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KNOCKING ON PARENTS' DOORS: REGULATION AND INTERGENERATIONAL MOBILITY

by Sauro Mocetti*, Giacomo Roma* and Enrico Rubolino**

Abstract

We exploited two major reforms in the regulation of professional services implemented in Italy since the 2000s in order to examine the impact on the intergenerational transmission of occupations. We built an OECD-style indicator of strictness of regulation for 14 occupations and three different cohorts (i.e. before and after each reform). Then, using a difference-in-differences strategy, we exploited the differential effect of regulation on the occupations considered compared with employees in similar occupations, before and after each reform. We found that the progressive liberalization of professional services affected the allocation of individuals across occupations, leading to a substantial decrease in the propensity to follow the same career as one's parents. The impact of regulation on the likelihood of being employed in the same occupation as one's parents is greater in soft sciences and in areas where the demand for professional services is higher; at individual level, it is greater for less able individuals.

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Keywords: regulation, intergeneration mobility, occupational choice.

Contents

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1 Introduction*

The literature on intergenerational mobility documents that socioeconomic status persists over generations in all countries studied so far, although to varying degrees (Black and Devereux, 2011; Corak, 2013). A growing number of papers also document persistence within specific occupations, such as doctors (Lentz and Laband, 1989), lawyers (Laband and Lentz, 1992), academic professors (Durante et al., 2011), pharmacists (Mocetti, 2016) and liberal professions (Aina and Nicoletti, 2018). The literature on the causes of intergenerational persistence has been largely dominated by the debate on the relative importance of an individual's innate qualities (nature) versus environmental factors (nurture)[1] while the role of the functioning of the labor market is substantially underinvestigated.

Another strand of literature is aimed at understanding the economic effects of regulation of occupations (Kleiner, 2000). One of the main justifications for regulation in certain professions is the existence of asymmetric information between suppliers and clients that, in turn, may lead to a market failure. However, excessive regulation may hinder competition and generate monopoly rents, especially when regulation is mainly shaped by the interests of the incumbents. Empirical studies usually find higher earnings for individuals in regulated occupations (Kleiner and Krueger, 2013) while the evidence on the effects on the selection of practitioners is scant and based on peculiar case studies.[2]

The present paper stands at the junction of these two strands of literature. Our aim is to provide a first thorough analysis of how regulation affects intergenerational persistence in occupations and therefore entry opportunities and allocative mechanisms of these labor markets.

Distinguishing a career following that is motivated by an intergenerational transfer of occupation-specific human capital (through either nature or nurture) from that caused by regulation and positional rents is empirically challenging. To address this issue we exploit two reforms in the regulation of professional services that occurred in Italy since the 2000s: the so-called Bersani decree in 2006 and the Monti reform in 2011. Although the liberalization of Italian professional services was remarkable in some aspects, initial conditions differed a lot across occupations and the pace and extent of regulatory reform also differed widely. To measure the strictness of regulation we build an OECD-style index for 14 oc-

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[1] See, among the others, Bowles et al. (2005), Björklund et al. (2006) and Sacerdote (2011).

[2] Kleiner and Kudrle (2000) examine the labor market of U.S. dentists; Kugler and Sauer (2005) that of physicians in Israel.

cupations and for three different cohorts (i.e. before and after each reform). The children's propensity to follow their parents' career is measured using data from the Labor Force Survey (LFS), matching the degree program to which they are enrolled and the occupation of their parents. Namely, we proxy occupation persistence with an indicator that is equal to 1 if children pursue a course of study that naturally leads to the parents' occupation. Then, using a difference-in-differences strategy, we exploit the differential effect of regulation on career following for professionals (treated group) and employees in similar occupations (control group), before and after each reform.

We find significant heterogeneity in intergenerational persistence across occupations: career following is remarkably high among lawyers and pharmacists, whereas it is lower among natural scientists. We also find that regulation does affect the extent of occupational persistence. According to our estimate, the combined effect of the two regulatory reforms (that corresponds to a 1.7 decrease in our index of the strictness of regulation over a 0-6 scale) reduced the propensity of career following by nearly 4 percentage points (about one third of the sample mean). The impact is stronger for occupations in *soft* sciences (e.g. lawyers, accountants, etc.) and in areas where the local economy is more dependent upon professional services (i.e. where economic rents are higher). Interestingly, at the individual level the impact of regulation on occupation persistence is stronger for less able individuals (as measured by the time to obtain their highest school qualification), thus confirming allocative inefficiencies in the distribution of talents across occupations. As far as the domains of regulation are concerned, the effect of regulation is entirely driven by restriction on market conduct (e.g. restrictions on prices and advertising); stricter entry requirements, in contrast, in certain occupations are associated with fairer entry opportunities.

We also exploit variability of regulation in a sample of 25 European countries. We find that intergenerational persistence among professionals is higher in Mediterranean countries and lower in the Scandinavian countries, which is in line with other evidence based on intergenerational income mobility for the entire population (Corak, 2013). However, after having controlled for country- and occupation-fixed effects, we still find that the extent of regulation is positively associated to intergenerational persistence in the same occupation.

Our paper contributes to the literature along four main directions. First, we provide comparable evidence on intergenerational persistence across a wide array of occupations and countries, documenting substantial heterogeneity for both dimensions. Therefore, our results are arguably more generalizable with respect to the evidence based on single case studies. Second, the overwhelming majority of existing empirical studies that examine the factors responsible for the observed intergenerational persistence are focused on nature versus nurture and on the mediating role of the education system (Black and Devereux, 2011).[3]

[3]As far as occupation persistence is concerned, Lindquist et al. (2015) find, using Swedish administrative

Surprisingly the role of regulation, which may heavily affect economic returns and barriers to entry in certain occupations, is largely neglected. Moreover, regulation is not a second-order issue as a large fraction of workers is employed in regulated sectors (Kleiner, 2000; Koumenta e Pagliero, 2016); as far as Italy is concerned, individuals employed in occupations whose activity requires membership in a professional body (*professioni ordinistiche*) represent about 10 percent of total employment and 31 percent of those with a college degree (Mocetti et al., 2018). Third, our empirical strategy allows the identification of a causal nexus (from anti-competitive regulation to career following), thus overcoming the descriptive approach prevailing in previous studies on occupation persistence.[4] Finally, we contribute to the literature on the impact of regulation on the selection of practitioners. We show that, beyond a *natural* degree of persistence (due, for example, to intergenerational transmission of occupation-specific skills), regulation generates rents that bias the allocation of individuals across occupations depending on their family background. This effect is larger for less able children, thus reinforcing the idea of a potential negative impact in terms of selection of practitioners.

The rest of the paper is organized as follows. In the following section we provide a deeper discussion on the economics of regulation (Section 2.1) and on the channels through which it might favor the intergenerational transmission of occupations (Section 2.2). In Section 3 we describe the data and the main variables. In Section 4 we discuss the empirical strategy. In Section 5 we show the main results. In Section 6 we generalize our findings providing similar evidence for European countries. Section 7 concludes.

2 Background

2.1 Institutional framework

In each country a complex set of laws and institutions regulate the functioning of the product and labor markets. As far as professional services are concerned, regulation might affect entry to a given market, the supply of services and the prices applied to consumers. Entry requirements generally include: having a university degree in a field of studies relevant for the specific occupation (e.g. a degree in law for becoming a lawyer); the acquisition of professional experience (e.g. through a practice period spent under the supervision of a

data on adoptees and on their biological and adoptive parents, that post-birth factors matter twice as much as pre-birth factors in explaining intergenerational transmission of occupations. However, they are not able to identify the underlying mechanisms behind such large post-birth effect.

[4] Indeed, other papers examined the role of non-market factors, such as *nepotism*, on occupation persistence but they do not provide *causal* evidence. One exception is Mocetti (2016) that focuses on the Italian pharmacists' labor market and exploits (cross-sectional) discontinuity produced by the regulation in the ratio between the number of allowed pharmacies and population.

professional and/or attendance of specialized courses); passing a state examination to get the license; becoming a member of a relevant formal professional body (*albo professionale*); for some economic activities there are also restriction on the number of firms that are allowed to operate in a given market. As far as the code of conduct is concerned, the professional body generally imposes rules and restrictions on pricing, advertising and business structure and is endowed with a disciplinary power to guarantee enforcement of these rules.

The economic rationale for regulation lies in reducing problems of asymmetric information. If suppliers are heterogeneous in markets with asymmetric information, consumers might not have the ability to discern or even collect the information needed to evaluate the quality of the services they consume. As a remedy to this market failure, the regulator may decide to put entry barriers and other forms of regulation to guarantee a better selection of practitioners and a higher level of average quality of services and, therefore, welfare gains for consumers (Akerlof, 1970; Leland, 1979; Law and Kim, 2005). However, regulation might also lead to negative outcomes. In particular, it might limit competition by impeding free entry into the market and reduces consumer welfare by inducing higher prices and lower supply than in a perfectly competitive equilibrium. Moreover, it might bias the allocation of resources across occupations. This is even more true when regulation is shaped by the professional body and is designed primarily for its benefit (Stigler, 1971; Pagliero, 2011).[5]

Empirical evidence shows that regulation has a significant effect on the labor market outcomes of the regulated occupations. Kleiner and Krueger (2013) for the US and Koumenta and Pagliero (2016) for European countries both find that licensing is associated with a significant wage premium. Reliable evidence on the impact of regulation on measures of practitioner quality is scant, partly due to identification issues and the difficulty of finding accurate measures of the service quality. Case studies examined so far do not find that regulation increase the quality of service.[6]

In Italy, professional services are historically subject to a strict regulation (Pellizzari et al., 2011). However, since the 2000s, different reforms have been past in order to open professional services to competition. Two main legislative actions were taken in 2006 (so-called Bersani decree) and 2011 (so-called Monti reform). The two reforms can be regarded as a

[5]The debate between proponents and opponents of licensing date back centuries. Adam Smith (1776) described the ability of the crafts to lengthen apprenticeship programs and limit the number of apprentices per master, thus ensuring higher prices and, therefore, higher earnings in these occupations. Friedman and Kuznets (1945) describes occupational licensing as an institution that allows practitioners to capture monopoly rents, with some professions characterized by reminiscences of the medieval guilds.

[6]Kleiner and Kudrle (2000) exploit cross-sectional variation in licensing stringency for dentists in the U.S. and find that tougher licensing does not improve dental health (but it raises the earnings of practitioners). Kugler and Sauer (2005), using data on physicians in Israel and exploiting variation induced by a policy rule, find that stricter licensing requirements lead to higher practitioner rents but also to lower quality of the service. Angrist and Guryan (2008) find that state-mandated teacher testing is associated with increases in teacher wages without a corresponding increase in their quality (as measured by their education background).

sudden and unexpected change in the Italian legislation. They were approved by two different governments, not long after they took office, via emergency decrees. The Monti reform was notably adopted as a response to the financial and sovereign debt crisis, which urged taking action swiftly and vigorously. Both reforms dealt with practitioners' conduct and, although to a lesser extent, with entry requirements. First, minimum prices and restrictions on advertising and inter-professional cooperation were withdrawn by the Bersani decree, which also took action on the reserves of activities of notaries and the sale of medicinal products by pharmacies. In the second wave of reforms, regulated tariffs were completely abolished and continuing education and other conduct obligations were introduced. A cap on the duration of initial training was also fixed up to 18 months. The number of notaries has been increased and the demographic criteria for the establishment of pharmacies loosened.

The progressive liberalization of Italian professional services is also certified by the OECD indicator that measures the regulatory environment for architecture, engineering, legal and accounting services: between 2003 and 2013, Italy moved from the 2nd (out of 27 OECD countries) to the 19th (out of 34) position with respect to the restrictiveness of regulation. Figure 1 provides clear visual evidence of these figures: Italy was one of the more regulated countries in professional services at the beginning of the period but it also experienced the largest variation of the strictness of regulation in the next decade.

2.2 Regulation and occupation persistence

As stated in the introduction, intergenerational persistence has been documented in several occupations studied so far, although to a varying extent. This stylized fact might be attributed to a number of reasons that are difficult to isolate from each other. Parents may influence their children through the genetic transmission of characteristics, such as innate abilities and personality traits that are more valued in certain labor markets (e.g. memory, locus of control, risk aversion, confidence, etc.). Moreover, parents may subtly influence the lifetime prospects of their children through family culture and other monetary and non-monetary investments that shape skills, aptitudes, beliefs and behaviors.[7]

However intergenerational occupation persistence might be also shaped by regulation. First, children of parents who are professionals might have privileged access *ex lege*. For example, in Italy the entry into the pharmacies market is highly regulated (the law establishes the number of pharmacies that should operate in a city as a function of the existing population) and inheriting the family business is one of the most common ways of owning a pharmacy. Second, having a parent already in the business might help the young practitioner to create a portfolio of clients, and this is clearly even more important when other instru-

[7] See Mogstad (2017) for a review on the human capital approach to intergenerational mobility.

ments to attract potential clients (such as advertising or competitive tariffs) are constrained by regulation. The interest in exploiting these positional rents is clearly larger when economic returns of the occupation (which in turn depends on the extent of regulation) are also larger. Third, parents might exploit their positional advantage (and their connections) to get privileged information that, in turn, might facilitate their children gaining admission to the college or passing the state exam.

Nevertheless, stricter regulation does not necessarily imply a higher propensity of career following. For example, strict but fair entry requirements (e.g. in terms of educational requirements or characteristics of the state exam) might also increase the role of individual merit and decrease that of less fair mechanisms, such as nepotism, family networks, etc.

Interestingly, Aina and Nicoletti (2018) show that having a liberal professional father affects to varying extent the different steps required to become a liberal professional. They show that the impact is stronger on the probability to complete a compulsory period of practice and to start a liberal profession, whereas there are no effects (after controlling for child 's and parental formal human capital) on passing the licensing examination.

The relevance of each channel might clearly vary to a large extent across occupations and the characteristics of the labor market.

3 Data

3.1 Labor Force Survey

Data for the Italian labor market of occupations are drawn from the LFS. This survey is performed by the National Institute of Statistics (ISTAT) during every week of a year. The annual sample is composed of over 250,000 households (about 600,000 individuals). The survey represents the leading source of statistical information for estimating the main aggregates of the Italian labor market at the national and local levels.

We retrieve data since 2004 on people aged 19-25 who are recorded as children in the survey and have at least one parent whose occupation is one of the following: accountants, agronomists, architects, biologists, chemists, doctors, engineers, geologists, lawyers, notaries, pharmacists, psychologists, social assistants and veterinarians.[8] These occupations are identified on the basis of the 4-digit ISCO occupational classification. Having co-residing children and parents allows us to match each children to their parents and there-

[8]We select this subset of occupations following two main criteria. First, we select occupations that require a specific degree programme, thus allowing to build our measure of propensity of career following. This is why, for example, we exclude journalists. Second, we select only occupations above a minimum population threshold. This is why we exclude the profession of actuary that is very rarely and infrequently surveyed in the LFS.

fore to observe two generations.

This strategy has two main drawbacks. First, focusing on a child still living with their parents might lead to a sample selection bias. However, the share of people aged 19-25 still living with their parents is about 92 percent. Therefore we argue that this issue is, if any, really limited. Second, the vast majority of children are not in the labor market yet and, therefore, we do not observe their occupation. However, we observe whether the children are enrolled at a university and, if so, their degree programme.

To construct our measure of intergenerational persistence, we match children's educational choice with their parents' occupation. Hence, we measure the individual propensity of children to follow their parents' occupation with an indicator that is equal to 1 if children pursue a course of study that naturally leads to the parents' occupation. We illustrate the matching between each occupation and the corresponding degree programme in Table 1 (top panel).[9]

In the empirical strategy, as we will discuss in the following section, we need to build a proper control group, i.e. children whose parents are employed in occupations similar to those of the treated ones but not exposed to entry requirements and conduct rules established by a professional body (or, at most, exposed to a milder and *time-invariant* occupational licensing). These control units have been chosen among highly-skilled occupations that are characterized by a similar education career with respect to that of the treated group.[10] More specifically, for each degree program of our treated occupations, we select other prominent occupations typically chosen by the students after graduation. For example, legal experts and magistrates represent the control group for lawyers and notaries; workers in the financial sector are the counterparts of accountants; building technicians, computer scientists or mathematicians have an educational background similar to that of engineers; etc.

Table 2 displays the summary statistics of our main variables, i.e. the indicator of occupation persistence and the main socio-demographic variables at both individual and household level. The sample of the children in the treated group includes 26,928 children-parents pairs. The average occupational persistence is nearly 0.20, that is about one-fifth of the children are enrolled in a degree programme that represents a prerequisite to entry in the occupation of their parents. This figure is higher among children whose parents are self-employed professionals (0.26) while it is remarkably lower among children of parents employed in similarly skilled occupations (0.07). Notice also that about 72 percent of this sample of children is enrolled at university, a percentage much higher than that for the overall population in the

[9]Less than 1 percent of the children in our sample have already a college degree and are employed in one of the occupations considered in our study. In this case, occupational persistence is directly measured comparing the occupation of the parent with that of the children.

[10]See Table 1 (bottom panel) for a complete list of the control occupations and their corresponding degree programme.

same age bracket.

3.2 Regulation index

Since the 1990s, the OECD has been constructing a system of indicators to measure stringency and ongoing development in product market regulation across the OECD countries (Nicoletti et al., 1999; Conway and Nicoletti, 2006; Koske et al., 2015). The basic idea is to turn qualitative data on laws and regulation that may affect competition into quantitative indicators.[11]

Following the OECD methodology, we develop a novel measure of the stringency of regulation for a selected sample of occupations in Italy. The indicator refers to the years 2003, 2008, 2013 and 2018; therefore it incorporates the effects of the Bersani decree in 2006 and of the Monti reform in 2011.

We depart from the OECD indicators along two main dimensions. First, we enlarge the set of occupations to the following: accountants, agronomists, architects, biologists, chemists, doctors, engineers, geologists, lawyers, notaries, pharmacists, psychologists, social assistants, and veterinarians. Second, we include a wider range of information in the construction of the indicators. In particular, with regard to entry, we refine the extent of exclusive rights by considering both the number and the value of reserves of activities of each occupation. We have also extended the set of information related to education requirements, with reference to the characteristics of the university courses that grant access to the professional exams and to the professional exams themselves (e.g. we consider whether there is limited enrollment at university and the composition of the examining board). We have also taken into account costs related to chamber membership and the extent of quantitative restrictions in running the business activities by professionals. With regard to conduct, we have introduced more specific answers regarding regulation on advertising and legal form of business and we added a further item referring to the disciplinary powers of chambers. More details about the construction of the indicator are illustrated in the Appendix.[12]

Table 3 shows the extent of regulation for the 14 occupations and over time. The occu-

[11] The OECD indicators are produced at five-year intervals and are composed of sectoral indicators capturing the stringency of regulation in seven network industries (electricity, gas, telecommunications, post, and air, rail and road transports), in professional services (legal, accounting, engineering and architecture services) and in retail trade. As far as professional services are concerned, the indicator is built aggregating simple indicators regarding entry regulation (exclusive rights, education requirements, compulsory chamber membership and quotas) and conduct regulation (prices and fees, marketing and advertising, form of business, inter-professional cooperation). These indicators have been widely used in the literature to examine, for example, the impact on growth and productivity in downstream sectors (Barone and Cingano, 2011; Bourlès et al., 2013).

[12] See Figure A1 in the Appendix for graphical illustration of the pyramidal structure of the index while Table A1 provides a complete description of the items included in the construction of the indicator.

pations with a more stringent regulation are those of notaries and pharmacists while those relatively less regulated are those of engineers and geologists. Moreover, the indicator decreases over time, reflecting the liberalization effects of the Bersani decree and the Monti reform, although to a different extent across occupations.

3.3 Descriptive evidence

Over the recent years, Italy has experienced a significant increase in the number of regulated occupations; moreover their wages have also markedly decreased (Figure 2). The increase of the supply and the decrease of rents are consistent with the liberalization process that occurred in the same temporal window.[13]

These occupations are characterized by a significant intergenerational occupational persistence. We find that on average the probability of being enrolled in a degree programme naturally leading to the same occupation of the parents is nearly 8 times higher among the children of the professionals compared to the rest of the population. We also find substantial heterogeneity across occupations. In particular, the odds ratios are higher among the children of lawyers and, in particular, among those of pharmacists. In contrast, career following is much lower among geologists and biologists.

In order to validate the goodness of our indicator of intergenerational persistence we examine whether and to what extent it is correlated with other available measures. For example, Basso and Labartino (2011) exploits the informative content of surnames to capture the strength of family connections across professionals in Italy. Figure 3 shows that the two indicators are positively associated with a coefficient of correlation equal to 0.54.

Figure 4 shows that there is also a strong and positive association between the extent of regulation and incomes (as declared in tax records), with a coefficient of correlation equal to 0.87. Economic returns, in particular, are significantly higher among pharmacists and notaries which are also the two most regulated occupations according to our indicator. This is somewhat reassuring since we know from previous studies that regulation does affect economic rents (Kleiner, 2000; Kleiner and Krueger, 2013).

Interestingly, the intergenerational persistence is also higher in more regulated occupations (Figure 5). The coefficient of correlation is equal to 0.50. It is worth noting that this positive correlation is not driven by pharmacists and notaries that visually appear as two outliers in the scatter plot; indeed, if we exclude these two occupations the correlation increases further. Moreover, intergenerational persistence has decreased over time in these occupations while it has remained fairly stable in the occupations of the control group. An

[13] See Mocetti et al. (2018) for a more detailed descriptive analysis of the labor market of regulated occupations in Italy.

obvious interpretation of these findings is that economic regulations provide market power to incumbents, constitute barriers to entry and ultimately generate rents. Thus, the children might benefit from their parents' positional rents and are more likely to follow in their parents' footsteps.

However these correlations, although suggestive, may be plagued by omission of relevant variables (e.g. sector-specific factors that might affect both the degree of competition and the extent of career following) and therefore cannot be interpreted as a causal nexus. In the following section we describe how we deal with this identification challenge.

4 Empirical strategy

The goal of our study is to identify the effect of regulation on occupation persistence. To address this issue we adopt a difference-in-difference strategy, thus evaluating the effect of the treatment (the changes in regulation) on occupational persistence for the treated and a proper control group. We consider as control units the children of parents employed in highly-skilled occupations that are characterized by a similar education career with respect to that of treated occupations but not subject to the entry requirements and conduct rules established by a professional body.

We define our dependent variable as an indicator that is equal to 1 if children are enrolled at the university in a degree programme that could lead to follow the parents' career; for example, children of doctors have a high propensity to become doctors themselves if they are enrolled in a medicine degree course. Moreover, the children are divided into three cohorts depending on the year in which they enroll at the university; the three cohorts are characterized by a diverse regulatory environment (essentially, the three periods are before 2006, between 2006 and 2011 and after 2011) that may affect children's educational and occupational choices.

Formally, we run regressions as the following:

$$Y_{i,p,t} = \alpha + \beta R_{p,t} + \gamma X_{i,t} + \phi_p + \delta_t + \rho_{e(p)} \times \delta_t + e_{i,t} \tag{1}$$

where $Y_{i,t}$ is the propensity of the child *i* (whose parent is employed in occupation *p*) at time *t* to follow the parents' career; this variable is equal to 1 if there is career following and 0 otherwise. The main explanatory variable is $R_{p,t}$ and measures the strictness of regulation in occupation *p* at time *t* (obviously, $R_{p,t} = 0$ for the control units). The specification also includes main socio-demographic variables ($X_{i,t}$) as controls. Crucially, we add a wide array of fixed effects in order to address the omitted variable bias. Namely, ϕ_p are occupation-fixed effects aimed at capturing any unobservable variable which may affect in-

tergenerational persistence, such as the fact that in certain jobs the heritability of occupation-specific skills (in the pre-birth stage or in the family environment) might be larger[14] or that the ability of our proxy to capture career following might vary across occupations. Moreover, δ_t is aimed at capturing common shock. Importantly, this specification also includes degree programme-time fixed effects ($\rho_{e(p)} \times \delta_t$), with the degree-programme e that we use as predictor of occupation p. This last set of fixed effects is aimed at capturing the fact that enrollment in a certain degree programme might vary across time due to supply factors (e.g. the spread of limited enrollment in certain faculties) or demand factors (e.g. an increase in the employment opportunities for the graduates in a certain degree programme).[15]

5 Results

This section lays out our main findings on the effects of regulation on intergenerational persistence among occupations.

We start with Table 4 that shows our baseline results. In the first column we control for time-, profession- and region-fixed effects, thus accounting for the common trends to which are exposed children belonging to the same cohort, for occupation-specific (time-invariant) factors affecting occupation persistence and for unobserved local variables that might affect both regulation and employment opportunities. According to these estimates, a 1 point decrease in the regulation index leads to 1.9 percentage points decrease in the propensity of children to follow their parent's professional career (relative to the control group). In the second column we add main socio-demographic characteristics, both at the individual and household level. The estimated parameter is unchanged and this is not surprising as the two groups are well balanced across these characteristics. In the third column we add degree programme fixed effects to account for the fact that certain degree-programmes structurally attract more students. Finally, in the fourth column (our preferred specification) we include degree programme-time fixed effects to capture asymmetric shocks such as time-varying demand of certain professional services (or variation in the supply of education across fields). The coefficient slightly increases with respect to the more parsimonious specification and it remains highly significant. According to this estimate, the combined effect of the two regu-

[14] Indeed, one may plausibly argue that the cost to acquire human capital related to a specific occupation is lower for children who follow their father's occupation. Where the direct and indirect transmission of job-specific knowledge and abilities is more relevant there would presumably be a higher percentage of children following their father's occupation.

[15] Standard errors are clustered to account for the presence of a common unobserved random shock at the group level that will lead to correlation between all observations within each group. Namely, standard errors are clustered at the occupation-region level since the effect of regulation varies both at the occupation level (as regulation is occupation-specific) and at the region level (as some regulatory domains are shaped by local professional bodies and demand of professional services is highly heterogeneous over the territory).

latory reforms (corresponding to a 1.7 decrease in our index of the strictness of regulation) reduced the propensity of career following by 3.7 percentage points, about one-third of the sample average.

In Tables 5 to 7 we provide some robustness checks. First, we examine whether our results are robust with respect to the measure of regulation (Table 5). Indeed, although we strictly follow the OECD methodology, turning qualitative information into quantitative evidence is still subject to a number of arbitrary choices. One important choice is the weights structure: the overall indicator is obtained as a simple average of the indicators of each sub-domain, thus implicitly assuming that, say, exclusive rights are as important as education requirements or that limitations on prices are as important as those on advertising. One might guess that these sub-domains are not all equally important but any different weights structure can appear as arbitrary. As a robustness check we use the principal component analysis as alternative strategy to extract information from each sub-domain. The first principal component, which we use as a synthetic measure, explains about 35 percent of the total variance of the underlying ten variables. This synthetic measure has the advantage of using a different weights structure that, however, is chosen by the statistical algorithm in a transparent way. The results are qualitatively similar.

Second, we examine whether our results hold for different specific subsamples of the population. Namely, in Table 6 we replicate the analysis using only children of self-employed (top panel) or only children enrolled at the university (bottom panel). The restriction to the children of self-employed parents is motivated by the fact that occupational persistence might differ markedly between employees and self-employed. Indeed, they are differently exposed to the regulation depending on their occupational status; e.g., lawyers who hold their legal firm are subject to the regulation for professional services while lawyers who are employed as, say, a legal adviser for a commercial bank are less subject to the regulation, as they work in a sector not (or, if any, less) affected by restrictions on market conduct. Therefore, we might expect that the impact of regulation on occupational persistence is stronger among self-employed. Results confirm this expectation while they remain highly significant from a statistical point of view. The restriction to the subsample of children enrolled at the university might help to discriminate whether enrollment in a degree program naturally leading to the parents' occupation is mainly driven by larger enrollment per se or to preference for that specific degree program among the enrolled. Indeed, parents' economic rents might directly affect the probability of studying at university, independently from the chosen course of study, and summary statistics shows that enrollment is higher among professionals' children. However, our results are substantially confirmed when we replicate the analysis for the subsample of enrolled children.

Third, we replicate the regressions excluding one treated occupation (and its correspond-

ing control occupation) at a time (Table 7) to examine whether the estimates are sensitive to the particular performance of a single occupation. Again, the results are qualitatively confirmed.

Finally, it is worth noting that the credibility of our difference-in-difference strategy crucially relies on the assumption that, in absence of the treatment, the occupation persistence for the treated and the control group would have followed parallel paths over time. In our setting we expect that the treated and the control groups have a different level of occupation persistence before the reforms (as they were exposed to different regulatory environment) while they should have a similar trend, thus suggesting the absence of an anticipatory effect and/or of divergent patterns between the two groups before the policy reforms were implemented. These assumptions are visually examined in Figure 6 that plots the difference in occupation persistence between treated and control group, year by year, in the 5 years before the treatment. The coefficients are fairly stable over time and that estimated in the last year before the treatment (t-1) is not statistically different from that observed five year before (t-5). Hence, the parallel trend assumption is empirically satisfied.

In Tables 8 and 9 we explore heterogeneous effects of the regulation. Namely, in Table 8 we examine whether the impact of regulation varies on the basis of individual (top panel) or occupation (bottom panel) characteristics. As far as individual characteristics are concerned, we examine whether the impact varies depending on the gender of the children, the birth order and a measure of individual ability. We find that the impact is somewhat stronger for males and first born.[16] More interestingly, the impact is also stronger among less able children, identified as those who obtain their highest school qualification with (at least) a year's delay. This suggests that the less able individuals are those who benefit most from positional rents induced by regulation to entry in the occupation. More generally, this result suggests that anti-competitive regulations bias the allocation of individuals across occupations, favoring family background instead of individual merit.

As occupation characteristics, we first distinguish two groups depending on whether they refer to soft sciences (e.g. economics, law, etc.) or hard sciences (e.g. engineering, medicine, natural sciences, etc.). We find that the impact of regulation on intergenerational occupation persistence is higher for soft sciences. This finding might be due to the fact that entry in these occupations is based on more subjective evaluation and/or to the fact that the output of these services is more difficult to evaluate in a comparative manner. Both factors might increase the positional rents generated by regulation. The distinction between soft and hard sciences also reflects the distinction between occupations which require a training period prior to the professional exam (e.g. lawyer, accountant, etc.) and those that do not (e.g. engineer, doctor, etc.). Consistent with Aina and Nicoletti (2018), such requirement

[16] See Bennedsen et al. (2007) for evidence on succession decisions within firms by anagraphic characteristics.

may explain the different impact of regulation in these two groups. Second, we examine whether results vary between private services and public services (i.e. public administration, health, education) as they might be exposed to different entry and demand conditions. We find that the impact is largely concentrated in the private services where restrictions on the market conduct might be more effective. The different effect might also be explained by the higher share of self employed (that, in turn, are more exposed to regulation) in private services compared to public services. Finally, we examine whether the impact of regulation is different across areas characterized by a different demand of professional services. The underlying idea is that while regulation of professional services is homogeneous over the territory - and geographical mobility is historically low (Faini et al., 1997) and professionals are largely *local* (Michelacci and Silva, 2007) - heterogeneity in the demand of these services might increase the rents at the local level. Stated differently, supply constraints are more binding (and rents higher) where the demand is higher. We build a measure at the province level capturing dependence of the economy on professional services. This measure is computed in two steps. First, using the input-output matrix, we compute the dependence on professional services for each sector of economic activity. Second, we translate these figures at the province level using the sector composition of the local economy (i.e. the distribution of employees across sectors at the province level as recorded by the 2001 Census).[17] Interestingly, we find that the impact of regulation on occupation persistence is entirely concentrated on the provinces where the demand of professional services is higher (i.e. where the measure of dependence is above the median).

In Table 9 we distinguish the effect by domains of regulation (and occupation characteristics). Namely, we replicate the results of Table 8 (bottom panel) using separately the index of regulation for entry and conduct rules. According to these findings the impact is mainly driven by conduct regulation although this result should be interpreted with caution due to the small variability of entry regulation observed in the reference period. Moreover, as expected, restrictions on market conduct are more effective in the private services and in areas with higher demand of professional services. Interestingly, strictness of entry regulation seems to favor intergenerational mobility in hard sciences.[18]

[17] According to our analysis, the financial sectors and manufacturing activities with higher technology content are more dependent on the professional services; in contrast, agriculture and services to the households basically do not demand professional services. Therefore we expect that the demand for these services is heterogeneous across provinces depending on the sector composition of the local economy.

[18] In unreported evidence we explore the impact of each sub-domain of regulation and we find that the results on conduct are mainly driven by the removal of restrictions applied to prices and advertising while those on entry regulation are shaped by educational requirements.

6 Cross-country evidence

In this section we examine whether our results are generalizable in a cross-country analysis. To this end, we exploit the EU-SILC data and the OECD index of regulation in the professional services (i.e. accountants, lawyers, engineers and architects). The EU-SILC survey provides harmonic cross-sectional and longitudinal multidimensional micro-data on income, occupations, several demographic and social characteristics and living conditions. More specifically, we exploit the wave conducted in 2005 that contains a specific section concerning intergenerational mobility, in which numerous aspects of family background (including parents' occupations) are recorded in a retrospective fashion, i.e. by collecting information on family background for the period when the interviewee was approximately 14 years old. Differently from the LFS we do not measure the children's propensity to follow their parents' career but we do observe occupation for both children and parents, although at a more aggregate level (i.e. 2-digit in the ISCO 88 occupational classification of both sons and parents).[19]

Figure 7 shows that in more regulated countries the share of workers employed in ISCO classification group 21 and 24 (i.e. those including accountants, lawyers, engineers and architects) is significantly lower and the wage premium is significantly higher, consistent with the idea that anti-competitive regulation hampers entry in the occupations and increases economic rents.

Moreover, Figure 8 shows that regulation is positively associated to intergenerational persistence in the same occupation. Indeed, in countries with an index of regulation below the median (i.e. with more market-friendly regulatory environments) the probability of being employed in a certain occupation if one's parent is employed in the same occupation is about twice the corresponding probability of the rest of the population. Conversely, in countries above the median (i.e. with a more restrictive regulatory environment), the probability of children following in their parents' footsteps is, relative to the general population, considerably higher (around four times).

However this cross-section association needs to be interpreted with caution as regulation and intergenerational mobility might likely have common correlates that cannot all be credibly controlled for. For example, Scandinavian countries are characterized by a mild level of regulation and by low degree of occupational persistence; in contrast, Mediterranean countries have both stricter regulation and higher occupational persistence. However, these two groups of countries also differ substantially in terms of other relevant variables (e.g. welfare institutions, labor market regulation, culture, income inequality, etc.) that might

[19]The analysis is restricted to the 25 European countries for which we observe data on the regulatory environment as provided by the OECD (2011).

be correlated with both the extent of regulation and the functioning of the labor market of professionals.

To address these identification threats, we use an empirical strategy similar to that described in Section 5 but exploiting cross-country (instead of cross-time) heterogeneity. The treated group includes children whose parents were employed in ISCO group 21 and 24 while the control group includes children whose parents were employed in group 22 or 23, i.e. occupations that belong to the same macro-group of professionals but that are mostly employed in the public sector (i.e. less exposed to market regulation) or not exposed to entry and conduct rules established by a professional body (e.g. teaching professionals).[20] Table 10 shows the summary statistics of our main variables. The average occupational persistence is about 15 percent among treated units.

Table 11 shows the results of the empirical analysis. In the first two columns we show our baseline results while in the last two columns we restrict the sample to the children of self-employed parents. Each specification includes occupation-fixed effects (to capture occupation-specific intergenerational persistence patterns) and country-fixed effects (to capture unobservables at the country level that might be correlated to both regulation and employment opportunities); moreover, we also include main socio-demographic controls. As a whole, these results confirm that regulation does matter, as it significantly affects intergenerational persistence. Interestingly, in both cases the estimated parameters have an order of magnitude that is comparable with that obtained with the Italian data.

7 Conclusions

Does regulation affect the allocation of individuals across occupations? Does regulation affect intergenerational persistence in certain (high-income) occupations? Answering to these questions might contribute to two strands of literature. The first examines the factors behind intergenerational persistence of earnings and occupations, where the role of regulation is substantially uninvestigated. The second examines the effects of regulation, where the evidence on the characteristics of the practitioners who entry the profession (and, more

[20]However, EU-SILC data raises some empirical issues that are worth mentioning. First, we might have some measurement error in the dependent variable. Indeed, the 2-digit ISCO classification is not sufficiently narrow to precisely measure persistence in the same occupation. For example, architects, engineers and other science professional are included in the same ISCO group and therefore we might erroneously classify as occupation persistence a case where the father is an architect and the child a chemist. Second, as we do not precisely identify the occupation of the parent, we associate the average OECD index for architects and engineers to the ISCO group 21 and the average OECD index for accountants and lawyers to the ISCO group 24. Moreover, within the same groups there are also other occupations that are not regulated (e.g. sociologists) or that are regulated but without knowing the extent of regulation (e.g. psychologists). These factors imply that we also have measurement errors in the main explanatory variable.

generally, on allocative efficiency) is scant.

To answer these research questions we exploit two main reforms in the regulation of professional services that occurred in Italy since the 2000s. Italy was one of the more regulated economies in these sectors until the first half of the 2000s while the combined effect of the two reforms led to a significant liberalization in the next decade.

We find that the progress towards a more market-friendly regulatory environment leads to a substantial decrease in the propensity of career following. These results suggest that intergenerational persistence in certain occupations depends to a large extent on the existence of positional rents generated by lack of competition. Stated differently, our findings suggest that regulation significantly bias the allocation of individuals across occupations in favor of those coming from a family where one parent is also a professional. The impact is stronger for professions in *soft* sciences and in areas where the demand of professional services is higher. Moreover, the impact of regulation on occupation persistence is stronger for less able individuals, thus confirming allocative inefficiencies in the distribution of talents across occupations.

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Tables

Table 1: Occupations and corresponding university degree

Occupation:	Degree:
a. Treated group	
Accountant	Economics
Agronomist	Agriculture and veterinary
Architect	Architecture
Biologist	Biology
Chemist	Chemistry
Doctor	Medicine
Engineer	Engineering
Geologist	Geology
Lawyer	Law
Notary	Law
Pharmacist	Pharmacy
Psychologist	Psychology
Social assistant	Social services
Veterinary	Agriculture and veterinary
b. Control group	
Banking and finance employee	Economics
Agricultural entrepreneur	Agriculture and veterinary
Artistic and industrial designer	Architecture
Biochemical technician	Biology
Chemical technician	Chemistry
Paramedical professional	Medicine
Building technician	Engineering
Physic and geologic technician	Geology
Legal expert	Law
Magistrate	Law
Pharmacologist	Pharmacy
Personnel professional	Psychology
Pre-primary and primary teacher	Pedagogy
Zoo technician	Agriculture and veterinary
Computer scientist	Computer sciences
Mathematician and statistician	Mathematics and statistics
Physician	Physics

For each occupation - identified on the basis of the 4-digit ISCO classification of occupations - the table reports the corresponding university degree.

Table 2: LFS: descriptive statistics

Variable	Children of:		
	Professionals	Self-employed professionals	Control professions
Occupation persistence	0.191 (0.393)	0.259 (0.438)	0.069 (0.253)
Female	0.490 (0.500)	0.486 (0.500)	0.479 (0.500)
Age	21.798 (1.975)	21.793 (1.975)	21.823 (1.981)
Number of siblings	2.037 (0.816)	2.038 (0.800)	2.017 (0.781)
Enrolled at university	0.717 (0.451)	0.721 (0.449)	0.553 (0.497)
Parents' age	55.054 (4.733)	55.611 (5.046)	52.022 (4.829)
# parent-child pairs	26,928	13,310	63,945

The table reports mean values and standard deviation (in parenthesis) of the main variables. The sample refers to individuals aged 19-25 who are recorded as children in the survey (and therefore they still co-reside with their parents) and have at least one parent who is a professional or employed in a control profession (see Table 1 for the list of occupations). Data are drawn from the Italian LFS (years 2004 to 2017).

Table 3: Regulation index in selected occupations in Italy

Occupation	Year:			
	2003	2008	2013	2018
Accountant	3.563	2.775	1.638	1.838
Agronomist	3.413	2.613	1.537	1.738
Architect	3.325	2.525	1.438	1.638
Biologist	3.278	2.490	1.415	1.603
Chemist	3.235	2.473	1.422	1.610
Doctor	3.473	2.573	1.766	1.941
Engineer	2.827	2.027	1.153	1.353
Geologist	3.185	2.398	1.310	1.498
Lawyer	3.735	3.048	2.335	2.335
Notary	5.013	4.026	3.613	3.813
Pharmacist	4.010	3.412	2.565	2.353
Psychologist	3.315	2.528	1.753	1.965
Social assistant	3.245	2.458	1.370	1.570
Veterinary	3.318	2.505	1.405	1.605

Stringency of regulation is measured with a 0-6 OECD-style index, with higher values indicating stricter regulation; see the Appendix for more details.

Table 4: Impact of regulation: baseline

Dependent variable:	Occupation persistence			
Regulation index	0.019**	0.019**	0.019***	0.022***
	(0.008)	(0.008)	(0.007)	(0.007)
Time FEs	YES	YES	YES	YES
Parent's profession FEs	YES	YES	YES	YES
Region FEs	YES	YES	YES	YES
Socio-demographic controls	NO	YES	YES	YES
Child's degree programme FEs	NO	NO	YES	YES
Child's degree programme $\times$ Time FEs	NO	NO	NO	YES
Observations	90,873	90,873	90,873	90,873

The dependent variable is an indicator equal to 1 when the children attend a degree programme that naturally leads to the same occupation of their parents. The sample includes all children having at least one parent who is a professional (treated group) or employed in a similar profession (control group). Socio-demographic controls include: gender, children's age, number of siblings, birth order, gender of the parent, parents' age. Standard errors (in parentheses) are clustered at the profession-region level; *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Impact of regulation: robustness to the measure of regulation

Dependent variable:	Occupation persistence			
Regulation index (PCA)	0.010*	0.010*	0.010**	0.012**
	(0.005)	(0.005)	(0.005)	(0.005)
Time FEs	YES	YES	YES	YES
Parent's profession FEs	YES	YES	YES	YES
Region FEs	YES	YES	YES	YES
Socio-demographic controls	NO	YES	YES	YES
Child's degree programme FEs	NO	NO	YES	YES
Child's degree programme $\times$ Time FEs	NO	NO	NO	YES
Observations	90,873	90,873	90,873	90,873

The dependent variable is an indicator equal to 1 when the children attend a degree programme that naturally leads to the same occupation of their parents. The sample includes all children having at least one parent who is a professional (treated group) or employed in a similar profession (control group). Socio-demographic controls include: gender, children's age, number of siblings, birth order, gender of the parent, parents' age. Standard errors (in parentheses) are clustered at the profession-region level; *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Impact of regulation: robustness to sample selection

Dependent variable:	Occupation persistence			
a. Subsample of self-employed parents				
Regulation index	0.032**	0.033**	0.030**	0.038***
	(0.016)	(0.016)	(0.013)	(0.014)
Observations	24,056	24,056	24,056	24,056
b. Subsample of enrolled children				
Regulation index	0.020*	0.020*	0.024**	0.024**
	(0.012)	(0.012)	(0.011)	(0.011)
Observations	54,365	54,365	54,365	54,365
Time FEs	YES	YES	YES	YES
Parent's profession FEs	YES	YES	YES	YES
Region FEs	YES	YES	YES	YES
Socio-demographic controls	NO	YES	YES	YES
Child's degree programme FEs	NO	NO	YES	YES
Child's degree programme $\times$ Time FEs	NO	NO	NO	YES

The dependent variable is an indicator equal to 1 when the children attend a degree programme that naturally leads to the same occupation of their parents. The samples include: in the top panel all children having at least one parent who is a *self-employed* professional (treated group) of *self-employed* in a similar profession (control group); in the bottom panel all children *enrolled at the university* having at least one parent who is a professional (treated group) or employed in a similar profession (control group). Socio-demographic controls include: gender, children's age, number of siblings, birth order, gender of the parent, parents' age. Standard errors (in parentheses) are clustered at the profession-region level; *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Impact of regulation: robustness to exclusion of professions

Dependent variable:	Occupation persistence			
Profession exluded:	β	S.E.	Full set of controls	# observations
Accountant	0.019**	(0.007)	YES	83,296
Agronomist	0.021***	(0.007)	YES	87,134
Architect	0.019**	(0.007)	YES	86,429
Biologist	0.023***	(0.007)	YES	89,538
Chemist	0.022***	(0.007)	YES	89,191
Doctor	0.033***	(0.009)	YES	61,076
Engineer	0.019***	(0.007)	YES	80,881
Geologist	0.022***	(0.007)	YES	90,514
Lawyer	0.018**	(0.007)	YES	88,556
Notary	0.023***	(0.007)	YES	90,475
Pharmacist	0.018**	(0.007)	YES	89,467
Psychologist	0.023***	(0.007)	YES	89,175
Social assistant	0.022***	(0.008)	YES	65,468
Veterinary	0.023***	(0.007)	YES	90,106

The dependent variable is an indicator equal to 1 when the children attend a degree programme that naturally leads to the same occupation of their parents. The sample includes all children having at least one parent who is a professional (treated group) or employed in a similar profession (control group), with the exclusion in each row of the listed treated profession (and its corresponding control profession). Full set of controls includes time-, parent's profession- and region-fixed effects, socio-demographic controls (gender, children's age, number of siblings, birth order, gender of the parent, parents' age) and child-s degree programme-time fixed effects. Standard errors (in parentheses) are clustered at the profession-region level; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 8: Impact of regulation: heterogeneous effects

Dependent variable:	Occupation persistence					
	a. By children's characteristics					
Regulation index	0.030***	0.018**	0.023**	0.021*	0.042***	0.020***
	(0.011)	(0.008)	(0.009)	(0.011)	(0.014)	(0.008)
Subsample:	*Male*	*Female*	*First born*	*Later born*	*Less able*	*More able*
Observations	46,663	44,203	60,487	30,380	11,069	79,799
	b. By Profession's characteristics					
Regulation index	0.030***	0.013*	0.045***	-0.003	0.009	0.030***
	(0.010)	(0.007)	(0.011)	(0.007)	(0.010)	(0.010)
Subsample:	*Soft sciences*	*Hard sciences*	*Private services*	*Public services*	*Low local demand*	*High local demand*
Observations	46,317	44,549	31,379	59,484	45,059	45,809
Full set of controls	YES	YES	YES	YES	YES	YES

The dependent variable is an indicator equal to 1 when the children attend a degree programme that naturally leads to the same occupation of their parents. The sample includes all children having at least one parent who is a professional (treated group) or employed in a similar profession (control group). Full set of controls includes time-, parent's profession- and region-fixed effects, socio-demographic controls (gender, children's age, number of siblings, birth order, gender of the parent, parents' age) and child-s degree programme-time fixed effects. Standard errors (in parentheses) are clustered at the profession-region level; *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Impact of different types of regulation

Dependent variable:	Occupation persistence					
Entry requirements	0.159	-0.683***	-0.038	-0.425	-0.326	0.118
	(0.192)	(0.234)	(0.157)	(0.363)	(0.240)	(0.203)
Conduct rules	0.015***	0.007*	0.023***	-0.002	0.005	0.015***
	(0.005)	(0.004)	(0.006)	(0.004)	(0.005)	(0.005)
Subsample:	*Soft sciences*	*Hard sciences*	*Private services*	*Public services*	*Low local demand*	*High local demand*
Observations	46,317	44,549	31,379	59,484	45,059	45,809
Full set of controls	YES	YES	YES	YES	YES	YES

The dependent variable is an indicator equal to 1 when the children attend a degree programme that naturally leads to the same occupation of their parents. The sample includes all children having at least one parent who is a professional (treated group) or employed in a similar profession (control group). Full set of controls includes time-, parent's profession- and region-fixed effects, socio-demographic controls (gender, children's age, number of siblings, birth order, gender of the parent, parents' age) and child-s degree programme-time fixed effects. Standard errors (in parentheses) are clustered at the profession-region level; *** p<0.01, ** p<0.05, * p<0.1.

Table 10: EU-SILC: descriptive statistics

Variable	Children of:		
	Professionals	Self-employed professionals	Control professions
Occupation persistence	0.147 (0.354)	0.205 (0.404)	0.150 (0.357)
Female	0.533 (0.499)	0.543 (0.498)	0.518 (0.500)
Age	39.858 (9.374)	39.858 (9.453)	39.306 (9.147)
Number of siblings	1.597 (1.417)	1.871 (1.563)	1.766 (1.464)
Employed	0.946 (0.226)	0.923 (0.266)	0.945 (0.229)
University degree	0.591 (0.492)	0.622 (0.485)	0.648 (0.477)
Parents' age	68.323 (9.301)	69.333 (9.460)	67.000 (9.256)
# parent-child pairs	8,809	899	10,657

The table reports mean values and standard deviation (in parenthesis) of the main variables. The sample refers to individuals aged 25-55 who have at least one parent who is a professional (i.e. groups 21 and 24 in the ISCO 88 classification of occupations) or employed in a control profession (i.e. groups 22 and 23 in the ISCO 88 classification of occupations). Data are drawn from EU-SILC (special section of the wave 2005 on intergenerational mobility).

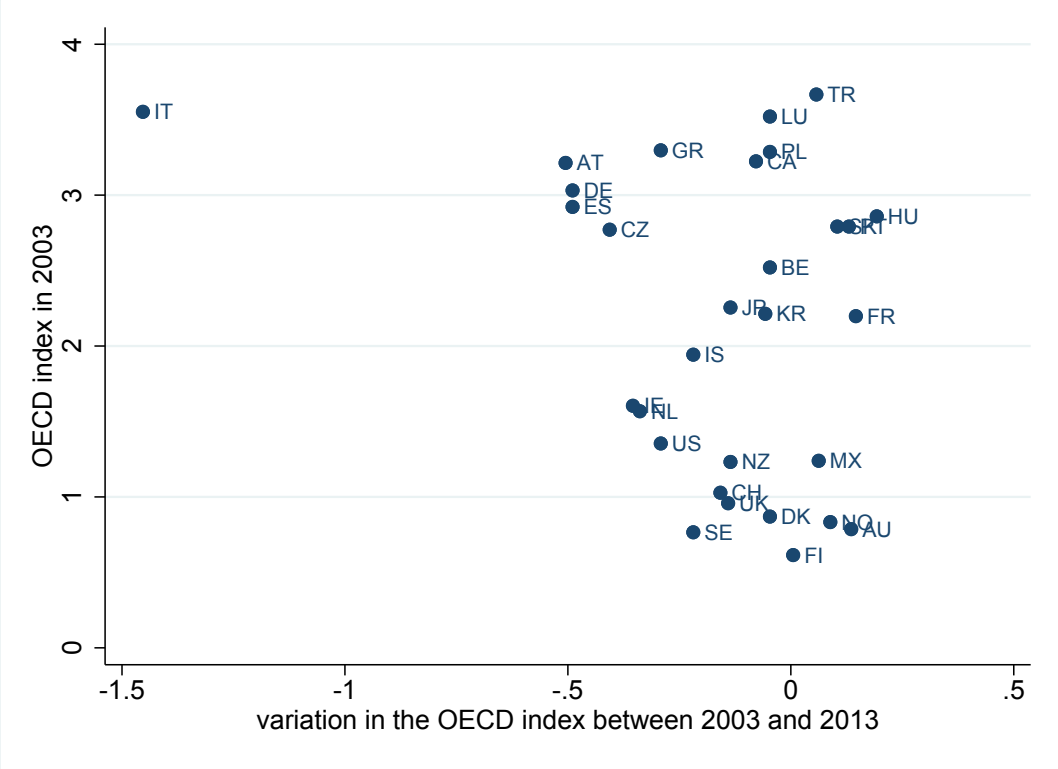
Table 11: Impact of regulation: cross-country evidence

Dependent variable:	Occupation persistence			
	Full sample		Subsample of self-employed parents	
OECD Regulation index	0.017**	0.016**	0.038**	0.036**
	(0.007)	(0.007)	(0.017)	(0.017)
Country FEs	YES	YES	YES	YES
Parent's profession FEs	YES	YES	YES	YES
Socio-demographic controls	NO	YES	NO	YES
Observations	19,466	19,466	1,670	1,670

The dependent variable is an indicator equal to 1 when the children are employed in the same occupation of their parents. The samples include: in the first two columns all children having at least one parent who is a professional (treated group) or employed in a similar profession (control group); in the second two columns all children having at least one parent who is *self-employed* professional (treated group) or *self-employed* in a similar profession (control group). Socio-demographic controls include: gender, children's age, number of siblings, gender of the parent, parents' age. Standard errors (in parentheses) are clustered at the profession-country level; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

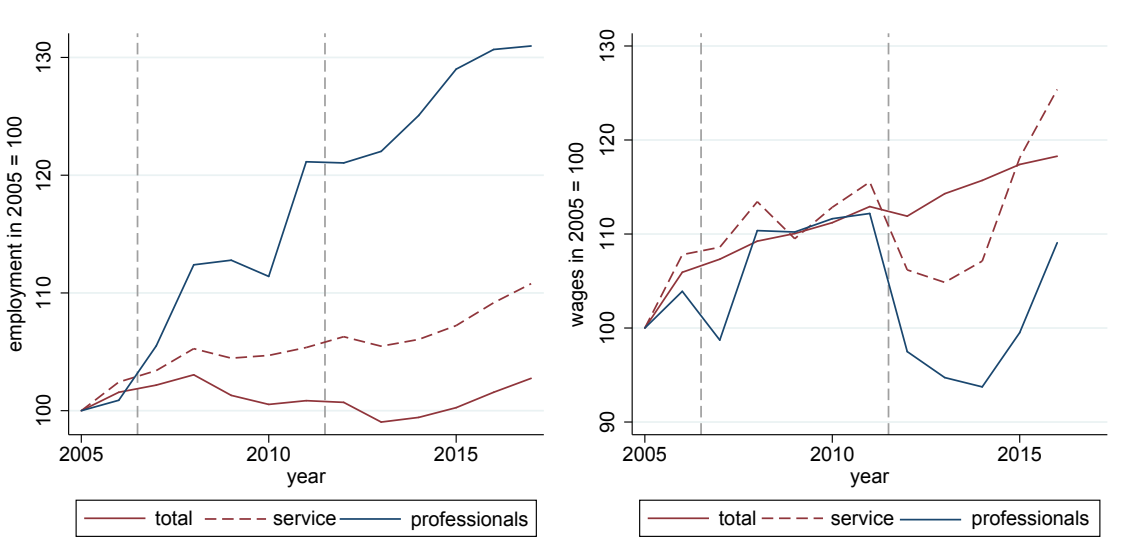
Figures

Figure 1: OECD indicator of regulation in professional services



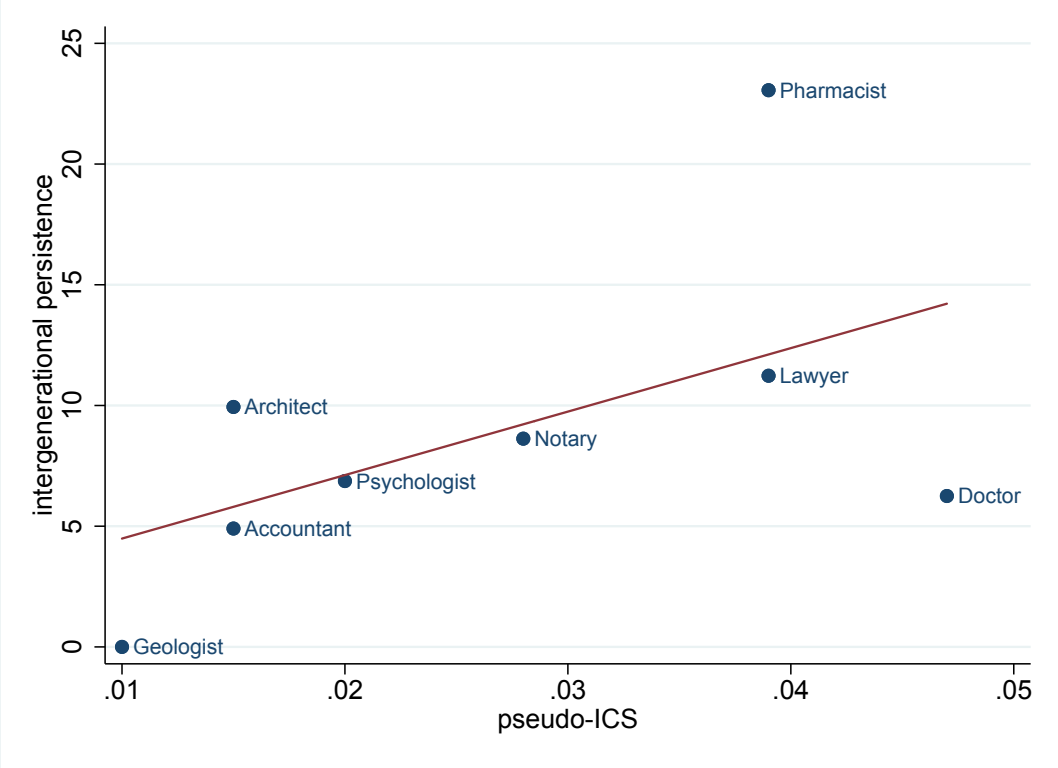
Authors' elaborations on data from OECD product market regulation website.

Figure 2: Employment and income patterns



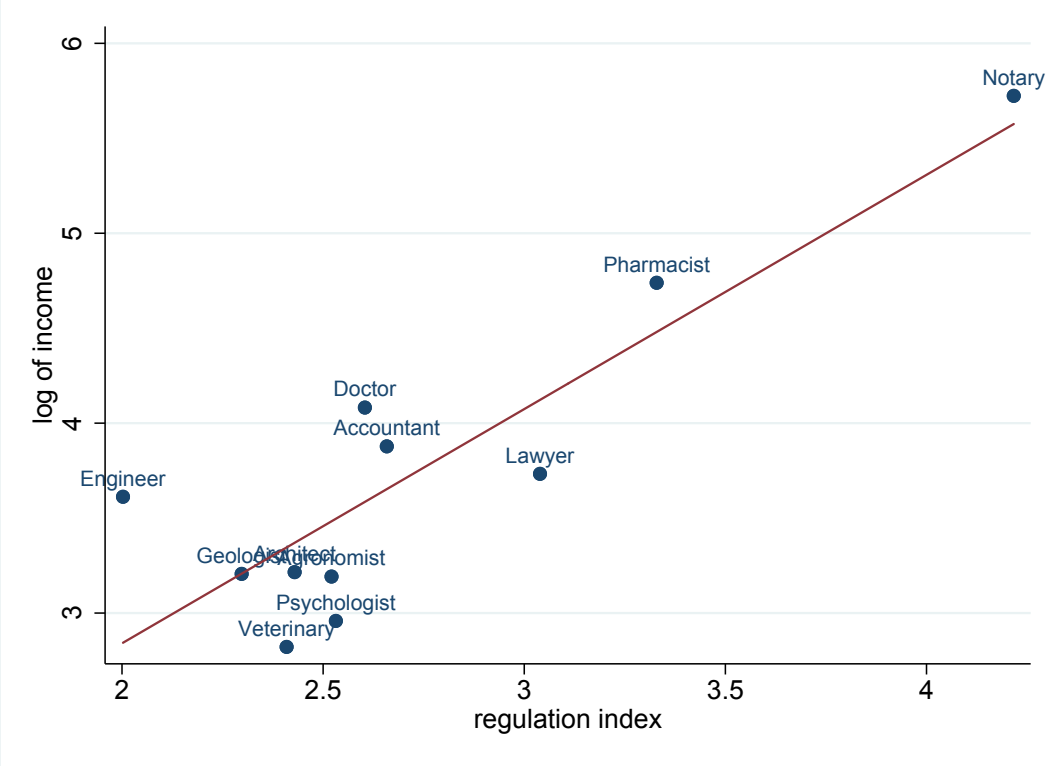
Authors' elaborations on data from LFS and MEF. Dashed vertical lines represent the years of the Bersani decree and the Monti reform, respectively.

Figure 3: Occupational persistence across professions



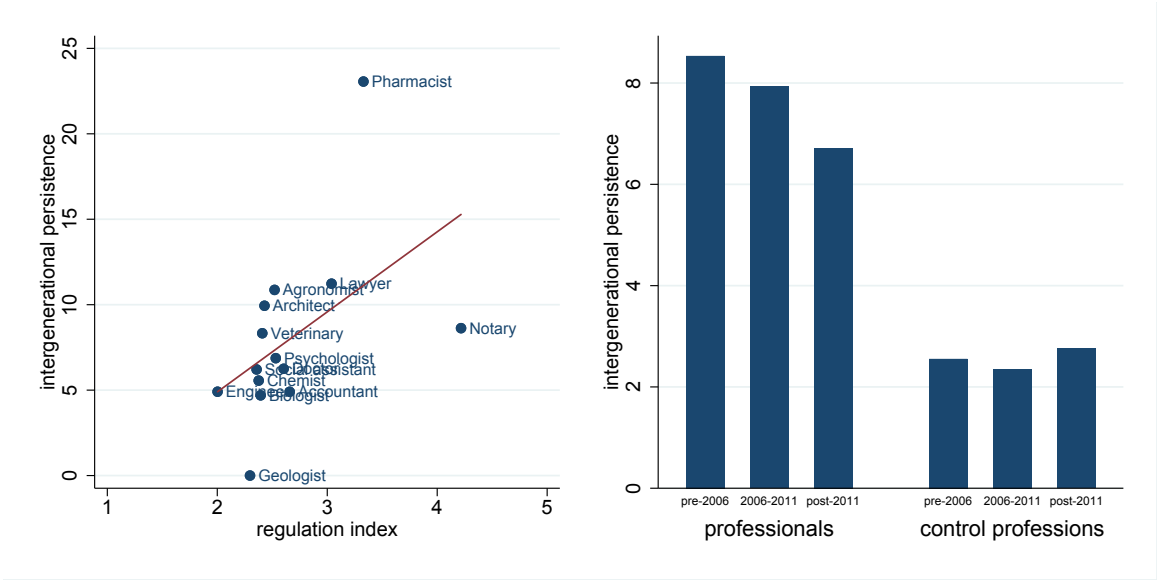
Authors' elaborations on data from LFS and Basso and Labartino (2011). Intergenerational persistence is measured with the odds ratios, i.e. the probability of becoming a member of a profession if one's parent is a member of the same profession relative to the corresponding probability for the overall population. The pseudo-ICS measures the strength of intergenerational links within professions exploiting the informational contents of surnames.

Figure 4: Wage premium and regulation in Italy



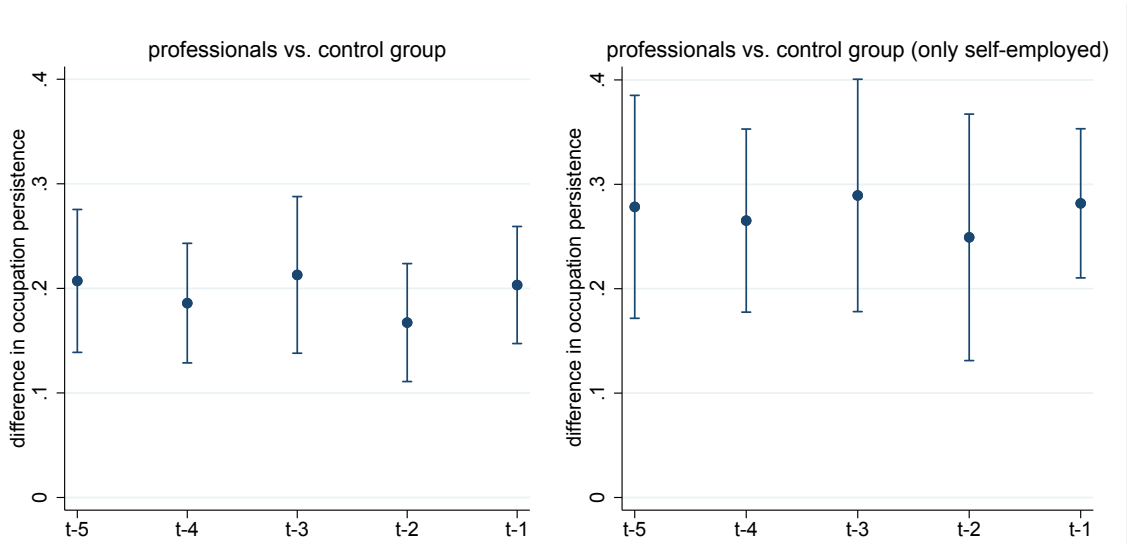
Authors' elaborations on data from the MEF. Stringency of regulation is measured with a 0-6 OECD-style index, with higher values indicating stricter regulation; see the Appendix for more details.

Figure 5: Occupational persistence and regulation



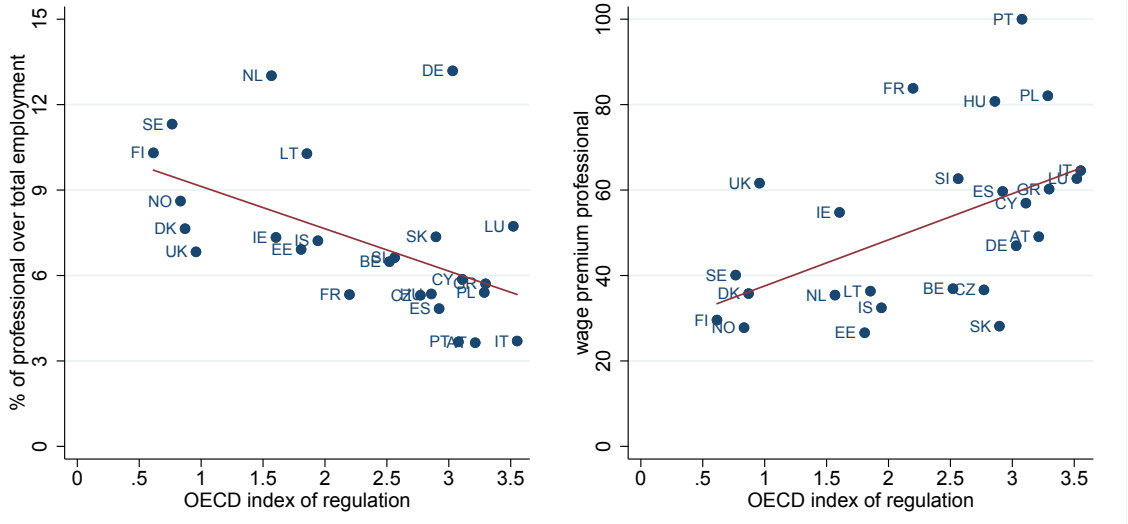
Authors' elaboration on data from the LFS. Intergenerational persistence is measured with the odds ratio, i.e. the probability of becoming member of a profession if one's parent is member of the same profession relative to the corresponding probability for the overall population. Stringency of regulation is measured with 0-6 OECD-style index, with higher values indicating stricter regulation; see the Appendix for more details.

Figure 6: Parallel trend assumption



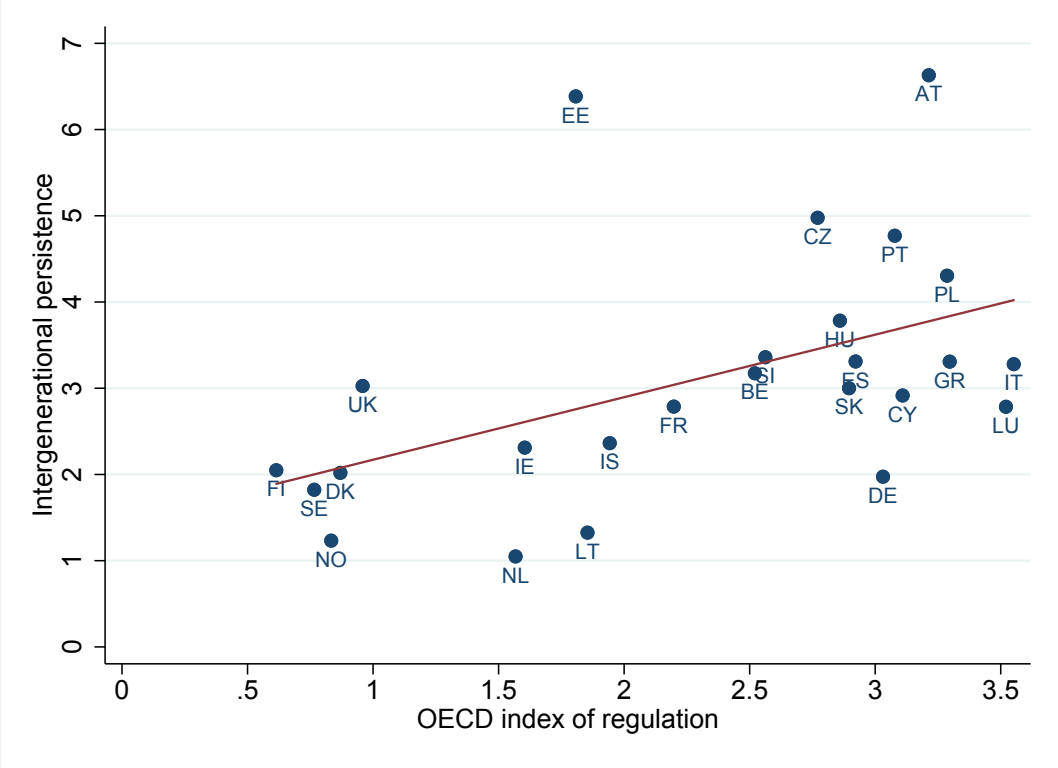
Authors' elaboration on data from the LFS. Each point represents the estimated difference in occupation persistence between the treated and the control group, for different years before the treatment. Vertical bands represent + / - 1.96 time the standard error for each point estimate.

Figure 7: Regulation and labor market outcomes in Europe



Authors' elaboration on data from the EU-SILC and OECD. We consider as professionals those employed in the ISCO group 21 and 24. Wage premium has been calculated on gross incomes, expect for Greece, Italy, Spain and Portugal for which we use net incomes; moreover, wage premium has been bounded to 100% for graphical reasons.

Figure 8: Occupational persistence and regulation across countries



Authors' elaboration on data from the EU-SILC and OECD. Intergenerational persistence is measured with the odds ratio, i.e. the probability of becoming member of a profession if one's parent is a member of the same profession relative to the corresponding probability for the overall population. Regulation is measured with the OECD product market indicator for professional services.

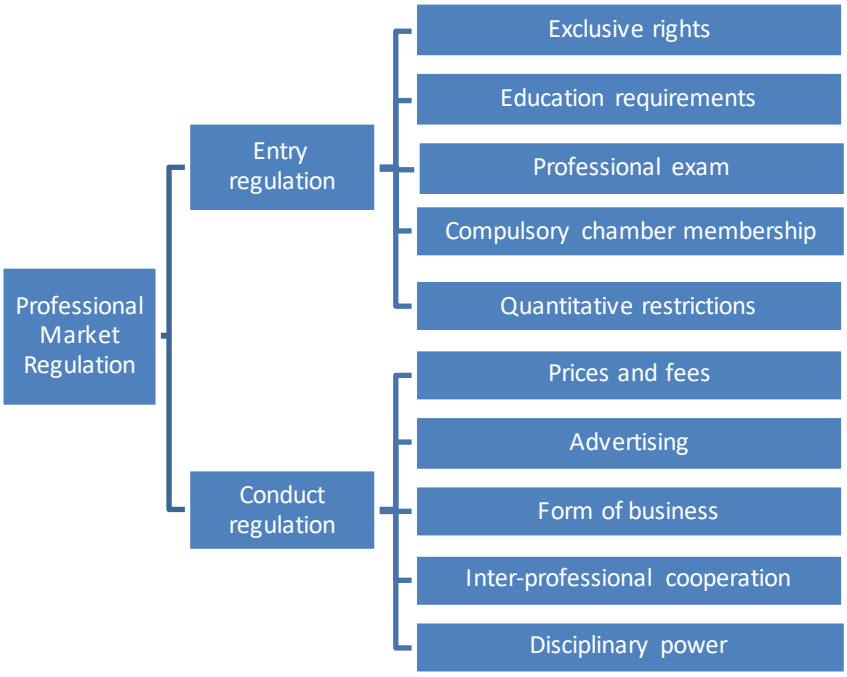
Appendix

Since the 1990s, the OECD has been constructing a system of indicators to measure stringency and ongoing development in product market regulation across the OECD countries. See Nicoletti et al. (1999), Conway and Nicoletti (2006) and Koske et al. (2015) for more details on the spirit of the indicator and on the methodology adopted to turn qualitative data on laws and regulation into quantitative indicators.

Following the OECD methodology, we develop a novel (time-varying) measure of regulation for 14 professions in Italy. Namely, the indicator has a pyramidal structure and it is aimed at summarizing regulations by regulatory domain.

At the top of the pyramid there is the overall regulatory environment of professional services that, in turn, is based on two main broad regulatory domains: the entry requirements into the profession and the regulation of the market behavior (i.e. conduct); these domains, finally, cover different sub-domains regarding specific classes of regulatory interventions, as shown in Figure A1.

Figure A1: Domains and sub-domains considered in the regulation index



For each sub-domain, different questions have been included in the analysis. The answers to these questions are all designed to express the stringency of regulations, from least to most restrictive (along a 0-6 scale), with regard to their impact on market competition. The aggregate indicators are built as mean of the values of the related sub-domains.

With respect to the OECD indicator we innovate along two main dimensions. First,

we consider a broader set of professions: accountants, agronomists, architects, biologists, chemists, doctors, engineers, geologists, lawyers, notaries, pharmacists, psychologists, social assistants and veterinarians. Second, we enrich the sub-domains of the regulatory environment along several directions.

For entry regulation we consider the following five sub-topics: exclusive rights (i.e. reserves of activities), education requirements, professional exam, compulsory chamber membership and quantitative restrictions. For conduct regulation we consider the following five sub-topics: prices and fees, advertising, form of business, inter-professional cooperation and disciplinary power. The content of each sub-domain is reported in Table A1. In the following we provide further details and we discuss the main element of novelty.

For **entry regulation**, the first sub-domain concerns exclusive rights (1.1). The ministerial decrees report the reserves of activities for each profession and set the reference price for each of them (either a fixed price or price range). For example, the ministerial decree regarding veterinarians sets the price of an examination of a cat or a dog at 30 euros; with regard to lawyers, the compensation is based on the value of the litigation. In the indicator, we have considered how many groups of similar activities are mentioned in the decrees (1.1.1) and, for each group of activities, we have estimated the value of the most common activities, based on the price set by the decree (1.1.2).[21] For education requirements (1.2), we consider the length of the university degree (1.2.1), whether an undergraduate degree of 3 years enables to register at the chamber (1.2.2),[22] whether the university programme which leads to pass the professional exam is free or with limited enrollment (1.2.3), the length of the compulsory practice (1.2.4). With regard to the professional exam, we have considered not only whether it exists or not but also – as a proxy of its difficulty and independence with respect to the local pressure of professional bodies – the number and types of tests it is composed of (1.3.1), the composition of the examining board (1.3.2), the national or local level of organization of the professional exam (1.3.3) and the pass rate (1.3.4).[23] With reference

[21]The ministerial decrees cover, for each profession, a number of groups of activities varying from two to twelve. In each group, different activities are listed and different value ranges are set. Let's consider the case of notaries. We identify five groups of activities (e.g. real estate deed, corporate deed, inheritances, etc.). For each group of activities, we consider different items. For example, as far as real estate sales are concerned, the compensation of the notary is parameterized with respect to the value range to which the sale belongs. Then, to build the value of the exclusive rights we proceed as follows. First, we select the most common activity within each group of activity. For real estate sales, we consider those in the value range 25,000-500,000 Euros. Second, we compute the compensation of the notary for the average sale in this bracket. Third, we replicate the exercise for other groups of activities. Finally, we get the simple average across the groups of activities as overall indicator of the values of the exclusive rights.

[22]This is a more accurate information than only the length of the university degree, as it allows to consider whether after three years it is possible to register at the chamber and, after that, how many years does the university degree last. People who register at the chamber after an undergraduate degree of 3 years are generally identified as "junior" professionals.

[23]These items have been added using the following assumptions. First, we assume that if the examining board is not composed of professionals the exam would be fairer and less subject to pressure by incumbents.

to chamber membership (1.4), we consider whether it is compulsory or not (1.4.1) – this provides little information, because for all professions such membership is compulsory – but also the costs related to the membership itself (1.4.2). We have calculated the latter for each profession as a mean of the cost of first-five-year membership using information drawn from the websites of the professional bodies in each region's capital.[24] We also include the extent of quantitative restrictions (1.5). Namely, we include not only the quotas for foreign professionals or firms (1.5.1) as done by the OECD, but also whether the running of the business by the professional is subject to quotas within the country (1.5.2), [25] and, if so, to what extent (1.5.3). The latter is measured as the number of inhabitants for each business activities as in some professional activities (notably for notaries and pharmacists) the entry in the market is parameterized to the population following a demographic criterion.

For **conduct regulation**, the first sub-domain is represented by the regulation on prices and fees (2.1). The answer to this question strictly follow the OECD structure. As far as regulation on advertising (2.2) and that on legal form of business (2.3) are concerned, we enrich the answers to have them more tailored to the Italian context. We notably distinguish, on the one hand, the different kinds of advertising (comparative, on the characteristics of the professional and services or on the professional) and, on the other hand, the different legal forms of business that have been introduced in the Italian law (sole proprietorship, partnerships, capital companies) and the existence of restrictions on shareholders for capital companies. The sub-domain of inter-professional cooperation (2.4) has the same questions and answers of the OECD indicator, based on the number of forms of inter-professional cooperation allowed. Finally, we added a novel sub-domain on the disciplinary power (2.5). As a proxy of the effectiveness of such power, failing data on disciplinary proceedings run and penalties imposed by the chambers, we consider whether such power exists and, if so, whether it is entrusted to a specific body, that is deemed more independent, or not.

Second, we assume that if there is a national examining board there is less risk of connections than in a local context. Third, a lower pass rate indicates higher difficulty to enter the profession (data drawn from CRESME).

[24] We consider the first-five-year average as for some professions the costs vary between the first and subsequent years. The average cost of membership varies from about 150 euros per year for social assistants to 1,500 euros per year for notaries

[25] This means that the running of the business is subject to a decision of the public authority (i.e. a license). We also consider whether such license can be inherited by the child of a professional or not.

Table A1: Coding of answers and weight of the indicator

		Coding of answers		TW	STW	QW
1.	**Entry**			1/2		
1.1.	*Exclusive rights*				1/5	
1.1.1	How many services does the profession provide under an exclusive right?	Number of reserved activities (*)	0-6			1/2
1.1.2.	What is the average value of the most common reserved activities?	Average value (*)	0-6			1/2
1.2.	*Education and training requirements*				1/5	
1.2.1.	What is the duration of the University degree?	Number of years	0-6			1/4
1.2.2.	Does an undergraduate degree (3 years) enable passing of the professional exam?	Yes	0			1/4
		No	6			
1.2.3.	Is access to University programme free or selective?	Percentage of Universities with entry restrictions (*)	0-6			1/4
1.2.4.	What is the length of compulsory practice / postgraduate education?	Number of years	0-6			1/4
1.3.	*Professional exam*				1/5	
1.3.1.	Which tests comprise the professional exam?	There are no professional exams	0			1/4
		One or more oral tests	1			
		A written test	2			
		A written test and an oral test	3			
		Two written tests and an oral test	4			
		Two written tests, an oral test and a practical test	5			
		Three or more written tests and a practical test	6			
1.3.2.	How is the examining board composed?	Mostly by non-professionals	0			1/4
		By members suggested by the chamber (also not professionals)	3			
		Mostly by professionals	6			
1.3.3.	Is the professional exam centralized or organized at local level?	Centralized	0			1/4
		Organized locally and evaluated by non-local examination boards	3			
		Entirely organized at the local level	6			
1.3.4.	What is the pass rate of the professional exam?	Percentage of candidates who pass the exam (*)	0-6			1/4
1.4.	*Compulsory chamber membership*				1/5	
1.4.1.	Is membership in a professional organization compulsory to legally practice?	No	0			1/2
		Yes	6			
1.4.2.	How much is the annual cost of the membership?	Average membership fee (*)	0-6			1/4
1.5.	*Quantitative restrictions*				1/5	
1.5.1.	Is the number of foreign professionals/firms restricted by quotas?	No	0			1/3
		Yes	6			
1.5.2.	Are quantitative restrictions on the number of businesses provided for?	No	0			1/3
		Yes	3			
		Yes with heritability of the business license	6			
1.5.3.	What is the extent of quantitative restrictions?	Strictness (*)	0-6			1/3

		Coding of answers		TW	STW	QW
2.	**Conduct**			1/2		
2.1.	*Prices and fees*				1/5	
2.1.1.	The charged fees or prices are regulated by the government or self-regulated?	No regulation	0			1
		Non-binding recommended prices for some services	1			
		Non-binding recommended prices for all services	2			
		Maximum prices for some services	3			
		Maximum prices for all services	4			
		Minimum prices for some services	5			
		Minimum prices for all services	6			
2.2.	*Advertising*				1/5	
2.2.1.	How is advertising and marketing of professional services regulated?	All kinds of advertising admitted	0			1
		Only advertising on professionals and services admitted	2			
		Only information on professionals admitted	4			
		Forbidden	6			
2.3.	*Form of business*				1/5	
2.3.1.	How is the legal form of business regulated?	Capital companies allowed with no restrictions on shareholders	0			1
		Capital companies allowed with restrictions on shareholders	2			
		Capital companies forbidden	4			
		Sole practitioners only	6			
2.4.	*Inter-professional cooperation*				1/5	
2.4.1.	How is inter-professional cooperation regulated?	All forms allowed	0			1
		Most forms allowed	2			
		Allowed between comparable professions	4			
		Generally forbidden	6			
2.5.	*Disciplinary power*				1/5	
2.5.1.	Is the chamber entitled with disciplinary power?	Yes, entrusted to a specific body	0			1
		Yes, entrusted to the chamber board	3			
		No	6			

TW = topic weight; STW = sub-topic weight; QW = question weight. (*) continuous values obtained normalizing each figure and letting the variable varies between 0 (minimum) and 6 (maximum).

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