# Top Civil Service: Meritocracy or Nepotism?*

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**Abstract**

We look into the potential existence of a "state nobility" in top civil service in Spain. With that aim we exploit the surname information of 21,000 members and 85,000 candidates for positions in the eleven main Corps of the Spanish Administration. We use a two-component linear mixture model to estimate the probability that a candidate is a relative of a Corps member. We show that (1) relatives are on average about 44 times more likely to apply for these positions than nonrelatives, constituting 20% of all candidates; (2) relatives are more likely to apply for exams including a practical test, as well as those containing more extensive study material; and (3) relatives perfom relatively better in oral tests than in anonymous multiple choice tests, but this difference is only marginally significant.

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*"but tell me, what verses are those which you have now in hand, and which your father tells me keep you somewhat restless and absorbed? If it be some gloss, I know something about glosses, and I should like to hear them; and if they are for a poetical tournament, contrive to carry off the second prize; for the first always goes by favour or personal standing, the second by simple justice; and so the third comes to be the second, and the first, reckoning in this way, will be third..."*[1]

*Miguel de Cervantes, Don Quijote de la Mancha, Volume II, Chapter XVIII (1615)*[2]

*"Professors' children are of higher quality [than other candidates] because their whole way of thinking is formed within the family" (Professor Giuseppe Nicòtina, father of the only candidate to a researcher position at Messina University, Italy)*

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# 1 Introduction

This paper deals with the selection of a society's elite; particularly the recruitment of top civil servants. In early societies, the aristocracy had the "right of blood" to privileged positions, including top civil service positions, and thus nobility determined the elite composition. With the advent of modern societies, though, elite education and evaluation systems were created as a way to replace a system based on aristocratic nepotism with a system where meritocracy would prevail. In that vein, in many countries in Europe, Latin America and Asia, top civil service positions are allocated through very competitive selection processes.[3]

In France, top civil servants must first study at one of the *grande écoles*, such as the prestigious Ecole Nationale d'Administration (ENA). A mere 5% of applicants to ENA are successful.[4] Among *énarques* (graduates of ENA) are two French presidents, six of the Country's last Prime Ministers, as well as a large bulk of France's top civil servants.[5] The omnipresence of *énarques* and Ecole Polytechnique graduates spills over into the private sector: firms run by CEOs who are graduates of these schools account for 12% of all firms traded on the Paris Stock Exchange, and for 65% in asset-weighted terms (Kramarz and Thesmar 2007).

In India, the elite Indian Administrative Service, which mostly runs India, numbers a mere 5,600.

[1] "Pero dígame vuesa merced: ¿qué versos son los que agora trae entre manos, que me ha dicho el señor su padre que le traen algo inquieto y pensativo? ... si es que son de justa literaria, procure vuestra merced llevar el segundo premio, que el primero siempre se lleva el favor o la gran calidad de la persona, el segundo se le lleva la mera justicia, y el tercero viene a ser segundo, y el primero, a esta cuenta, será el tercero..."

[2] "I figli dei docenti sono più bravi perché hanno tutta una *forma mentis* che si crea in famiglia"

[3] In France, Napoléon Bonaparte founded the Ecole Polytechnique in 1794 in line with the Revolution and the ideas of the Enlightenment. In Spain, a system of public examinations was established in the mid 19th century to grant access to judicial top civil service by Santiago Fernández Negrete, then Minister of Justice.

[4] In 2007 80 out of 1,588 applicants gained acceptance, including internal and external candidates (http://www.ena.eu/index.php?page=formation/initiale/concours/statistiques., retrieved May 1, 2008).

[5] Bourdieu (1998). While ENA was created to prevent nepotism, and in fact in 1950 29% of students were coming from working-class backgrounds, the figure has shrunk to 9% today (*The Guardian Education*, November 27, 2003).

Admission to the India Administrative Service is extremely hard: in 2008, 140 people will be recruited from around 200,000 applicants, that is, less than 1% will be admitted.[6]

In the case of Spain and some other civil law countries, recruitment into top positions in the public sector is determined by competitive examination following graduation in an undergraduate degree.[7] As shown in this paper, the average success rate for the best positions is 5%. Moreover, the exams require enormous preparation: on average it takes four years of full-time study to get a judge position; a notary position takes an average of eight years. Not only do top civil servants become a class of its own, the legitimacy obtained by passing a top public exam may help to land a top position in the government or in the private sector: around one third of state lawyers take a leave of absence in the public sector in order to take an executive position in the private sector.[8] Being a top civil servant constitutes a requirement for most top government positions: all undersecretary positions, all technical general secretary positions, and most director general positions must be allocated amongst individuals who passed one of these examinations.[9] Top civil servants often fill cabinet positions, and become political party leaders.[10]

Despite the fact that admission to all of these elite programs is highly competitive, it has been argued that those who gain access to these programs still display a strong hereditary component, constituting what Pierre Bourdieu has called a "state nobility". In France, Bourdieu (1998) argues that the proportion of ENA graduates who are themselves children of top civil servants is high and keeps increasing (for example, Valéry Giscard d'Estaing, former president of France and ENA graduate is the son of a top civil servant). There is little systematic research into the potential existence of a state nobility, presumably because it is difficult to know the extent of family ties between current top civil servants and candidates to positions in top civil service.

In this paper we develop a methodology that exploits surname information to look into the potential existence of a state nobility. We apply this methodology to top civil service in Spain. For this we use a unique database which contains information on the surnames of Spanish (1) current top civil servants, (2) applicants (both successful and unsuccessful) to top civil service positions from 1997 through 2007, and (3) the distribution of surnames across the Spanish population. Our database involves 69 public

[6] *The Economist*, March 6, 2008.

[7] An undergraduate degree in law is required for judicial occupations (judge, prosecutor, notary and registrar). An undergraduate degree in economics is required for more economics related occupations (state economist and tax inspector). Finally, information systems specialists positions require at least a BA degree.

[8] Authors' calculation based on the information provided by the *Escalafón de Abogados del Estado*, 2007.

José Isla, the CEO of possibly the best known Spanish company, Inditex (Zara), is a former state lawyer.

[9] These positions must be assigned to public servants that passed a type A exam, the type we analyze in this paper (*Ley 6/1997 de Organización y Funcionamiento de la Administración General del Estado, Exposición de motivos*, Part VIII)

[10] A few top civil servants end up in key positions in the goverment: around a third of all ministers serving in the last four terms of office (1996-2008) held top public sector positions (which they gained through success at a public exam) before landing important posts in the government. Interestingly, this figure is about the same for the last two right-wing governments and the last two left-wing governments. During the two Aznar terms of office, with elections in 1996 and 2000, ten out of 32 ministers had a top ci vil service background, while four were professors and 18 were either professionals (e.g., undergraduate degree in law, medical doctors) or were entrepreneurs. During the two Zapatero terms of office thus far, with elections in 2004 and 2008, these figures were respectively eight, 12, and eight.

Moreover, all of the leaders of the right-wing in modern Spain were top civil servants. Presidents of the *Partido Popular* (the main right-wing Spanish party, formerly called *Alianza Popular*) have been: Manuel Fraga Iribarne, *Letrado de las Cortes Generales* (Legal Advisor to the Spanish Parliament) and diplomat (1976-1986), Antonio Hernández Mancha, state lawyer (1987-1995), José María Aznar, tax inspector (1996-2004), and Mariano Rajoy, registrar (2004-present).

exams used to make appointments to the eleven main Corps of the Spanish Administration, involving approximately 85,000 candidates and over 21,000 corps members. The positions we consider are civil administrator, court secretary, diplomat, information systems specialist, judge, notary, prosecutor, registrar, state economist, state lawyer and tax inspector.[11] We find evidence that is consistent with the existence of a state nobility in the Spanish top civil service: candidates who are estimated to be relatives are on average 44 times more likely to apply for a position in the top civil service than candidates who are estimated to be nonrelatives, and they constitute about 20% of new members; they are also 26% more likely to pass a given exam than nonrelatives. We find a large heterogeneity across exams: for instance, relatives of information systems specialists are nine times more likely to apply than nonrelatives, while relatives of state economists are 130 times more likely to apply than nonrelatives.

Why do we observe a strong hereditary component in top civil service? On the one hand, one possibility is that relatives of current top civil servants have greater human capital, perhaps due to intergenerational transmission of human capital, including access to certain networks (Chevalier 2001), or because of differences in preferences.

On the other hand, another possibility is the existence of nepotism. Nepotism, understood as "favoritism (as in appointment to a job) based on kinship" could be generated in two ways.[12] First, a form of direct nepotism might be present if relatives are favored over equally good candidates. For example, selective US universities regularly employ policies that favor legacies in undergraduate admissions (Golden 2006). One recent study about admission patterns to 19 American top universities, including five Ivy League universities, finds that legacies have an admissions probability 20 points higher than nonlegacies for a given SAT score (Bowen et al 2005).[13] Similarly, despite the fact that public examinations are supposed to guarantee objectivity in evaluation, anecdotal evidence suggests that there is ample room for nepotism, or endogamic behavior, in Spain,[14] and in other countries.[15]

Our database allows us to investigate into the issue of direct nepotism. In particular, the existence of a number of exams including preliminary multiple choice tests provide us with a potential control for candidate quality. We find that candidates who are close relatives of current top civil servants tend

[11] The original names in Spanish of the Corps we consider are, respectively, *Cuerpo Superior de Administradores Civiles del Estado (TAC), Secretarios Judiciales, Carrera Diplomática, Cuerpo Superior de Sistemas y Tecnologías de la Información (TIC), Carrera Judicial, Notarios, Carrera Fiscal, Registradores, Economistas del Estado, Abogados del Estado, Inspectores de Hacienda.*

[12] Merriam-Webster Online Dictionary, 2008.

[13] According to *The Economist*, in the last US presidential election both candidates—George Bush and John Kerry—were "C" students who would have had little chance of getting into Yale if they had not come from Yale families. Al Gore and Bill Frist both got their sons into their alma maters (Harvard and Princeton respectively), despite their average academic performances (*The Economist*, September 21, 2006).

[14] Introducing the words *enchufe* (connexion) and *oposiciones* together (public examinations) in the Google search engine delivers over 20,000 results (February 3, 2008). In many cases these correspond to forum where candidates discuss their anecdotal impressions.

In the last state lawyer exam (April 2008), three candidates were accused of dishonest behavior and were disqualified in the last stage of the exam. They were suspicious of having gained access beforehand to the particular case to be discussed in the exam. Interestingly, one of the candidates is the daughter of a current state lawyer (http://www.cotizalia.com/foro/foro.asp?id=21017&sec=93, retrieved June 15, 2008).

[15] In Italy, where nepotism is extended, a recent TV program reported that in close to 40% of university clinics at the Politecnico di Bari, in southern Italy, the head's son gained a position at the clinic he heads, despite the fact that the position must be gained via public examination ("Baroni se nasci", *Annozero* TV program, RAI, broadcasted May 3, 2007).

to obtain marginally significantly higher grades in the oral tests than would be expected from their performance in the preliminary multiple choice test. While the material evaluated in the multiple choice tests and the oral tests is the same, given that oral skills and multiple choice test skills might differ, the possibility remains open that relatives are relatively better in the former.

Nevertheless, another, more indirect form of nepotism exists if the selection process is designed in such a way that certain candidates are more likey to get the position. In that line, Bourdieu argues that the methods of recruitment of *grandes écoles* (preparatory classes and entrance exams) are adjusted to the social provisions that are typical of the "upper class": entrance tests, presented as perfectly egalitarian in principle, are actually deeply unequal, as they reward the knowledge and skills of the *bourgeoisie*. While the existing modern "credential" system is typically thought of as fostering social mobility, Bourdieu argues that in reality it has tended to consecrate certain families in high powered positions across generations. This class would be the heir of the early *noblesse de robe*, which, in order to consolidate its position in relation to other forms of power, had to construct the modern state and the republican myths, meritocracy, and civil service that went along with it. This "state nobility" would have at its disposal an unprecedented range of powers and distinctive titles to justify its privilege. In the case we study here, it has been argued that the long time required to prepare entrance exams to the Spanish Corps of Administration may deter candidates from more humble social origins (Bagues 2005).

We explore the determinants of the self-selection of relatives into particular Corps and find that the proportion of relatives in exams is related to the characteristics of the selection process: relatives are relatively significantly more likely to apply to exams including a practical stage as well as exams containing more extensive study material. For instance, relatives of current state lawyers, a profession with allegedly the hardest, most extensive public examination, are 90 times more likely to take the exam than nonrelatives. Our estimates for the information systems specialist exam, with the shortest material to prepare, show that relatives are only nine times more likely to apply for positions. This is consistent with a form of indirect nepotism.

The paper is organized as follows. Section II describes the related literature. Section III offers background information on public examinations in Spain, and Section IV describes the data. Section V turns to the empirical analysis. Finally, Section VI discusses results and concludes.

## 2 Related literature

Our study can be connected to several strands of papers. First and foremost, our paper is related to a wide array of papers investigating intergenerational occupational mobility, such as Solon (1999) and Robertson and Symons (1990). Relatedly, our paper deals with the self-selection of workers into public sector positions, an issue that has been investigated in other contexts, such as Blank (1985), who analyzes US workers' choice between private and public employment. For the case of Spain, Prieto Rodríguez and Suárez Fernández (2006) use survey information regarding employment in the public sector in Spain and find that male workers whose father worked in the public sector as professional

are significantly more likely to be working as professionals or managers in the public sector.

Our paper also fits in a large body of literature providing empirical evidence which indicates that candidate characteristics matter for hiring. Evaluators could be discriminating against (or in favor of) a group of candidates for mainly two reasons. On the one hand, statistical models of discrimination argue that, in the presence of information asymmetries about the real productivity of workers, the group belonging of an individual can be considered a signal that provides additional information.[16] On the other hand, evaluators might exert taste discrimination; that is, they might have a preference for candidates from a particular group, regardless of their quality (Becker 1957).

The literature testing for discrimination has focused on a number of candidate characteristics, such as gender, race, and looks. Among papers testing for gender discrimination, Blank (1991) compares single-blind and double-blind reviewing of papers submitted to *The American Economic Review* and finds a small, insignificant effect, in that female authors fare better under double-blind reviewing. Goldin and Rouse (2000) find that the adoption of a screen in orchestras' hiring of musicians fosters impartiality in hiring and increases the proportion of women hired. Among papers dealing with potential race discrimination, Bertrand and Mullainathan (2004) perform a field experiment where they respond with fictitious resumes to help-wanted ads in Boston and Chicago newspapers. The authors assign each resume either a very African American sounding name or a very White sounding name, and find that the latter receive 50 percent more callbacks for interviews than the former. Daniel Hamermesh has, on the other hand, studied the impact of beauty on earnings in a number of papers (e.g., Hamermesh and Biddle 1994), and typically finds that better looking employees earn more and are more likely to be employed.

This paper is concerned with investigating another type of discrimination: discrimination on grounds of kinship. Here we investigate whether top civil service candidates with next of kin among top civil servants are more likely to be hired. Indeed, there exists a literature pointing towards the importance of family connections and nepotism in the labor market.[17] In many studies it is very difficult to rule out that differences in, say, earnings are due to differences in the average quality of groups. Thus it has been difficult to identify whether a group's higher earnings are due to higher productivity or due to discrimination by employers.[18] For instance, Lentz and Laband (1989) find that college graduates who are the children of medical doctors tend to enjoy a 10% greater probability of admission to medical school, conditional on a number of controls. However, Chevalier (2001) attributes the relatively higher earnings of British graduates with the same career choice as their parents to the intergenerational transmission of human capital.

Our paper can also be linked to a growing literature on the role of social networks in hiring in top positions in both the public and private spheres. Kramarz and Thesmar (2007) use a large database with information on French CEOs and nonexecutive directors and investigate the probability of being

[16] Groups of workers may differ in their expected productivity (Phelps 1972, Lazear and Rosen 1990) or in the reliability of the observable signals (Aigner and Cain 1977, Cornell and Welch 1996).

[17] The model in Goldberg (1982) explains the persistence of nepotism in competitive markets.

[18] Distinguishing between taste and statistical discrimination is a daunting task, because it requires information on future earnings: candidates who are discriminated positively under statistical discrimination would exhibit similar performance than other candidates in the observable dimensions, yet higher evaluations and future returns on such dimensions.

hired in a given firm when the individual and the firm's CEO belong to the same network. They find that this probability is larger for networks of former civil servants who graduated from either the Polytechnique or the ENA. Blanes i Vidal and Leaver (2006), on the other hand, explore the determinants of senior judicial appointments in England and Wales with data from 275 High Court judges. They find that controlling for experience and a range of judicial performance measures, High Court judges with a traditional background (those with either a private education, or a state education followed by Oxbridge and a leading London set) are associated with a two-fold increase in the odds of being chosen for promotion to the Court of Appeals by a given committee. Calvó-Armengol and Jackson (2005) explore the interaction of family and social networks in order to explain social mobility. Their model is based on a social structure that exhibits strong family persistence in human capital investments and resulting earnings across generations. Sylos Labini (2004) studies the importance of family networks in the labor market in Italy. In the case of public examinations we analyze here, kinship between a candidate and a current member of the Corps she applies to might be correlated with candidate quality if, for example, potential networking has either increased her knowledge about the profession or given her access to more qualified coaches.

Methologically speaking, our paper can be connected to a growing literature that, following Dempster et al. (1977) seminal paper, uses mixture models in order to deal with unobserved heterogeneity. Mixture models have been particularly used in dynamic discrete models (see Aguirregabiria and Mira (2008) for a survey). The use of mixture models has been stimulated by recent econometric developments that have improved the expectation maximization algorithms allowing to compute maximum likelihood estimates of these models (Arcidiacono and Jones 2003, Bonhomme and Robin 2007).

Finally, our paper is related to a recent but growing literature in economics that exploits surname information. For instance, Angelucci et al (2007) use household panel data from the Progresa social assistance program in rural Mexico to investigate how a household's behavior is influenced by the presence and characteristics of its extended family, as measured with surname information. There also exist a number of papers that use information on Spanish surnames in order to explore the potential existence of nepotism in public exams (Bagues 2005) and intergenerational mobility (Güell et al 2007, Collado et al 2007a,b).

# 3 Background

## 3.1 Public examinations

Nation-wide public exams are used as the method of selection to determine access to a variety of positions in the civil service in many countries in continental Europe, Asia and Latin America. In these countries success in the corresponding public examination is typically required in order to obtain a permanent position. In Spain, approximately 170,000 individuals prepare full-time for public examinations. Around two thirds of these candidates are university graduates.[19]

[19] Authors' calculation based on data from the Spanish Survey of Active Population (*Encuesta de Población Activa*), year 2005.

Public examinations are usually justified in the need for civil servants to master, not only general knowledge, but also very specific knowledge about, first, the State and the Public Administration, and second, the functioning of the particular Corps that candidates are applying for. In addition, public examinations are sometimes described as a system of recruiting which is open to anyone with the appropiate educational credentials and where, therefore, there is less room for discrimination (Mora and Ruiz-Castillo 2004) or as a "competitive system that allows to recruit the best candidates" (Parada 2000). [20]

## 3.2 Characteristics of the exams

In this paper we use information on the eleven main Corps of the Spanish top civil service. These Corps are ruled by different Ministries: the Ministry of Public Administration (civil administrators, information systems specialists), the Ministry of Justice (court secretaries, notaries, prosecutors, registrars, state lawyers), the Ministry of Finance (state economists, tax inspectors), the Ministry of Foreign Affairs (diplomats), and the General Council of Judicial Power (judges). Civil servants in all these positions earn salaries that are fixed by law and very similar across Corps.[21]

The exams to all of these positions are called "type A" exams and are held every one or two years. Applicants must hold a BA degree or an equivalent degree, but there is some variability in the fields required by different Corps:[22] candidates to judicial exams must have a law degree, while candidates to state economist and tax inspector positions must have an economics degree. Candidates to civil administrator, diplomat and information systems specialist positions must have at least a BA degree.

In Table 1 we present information on the characteristics of the exams we study. Exams are composed of several qualifying stages; in each stage candidates are evaluated on a set of topics. For most of the tests in these exams (oral and written), candidates are expected to memorize thousands of pages of law articles and then *regurgitate* them during the examination. A random lottery decides which topics a candidate must answer. Some examinations include a practical stage, often in written format; however even in the latter cases the evaluation is not anonymous because the written test must be read by the candidate in front of the committee.[23]

In a few cases, some anonymous tests in the form of preliminary multiple choice tests have been used (Table 1). In particular, a preliminary qualifying multiple choice test is used in the exam to the information systems Corps, in the judge and prosecutor exam (since 2003), and in the court secretary

[20] Spanish writer Paco Umbral ironically also argues in favor of public examinations on the grounds that "thanks to traditional public examinations, courtship used to last for longer and families were established later in life. That way, families had less time to pray united and remain united until death did them part due to a heart attack" (*El País*, February 11, 1978).

[21] The case of notaries is slightly different. The prices of services provided by notaries are fixed by law, but their total income depends on how many documents they sell.

[22] *Ley 30/1984 de Reforma de la Función Pública* (August 2, 1984).

[23] In the exams analyzed here, there is at least one written test in all of the exams except for the judge and prosecutor and court secretary exams. During a written test, a candidate was first given several hours to write her answers, and was then required to read them in front of the committee. During the reading stage, a public clerk kept a copy of the original test to make sure that the candidate would not change the written version while reading it.

The only exception to this rule is the first and second exams to tax inspector.

exam (since 2006). In contrast, there used to be a multiple choice test in the diplomat examination but has not been included since 2004.

Exams also differ in the amount of material covered. We measure the difficulty or length of preparation with the number of topics that applicants have to prepare (Table 1). The exam with the highest number of topics, 485, is the state lawyer exam. Similarly, the notary and the registrar exams have close to 400 topics as due material. In contrast, the information systems exam is the one with the least material (120 topics), followed by the exams to civil administrator positions (160) and state economist positions (180). Given that the structure of the exams is in many ways similar across exams, the number of topics can be a good measure of exam difficulty.

### 3.3 Committee composition

Committees are formed by between seven and ten members. The number of members is the same for every committee within a given exam but can vary slightly over time or across positions. Members are appointed according to rules specifying their Corps of origin and their qualification. Each committee is composed of, first, members of the Corps that offers the position in question; second, members of some other, related Corps of the Administration (e.g. notaries sit in the committees for registrar positions and viceversa, civil administrators sit in committees for information systems positions); finally, external members (e.g., professors, private sector lawyers). Members of the Corps that organizes the exam never make up more than half of the committee. Detailed information regarding the rules on committee composition of each exam are displayed in Table 2.

While committee members must resign if a candidate with whom they share close family ties is assigned to their committee, it is possible that a candidate is a relative of a Corps member not serving in the candidate's evaluation committee. In this paper we want to consider that, while a Corps member is not sitting in the committee evaluating her relative, one of her colleagues may be.[24]

## 4 Data

In this paper we use surname information in order to estimate kinship between current top civil servants and candidates to becoming top civil servants. For this we use data from top civil servants, from candidates, and from the Spanish population at large.

[24] There are two requirements for applicants: first, they must have Spanish citizenship. Second, they must have at least a BA degree. We do not have the list of Spanish graduates, therefore we are jointly estimating the probability that someone is a graduate and is taking the exam (for the former is condition for the latter). We cannot thus rule out that relatives are relatively abundant in these exams because they are more likely to hold a BA degree.

## 4.1 Spanish population

We have obtained information about the distribution of surnames in the Spanish population across provinces from the *Instituto Nacional de Estadística* (henceforth, INE). For the sake of illustration, Figure 1 depicts the distribution of the Spanish population according to the frequency of surnames, where we classify individuals into five groups from lower to higher frequency of their surname in the Spanish population: those with surnames held by (i) between one and 99 individuals, (ii) between 100 and 999 individuals, (iii) between 1000 and 9999 individuals, (iv) between 10000 and 999999, (v) at least one million people.

About 6% of individuals are in the group of very infrequent surnames (fewer than 100 individuals), and about 12% of individuals hold a surname held by between 100 and 999 people in Spain. Close to 70% of candidates are in the one of the first four groups, meaning that their surnames' can be found in fewer than 100,000 of the Spanish.

## 4.2 Top civil servants

In Table 3 (row one) we display information on the number of civil servants by Corps in 1997. These Corps vary greatly in terms of size: some Corps are very large and thus offer many positions, while others are relatively small. The judge and prosecutor Corps constitute two different Corps, but the exam to judge and prosecutor positions has been the same for both types of positions since 2001, so we consider both Corps together. The two Corps together are relatively large, with over 6000 Corps members. Another Corps that is relatively large is that of court secretaries, with close to 3000 of them. In contrast, there are only about 500 state economists and state lawyers, approximately 700 information systems specialists and diplomats, and about 800 registrars. In the middle of the spectrum, there exist about 1500 civil administrators, 2000 notaries, and about 2500 tax inspectors.[25]

The information about Corps members includes their surnames and firstnames. In Spain it is practically always possible to tell a person's gender by their firstname, hence we have information on the gender of civil servants. We also have information on their date of birth.

## 4.3 Candidates

Our database contains information on approximately 85,000 candidates who applied to positions in one of the Corps listed above within the last ten years.[26] Availability according to exam is shown in Table 4.

Lists of candidates are publicly available from the respective Ministries and provide us with information about candidates. First, their firstname. In Spain, it is practically always possible to tell a person's

[25] The total number of Corps members has been calculated using the rankings from the year before the first exam for which data are available.

[26] The judge and prosecutor exams were separate until the year 2001 (and thus we effectively have data on ten exams). Since then there has been a unique exam covering both judge and prosecutor positions.

gender by their firstname, so we have information on the gender of candidates. Second, their surnames. The Spanish use two surnames: the first is inherited from the father's paternal lineage, and the second from the mother's paternal lineage. Both surnames are published in the lists. Since we have information on the full names of members of the Corps at the time of the exam, we can check if they are connected to candidates through their surnames. Additionally, we can track candidates over time and so have a measure of their experience.

Figure 1 also displays the distribution of candidates in our sample. About 40% of them share a surname with fewer than 10,000 people. In particular, about 6% of individuals are in the group of very infrequent surnames (fewer than 100 individuals), and about 12% of individuals hold a surname held by between 100 and 999 people in Spain.

Table 5 shows other descriptive statistics for candidates. Men are, on average, 35% of all candidates. The probability of success in these exams is low, typically about 5% per year, and failing candidates tend to retake the exam. Almost 30% of candidates in public examinations are taking the exam for the first time, and about half of the candidates are taking the exam for at least the third time, the figure is over a third for those taking it at least for the fourth time. For registrar and notary candidates, for whom the exam is every two years, this means at least eight years of preparation.

# 5 Empirical analysis

Our empirical analysis is structured as follows. First we exploit surname information to estimate the probability that, conditional on her surname, a candidate to a public examination is a relative of a top civil servant. In order to do this we estimate a two-component linear mixture model, where relatives are one component and nonrelatives are the other component. Once we have estimated the probability that candidates are relatives, we check whether candidates who are more likely to be relatives are more likely to apply. Relatedly, we investigate which exams are relatives disproportionally applying to: what are their characteristics? Then we estimate whether relatives are more likely to pass an exam.

## 5.1 Kinship

Candidates to top civil service positions do not report whether they have close relatives among top civil servants. For this reason, in this section we propose a methodology that, exploiting surname information, calculates a measure of kinship, or more exactly, of the probability that the candidate's father/mother or aunt/uncle belongs to the top civil service. Our strategy relies on infrequent surnames. A crude application of the general idea was already applied by Bagues (2005), who exploits the fact that hyphenated double-barrelled surnames are very infrequent in Spain in order to identify potential kinship between two individuals. Indeed, and as pointed out by Güell et al (2007), surnames provide information about kinship because their distribution tends to be very skewed, and thus a large percentage of the population is bound to have an infrequent surname. As shown by Figure 1,

over 40% of the Spanish population share a surname with fewer than 10,000 other people. Relatively infrequent surnames make it possible to identify potential kinship.

Given the potential self-selection of relatives into applicants, the solution to this problem is nontrivial. For the sake of illustration, if we randomly meet with an individual named Bagues, there is only 1/400 possibilities that he is the brother of Manuel Bagues (Manuel Bagues only has one sibling, while there are about 400 Bagues in the world). However, if we find an individual named Bagues among the list of applicants to, let's say, lecturing positions at Universidad Carlos III, the probability that the applicant is Manuel Bagues's brother is probably larger.

### 5.1.1 A linear mixture model

Our problem can be summarized as follows. We observe a list of candidates (characterized by their surnames). Suppose that we also observe the populations out of which the sample of candidates was drawn, that is, that we observe both the list of relatives in the population, and the list of nonrelatives. That is, for every surname $s$ we can observe $x_s^e$, i.e., how many people with this surname took exam $e$, as well as how many people in the population with that surname belong to the set of relatives of top civil servants, $n_s^R$, and how many people belong to the set of nonrelatives [of top civil servants], $n_s^N$.

Let us first assume that the number of individuals with surname $s$ in group $m$ taking exam $e$ follows a binomial distribution, $X \tilde{} B(n_s^m, \lambda_s^{m,e})$, where $m \in \{R, \overline{R}\}$, $R$ denotes relatives and $\overline{R}$ denotes nonrelatives, and $\lambda_s^{m,e}$ is the probability that a candidate in group $m$ takes exam $e$. For example, let us consider the surname Bagues. We assume that the number of candidates with surname Bagues and with a close relative being a civil servant follows a binomial distribution defined by the following parameters: the number of Bagues who have a top civil servant relative, and the probability that a Bagues relative takes the registrar exam.[27] The same applies for the distribution of applicants that have no relative who is a top civil servant and whose surname is Bagues.

Our first identification assumption is that the probability of taking the exam within each group is surname independent:

$$\forall s,\ \lambda_s^{m,e} = \lambda^{m,e},\ \text{where } m \in \{R, \overline{R}\}$$

In other words, we are assuming that the probability that a candidate in group $m$ takes exam $e$ is the same for all candidates in that group, regardless of their particular surnames. In terms of our example, if there are two Corps members, one Fernandez and one Bagues, we assume that the probability that a relative of Fernandez takes the registrar exam is the same as the probability that a relative of Bagues takes the registrar exam.

[27] If there are $n_s^m$ individuals in component $m$ with surname $s$, the probability that exactly $x$ of them take exam $e$ is given by the following probability mass function:

$$\Pr(X = x_s) = \binom{n_s^m}{x_s} (\lambda_s^{m,e})^{x_s} (1 - \lambda_s^{m,e})^{(n_s^m - x_s)}$$

Next we want to model the likehood of applying for positions in top civil service. Our model needs to consider that applicants can be split into two groups: relatives of current members, and nonrelatives. That is, if our candidate list includes candidates named Bagues, we want to know how likely it is that these candidates are relatives of Bagues; in other words, if there are Bagues candidates in our list, we would like to know how many of them are relatives, and how many of them are nonrelatives. This amounts to specifying a two-component mixture model, where one component is relatives, and the other component is nonrelatives. Furthermore we are going to specify a mixture model of linear form. Assuming a linear model means assuming that the probability that a Bagues who is a relative applies for a position is independent from the probability that a Bagues who is not a relative applies for a position. While a nonlinear form could also be used, the computational difficulties associated with this strategy deter us at this point from using it.

The set of candidates taking exam $e$ who share a common surname $s$ can be therefore characterized by the following two-component linear mixture model:

$$p(x_s^e|\Theta) = \alpha_R B(x_s|n_s^R, \lambda^{R,e}) + (1-\alpha_R)B(x_s|n_s^{\overline{R}}, \lambda^{\overline{R},e}) \tag{1}$$

where $\alpha_R$ is our mixing coefficient, $x_s$ is the number of times that we observe a given surname (for instance, Bagues) in our candidate list.

If $n_s^R$ and $n_s^{\overline{R}}$ are observable, the particular parameter matrix to be estimated is $\Theta = (\alpha_R; \lambda^R, \lambda^{\overline{R}})$.

Using maximum likelihood estimation it is possible to find the values for these parameters that maximize the likelihood of observing our data. However, given the difficulty to directly estimate the parameters following standard optimization procedures, mixtures models are typically estimated using expectation-maximization (EM) algorithm, which is an iterative process with two stages.[28] First, the expectation stage allows to calculate, for some guess of the true values of the parameters $[\Theta^g]$, the posterior probability that a given individual belongs to a certain group. In particular, it follows from Bayes' theorem that $p(R|x_s, n_s^R, n_s^{\overline{R}}, \Theta^g)$ and $p(\overline{R}|x_s, n_s^R, n_s^{\overline{R}}, \Theta^g)$, the probability that a candidate is a relative and a nonrelative respectively, given her surname and our guess for the parameter vector, are calculated as:

$$p(R|x_s, n_s^R, n_s^{\overline{R}}, \Theta^g) = \begin{cases} 0 \text{ whenever } n_s^R = 0 \text{ and } x_s > 0 \\ \frac{\alpha_R B(x_s|n_s^R, \lambda^{Rg})}{\alpha_R B(x_s|n_s^R, \lambda^{Rg}) + (1-\alpha_R)B(x_s|n_s^{\overline{R}}, \lambda^{\overline{R}g})} \text{ otherwise} \end{cases} \tag{2}$$

$$p(\overline{R}|x_s, n_s^R, n_s^{\overline{R}}, \Theta^g) = \begin{cases} 0 \text{ whenever } n_s^{\overline{R}} = 0 \text{ and } x_s > 0 \\ \frac{(1-\alpha_R)B(x_s|n_s^{\overline{R}}, \lambda^{\overline{R}g})}{(1-\alpha_R)B(x_s|n_s^{\overline{R}}, \lambda^{\overline{R}g}) + \alpha_R B(x_s|n_s^R, \lambda^{Rg})} \text{ otherwise} \end{cases}$$

Second, in the maximization stage, using these posterior probabilities we can calculate the values of the parameters that maximize the probability of observing the data. In particular, using equation (2) it follows that if one maximizes the sample log-likelihood, $L(\Theta) \equiv \sum_{s \in S} \ln(\alpha_R B(x_s|n_s^R, \lambda^R) + (1 -$

[28] Dempster et al (1977), Redner and Walker (1984), Bilmes (1998).

$\alpha_R)B(x_s|n_s^{\overline{R}}, \lambda^{\overline{R}}))$, the maximum likelihood estimate of $\alpha_R$ is given by[29]

$$\alpha_R = \frac{1}{N_s}\sum_{s\in S} p(R|x_s, n_s^R, \Theta^g) \tag{3}$$

so that

$$\lambda^R = \frac{\sum_{s\in S} x_s \cdot p(R|x_s, n_s^R, n_s^{\overline{R}}, \Theta^g)}{\sum_{s\in S} n_s^R \cdot p(R|x_s, n_s^R, n_s^{\overline{R}}, \Theta^g)} \text{ and } \lambda^{\overline{R}} = \frac{\sum_{s\in S} x_s \cdot p(\overline{R}|x_s, n_s^R, n_s^{\overline{R}}, \Theta^g)}{\sum_{s\in S} n_s^{\overline{R}} \cdot p(\overline{R}|x_s, n_s^R, n_s^{\overline{R}}, \Theta^g)} \tag{4}$$

where $N_s$ is the number of surnames.

### 5.1.2 Degree of kinship

Equation (2) defines the general expression for our measure of kinship. In order to derive this, and as explained above, three pieces of information are needed: (1) the number of candidates with a certain surname, which we readily observe, (2) the number of Corps members' relatives with a certain surname in the population, and (3) the number of individuals in the population with a certain surname and no relatives in the Corps. Here we explain how we construct lists (2) and (3) in order to estimate equation (2).

First of all we define the set of potential candidates. We do not know the percentage of the population holding an undergraduate degree, so we take as the population of potential candidates the whole Spanish population which, according to their age, could potentially apply for the position. Applicants typically start applying shortly after they graduate from university, when they are around 25 years old. Using census demographic information from INE we know that around 16% of the Spanish population now was 25 at some point during the period we consider. That is, if there are around 400 people nowadays whose surname is Bagues, one would expect that around 67 of them were 25 at some point between 1997 and 2007.

Then, for every surname, we must determine how many relatives of current Corps members exist within the potential population of candidates. For the purpose of investigating the existence of a state nobility in top civil service, there could exist a number of possible definitions of kinship that could be considered. A restrictive one would be only children.[30] Here, since we observe both paternal and maternal surnames and given their potential importance for family ties, we consider not only children but also nephews and nieces.[31]

We identify relatives and nonrelatives by comparing candidates' surnames with those of Corps mem-

[29] Bilmes (1998), p.7.

[30] Countries where only one (mostly the paternal) surname is used, such definition would be the only operative one—identifying nephews and nieces requires information on the maternal surname.

Given that the Spanish use both the paternal and the maternal surname, we have information on potential children, nephews and nieces of female Corps members, and potential nephews and nieces of male Corps members. Additionally, since women do not change surnames at the time of marriage, we do not have the problem of candidates who take their husbands' names.

[31] Ethymologically the word nepotism actually originates from *nepotes*, Latin for nephew. The origin has been attributed to the fact that, in the middle ages, bishops were sometimes accused of favoring their nephews.

bers. As explained before, the Spanish use two surnames: the first is inherited from the father's paternal lineage, and the second from the mother's paternal lineage. That means that male Corps members' children will inherit their fathers' surname as first surname, while female Corps members' children will inherit their mothers' surname as second surname.

As shown in Figures 2 in 3, we can calculate a measure of kinship by comparing the surnames of male and female Corps members respectively and the surnames of candidates. Using census demographic information from INE, we calculate that, at the time candidates in our database were born, the average number of children per couple was three (see the Appendix for derivations using demographic information with the cohorts of interest). Given this, in expected terms, each male Corps member has three children and three nephews or nieces who share his paternal surname, and each female Corps member has three nephews or nieces who share her paternal surname. Therefore, on the one hand, for every male Corps member we should expect to find six relatives with his paternal surname, and for every female Corps member we should expect to find three relatives with her paternal surname. On the other hand, for every male Corps member there are three nephews or nieces whose maternal surname is the same as the Corps member's paternal surname, and for every female Corps member there are three children and three nephews or nieces whose maternal surname coincides with the Corps member's paternal surname. Based on this, we can estimate the number of candidates' close relatives in Corps.

However, based on their age, not all current Corps members might be close relatives of candidates in our database. Given that our candidates took the exam within the last ten years, and that candidates could be as young as 23 years of age but are usually not much older than 30 (Bagues 2005, Bagues and Esteve-Volart 2007b),[32] we can restrict Corps members in our analysis to those born before 1960.[33]

In Table 3 we show the number of Corps members (first row), the number of Corps members who were born before 1960 (and thus are relevant to our analysis) (second row), and the number of male Corps members born before 1960 (third row). The numbers vary by Corps, state economists being the smallest Corps, court secretaries being the largest Corps. In aggregate terms (first column), about two thirds of the current Corps members were born before 1960 and thus are potential relatives of candidates in our database. The set of female Corps members older than 40 years of age is very small, as women were banned by law from holding positions in the Public Administration, and it was not until the advent of democracy in the late 1970s that females irrupted into the these positions in significant numbers.[34] In general the share of women amongst Corps members born before 1960 is very low, however this varies greatly, ranging between 1.5% (state lawyer) and 45% (court secretary).

Next we construct (2) and (3) using three pieces of information: the distribution of surnames across Corps members for every Corps, the distribution of surnames in the Spanish population, and the

[32] For most of the exams in our database, a BA in either law or economics is required. Youngest graduates are 22 years of age, and it would take at least one year to prepare for an exam.

[33] While it is theoretically possible that a candidate is a sibling of a Corps member, the age gap makes this unlikely. It is also possible that some Corps members born before 1960 have had a grandchild applying for positions between 1997 and 2007. In particular, a Corps member born, say, in 1936 would be 70 in 2006 and thus could have a 23-year-old grandchild who is taking an exam in 2006, but that would require all generations involved to have children very early in their life. Therefore it is unlikely that our measure of kinship captures many grandchildren.

[34] *Ley de Funcionarios Civiles del Estado*, Decreto 315/1964.
Bagues and Esteve-Volart (2007a).

Spanish population by age.

First we create two variables that capture coincidence of surnames between candidates and Corps members of the ages of interest.

The first variable, $surname(1,1)$, is the probability that a candidate is the relative of a Corps member and both have the same paternal surname. In this calculation we use as inputs $n^R$ and $n^{\overline{R}}$ which are in this case as follows. We calculate $n^R$ as the number of male Corps members who are old enough to have children who might have applied to positions during our period, multiplied by six (three children of his own, plus three nephews or nieces on his brother's side), plus the number of female Corps members who are old enough to have children who might have applied to positions during our period multiplied by three (three nephews or nieces on her brother's side). The number of Corps members' nonrelatives, $n^{\overline{R}}$, is then calculated as the difference between the total population who could have been candidates those years according to their age, and the number of relatives, $n^R$. Given our calculations for the number of relatives and nonrelatives, $surname(1,1)$ can then be found along the lines in equation (2).

The second variable, $surname(2,1)$, is the probability that a candidate is a relative of a Corps member whose paternal surname coincides with the candidate's maternal surname. Here we calculate $n^R$ as the number of male Corps members who are old enough to have children who might have applied to positions during our period, multiplied by three (nephews or nieces via his sister), plus the number of female Corps members who are old enough to have children who might have applied to positions during our period, multiplied by six (three children of her own, plus three nephews or nieces on her sister's side). The number of Corps members' nonrelatives, $n^{\overline{R}}$, is then calculated as the difference between the total population who could have been candidates those years according to their age, and the number of relatives, $n^R$. Given our calculations for the number of relatives and nonrelatives, $surname(2,1)$ can then be found according to equation (2).

Table 6 displays the estimated parameters for our mixture model, and Table 7 displays descriptive statistics for our *surname* variables.

**Kinship measures** While the two surname measures defined above are useful for our calculations, we now want to create a unique measure of kinship that captures whether a candidate is a close relative of a Corps member. Therefore from now on we define a measure of *kinship* that compares the paternal (for $surname(1,1)$) and maternal (for $surname(2,1)$) surname of candidates with the paternal surname of Corps members.

We consider three different forms of *kinship* as follows: (1) $kinship^p$ compares the paternal and maternal surname of candidates with the paternal surname of Corps members who are in the Corps of the candidate's application;[35] (2) $kinship^c$ compares the paternal and maternal surname of candidates with the paternal surname of Corps members who are in the same Corps as committee members; (3)

[35] In all exams but one, the Corps of application coincided with the committee president's Corps: in the case of the court secretary exam, the committee president must be a judge, not a court secretary itself (see Table A1 for details on committee composition rules).

$kinship^n$ compares the paternal and maternal surname of candidates with the paternal surname of Corps members who are in the Corps that are not represented in the committee.

In Table 8 we display descriptive statistics for our *kinship* measures by Corps. Each panel in the table displays statistics according to type of kinship as described above (with the committee's president Corps (A), with another committee member's Corps (B), with a member in a Corps not in the committee (C), and a measure that considers any of those types of kinship (D)).

In row one in each panel we display kinship among potential candidates, which we calculate as the set of relatives, divided by the set of potential candidates (those individuals in the Spanish population who were born between 1974 and 1983, that is 7,293,172 individuals).[36] Kinship among potential candidates is typically very low, usually less than 1%, unless we are considering any type of kinship (panel D): there is 1.4% of relatives of Corps members in the Spanish population of the age of interest.

## 5.2 Are relatives more likely to apply?

A state nobility might exist if certain families perpetuate themselves in elite positions. A first step in investigating whether this is the case in top civil service positions is to find out whether members from certain families are more likely to apply for these positions than nonrelatives. Here we would like to ask whether, for instance, close relatives of notaries are more likely to apply for e.g. notary positions.

We estimate the share of relatives among candidates using the kinship measures calculated using the mixture model as described above and present results in the second row of Table 8. Kinship among candidates when considering kinship with a member of the Corps of application is naturally lower than kinship with a member of any of the Corps represented in the committee (panel B), or kinship with a member of a Corps not represented (panel C); all of the three add up to kinship with any Corps member (panel D). On average, 3.2% of candidates are estimated to be relatives of a member in the committee president's Corps, 5.9% of candidates are estimated to be relatives of a Corps member whose Corps is in the committee, and 10.3% of candidates are estimated to be relatives of Corps members in other Corps (this makes sense as there are only a few Corps represented in an evaluation committee; for information on committee composition see Table 2). There exists some variabilty across Corps: about 7% of candidates to notary positions are relatives of notaries; but only about 0.6% of candidates to information systems positions are relatives of information systems Corps members (panel A). Over 16% of applicants to state lawyer and registrar positions are relatives of Corps members represented in their committees, while only 0.3% of candidates to judge and prosecutor positions are (panel B). The share of relatives with any Corps member among candidates (panel D) shows great variability: about 36% of candidates to state economist and state lawyer positions are relatives of some Corps member; this number is about 2.5% for candidates to court secretary and judge and prosecutor positions.

In row four in Table 8 we calculate how many more relatives are taking the exam than would be

[36] This calculation takes into account those individuals who would have taken their exam for the first time (at 23 years of age).

expected according to their presence in the population, we call this figure *premium exam*; it is calculated as the share of relatives among candidates (row two) divided by the share of relatives among potential candidates (row one). This figure is strikingly high when looking at kinship with the Corps of application (panel A): on average, relatives are taking the exam over 40 times more than we would expect according to their presence in the population—again there is large variability, with this figure ranging from 9.3 for information systems applicants to 131 for state economist applicants. The premium exam according to kinship with Corps members represented in the committee is also high on average (about 24), but lower than with kinship with the Corps of application. The state economist exam displays the highest premium exam for this type of kinship (119); the lowest figures are for the judge and prosecutor, court secretary, and information systems exams, all with less than ten).

In sum, individuals who are relatives of Corps members represented in the committees evaluating them are more likely to be taking an exam than nonrelatives. However, in some exams, like the information systems exam, this difference is relatively low, while in some exams, like the state economist exam, it is very large. We shall exploit this variability later in order to examine which exam characteristics are associated with more relatives among candidates.

### 5.3 Which exams attract more relatives?

Next we exploit the variability in exam characteristics to investigate the determinants of relatives applying to become civil servants. In particular, the exams that we study here are different in three main respects.

First, some exams contain (or have contained at some point over the period we study here) an anonymous test in one of the stages (this is the case of exams to positions as court secretary, diplomat, information technology, and judge and prosecutor; Table 1). It is possible that relatives are less likely than nonrelatives to apply to exams with anonymous testing. The multiple choice test constitutes the first stage in these exams and thus can be considered a preliminary stage.

Second, some exams contain a practical stage (Table 1). As opposed to the more theoretical tests (oral, multiple choice), these exams are not based on memorizing and regurgigating information, but rather involve another sort of preparation, which relies more on coaching. Indeed, there are many professional coaches preparing candidates to ntary exams, for instance, where one of three stages is a practical case. In that vein, it is possible that relatives have relatively better access to good coaching and therefore are better prepared for practical tests.

Third, exams differ in the amount of material covered. It has been argued that public examinations are a system skewed towards the wealthy because of the length of preparation: candidates to the judge exam must learn by heart about 4,000 pages of legislation. On average it takes four years of full-time study to get a judge position; the figure is eight years for a notary position (Bagues and Esteve-Volart 2007b). Given that top civil servants are relatively well paid, one can expect that relatives might come from better off families and so be more likely to apply for exams that take longer to prepare than nonrelatives. Similarly, if relatives are more confident in their success in harder exams, perhaps

because they have better access to coaches or because they are able to do more networking, that could also imply that they are more likely to apply.

Now we use exam-level data in order to explore whether these characteristics have an effect on the share of relatives taking an exam. We run the following regression:

$$premium\ exam_e = \beta\ anonymous_e + \delta\ practical_e + \lambda\ topics_e + \varepsilon_e \tag{5}$$

where $e$ denotes an exam (i.e., "public exam for judge positions held in 1995"), *premium exam* is calculated as the share of relatives among candidates divided by the share of relatives among potential candidates, *anonymous* is a dummy variable equal to one in the case that exam $e$ contains an anonymous (multiple choice) test, *practical* is a dummy variable equal to one in the case that exam $e$ contains a practical test, and *topics* denotes the number of topics in the material for exam $e$.

We run a different regression for each type of kinship and show results in Table 9. Results are quite similar across the four columns. In general, whether an exam contains a multiple choice tests does not significantly matter for relatives' self selection. However, in all columns we find that relatives tend to apply significantly more to exams that contain a practical stage. Finally, relatives tend to apply significantly more to exams that take longer to prepare, as measured by the number of topics in the material.

## 5.4 Are relatives more likely to succeed?

In this subsection we want to test the hypothesis that relatives of Corps members are more likely to pass a public examination than nonrelatives. For this we run probit regressions following the specification:

$$y_{ie} = \alpha_e + \beta\ surname(1,1)^j_{ie} + \beta\ surname(2,1)^j_{ie} + \delta\ frequency_i + \varepsilon_{ie} \tag{6}$$

where $y_{ie}$ equals one if candidate $i$ passed exam $e$, and zero otherwise and for $j = \{p, c, n\}$.

Table 10 displays results from estimating regression (6). In column (1) we only include kinship calculated with respect to the president's Corps. An increase of one percent in the probability of being a relative increases in about four percent the probability of passing an exam—which is equivalent to 60% of the predicted probability to pass. This effect is significant at the one percent level for the first variable and at the five percent level for the second variable respectively. As expected, candidates whose surnames are more frequent have significantly less chances to pass the exam. In column (2) we add our two kinship variables with respect to the Corps in the committee; again our president kinship variables are significant but the two committee variables are not. In column (3), similarly kinship with respect to other Corps not represented in the committee does not matter.

In Table 11 we present results of running regression (6) for every exam separately, now with a measure of kinship that integrates both $surname(1,1)$ and $surname(2,1)$ as explained before. The effect is estimated to be positive in most exams (except for the court secretary and prosecutor exams), while

relatively large and statistically significant for three of them: the diplomat, judge, and notary exams. In the case of the judge exam, an increase in one percent in the probability to be a relative is associated with an increase in 9% in the probability to pass, that is 180% increase on the predicted probability. While the effect is not much different for most of the exams, the available samples are not big in many cases.

### 5.4.1 Robustness checks

**Looking at Corps members' maternal surnames** As can be seen from Figures 2 and 3, Corps members do not transfer their maternal surnames, neither female nor male: in the Figure, S2, the Corps members' maternal surname, does not coincide with their children's, nieces's, or nephews's surnames. Thus, candidates whose surname (either paternal or maternal) coincides with Corps members' maternal surnames do not share a close kinship with them; they could at most be distant cousins. We then create the following measures for robustnes checks: $surname(1,2)$ calculates the probability that the candidate's paternal surname and the Corps member's maternal surname are the same; $surname(2,2)$ calculates the analogous measure by looking at candidates' maternal surnames. Therefore we now run:

$$y_{ie} = \alpha_e + \beta\ surname(1,1)^j_{ie} + \beta\ surname(2,1)^j_{ie} + \beta\ surname(1,2)^j_{ie} + \beta\ surname(2,2)^j_{ie} + \delta\ frequency_i + \varepsilon_{ie} \tag{7}$$

where $y_{ie}$ equals one if candidate $i$ passed exam $e$, and zero otherwise, for $j = \{p, c, n\}$.

Results are presented in column (4) in Table 10. As expected, these variables do not matter for passing an exam for any sort of kinship considered.

**Other controls** In column (5) in Table 10 we include gender and experience controls: whether the candidate has taken the exam once before, twice before, and thrice before. Despite the controls and having only half of the previous sample, the estimated effect of kinship is exactly the same as in column (1). Additionally, male candidates are more likely to pass an exam, and having one or two years of experience increases the probability to pass the exam. This is in line with results in Bagues and Esteve-Volart (2007b).

**Uncommon surnames** In column (6) in Table 10 we run regression (7) with only uncommon surnames. We include candidates whose surname is shared by less than the median, that is shared by less than approximately 25,000 individuals in Spain. The magnitude of the estimated coefficients for our variables of kinship with respect to the committee's president is practically the same, but now the standard error for the second estimate is slightly higher so it is not statistically significant anymore.

The bottom line from Table 10 is that the higher the probability that the candidate is a relative of a Corps member, the higher the candidate's chances to pass.

## 5.5 Evidence from multiple choice tests

In Table 10 we have shown that candidates who are close relatives of Corps members have greater chances to succeed than nonrelatives, as proxied by their surname information and controlling for the distribution of surnames in the population. However, those results do not tell us anything about nepotism: perhaps relatives succeed more because they are better qualified. On the one hand, that could be the case if, for instance, relatives receive profession-specific knowledge, either through networking or through access to more qualified coaches for example. On the other hand, perhaps relatives are more likely to pass an exam because they are favored by committees, that is they are positively discriminated. In sum, here we want to explore how relatives perform relative to their multiple choice test, with respect to nonrelatives.

In the spirit of Blank (1991), Goldin and Rouse (1999) and Lavy (2004), we now analyze individual level information from three examinations that include a preliminary multiple choice test (i.e., we are able to exploit blind vs. nonblind evaluation). For this exams, we use the marks obtained by candidates in the multiple choice test as control for candidate quality. In this subsection we exploit the availability of multiple choice test information for the judge and prosecutor exam (years 2003 through 2007), court secretary (2006-2007), and information systems (all years for which we have data).[37] In all these examinations, in addition to the two oral tests, a preliminary qualifying multiple choice test is held. The material required for the multiple choice test is contained in the material that is due for the oral stages of the examination; the mark obtained in the multiple choice test can thus be a good measure of candidate quality in the oral stages.[38]

Our strategy here is twofold. First, we analyze whether Corps members' relatives do better in the multiple choice. Second, we investigate whether their multiple choice test scores can explain their higher probability to pass.

### 5.5.1 Are they better qualified?

In Table 12 we display results from regressing the multiple choice test mark on our measure of kinship, controlling for surname frequency, a gender dummy, experience dummies, and exam dummies. For this we estimate a Tobit model. In columns (2) and (3), for the court secretary and information

[37] Additionally, there are anonymous tests (two) in the exam for tax inspector positions. We have not used this information because the tests have been used in all of the exams that we have data about; that is, we do not have a counterfactual with which we can compare results with and without anonymous testing.

Similarly there has been a multiple choice test in the diplomat exam but the only public outcome of this exam is pass or fail, so we cannot exploit that information.

[38] The multiple choice test consists of 100 questions, which had to be answered within two hours during 2003 and 2004, and two and a half hours in 2005 and 2006. Each question lists a set of four possible answers. If the answer to a question is correct, the candidate receives one mark. If the answer to the question is incorrect, the candidate loses 0.33 marks (and therefore the expected value of a randomly answered question is zero). If the question is left unanswered, the candidate gets zero marks. For the sake of illustration, in the 2005 exam the distribution of topics covered by the multiple choice test was as follows: ten questions about general theory of law and consitutional law; 40 questions about civil law; 30 questions about penal law; and 20 questions about procedures of law (13 on procedures of civil law, seven on procedures of penal law). In 2003 and 2004, the material required for the multiple choice test was the same as in stage two of the examination. Instead, in 2005 and 2006 the material for the test was slightly changed, as 20 of the questions were on material that is required for the third stage.

systems positions respectively there is no relationship between kinship and the multiple choice test. In column (1), however, we see that candidates who are more likely to have relative in the same Corps as the committee's president get higher grades in the judge and prosecutor multiple choice test. This is significant at the five percent level. Other resuts are that male candidates seem to do better in the multiple choice (consistent with evidence in Bagues and Esteve-Volart 2007a); similarly more experienced candidates also have better marks, this is especially the case for candidates with one year of experience.

In Table 10 we found evidence that relatives are more likely to pass an exam than nonrelatives. Now we would like to know if that greater likelihood to pass can be totally explained by our measure of quality. That is, controlling for our quality measure, do we still find that relatives are more likely to pass? Therefore now we run the following regression:

$$y_i = \beta\ kinship_i + \delta\ total_i + \phi\ test_i + \varphi\ test_i^2 + \gamma_t + \varepsilon_i \tag{8}$$

where *test* denotes the mark from the multiple choice test.

We present results in Table 13. In columns (1)-(3) we show results from simply running regression (8) on the subsample of candidates who passed the multiple choice test in those years for the exam judge and prosecutor, court secretary, and information systems exams. There is no significant effect from kinship in the latter: if anything, relatives taking the information systems exam tend to be less succesful in the oral stages than in the multiple choice test.

In the other two exams, candidates who are estimated to be relatives do have marginally significantly better performance in the oral stages than in the multiple choice. That is true for judge and prosecutor exam candidates who are relatives of judges, and for court secretary exam candidates who are relatives of court secretaries.[39] While the effect is only significant at the 10 percent level, it is estimated to be quite large: for the judge and prosecutor exam, a one percent increase in the probability to be next of kin increases the probability to succeed in about 5%, an 963% change in the predicted probability; for the court secretary exam this figure is 73%, a 332% of the predicted probability. Inasmuch as relatives' success beyond what is predicted by their test is consistent with direct nepotism, it is also consistent with relatives performing better than nonrelatives in oral tests.

# 6 Conclusions

In this paper we investigate the potential existence of a state nobility in top civil service in Spain: who is being recruited through the current selection process, whereby top positions are allocated via public examinations? We explore the recent hiring of top civil servants in Spain by exploiting the surname information of 21,000 members and 85,000 candidates for positions in the eleven main Corps of the Spanish Administration. We use a two-component linear mixture model to estimate the probability

[39] In court secretary exam committees, the committee president is not a court secretary but rather a judge. In all other Corps committee presidents are members of the Corps where candidates are applying to.

that a candidate is a relative of a Corps member. We provide evidence that is consistent with the existence of a state nobility: relatives are on average about 44 times more likely to apply for these positions than nonrelatives. However, we observe a great heterogeneity across exams: in some of them relatives are over a hundred times more likely to apply for positions than nonrelatives (e.g., state economist), while in some of them, they are less than ten times more likely to apply (e.g., court secretary, information systems). Conditional on taking the exam, we also observe that candidates are significantly more successful than nonrelatives: relatives are 26% more likely to get the position than nonrelatives.

Why do relatives of current civil servants disproportionally apply to civil service positions? One possibility is that, perhaps due to intergenerational transmission of skills, or access to better coaching and networks, relatives have greater human capital. A second possibility is the existence of nepotism: perhaps they are being favored (direct nepotism) or, as argued by Bourdieu (1998) for the French case, perhaps public examinations have been designed in a way that favors the skills of relatives of current civil servants.

We find evidence consistent with the existence of indirect nepotism: relatives tend to apply more to exams including a practical test (for which coaching and networks are more important for success), and exams containing more extensive study material (for which the required preparation time is longer).

We also find evidence that is consistent with the existent of direct nepotism: in two out of three exams for which we have multiple choice information, relatives perform relatively marginally better in oral tests than predicted by their multiple choice mark. However, inasmuch as this could be reflecting discrimination, it is also possible that this effect is due to relatives having relatively better oral skills than multiple choice skills.

The finding that exam design has implications for the extent of the state nobility provides us with policy implications. There are many exams that include a practical test, with the rationale that practical tests provide evaluators with a better assessment of candidate quality regarding the position they are applying to. However, our evidence suggests that practical tests, perhaps because they require specific coaching from top civil servants themselves, attract relatives in a more disproportionate way. In that sense, including practical testing risks increasing the perpetuation of certain families in top civil service, thus decreasing social mobility.

Our methodology, whereby we estimate out of surname information who is a relative and who is not, could also we useful in many other instances where the extent of family ties (e.g., in a profession, an activity) is unkown.

# 7 Appendix: fertility kinship calculation

In Section 5.1.1. we have calculated the number of Corps members' relatives, as well as nonrelatives. For those calculations we have used a number of children per Corps member equal to two. Here we provide details on the calculations of this fertility pattern.

The number of Corps members' relatives (i.e. children) could be generally expressed as

$$n^R = k \cdot n^{Corps} \tag{9}$$

where $n^R$ is the number of relatives, $n^{Corps}$ is the number of Corps members, and we define $k$ to be the *descendant multiplier*. If we consider children as measure of kinship, then $k$ will tell us how many children on average each Corps member (or, more generally, each person in the same cohort as Corps members) has had, that could be taking an exam. Once we know the number of relatives, $n^R$ , the number of nonrelatives is given by the difference between the total population who could have been candidates those years, and the number of relatives. In other words, $n = n^R + n^{\overline{R}}$, where $n$ denotes total candidates.

In equation (12), though, $k$, the descendant multiplier, is unknown. One way of solving for $k$ is to take the total population for the same cohorts of interest: that of individuals of the same age as Corps members, and potential candidates. The assumption here is that fertility patterns that hold for Corps members' relatives, also hold for the population at large within the same cohort. That is, if Corps members born in a given cohort have $k$ children who could be candidates, then people born in that same cohort also have $k$ children who could be candidates.

What is here the cohort of interest? Given that the exams in our data base are held from 1997 through 2007, we are going to focus on individuals in the Spanish population who were between 23 and 32 years of age at any point during that period. For a candidate to be 23 years of age in 2006, her father should be in 2006 at least 46 years of age, supposing she was born when her father was at least 23.[40] That means we should look at individuals who were born in 1960 at the latest. Hence this is the cohort we are going to focus on: that of males born before 1960.

Then we can rewrite a version of equation (12) as:

$$n^R + n^{\overline{R}} = k \cdot n_{born<1960} \tag{10}$$

where $n_{born<1960}$ denotes all males in the Spanish population who were born before 1960. Looking at 2006 demographic information from INE, males born before 1960 constitute approximately 16.7% of the Spanish population. Now we look at the total population who could be children of our Corps member cohort. Again using demographic information from INE for 2006; we calculate those to be about 34.7% of the Spanish population.[41] Applying this information to equation (13), that throws a descendant multiplier of 2.05. In other words, on average individuals in the cohort of Corps members have had roughly two children each who, based on their age, could be taking the exams in our data base. Thus we are going to take $k$ to be equal to two—now using equation (12) it is very easy to calculate the number of relatives. While we take two as our benchmark, we have also performed

[40] During the period 1975-1990, the average age at first marriage was around 26-27 years of age for males and 24-25 for females (INE). We pick 23 years of age for calculating generations here to be on the conservative side.

[41] In fact, the exams in our data base are usually available for a subperiod of 1997-2007. In particular, we have information for 1999-2007 (state lawyer, judge and prosecutor; 31.6% of the Spanish population), 1998-2006 (court secretary; 31.9%), 2000-2007 (diplomat; 29.9%); civil administrator (2001-2007, 28.3%); 1997-2005 (notary, registrar; 32.1%), 1999-2006 (tax inspector; 30.3%). Hence the average figure would be around ?%.

robustness checks varying the descendant multiplier.

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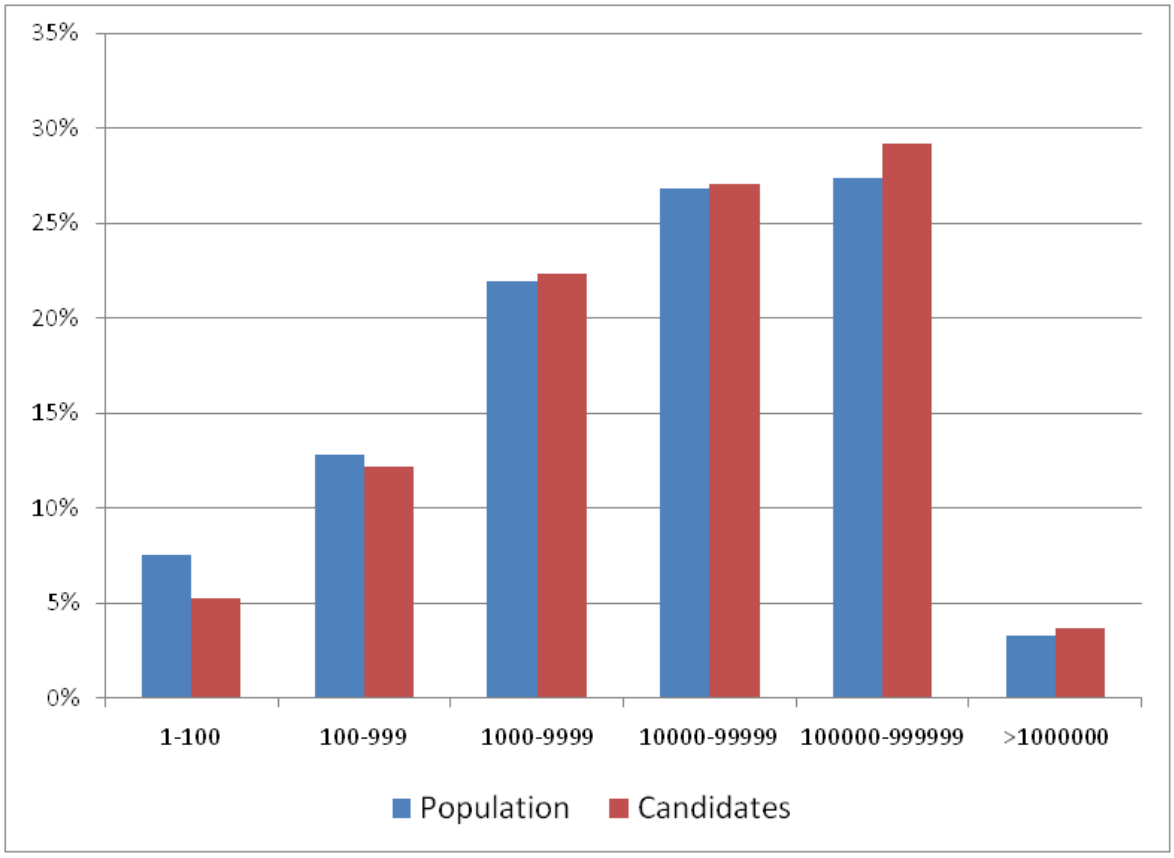
Figure 1. Distribution of Candidates and Spanish Population according to Surname Frequency




Notes - groups on the horizontal axis represent the number of individuals sharing a (paternal) surname; the vertical axis measures the percentage of the population in each group. For instance, just about 5% of candidates have a surname that only up to one hundred individuals have. Source is authors' calculations based on data from INE

Figure 2. Family Tree for a Male Corps Member

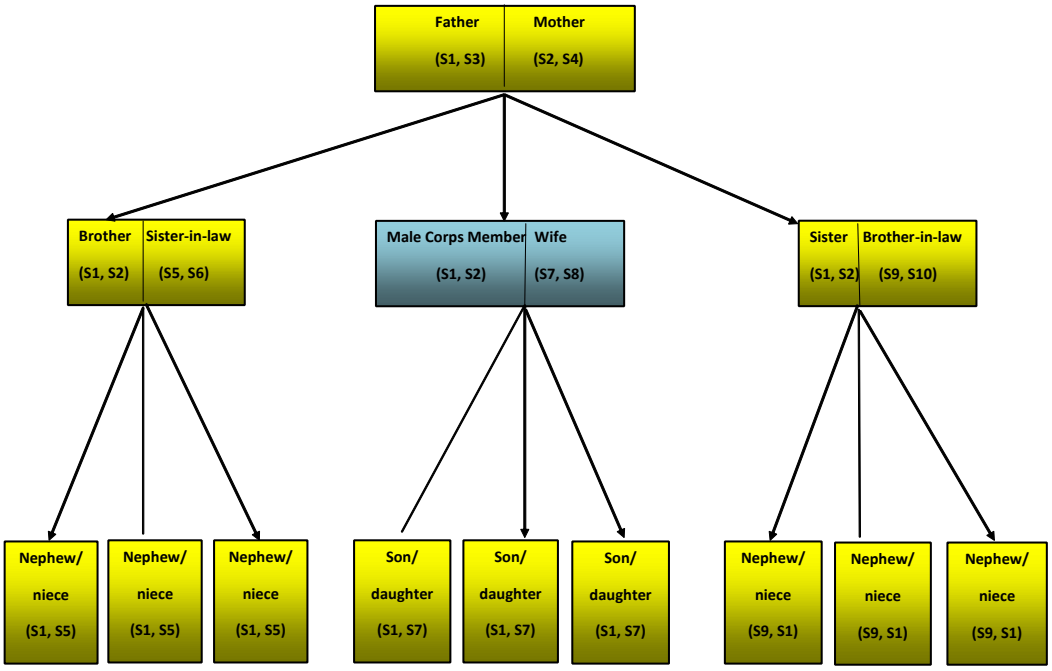



Figure 3. Family Tree for a Female Corps Member

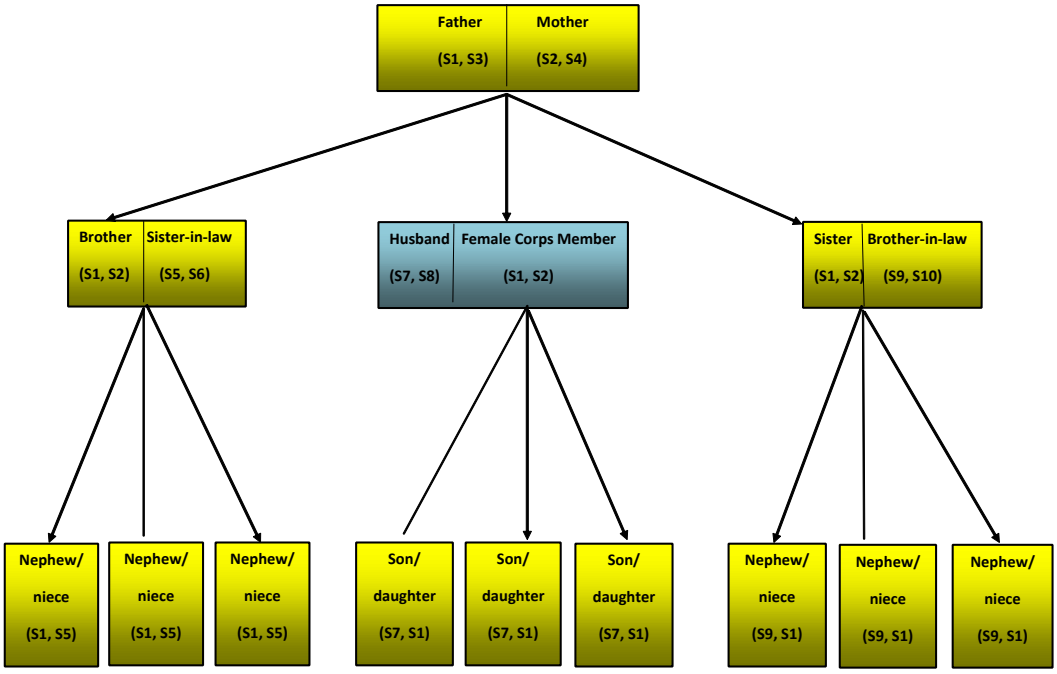


Table 1: Rules on the Format of Exams, by Type of Examination

| | Civil Administrator (TAC) | Court Secretary | Diplomat | Information Technology (TIC) | Judge | Judge & Prosecutor | Notary | Prosecutor | Registrar | State Economist | State Lawyer | Tax Inspector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Number of topics | 160 | 265 | 205 | 120 | 360 | 360 | 373 | 360 | 372 | 180 | 485 | 182 |
| Number of stages | 4 | 2 | 4 | 4 | 2 | 2/3 | 2 | 2 | 3 | 5 | 5 | 5 |
| Stage 1 | general[1] | multiple choice[2] | multiple choice[3] | multiple choice | topics | multiple choice[4] | topics | topics | topics | practical | topics | topics |
| Stage 2 | foreign language | topics | foreign language | foreign language | topics | topics | topics | topics | topics | foreign language | topics | topics |
| Stage 3 | topics | topics | general | topics | | topics | practical | | practical | topics | foreign language | practical & foreign language |
| Stage 4 | practical | | topics | practical | | | | | | topics | practical | topics |
| Stage 5 | | | practical | | | | | | | topics | practical | topics |

Notes: Over the years, the rules regarding the composition of some committees have slightly changed. 1/Written exams have to be read by candidates in front of committees. 2/Preliminary multiple choice added in 2006. 3/In 2004 the multiple choice test was replaced by the third stage, which is since then the first stage. 4/Preliminary multiple choice added in 2003.

Table 2: Rules on Committe Composition, by Type of Examination

| | Civil Administrator (TAC) | Court Secretary | Diplomat | Information Technology (TIC) | Judge | Judge & Prosecutor | Notary | Prosecutor | Registrar | State Economist | State Lawyer | Tax Inspector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Number of committee members | 7 | 7 | 7 | 7 | 10 | 9 | 7 | 8 | 7 | 7 | 7 | 11 |
| President | TAC | Judge | Diplomat | TIC/TAC | Judge | Judge/ Prosecutor | Notary President | Prosecutor | Registrar | State Economist | State Lawyer | Tax Inspector |
| Other members | | | | | | | | | | | | |
| TAC | 2 | 0 | 1[7] | 2/3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1/2[20] |
| Court secretary | 0 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diplomat | 1[1] | 0 | 2/1[8] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Economist | 1[2] | 0 | 1[9] | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| TIC | 0 | 0 | 0 | 2/3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Judge | 0 | 0 | 1[10] | 0 | 3 | 2 | 0 | 1 | 1 | 0 | 2 | 0 |
| Lawyer | 0 | 1 | | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| Notary | 0 | 0 | | 0 | 0 | 0 | 1 | 0 | 2/1[16] | 0 | 1[18] | 0 |
| Professor | 1[3] | 1 | 3/2[11] | 0 | 2 | 1 | 1 | 1 | 1 | 3 | 1 | 2 |
| Prosecutor | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 |
| Registrar | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1/2[17] | 0 | 1[19] | 0 |
| State Lawyer | 1[4] | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 1[21] |
| Tax Inspector | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Other | 2[5] | 0 | 0 | 1/2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3[22] |

Notes: Over the years, the rules regarding the composition of some committees have slightly changed. 1/Years 2002-2005. 2/Year 2004. 3/Years 2001, 2005 and 2007. 4/Years 2001-2004, 2006-2007. 5/One of those was there in all years, the other one in years 2001-2003, 2005 and 2007. 7/From 2004. 8/There were 2 members up to 2006; from that year onwards there has only been one. 9/In 2007. 10/One member for all years except for 2004-2005, when there was none. 11/Three members before 2007, two in 2007. 16,17/Before 2000, there were two notariesand one registrar; this changed to one notary and two registrars in 2000. 18/Years 2000, 2002 and 2004. 19/Years 1999, 2001, 2003 and 2006. 20/One member in years 2000, 2002, 2005 and 2006; two members in years 2001 and 2007. 21/Years 2000-2002, 2005. 22/Only one (2005-2007) or two (2000-2004) were present at the same time.

Table 3: Corps Members and Relatives, by Corps

| | All | Civil Administrator | Court Secretary | Diplomat | Information Systems | Judge | Notary | Professor in Economics | Professor in Law | Prosecutor | Registrar | State Economist | State Lawyer | Tax Inspector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| Total members | 21509 | 1536 | 2748 | 748 | 731 | 4183 | 1832 | 1111 | 2223 | 1912 | 829 | 448 | 562 | 2646 |
| Members born before 1960 | 14136 | 1295 | 1859 | 505 | 619 | 2641 | 1820 | 279 | 577 | 1029 | 692 | 448 | 343 | 2029 |
| Male members born before 1960 | 11223 | 1036 | 1012 | 471 | 509 | 2115 | 1706 | 230 | 460 | 795 | 547 | 354 | 338 | 1650 |

Notes: calculated using the rankings the year before the first exam for which data are available. The set of relatives has been calculated as the number of male members born before 1960, multiplied by nine (three children, six nephews). The set of potential candidates (7,293,172) has been calculated as the individuals in the Spanish population who were born between 1974 and 1983. Row four is calculated as row three muliplied by nine and divided by 7,293,172.

Table 4: Available Exams, by Type of Examination

| | All | Civil Administrator | Court Secretary | Diplomat | Information Technology | Judge & Prosecutor | Notary | Registrar | State Economist | State Lawyer | Tax Inspector |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| Years | 1997 through 2007 | 2001,2002, 2003,2004, 2005,2006, 2007 | 1998,1999, 2000,2001, 2002,2003, 2006 | 2000,2002, 2003,2004, 2005,2006, 2007 | 2002,2003, 2004,2005, 2006,2007 | 1999,2000, 2001,2002, 2003,2004 2005,2006 | 1997,1999, 2001,2003, 2005 | 1997,2000, 2001,2003, 2005 | 2002,2003, 2004,2005, 2006,2007 | 1999,2000, 2001,2002, 2003,2004 2006,2007 | 1999,2000, 2001,2002, 2003,2004, 2005,2006 |
| Number of exams | 69 | 7 | 7 | 7 | 6 | 10 | 5 | 5 | 6 | 8 | 8 |
| Number of positions per exam | 74 | 41 | 136 | 35 | 34 | 239 | 115 | 45 | 14 | 24 | 29 |
| Number of candidates | 85361 | 2617 | 13034 | 2376 | 4521 | 46940 | 6602 | 3274 | 796 | 1738 | 3463 |

Note: the Judge and Prosecutor exam has been joint since 2001, but constituted two separate exams before. Our sample includes one Prosecutor exam (2000), and two Judge exams (1999 and 2000).

Table 5: Descriptive Statistics - Candidate Characteristics

| | Number of Observations | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male share | 85362 | 0.37 | 0.48 | 0 | 1 |
| Success | 85362 | 0.06 | 0.23 | 0 | 1 |
| One year of experience | 46002 | 0.69 | 0.46 | 0 | 1 |
| Two years of experience | 46002 | 0.50 | 0.50 | 0 | 1 |
| Three years of experience | 46002 | 0.35 | 0.48 | 0 | 1 |

Table 6: Mixture Model Estimates, by Type of Examination, by Type of Examination

| | Civil Administrator | Court Secretary | Diplomat | Judge | Judge & Prosecutor | Notary | Prosecutor | Registrar | State Lawyer | Tax Inspector |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| $\alpha_R$ | 0.13 | 0.032 | 0.21 | 0.063 | 0.079 | 0.39 | 0.069 | 0.36 | 0.40 | 0.042 |
| $\lambda_R$ | 0.14 | 0.27 | 0.17 | 0.22 | 0.25 | 0.23 | 0.23 | 0.28 | 0.15 | 0.21 |
| $\lambda_N$ | 0.00019 | 0.00073 | 0.00014 | 0.00083 | 0.0014 | 0.00043 | 0.00090 | 0.00025 | 0.000097 | 0.00051 |

Notes: the number of observations is equal to the number of surnames in the Spanish population with frequency bigger than or equal to five (93082). $\alpha_R$ is the estimated mixture model weight according to equation (2) in Section 5. $\lambda_R$ and $\lambda_N$ are the estimated probability of taking the exam for the group of relatives and the group of nonrelatives respectively, calculated according to equations (6) and (7) in Section 5.

Table 7: Surname Information among Candidates, by Type of Surname

| | Mean | Standard deviation |
|---|---|---|
| | (1) | (2) |
| Surname$^{p}$ (1, 1) | 0.013 | 0.08 |
| Surname$^{p}$ (2, 1) | 0.0038 | 0.038 |
| Surname$^{p}$ (1, 2) | 0.006 | 0.042 |
| Surname$^{p}$ (2, 2) | 0.0047 | 0.04 |
| Surname$^{c}$ (1, 1) | 0.017 | 0.08 |
| Surname$^{c}$ (2, 1) | 0.0071 | 0.048 |
| Surname$^{c}$ (1, 2) | 0.012 | 0.057 |
| Surname$^{c}$ (2, 2) | 0.012 | 0.06 |
| Surname$^{n}$ (1, 1) | 0.024 | 0.086 |
| Surname$^{n}$ (2, 1) | 0.015 | 0.062 |
| Surname$^{n}$ (1, 2) | 0.021 | 0.07 |
| Surname$^{n}$ (2, 2) | 0.0053 | 0.024 |
| Number of observations | 85364 | 85364 |

Notes: The Judge and Prosecutor exam has been joint since 2001, but constituted two separate exams before. Here we merge the observations. In the case that the number of observations varies across the four variables, we report the figure for the first variable.

Table 8: Corps Members and Relatives, by Corps

| | All | Civil Administrator | Court Secretary | Diplomat | Information Systems | Judge & Prosecutor | Notary | Registrar | State Economist | State Lawyer | Tax Inspector |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| | A. Kinship with a member of the committee president's Corps | | | | | | | | | | |
| Kinship among potential candidates (%) | 0.13 | 0.13 | 0.13 | 0.058 | 0.063 | 0.36 | 0.21 | 0.068 | 0.044 | 0.042 | 0.20 |
| Kinship among candidates (%) | 3.2 | 2.5 | 0.7 | 3.9 | 0.59 | 0.65 | 7.1 | 4.5 | 5.8 | 3.7 | 2.7 |
| Kinship among winners (%) | 4.7 | 3.8 | 0.95 | 6.3 | 0.36 | 0.11 | 11 | 5.5 | 5.7 | 5 | 3.3 |
| Premium exam | 43.7 | 19.7 | 4.77 | 66.3 | 9.27 | 25.3 | 33.6 | 66.8 | 131 | 90.2 | 12.8 |
| Premium success | 1.26 | 1.45 | 1.19 | 1.62 | 0.66 | 1.37 | 1.57 | 1.21 | 0.97 | 1.38 | 1.17 |
| | B. Kinship with a member of another Corps in the committee | | | | | | | | | | |
| Kinship among potential candidates (%) | 0.32 | 0.2 | 0.42 | 0.47 | 0.13 | 0.22 | 0.43 | 0.57 | 0.028 | 0.60 | 0.20 |
| Kinship among candidates (%) | 5.9 | 2.6 | 0.74 | 9.65 | 0.94 | 0.30 | 6.57 | 16.1 | 3.4 | 16.7 | 1.57 |
| Kinship among winners (%) | 6.3 | 3.16 | 1.01 | 8.83 | 0.74 | 0.23 | 7.61 | 18.4 | 3.8 | 17.4 | 1.88 |
| Premium exam | 24.4 | 13.9 | 1.67 | 20.3 | 7.36 | 1.32 | 15.4 | 28.2 | 119 | 28.6 | 7.95 |
| Premium success | 1.04 | 1.07 | 1.22 | 0.92 | 0.75 | 0.89 | 1.16 | 1.15 | 1.02 | 1.02 | 1.16 |
| | C. Kinship with a member of a Corps not in the committee | | | | | | | | | | |
| Kinship among potential candidates (%) | 0.93 | 1.06 | 0.84 | 0.85 | 1.19 | 0.80 | 0.75 | 0.75 | 1.31 | 0.75 | 0.98 |
| Kinship among candidates (%) | 10.3 | 13.4 | 1.06 | 1.49 | 2.74 | 1.34 | 6.54 | 10.2 | 27.2 | 15.6 | 9.61 |
| Kinship among winners (%) | 10.8 | 15.5 | 1.29 | 1.36 | 2.78 | 1.64 | 7.16 | 11.1 | 27.2 | 17.4 | 10.1 |
| Premium exam | 10.9 | 12.5 | 1.22 | 17.3 | 2.29 | 1.78 | 8.8 | 13.6 | 20.6 | 21.2 | 9.83 |
| Premium success | 1.07 | 1.15 | 1.2 | 0.9 | 0.99 | 1.15 | 1.08 | 1.07 | 0.97 | 1.14 | 1.08 |
| | D. Any kinship | | | | | | | | | | |
| Kinship among potential candidates (%) | 1.39 | 1.39 | 1.39 | 1.39 | 1.39 | 1.39 | 1.39 | 1.39 | 1.39 | 1.39 | 1.39 |
| Kinship among candidates (%) | 19.3 | 18.5 | 2.45 | 28.4 | 4.27 | 2.49 | 20 | 30.8 | 36.4 | 36 | 13.7 |
| Kinship among winners (%) | 21.3 | 22.4 | 3.25 | 28.7 | 3.87 | 3.13 | 25.5 | 35 | 36.6 | 39.3 | 15.2 |
| Premium exam | 14 | 13.4 | 1.67 | 20.4 | 3.08 | 1.90 | 14.6 | 22.2 | 26.1 | 26.5 | 10 |
| Premium success | 1.12 | 1.18 | 1.28 | 1 | 0.91 | 1.18 | 1.28 | 1.14 | 0.98 | 1.11 | 1.11 |

Notes: row one is calculated as the set of relatives (the number of male members born before 1960, multiplied by nine (three children, six nephews)) and divided by the set of potential candidates (those individuals in the Spanish population who were born between 1974 and 1983, 7,293,172). This calculation accounts for those individuals who would have taken their exam for the first time (at 23 years of age). Row two includes candidates whose first or second surname coincides with a Corps member (by type of kinship: A) with a member in the committee president's Corps; B) with a member in Corps represented in the committee; C) with a member in a Corps not represented in the committee; D) with any Corps member). Row three shows similar estimates as row two, but for winning candidates only. Row four is calculated as row two divided by row one; row five is calculated as row three divided by row two.

Table 9: Share of Relatives Taking an Exam and Exam Characteristics

| | Dependent variable: Premium Exam | | | |
|---|---|---|---|---|
| | Any Kinship | Kinship$^p$ | Kinship$^c$ | Kinship$^n$ |
| | (1) | (2) | (3) | (4) |
| Exam contains an anonymous stage | -0.0051 | 0.0056 | -0.019** | 0.014 |
| | (0.023) | (0.0043) | (0.0080) | (0.018) |
| Exam contains a practical stage | 0.26*** | 0.033*** | 0.092*** | 0.13*** |
| | (0.024) | (0.0044) | (0.0080) | (0.018) |
| Number of topics | 0.00054*** | 0.000057*** | 0.00037*** | 0.00011 |
| | (0.00010) | (0.000019) | (0.000035) | (0.000080) |
| Adjusted/Pseudo $R^2$ | 0.65 | 0.45 | 0.80 | 0.41 |
| Number of observations | 69 | 69 | 69 | 69 |

Notes: standard errors in parentheses. *significant at 10%; **significant at 5%;
***significant at 1%

Table 10: Probability to Pass an Exam and Kinship

| | Dependent variable: Probability to Pass an Exam [Probit] | | | | | |
|---|---|---|---|---|---|---|
| | All candidates | | | | | Candidates with uncommon surname |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Surname$^p$ (1, 1) | 0.04*** | 0.038*** | 0.037*** | 0.038*** | 0.043*** | 0.04*** |
| | (0.0073) | (0.0074) | (0.0075) | (0.0076) | (0.0086) | (0.008) |
| Surname$^p$ (2, 1) | 0.036** | 0.04** | 0.037** | 0.037** | 0.034* | 0.032 |
| | (0.015) | (0.016) | (0.016) | (0.016) | (0.018) | (0.022) |
| Surname$^c$ (1, 1) | | 0.01 | 0.0086 | 0.0088 | 0.015 | 0.0057 |
| | | (0.0085) | (0.0087) | (0.0088) | (0.099) | (0.0094) |
| Surname$^c$ (2, 1) | | -0.0093 | -0.012 | -0.012 | 0.00068 | -0.0053 |
| | | (0.015) | (0.015) | (0.016) | (0.018) | (0.019) |
| Surname$^n$ (1, 1) | | | 0.0049 | 0.0053 | 0.0059 | 0.0046 |
| | | | (0.008) | (0.0081) | (0.0095) | (0.0087) |
| Surname$^n$ (2, 1) | | | 0.012 | 0.012 | 0.017 | 0.015 |
| | | | (0.011) | (0.011) | (0.013) | (0.015) |
| Surname$^p$ (1, 2) | | | | -0.0035 | -0.0064 | |
| | | | | (0.0016) | (0.018) | |
| Surname$^p$ (2, 2) | | | | 0.0065 | -0.0049 | |
| | | | | (0.019) | (0.023) | |
| Surname$^c$ (1, 2) | | | | 0.005 | 0.00052 | |
| | | | | (0.013) | (0.015) | |
| Surname$^c$ (2, 2) | | | | -0.0071 | -0.019 | |
| | | | | (0.012) | (0.015) | |
| Surname$^n$ (1, 2) | | | | -0.0058 | -0.0059 | |
| | | | | (0.011) | (0.012) | |
| Surname$^n$ (2, 2) | | | | 0.030 | 0.013 | |
| | | | | (0.031) | (0.038) | |
| Male | | | | | 0.004** | |
| | | | | | (0.002) | |
| One year of experience | | | | | 0.038*** | |
| | | | | | (0.002) | |
| Two years of experience | | | | | 0.017*** | |
| | | | | | (0.02) | |
| Paternal surname frequency | -0.00074*** | -0.00072*** | -0.00071*** | -0.00072 | -0.0009*** | -0.00047 |
| | (0.00025) | (0.00025) | (0.00025) | (0.00025) | (0.0003) | (0.00053) |
| Maternal surname frequency | -0.00034 | -0.00034 | -0.00032 | -0.00034 | -0.00007 | -0.00075** |
| | (0.00025) | (0.00025) | (0.00025) | (0.00025) | (0.0003) | (0.00036) |
| Adjusted/Pseudo $R^2$ | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 | 0.04 |
| predicted probability | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Number of observations | 85364 | 85364 | 85364 | 85364 | 56592 | 42634 |

Notes: standard errors in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%.

Table 11: Probability to Pass an Exam and Kinship, by Type of Examination

| | Civil Administrator | Court Secretary | Diplomat | Information Systems | Judge & Prosecutor | Notary | Registrar | State Economist | State Lawyer | Tax Inspector |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Kinship$^p$ | 0.11* | 0.026 | 0.09** | -0.10 | 0.033** | 0.072*** | 0.019 | -0.0063 | 0.028 | 0.03 |
| | (0.059) | (0.042) | (0.039) | (0.12) | (0.013) | (0.017) | (0.026) | (0.065) | (0.05) | (0.04) |
| Kinship$^c$ | 0.012 | 0.022 | -0.036 | -0.044 | -0.011 | 0.008 | 0.03 | 0.031 | -0.03 | 0.056 |
| | (0.061) | (0.04) | (0.047) | (0.063) | (0.022) | (0.022) | (0.019) | (0.091) | (0.04) | (0.07) |
| Kinship$^n$ | 0.052 | 0.03 | -0.06 | -0.0089 | 0.0081 | 0.003 | 0.011 | -0.0022 | 0.046 | 0.014 |
| | (0.033) | (0.04) | (0.038) | (0.039) | (0.013) | (0.025) | (0.025) | (0.0045) | (0.04) | (0.029) |
| Paternal surname frequency | -0.0012 | -0.00047 | -0.0032* | -0.002** | -0.00041 | -0.0013 | -0.0012 | -0.0013 | -0.006** | 0.0027* |
| | (0.0019) | (0.00074) | (0.0019) | (0.00097) | (0.0003) | (0.0011) | (0.0014) | (0.0032) | (0.0022) | (0.015) |
| Maternal surname frequency | 0.0013 | 0.0013* | -0.0043** | -0.0012 | -0.00041 | -0.0017 | 0.0021 | -0.00089 | -0.02 | -0.0001 |
| | (0.002) | (0.00075) | (0.0018) | (0.00099) | (0.0003) | (0.0011) | (0.014) | (0.003) | (0.02) | (0.0014) |
| Adjusted/Pseudo $R^2$ | 0.008 | 0.005 | 0.024 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.004 |
| predicted probability | 0.10 | 0.06 | 0.09 | 0.04 | 0.04 | 0.08 | 0.06 | 0.10 | 0.10 | 0.06 |
| Number of observations | 2617 | 13034 | 2376 | 4521 | 46943 | 6602 | 3274 | 796 | 1738 | 3463 |

Notes: standard deviations in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%.

Table 12: Multiple Choice Test Mark and Kinship

| | Dependent variable: Multiple Choice Test mark [Tobit] | | |
|---|---|---|---|
| | Judge & Prosecutor | Court Secretary | Information Systems |
| | (1) | (2) | (3) |
| Kinship$^p$ | 4.40** | -0.38 | -0.79 |
| | (1.83) | (1.20) | (3.29) |
| Kinship$^c$ | -1.82 | -1.71 | 1.24 |
| | (2.94) | (1.45) | (2.07) |
| Kinship$^n$ | 1.52 | 0.58 | 2.90* |
| | (1.64) | (1.15) | (1.49) |
| Paternal surname frequency | -0.000*** | 0.016 | -0.12** |
| | (0.000) | (0.023) | (0.047) |
| Maternal surname frequency | -0.000 | 0.0096 | -0.02 |
| | (0.000) | (0.023) | (0.048) |
| Male | 2.27*** | 0.11 | 0.65** |
| | (0.24) | (0.15) | (0.30) |
| One year of experience | 10.3*** | 1.10*** | 1.81*** |
| | (0.38) | (0.18) | (0.36) |
| Two years of experience | 4.60*** | -0.10 | 0.68 |
| | (0.39) | (0.28) | (0.48) |
| Three years of experience | 2.23*** | 0.0044 | 0.16 |
| | (0.33) | (0.30) | (0.53) |
| Exam dummies (Year) | yes | yes | yes |
| Adjusted/Pseudo $R^2$ | 0.08 | 0.01 | 0.03 |
| Number of observations | 17399 | 3128 | 2383 |

Notes: standard errors in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%

Table 13: Probability to Pass an Exam and Kinship, Using the Multiple Choice Test Mark

| | Dependent variable: Probability to pass an exam [Probit] | | |
|---|---|---|---|
| | Judge & Prosecutor | Court Secretary | Information Systems |
| | (1) | (2) | (3) |
| Kinship$^p$ | 0.048* | 0.17 | -1.01 |
| | (0.029) | (0.24) | (0.86) |
| Kinship$^c$ | 0.022 | 0.73* | -0.14 |
| | (0.06) | (0.41) | (0.28) |
| Kinship$^n$ | -0.013 | 0.11 | -0.39* |
| | (0.033) | (0.23) | (0.23) |
| Multiple choice mark | 0.0072*** | 0.081*** | 0.031*** |
| | (0.0003) | (0.0093) | (0.0076) |
| Paternal surname frequency | -0.00079 | -0.0047 | 0.0024 |
| | (0.00078) | (0.0046) | (0.0061) |
| Maternal surname frequency | 0.00001 | 0.0031 | -0.0059 |
| | (0.00078) | (0.0046) | (0.0061) |
| Male | -0.0034 | -0.025 | -0.12*** |
| | (0.0047) | (0.03) | (0.043) |
| One year of experience | 0.012 | 0.038 | 0.094** |
| | (0.0097) | (0.034) | (0.046) |
| Two years of experience | -0.0014 | 0.0099 | -0.12** |
| | (0.0077) | (0.052) | (0.052) |
| Three years of experience | -0.0019 | -0.10 | 0.073 |
| | (0.0063) | (0.045) | (0.071) |
| Year dummies | yes | yes | yes |
| Adjusted/Pseudo $R^2$ | 0.13 | 0.08 | 0.07 |
| predicted probability | 0.05 | 0.22 | 0.21 |
| Number of observations | 9299 | 1032 | 509 |

Notes: standard errors in parentheses. Here we consider candidates who passed stage one and hence are evaluated by committees. *significant at 10%; **significant at 5%; ***significant at 1%