

Aina, Carmen; Nicoletti, Cheti

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## The intergenerational mobility of liberal professions: Nepotism versus abilities

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# The intergenerational mobility of liberal professions: nepotism versus abilities

**Carmen Aina**

Department of Economics  
University of Piemonte Orientale A. Avogadro

**Cheti Nicoletti**

Department of Economics and Related Studies  
University of York

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October 2014



INSTITUTE FOR SOCIAL  
& ECONOMIC RESEARCH

## Non-technical summary

It is commonly believed that a strong association between children's and parents' occupation is a signal of unequal opportunities and that public policy should improve the opportunities for those from disadvantaged backgrounds; but to judge whether a high level of transmission of occupations from parents to children is unfair and whether there is room for policy interventions, we need to study the mechanisms that explain this transmission of occupations from parents to children.

In this paper we focus on the transmission of liberal professions from parent to children in Italy and assess whether there are mechanisms of intergenerational transmission that are related to nepotism and family networking. By liberal professions we mean professions that require to first obtain a recognized degree and then to pass a licensing exam consisting of written and oral tests. In particular, we consider lawyers, notaries, accountants, pharmacists, psychologists, architects, engineers, biologists and geologists. We assess the effect of having a father who is a liberal professional on the probability to choose a university degree that gives access to a liberal profession, the probability of obtaining a licensing exam, and the probability to become a liberal professional.

The effect of the father's occupation on these probabilities can operate through different mechanisms, which include the intergenerational transfers of financial resources, skills, job preferences, nepotism and family networking.

By using rich administrative data on university students linked with surveys data that cover the whole population of graduates in 2002 and 2003 in 22 Italian Public Universities, we find that the odds to become a liberal professional if one's father is a liberal professional are twice the corresponding odds if one's father is not a liberal professional. The effect of having a liberal professional father on the choice of the degree is very modest, whereas this effect gets larger when considering the probability of passing a licensing exam and even larger when looking at the probability of becoming a liberal professional conditional on having passed a licensing exam. Furthermore, these effects seem to be explained, at least in part, by nepotism and family networking.

# The intergenerational transmission of liberal professions: nepotism versus abilities

**Carmen Aina**

Department of Economics, University of Piemonte Orientale A. Avogadro

**Cheti Nicoletti**

DERS, University of York

October 21, 2014

## **Abstract**

By using university administrative and survey data on Italian graduates, we analyze the transmission of liberal professions from fathers to children. We assess the effect of nepotism and family networking, separately from other transmission channels, on the probability of choosing a degree that gives access to liberal professions, of obtaining a licensing and of starting a liberal profession. The results suggest that the effect of nepotism and networking is irrelevant on the degree choice, modest on the success rate at the licensing exam, but large and significant on the probability to start a liberal profession.

**Keywords:** Professional licensing, liberal profession, intergenerational mobility, nepotism

**JEL codes:** J44, J62, J24

Corresponding authors: Carmen Aina, e-mail: [carmen.aina@eco.unipmn.it](mailto:carmen.aina@eco.unipmn.it), and Cheti Nicoletti, e-mail: [cheti.nicoletti@york.ac.uk](mailto:cheti.nicoletti@york.ac.uk).

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# 1 Introduction

The belief that a strong association between children's and parents' occupation is a signal of unequal opportunities and that public policy should improve the opportunities for those from disadvantaged backgrounds has led to a plethora of empirical studies assessing the extent of intergenerational mobility.<sup>1</sup> But to judge whether a high level of intergenerational transmission of occupations is unfair and whether there is room for policy interventions, we need to study the mechanisms that explain this transmission of occupations from parents to children. While papers on intergenerational mobility in income and earnings have looked at potential mechanisms that drive the intergenerational transmission,<sup>2</sup> empirical papers on the transmission of occupations have mainly focused on assessing the level of intergenerational association in occupational prestige indexes or occupational categories<sup>3</sup> but have not generally provided an explanation of why children tend to follow their parents' occupations.

Studies that have looked for explanations of the occupational transmission from fathers to children have generally focused on the intergenerational transmission of employers (see Corak and Piraino 2011; Bingley et al. 2012; Kramarz and Skan 2014) or on occupations for which the intergenerational transmission is strong such as self-employment and entrepreneurial occupations (see Laband and Lentz 1983, Dunn and Holtz-Eakin 2000, Sørensen 2007; and Lindquist et al. 2015), public sector occupations (see Scoppa 2009; Allesina 2011; Ferlazzo and Sdoia 2012) and high skilled jobs, as for example chief executive officers, liberal professionals and doctors (see Lentz and Laband 1989; Pérez-González 2006; Bennedsen et al. 2007; Pelizzari and Pica 2011; Pelizzari et al. 2011).

We add to this literature on intergenerational occupational mobility by focusing on the transmission of liberal professions in Italy and assessing whether there are mechanisms of intergenerational transmission that are related to nepotism and family networking. By liberal professions we mean professions that require to first obtain a recognized degree and then to pass a licensing exam consisting of written and oral tests. In particular, we consider lawyers,

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<sup>1</sup>For a review of papers on intergenerational mobility see Solon (1999), Björklund and Jantti (2009), and Ermisch et al. (2012).

<sup>2</sup>See Bowles and Gintis (2002), Blanden et al. (2007), Black and Devereux (2010) and for early work Conslík (1974 and 1977), Atkinson (1980) and Atkinson and Jenkins (1984).

<sup>3</sup>See e.g. Ermisch and Francesconi (2002), Di Pietro and Urwin (2003), Ferrie (2005), Ermisch et al. (2006), Goldthorpe and Mills (2005), Nicoletti and Ermisch (2007), Long and Ferrie (2007), Hellerstein and Morrill (2011), and Long and Ferrie (2013).

notaries, accountants, pharmacists, psychologists, architects, engineers, biologists and geologists. We focus deliberately on intergenerational transmission mechanisms that operate for university graduates in the period before their entry into labour market and evaluate the effect of having a father in a liberal profession for each of three following sequential processes:

1. the probability to choose a university degree that gives access to a liberal profession,
2. the probability of obtaining a licensing exam,
3. the probability to become a liberal professional.

The effect of the father's occupation on these probabilities can operate through different mechanisms, which include the intergenerational transfers of financial resources, formal and informal human capital, job preferences, nepotism and family networking.

By using rich administrative data on university students linked with surveys data that cover the whole population of graduates in 2002 and 2003 in 22 Italian Public Universities (see details on AlmaLaurea data in Section 4), we are able to

1. provide estimates of the degree of intergenerational transmission of liberal professions,
2. evaluate whether the effect of having a liberal professional father is equally important for each of three above processes,
3. assess the importance of the intergenerational transfer of informal human capital (such as job specific skills and know how) and of the effect of nepotism and family networking in explaining this intergenerational transmission.

We find that the odds to become a liberal professional if one's father is a liberal professional are twice the corresponding odds if one's father is not a liberal professional. The effect of having a liberal professional father on the choice of the degree is very modest, whereas this effect gets larger when considering the probability of passing a licensing exam and even larger when looking at the probability of becoming a liberal professional conditional on having passed a licensing exam. Furthermore, this effect seems to be explained, at least in part, by nepotism and family networking.

The main novelty of our paper is that we consider different processes and channels through which father's occupation can affect children. Our approach is similar in spirit to Mare's educational transition model, which estimates the effect of parental background on the probability of progressing from one educational level to the next using a sequential binary model (see Mare 1979, 1980, 1981, 2011). The main difference is that, rather than evaluating the effect of background on school transitions, we evaluate the effect of parental occupation on the three sequential processes defined above. We estimate these probability processes by using a sequential probit model and controlling for the intergenerational transmission of formal human capital and of job preferences. Because we cannot control for the direct transmission of financial resources and of informal human capital, we provide, rather than an exact value, an upper bound on the effect of the transmission of informal human capital and a lower bound on the effect of nepotism and family networking on the probabilities of obtaining a licensing and of starting a liberal profession.

In our models we are also unable to control for pre-birth factors such as inherited genetic endowments and in-utero environment. We are aware of only one paper on occupational transmission that focuses on both pre-birth and post-birth factors, which is the paper by Lindquist et al. (2015). By using unique Swedish administrative data on adoptees and on their biological and adoptive parents, Lindquist et al. (2015) are able to identify separately the part of the intergenerational transmission of occupations (in particular entrepreneurial occupations) explained by pre-birth factors and the part explained by post-birth factors. They find that post-birth factors matter twice as much as pre-birth factors. This seems to suggest that the transmission of occupations is mainly explained by mechanisms occurring after child birth rather than through genetic inheritance.

Even if we focus exclusively on mechanisms of transmission that operate between graduation and the entry into the labor market, we are still concerned that our estimation results might be biased by the presence of unobserved heterogeneity and more specifically by unobserved pre-birth factors. For this reason we also estimate a sequential probit model that controls for the presence of unobserved heterogeneity by allowing for correlation between the error components in the three probability models.<sup>4</sup> We find that the omission of unobserved

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<sup>4</sup>The potential bias caused by unobserved heterogeneity in sequential binary models have been emphasized in the context of sequential binary models for educational transitions by Cameron and Heckman (1998) (see also Mare 2011; Tam 2011; Buis 2011; and Xie 2011) and in the context of sequential binary models for discrete duration by Baker and Melino (2000), Gaure et al. (2007) and Nicoletti and Rondinelli (2010).

heterogeneity does not seem to bias the estimates of the marginal effect of the three processes analyzed.

The remaining of the paper is organized as follows. Section 2 summarizes the literature related to our research. Section 3 provides some institutional details on the educational system and on the licensed occupations in Italy. We then move to describe our data and our empirical results in Sections 4 and 5. Finally, Section 7 summarizes our main findings and conclusions.

## 2 Previous literature

Similarly to the intergenerational transmission of income, the occupational transmission has been explained by inheritability of endowments and parents' investments in their children's human capital (see Becker and Tomes 1979, 1986). But, to justify a different degree of transmission for different occupations, it is necessary to recognize that there are two types of human capital investments: the indirect investment through formal education and the direct investment through the transmission of job-specific abilities and knowledge from fathers to children (see Laband and Lentz 1983 and 1992, Evans and Jovanovic 1989, Dunn and Hotz-Eakin 2000, Fairlie and Robb 2007, Fairlie and Krashinsky 2012).

By assuming that the cost to acquire human capital related to a specific occupation is lower for children who follow their father's occupation and that fathers with a child who is a follower maximize their own earnings as well as their child's ones, Laband and Lentz (1983) develop an economic model which allows explaining the mechanisms behind the intergenerational occupational transmission and the differences in this transmission across occupations. Direct and indirect human capital transfers from fathers to children are assumed to be the mechanisms of intergenerational transmission at work, and the explanation given for why some types of occupations are more often transmitted than others is that they require job-specific human capital that can be easily and cheaply transmitted from fathers to children. Laband and Lentz (1983) find that for occupations where the direct transmission of job-specific knowledge and abilities is more relevant, such as farmers and self-employees, there is a higher percentage of children following their father's occupation. High levels of intergenerational transmission have been found also by Dunn and Holtz-Eakin (2000) and Sørensen



(2007) for self-employment and by Lindquist et al. (2015) for entrepreneurial occupations. Liberal professions are another example of occupation for which there is evidence of a strong intergenerational association (Pelizzari et al. 2011), which may be explained by the transmission of skills and knowledge that help to lower the entry barrier to the profession, e.g. shortening the time needed to set a portfolio of customers and increasing potential early profits.

If parental human capital investments were the only explanation for the occupational transmission from fathers to children, then there would be no reason for thinking that a high degree of occupational transmission is unfair. However, another possible explanation is the presence of credit market imperfections, which may lead to a failure of meritocracy (see Evans and Jovanovic 1989, Holtz-Eakin et al. 1994, Dunn and Hotz-Eakin 2000, Caselli and Gennaioli 2005 and Fairlie and Krashinsky, 2012).

Evans and Jovanovic (1989) propose an economic model for the decision to be a self-employee, and they provide empirical evidence that wealthier people have higher probability of starting a self-employment activity. Dunn and Hotz-Eakin (2000) extend this model to allow for financial capital transfers from fathers to children, so that the decision to become a self-employee depends on the personal human and financial capital as well as on the human and financial capital transmitted from the father. Some papers have provided empirical evidence that the probability of starting a self-employed activity, such as own-account workers or entrepreneurs, is higher for children whose fathers are wealthier (see Holtz-Eakin et al. (1994) and Dunn and Hotz-Eakin 2000, Parker and Van Praag 2006). This evidence seems to prove that there are financial constraints and that family credit market may replace the more formal credit market, so that intergenerational occupational transmission may operate through financial capital transfers from fathers to children.

Another potential explanation for the intergenerational occupational mobility, which has been mentioned but not formalized in a theoretical economic framework, is the transmission of preferences and attitudes from parents to children. For example risk averse fathers are less likely to become an entrepreneur and probably transmit their risk aversion to their child, who in turn will be less likely to become an entrepreneur (see Dunn and Hotz-Eakin 2000, Fairlie 2002).

A final mechanism of transmission is the nepotism, which may affect the outcomes of school admission exams and licensing exams, and ultimately the probability of starting specific occupations.<sup>5</sup> It is generally difficult to distinguish the roles of nepotism and of human capital transfers in the intergenerational occupational transmission. This is because the intergenerational transmission of knowledge and the father's work network may increase intergenerational mobility without implying favoritism (see Magruder 2010; Ponzio and Scoppa 2011b; Kramarz and Skans 2014). It is perhaps easier to identify the contribution of nepotism when looking at success rate at exams for which the probability of success should be independent of the father's occupation once controlled for the child's ability. In this paper we identify the effect of nepotism on the probability of passing a licensing exam in Italy.

Liberal professions in Italy have been traditionally heavily regulated and require to pass a professional licensing exam (see Paterson et al. 2003, Catania and Monti 2011 and Pellizzari and Pica 2011). The licensing is usually introduced to increase the quality of the professional services and to reduce the uncertainty of the consumers on the quality. Nevertheless, it has been recognized that there can be also negative effects of professional licensing, in particular an increase in the price of the services, a reduction of competition and a possible quality worsening (see Maurizi 1974, Kleiner 2000 and Pagliero 2011). By focusing on the intergenerational transmission of liberal professions, we examine another potential negative effect, which is an increase in the transmission of liberal professions from fathers to children caused by nepotism rather than better work abilities. This may result in a reduction of the quality of the professional services, which is opposite to the outcome intended by the introduction of licensing.

Italian licensing examinations have been often accused of favoritism toward children of liberal professionals, but the empirical evidence is mostly anecdotal or based on statistical analysis that cannot adequately control for the intergenerational transmission of financial resources, formal and informal human capital and preferences (see Basso and Labartino 2011). The most convincing evidence on the effect of fathers on children entry into a liberal

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<sup>5</sup>Previous papers that have studied the effect of nepotism include Lentz and Laband (1989) and Arulam-palam et al. (2005), who look at school admission; Pérez-González (2006) and Bennedsen et al. (2007), who analyze the chief executive officer (CEO) successions; Basso and Labartino (2011), who evaluate the effect of nepotism on the starting age of licensed professions; Ponzio and Scoppa (2011a), who study its effect on recruitment; and Scoppa (2009), who estimates the intergenerational mobility of public sector jobs.

profession is given by Basso and Pellizzari (2010).<sup>6</sup> Using local administrative registers of professionals in Italy, they find a negative relationship between the age when people start a lawyer profession and the frequency of their family name in the local register. Since the frequency of their surname is likely to indicate family connections, the negative relation might suggest a potential effect of nepotism on the probability of passing a licensing exam. The presence of nepotism is confirmed by a comparison of the relationship between starting age of lawyer professions and frequency of the family names before and after the introduction of a reform aimed at reducing biases in the marking of the licensing exams. The association between starting age and surname frequency decreases after such intervention, indicating a potential reduction in the nepotism effect.

## 3 Institutional background

### 3.1 The Italian university education system

In Italy all students with any type of high school diploma can enrol in a university degree. High school diplomas are upper secondary qualifications, which are usually completed at age 18-19, and they can be academic (*licei classici* and *licei scientifici*) or vocational (*istituti tecnici* and *istituti professionali*).

The Italian university system traditionally includes only academic degrees with little vocational or professional purposes and with an official duration that varies between 4 and 6 years. This university system has been changed by a reform in 2001, but our sample includes graduates in 2002 and 2003, who started university before 2001 and are therefore unaffected by this reform.

Most of the Italian Universities are public and, with the exceptions of few types of faculties (e.g. Medical Schools and Architecture), there are no university admission exams. Progression from one year to another is generally not conditional on past performance, and, if students fail an exam or are unhappy with the mark obtained, they can re-sit the exam several times. Consequently, students usually take much longer than the minimum official

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<sup>6</sup>The main results are also summarized in Basso and Labartino (2011).

period to complete their degree. Four-year degrees are usually completed in an average of 7.5 years, with only one in eight students completing within 4 years (ISTAT 2000).

Financial aid for university students is limited,<sup>7</sup> but public university fees are moderate and students from family with low income pay lower fees.

### 3.2 Professional licensing in Italy

In Italy, as in many other countries, professional occupations are subject to a range of requirements to guarantee the acquisition of professional credentials. The main four prerequisites generally required by all types of liberal professions are: (i) to have a university degree in a field of studies relevant for the specific liberal profession (e.g. a degree in Law for becoming a lawyer or a notary and a degree in Economics for becoming an accountant); (ii) the acquisition of professional experience through a period of practice and/or specialized courses; (iii) passing a licensing exam (state examination); (iv) becoming member of a relevant formal professional body.<sup>8</sup>

Several liberal professions require a practice period spent under the supervision of a member of the relevant professional body and practitioners are not paid but may receive a fellowship. The length of the practice period is of three years for accountants, two years for lawyers (but can be shorten to one year by attending a Law specialization school for two years), eighteen months for notaries, one year for psychologists, and six months for pharmacists and architects; while it is not mandatory for engineers, biologists and geologists.

The state examination is compulsory and consists of one or more written tests and an oral exam. Generally, the state examination takes place once per year in different provinces. There are no limits to the number of candidates admitted to the state examination and to the number of times an examination can be taken. Because the state examination includes an oral exam, it is impossible to guarantee the absence of interference with the examination committee's members to favor specific applicants.

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<sup>7</sup>In 2000 only 12% of students received a public university grant (Fondazione RUI and Università di Camerino 2002).

<sup>8</sup>For more details on the institutional context of licensed occupations in Italy see Catania and Monti (2011).

Candidates who successfully pass the state examination have to become members of a formal professional body (*Albo Professionale*) before starting their liberal profession. Except for passing the licensing exam, there are no other relevant prerequisites for the enrollment in the professional body. The main requirement for the members of the professional body is to respect the code of conduct set by the body, which generally imposes rules and restrictions on pricing, advertising and business structure.

## 4 Data

In our empirical application we use AlmaLaurea data. AlmaLaurea is a consortium of Italian Universities whose aim is providing employers with information on graduates. From 1994 onward it has been running surveys for each cohort of graduates from the universities belonging to the consortium. Graduates are interviewed at the completion of their degree (*Profilo dei Laureati* survey), and they are followed and interviewed again after 1, 3 and 5 years from the degree (*Condizione Occupazionale dei Laureati* survey). All interviews are computer assisted telephone interviews administered by trained interviewers.

Information from the four interviews is matched with students' details contained in the universities' administrative data registers, so that for each cohort of graduates AlmaLaurea is able to provide details on age, sex, area of residence, family background (e.g. parents' occupation and education), educational choices and test scores pre and during university, labour market status during and after the university, and occupational characteristics and wage after the degree.

The initial survey at the completion of the degree covers almost the whole population of new graduates from the Universities belonging to the AlmaLaurea consortium. The response rates in these initial surveys are usually well above 90%. Looking at the interviews at 5 years after the degree the responding people still represent more than 80% of the population of graduates who answered to the initial interviews.

## 4.1 Samples definitions

Our main sample is given by all graduates in 2002 and 2003 and interviewed 5 years after graduation, i.e. in 2007 and 2008. We include all universities and departments belonging to the Consortium in 2002 or 2003 except for Sport Science and Medical Departments and the IULM (Istituto Universitario di Lingue Moderne).<sup>9</sup> The universities included in our sample of graduates are the following 22: University of Bologna, Cassino, Catania, Chieti, Ferrara, Firenze, Genova, Messina, Modena and Reggio Emilia, Molise, Padova, Parma, Piemonte Orientale, Roma LUMSA, Sassari, Siena, Torino Politecnico, Torino, Trento, Trieste, Udine, and Venezia Architecture. We drop from our sample all students that are older than 40 at the completion of their degree and the few ones that were resident in a foreign country or with a foreign high school diploma before starting university.

Our final sample of graduates, which we call main sample, includes 24,309 people. We also use three subsamples, which we call:

1. the sample of graduates with access to liberal professions (16,238 people), i.e. the subsample of graduates with degrees that allow them to obtain a professional licensing and to begin a liberal profession;
2. the sample of graduates with a period of practice (7,464 people), i.e. the subsample of graduates with access to liberal professions who completed a period of compulsory practice (within 5 years from graduation), which is required for several liberal professions before obtaining a licensing;<sup>10</sup>
3. the sample of graduates with professional licensing (9,544 people), i.e. the subsample of the graduates with access to liberal professions who actually obtained a professional licensing within 5 years from the degree (either with or without a compulsory practice period).

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<sup>9</sup>We exclude students graduating in Sport Science because of the very small sample size. Medical schools are excluded because, contrary to all other departments, they have a very selective admission exam and almost all medical graduates end up obtaining professional licensing. Finally, the IULM is dropped from the sample because it is the only private university and has a high incidence of missing cases for some of the variables in 2002.

<sup>10</sup>Liberal professions considered in our sample for which a period of practice is compulsory are architects, accountants, pharmacists, psychologists, lawyers and notaries. In other words degrees whose access to a liberal profession requires a period of practice are Architecture, Economics, Pharmacy, Psychology and Law.

## 4.2 Variables definitions

### 4.2.1 Dependent Variables

We consider three dependent variables that are three dummy variables taking value 1 respectively for graduates who chose a degree with access to a liberal profession, who obtain a professional licensing and who start a liberal profession. Degrees for which more than 3% of the graduates obtain a professional licensing within 5 years are defined as degrees giving access to liberal professions. These degrees are Agriculture, Pharmacy, Architecture, Engineer, Law, Psychology, Geo-Biology and Economics. The degrees with no access to liberal professions are Language and Linguistics, Modern Literature and Philosophy, Education, Political Science, Mathematics and Physics. We say that an individual obtains a professional licensing if he/she is successful in passing a professional licensing exam (state exam). An individual is defined to have started a liberal profession if he/she reports to be a liberal professional in the interview administered 5 years after his/her graduation.

The means of these three dependent variables using the main sample are reported in top panel of Table 1. 66.8% of graduates choose a degree that gives access to a liberal profession, 40.6% obtain a licensing exam, and only 13.0% of graduates becomes a liberal professional within 5 years from graduation.

### 4.2.2 Explanatory Variables

The explanatory variables used in our analysis include observable characteristics at the start and at the completion of the university degree.

The characteristics we consider at the start of the university are: gender; age at the start of university and its square; high school final mark, which ranges between 36 and 60; high school type, i.e. a dummy variable taking value 1 for vocational high schools (*istituti tecnici* and *istituti professionali*) and 0 for academic high schools (*licei classici* and *licei scientifici*); area of residence in Southern Italy, which is given by a dummy variable taking value 1 for individuals living in the Southern regions and the two mains Islands and 0 for individuals living in the Northern and Central regions; a set of dummy variables to distinguish between fathers who are graduate liberal professionals, non-graduate liberal

professionals,<sup>11</sup> managers, entrepreneurs, own-account workers, non-manual workers and blue collars;<sup>12</sup> having a graduate father who is not a liberal professional; and a dummy variable equals to 1 for mothers who are liberal professionals and 0 for those who either have another job or are housewives.

Both own-account workers and entrepreneurs work on their own account, but, while entrepreneurs engage one or more employees on a regular basis, own-account workers do not usually engage employees. Liberal professionals are self-employed who provide a public service which requires specific intellectual skills and an official licensing. Both blue collars and non-manual workers are employees; but while the former include unskilled and semi-skilled manual workers, the latter include technicians, teachers, clerical workers and lower supervisors. Finally, managers are employees who have high managerial occupations such as bank directors, head teachers, university professors and chief physicians.

The characteristics at the completion of the university that we control for are: a set of dummy variables for the type of degree; a dummy for having graduated from a South university; the final university grade standardized at department level by using all the observations available in the main sample;<sup>13</sup> the interaction term between the dummy for Southern university and the standardized university final grade; a set of dummy variables for having graduated with 1, 2, 3, 4 and 5 or more years of delay, where the delay is computed as additional number of years spent to get a degree beyond the minimum period; having worked during university; having a graduate liberal professional father with a different degree; having a graduate liberal professional father with the same degree; having a liberal professional mother with a different degree; having a liberal professional mother with the same degree; having a preference for jobs with high security; having a preference for jobs with independence/autonomy. To measure the graduates' preferences for jobs with high degree of autonomy and independence and for jobs with high security, all graduates, at the completion of university, are asked the following two questions: "How much important is to have high stability/security in the job you are looking for?" and "How much important is independence/autonomy in the job you are looking for?" The answers are reported in a

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<sup>11</sup>For the parents' generation there are liberal professions that did not require a university degree, e.g. accountants.

<sup>12</sup>For fathers who are retired, unemployed or dead we consider their last occupation.

<sup>13</sup>The unstandardized final degree ranges between 73 and 111 and its mean and standard deviation are reported in Table 1.



5-point scale, where 1 means “not at all important” and 5 means “extremely important”. We use these responses to derive the two dummy variables for having a preference for jobs with high security and for jobs with independence and autonomy, each one taking value 1 if the corresponding answer is greater than 3 and 0 otherwise.

Tables 1 and 2 summarize the explanatory variables of graduates and their fathers, respectively. We report mean and standard deviation for each explanatory variable using our main sample of 24,309 graduates. The average high school final grade is about 49 (out of 60 maximum points) and only one in three individuals has a vocational diploma. The average age at matriculation is 19, and only 4.7% of the individuals complete their degree within the minimum required period. 31.6% of the graduates were resident in the South of Italy before starting the university, but only 24.8% obtain their degree in a university located in the South of Italy. 64.4% of people in our main sample has some work experiences during university, and 73.1% and 62.8% care a lot about the stability and independence of the job they are looking for after the university completion. More than 50% of the fathers are either blue collars or non-manual workers (19.1% and 31.5%, respectively), while 9.7% are liberal professionals, whereof 5.1% are graduate and only 1.3% with the same degree.

## 5 Empirical Results

### 5.1 Measures of intergenerational mobility in liberal professions

We begin by reporting the probability of a child of being a liberal professional when interviewed 5 years after graduation<sup>14</sup> conditioning on the father’s occupation,

$$Pr(Y^c = 1|D^f = j) \quad j = 1, \dots, 6, \quad (1)$$

where  $Y^c$  is a dummy variable taking value 1 if a child becomes a liberal professional, and  $D^f$  is a categorical variable denoting his/her father’s occupation, which takes value 1 for liberal professionals, 2 for managers, 3 for entrepreneurs, 4 for own-account workers, 5 for non-manual workers and 6 for blue collar workers. In the top panel of Table 3 column (1) we report these conditional probabilities for the main sample of graduates. The probability of a child of being a liberal professional given that his/her father is a liberal professional is higher

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<sup>14</sup>For brevity in the following we will omit to specify “5 years after graduation”.

than the corresponding probabilities conditional on other types of father's occupation. The probabilities are very precisely estimated with standard errors that are always below 1 in columns (1), (2) and (5), below 2 in column (3) and below 3 in column (4).

In the bottom panel of Table 3 we also report the odds ratios, i.e. the ratio of the odds of being a liberal professional if one's father has occupation  $j$  to the odds of it if one's father has a different occupation,

$$\frac{Pr(Y^c = 1, D^f = j)Pr(Y^c = 0, D^f \neq j)}{Pr(Y^c = 1, D^f \neq j)Pr(Y^c = 0, D^f = j)}. \quad (2)$$

The odds ratio measures the so called intergenerational exchange mobility, which is unaffected by changes in the frequency of liberal professionals from the fathers to the children generation. It measures the association between being a liberal professional and having a father with occupation  $j$  and takes values higher (lower) than 1 when the association is positive (negative). Considering the main sample of graduates, we find that the odds to be a liberal professional if one's father is a liberal professional is about twice the corresponding odds if one's father is not a liberal professional and it is higher than any other odds computed for other occupations.

As already said in the Introduction, a strong transmission of liberal professions from fathers to children can be a signal of inequality in opportunities; but stating whether this intergenerational association is really a signal of an unfair society requires to assess and distinguish between different processes and channels mediating the transmission from fathers to children. Focusing on our main sample of graduates, we consider three sequential steps that a child has to take if he/she wants to become a liberal professional and we decompose the probability of a child of being a liberal professional given his/her father's occupation in the product of three sequential probabilities:

$$\begin{aligned} Pr(Y^c = 1|D^f = j) &= Pr(Y_1^c = 1|D^f = j) \\ &\cdot Pr(Y_2^c = 1|D^f = j, Y_1^c = 1) \cdot Pr(Y_3^c = 1|D_i^f = j, Y_2^c = 1), \end{aligned} \quad (3)$$

where  $Y_1^c$ ,  $Y_2^c$  and  $Y_3^c$  are three dummy variables taking value 1 respectively if the child chooses a degree that can lead to a liberal profession, if he/she obtains a licensing exam and if he/she starts a liberal profession.

In columns (2), (3) and (4) in the top panel of Table 3 we report the three right hand side predicted probabilities conditional on 6 types of father's occupation,  $j = 1, \dots, 6$ . For the

probability of choosing a degree that gives access to a liberal profession we distinguish the liberal professional fathers in two categories, which are liberal professionals with and without a degree. For the probability of obtaining a licensing and the probability of starting a liberal profession two additional categories are considered, namely having a liberal professional father with and without the same type of university degree than their child. Furthermore, in the bottom panel of table of Table 3 we report the odds ratios. We also produced the same results separately for male and female graduates, which we report in Tables A1 and A2.

Results reported in column (2) in Table 3 suggest that the effect of having a father who is liberal professional on the university choice is small and comparable with the effect of having a father who is manager, own-account worker or entrepreneur. Women are much less likely than men to choose a degree that gives access to a liberal profession for any type of father's occupation, but looking at the odds ratios, which are unaffected by gender differences in the marginal probabilities of choosing a degree with access to a liberal profession, we find that there is no considerable differences across gender (see Tables A1 and A2).

When looking at the probability of obtaining a licensing exam conditional on having a degree, the effect of having a liberal professional father seems larger than the effect of any other type of father's occupation (see column 3 in the top panel of Table 3). A liberal professional father without a degree leads to an increase in his/her child's probability of obtaining a licensing of 7.9 percentage points with respect to a blue collar father, this increase rises to 13.9% points when the liberal professional father has a degree and to 18.8% when he has the same type of degree as his/her child. If a father and his child are both liberal professionals with the same type of degree, they presumably work in the same field. While the transmission from fathers to children who work in the same field is likely to be in part explained by the transfer of specific knowledge and abilities in the field, the direct transfer of informal human capital from parents to children is unlikely to occur when fathers and children are specialized in different fields. The importance of having a liberal professional father in the same field is evident also when looking at the odds ratios reported in column (3) in the bottom panel of Table 3 and results do not seem to change across gender.

We get even a larger effect of having a liberal professional father on the probability of starting a liberal profession conditional on having passed a licensing exam (see column 4 in the top panel of Table 3). This effect amplifies if the father is a liberal professional with the

same type of degree and gets even larger if the father is liberal professional with the same type of degree than his child. There seem to be some differences across gender, especially when looking at the odds to start a liberal profession, which indicate that the transmission of a liberal profession is stronger for sons than for daughters (see Tables Tables A1 and A2).

## 5.2 Probability of passing a licensing exam

Prerequisites for some types of licensing exam are to have a specific degree as well as to have spent a period of practice supervised by a recognized liberal professional. This implies that a father can affect his child's probability of obtaining a licensing by improving his/her chances of getting accepted for a period of practice (through for example networking) and by financially supporting him/her during this practice period that is not usually paid. To control for these two channels of transmission (networking and financial resources transfer), we also report the probability of passing a licensing conditional on having already completed the required period of practice (see column 5 in the top panel of Table 3). Because people complete a period of practice with the aim to get admitted to a licensing examination, we assume that the probability to pass the licensing exam conditional on completing a practice period is a good approximation of the success rate in the licensing exam. By comparing these conditional probabilities for different professions with the corresponding licensing passing rates published in "Il Sole 24 Ore"<sup>15</sup>, we find indeed that the conditional probabilities are comparable or even slightly higher. For this reason we rename the probability of obtaining a licensing conditional on completing a practice period as the probability of passing the licensing exam.

The differences in these passing probabilities by father's occupation are slightly smaller than for the probabilities of obtaining a licensing (compare columns 3 and 5 in Table 3), but having a liberal professional father seems still to have the largest positive effect on the probability of passing the licensing exam. In particular, having a father who is a liberal professional with a degree rather than a blue collar gives an advantage of 9 percentage points.

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<sup>15</sup>"Il Sole 24 Ore" is the main Italian daily business newspaper and we considered the issue published on the 7th of January 2013.

### 5.3 Understanding the intergenerational mobility mechanisms

While we have focused so far on assessing the magnitude of intergenerational mobility of liberal professions using association measures, in this section we aim at better understanding the potential channels of transmission from fathers to children by estimating a sequential probit model to explain the three sequential processes already defined above, which are the probabilities of choosing a degree that gives access to a liberal profession, of obtaining a licensing exam and of becoming a liberal professional controlling for a set of explanatory variables. In practice we do this by considering a set of explanatory variables,  $X$ , for the probability of becoming a liberal professional, which we decompose in the product of three probabilities,

$$\begin{aligned} Pr(Y^c = 1|D^f = j, X) &= Pr(Y_1^c = 1|XD^f = j, X) \\ &\cdot Pr(Y_2^c = 1|D^f = j, Y_1^c = 1, X) \cdot Pr(Y_3^c = 1|D_i^f = j, Y_2^c = 1, X), \end{aligned} \tag{4}$$

and by estimating each of these three probabilities in the right hand side adopting a probit model.

#### 5.3.1 Modeling the probability of choosing a degree that gives access to liberal professions

We estimate the probit model for the the probability of choosing a degree that gives access to liberal professions using children’s characteristics observed at the start of the university (see Section 4.2.2 for a description of these variables). In column (1) of Table 4 we report the average marginal effect of having a father in different types of occupation (with blue collar being the reference category) as well as of having a father with a university degree.<sup>16</sup> The marginal effect of having a father who is a liberal professional without a university degree is significantly higher than the one of having a father who is a non-manual or a blue collar worker, but it is similar to the marginal effect of having a father who is a manager or an own-account worker and even lower than the effect of having a father who is an entrepreneur. The marginal effect of having a father who is a liberal professional with a degree is higher, but it still comparable to the marginal effect of having an entrepreneur father.

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<sup>16</sup>We also report the marginal effects separately for sons and daughters in Tables A3 and A4 and the full set of marginal effects for all control variables in Table A5.

### 5.3.2 Modelling the probability of obtaining a licensing

For the estimation of the probit model for the probability of obtaining a licensing, conditional on having a degree that gives access to liberal professions, we use children's characteristics observed at the start of the university as well as at the end of the university. In particular, we control for abilities acquired through a formal education (grades and other school and university related variables), preferences for jobs with high degree of autonomy and independence and for jobs with high security, a gender dummy, the type of occupation of the father and whether he has a university degree (see Section 4.2.2 for a description of these variables).

In column (2) of Table 4 we report the average marginal effects for each type of occupation of the father on the probability of obtaining a licensing conditioning on having chosen a degree that provides access to a liberal profession.<sup>17</sup> Results show that having a liberal professional father, especially if graduate and in the same field, leads to a substantial and significant increase in the probability of obtaining a licensing when compared with having a father who is a blue collar.

The probability of obtaining a licensing is not equivalent to the probability of passing a licensing exam, this is because our dependent variable is a dummy variable taking the value of 1 for people obtaining a licensing exam and 0 for people who either fail the licensing exam or do not attempt it. People who do not attempt the licensing exam are individuals who either are not interested to become a liberal professional or cannot yet take a licensing exam because they have not completed the compulsory period of practice required by some specific liberal professions. This implies that the fathers can affect the probability of obtaining a licensing not only through human capital transfers but also by financially supporting the child during the period of practice and/or the period during which the child is preparing to pass the licensing exam and by improving the chance of his/her child to get accepted for a period of practice (networking effect). Therefore the effect of having a professional father on the probability of obtaining a licensing (after controlling for abilities acquired through a formal education and job preferences) can be explained by the direct transmission of job

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<sup>17</sup>Again we also consider the full set of marginal effects for all control variables, which are reported in Table A5, and the marginal effect separately for sons and daughters in Tables A3 and A4.

specific skills and knowledge and by nepotism as well as by the transfer of financial resources and by the family networking.

By assuming that the direct intergenerational transmission of human capital can work only when the father is a liberal professional with the same university degree as his/her child, the difference between the marginal effect of having a father who is a professional in the same field and the one of having a father who is liberal professional in a different field is explained by the direct transmission of human capital but also by a potential bigger effect of nepotism and networking of fathers who specialized in the same field. Therefore, this difference represents an upper bound on the effect of transmission of job specific skills and knowledge. Notice that we assume that the intergenerational transmission of financial resources from fathers who are liberal professionals in the same field be similar to the transmission of financial resources from fathers who are liberal professionals in a different field. We report these upper bound in column (2) in the bottom panel of Table 4. This upper bound is of 9.1% points.

We also compute a lower bound on the effect of nepotism and networking of liberal professional fathers specialized in the same field as their children. Assuming that (i) there are no differences in the intergenerational transfer of financial resources between fathers who are liberal professionals and who are managers, (ii) the effect of nepotism and networking be higher for fathers who are liberal professionals with the same degree rather than with a different degree than their child, and (iii) managers cannot affect the probability of their child to obtain a professional licensing through nepotism and networking (or at least this effect is lower than for liberal professionals); the difference in the marginal effect of having a father who is a liberal professional with a different degree and the one of having a father who is a manager with a degree provides a lower bound on the effect of nepotism and networking for children of liberal professionals with the same degree.<sup>18</sup> Beside this lower bound on nepotism and networking for liberal professional fathers with a degree, we also compute the corresponding lower bound for liberal professional fathers who do not have a degree by taking the difference between the marginal effect of having a father who is a liberal professional with no degree and the one of having a father who is a manager with no degree. We report these

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<sup>18</sup>Specifically, the lower bound is computed by subtracting from the average marginal effect of having a father liberal professional with a different degree the corresponding effects of having a father who is manager and having a father who has a degree.

lower bounds in column (2) in the bottom panel of Table 4. The effect of nepotism and networking for fathers who are liberal professionals with the same degree as their child is 4.1% points. The corresponding lower bound for fathers who are liberal professionals with no degree are 3.4 percentage points.<sup>19</sup>

If we assume that the transmission of direct human capital does not affect the chance of children of obtaining a licensing after having controlled extensively for abilities acquired through formal education, then the effect of nepotism and networking for children of liberal professionals with the same degree would be of 13.2% points (these effects are given by the marginal effects of liberal professional fathers with the same degree as their child minus the marginal effects of fathers who are managers, minus the marginal effects of having a father who is graduate but not a liberal professional). In other words, the effect of nepotism and networking on the probability of obtaining a licensing is at least of 4.1% and at most of 13.2% points.

### 5.3.3 Modelling the probability of starting a liberal profession

As for the probability of obtaining a licensing, we model the probability of starting a liberal profession (given that the licensing exam has been passed) considering a probit model and controlling for abilities acquired through formal education, preferences for jobs with high degree of autonomy and independence and for jobs with high security, a gender dummy, the type of occupation of the father and whether he has a university degree. Beside the transmission of preferences and the indirect transfer of formal human capital, which we control for, a father who is liberal professional can affect the probability of his/her child to begin a liberal profession by (i) the direct transmission of job-specific knowledge and skills which can reduce the entry cost, (ii) the networking and nepotism which can help the child in setting a portfolio of customers and in increasing potential early profits, (iii) the direct financial support, (iv) the actual transmission of the family business.

We report the marginal effects of the father's occupation in column 3 in Table 4.<sup>20</sup> We find a positive and large effect of having a liberal professional father and especially if he has

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<sup>19</sup>See Tables A3 and A4 for the upper and lower bounds computed separately for sons and daughters.

<sup>20</sup>The marginal effect for each of the control variables can be found in Table A5, whereas the marginal effects separate for sons and daughters are reported in Tables A3 and A4.



the same degree as his child. This effect is larger than the corresponding effects observed for the probabilities of choosing a degree with access to a liberal profession and of passing a licensing exam. But, while for the latter probabilities there are no substantial gender differences in the effect of having a liberal professional father, there are quite large gender differences for the probability of starting a liberal profession and having a liberal professional father has a smaller effect on women than on men.

Adopting the same approach used in last section, we report in column (3) in the bottom panels of Table 4 the estimated upper bounds on the effect of direct transmission of job-specific skills and knowledge, which are 9.3%, 9.4% and 7.4% points respectively for the main sample and for the separate samples of sons and daughters. The corresponding lower bounds on the effect of nepotism and networking are 7.4% (8.6%), 12.5% (11.9%) and 3.0% (5.5%) for father who are liberal professionals but with no university degree (for fathers who are liberal professionals and with the same type of degree as their child). Because the transmission of the family business happens presumably only for children with a liberal professional father with the same degree, the upper bound on the effect of direct transmission of job-specific skills and knowledge includes also the the potential family business transmission effect. On the contrary, the lower bounds on the effect of nepotism and networking do not include the effects of a potential transmission of the family business and of job specific skills because their computation is based on liberal professional fathers with a degree that differs from their child's degree. These lower bounds are also net of the effect of intergenerational financial transfer as long as financial transfers from fathers who are managers and from fathers who are liberal professionals are similar.

For sons, the effect of nepotism and networking is larger than the one of direct transmission of job-specific skills and knowledge. On the contrary, for daughters, the effect of nepotism and networking seems smaller and statistically insignificant.

#### **5.3.4 Modeling the probability of passing a licensing exam**

In column (4) of Table 4 we also report the marginal effects of the father's occupation on the probability of obtaining a licensing conditional on having already completed a compulsory period of practice, using again a probit model with the same set of explanatory variables described above. In principle, all graduates with a compulsory period of practice aim at

getting a licensing and take a licensing exam. Therefore, the new model is closer to explain the probability to pass a licensing exam for people who actually take the exam. This probability should be unrelated to father’s financial resources and networking but can be related to the direct transmission of job specific abilities and nepotism. Therefore the lower bound on the effect of nepotism for fathers who are liberal professionals and non-graduates is directly given by the average marginal effect of having a non-graduate liberal professional father and it is equal to 6.0% points; whereas the lower bound on the effect of nepotism for fathers who are liberal professionals and with a degree different from their child is given by the difference between the effect of having a liberal professional father with a different degree and the effect of having a father who has a degree but is not a liberal professional and it is small (3% points) and statistically insignificant (see column 4 of the bottom panel in Table 4). As before the upper bound for the effect of the intergenerational transmission of job specific skills and know how from liberal professional fathers is given by the difference between the effect of having a liberal professional father with the same degree and without the same degree and it is 5.1% points. Even if we estimated an effect of nepotism which included the potential transmission of job specific skills and knowledge, the nepotism effect would be at most of 8.1% points (9.2% points for sons 7.1% points for daughters).<sup>21</sup> This seems to suggest that the effect of nepotism cannot be huge.

## 6 Sensitivity analysis

Since we are concerned with the omission of mother’s characteristics, of financial resources measures and of unobserved variables such as inherited abilities, we consider some sensitivity analyses to assess the potential consequent bias. Omitted variables that affect the probabilities of taking the three steps needed to become a liberal professional (i.e. choosing a degree with access to a liberal profession, obtaining a licensing and starting of a liberal profession) may lead to an underestimation of the effect of having a father in a liberal profession. Let us consider for simplicity an unobserved random component/effect that affects positively the probabilities of taking the three needed steps. Students who have a low unobserved random component are more likely not to take these three steps; therefore the sub-sample of students

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<sup>21</sup>These effects are computed as the difference between the average marginal effect of having a father who is a liberal professional with the same degree and of having a father with a degree who is not a liberal professional.

who choose a degree with access to a liberal profession is a selected sample with relatively large random effects and the sub-sample of students passing a licensing exam is even a more selected sub-sample with larger random effects. This selection process is known as “weeding out” or “sorting effect”.<sup>22</sup> Conditionally on the decision to take one or more steps needed to become a liberal professional, children without a liberal professional father are likely to have a larger unobserved random component than children with a liberal professional father. This implies that omitting this unobserved random component leads to an attenuation bias for the effect of having a liberal professional father on the probability to pass a licensing exam and even to a larger attenuation bias on the probability to start a liberal profession.

To understand whether this is a potential issue for our main estimation results, we consider the joint estimation of the three sequential probit models by allowing the error term in each equation to be normally distributed and correlated with the error terms in the other equations.<sup>23</sup> Allowing for such correlations between errors is equivalent to consider for each equation a composite error term given by the sum of a normal random effect that is identically distributed across the three equations and identically and independently distributed across individuals and of an idiosyncratic error term that is normally identically and independently distributed as a normal across individuals and equations but with a variance that can vary across equations.

Tables 5 and 6 report the average marginal effect of father’s occupations on the probability of choosing a degree with access to a liberal profession, obtaining a licensing and starting of a liberal profession respectively. In column (1) we report the average marginal effect estimated considering a sequential probit model ignoring the presence of unobserved heterogeneity as already reported in Table 4; whereas in column (2) we report the corresponding results when using a sequential probit model taking account of unobserved random effects by allowing for correlation between the error terms in the three equations. Comparing columns (1) and (2) there does not seem to be any substantial difference in the average marginal effects on the probability of choosing a degree with access to a liberal profession and of starting of a liberal profession, while there seems to be a slight amplification of the effect of having a father in a liberal profession on the probability of obtaining a licensing. These slight changes do

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<sup>22</sup>See Cameron and Heckman (1998) and Van den Berg (2001) for more details on this selection process in sequential binary models for educational transitions and in the similar context of discrete duration models.

<sup>23</sup>We implement this estimation using the Stata module CMP for conditional (recursive) mixed process estimator (see Roodman 2010).

not seem to alter any of our results on the upper bounds on the effect of intergenerational transmission of job specific skills and knowledge (direct human capital transfer) and on the lower bounds on the effect of nepotism and networking. In conclusion, these new results are quite comforting and seem to suggest that the omission of variables does not appear to be a major issue for our estimation results.

We also run two additional estimations to check whether results are robust when controlling for having a liberal professional mother (see results in column 3 in Tables 5 and 6 and when including proxy variables to measure financial resources, which are dummy variables for whether the child received a scholarship and worked meanwhile studying at the University <sup>24</sup> (see results in column 4 in Table 15-16). The average marginal effects for these new estimations hardly changes and we conclude that our main estimation results seem robust to different model specifications that try to control for potential omitted variables.

## 7 Conclusions

In this paper we studied the mechanisms and channels of transmission of liberal professions from fathers to children. Using data on 22 Italian universities, we find that there is a very strong intergenerational transmission. The odds of being a liberal professional for children of liberal professionals is twice the corresponding odds for children of non-professionals.

The effect of having a liberal professional father on the choice of a university degree is modest and comparable to the effect of some other father's occupations. On the contrary, liberal professional fathers have a larger and positive effect on the probability of passing a licensing exam and an even larger effect on the probability of starting a liberal profession than any other type of father's occupation.

Our results on the effect of nepotism on the probability of passing a licensing exam confirm only partly the anecdotal evidence on failure of meritocracy of the licensing exam system. This is because we find that the effect of nepotism increases the chance to pass the licensing exam at most of 8.1% points (9.2% points for sons 7.1% for daughters). This effect is computed by controlling for the children's educational attainments and choices,

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<sup>24</sup>Students eligible for scholarships come from low income families and children who work meanwhile studying have usually more limited financial resources.

their job preferences and their father's education, but neglecting (and therefore including) the potential transmission of job specific ability and knowledge from fathers to children.

Where the effect of intergenerational transmission is really large is for the probability to start a liberal profession after that the licensing exam has been passed. New entrants into a liberal profession need job specific abilities, knowledge of the market, networking skills and financial resources to start their business. Having a liberal professional father who already works in the same field can help with all of these requirements. After controlling for the children's educational attainments and choices, their job preferences and their father's education, sons (daughters) of liberal professionals with their same degree are 25.3% (15.1%) points more likely to start a liberal profession. We find the effect of nepotism/networking is at least of 12.5% for sons of liberal professional fathers with no degree and of 11.9% for liberal professional fathers with a degree, but this effect is statistically not significant for daughters. We also find that the transmission of job specific skill and knowledge is at most of 9.4% points for sons but again it is not statistically significant for daughters.

A potential suggestion coming from these results is that there are entry barriers to the liberal professions that can be too costly for children, especially sons, of non liberal professionals. Perhaps interventions to lower these entry barriers, for instance offering financial support to start a new business or introducing programmes to help new liberal professionals to get a network of customers, could help to make the access to the liberal profession fairer.

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Table 1: Summary statistics of children's variables

Variable	Mean	Std. Dev.
<i>Child Dependent Variables</i>		
Holding a degree with access to a liberal profession	0.668	
Obtaining a licensing exam	0.406	
Starting a liberal profession	0.130	
<i>Child Explanatory Variables</i>		
Female	0.600	
Age at the start of university	19.183	0.863
Age squared at the start of university	368.718	35.410
Vocational high school	0.337	
High school final grade	48.825	7.162
University final grade	102.827	7.426
Area of residence in Southern regions	0.316	
Standardized university final grade	0.040	0.982
University in Southern regions	0.248	
Standardized university final grade*University located in the South	0.035	0.498
Having worked during university	0.644	
Scholarship	0.302	
Agricultural	0.031	
Pharmacy	0.048	
Architecture	0.049	
Engineer	0.126	
Law	0.145	
Economics	0.176	
Psychology	0.048	
Geo-Biology	0.045	
Education	0.057	
Language and Linguistics	0.059	
Modern Literature and Philosophy	0.101	
Political Science	0.084	
Mathematics and Physics	0.031	
Graduation within the minimum period	0.047	
Graduation with 1 year of delay	0.197	
Graduation with 2 years of delay	0.210	
Graduation with 3 years of delay	0.167	
Graduation with 4 years of delay	0.121	
Graduation with 5 years or more of delay	0.258	
Preferences for job security	0.731	
Preferences for job independence	0.628	
No. of observations	24,309	

Notes: Percentage mothers liberal professionals = 1.9%; Percentage mothers liberal professionals with a different degree = 1.8%; Percentage mothers liberal professionals with a same degree = 0.2%.

Table 2: Summary statistics of the explanatory variables for fathers

Variable	Mean
<i>Father's Variables</i>	
Liberal professional	0.097
Non-Graduate liberal professional	0.051
Graduate liberal professional with different degree	0.033
Graduate liberal professional with same degree	0.013
Manager	0.180
Entrepreneur	0.072
Own-account worker	0.145
Non-manual worker	0.315
Blue collar	0.191
No. of observations	24,309

Table 3: Associations between father's occupation and child's choices

Father's occupation	Probability				
	(1)	(2)	(3)	(4)	(5)
Liberal professional	21.4	69.6	67.7	45.5	75.1
Non-graduate liberal professional	17.5	66.6	64.7	40.7	74.7
Graduate liberal professional	25.7	73.0	70.7	49.9	75.3
Graduate liberal professional with different degree			67.7	45.6	75.3
Graduate liberal professional with same degree			75.6	56.3	75.3
Manager	13.6	68.6	59.7	33.0	69.1
Entrepreneur	16.1	73.4	54.9	40.0	68.7
Own-account worker	13.6	67.9	55.9	35.5	67.2
Non-manual worker	11.2	65.3	58.9	28.7	67.4
Blue collar	9.7	62.8	56.8	26.8	66.3

  

Father's occupation	Odds ratios				
	(1)	(2)	(3)	(4)	(5)
Liberal professional	2.0	1.2	1.5	1.8	1.4
Non-graduate liberal professional	1.4	1.0	1.3	1.4	1.4
Graduate liberal professional	2.4	1.4	1.7	2.1	1.4
Graduate liberal professional with different degree			1.5	1.7	1.4
Graduate liberal professional with same degree			2.2	2.7	1.4
Manager	1.1	1.1	1.0	1.0	1.0
Entrepreneur	1.4	1.4	0.8	1.4	1.0
Own-account worker	1.1	1.1	0.9	1.1	0.9
Non-manual worker	0.8	0.9	1.0	0.8	0.9
Blue collar	0.7	0.8	0.9	0.7	0.9

  

No. of observations	24,309	24,309	16,238	9,544	7,464
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Notes: Probability and odds ratios of: (1) being a liberal professional; (2) choosing a degree with access to liberal professions; (3) obtaining a licensing; (4) starting a liberal profession; (5) passing a licensing exam after completing a practice period.

Table 4: Probit models for the probabilities of (1) having chosen a degree that gives access to a liberal profession, (2) obtaining a licensing, (3) starting a liberal profession, (4) passing a licensing exam after completing a practice period.

Father's occupation	Average marginal effect of father's occupation			
	(1) (S.E)	(2) (S.E)	(3) (S.E)	(4) (S.E.)
Non-graduate liberal professional	0.042 (0.024)	0.033 (0.015)	0.113 (0.021)	0.060 (0.023)
Graduate liberal professional	0.108 (0.041)			
Graduate liberal professional with different degree		0.056 (0.018)	0.122 (0.026)	0.046 (0.027)
Graduate liberal professional with same degree		0.147 (0.021)	0.215 (0.032)	0.097 (0.027)
Manager	0.050 (0.022)	-0.001 (0.011)	0.039 (0.016)	0.007 (0.018)
Entrepreneur	0.106 (0.025)	0.018 (0.013)	0.071 (0.019)	0.043 (0.020)
Own-account worker	0.057 (0.015)	0.007 (0.010)	0.071 (0.015)	0.016 (0.017)
Non-manual worker	0.026 (0.013)	-0.005 (0.009)	0.014 (0.013)	-0.003 (0.015)
Blue collar (reference category)				
Non-liberal professional with a degree	0.007 (0.016)	0.016 (0.010)	-0.003 (0.014)	0.016 (0.015)

  

Father's occupation	Upper Bounds and Lower Bounds			
	UB on the effect of direct human capital for graduate		0.091 (0.025)	0.093 (0.037)
LB on the effect of nepotism/networking for non-graduate		0.034 (0.015)	0.074 (0.022)	0.060 (0.023)
LB on the effect of nepotism/networking for graduate		0.041 (0.018)	0.086 (0.026)	0.030 (0.030)

  

No. of observations	24,309	16,238	9,544	7,526
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Notes: Standard errors are reported in parenthesis. Beside the dummy variables for the father's occupation and education, we control for gender, age at the start of university, high school type and final mark and area of residence. Furthermore, in column (2) to (4) we control also for the type of degree, South university, final university grade, delayed graduation, having a graduate liberal professional father with the same and with a different degree, and preference for jobs with high security and with independence/autonomy.

Table 5: Sensitivity analysis: probability of choosing a degree that gives access to liberal professions

Father's occupation	Average marginal effect of father's occupation					
	(1)	(S.E.)	(2)	(S.E.)	(3)	(S.E.)
Non-graduate liberal professional	0.042	(0.024)	0.043	(0.014)	0.041	(0.024)
Graduate liberal professional	0.108	(0.041)	0.105	(0.014)	0.107	(0.040)
Manager	0.050	(0.022)	0.050	(0.010)	0.050	(0.022)
Entrepreneur	0.106	(0.025)	0.103	(0.012)	0.106	(0.025)
Own-account worker	0.057	(0.015)	0.056	(0.010)	0.057	(0.015)
Non-manual worker	0.026	(0.013)	0.026	(0.009)	0.026	(0.013)
Blue collar (reference category)						
Non-liberal professional with a degree	0.007	(0.016)	0.006	(0.009)	0.007	(0.016)
No. of observations	24,309		24,309		24,309	

Notes: Standard errors are reported in parenthesis. Sequential probit model: (1) with no random effect as in Table 4 column (1), (2) with random effect, (3) with no random effect and with an additional dummy variable for liberal professional mothers.

Table 6: Sensitivity analysis: Probit models for the probability of obtaining a licensing and of starting a liberal professional

Father's occupation	Average marginal effect of father's occupation on the probability of obtaining a licensing			
	(1)	(2)	(3)	(4)
Non-graduate liberal professional	0.033 (0.015)	0.044 (0.015)	0.033 (0.015)	0.030 (0.015)
Graduate liberal professional with a different degree	0.056 (0.018)	0.093 (0.018)	0.056 (0.018)	0.051 (0.018)
Graduate liberal professional with same degree	0.147 (0.021)	0.188 (0.022)	0.148 (0.021)	0.141 (0.021)
Manager	-0.001 (0.011)	0.017 (0.011)	-0.001 (0.011)	-0.005 (0.011)
Entrepreneur	0.018 (0.013)	0.055 (0.013)	0.018 (0.013)	0.015 (0.013)
Own-account worker	0.007 (0.010)	0.029 (0.011)	0.007 (0.010)	0.005 (0.011)
Non-manual worker	-0.005 (0.009)	0.006 (0.009)	-0.005 (0.009)	-0.007 (0.009)
Blue collar (reference category)				
Non-liberal professional with a degree	0.016 (0.010)	0.018 (0.010)	0.016 (0.010)	0.013 (0.010)
No. of observations	16,238	16,238	16,238	16,238

  

Father's occupation	Average marginal effect of father's occupation on the probability of starting a liberal professional			
	(1)	(2)	(3)	(4)
Non-graduate liberal professional	0.113 (0.021)	0.088 (0.017)	0.111 (0.021)	0.103 (0.022)
Graduate liberal professional with a different degree	0.122 (0.026)	0.116 (0.020)	0.120 (0.026)	0.111 (0.026)
Graduate liberal professional with same degree	0.215 (0.032)	0.221 (0.029)	0.209 (0.032)	0.199 (0.032)
Manager	0.039 (0.016)	0.030 (0.010)	0.039 (0.016)	0.031 (0.016)
Entrepreneur	0.071 (0.019)	0.066 (0.013)	0.070 (0.019)	0.062 (0.019)
Own-account worker	0.071 (0.015)	0.053 (0.011)	0.071 (0.015)	0.065 (0.016)
Non-manual worker	0.014 (0.013)	0.010 (0.008)	0.014 (0.013)	0.010 (0.013)
Blue collar (reference category)				
Non-liberal professional with a degree	-0.003 (0.014)	0.003 (0.009)	-0.003 (0.014)	-0.004 (0.014)
No. of observations	9,544	9,544	9,544	9,544

Notes: Standard errors are reported in parenthesis. Sequential probit model: (1) with no random effect as in Table 4 column (2), (2) with random effect, (3) with no random effect and with two additional dummy variables for liberal professional mothers with or without the same degree as their child, (4) with no random effect and with dummies for having worked during university and for having received a scholarship during university.

Appendix: Supplemental Tables

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Table A1: Associations between father's occupation and son's choices

Father's occupation	Probability				
	(1)	(2)	(3)	(4)	(5)
Liberal professional	27.4	81.8	67.3	49.8	71.9
Non-graduate liberal professional	22.5	79.4	64.3	44.1	69.9
Graduate liberal professional	32.6	84.3	70.3	54.9	73.1
Graduate liberal professional with different degree			65.8	50.0	70.2
Graduate liberal professional with same degree			76.8	61.1	76.4
Manager	15.1	80.3	60.1	31.3	65.7
Entrepreneur	19.6	86.1	55.1	41.4	64.5
Own-account worker	17.0	81.1	59.8	34.5	65.0
Non-manual worker	13.8	78.1	60.2	28.6	62.8
Blue collar	12.4	77.9	62.0	25.3	65.7
	Odds ratios				
Liberal professional	2.2	1.2	1.4	2.3	1.4
Non-graduate liberal professional	1.6	1.0	1.2	1.7	1.2
Graduate liberal professional	2.7	1.4	1.6	2.7	1.5
Graduate liberal professional with different degree			1.3	2.1	1.3
Graduate liberal professional with same degree			2.2	3.4	1.7
Manager	0.9	1.0	1.0	0.9	1.0
Entrepreneur	1.3	1.6	0.8	1.5	0.9
Own-account worker	1.1	1.1	0.9	1.1	1.0
Non-manual worker	0.8	0.9	1.0	0.8	0.8
Blue collar	0.7	0.9	1.1	0.6	1.0
No. of observations	9,730	9,730	7,773	4,724	2,801

Notes: Probability and odds ratios of: (1) being a liberal professional; (2) choosing a degree with access to liberal professions; (3) obtaining a licensing; (4) starting a liberal profession; (5) passing a licensing exam after completing a practice period.

Table A2: Associations between father's occupation and daughter's choices

Father's occupation	Probability				
	(1)	(2)	(3)	(4)	(5)
Liberal professional	17.1	61.0	67.9	41.4	77.2
Non-graduate liberal professional	14.2	58.1	65.0	37.6	77.3
Graduate liberal professional	20.6	64.4	71.1	45.0	77.1
Graduate liberal professional with different degree			69.4	41.9	79.0
Graduate liberal professional with same degree			74.1	50.5	74.3
Manager	12.3	59.0	59.2	35.0	71.6
Entrepreneur	13.6	64.4	54.6	38.7	71.5
Own-account worker	11.8	60.8	53.1	36.2	68.3
Non-manual worker	9.5	56.8	57.7	28.7	70.1
Blue collar	8.1	53.5	52.1	28.5	66.7
	Odds ratios				
Liberal professional	1.8	1.1	1.7	1.5	1.5
Non-graduate liberal professional	1.4	1.0	1.4	1.2	1.5
Graduate liberal professional	2.2	1.3	1.9	1.7	1.4
Graduate liberal professional with different degree			1.7	1.5	1.6
Graduate liberal professional with same degree			2.2	2.1	1.2
Manager	1.2	1.0	1.0	1.1	1.1
Entrepreneur	1.3	1.3	0.9	1.3	1.1
Own-account worker	1.1	1.1	0.8	1.2	0.9
Non-manual worker	0.8	0.9	1.0	0.7	1.0
Blue collar	0.7	0.8	0.8	0.8	0.8
No. of observations	14,579	14,579	8,465	4,820	4,663

Notes: Standard errors are reported in parenthesis. Probability and odds ratios of: (1) being a liberal professional; (2) choosing a degree with access to liberal professions; (3) obtaining a licensing; (4) starting a liberal profession; (5) passing a licensing exam after completing a practice period.

Table A3: Probit models: males

Father's occupation	Average marginal effect of father's occupation							
	(1)	(S.E.)	(2)	(S.E.)	(3)	(S.E.)	(4)	(S.E.)
Non-graduate liberal professional	0.028	(0.027)	0.016	(0.021)	0.158	(0.031)	0.085	(0.040)
Graduate liberal professional	0.082	(0.045)						
Graduate liberal professional with different degree			0.053	(0.025)	0.159	(0.038)	0.049	(0.042)
Graduate liberal professional with same degree			0.144	(0.027)	0.253	(0.043)	0.130	(0.041)
Manager	0.044	(0.024)	-0.007	(0.015)	0.033	(0.021)	0.013	(0.029)
Entrepreneur	0.093	(0.039)	-0.002	(0.018)	0.089	(0.026)	0.021	(0.034)
Own-account worker	0.039	(0.018)	-0.001	(0.016)	0.082	(0.022)	0.019	(0.030)
Non-manual worker	0.013	(0.018)	-0.013	(0.013)	0.020	(0.017)	-0.008	(0.025)
Blue collar (reference category)								
Non-liberal professional with a degree	-0.003	(0.014)	0.022	(0.013)	0.007	(0.019)	0.038	(0.023)
Upper Bounds and Lower Bounds								
UB on the effect of direct human capital for graduate			0.091	(0.033)	0.094	(0.053)	0.081	(0.050)
LB on the effect of nepotism/networking for non-graduate			0.023	(0.022)	0.125	(0.032)	0.085	(0.040)
LB on the effect of nepotism/networking for graduate			0.038	(0.025)	0.120	(0.038)	0.011	(0.048)
No. of observations	9,730		7,773		4,724		2,842	

Notes: Standard errors are reported in parenthesis. Probit models for the probabilities of (1) having chosen a degree that gives access to a liberal profession, (2) obtaining a licensing, (3) starting a liberal profession, (4) passing a licensing exam after completing a practice period.

Table A4: Probit models: females

Father's occupation	Average marginal effect of father's occupation							
	(1)	(S.E)	(2)	(S.E)	(3)	(S.E)	(4)	(S.E)
Non-graduate liberal professional	0.051	(0.030)	0.046	(0.021)	0.070	(0.029)	0.050	(0.029)
Graduate liberal professional	0.122	(0.048)						
Graduate liberal professional with different degree			0.055	(0.026)	0.077	(0.035)	0.048	(0.035)
Graduate liberal professional with same degree			0.146	(0.032)	0.151	(0.046)	0.074	(0.038)
Manager	0.053	(0.028)	0.002	(0.016)	0.040	(0.023)	0.003	(0.022)
Entrepreneur	0.114	(0.025)	0.034	(0.018)	0.049	(0.027)	0.054	(0.024)
Own-account worker	0.068	(0.016)	0.012	(0.014)	0.056	(0.021)	0.017	(0.020)
Non-manual worker	0.036	(0.020)	0.000	(0.013)	0.004	(0.019)	-0.001	(0.018)
Blue collar (reference category)								
Non-liberal professional with a degree	0.013		0.011	(0.014)	-0.018	(0.019)	0.003	(0.020)
Upper Bounds and Lower Bounds								
UB on the effect of direct human capital for graduate			0.091	(0.038)	0.074	(0.053)	0.026	(0.047)
LB on the effect of nepotism/networking for non-graduate			0.044	(0.022)	0.030	(0.031)	0.050	(0.029)
LB on the effect of nepotism/networking for graduate			0.042	(0.026)	0.055	(0.035)	0.045	(0.040)
No. of observations	14,579		8,465		4,820		4,628	

Notes: Standard errors are reported in parenthesis. Probit models for the probabilities of (1) having chosen a degree that gives access to a liberal profession, (2) obtaining a licensing, (3) starting a liberal profession, (4) passing a licensing exam after completing a practice period.

Table A5: Sequential probit model with no random effect. Estimates of the average marginal effect for all variables.

Explanatory variable	Average marginal effect on the probability of					
	choosing a degree with access	(S.E.)	obtaining a licensing	(S.E.)	starting a liberal profession	(S.E.)
Non-graduate liberal professional	0.042	(0.024)	0.033	(0.015)	0.113	(0.021)
Graduate liberal professional	0.108	(0.041)				
Graduate liberal professional with a different degree			0.056	(0.018)	0.122	(0.026)
Graduate liberal professional with a same degree			0.147	(0.021)	0.215	(0.032)
Manager	0.050	(0.022)	-0.001	(0.011)	0.039	(0.016)
Entrepreneur	0.106	(0.025)	0.018	(0.013)	0.071	(0.019)
Own-account worker	0.057	(0.015)	0.007	(0.010)	0.071	(0.015)
Non-manual worker	0.026	(0.013)	-0.005	(0.009)	0.014	(0.013)
Non-liberal professional with a degree	0.007	(0.016)	0.016	(0.010)	-0.003	(0.014)
Female	-0.214	(0.073)	0.005	(0.006)	-0.037	(0.010)
Age at the start of university	-0.060	(0.014)	-0.027	(0.006)	0.021	(0.008)
Vocational high school	0.088	(0.041)	-0.011	(0.007)	-0.002	(0.014)
High school final grade	0.001	(0.003)				
Residence in Southern regions	-0.025	(0.191)				
Standardized university grade			0.014	(0.003)	-0.012	(0.005)
University in Southern regions			0.122	(0.007)	-0.054	(0.011)
Agricultural			0.613	(0.017)	-0.097	(0.029)
Pharmacy			0.738	(0.011)	-0.424	(0.021)
Architecture			0.745	(0.010)	0.104	(0.026)
Engineer			0.778	(0.007)	-0.300	(0.022)
Law			0.373	(0.010)	0.152	(0.023)
Psychology			0.744	(0.011)	-0.188	(0.026)
Geo-Biology			0.370	(0.016)	-0.303	(0.026)
Graduation with 1-year delay			0.001	(0.015)	-0.015	(0.020)
Graduation with 2-year delay			-0.019	(0.015)	0.010	(0.021)
Graduation with 3-year delay			-0.039	(0.016)	0.017	(0.022)
Graduation with 4-year delay			-0.062	(0.016)	0.057	(0.023)
Graduation with 5-year + delay			-0.092	(0.015)	0.069	(0.022)
Preference for job security			-0.003	(0.007)	-0.010	(0.010)
Preference for job independence			0.028	(0.006)	0.040	(0.009)
No. of observations	24,309		16,238		9,544	

Notes: Standard errors are reported in parenthesis.