire to explain are the math scores and the Spanish scores in 2011 since the information of these two scores is relatively complete. The table below shows the average scores of students in four different types of schools.

Table 1 Average Scores in Different Types of Schools

	General	Particular	Technical	Telesecondary
Math	495.9389	573.8187	497.4766	516.9347
Spanish	488.2634	568.5164	489.3771	476.7061

Preliminarily, in Table 1, we report the mean of the academic achievement in math and Spanish of the students in different types of schools. We can roughly draw the conclusion that particular school students have better academic achievement both in math and Spanish test than others, while the general school and the technical school are similar when it comes to the test scores. Participation in telesecondary school promotes the math scores but lowers the Spanish scores compared with those of the students in public schools.

Besides, we also include other factors that may explain the variation of the test scores in 2011. For example, the test scores in grade six are essential predictors of lower- and upper-secondary on-time graduation and are the test scores as well generated from the results of De Hoyos, Estrada, and Vargas (2018) [18]. As a result, we add the test scores in 2010 when the students are in grade six to explore further. Furthermore, the age of the students may be responsible for the difference in test scores since older individuals are exposed to other kinds of family responsibility, and time spent on schoolwork may be limited. Sex is also chosen to be another independent variable as it is generally confirmed that boys and girls are excellent in different aspects of the study. Other variables, including some basic information about family background and personal health problems, are added to the linear equation we build as well, based on our common sense that these factors have impact on the test scores. We use the survey results in 2008 when choosing the variables concerning the family background and personal health problems because

we assume these types of conditions to be roughly constant through a short time. Therefore, these selectively chosen statistics can generally represent the information of those aspects in 2011.

3.1 Model

After deleting the observations of those students who dropped out before grade 7, we can ensure that each individual i in our dataset participates in a certain one of the four types. We set three dummy variables to represent four choices of schools: We define $D_{ik}(k=1,2,3)=1$ if the individual studied in the school type k, and $D_{ik}=0$ if not. Table 2 below shows the specific matchup between school types and dummy variables.

Table 2 Dummy variables

	D_{i1}	D_{i2}	D_{i3}
General	1	0	0
Technical	0	1	0
Particular	0	0	1
Telesecondary	0	0	0

Besides, we assume $T_{ij}(j=1,2)$ to represent the test scores of the two subjects. Let j=1 if we are measuring the math scores and j=2 if using the Spanish scores. Therefore, we have two separate linear equations for each stage of our exploration since we have two dependent variables.

To begin with, we only use these three dummy variables as the independent variables to explore the variation of the test scores. (1) is the simple linear equation.

$$T_{ij}=\alpha_0+\alpha_1 D_{i1}+\alpha_2 D_{i2}+\alpha_3 D_{i3}+\varepsilon_{ij} \quad (1)$$

The next step is to add some other factors to the model. Age and sex are possible factors, as we discussed above. The data of age is already numeric so we can directly use "age_i" as an independent variable. We set another dummy variable, "sex_i", letting $sex_i=1$ if the individual is male and $sex_i=0$ if the individual is female.

Next, the test scores in grade six may be helpful to explain the variation of future behaviors, as we mentioned. Likewise, we use $ET_{ij}(j=1,2)$ to represent the scores in 2010 and draw a table to record the relevant correlation.

Also, we assume $Z_{im}(m=1,2)$ to be other observable characteristics that may affect the scores of two subjects, and Z_{i1} and Z_{i2} respectively represent two aspects of students' basic information——family background and possible physical problems. We pick up several variables from the big dataset including "HealthProb_Attending", "HealthProb_Walking", "HealthProb_Writing", "HealthProb_EyesEars", "MomEduc_Parent", "DadEduc_Parent" and "FamIncome". Then we do a summary of these variables.

Table 3 Descriptive statistics

Variables	Sample size	Mean	Standard Deviation	Medium	Maximum
Attedding08	163163	0.096	0.308	0	0
Walking08	163163	0.034	0.074	0	0
Writting08	163163	0.065	0.183	0	0
Eyes_Ears08	163163	0.112	0.326	0	0
Mom_EDU	163163	4.130	0.263	4	1
Dad_EDU	163163	4.282	0.693	4	1
Income08	163163	2.419	0.943	2	1

The variables "HealthProb_Attending", "HealthProb_Walking", "HealthProb_Writing" and "HealthProb_EyesEars" describe the health problems similarly. Their specific meanings lie in the table 4, and they are equal to 1 if the individual has the specific problem, otherwisehe or she does not have.

Table 4 Specific Content

HealthProb_Attending	Do you have health problems that force you to miss classes?
HealthProb_Walking	Do you have some physical problem that prevents or hinders you from walking or climbing a ladder?
HealthProb_Writing	Do you have some physical problem that prevents or hinders you from writing?
HealthProb_EyesEars	Do you have problems with eyesight or hearing?

And the "MomEduc_Parent" and "DadEduc_Parent" record numeric values from 1 to 9. The larger these two variables are, the higher the degree of parents' education is. Finally, the "FamIncome", which contains numeric values from 1 to 6, also works the same. The bigger the value is, the higher income the family owns. The specific content of these variables is listed in Table 5.

Table 5 The Specific Contents Represented by the Variables

MomEduc_Parent	Maximum level of education of the mother	1 - Did not go to school 2 - Incomplete primary 3 - Complete primary 4 - Incomplete secondary 5 - Complete secondary 6 - Baccalaureate or technical career 7 - Bachelor 8 - Mastery 9 - Doctorate
DadEduc_Parent	Maximum level of education of the father	1 - Did not go to school 2 - Incomplete primary 3 - Complete primary 4 - Incomplete secondary 5 - Complete secondary 6 - Baccalaureate or technical career 7 - Bachelor 8 - Mastery 9 - Doctorate
FamIncome	The family's monthly income	1 - Less than 1,500 pesos 2 - From 1,500 to 2,999 pesos 3 - From 3,000 to 7,499 pesos 4 - From 7,500 to 14,999 pesos 5 - From 15,000 to 30,000 pesos 6 - More than 30,000 pesos

Also, we compute the correlation between variables in D_{ij} and variables in Z_{im} so as to make sure these extra variables do not disturb our exploration on the impact of the school types. Table 6 displays our finding, which reveals no perfect collinearity between the variables since all the correlations are below 0.8. Hence, we can use these factors.

Table 6 The Correlation Between School Type and Other Factors

	MOD_SEP11ifgeneral (D_{i1})	MOD_SEP11iftechnica (D_{i2})	MOD_SEP11ifparticular (D_{i3})
Math 08	**-0.02667971**	**0.02979030**	**0.16824405**
Spanish 08	**-0.02285167**	**0.01590672**	**0.23894317**
Sex	**0.0056407124**	**-0.0005252749**	**-0.0106141947**
Age	**-0.049348469**	**-0.045825955**	**0.007907691**
HealthProb_Attending	**-0.0073114464**	**-0.0006050447**	**-0.0371251372**
HealthProb_Walking	**-0.004640177**	**-0.008355450**	**-0.028938548**
HealthProb_Writing	**0.008487601**	**-0.030690458**	**-0.042824130**
HealthProb_EyesEars	**0.014766643**	**-0.002911897**	**0.014598264**
MomEduc_Parent	**0.02037257**	**0.01828466**	**0.35437767**
DadEduc_Parent	**0.01175596**	**0.02531397**	**0.35600859**
FamIncome	**-0.03680751**	**-0.01548266**	**0.45650524**

Finally, we bond all these possible variables together to build a new linear model, as following:

$$T_{ij}=\alpha_0+\alpha_1 D_{i1}+\alpha_2 D_{i2}+\alpha_3 D_{i3}+\alpha_4 age_i+\alpha_5 sex_i+\alpha_6 Z_{im}+\alpha_7 ET_{ij}+\varepsilon_{ij} \quad (2)$$

After calcalating the coefficients of equation (2), we can have a rough idea about which factor appears to be more significant in deciding the variation of the dependent variables and the magnitude of impact. The final step to improve our model is to apply the control variablemethods, based on the results obtained from (2). We can omit those variables that have little significance in deciding the variation of test scores and further discuss some of the factors that appear to be different in different types of schools. We discuss our results of (1) and (2) along with the further design in the next part.

3.2 Results

(1)

According to the simple linear regression model we built in (1), we worked out the estimated coefficients of these equations.

Table 7 column (1) and column (2) depicted the results we had already obtained in Table 1 more vividly. The impact of school types on the test score is significant, and the estimated magnitude relationship of students' scores in the four types is just the result we have discussed.

(2)

The next step is to find out the coefficients of equation (2) to understand better the impact of school type on the test scores. The table below is the result we work out.

Table 7 The Regression Result

Variables	(1) $T_{i,j}$	(2) $T_{i,j}$	(3) $T_{i,j}$	(4) $T_{i,j}$
GENERAL	-20.279***	-11.960***	-46.939***	-15.730***
	(-22.37)	(14.32)	(-61.365)	(-22.488)
TECHNICA	-18.794***	12.988***	-50.902***	-18.715***
	(-19.02)	(14.27)	(-61.442)	(-24.752)
PARTICULAR	57.617***	92.180***	-27.488***	3.752**
	(43.51)	(75.57)	(-21.502)	(3.209)
ESP10			0.262***	0.528***
			(67.218)	(148.119)
MAT10			0.462***	0.142***
			(138.964)	(46.743)
SEX			5.186***	-25.715***
			(9.820)	(-53.248)
AGE11			-2.373***	-1.631***
			(-5.549)	(-4.172)

ATTENDING08			-1.411	-2.429**
			(-1.580)	(-2.975)
WALKING08			-7.523***	-9.231***
			(-5.145)	(-6.903)
WRITING08			1.780	4.593***
			(1.613)	(4.551)
EYES_YEARS08			-3.857***	-2.774***
			(-4.642)	(-3.651)
MOM_EDU08			0.566**	1.163***
			(2.775)	(6.233)
DAD_EDU08			1.304***	1.705***
			(6.616)	(9.459)
FAMINCOME			2.637***	2.158***
			(9.583)	(8.819)
_cons	516.237***	476.366	-0.175***	149.418***
	(669.63)	(670.79)	(-23.53)	(27.442)
N	136136	136136	136136	136136
r2	0.0340	0.0454	0.000	0.078

Note: *** represents the significance level of 1%, ** represents the significance level of 5%, and * represents the significance level of 10%

Table 7 column (3) and (4) indicate that most of the factors we add are generally reasonable since they seem to be statistically significant. Among all the variables we choose, HealthProb_Attending and HealthProb_Writing seem to be insignificant in explaining the variation of math test scores. But since physical problems are universally believed to have negative impact on students' behaviors, it is reasonable to include these factors into our Z_{im}.

However, the addition also causes the estimated impact of school types on test scores to be different, especially the ranking from the largest to the smallest. For math tests, the telesecondary students seem to behave the best, followed by students from particular, general and technical schools. For the Spanish tests, the order exhibits as particular, telesecondary, general, and technical schools. Besides, adding these variables also lowers the significant level of the dummy variable that represents the particular school when exploring the impact on Spanish scores.

(3)

To explore the cause of this difference, we further compute the distribution of these factors in different types of schools. Firstly we take the gender and age distributions in different schools into consideration and discover that they are almost the same in the four types. According to Table 8, which records the proportion of specific gender in different types of schools, the male-female ratios are roughly the same and the proportion is all 1:1. Furthermore, according to Figure 1, most students in grade seven are from 12 to 14, and the majority are 13 years old. Besides, the age distributions turn out to be similar among four types of schools.

Table 8 The Male-female Ratio in Different Types of Schools

	General	Particular	Technical	Telesecondary
Male	0.5010851	0.4812048	0.4976043	0.4972899
Female	0.4989149	0.5187952	0.5023957	0.5027101

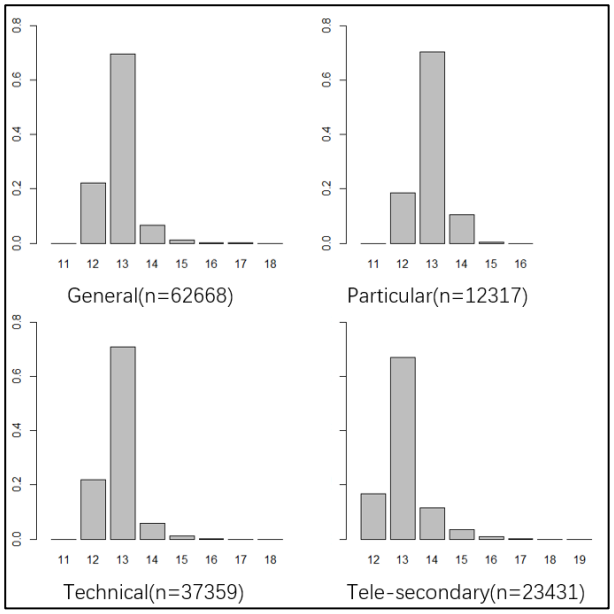

Figure 1 The Age Distribution of the Sample

Next, we discover that the proportions of those students who have physical problems also appear to be different in different types of schools. As we can see in Table 9, where we take the problems of attendance as an example, the proportions of individuals who have such a problem are about 10% in general and technical schools. And likewise, the proportion is even higher in telesecondary, reaching about 12%. By way of contrast, when it comes to the particular schools, the proportion is 6% or so. Similar results are obtained from the statistics of the other two health problems, from which we draw the conclusion that Particular schools tend to include the least disabled students, while telesecondary ones accept the most. (1. Walking: Particular——1% Telesecondary——5% Others——3% 2. Writing: Particular——3% Telesecondary——9% Others——6%) The exception is the problems concerning eyes and ears: Particular——13% Telesecondary——9% Others——11%. But still, we just ignore this deviation and assume that telesecondary students have the most significant proportion of physical issues, while particular schools appear to have the smallest proportion. The general ones and technical ones are roughly the same, while the proportion in which is located between the latter two.

Generally speaking, we can assume that the variables included to describe health problems to some extent weaken the personal factors lying behind the coefficients of the school types, which helps us have a better understanding of the impact of school type itself.

Our next step is to exhibit the distribution of the family background situations in the four types of schools and draw several plots to display our findings graphically.

Table 9 The Proportion of Attending Problems in Different Types of Schools

	General	Particular	Technical	Telesecondary
Unhealthy	0.09325	0.06097	0.09529	0.11839
Healthy	0.90675	0.93903	0.90471	0.88161

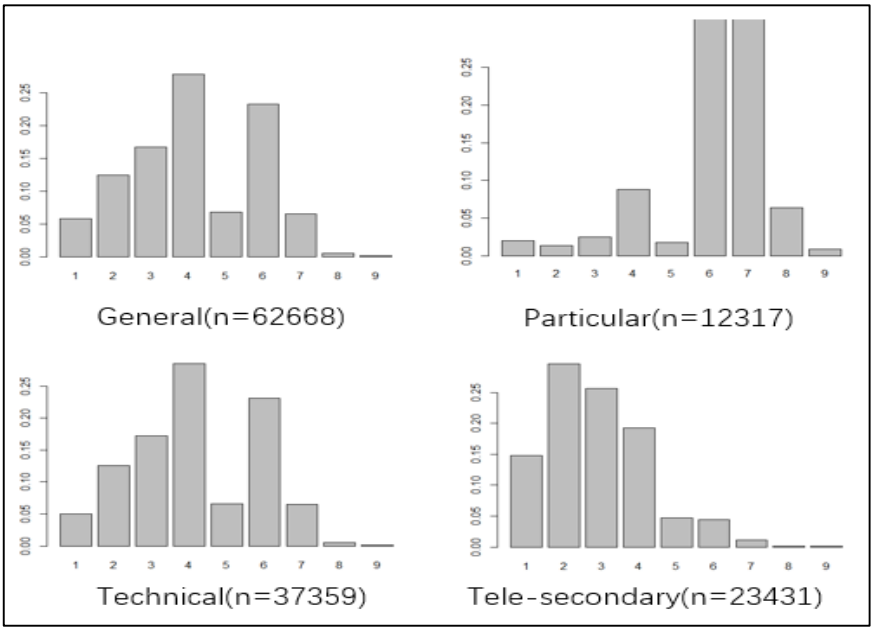

Figure 2 The Mother's Educational Level of the Sample

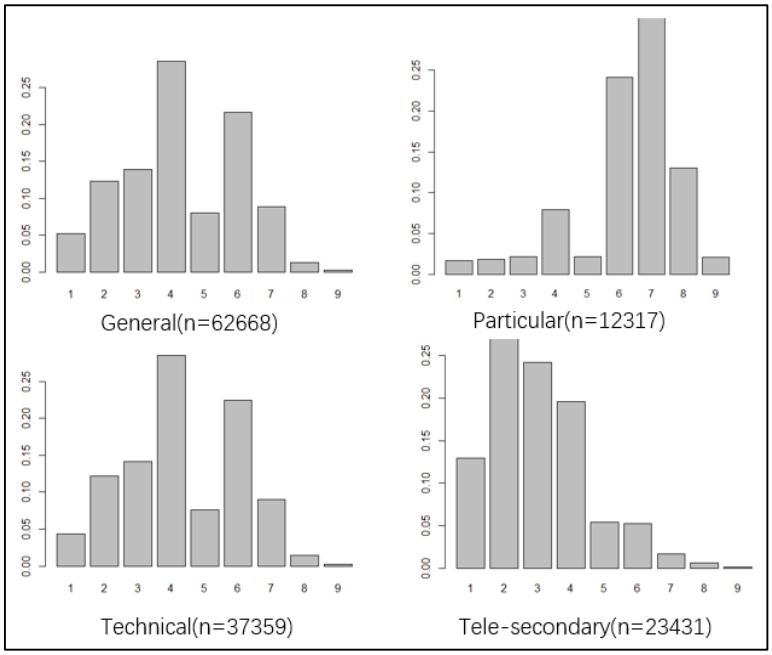

Figure 3 The Father's Educational Level of the Sample

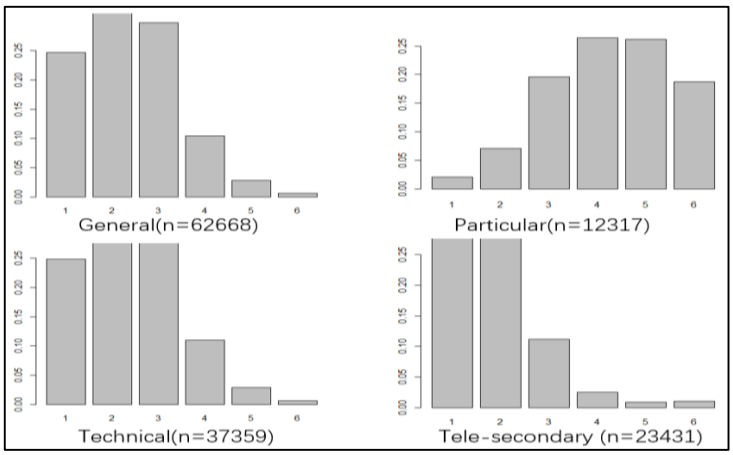

Figure 4 The Family Income Distribution of the Sample

Figure 2 and Figure 3 respectively depict the distributions of mother's education and father's education, and Figure 3 depicts the distributions of family income. With the description of these figures, we can see that the distributions of parents' education degree in general schools and technical schools are almost the same. The parents whose children participate in these two mostly hold medium education degree. The same result of the family income can be obtained from Figure 4 as well. However, the situation in particular schools is that most parents have relatively high degrees of education, and most families have high incomes. As for the telesecondary students, their parents tend to have low degrees of education, and their families have a very low income.

According to the analysis above, we find that the variables included to describe the family background, to some extent, also weakens the background factors lying behind the coefficients of the school types since the parents of particular students tend to have higher degrees of education, and there may be some IQ inheritance and methods instructions, which surely promote their study. A higher family income, which means more devotion to children's study, also contributes to their grades. As a result, the ranking of school types changes as we separate these variables.

Moreover, since grade seven is the first year of their secondary school, we assume that their subject basis may be originally different, and this can be measured by our variables of test scores in grade six. We then compute the mean value of the scores in 2010 at the unit of school types.

Table 10 Students' Scores in the Grade Six in Different Types of Schools

	General	Particular	Technical	Telesecondary
Math	556.2667	619.6707	564.9857	529.8987
Spanish	554.1043	632.5284	559.1774	520.0027

From Table 10, we can find that there is biasedness of primary scores in the four types of secondary schools, due to different bases of the students as we assumed. Still, the students in particular schools appear to behave the best in their the primary school, and the telesecondary students used to have the lowest scores, which is mainly caused by theirpoor family background.

Thus, the coefficients of the three dummy variables in Table 7 (3) and (4) make sense. Most students enroll in particular schools have families with higher degrees of education and a higher income. By contrast, telesecondary students are generally poor, and their parents are of low degree of education. Therefore, other factors, including personal health problems, the test scores in grade six, and the family background, are taking into consideration, the estimated order of math scores from the highest to the lowest is telesecondary schools, particular schools, general schools, and technical schools. Likewise, the order of Spanish scores goes with particular schools, telesecondary schools, general schools, and technical schools.

We can roughly attribute the phenomenon that telesecondary students even get better scores after receiving secondary education through the widespread PROGRESA program that has promoted the development of the telesecondary schools, and these schools can potentially deliver better education in certain subjects. However, since we have no idea about how telesecondary school works--- their courses, their study materials, the teachers they hire, etc.---and do not have any variables which depict the relevant details, we cannot work out the specific reasons why the telesecondary students have higher math scores.

4. CONCLUSION

In the first part of the paper, the regression result shows that there is a significant difference in academic achievement on different type of school. Particular students perform the best both in math and Spanish. In the second part of the paper, after the control variables are added, the significance of particular school effect on test results becomes weaker and the ranking of test scores in different school types even varies compared with the primary result.

The findings in this paper provide evidence that expanding telesecondary school promote the academic achievements in developing countries. Although the students in the particular schools shows the best test results, it is mainly because of the excellent subject basis, rich family background, healthy physical condition and other factors which potentially have significant impact on test scores but are highly different in different types of schools. After adding the control variables, the regression model shows that telesecondary school promote the students' test score further than other types of school, at least in math study. Furthermore, most beneficiaries who received the grant from the program are impoverished people, some of them live in remote district with minor rural road. Therefore, the participants to study in telesecondary schools can get large improvement in average score in high school in developing countries.

The limitation of this paper is that we cannot include all the influential factors in our Z_{im}, so the existence of endogeneity may cause deviation to our estimated results. What's more, we do not find any prominent difference between general school and technical school since the values of all the variables we choose are similar in these two types. The next step will come to the robustness test, which will help us measure the endogeneity in our model; nevertheless, further exploration of the difference in general and technical school needs to be completed, in which the variables mainly depict the difference between the attributes of these two.

REFERENCES

[1] Rui.G. An empirical study on the relationship between high school extracurricular tutoring, academic performance and higher education entrance opportunity [D]. *Shihezi University*,2018.

[2] Skoufias, E. (2005). *PROGRESA and its impacts on the welfare of rural households in Mexico*. Washington, DC: International Food Policy Research Institute.

[3]Fabregas, R. (2019). Broadcasting Human Capital? T he Long Term Effects of Mexico's Telesecundarias. Mimeo, LBJ School of Public Affairs, University of Texas at Austin.

[4] Secondary School Expansion through Televised Lessons: The ... (n.d.). Retrieved from https://laianaso.github.io/laianavarrosola.com/Navarro-Sola_JMP.pdf

[5] Banerjee, A., La Ferrara, E., and Orozco, V. (2019). Entertainment, education, and attitudes toward domestic violence. *AEA Papers and Proceedings,* 109:133–137

[6] Behrman, Jere R., et al. "Progressing through PROGRESA: An Impact Assessment of a School Subsidy Experiment in Rural Mexico." *Economic Development and Cultural Change, vol.* 54, no. 1, 2005, pp. 237–275., doi:10.1086/431263.

[7]Latapí, A. E., & de la Rocha, M. G. (2009). Girls, mothers and poverty reduction in Mexico: evaluating Progresa-Oportunidades. In The gendered impacts of liberalization (pp. 283-305). Routledge.

[8] AGUSTÍN ESCOBAR LATAPÍ AND MERCEDES GONZÁLEZ DE LA ROCHA. (2009, January 13). Girls, Mothers and Poverty Reduction in Mexico: Evaluating PROGRESA -Oportunidades: Taylor & Francis Group. Retrieved from https://www.taylorfrancis.com/chapters/girls-mothers-poverty-reduction-mexico-evaluating-progresa-oportunidades-agustín-escobar-latapí-mercedes-gonzález-de-la-rocha/e/10.4324/9780203884034-21

[9] Scott, D., Posner, C., Martin, C., & Guzman, E. (2018). *The education system in Mexico*. London: UCL Press.

[10] Ornelas, C. (1988). The decentralization of education in Mexico. *Prospects, 18*(1), 103-113. doi:10.1007/bf02192963

[11] Martin, M. S., & Pardo, M. S. (2020). Estimating the Medium-Term Impact of a Scholarship Program Using Standardized Test Data. *Journal of Education and Learning, 9*(1), 172. doi:10.5539/jel.v9n1p172

[12] Bastagli, F., Hagen-Zanker, J., Harman, L., Barca, V., Sturge, G., Schmidt, T., & Pellerano, L. (2016). Cash transfers: what does the evidence say. A rigorous review of programme impact and the role of design and implementation features. London: ODI, 1(7).

[13] Molina Millan, T., Barham, T. C. J., Macours, K., Maluccio, J. A., & Stampini, M. (2016). Long-term impacts of conditional cash transfers in Latin America: Review of the evidence.

[14] Acevedo, I., Ortega. A., & Székely, M. (2018). Rendimiento Escolar y Transiciones Laborales con Transferencias Condicionadas en México. Unpublished manuscript.

[15] Marsh, H. W., Smith, I. D., & Barnes, J. (1985). Multidimensional self-concepts: Relations with sex and academic achievement. *Journal of Educational Psychology, 77*(5), 581–596. https://doi.org/10.1037/0022-0663.77.5.581

[16] Caldas, S. J., & Bankston, C. (1997). Effect of School Population Socioeconomic Status on Individual Academic Achievement. *The Journal of Educational Research, 90*(5), 269-277. doi:10.1080/00220671.1997.10544583

[17] Hoyos, R. D., Estrada, R., & Vargas, M. J. (2018). Predicting Individual Wellbeing Through Test Scores: Evidence from a National Assessment in Mexico. doi:10.1596/1813-9450-8459

[18] De Hoyos, Rafael E. and Estrada, Ricardo and Vargas, Maria Jose.(2018) Predicting Individual Wellbeing Through Test Scores: Evidence from a National Assessment in Mexico. World Bank Policy Research Working Paper No. 8459.