

Analyzing the roadblocks of Intergenerational Mobility: A year-to-year analysis of a national cohort of students

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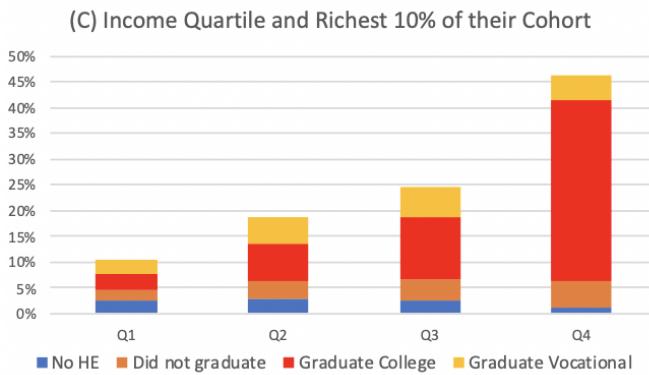
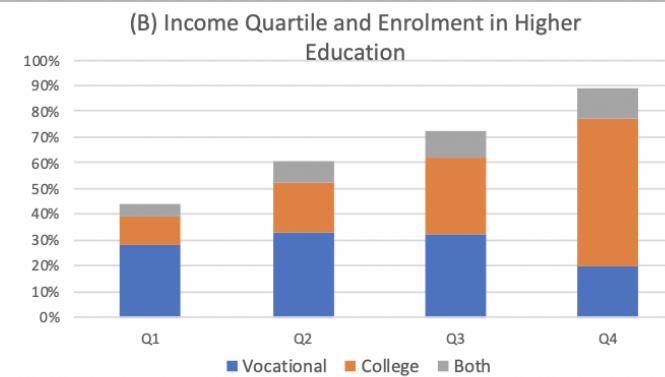
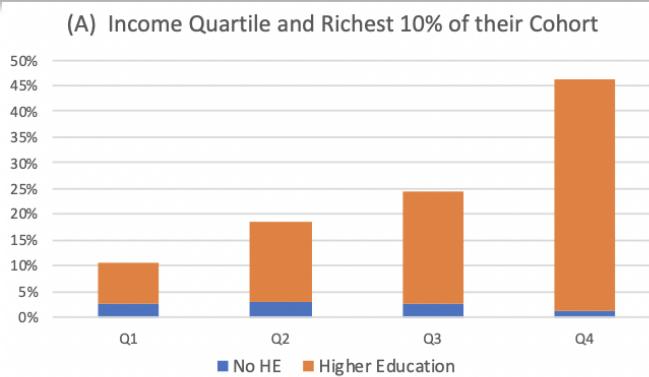


Table 5: Areas of Study of Students, and proportion that reaches Richest 10%

	q1	q2	q3	q4
Agriculture	17%	19%	14%	30%
Sciences	29%	39%	40%	45%
Social Sciences	23%	29%	27%	45%
Education	15%	16%	14%	19%
Humanities	0%	7%	7%	15%
Engineering	31%	36%	39%	56%
Health	23%	27%	32%	40%
Services	12%	12%	16%	20%

- H0: Can mobility be explained by role models, own education and economic shocks?

Intergenerational Mobility

- Intergenerational Mobility: the opportunity for children to move beyond their social origins (Fox & Torche, 2016).
- Association between parents' and adult children's status (social class, occupation, earnings, education, or family income).
- Stronger associations mean more intergenerational transmission of advantage and less mobility.
- Weaker associations indicate less persistence and more mobility.

Methodology

$$IncomeSon = \beta_0 + \beta_1 * IncomeFather + \varepsilon_i$$

- β_1 = Intergenerational Mobility Coefficient

There are two branches in the literature:

- Literature measures Intergenerational mobility
- Literature that analyzes the causes of Intergenerational mobility

Literature: Measuring Intergenerational Mobility

- Administrative data in Scandinavian countries and the US: Rank-Rank Methodology
- Longitudinal Surveys in the Developed World: Log-Log (IGE)
- Retrospective surveys in developing countries: Instrumental Variables (IV), generating “Synthetic Fathers”
- Transition matrices

Methodological Trends in the Literature

- Using log-log Landersø & Heckman (2017) estimate the IGE of .44 for US and .27 for Denmark.
- Using a Rank-Rank methodology (Chetty et al., 2014) estimate a coefficient of .34 for the US.
- Instrumental Variables (IV), the IGE is estimated to be .54 for Chile (Nunez & Miranda, 2010).

Causes of Intergenerational Mobility

- Pre-school Education: Chetty et al. (2011) analyze the effect of project star, a randomized pre-school policy, finding that better educational environments are associated with positive labor market outcomes.
- General Education: Machin (2007) and Oreopoulos et al. (2006) show that national changes in education policy generated long term effect on intergenerational mobility.
- College Education: Palomino et al., (2018), Torche (2011) & Chetty et al. (2017) analyze the effect of higher education in the US, showing it's importance.
- These studies have omitted initial decisions and characteristics in the educational trajectories.
- There is still space to explore further the relative importance of educational trajectories on intergenerational mobility.

Less analyzed causes of Intergenerational Mobility

- Credit Constraints: Hard to detect in developed world (Black & Devereux, 2010).
- Credit Constraints in Latin America: effect of credit constraints on educational enrollment (Torche (2010), Solis (2017))
- Role Models: In Chile, Sweden and Croatia students with older siblings are motivated to study in the same institution and the same major as older siblings (Altmejd et al., 2020).

Methodology

Current Methods in the Literature

- use point-to-point data bases and estimations.

Data Innovation

- **Trajectories:** While some of the factors or channels that affect intergenerational mobility are fixed during life (genetics), others change over time (health or education) and depend on a plethora of factors and decisions.
- **Innovation: Explanatory variables measured on a year-to-year basis could help**
- Follow students on a yearly basis, and analyze their trajectories, environments and negative shocks

Using the Innovation

- **Chain of Factors**
- Necessary factors to achieve social mobility.
- Analyze prior decision that enable or helped further developments
- Look for educational roadblocks and complementarities

Using the Innovation

- **Negative Shocks during different years**
- Negative shocks in parental unemployment
- Negative shocks in family health

Data Set: Cohort of Chilean Students

- Follow a national cohort of students from age 13 to 27.
- The gross primary and secondary education enrollment rate reached 104.1% and 99.6%, respectively, in 2015.
- The net primary and secondary education enrollment rate reached 93% and 74% respectively that year
- Three big sources of information.
- Educational Administrative data sets
- Labor market administrative data sets
- Administrative surveys

Data Sets from three sources

1.- Education: Administrative Data Bases



2.- Labor Market: Administrative Data Bases



3.-Education: Administrative Surveys



Data Sets: Education and Labor

Educational Data:

- Year to year
- High School
- School Characteristics
- Grades repeated
- School change
- rural-urban
- Higher education institution
- Higher education program
- Financial Aid
- All individuals

Labor Market Data:

- Year to year
- Monthly wage
- Months worked
- 72% of individuals
- Over 35% of parents

Administrative Surveys:

- 2004, 2006 & 2008
- Parental Education, Income and expectations

Data Set

Ministry of Labor

- Wages in the Private Sector + Government = 72%
- Wages of parents (32% of the sample)

Weaknesses

- Wages only in the formal sector and Government.
- 8% of students are in the Informal Sector (CASEN 2017)
- There is a high proportion of individuals out of the labor market.
- Individuals in the informal sector are not in the riches 10% of their cohort (CASEN 2017)

Data Set

- Table. Data Sets Used, Age of Students and Proportion of Available Data

	Age	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
(1)	SIMCE National Test	100%		75%												
(2)	College Selection Test					57%										
(3)	School Enrollment and Performance															
(4)	Higher Education Enrollment						28%	39%	38%	35%	30%	23%	17%	12%	9%	
(5)	Higher Education Graduation						0%	0%	1%	1%	2%	3%	4%	3%	2%	
(6)	Financial Aid Application					31%										
(7)	Monthly Wages				2%	7%	29%	38%	43%	47%	50%	54%	57%			72%

Data Set

Methodology

Use current Methods in the Literature

- ① Log-log
- ② Rank-rank
- ③ Instrumental Variables
- ④ Matrices / Probit (students in the lowest 25% that reach richest 10%)

Methodology

$$WageSon = \beta_0 + \beta_1 * IncomeFather + \beta_n * AcademicOutcomes_{it} + \varepsilon_i$$

- β_n =yearly academic outcomes

Preliminary Results

	(1)	(2)	(3)	(4)
	Log-Log	Rank-Rank	IV	Probit
Intergenerational Coefficient	.162***	.205***	.239***	.081
N observations	182,412	182,460	167,271	46,493
Adj-R2	0.0464	0.0395	0.0394	0.0014

For Probit, predicted mean value. *** p<0.01, ** p<0.05, * p<0.1

Preliminary Results: year-to-year

Table 7: Year to Year Analysis of Intergenerational Mobility and Educational Achievements
 (High School graduate as Base)

VARIABLES	(1) Model rank-rank	(2) Model Log-Log	(3) Model IV	(4) Probit
Rank Father	0.0848***	0.0772***	0.0827***	
Middle School	-0.0680***	-0.182***	-0.715***	1.6%
9 th Grade Drop-out	-0.0712***	-0.203***	-0.736***	1.7%
10 th Grade Drop-out	-0.0645***	-0.171***	-0.692***	1.6%
11 th Grade Drop-out	-0.0275***	-0.0831***	-0.612***	3.6%
High School Grad (base)	0.405***	11.89***	11.83***	3.4%
HE Freshman	0.0471***	0.106***	-0.511***	5.3%
HE Sophomore	0.0286***	0.0533***	-0.598***	6.2%
HE Junior	0.0391***	0.0880***	-0.433***	3.9%
HE Senior + more	-0.0197***	-0.0746***	-0.469***	5.0%
Vocational Graduate	0.114***	0.247***	-0.414***	10.7%
College Graduate	0.237***	0.529***	-0.276***	28.1%
Observations	180,460	180,412	167,271	45,799
R-squared	0.148	0.114	0.115	0.0944

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Preliminary Results: Parental Unemployment Shock

- Negative Shock
- Six months of unemployment, if worked the previous year

Preliminary Results: Parental Unemployment Shock

Table 11: Year to Year Analysis of Intergenerational Mobility and Unemployment Shock

VARIABLES	(1)	(2)	(3)
	Model rank-rank	Female	Female
		Model rank-rank	Model rank-rank
Rank Father	0.180***	0.208***	0.200***
Shock -11 th Grade	-0.007	-0.005	-0.005
Shock -12 th Grade	-0.013*	-0.018*	-0.018*
Shock -HE Freshman	-0.006	-0.001	-0.003
Shock -HE Sophomore	0.004	0.002	0.002
Shock -HE Junior	-0.000	-0.005	-0.006
Shock -HE Senior	-0.001	-0.000	0.001
Shock -HE Senior +1	-0.018***	-0.021**	
Shock -HE Senior +2	-0.003	-0.007	-0.007
Shock -HE Senior +3	-0.008	-0.011	-0.011
Financial Aid			0.070***
Shock -HE Senior +1 FA			-0.013
Shock -HE Senior +1 NO FA			-0.021**
Constant	0.476***	0.438***	0.418***
Observations	78,366	43,661	43,661
R-squared	0.028	0.037	0.049

*** p<0.01, ** p<0.05, * p<0.1

Preliminary Results: Area of Study and Role Models

- Area of study is relevant
- Role models influence that decision: older students and classmates parents
- Older students in the same high school that study sciences and engineering
- Parents of classmates that are CEOs

Preliminary Results: Role Models

Table 5: Year to Year Analysis of Intergenerational Mobility and Educational Achievements and Area of Study

VARIABLES	(1) Model rank-rank	(2) Model log-log	(3) Model IV	(4) Logit
Rank Father	0.082***	0.079***	0.106***	0.428***
Middle School	0.116***	0.275***	0.204***	0.497***
Role Models - 9 th Grade	-0.013	-0.071**	-0.089**	0.534**
Role Models - 10 th Grade	0.027*	0.084**	0.041	-0.239
Role Models - 11 th Grade	0.134***	0.322***	0.308***	1.226***
Role Models - 12 th Grade	0.332***	0.736***	0.736***	1.266***
Constant	0.350***	11.781***	11.493***	-2.238***
Observations	182,460	155,862	142,942	46,493
R-squared	0.085	0.080	0.079	

*** p<0.01, ** p<0.05, * p<0.1

Preliminary Results: Role Models

Table 5: Year to Year Analysis of Intergenerational Mobility and Employment Class Mates Parents: CEOs

VARIABLES	(1) Model rank-rank	(2) Model log-log	(3) Model IV	(4) Model Probit
Rank Parents	0.139*** (0.00254)	0.106*** (0.00221)	0.172*** (0.00518)	0.601*** (0.139)
CEO Parent	-0.0126** (0.00601)	-0.0340** (0.0166)	-0.0484*** (0.0174)	-0.300 (0.262)
Middle School	0.0453 (0.0360)	0.0424 (0.0999)	-0.205* (0.109)	2.550** (1.086)
HS 9 th Grade	-0.00148 (0.0461)	-0.181 (0.129)	-0.124 (0.142)	0.108 (1.919)
HS 10 th Grade	-0.0134 (0.0521)	0.0624 (0.148)	-0.105 (0.167)	2.701 (2.531)
HS 11 th Grade	-0.0209 (0.0581)	-0.0849 (0.164)	-0.0789 (0.177)	-3.087 (2.404)
HS 12 th Grade	0.280*** (0.0484)	0.715*** (0.136)	0.712*** (0.146)	7.082*** (1.966)
HE Freshman	0.277*** (0.0232)	0.685*** (0.0643)	0.636*** (0.0673)	2.174*** (0.637)
HE Sophomore	0.114*** (0.0325)	0.333*** (0.0910)	0.175* (0.0960)	1.333* (0.728)
HE Junior	0.127*** (0.0357)	0.445*** (0.0993)	0.383*** (0.104)	1.457* (0.805)
HE Senior	0.177*** (0.0347)	0.273*** (0.0949)	0.300*** (0.0998)	2.049** (0.842)
HE Senior + 1	0.178*** (0.0298)	0.482*** (0.0814)	0.434*** (0.0859)	0.665 (0.733)
HE Senior + 2	-0.0557*** (0.0216)	-0.111* (0.0584)	-0.132** (0.0619)	0.210 (0.588)
Constant	0.421*** (0.00135)	11.68*** (0.0264)	10.90*** (0.0618)	-1.836*** (0.0215)
Observations	182,460	155,862	142,942	46,493
R-squared	0.066	0.068	0.063	

Preliminary Results: Role Models

Table 7: Year to Year Analysis of Intergenerational Mobility and Employment Class Mates Parents, CEOs

VARIABLES	(1) Model rank-rank	(2) Model log-log	(3) Model IV	(4) Logit
Rank Parents	0.046***	0.040***	0.003	0.362**
Middle School	-0.016**	-0.019	0.026	-0.067
Role Models - 9 th Grade	-0.030**	-0.086**	-0.055	0.461**
Role Models - 10 th Grade	0.015	0.049	0.043	-0.285
Role Models - 11 th Grade	0.093***	0.223***	0.247***	1.158***
Role Models - 12 th Grade	0.052***	0.109***	0.111***	-0.103
CEO Parent	0.008	0.017	0.016	-0.105
CEO Middle School	0.059*	0.100	0.190*	1.833
CEO HS 9 th Grade	0.075*	0.071	0.030	-0.529
CEO HS 10 th Grade	0.037	0.157	0.184	1.885
CEO HS 11 th Grade	-0.064	-0.136	-0.065	-3.077
CEO 12 th Grade	0.037	0.145	0.152	1.015
CEO HE Freshman	0.218***	0.563***	0.542***	1.227*
CEO HE Sophomore	-0.018	0.040	0.019	0.301
CEO HE Junior	0.051	0.272***	0.327***	0.205
CEO HE Senior	0.124***	0.184**	0.226**	0.526
CEO HE Senior +1	0.078***	0.267***	0.272***	-0.063
CEO HE Senior+2	-0.042**	-0.077	-0.073	0.604
Middle School	-0.258***	-0.590***	-0.625***	-1.177***
9 th Grade Drop-out	-0.260***	-0.607***	-0.638***	-1.150***
10 th Grade Drop-out	-0.253***	-0.568***	-0.585***	-1.164***
11 th Grade Drop-out	-0.223***	-0.503***	-0.524***	-0.949***
High School Grad	-0.198***	-0.435***	-0.447***	-0.956***
HE Freshman	-0.228***	-0.509***	-0.512***	-0.886***
HE Sophomore	-0.164***	-0.356***	-0.363***	-0.762***
HE Junior	-0.173***	-0.398***	-0.407***	-0.978***
HE Senior + more	-0.155***	-0.330***	-0.333***	-0.828***
Vocational Graduate	-0.094***	-0.219***	-0.226***	-0.505***
College Graduate	0.602***	12.776***	13.216***	-1.193***
Observations	180,648	154,270	141,528	45,799
R-squared	0.158	0.137	0.137	

High School Trajectory

- We have analyzed several factors that influence Intergenerational mobility
- Role Models, Shocks and previous outcomes
- Let's use them to predict future performance during the last year of highschool.

High School Trajectory: Many factor correlate with mobility

Table 11: Year to Year Analysis of Intergenerational Mobility, Trajectories and College

VARIABLES	(1) Model rank-rank	(2) Model rank-rank	(3) Model rank-rank
Rank Parents	0.075***	0.049***	0.035***
Middle School	-0.023***	-0.026***	-0.026***
9 th Grade Drop-out	-0.027***	-0.035***	-0.032***
10 th Grade Drop-out	-0.017***	-0.024***	-0.021***
11 th Grade Drop-out	0.005	-0.001	0.000
High School Grad	0.051***	0.021***	0.024***
SIMCE Test Score		0.000***	0.000***
College Selection Test Score		0.000***	0.000***
Role Models - 8 th Grade		0.028***	-0.035***
Role Models - 9 th Grade		0.016	-0.038***
Role Models - 12 th Grade		0.146***	0.061***
Parent CEO		0.023***	0.025***
CEO HS 8 th Grade		0.126***	0.136***
CEO HS 9 th Grade		0.136***	0.116***
CEO HS 12 th Grade		0.101***	0.100***
Shock -12 th Grade		-0.010*	-.009
College Graduate	0.244***		0.199***
Vocational Graduate	0.120***		0.108***
Constant	0.354***	0.272***	0.317***
Observations	182,460	182,459	182,459
R-squared	0.151	0.115	0.162

Next Steps

- Necessary Factors for Intergenerational Mobility
- Chains of Factors and Added-value variables
- strategies to climb the ladder (different majors)

Thank You

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