

## **Family background, secondary school and university prestige: Contributors to income inequality in Chile**

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There is strong evidence that expansion of university enrolment contributes to economic growth. Less clear, however, is whether that expansion will reduce income inequality. Human capital theory argues that education provides graduates with the knowledge and skills to be more productive. As more students from disadvantaged families graduate from universities, the theory states, the effect will be greater income equality. If, however, salaries depend on characteristics linked to graduates' social origin, expansion can perpetuate inequality. This study examines the relationship between salary on graduation from university, and mother's education, prestige of secondary school and university attended, and graduates' perceptions of the quality of the university program completed. Data were collected from a sample of students in two degree programs in three universities in Chile. Salaries for graduates in psychology were unrelated to any of the independent variables. Salaries for graduates entering teaching were higher for those who attended more prestigious secondary schools.

### **Introduction**

What can universities do to ensure that expansion of access to higher education will contribute to a reduction of income inequality in society? The 21st century began with enormous efforts worldwide to raise levels of schooling. *Education for All* has been successful, to the extent that enrolment rates have jumped considerably, attaining a global gross enrolment ratio of 32% in higher education by 2013 (UNESCO, 2015). Better educated workers have meant economic growth and, on average, improved incomes. At the same time, however, many countries have also experienced an increase in income inequality (Dabla-Norris, Kochhar, Suphaphiphat, Ricka & Tsounta, 2015).

Chile is among those countries in which democratic leaders had hoped, by expansion of access to education, to reduce long-standing social and economic inequality. By 2012 the gross enrolment ratio in higher education reached 50 percent of the eligible population (Rolwing & Clark, 2013). The economy has grown and poverty has been reduced (Gammage, Albuquerque & Durán, 2014). Income inequality continues, however; Chile today has the worst income distribution of all industrialised countries (OECD, 2014).

Why has expansion of education in Chile not been followed by a reduction of income inequality? Among the possible reasons is that salaries paid to recent university graduates are skewed in favour of those from higher socio-economic status (SES) families. This paper assesses the validity of this hypothesis. We distinguish between factors whose impact reproduces current social and economic stratification, and factors that permit a more equitable distribution of income across strata. To this end, the paper asks four questions about the relative impact of university attendance on job salary after graduation. First, do family SES and secondary school attendance affect which university is attended? For example, are students from less-educated families more likely to attend less prestigious universities? Second, is there an association between the salaries paid graduates and the prestige of the university attended? Third, if there is such an association, are differences in salary related more to family SES and attendance at a private secondary school, or to employers' assumptions about the quality of the university attended? Finally, anticipating that salaries vary by professions, we ask whether salaries are related to the perceived quality of the specific program. By this means we seek to answer the question, which has most impact on salary, perceived quality of the program, or the specific institution attended? Our assumption is that the more salaries are based on program quality, the more likely it is that expanding access to universities will reduce income inequality.

### **Research on university education and income inequality**

Economics offers several general theories about the specific mechanisms through which education affects earnings. Human capital theory (Bowman & Mehay, 2002) argued intuitively that schooling endows an individual with productivity-enhancing human capital, and that this increased productivity results in increased earnings in the labor market. School attainment, or years of schooling, can be used (by employers) to estimate an individual's human capital.

Human capital theory makes several assumptions, for example, that schools produce learning that increases productivity, and that employers are rational actors. These assumptions may not always hold true (Tan, 2014). The impact of schooling may depend in part on individual characteristics with little relevance for future economic productivity (Jencks, 1972; Davies & Guppy, 1997; Sirin, 2005; Espinoza, 2002, 2008). Early childhood experiences mediated by the family determine the later impact of schooling on abilities and on non-cognitive factors, especially self-esteem and motivation (Pinquart & Sorensen, 2000; Twenge & Campbell, 2003). These antecedent factors in turn affect a person's general knowledge and academic skills. Socio-economic factors account for between 14.9 and 34.6% of differences in PISA math scores of European students (Martins & Veiga, 2010). Expansion of education, therefore may only perpetuate inequities in learning outcomes. A study in Germany of higher education expansion concluded that it had no impact on educational inequality "... because working class children were not disproportionately the beneficiaries of educational reform [in lower grades]" (Reimer & Pollak, 2010, p.302). In addition, knowledge of and access to employment opportunities are linked to SES and residential location. A European study found that time to first

employment varied by region and was related to family socio-economic status and field of study (Salas-Velasco, 2007). In short, many factors may account for a relationship between years of schooling and income.

Signaling theory offers an alternative argument to human capital theory. In this perspective, the salaries employers assign to new employees are not based on years of schooling per se, but on other sources of information about the person and the labor market (Spence, 1973; Connelly, Certo, Duane & Reutzler, 2011; Perri, 2014; Arango, Evans, & Quadri, 2016). Family background, success in school and attendance at a prestigious institution are interpreted by employers as signals of an individual's possession of the knowledge and important skills for the employer (Kjelland, 2008; Jafri, 2016). The use of these signals is self-validating: universities whose graduates obtain higher salaries are perceived as offering higher quality education (Arum & Roska, 2011; Espinoza, McGinn, González & Sandoval, 2017). These universities acquire a prestige as "quality" institutions, which attracts applicants, especially from higher SES families. A comparison of graduates in three European countries found that students whose parents had university education were more likely to enrol in a field of study of longer duration, in institutions perceived to be of higher quality. These institutions in turn had stronger ties with the labor market (Triventi, 2013).

To date, however, there is no generally accepted method for estimating the quality (amount of learning) from programs offered in universities, nor are there tests of graduates' employment-relevant knowledge. Rankings of universities are based on judgments of the quality of resources and students, and measures of scientific productivity of faculty, but not of learning outcomes of students (Wächter, Kelo, Lam, Effertz, Jost & Kottovski, 2015). What is clear is that university prestige based on ratings is linked to salaries offered, and that especially higher SES students are selective in which universities they seek to attend. This scenario is explained by cultural capital theory. It posits that family background and secondary schooling are important factors that determine college access, graduation and income, and therefore social and economic inequality. Persons at different SES levels do not start with the same kind or level of cultural capital (Bourdieu & Passeron, 1964, 1970; Barone, 2006). Because education systems are designed to reproduce a general set of dominant values and ideas, those who are schooled will have a big advantage over those who have not been schooled (Bourdieu, 1972; Farkas, 1996; De Graaf, De Graaf & Kraaykamp, 2000).

Some universities justify their prestige (elite status) by claiming that they recruit and admit the most highly qualified students from all social groups. This claim appears justified in some European countries, although they vary considerably in how they select students (Murdoch, 2002). There is evidence, however, that at least in the United States, many high achieving low-income students, and especially those from non-urban areas, do not apply to elite universities (Hoxby & Avery, 2012).

Expanding access to education increases the proportion of students with less-educated parents entering university (Breen, 2010). This favours greater social mobility. If, however, increased social mobility is not accompanied by reduced income inequality, over time

mobility is reduced (Mitnik, Cumberworth & Grusky, 2016). Lower SES students are less likely to enter high prestige institutions. Social mobility is hindered and income inequality enhanced to the extent that universities are sharply differentiated by prestige (Marginson, 2016).

### **Higher education expansion and income inequality in Chile**

There are three types of secondary schools (that prepare for university) in Chile. Municipal schools are controlled by municipal governments, voucher schools are chartered by the government but controlled by private (religious and secular) groups, and private schools are privately funded and operated. Municipal and voucher schools receive a basic subsidy from the central government, and both can charge a tuition fee. Some of the municipalities provide extra funds for their schools; some voucher schools receive private funds. Although several studies have demonstrated that there is no difference in learning outcomes across types of schools (Manzi, Strasser, San Martín & Contreras, 2008), average scores on national examinations are highest for private school graduates, lowest for graduates of municipal schools. Publication of test results without taking student SES into account has generated a stigma against public schools, with the consequence that families who can afford to send their children to private or voucher schools tend to do so (Allende & Valenzuela, 2016). During the past 20 years voucher schools have increased their share of secondary student enrolment from 36 per cent to 54 per cent. About 10 per cent of students are enrolled in privately controlled schools.

In Chile, universities established before 1980 are known as "traditional". Beginning in 1989-1990, 60 new private universities have been established. The traditional universities are partly funded by a block grant subsidy from the central government. Private (non-traditional) universities receive no direct subsidies.

The 27,000 applicants with highest scores on the PSU (a national Test of University Selection based on knowledge of the secondary level curriculum) are eligible for government-funded scholarships (OECD & IBRD, 2010), but only at the traditional universities. The government also guarantees low cost loans for university study in public and private institutions. About 50 percent of students today are enrolled in private institutions, most of which set low qualifications for admission. Most of the "first-generation" students (whose parents had no university education) are enrolled in the new private universities.

In 2006 rumblings of discontent about education exploded into massive public protests. Initially led by students from three public high schools, the protest expanded into a national strike of public and private high school students. Demands were for improved quality of schooling, and reduction of costs associated with attending school (Donoso, 2013). Discontent surfaced again in 2011, this time in higher education. University students demonstrated on the streets, demanding a reduction in costs and elimination of for-profit institutions. Student unrest quieted briefly but began again in 2015 and is ongoing (Espinoza, González & McGinn, 2016). One analyst attributed the unrest to generational change (Cummings, 2015); others argued that government spending on some

universities contributed to income inequality (Espinoza & González, 2015). Can differences in incomes be explained, at least in part, by university prestige?

The study that follows was designed to identify the extent to which the salaries graduates received on first employment are related to the quality of their training, or to other factors associated with their academic performance. Quality of training serves as a proxy for human capital formation. Family education, performance in secondary education and prestige of the university may be used by employers as signals of future productivity. Our objective is to determine the extent to which each of these factors account for variations in salaries received.

## **Method**

This study reports on a correlational analysis of self-reported observational data, including experiences during graduate study, in order to assess the relative contribution of family background, schooling, program quality and university prestige to graduates' salaries.

### **Sample of participants**

The universe of subjects for this study were the students graduating in the years 2012, 2013 and 2014 from the professional programs in Psychology and in Basic Education Teaching, in three universities located in Santiago, Chile. Psychology ranks 4th in total university enrolments in Chile; total enrolments in Education are 1st; Teaching by itself is 7th (Consejo Nacional de Educación, 2015). Each program awards a professional title for which all students take the same set of courses. The Teaching program can be completed in four years but may take four and one half or five years. Psychology programs usually are completed in five years. Students were sampled only from those taking regular day-time classes.

The universities that were chosen are at three approximate levels of "prestige", associated with their age, national "ranking" and admission stringency. The university here identified as the "Higher" is one of the "traditional" institutions that receive government funding, is ranked among the top 5 Chilean universities in the *QS World University* list, and requires entering students to have score at 600 points or above on the national University Selection Test (PSU). The PSU is designed to produce mean scores of 500 with a standard deviation of 110. Scores on this test, modelled after the US-developed *Scholastic Aptitude Test*, have a sizeable correlation (0.44) with first year university grade-point average (Pearson, 2013). They also have a strong correlation with family SES.

The second university was opened around 1980. It receives no direct financial subsidies from the government. A minimum of 475 points on the PSU is required for admission. Students entering this university between 2011 and 2013 had average scores of 550. We refer to it as "Moderate" prestige. The third university also is private and more recently established. Applicants are required to take an admission examination but all are selected. We refer to it as the "Lower" prestige university.

The sample size for the study was fixed at 266 persons, representing about half of the graduates for the three successive years. Participants were chosen randomly from a master list and contacted over the Internet during the months of November and December 2015. Graduates who did not accept the invitation to participate in the study were replaced by random choice. The results of the sampling process are described in Table 1. The differences in the number of cases for each university are a function of enrolment size. The procedures for selection of participants, and the content of the questionnaire, were reviewed by the Ethics Committees of each university.

Table 1: Obtained sample of cases by university and program

University prestige	Program	Population	Number in sample	% of population
Lower	Psychology	77	42	12.4
	Teaching	76	33	12.2
Moderate	Psychology	136	53	21.9
	Teaching	96	39	15.4
Higher	Psychology	162	70	26.0
	Teaching	75	29	12.1
	Total	622	266	100

### Variables

The questionnaire (in Spanish) was pre-tested on students in other universities. The final version sent to the study's sample included 47 items, all but three of which were closed-ended (only these questions were used in the analysis that follows). All questions were answered except those that were not yet appropriate (for example, salary if not yet employed). Background questions included university and program in which enrolled, age, gender, mother's education (as a proxy for family SES), type of secondary school attended, time in the program and others. The questionnaire asked about past and current employment, elapsed time between graduation and current employment, whether current employment is full or part-time, and level of responsibility on the job. We also asked the wage or salary level of their current employment.

### Measurement of quality of program

As noted above, there are not yet any standardised measures of university or program quality (Wächter et al., 2015). The OECD has initiated a value-added approach to measuring quality but results are not yet available (Kim & Lalancette, 2013). Satisfaction has been used as a proxy for quality in a variety of studies (Lenton, 2015; Senior, Moores & Burgess, 2017; Wach, Karbach, Ruffing, Brünken & Spinath, 2016). A study in the United Kingdom found significant differences between student satisfaction as a measure of quality, and so-called league rankings (Gibbons, Neumayer & Perkins, 2015). In Australia researchers found that university image or prestige predicted the perceived value of a degree but was only weakly associated with student satisfaction (Brown & Mazzarol, 2009). In the United States, student satisfaction was most strongly related to perceived faculty preparedness which predicted student achievement (Thomas & Galambos, 2004).

The underlying model for our questionnaire was the work of Vaatstra and De Vries (2007). Other studies consulted included de la Fuente, Marzo, & Reyes (2010), Medrano & Pérez (2010), Garcia-Aracil (2009), and Thomas & Galambos (2004). The second part of the questionnaire included 27 affirmations or declarations about various aspects of the program. One item was incorrectly worded and was eliminated from the analysis. Respondents indicated their agreement with the statement using a Likert-scale type response (1=Completely disagree, 2=Disagree, 3=Agree, 4=Completely agree).

The items, translated by the authors, are listed in Table 2. One aspect (or dimension) was the overall impression of the quality of the program. One set of statements referred to characteristics of the program and its content. A second set referred to the implementation of the program. A third perspective was the relevance of program activities for future work. A fourth perspective was conditions and level of remuneration of employment.

We carried out a principal components factor analysis of the 26 items, substituting means for the few missing values. The unrotated factor solution generated four factors; the first accounted for 44% of the total variance explained, with the remaining factors accounting for 9, 6 and 5%, for a total of 64% of variance explained. A Kaiser Meyer Olkin test was performed to determine whether the items shared enough variance to yield a reliable factor analysis. The value obtained, 0.926, indicates the sample is adequate. The Bartlett's Test of Sphericity ( $p < .000$ ) confirms that result. Given the high level of covariance across the items, we did an oblique rotation of the factor loadings. The results appear in Table 2.

As Table 2 indicates, the first factor included 8 items with loadings over 0.500. We consider this scale to measure perceptions of quality. The value of Cronbach's alpha for these items is 0.908, the split-half correlation is 0.776; the scale can be considered reliable. Scores on quality were computed by summing up responses across the 8 items. The other three scales were constructed in the same way.

Table 2: Factor loadings, pattern matrix

Questionnaire item		I	II	III	IV
1.	My degree program was very demanding.				-.532
2.	The training I received in my degree program was of high quality.	.731			
3.	If I had the opportunity to take my program again I would choose the institution where I studied.	.802			
4.	As a graduate of the program and the institution where I studied I have a professional identity.	.783			
5.	The program gave me a training that permitted me to take on the process of obtaining the academic degree and professional title without problems.	.710			
6.	The theoretical training that the degree program gave me was adequate.	.563			

7.	The practical training that the program gave me was appropriate.				
8.	The personal and value training the program gave me was superb.				
9.	When I studied the program they exposed me to the curriculum.				-.623
10.	The program and/or institution where I studied had a good policy with respect to the labor force.			.539	
11.	The training I received was sufficient to perform satisfactorily in the world of work.	.528			
12.	The preparation for work that the program gave me matched the requirements of the workplace.				
13.	On graduating from the program, I was hired at a level that met my professional expectations and income requirements.			.577	
14.	When I compare myself with graduates from other programs I am aware that the reaction of employers was more favourable toward us.	.665			
15.	The study plan included activities that linked students to the workplace.			.705	
16.	The study plan and course program were fulfilled completely.				-.712
17.	The curriculum seemed coherent and flexible to me.				-.741
18.	The curriculum proposal clearly identified the minimal knowledge and skills required to graduate.				-.610
19.	The learning objectives of the Study Plan were made clear to me.			-.672	
20.	The course contents were appropriate for my training and performance as a professional.	.502			
21.	The course activities made it possible for me to combine theory and practice in the work place.				
22.	The teaching styles of the program were motivating and stimulated participation.				-.617
23.	The institution was constantly concerned about improving the quality of the infrastructure.		.702		
24.	The program in which I studied always provided the (means) (equipment) for activities (seminars, field trips, etc.) necessary for my training.		.783		
25.	The institution and the program had an adequate library and places to study.		.875		
26.	The lab and workshop sessions were correctly implemented.		.826		

*Note:* Rotation method: Oblimin with Kaiser normalisation.

Rotation converged in 27 iterations.

Table 3 presents the correlations between the factor loadings on each of the four factors, and the labels we have assigned to them. Only the quality factor is significantly related to the others.

Table 3: Correlations between components of principal components analysis, oblique rotation

Component	Quality	Infrastructure	Linkage	Curriculum
Quality of program	1.000	0.419	-0.478	0.083
Infrastructure	0.371	1.000	-0.359	-0.129
Linkage with work	-0.478	-0.359	1.000	0.028
Curriculum and practices	0.083	-0.129	0.028	1.000

## Results

### Relationships between age, gender, mother's education, type of secondary school attended, and university

Overall, the universities do not differ in their proportion of female and male graduates. As indicated in Table 4, women are more numerous than men in both programs. There is a difference, however, in the distribution of graduates by gender and profession across the universities. Proportionately more women are in Teaching overall, especially in the Moderate university. The Psychology program in the Lower university attracts proportionately more men than does the Psychology program in the Moderate and Higher programs ( $\chi^2=6.29$ ,  $p=.043$ ). Table 5 shows that mothers who complete either secondary or university are more likely to send their son to a municipal secondary school, and their daughter to a voucher school ( $\chi^2=13.57$ ,  $p=.001$ ). We used only education of mother because fathers are absent in a significant number of cases, and their education has less impact than mother's when they are present (Kaufmann, Messner & Solis, 2013).

Table 4: Choice of programs and university by gender

Program	Gender	University			Total
		Lower	Moderate	Higher	
Psychology	Female	22 52.4%	38 71.7%	53 74.3%	113 67.9%
	Male	20 47.6%	15 28.3%	17 25.7%	52 32.1%
	Total	42 100.0%	53 100.0%	70 100.0%	165 100.0%
Teaching	Female	27 81.8%	31 79.5%	23 79.3%	81 80.2%
	Male	6 18.2%	8 20.5%	6 20.7%	20 19.8%
	Total	33 100.0%	39 100.0%	29 100.0%	101 100.0%

Finally, the antecedent variables of Mother's education and Type of secondary school attended have little to do with which university a graduate attended. In Table 6 we see that graduates of the Lower and Higher universities do not differ significantly in the level of Mother's education or Type of secondary school attended. The Moderate university, compared to the other two, enrolled relatively fewer students from municipal secondaries than from voucher or private schools: the difference is not statistically significant for mothers with post-secondary education but it is for graduates whose mothers had secondary education only ( $\chi^2=13.25$ ,  $p=.010$ ).

Table 5: Type of secondary school attended by gender and mother's education

Mother's education	Gender	Type of secondary school			Number of cases
		Municipal	Voucher	Fee charging	
Complete university 27.4%	Female	17.8%	48.9%	33.3%	45
	Male	46.4%	28.6%	25.0%	28
	N	21	30	22	73
Some post-secondary 23.3%	Female	15.2%	73.9%	10.9%	46
	Male	37.5%	37.5%	25.0%	16
	N	13	40	9	62
Complete secondary 27.8%	Female	27.3%	65.5%	7.3%	55
	Male	57.9%	31.6%	10.5%	19
	N	26	42	6	74
Less than complete secondary 21.5%	Female	36.2%	57.4%	6.4%	47
	Male	20.0%	70.0%	10.0%	10
	N	19	34	4	57

Table 6: University attended by Mother's schooling and Type of secondary school

Mother's schooling	Type of secondary school	University			%	N
		Lower	Moderate	Higher		
Complete or some post-secondary	Municipal	6 17.6%	14 41.2%	14 41.2%	100	34
	Voucher	22 31.4%	22 31.4%	26 37.1%	100	70
	Private	8 25.8%	8 25.8%	15 44.2%	100	31
	N	36	44	55		135
Complete secondary or less	Municipal	5 11.1%	19 42.2%	21 46.7%	100	45
	Voucher	27 39.5%	30 35.5%	19 25.0%	100	76
	Private	2 40.0%	2 20.0%	4 40.0%	100	10
	N	39	48	44		131

### Graduates' evaluation of various aspects of program

Graduates in Psychology and Teaching did not differ in terms of their evaluation of program quality, but they did differ in their ratings of infrastructure, opportunities to learn about the world of work, and details of program implementation. Table 7 presents the mean factor scores for each of the four factors. Graduates rate the two programs approximately the same in quality. Teaching graduates are more positive than Psychology graduates about infrastructure, linkage with work, and curriculum.

Graduates from the Higher university were significantly more positive than the others about their experience in their program in terms of quality (Table 8), but scored significantly lower on ratings of infrastructure. Most (89.7%) Higher graduates disagreed with the statement "The program and/or institution where I studied had a good policy with respect to the labor force" but were less critical on the other items on the Linkage with work factor.

Table 7: Average mean scale scores of graduates in Psychology and in Teaching

Program	Program quality	Infra-structure	Linkage with work	Curriculum and practices
Mean	3.017	2.411	2.305	2.910
Psychology no.	165	165	165	165
SD	.564	.638	.619	.475
Mean	2.981	2.765	2.649	3.187
Teaching no.	101	101	101	101
SD	.803	.838	.773	.796
Mean	3.003	2.545	2.436	3.014
Total no.	266	266	266	266
SD	.664	.739	.700	.630
F	.180	15.164	15.924	12.824
Sig.	.672	.000	.000	.015

Note: Strongly disagree = 1; Disagree=2; Agree=3; Strongly agree=4.

Table 8. Average mean factor scores of graduates by university

University	Program quality	Infra-structure	Linkage with work	Curriculum and practices
Mean	2.722	2.622	2.396	3.000
Lower no.	75	75	75	75
SD	.795	.825	.754	.786
Mean	2.987	2.715	2.527	3.108
Moderate no.	92	92	92	92
SD	.616	.660	.743	.620
Mean	3.232	2.330	2.381	2.936
Higher no.	99	99	99	99
SD	.496	.692	.610	.484
Mean	3.004	2.545	2.436	3.014
Total no.	266	266	266	266
SD	.664	.739	.700	.630
F	13.915	7.374	1.218	1.807
Sig.	.003	.001	.297	.166

### Graduates' experience in the labour force

Some of the respondents (30.1%) were employed before graduating from the university; there are no significant differences by university, year in which graduated, or by program. Type of secondary school attended is not related to employment while in the university. Graduates were, however, more likely to have worked during their university program if their mother had either not graduated from secondary school or completed university (44.6% as compared to 25.4% if completed secondary; 36.2% compared to 18.3% for completed university). There was no difference in terms of "time to get a job" between the three universities but Psychology graduates took longer (44.3% take more than 2 months, compared to 31.6% for Teaching graduates).

Graduates of the two programs differed in terms of whether their employment is full-time or part-time (77.2% of Psychologists work full-time, compared to 47.9% of Teachers), but "part-time" for most teachers is a 3/4 time shift (especially those who graduated in 2014). The graduates also differ in terms of their employer. Almost 60% of the Psychologists have jobs in the public sector, compared to 33% of the Teachers. Most teachers work in voucher (or charter) schools. An equal proportion (80%) of Psychologists and Teachers are working as employees; more Teachers (18% to 11% of Psychologists) have a managerial position, the remaining Psychologists work as independent professionals.

Do graduates from one university earn significantly more than graduates from other institutions? In Table 9, the middle category, US\$750 to \$1500, includes the 2014 income per capita (GDP/capita) for Chile, approximately US\$1185 per month (United Nations Statistics Division, 2015). Psychologists on average earn more than Teachers; 21% of the Psychologists earn more than US\$1500 per month, compared to 3.2% of the Teachers. On average, proportionately more Psychologists from the Lower and Higher universities are in the highest income bracket than are graduates from the Moderate institution. Some 35.6% of the Teachers earn less than US\$750 per month, compared to 18.8% of the Psychologists.

Table 9: Monthly earnings of graduates by profession and university

University	Program	Average monthly income						Total N
		< US\$750		US\$750-1500		>US\$1500		
		N	%	N	%	N	%	
Lower	Psychology	9	22.5	23	52.5	10	23.8	42
	Teaching	21	23.4	12	66.0	0	0	33
	Total	30	15.7	33	58.6	10	7.6	75
Moderate	Psychology	11	20.8	37	69.8	5	9.4	53
	Teaching	10	25.6	27	63.6	2	5.1	39
	Total	21	22.8	64	69.6	7	7.6	92
Higher	Psychology	11	15.7	41	58.6	18	25.7	70
	Teaching	5	17.2	23	79.3	1	3.4	29
	Total	16	16.2	64	64.3	19	19.2	99

Salaries typically increase with years of work experience. We might expect, therefore, that 2012 graduates would now be earning more than 2013 or 2014 graduates. Table 10 shows that for both professions the proportion of graduates' receiving higher earnings does increase with more years of service; the difference in average salaries of teachers and psychologists disappears. The big jump in teacher earnings after 1 year of service may be due to promotion from a 3/4 workload to a full work load. Psychologists in managerial positions are paid significantly more than those who are employees; Teachers who are managers (principals) are paid only slightly more than their colleagues. None of the Psychologists from the Lower university were in managerial positions.

Table 10: Graduates' earnings in 2015 by year of graduation

Year of graduation	Less than US\$750/month		US\$750 or more/month	
	Psychology	Teaching	Psychology	Teaching
2012	14.1%	12.0%	85.9%	88.0%
2013	21.4%	22.6%	78.6%	77.4%
2014	27.0%	68.5%	73.0%	31.5%

Is there an association between amount of salary and university attended? Table 11 presents, by profession for each of the graduating classes, the proportions of graduates earning US\$750 or more per month. The proportion was higher for 2012 as compared to 2014 Psychology graduates from the Lower and Higher universities but not for those from the Moderate. The number of Teachers receiving higher salaries increased over time in both the Moderate and the Higher universities. In other words, salaries for this group of relatively new professionals are influenced by several factors.

Table 11: Percent of graduates earning US\$750 per month or more, by university, profession and year of graduation

Year of graduation	Lower		Moderate		Higher	
	Psychology	Teaching	Psychology	Teaching	Psychology	Teaching
2012	90.5%	50.0%	75.0%	92.3%	92.0%	100.0%
2013	66.7%	80.0%	80.0%	63.6%	83.3%	85.7%
2014	66.7%	21.7%	83.3%	66.7%	73.3%	0.0%

### The relative importance of university attended and program quality

We can now address the major questions of this study. First, is the relationship between employment income and university attended moderated by background characteristics? Second, is the relationship between income and university attended mediated by quality of the program taken? Given the sample size, cross-tabulation of three or more variables with income yields cells with few cases. In its place, we used *Univariate Analysis of Variance* (Anderson, 2001) to assess direct and interaction effects. For ease of interpretation we reduced Mother's education from four categories to two, those with only some or all secondary education, and those with more than secondary education. We created the dummy variable Voucher to represent graduates who attended a voucher secondary and Private for those who attended private schools. Attendance at a Municipal school is the comparison for both. University attended is inversely ranked 1 to 3 from Lower to Higher elitism. We inversely ranked Quality from 1 to 4 by quartiles.

Given the salary differential between Psychologists and Teachers, we conducted the analyses separately for each group of graduates. We first examined, for Psychologists, the effects of Mother's schooling, Voucher or Private, and University on income. None of three variables was significantly related to income. We then dropped Mother's schooling, and added Quality. Table 12 presents the results. Among Psychologists, neither background factors nor university attended make a significant difference in graduates' level of income.

Table 12: Analysis of variance showing independent and combined effects of secondary school, program quality, and university on income of Psychology graduates

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	8.725**	22	.397	.962	.516
Intercept	347.346	1	347.346	842.439	.000
Voucher	.268	1	.268	.650	.421
Quality	1.461	3	.487	1.181	.319
University	1.164	2	.582	1.412	.247
Vouch*Qual	.527	3	.176	.426	.735
Univ*Vouch	.086	2	.043	.104	.901
Univ*Qual	.830	6	.138	.335	.917
Vouch*Univ*Qual	1.952	5	.390	.947	.453
Error	55.249	134	.412		
Total	700.000	157			
Corrected total	63.975	156			

\*\*R squared = .136 (adjusted R squared = -0.005)

*Note:* The F ratio indicates the extent to which changes in the values of the independent variable are associated with changes in earnings.

The model is not statistically reliable; none of the variables are correlated at a significant level.

Significant relationships between the several factors and income do appear, however, in the analysis of Teaching graduates. In Model 1 in Table 13, Income is associated with University attended but not with Mother's Schooling. The results in Model 2 are complex. Graduates from lower SES families who attended a voucher school receive lower salaries than those who attended a municipal school. The relationship is opposite for graduates whose mothers had post-secondary education. The relationship varies according to which university was attended, but University independently has no effect on Income.

In Model 3 inclusion of attendance at a Private secondary school increases Income significantly, and once again the interaction between University, Mother's Schooling and Voucher is important. Model 4 adds Quality and, while the R square does not increase a great deal, the combination makes clearer the effect of type of secondary school while reducing the effect of University.

Model 5 includes Mother's schooling but takes out Private secondary. The interaction between University and Quality becomes significant. With this set of independent variables one can explain almost 45 per cent of the variance in Income.

There is a modest but clear relationship between the ordinal elitism score and income, but it is mediated by the professions studied in those universities and by changes in shifts from employee to management status. Teachers graduating from the more selective universities were more likely to become principals and receive salaries in the same range as Psychologists (Table 12). In other words, the income differences are explained more by university attended than by profession.

Table 13: Analysis of variance showing independent and combined effects of Mother's schooling, Secondary school, Program quality, and University on Income of Teaching graduates

Source	Model 1		Model 2		Model 3		Model 4		Model 5	
	F	Sig.	F	Sig.	F	Sig.	F	Sig.	F	Sig.
Corrected model	3.562	.006	5.038	.000	5.257	.000	3.425	.000	3.155	.000
Mother higher	.015	.904	.516	.475	.439	.510			.507	.479
Voucher			.213	.646	3.202	.077	14.269	.000	6.183	.016
Private					10.205	.002	14.372	.000		
University	6.747	.002	1.353	.264	2.394	.098	1.369	.261	.408	.667
Quality							2.227	.093	2.286	.088
Univ*Moth	.622	.539	.183	.833	.564	.571			1.505	.230
Univ*Vouch			.268	.766	.916	.404	.155	.857	1.351	.267
Univ*Private					1.020	.365	1.320	.255		
Univ*Qual							1.070	.389	2.268	.049
Vouch*Priv							NA			
Vouch*Qual							2.310	.084	.511	.676
Moth*Vouch			15.561	.000	NA				2.632	.110
Un*Mo*Vo			7.150	.001	4.847	.010	NA			
Univ*Mo*Pr					NA		NA			
Univ*Mo*Qual									.694	.504
Univ*Vo*Qual									1.227	.308
Mo*Vo*Pr					NA		NA			
Mo*Vo*Qual									.264	.609
Un*Mo*Vo*Pr					NA		NA			
Adjusted R <sup>2</sup>		.121		.323		.391		.404		.448

NA = no degrees of freedom. Empty cells indicate no cases.

## Discussion

This study was not designed to prove that “satisfaction” is an objective measure of the quality of education offered. Instead, the intention is to demonstrate whether the subjective judgments of employers about the qualities of job candidates are consistent with how graduates view their higher education. Income inequality, at least at the time of hiring, is not based on objective data but on subjective judgments. As per the review of previous research, we conclude that at least in this instance signaling theory is more credible than human capital theory.

The data collected in this study provide a complex view of how family background, gender, secondary school preparation, the perceived quality of the program, and the university attended influence (at least initial) success in the world of work. The data for Psychologists do not offer a clear picture of the education-linked factors that influence employment earnings. It may be that the labour market in this profession is segmented, with different forces shaping incomes for self-employed and those in public service. The labor market in education is more uniform in that regard.

The results for Teachers do not support a conclusion that university admission policies are a powerful contributor to income inequality. In fact, which university a student attends appears to have had little or no effect on the salary received on graduation. In that regard the signaling hypothesis is not supported. On the other hand, incomes clearly are affected by the type of secondary school attended; those who went to a more expensive secondary school were more likely to receive a higher salary. The interaction of university with secondary schools could indicate that one or more of these universities have links to voucher or private schools that will be their graduates' employers.

Mother's schooling has no direct effect on employment earnings, even though it is related to which university students attend. University is not directly related to income, however. We had thought the variations in program quality would have more impact on income, but this did not emerge. The Quality scale is based on student perceptions of program characteristics; the results imply that these are not a reliable indication of the skills and knowledge visible to an employer. Alternatively, it may be that the skills and knowledge they signal are not what employers were looking for. The results offer no support to the human capital explanation of incomes.

## Conclusion

This study of the employment of university graduates confirms the results of prior research: graduates of more prestigious universities receive higher compensation for their employment. In this study, however, higher rewards depend principally on characteristics students bring to that institution. Left unanswered is the question of whether differential salaries are "merited", in the sense that better-paid workers in fact contribute more to the enterprise for which they work than do those who receive lower wages. Some work has been done on the construction of value-added measures for higher education (Kim & LaLancette, 2013; Schleicher, 2016), but those built to date rely on tests designed to measure curriculum knowledge obtained before entry to university. The results of this study highlight the importance of developing a valid measure of the impact of university education on learning.

This study was carried out with graduates from relatively "low status" professions. University prestige, however, is most likely to be influenced on the social and economic outcomes of graduates in the "high status" professions such as medicine, law and engineering. A recent study in Australia concluded that:

When universities give preference to an input model of quality based on test scores and ranks, they effectively disadvantage students from low-income school communities ... who did not receive the type of education ... necessary to be competitive in the high status degree process..." (Southgate, Grimes & Cox, 2018, p. 301).

Yet these students make excellent professionals. The ranking system thereby reinforces income inequality.

If wages and salaries are based on the employers' incorrect judgments about work performance, then income inequality cannot be justified in terms of increased productivity. The links between family socio-economic status, university attended, and income therefore can have a pernicious effect. Efforts to reduce future income inequality should include a campaign to improve public knowledge about the relative quality of university programs and the limitations of university prestige as a predictor of quality of education.

A second question is how employees' performance changes over time. In addition to knowing whether a university's graduates know what is required to perform well as novices, it would be valuable to know whether the university prepared them to continue to learn and improve their performance over time. We have not found any research that links admission policies to long-term performance of graduates. Accordingly, we plan to follow the participants in this study over time, assessing the longer-term effect of university on their incomes.

The conclusions drawn from this study should be tempered by recognition of its limitations. We certainly do not wish to conclude that universities need not worry about the quality of their programs. The three universities included cannot represent the full range of universities in Chile, much less in other countries. The sample size while adequate for the analyses carried out is too small to sustain more complex comparisons involving more variables. The questions explored, while important, tap only a fraction of the issues involved in how universities choose students, and income equality. Future research should include a sample of graduates who have been in the labour force for longer periods of time.

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