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Mothers and students'mobility

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Mothers and students' mobility [*]

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Abstract

This paper examines how female leadership in the household influences offspring's key life decisions, with a particular focus on student mobility. Using Italian data from 2014 to 2020, we perform both individual-level and regional gravity analyses. The individual-level analysis focuses on the decision to study in another region, while the gravity analysis explores bilateral student flows between pairs of Italian regions. Female headship is used as a proxy for the mother's bargaining power within the household, with headship assigned to the parent with the highest income. Our findings reveal that when mothers hold greater decision-making power as heads of the household, students are less likely to move away for higher education. This 'mother-hen' effect applies to both sons and daughters and appears to be driven by strong family ties, rather than traditional gender roles, risk aversion, or parental preferences regarding their children's independence.

Keywords: female headship; student mobility, university education, family ties.
JEL Classification: R2; R23; J16; J12; J13; I12.

1 Introduction

Mobility has shaped human history, from the nomadic lifestyles of early hunter-gatherers to the increasing migration flows of today's global society. People move for various reasons, from seeking better economic opportunities (Artuc et al. (2015)) to fleeing the impacts of climate change (Beine and Parsons (2015)). For young adults, mobility is often driven by educational aspirations. This paper explores the family-driven factors behind these temporary migration decisions, with a particular focus on how the choice to study away from home is influenced by whether the mother or father is the head of the household.

Student mobility has become increasingly relevant as more young adults leave their home regions or countries to pursue studies, often leading to permanent relocation (Gwenaëlle (2022); Fielding (2012)). This migration has significant economic and social implications for both the students' regions of origin and their host countries. Moreover, this movement can impose emotional costs. When students relocate —often permanently— they may leave behind parents who face loneliness, which is a growing public health concern (Jaffe (2023); Lepinteur et al. (2024)). Loneliness, defined as the gap between desired and actual social relationships (Cacioppo and Cacioppo (2018)), is associated with adverse mental and physical health outcomes, such as depression, anxiety, and cognitive decline (Cacioppo et al. (2010); Hawkley et al. (2010)), and even increases the risk of early mortality (Holt-Lunstad et al. (2015)).

Alesina and Giuliano (2010) suggest that the socialization of children with mothers and fathers is asymmetrical in terms of time spent on childcare, shaped by cultural factors. In more traditional societies, where stronger family ties exist, women primarily assume childcare responsibilities. As a mother's income increases, so does her bargaining power in household decisions, influencing offspring's life choices. This shift leads to more equitable household responsibilities (Magda et al. (2023)), a less gender-biased environment (Aizer (2010); Tur-Prats (2021)), and an expanded role for women in determining their children's futures (Goldin (1991); Guiso and Zaccaria (2023)). Building on this literature, we investigate whether these differing parental roles impact the decision to pursue university studies differently when the mother, rather than the father, is the head of the household, using evidence from Italian data. Our findings reveal a 'mother-hen' effect, wherein greater maternal bargaining power within the family and the region is associated with a lower likelihood of children relocating for higher education.

To examine the relationship between student mobility and maternal headship, we conduct both regional- and individual-level analyses. Our primary data source for the individual-level analysis is the MOBYSU.IT dataset, covering Italian students from 2014 to 2020[1]. The key outcome variable is the individual decision to either study in another region or pursue a college degree in the region of origin. We measure maternal headship based on whether the mother holds a job with a higher average wage than the father. At the regional level, we construct dyadic student mobility flows for all possible pairs of Italian regions for the years 2014-2020. Maternal headship is measured by the proportion of households with female heads at the regional level, using data from the Household Income and Wealth survey of the Bank of Italy. We employ a gravity model, where the dependent variable is the intensity of student flows between regional pairs each year.

Our findings suggest that maternal headship, both within families and across regions, significantly influences student mobility. Specifically, higher maternal bargaining power within the family or greater female emancipation in the region is associated with a lower likelihood of children leaving their home regions to pursue higher education. This effect remains robust across a wide range of controls, including economic drivers of student mobility and regional levels of female emancipation. It also holds when focusing solely on northern and central Italy, ruling out the possibility that our results are driven by students moving from less developed southern regions to the more prosperous center and north. Notably, we find that children of entrepreneurial mothers are even less likely to leave home than those of entrepreneurial fathers, possibly because owning a business may give parents a reason to keep their children closer. Using data from the

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[1]The data used in this study have been processed in accordance with the RESEARCH PROTOCOL FOR THE STUDY 'From high school to the job placement: analysis of university careers and university mobility from Southern to Northern Italy' among the Ministry of University and Research, the Ministry of Education and Merit, the University of Palermo as the lead institution, and the INVALSI Institute. The reference researcher is Bruno Bertaccini (UNIFI).

European Social Survey, we further establish that our result is linked to strong family ties, rather than maternal risk attitudes or parental views on children's independence. Interestingly, traditional gender norms do not further contribute to the 'mother-hen' effect.

To address potential endogeneity concerns, such as omitted variable bias and confounding factors, we adopt an instrumental variable (IV) approach. Following Pryor (1985) and Alesina et al. (2013), we use historical suitability for plough agriculture across Italian regions as an instrument for maternal headship. Alesina et al. (2013) demonstrated that historical plough use shaped gender norms, influencing women's labor market outcomes, such as female employment rates. We argue that these regional variations in historical plough suitability serve as valid instruments for women's emancipation. The IV analysis corroborates the results obtained from our gravity model.

This paper contributes to at least three strands of literature. First, a significant body of economic literature has explored the differential impacts mothers have on their children's major life decisions. For instance, Duflo and Udry (2004) found that an unexpected increase in a mother's income leads to increased household spending on food, whereas an increase in a father's income tends to be directed toward children's education. This pattern holds not only at the household level but also in community-level research, with Chattopadhyay and Duflo (2004) showing that men place a higher emphasis on education, while women prioritize basic needs such as access to clean water.

Second, existing research on student mobility (e.g., Beine et al. (2020), among others) has largely focused on economic factors such as tuition fees, living costs, and the quality of educational institutions. Our study breaks new ground by examining the familial dynamics, particularly maternal headship, as a determinant of offspring mobility.

Finally, this paper also contributes to the literature on the determinants of temporary migration (Galor and Stark (1991), Bijwaard and Wahba (2014), and Dustmann and Görlach (2016), among others). Previous economic studies have focused on temporary migration driven by economic incentives, but our analysis extends this understanding by incorporating the role of family structure and gender dynamics in shaping temporary migration decisions.

The rest of this paper is organized as follows: Section 2 focuses on Italian students' mobility, Section 3 introduces the data and main variables, Section 4 details the empirical analysis at the individual level, Section 5 presents the regional-level approach, Section 6 discusses the instrumental variable strategy to address endogeneity issues, and Section 7 concludes.

2 Student Mobility in Italy

Internal student mobility within the twenty Italian regions exhibits a notable movement of students among nearly any pair of regions (Attanasio and Enea (2019)), with a particularly pronounced trend towards the Center and the North. The flow of the students has intensified over time. For example, the percentage of students leaving the Italian islands doubled between 2008 and 2014: in 2008, 13.9% whereas in 2014, this number increased to 25.7% (Attanasio and Priulla (2020)). Similarly, the percentage of students leaving the southern regions of Italy increased from 18.9% to 22.3% during the same period. In a broader context, between 2003 and 2016, more than 20 000 southern students each year -approximately one in five - enrolled in universities outside their regions of residence, a trend unparalleled in other countries, where outmigration

rates reached a maximum of 8%.

Tertiary education in Italy is provided through a system of state-funded public universities, offering access to nearly all fields of study for high-school diploma holders. Over the past two decades, '3+2 reform' led to an expansion of degree programs and decentralized branches at the provincial (NUTS-3 region) level, resulting in a more even distribution of universities nationwide. Additional public funding expanded the coverage of higher education institutions in peripheral provinces and the South, which previously lacked a tertiary education infrastructure, further bolstering educational opportunities for all. Figures 1 provide an overview of the distribution of universities across the Italian territory.[2] In particular, it can be observed that the highest concentration of universities (at the level of institutions) is in Lombardy and Lazio, with the percentage of universities present at the regional level relative to the national total ranging from 12% to 16%. The following are closely followed by Campania and Tuscany, with a significant number of universities also present in Puglia.

The local availability of degree programs, with the number of municipalities hosting a university campus increased from 104 to 211 between 1990 and 2010, with a temporary peak of 244 in 2006. As pointed out by previous studies (Impicciatore and Tosi (2019)), this increase in the local offer has not reduced the flow of students quitting their origin region. Importantly, to ensure our results are not capturing 'forced' student mobility due to the limited number of universities in the South and on the Islands, we also run our benchmark estimation, focusing solely on student mobility within the North and Center of Italy.
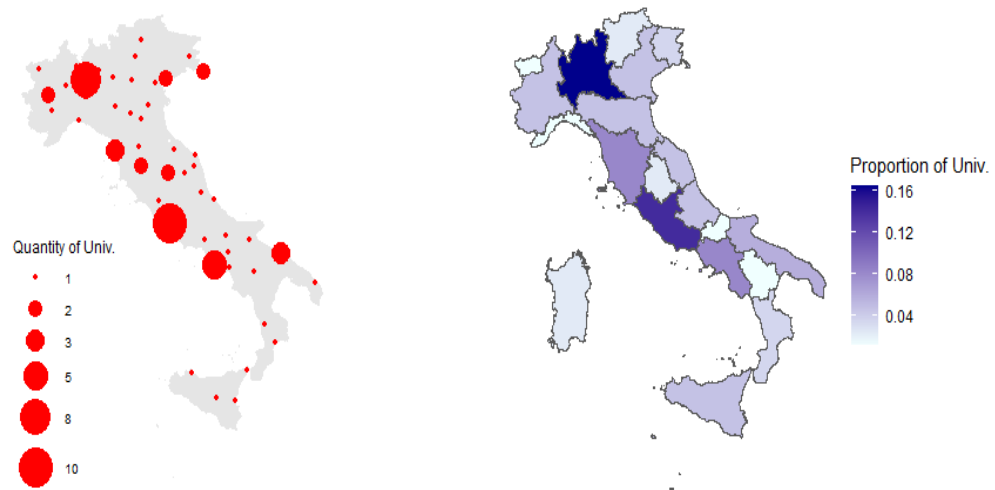

Figure 1: Concentration and Proportion of Italian Universities:s. Source: CRUI, Istat and GADM Data re-elaboration

3   Data and Variables

3.1   Data

Our paper integrates both macroeconomic and microeconomic approaches to analyze internal student mobility, using a comprehensive dataset that combines multiple sources. This allows us to capture individual-level variability while also adopting a dynamic perspective in the gravity analysis of student flows over time.[3]

We use the individual-level data for Italian students denominated as MOBYSU.IT[4] for the period 2014-2020, a database that integrates multiple data sources, such as the Italian National Student Register (ANS), and the INVALSI data files, including results for periodic tests about learning outcomes in the Italian Secondary Educational System. ANS is a government administrative database on the population of students enrolled in an Italian university between 2010 and 2020. The ANS data contain information on university students' career, individual characteristics, and high school background. The INVALSI data collect information on high school students' performances who obtained high school diploma in 2019 and 2020. For each student, the following information, among others, are available: students' INVALSI test scores, parents' education and type of employment, as well as other information about school, class and the student themselves. These two sources of information at the student level are merged using exact matching. We also collect regional information from IstatData (*http://dati.istat.it/*) and we use Immobiliare (*https://www.immobiliare.it/mercato-immobiliare/*) for house-renting prices.

We consider the Survey of Household Income and Wealth (SHIW) of the Bank of Italy to identify the percentage of Italian families with women as family heads. Finally, we used the joint database of the European Value Study and the World Value Survey (EVS-WVS) to build indicators on gender norms at the regional level in Italy. After cleaning, we have 1182094 students over the entire period, of which approximately 200000 move to a different region and are considered movers, meaning if the distance between the origin (using the high school municipality as a proxy for residence) and the destination is greater than 90km. As shown in Table 1, the average age is 19 years old; 58% are girls and the average grade at high schools is approximately 82 over 100. For the gravity analysis at the regional level, we build dyadic student mobility flows between regions of origin and destination regions. The final regional data set contains 2097 observations that constitute bilateral student flows between two pairs for more than 100 variables. Importantly, we have eliminated intra-regional flows. Table 2 shows the descriptive statistics of the main sociodemographic and regional variables.

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[3]Previous literature has primarily focused on either macroeconomic or microeconomic determinants of student mobility. The macroeconomic approach relies on aggregated data at the regional or university level to uncover institutional and contextual factors influencing students' choices (Caruso and de Wit (2015); Mixon and Hsing (1994); Van Bouwel and Veugelers (2013); Baryla and Dotterweich (2001)), among others). On the other hand, the microeconomic approach examines individual-level data to identify personal factors driving geographical mobility.

[4]As we already specified, the data used in this study have been processed in accordance with the RESEARCH PROTOCOL FOR THE STUDY 'From high school to the job placement: analysis of university careers and university mobility from Southern to Northern Italy' among the Ministry of University and Research, the Ministry of Education and Merit, the University of Palermo as the lead institution, and the INVALSI Institute. The reference researcher is Bruno Bertaccini (UNIFI).

Table 1: Summary Statistics of Individual data

	Mean	SD	Min	Max	N
Socio-demographic Characteristics					
Age	19.24	1.06	16	25	217343
Female	0.54	0.50	0	1	217343
High School Diploma Grade	83.99	12.16	60	101	196866
University Ranking	14.76	5.40	1	19	216391
Non Public High School	0.04	0.19	0	1	217343
Regional Characteristics					
Female Head (Origin)	0.35	0.03	0.31	0.47	187990
Female Head (Dest.)	0.38	0.02	0.31	0.47	217343
Female Empl. Rate (Origin)	33.79	9.70	15.68	53.63	89943
Female Empl. Rate (Dest.)	43.01	7.01	15.68	53.63	213402
Income (Origin)	12693.57	3323.12	4500.30	25309.29	184161
Income (Dest.)	18098.82	3189.93	7931.91	23699.70	216965
Population (Origin)	174011.10	463741.70	1023	2814256	185877
Population (Dest.)	997131.10	896608.20	1642	2814256	216967
Rental prices (Origin)	10.28	3.46	6.77	19.26	27140
Rental prices (Dest.)	12.40	3.60	6.76	19.26	200953
Distance	513.34	436.81	0	2209.71	187990

Notes: Italian students who move from their region to begin university (2014-2020). *Age* is the age of the students, *Female* is a dummy that indicates if the student is female and the *High school diploma grade* is the high school grade. *University Ranking* is the difference in ranking between the biggest university in the origin region and university chosen (we consider as a reference for the region of origin the university with the highest number of enrolled. To construct the variable of the ranking differential, we take into account the Shanghai Ranking classifications (*https://www.shanghairanking.com/*), analyzing all the years from 2014 to 2020.). *Non Public High School* indicates if the high school is private or not. *Female Head origin/destination* indicate the regional percentage of families with women heads. *Female Empl. Rate origin/destination* is the regional female employment rate. *Population origin/destination* is the number of individuals living in the origin/destination municipality (source on IstatData: Popolazione residente al 1° gennaio). *Income origin/destination* is the Irpef/Population at the municipal level of the origin and destination (source on IstatData: Istat: reddito delle persone fisiche (IRPEF) per comuni). *Rental prices origin/destination* are the average renting prices of the provincial capital of the origin and destination regions (*https : //www.immobiliare.it/mercato − immobiliare/*). *Distance* is the geodetic distance between the centroid of the source and destination region.

Table 2: Summary Statistics of Regional Data

	Mean	SD	Min	Max	N
Socio-demographic Characteristics					
Age	19.36	0.56	18	24	2097
Female	0.58	0.22	0	1	2097
High School Diploma Grade	81.58	6.59	60	101	2095
University Ranking	0.08	0.92	-2.08	2.08	2097
Non Public High School	0.07	0.14	0	1	2097
Regional Characteristics					
Female Head (Origin)	0.43	0.04	0.33	0.54	2097
Female Head (Dest.)	0.43	0.05	0.33	0.54	2097
Female Empl. Rate (Origin)	48.35	12.2	27.37	65.01	2097
Female Empl. Rate (Dest.)	50.43	11.56	27.37	65.01	2097
Income (Origin)	30275.15	4396.35	21807	38593	2097
Income (Dest.)	31057.73	4258.19	21807	38593	2097
Population (Origin)	3290714	2488576	125034	1.00e+07	2097
Population (Dest.)	3465825	2474166	125034	1.00e+07	2097
Rental Prices (Origin)	9.168949	3.267465	4.5	19.26481	2097
Rental Prices (Dest.)	9.56	3.22	4.5	19.26	2097
Distance	644.2	411.90	115.92	2209.71	2097

Notes: The table shows the Italian students sample who moved from their region to begin university (2014-20). *Age* is the average age of the students, *Female* is the percentage of female students, the *High School Diploma Grade* is the final high school grade. *Non Public High School* indicates if the high school is private or not. *University Rankings* is the difference in ranking between the biggest university in the origin region and the destination one (we consider as a reference the university with the highest number of enrolled student in the region of origin and destination. To construct the variable of this ranking differential, we take into account the Shanghai Ranking classifications (*https://www.shanghairanking.com/*), analyzing all the years from 2014 to 2020). *Female Head origin/destination* indicates the average percentage of households where women are the family's main income earners. *Female Empl. Rate origin/destination* is the regional female employment rate. *Income origin/destination* is the average income of the origin and destination regions (source on IstatData: Reddito netto: Regioni e tipo di comune (esclusi fitti imputati). *Population origin/destination* is the number of individuals living in the origin/destination region (source on IstatData: Popolazione residente al 1° gennaio). *Rental Prices destination* are the average renting prices of the provincial capital of the destination regions (*https : //www.immobiliare.it/mercato − immobiliare/*). *Distance* is the geodetic distance between the centroid of the source and destination region.

3.2 Main variables

In our individual-level analysis, the primary *output variable* is a binary indicator of whether a student chooses to attend a university in a different region or remains in their current area. We focus exclusively on those who move to another region, provided the distance between their place of origin (with the high school municipality

serving as a proxy for residence) and the destination is greater than 90 km.[5] The main *explanatory variable* at the individual level categorizes families based on the professional gap between parents. The idea is to measure the mother's bargaining power by assigning her a leading role if she holds a higher-paid job than the father. Consequently, family types 0 to 3 represent different combinations in which the father holds an equal or higher position than the mother, ranging from managerial roles to workmen, with mothers unemployed, inactive, or in lower-paid positions. Types 4 to 6 represent cases where the mother has a higher paid job, serving as a proxy for her greater bargaining power to influence the child's university choice. The independent variable takes the value 0 if the father holds an equal or higher position (types 0-3) and 1 if the mother does (types 4-6). To rank the professions according to their average earnings, we use the mean hourly earnings by sex, age, and occupation, provided by EUROSTAT (2018).

In the gravity analysis conducted at the regional level, *the outcome variable* is the bilateral interregional flows of students. To stay as close to our definition of the bargaining power of mothers as possible, the main *explanatory variable* is the percentage of households headed by women (who earn more than their partner) at the regional level, based on data from the Household and Income Survey of the Bank of Italy. As a robustness check, we also use the female employment rate, obtained from ISTAT data for 2014-2020, as a secondary predictor of bargaining power at the regional level. Figure 2 shows the distribution of the two variables of interest through two different maps. In the panel on the left, we report the percentage of female headship and and on the right, the female employment rate, that we use in the robustness analysis. The color red indicates the highest intensity and blue the smallest. Data are average data from 2014 to 2020.
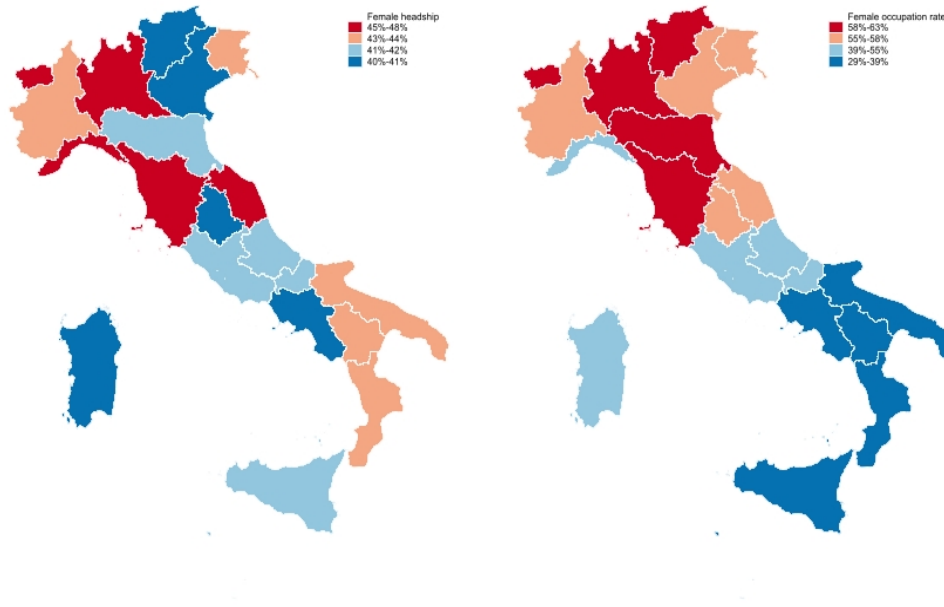

Figure 2: The distribution by region of percentages of families with Female Head and Female Occupation rates

The maps show significant heterogeneity across regions and the geographical distribution of the two

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[5]Both conditions apply even in cases where the student's residence and the destination university are in different regions but near the border.

variables. This underscores the fact that, while these two variables reflect different degrees of women's emancipation, they also capture distinct facets of this intricate mechanism. All control variables are explained in Tables 1 and 2.

4 Empirical Analysis at the Individual Level

4.1 Empirical Model

At the individual level, our empirical model regresses the individual choice to leave or stay y_i[6], where i indicates the student i. We perform different logit specifications as follows:

$$\text{logit}(P(Y_i = 1)) = \beta_0 + \beta_1 MotherPower_i + \beta_2 X_i + \beta_3 Z_i + \gamma_t T_i + \epsilon_i \tag{1}$$

The vector $MotherPower_i$ indicates our main explanatory variables at the individual level i. In addition, we take into account socio-demographic factors X_i such as age, sex, the ability of the student proxied by the final high school grade, but also regional variables Z_i such as income level and the population at origin/destination, the rental prices at destination, the university ranking and the distance between origin and destination. We also consider whether the high school is public or private. T_i is the year in which the individual i was observed, included as a dummy for the control of year effects. Importantly, we also run probit models as well as linear probility models which bring qualitatively to the same results.

4.2 Results

The main results are presented in Table 3. We gradually include our controls as we move along the table. In the first column, we include only the main variable. Then, we add the sociodemographic variables and then the regional time varying controls (column 3). In column 4, we include regional fixed effects. Finally, in the last column, we run a horserace between the bargaining power of the mother in the household and the percentage of families with a female head in the region of residence.

We establish a negative correlation between the mother's bargaining power and student mobility. Specifically, the greater the disparity in professional level or income in favor of the mother, the less likely the student is to leave their home region to study elsewhere. More precisely, a higher-paying job for the mother compared to the father is associated with a 0.7% decrease in the probability of the child moving away, ceteris paribus. This effect is statistically significant, and while the size of the effect may appear small, it is consistent with the other determinants of mobility in the model.

Additionally, individual ability—reflected by final high school graduation grades—and the ranking of the university, which signals institutional quality, remain significant and positively correlated with student mobility. Interestingly, while a higher level of maternal education tends to positively influence mobility, an opposing effect arises when the mother is the head of the household, leading to a reduction in the likelihood of moving.

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[6]As we already specified, we consider only who move to a different region and if the distance between the origin (using the high school municipality as a proxy for residence) and the destination is greater than 90 km.

Table 3: Mothers and students' mobility: individual analysis

Mothers' Power and Students' Mobility

	(1)	(2)	(3)	(4)	(5)
Mothers' Power	-0.022***	-0.009***	-0.007***	-0.007***	-0.007**
	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Female Head					-1.031***
					(0.019)
Mother with Uni Degree		0.022***	0.022***	0.010***	0.023***
		(0.003)	(0.002)	(0.002)	(0.003)
High School Diploma Grade		0.155***	0.089***	0.090***	0.118***
		(0.007)	(0.006)	(0.006)	(0.007)
University Ranking		0.064***	0.029***	0.030***	0.004***
		(0.002)	(0.001)	(0.001)	(0.001)
Rental Prices (Dest.)			0.078***	0.072***	-0.007
			(0.010)	(0.010)	(0.008)
Observations	122,032	105,065	101,910	101,004	101,910
Socio-Demographic Controls	No	Yes	Yes	Yes	Yes
Regional Controls	No	No	Yes	Yes	Yes
Regional FE	No	Yes	Yes	Yes	Yes
School and University Controls	No	No	No	Yes	Yes

Notes: Estimation sample: Italian students during the period 2014-2020. Dependent variable: a dummy that indicates whether the student is a mover. Mother's power is represented by the gap in her profession as compared to the father. The estimation method is logit and the results reported are the marginal effects. Specification (1) presents only the relationship between mothers' power and students' mobility, then we add socio-demographic controls (defined in Table 1) and regional fixed effects (column 2), and then we add also regional controls (column 3) also defined in Table 1. In column 4 we also control for high school and university type. In the last specification (column 5) we consider also the variable the percentage at the regional level of households with a woman head: Female Head. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

In the final column, we test whether women's bargaining power, measured at the regional level, predicts individual choices regarding studying in a different region, while controlling for maternal power within the household. Both family-level and societal-level measures of female emancipation are significant. The negative relationship between maternal bargaining power and mobility persists even when considering both factors in a 'horserace' model. The effect of maternal power within the family is reinforced by regional-level societal development measures that capture the broader role of women.

4.3   The mechanism

Entrepreneurs parents and Students' Mobility

What explains our result? The first avenue we explore to uncover the dynamics behind our findings is by focusing on a specific parental profession: entrepreneurship. We examine families where at least one parent has a profession that offers the possibility for the child to continue the family business. This could be a potential reason parents may want to keep their children closer. In Table 4, we analyze families where either the mother or the father is an entrepreneur or a professional. Interestingly, the results show that children of entrepreneurial mothers are less likely to move away for studies compared to children of fathers in similar

professions, who are more likely to leave. Furthermore, when we compare entrepreneurial mothers who are also family heads, the effect is even more pronounced than in our baseline specification.

Table 4: Mechanism: Focus on entrepreneurs

Entrepreneurs and Students' Mobility

	Mothers Entrepreneurs	Fathers Entrepreneurs	Baseline
Mothers' Power	-0.010***	0.012**	-0.007***
	(0.004)	(0.005)	(0.002)
Observations	31,546	13,898	101,910
Socio-Demographic Controls	Yes	Yes	Yes
Regional Controls	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes
School and University Controls	Yes	Yes	Yes

Notes: Estimation sample: Italian students during the period 2014-2020. Dependent variable: a dummy that indicates whether the student is a mover. Mother's Power is proxied by the gap in her profession as compared to the father. The estimation method is logit and the results reported are the marginal effects. Specification (1) presents only families where mothers are entrepreneurs, while specification (2) considers only families where father are entrepreneurs. Column (3) reports the baseline. *** p<0.01, ** p<0.05, * p<0.1

Norms and Students' Mobility

Another avenue we explore is based on a longstanding literature that shows economic decisions are shaped by cultural and social norms (Fernández (2007), Giuliano (2007), Luttmer and Singhal (2011), Litina et al. (2016)). This literature suggests that men and women may hold different preferences because societal norms assign distinct roles to men and women. To capture these social norms, we draw on questions from the EVS-WVS survey data, used in this literature. We focus on the following questions:

'Important in life: Family': This question captures the cultural norm that places a high value on family life - family ties -, which may reflect traditional expectations of women's roles as primary caregivers, influencing decisions to stay closer to home.

'Important child qualities: independence': This question measures the value parents place on self-reliance and independence, reflecting cultural differences in child-rearing practices that may influence a child's likelihood of moving away for education.

'A woman has to have children to be fulfilled': This question addresses traditional gender norms regarding motherhood and societal expectations placed on women, potentially influencing parental decisions around mobility.

'Living day to day because of an uncertain future': This question touches on perceptions of economic insecurity, which can affect risk aversion and the decision to leave home for educational opportunities, particularly for women if they are more risk averse.

Findings are reported in Table 5, the importance of family - family ties- appear to be a driving mechanism,

while the other factors do not seem to be behind our findings.

Table 5: Mechanism: Norms and student mobility

Norms and Students' Mobility: EVS-WVS Survey Questions				
	A001	A029	D019	E144
Mothers' Power	-0.007***	-0.007***	-0.007***	-0.007***
	(0.002)	(0.002)	(0.002)	(0.002)
Family Ties	-0.162***			
	(0.004)			
Mothers' Power#Family Ties	-0.141**			
	(0.072)			
Independent Child		0.583***		
		(0.014)		
Mothers' Power#Independent Child		0.136		
		(0.233)		
Trad. Gender Norm			0.146***	
			(0.004)	
Mothers' Power#Trad. Gender Norm			0.063	
			(0.072)	
Uncertainty				6.207***
				(0.155)
Mothers' Power#Uncertainty				-0.049
				(0.31)
Observations	101,910	101,910	101,910	101,910
Socio-Demographic Controls	Yes	Yes	Yes	Yes
Regional Controls	Yes	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes	Yes

Notes: Estimation sample: Italian students during the period 2014-2020. Dependent variable: a dummy that indicates whether the student is a mover. Mother's Power is proxied by the gap in her profession as compared to the father. The estimation method is logit and the results reported are the marginal effects. We consider the cultural mechanism through different EVS-WVS questions: A001 - Important in life: Family; A029 - Important child qualities: independence; D019 - A woman has to have children to be fulfilled and E144 - Living day to day because of uncertain future. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

4.4 Robustness Analysis: South versus North

Beyond the broader endogeneity issues, which will be addressed in the instrumental variable analysis, we focus on two specific characteristics of the Italian context regarding student mobility. First, there is a longstanding tradition of students from the South migrating to the North in pursuit of better opportunities,

given the more developed economic conditions in the northern regions. Additionally, such migration may reflect selection based on norms like civicness (see Moti et al. (2022)), as students from the South may be drawn to the North for reasons beyond economic opportunity alone. Thus, our analysis may inadvertently capture these movements driven by other factors.

Second, particularly in the South and the islands of Sicily and Sardinia, some provinces have limited access to universities. This lack of local educational institutions forces students to relocate if they wish to pursue higher education. To address these concerns, we separately analyze students originating from the North/Central regions and those from the South[7]. The results are presented in Table 6. Columns 1 and 2 display the specifications with full controls for the Northern/Central regions and the Southern regions, respectively. Reassuringly, the findings indicate that our results are driven primarily by students who originate from and move within the regions of the North and the Center of Italy.

Table 6: Heterogeneity Analysis-North vs South

Mothers' Power and Students' Mobility: North vs South Regions		
	North&Center	South
Mothers' Power	-0.009***	-0.001
	(0.003)	(0.005)
Mother with Uni Degree	0.014***	0.001
	(0.003)	(0.004)
High School Diploma Grade	0.107***	0.042***
	(0.008)	(0.010)
University Ranking	0.042***	0.050***
	(0.002)	(0.003)
Rental Prices (Dest.)	-0.059***	0.265***
	(0.016)	(0.020)
	58,941	35,791
Socio-Demographic Controls	Yes	Yes
Regional Controls	Yes	Yes
Regional FE	Yes	Yes

Notes: Estimation sample: Italian students during the period 2014-2020. Dependent variable: a dummy that indicates whether the student is a mover. Mother's Power is proxied by the gap in her profession as compared to the father. The estimation method is logit and the results reported are the marginal effects. Specification (1) presents only the nothern and central regions while specification (2) only the southern one. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

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[7]Following ISTAT, we classify the North and Centre as: Liguria, Lombardia, Piemonte, Valle d'Aosta, Emilia-Romagna, Friuli Venezia Giulia, Trentino-Alto Adige, Veneto, Lazio, Marche, Toscana, and Umbria. The South includes: Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia, Sardegna, and Sicilia.

5 Empirical Analysis at the Regional Level

5.1 Empirical model

We now turn to a gravity model, which is ideal for analyzing mobility using the aggregated flow intensity data at our disposal. This model is widely used in the literature to study various phenomena, such as international trade and migration flows. Specifically, we draw on the segment of the literature that applies gravity models to student mobility (e.g., Agasisti and Dal Bianco (2007), Rodríguez González and Bustillo Mesanza (2011), Kostzyán et al. (2021)). By complementing our individual-level analysis with a gravity model at the regional level, we can conduct a dynamic analysis that accounts for potential connections between pairs of Italian regions, which might otherwise confound our individual-level findings.

The main specification is given by Equation 2:

$$
\begin{aligned}
\log Y_{o,d,t} = & \beta_0 + \beta_1 Mother'sPower_{o,t} + \beta_2 Mother'sPower_{d,t} + \beta_3 X_{o,t} + \\
& + \beta_4 X_{d,t} + \beta_5 Z_{o,t} + \beta_6 Z_{d,t} + d_{o,d} + \epsilon_{o,d,t}
\end{aligned}
\tag{2}
$$

The flow of students between regional pairs is the dependent variable, denoted as $Y_{o,d,t}$, where o represents the origin region, d the destination region, and t the year. The key explanatory variable is the regional percentage of families with female heads, captured by the $Mother'sPower$ vector.

We include several origin-destination controls: socio-demographic variables (X), such as the average age of students, the percentage of females, and the average high school grade at both the origin and destination; and regional variables (Z), including the university ranking[8], income levels at both the origin and destination, distance, housing prices, and population size in both regions.

As is standard in gravity models, distance between the origin and destination regions is incorporated, and all variables are expressed in logarithmic form. In the most comprehensive specification, we also include region-pair fixed effects to control for unobserved heterogeneity.

5.2 Results

Table 7 presents the main findings from various OLS specifications, where we gradually introduce different controls and fixed effects. In Column 1, we examine only female headship in the origin and destination regions. In Model 2, we incorporate individual regional averages through vector X, which includes variables such as average age, percentage of women, and average high school diploma grades. In Model 3, we add regional-level controls (Z), such as income in both the origin and destination regions, distance between regions, rental prices, population, and university rankings at both the origin and destination. Column 4 includes additional controls for the type of high school and university attended. Finally, Model 5 incorporates all controls along with a time trend. Each specification employs a fixed-effects model with regional pair fixed effects ($d_{o,d}$).

Focusing on the most comprehensive specification (Column 5), our main finding remains consistent with the individual-level analysis: as the share of families headed by women increases, extra-regional student mobility decreases. Specifically, a 1% increase in the number of female-headed households results in a 0.247

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[8]As in the individual analysis, the ranking is based on the Shanghai Ranking.

percentage point reduction in the flow of students leaving the region.

Moreover, as seen earlier, students with higher high school diploma grades are more likely to move. Additionally, the university ranking proves to be a key determinant in mobility decisions, highlighting the significant influence of institutional quality on student movement, in line with existing literature.

Table 7: Mothers and students' mobility: regional analysis

Female Head and Students' Mobility					
	(1)	(2)	(3)	(4)	(5)
Female Head (Origin)	-0.286**	-0.291***	-0.247***	-0.262***	-0.247***
	(0.114)	(0.103)	(0.0908)	(0.0909)	(0.0908)
Female Head (Dest.)	-0.375***	-0.318***	-0.0932	-0.0736	-0.0754
	(0.116)	(0.105)	(0.0954)	(0.0948)	(0.0928)
High School Diploma Grade		0.459*	0.851**	1.002**	1.220***
		(0.244)	(0.426)	(0.406)	(0.432)
University Rankings			0.0471*	0.0517*	0.0466*
			(0.0268)	(0.0271)	(0.0268)
Rental Prices (Origin)			0.121	0.0662	0.203
			(0.257)	(0.247)	(0.241)
Rental Prices (Dest.)			-0.458**	-0.494***	-0.331
			(0.183)	(0.190)	(0.224)
Observations	2,097	1,977	1,149	1,149	1,149
Socio-Demographic Controls	No	Yes	Yes	Yes	Yes
Regional Controls	No	No	Yes	Yes	Yes
School and University Controls	No	No	No	Yes	Yes
Pair-Region FE	Yes	Yes	Yes	Yes	Yes
Time Trend	No	No	No	No	Yes

Notes: Estimation sample: extra-regional Italian students' flows for 2014-2020. The dependent variable in all models is the flow of students changing regions to study. The estimation method is OLS. Pair region fixed effects are used in each model. Model 5 is the most restrictive, including all the controls and time trend. Standard errors are clustered at the regional pair level. Stars correspond to the following p-values: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

For the robustness checks, we use another variable which captures female emancipation at regional level: female employment rate. Table 10 presents the main findings in the Appendix. Again, we performed five OLS specifications for each dimension of female bargaining power, gradually adding (in the same way as before) different controls and fixed effect sets. Focusing on the last specification, our main finding is that if the level of female occupational rate increases, the extra-regional flows decrease. Mothers' higher occupational rates makes students less mobile. A 1% increase of female employment rate decreases the flow by 2.630 percentage points. Taken overall, our previous main results are confirmed.

6 Endogeneity issues and Identification Strategy

In our study of how mothers' roles as heads of households affect student mobility, several potential endogeneity issues arise, necessitating the use of an instrumental variable (IV) analysis. A key concern is omitted variable bias. Unobserved factors, such as family values, or economic conditions, may simultaneously influence both the likelihood of a mother heading a household and student mobility. If these factors are not properly accounted for, our results may be biased.

Additionally, the measurement of the mother's bargaining power or headship status might be imperfect, potentially leading to errors that correlate with other variables in the model, further biasing the results. We are also concerned about selection bias: there may be systematic differences between families where the mother is the head and those where she is not, which could influence mobility. For example, women who head households may possess specific characteristics that also correlate with student mobility decisions.

To address these concerns, we introduce an instrumental variable based on the concept of plogh suitability of lands (Boserup (1970), Pryor (1985), and Alesina et al. (2013)). Alesina et al. (2013) demonstrated in a pivotal study that historical agricultural practices involving the plough have shaped prevailing gender norms and outcomes related to women's emancipation, such as female employment rates.

In our context, we leverage these regional differences in plough suitability as instruments to measure women's empowerment across regions. Specifically, we adopt the classification proposed by Pryor (1985), which categorizes crops into two groups: Plough-positive crops, such as wheat, barley, rye, tea, buckwheat, wet rice, and industrial crops; and Plough-negative crops, such as millet, sorghum, root crops, maize, dry rice, and tree crops. We obtained the Suitability Index values for all land in the grid cells through the GAEZ portal. Using QGIS, we applied these values to Italian regional boundaries, as defined by Geoportale Mase.[9]

We decided to use the plough-negative index, focusing on sorghum, because it has a direct and positive relationship with our main independent variables representing women's empowerment. In the regional analysis, to leverage the panel dimension, we multiplied the logarithm of the suitability index (which ranges from 1 to 10,000 and reflects historical values) by the national average growth rate of female employment, excluding the region of reference for each observation. For the individual analysis, we followed the same procedure.

The IV results presented in Table 8 and 9 confirm our OLS findings, with the variables representing women's emancipated role in society and the family entering negatively and significantly in the specification. Specifically, the upper panels present the first stage, where the variable *Ploughnegative* is significant and negatively correlated with our two variables of female emancipation. The underlying idea is that the more suitable a region is for ploughing, and therefore historically more dependent on it, the less likely women have held an emancipated role in society. The lower panels represent the second stage, confirming the results of our main analysis (with OLS results included in the second column for comparison): the more significant a woman's role is in employment and the economy, the less likely students are to leave home to attend university.

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[9]Climate source: CRUTS31. RCP historical. The crop analyzed is sorghum. The time period selected is "Baseline (1961-1990)," the best available for historical climate data. We use low inputs and rain-fed water supply without CO2 fertilization. The theme option is agro-climatically attainable yield.

Table 8: IV Strategy at Individual Level: land suitability to plough

IV Strategy-Suitability to plough	IV	OLS
First Stage		
Plough negative	0.00***	
	(0.000)	
Constant	-0.34	
	(0.21)	
Observations	101,910	
R-squared	0.04	
F-Stat	45	
Second Stage		
Mothers' Power	-1.922***	-0.006***
	(0.312)	(0.002)
Mother with Uni Degree	0.129***	0.014***
	(0.020)	(0.002)
High School Diploma Grade	0.103***	0.106***
	(0.016)	(0.006)
University Rankings	0.012***	0.025***
	(0.004)	(0.002)
Rental Prices (Dest.)	-0.090***	0.011
	(0.032)	(0.015)
Observations	101,910	101,910
Socio-Demographic Controls	Yes	Yes
Regional Controls	Yes	Yes
Regional FE	Yes	Yes

Notes: Estimation sample: extra-regional Italian students' flows for 2014-2020. Dependent variable in the second stage is the decision of the students to depart or not from their origin region (in the first one the mother power variable). The instrumental variable is the regional suitability to plough. In column (2) we report the OLS results. We control for the same controls of the main specification. Stars correspond to the following p-values: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 9: IV Strategy at Regional Level: land suitability to plough

IV Strategy-Suitability to plough	IV	OLS
First Stage		
Plough negative	0.00***	
	(0.000)	
Constant	-10.45**	
	(4.39)	
Observations	1,129	
R-squared	0.09	
F-Stat	79	
Second Stage		
Female Head (Origin)	-3.815***	-0.247***
	(0.884)	(0.091)
Female Head (Dest.)	-0.035	-0.075
	(0.243)	(0.0928)
High School Diploma Grade	-2.172**	1.220***
	(0.881)	(0.432)
University Rankings	0.294***	0.047*
	(0.0767)	(0.0268)
Rental Prices (Origin)	0.394	0.203
	(0.243)	(0.241)
Rental Prices (Dest.)	1.077***	-0.331
	(0.218)	(0.224)
Observations	1,129	1,149
Socio-Demographic Controls	Yes	Yes
Regional Controls	Yes	Yes
School and University Controls	Yes	Yes
Pair-Region FE	No	Yes
Time Trend	Yes	Yes

Notes: Estimation sample: extra-regional Italian students' flows for 2014-2020. Dependent variable in the second stage is the flow of stu- dents (in the first one the female head variable). The instrumental variable is the regional suitability to plough. In column (2) we report the OLS results. We control for the same controls of the main specification. Stars correspond to the following p-values: *** p<0.01, ** p<0.05, * p<0.1.

7   Conclusions

This paper explores the relationship between maternal headship and student mobility in Italy, revealing a significant 'mother-hen' effect where students are less likely to relocate for higher education when mothers hold greater decision-making power in the household. This effect holds both at the individual level, using a logit fixed-effect model, and at the regional level, using a gravity model of student flows. Our findings show that higher maternal bargaining power, as measured by wage disparity or headship, is consistently associated with lower student mobility. This relationship persists even after controlling for other influential factors, such as university rankings, family income, and regional economic conditions.

A key contribution of this research is the identification of strong family ties as the primary factor behind reduced student mobility, rather than other factors like risk aversion or parental expectations of independence. Mothers' roles in maintaining these ties are crucial, with the influence extending to both sons and daughters, challenging traditional assumptions about gender differences in family influence. This suggests that the presence of the mother within the household may serve as an anchor, leading children to prioritize staying close to home for university.

At the regional level, higher levels of female emancipation, measured by the proportion of female-headed households, correlate with reduced student mobility across Italian regions. This highlights that maternal headship and female empowerment at both micro (family) and macro (regional) levels serve as deterrents to student relocation. The findings add a new dimension to the study of temporary migration, particularly in the context of higher education, by emphasizing the emotional and social ties that shape mobility decisions.

To address potential endogeneity concerns, such as omitted variable bias and measurement errors, we adopt an instrumental variable (IV) approach using historical suitability for plough agriculture as an instrument for women's emancipation. The results remain robust and confirm that maternal headship plays a key role in reducing student mobility, free from confounding influences. This use of historical instruments demonstrates the long-term impact of gender norms on contemporary family dynamics and educational choices.

In terms of policy implications, regions seeking to promote greater student retention —and, by extension, a more balanced distribution of human capital—should consider family dynamics, particularly the role of maternal influence.

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Appendix

Table 10 provides results for an alternative measure of the bargaining power of women at the regional level in Italy: the female employment rate.

Table 10: Mothers and students' mobility: robustness checks of the regional analysis

Female Employment Rate and Students' Mobility					
	(1)	(2)	(3)	(4)	(5)
Female Empl. Rate (Origin)	-2.923***	-3.135***	-2.562***	-2.524***	-2.630***
	(0.511)	(0.522)	(0.545)	(0.538)	(0.572)
Female Empl. Rate (Dest.)	-2.925***	-2.638***	-1.761***	-1.683***	-1.783***
	(0.560)	(0.571)	(0.664)	(0.641)	(0.656)
High School Diploma Grade		0.744***	0.595	0.735*	0.658
		(0.234)	(0.425)	(0.412)	(0.451)
University Rankings			0.0360	0.0409	0.0416
			(0.0261)	(0.0268)	(0.0267)
Rental Prices (Origin)			0.214	0.145	0.108
			(0.247)	(0.235)	(0.229)
Rental Prices (Dest.)			-0.268	-0.304*	-0.341
			(0.175)	(0.183)	(0.213)
Observations	2,097	1,977	1,149	1,149	1,149
Socio-Demographic Controls	No	Yes	Yes	Yes	Yes
Regional Controls	No	No	Yes	Yes	Yes
School and University Controls	No	No	No	Yes	Yes
Pair-Region FE	Yes	Yes	Yes	Yes	Yes
Time Trend	No	No	No	No	Yes

Notes: Estimation sample: extra-regional Italian students' flows for 2014-2020. The dependent variable in all models is the flow of students changing regions to study. The estimation method is OLS. Pair region fixed effects are used in each model. Model 5 is the most restrictive, including all the controls and time trend. Standard errors are clustered at the regional pair level. Stars correspond to the following p-values:*** $p<0.01$, ** $p<0.05$, * $p<0.1$.