Does It Pay to Be a General Practitioner in France ?*

Brigitte Dormont†, Anne-Laure Samson‡

February 8, 2016

Abstract

The aim of this paper is to determine if the profession of GP is financially attractive in France. Using longitudinal data, we created two samples of 1,389 self-employed GPs and 4,825 salaried executives observed from 1980 to 2004. These two professions require high qualification levels, but studying to become a GP takes longer. To measure if GPs get returns that compensate for their investment in education, we analyze GPs' and executives' career profiles and construct a measure of individual wealth that takes into account all earnings from the age of 24, including years with no or low income for GPs before they set up their practice.

Econometric analysis shows that after an initial period of patient recruitment, physicians experience a flatter career profile than executives. We also find that GP incomes for recent cohorts are favored by the low *numerus clausus* applied when they were in medical school.

Stochastic dominance analysis shows that, for men, wealth distributions do not differ significantly between GPs and executives, but, for women, GP wealth distribution dominates executive wealth distribution at the first order. Hence, the relative return on medical studies is higher for women. While for men there is no monetary advantage or disadvantage in being a GP, for women, it is more profitable to be a GP than an executive. This can explain the large proportion of female GPs and the strong increase in the share of women among medical students.[1]

I Introduction

Throughout the world, physicians are at the top of the earnings distribution (Cutler and Ly [2011]). In the United States, in 2010, specialists and generalists earned, respectively, 5.8 and 3.9 times the average per capita GDP. For France the corresponding

*We are grateful to the two anonymous referees for their very helpful comments and suggestions. We also thank all participants to the $27^{ème}$ Journées de microéconomie appliquée (2010), to the $59^{ème}$ AFSE Congress (2010), to the 8^{th} World Congress on Health Economics (2011) and to the 10^{th} TEPP Conference - Research in health and labour economics (2013). We wish to thank Nicolas Pistolesi for kindly providing us with his programs to test for stochastic dominance. We gratefully acknowledge financial supports from DREES (Direction de la Recherche, des Etudes, de l'Evaluation et des Statistiques) of the Ministry of Health and from the Health Chair - a joint initiative by PSL, Université Paris Dauphine, ENSAE, MGEN and Istya under the aegis of the Fondation du Risque (FDR).

†PSL, Université Paris Dauphine, LEDa-Legos. E-mail: brigitte.dormont@dauphine.fr

‡PSL, Université Paris Dauphine, LEDa-Legos. E-mail: anne-laure.samson@dauphine.fr

[1]JEL Classification : D31, J31, I11, C23 ; Keywords: GPs, executive, self-employed, earning profile, longitudinal data, stochastic dominance

figures are 4.4 and 2.7 times the average per capita GDP. General Practitioners (GPs) earn less than specialists in every country except the United Kingdom. Defining high earners as tax filing units between the 95th and 99th percentiles, Cutler and Ly [2011] show that GPs' earnings amount to 0.92 times the average for high earners in the US and in France, while specialists' earnings amount to 1.37 times the average for high earners in the US and 1.47 times the average for high earners in France.

In France, GPs and specialists who provide ambulatory care are mainly self-employed and paid on a fee-for-service basis. National Health Insurance offers universal coverage on the basis of a fixed price per consultation or procedure, which is set by bargaining between the National Health Insurance and doctors' associations. Physicians who want to charge more than negotiated reference fees have to register in "Sector 2," whereas "Sector 1" physicians must charge only reference fees.[2] Access to Sector 2 was opened to GPs in 1980, but it was closed in 1990 in order to control primary care prices. Currently, most GPs are self-employed (90%) and belong to Sector 1 (87%). They are paid reference fees. Hence their incomes depend solely on the level and composition of their activity.

Currently, GPs' associations have been complaining about insufficient earnings and demanding an increase in the level of negotiated fees or permission to bill freely. To justify these demands, they invoke the length of their studies, their responsibilities and their long working hours. They contend that the incomes of GPs are too low in France to keep the profession attractive. Of course, raising negotiated fees would induce higher costs for National Health Insurance, and authorizing more balance billing would jeopardize coverage.

Are the claims of GP associations legitimate? To answer this question, we cannot refer to an equilibrium price on the market for ambulatory care because of the existence of health insurance and numerous information asymmetries. Turning to the market for education, we can ask whether the financial return on medical studies is sufficient. In principle, the only question at stake is the length of medical studies since tuition fees are low in France because medical schools are publicly financed.

Currently, the number of applicants to medical schools shows that there is excess demand for medical education. The number of students in medical schools has been fixed since 1971 through a numerus clausus. Access to medical schools is limited through a competitive examination that takes place at the end of the first year. The proportion of students who pass this examination is very low - between 10 and 20 % depending on the year. Furthermore, many applicants pay for private courses to increase their chances of passing the examination and most of those who fail repeat the first year, which indicates that the medical profession is quite attractive.

Yet, it is not clear that it is desirable to be a GP. The competitive examination at the end of the first year of medical school is common to GPs and specialists. The split between them takes place after 6 years of medical studies through another competitive examination, called *épreuves classantes nationales* (ECN). After the ECN, not all slots for GPs are filled by medical students: for example, 14 % of GP positions were not filled in 2004 and 16 % were not filled in 2011, whereas all specialist positions were filled, except for public health and occupational medicine. On the other hand, it should be noted that some very successful medical students choose to be GPs, even though their high ranking gives them access to more lucrative specialties.

[2]Sector 2 physicians must pay higher contributions for their social insurance.

There is a process of feminization among GPs in France. The proportion of women among GPs rose from 25 % in 1984 to 41 % in 2011, and they currently make up more than 60 % of all medical students. While feminization is observed in all of the highly qualified professions, it is more pronounced among doctors than among company executives, for example. Some of the people who think that the profession of GP is in decline, point to the rising share of women among GPs as a sign of this decline. Yet, everybody agrees that it is attractive to be a specialist, although the proportion of women is comparable and is growing at the same pace for specialists and for GPs.

The aim of this paper is to determine if GPs' earnings are high enough to keep this profession attractive. For this purpose, we compare GPs' and executives' earnings. In France, executives hold a Ph. D. or a diploma from one of the *Grandes Ecoles*, which are elite engineering or business schools. Access to *Grandes Ecoles* is obtained by passing highly selective competitive examinations and only 5 to 12 % of applicants pass the examinations.[3] Hence, both executives and physicians have high qualification levels and high levels of human capital. However, physicians choose longer studies. Do they obtain returns that compensate for this investment?

To answer this question, we set up two samples, with longitudinal data relative to GPs and executives who have similar levels of human capital and who are observed over the same period. We study their career profiles and compare GP and executive wealth, defined as the present value of total income over their careers. Our approach is mostly descriptive and comes down to comparing net incomes and wealth observed ex post: the executives we observe could have chosen to enter medical school but they did not. We cannot control for the individual heterogeneity that influences choices in education. In France, there are no lotteries unlike the Netherlands, where applicants to medical schools are randomly selected (Ketel et al. [2013]).

Our analysis is therefore mostly retrospective and compares the career incomes of people who have chosen to be GPs or executives, that is self-employed GPs or salaried executives. However, comparing wealth distributions with criteria of stochastic dominance is likely to shed light on ex ante choices.

Our analysis compares the two professions solely from a financial point of view. Of course, non-monetary qualities can make a profession attractive. People may attach importance to autonomy at work, prestige, and job security.[4] The social usefulness of their profession may also count. Control over one's own work schedule can also be important: people may desire flexible working hours and the freedom to allocate work time over their life cycle.

Prestige can be experienced by both doctors and executives. Other qualities particularly enhance the medical profession. Helping others, especially saving lives, may give a great sense of purpose to one's own life. Being self employed, as are GPs, offers the non-pecuniary advantage of "being your own boss." It also provides the freedom to choose one's own work schedule.

[3]The degree of selectivity varies between schools. As shown below, our executive sample concerns people that were admitted to the most selective schools.

[4]Both professions can suffer from involuntary drops in earnings, which are linked to unemployment spells for salaried executives, and to lack of patients for doctors.

Although our analysis is limited to earnings, it provides insights into differences between GPs and executives in their control over their work time.

We have at our disposal remarkable administrative sources of information that provide longitudinal observations for GPs and executives over a long time span. It is hardly ever possible to correctly measure self-employed individuals' earnings, but access to fiscal data enables us to compute doctors' earnings net of expenses. Our samples concern 1,389 GPs and 4,825 executives observed from 1980 to 2004. We chose to focus on beginners in order to examine their subsequent careers: in our samples, all GPs set up their practices and all executives started their careers during the observation period.

Our descriptive analysis shows how the length of studies and the timing of career beginnings differ markedly for GPs and executives. These two professions have also experienced opposite demographic changes: while the number of doctors per cohort is decreasing over time because of a numerus clausus aimed at limiting the number of doctors, the number of executives per cohort is increasing rapidly. Econometric analysis of yearly earnings enables us to compare the impact of experience and cohort effects on GP and executive earnings. This allows us to examine differences in yearly earnings and career profiles between the two professions, but it does not enable us to compare the present value of a GP career with the present value of an executive career.

For that purpose, we construct a measure of wealth for each individual by adding up yearly earnings, beginning at the same age (24) for GPs and executives, including zero or low-income years that occur sometimes for executives who do not start their career at 24, and that concern all doctors because of their long education. We then compare GP and executive wealth distributions with stochastic dominance analysis to see if it pays to be a GP in France. If people with the requisite level of qualification can choose freely between a GP or an executive career, long-run equilibrium would imply a higher return to studies for GPs that would compensate for their greater investment. In this case, wealth distributions should not differ significantly between executives and GPs.

Our findings confirm this conjecture for men. As concerns women, however, GP wealth distribution dominates executive wealth distribution at the first order. Hence, it is more profitable for women to be GPs than executives.

Since our GPs are self-employed and paid on a fee-for-service basis with the same fixed fee schedule for men and women, and since they can freely allocate their work time over their careers and within the week, these findings give support to Claudia Goldin's (2014) interpretation of the gender gap in pay, i.e. that there exists a penalty that affects the remuneration of salaried workers that need flexibility in their time allocation.[5] Our results can be interpreted as an illustration of such a mechanism: female executives can suffer from lower wages and slower promotions because of maternity leaves, while female GPs are paid the same fixed fees as men and their earnings depend on their own decisions concerning work time. These results might explain why highly qualified women have been applying to medical schools in continuously increasing proportions.

[5] As stated by Goldin [2014], "The gender gap in pay would be considerably reduced and might vanish altogether if firms did not have an incentive to disproportionately reward individuals who labored long hours and worked particular hours".

This paper is organized as follows. In section II, we provide an overview of the literature devoted to earning comparisons between physicians and other professions, as well as between self employment and salaried employment. In section III we describe the construction of our GP and executive samples and perform a descriptive analysis in section IV. Econometric estimations are presented in section V and stochastic dominance analysis on wealth distributions is presented in section VI. The final section concludes.

II Literature

There is not much literature about physicians' earnings in industrialized countries. As concerns France, a pioneer study was carried out by Eicher *et al.* [1979]. More generally, Nicholson and Propper [2012] ask if high rates of return on medical training can be seen as evidence of the existence of barriers to entry. They conclude that the financial returns from entering medicine are comparable with returns for similar occupations. However, several studies show that returns for GPs are much lower than returns for specialists working in non-primary care. More precisely, Weeks et al. [1994, 2002] used US data on average income and number of hours by age and occupation for the years 1990 and 1997 to compare earnings over a working lifetime of primary care physicians, medical specialists, dentists, attorneys and graduates of business schools. They show that students who chose a career in primary care medicine got a poorer financial return than those who chose business, law, a medical specialty or dentistry. In addition to the fact that they are not based on microdata, these results might be affected by a selection bias because individuals' capacities might explain their allocation between different types of education. More recently, Ketel et al. [2013] used individual data on doctors in the Netherlands to examine the earnings profiles of doctors and professionals with a similar level of qualification over a period of 22 years after the beginning of their studies. Their evaluation is free of selection bias, since admittance to medical school in the Netherlands is determined by a lottery. They find large returns for doctors.

Studies on self-employed professionals are rather scarce. Pioneering work was performed in 1945 by Friedman and Kuznets [1945] who compared physicians with other self-employed professionals (lawyers, dentists) using fairly small samples. A few papers are devoted to comparison of earnings between self-employed and salaried employees. Hamilton [2000] compares the earnings of self-employed and salaried workers at all levels of qualification. He shows that most entrepreneurs start up their own businesses and stay in them despite the fact that they have both lower initial earnings and lower earnings growth than in salaried employment, resulting in a median earnings differential of 35 percent for individuals who have been in business for 10 years. Hamilton concludes that the self-employment earnings differential reflects entrepreneurs' willingness to sacrifice substantial earnings in exchange for the nonpecuniary benefits of owning a business, such as autonomy and freedom.

Lazear and Moore [1984] use data on self-employed workers to understand why earnings profiles increase with age for salaried workers. Such profiles can be seen as an incentive to discourage shirking or as a reflection of human capital accumulation. Lazear and Moore [1984] assume that earnings profiles should be steeper for salaried workers in order to discourage shirking, whereas there is no agency problem in self-employment. Taking self-employed workers as a control group, they could empirically separate the

effects of human capital accumulation from incentive effects. Their results suggest that earnings profiles are mostly due to employers' desire to provide incentives, rather than reflecting human capital accumulation due to on-the-job training.

Finally, we should mention a paper by Welch [1979], who examines the relationship between cohort size and the earning levels of salaried workers. He shows that cohort size has a significant negative effect on income that declines but does not vanish over the course of careers. Similarly, concerning self-employed GPs, Dormont and Samson [2008] showed that large variations in cohort size due to restrictions in the number of places in medical schools resulted in sizeable earnings gaps between cohorts.

III Data: Comparable Panels of GPs and Executives

III.1 Self-Employed GPs

The first data set is a representative panel of self-employed GPs practicing in France between 1980 and 2004. The sample is drawn from an administrative file produced by the National Health Insurance Fund (*Caisse Nationale d'Assurance Maladie des Travailleurs Salariés*, CNAMTS). It is a random sample made up of about one tenth of the whole population of GPs. For each physician i during each year t, we have information on age, gender, first year of practice, year of graduation, location, type of practice, and the level and composition of annual activity (mostly home and office visits) and annual earnings. The category "type of practice" indicates whether or not the GPs has a *Mode d'Exercice Particulier* (MEP), i.e. engages in certain specialized activities such as acupuncture, homeopathy, nutrition counseling, etc. for which National Health Insurance does not set specific fees.

GPs' earnings correspond to total fees received during the year. In order to make the remuneration of GPs comparable to that of executives, we matched this data set with tax records and computed GPs' annual income, i.e. GPs' earnings net of all expenses (e.g. office rent, secretarial services and social contributions), but before income tax.[6]

We apply four restrictions to the sample to make it more homogeneous. First, since we observe only earnings generated by self-employment, we deal only with GPs who are fully self-employed, and do not receive unobserved earnings from part-time salaried work at a hospital or elsewhere (in 2004, 87% of GPS were fully self-employed).[7] Second, we focus only on Sector 1 GPs (86% of GPs in 2004), for whom fees are fixed. Sector 2 GPs are in the minority, and their activity is very heterogeneous. This choice is appropriate since Sector 1 physicians are paid only National Health Insurance rates and we wish to know if these fees are sufficient to give GPs a comfortable income without balance billing.

[6] As there is no identifier common to the two data sets, they cannot be merged and tax records can be used only to simulate GPs' expenses. We therefore measure income as the difference between observed earnings and predicted expenses. We do not take into account the fact that expenses are predicted in our statistical inference. A detailed description of the methodology can be found in Dormont and Samson [2009].

[7] This choice can generate a selection bias because fully self-employed GPs are older than other GPs and are more likely to be male. However, sensitivity checks suggest that results are similar when we do not apply this restriction to the sample (and use incomplete earnings for some GPs, see Dormont and Samson [2011]).

Third, we exclude GPs located in French overseas territories because they are difficult to follow on a longitudinal basis. Finally, we select only GPs who are observed from the start of their practices.

After applying these restrictions, the initial sample contains 9,039 GPs who began their practices between 1980 and 2004 and who are observed over the 1980-2004 period. This panel contains 53,096 observations and is unbalanced: GPs could have begun their practices at any time between 1980 and 2004. A very small fraction of GPs - 1.5% - leaves the sample. The reasons for leaving are unobserved: they may become salaried, die or quit the profession.

III.2 Executives

The second dataset is a representative panel of French salaried workers employed between 1976 and 2008 in the private or semi-public sector; self-employed workers and public-sector workers are not included. This panel is built using a source from the French administration, the DADS (*Déclarations Annuelles de Données Sociales*), compiled from mandatory reports of employee earnings filed by all French employers. The panel is drawn by selecting all salaried workers born in October of every even-numbered year. These workers are followed every year from 1976 to 2008, except for 1981, 1983 and 1990 which are missing due to the population census. This panel contains information on individual employees (age, gender, region of work), job and earnings (annual gross and net salary before income tax, annual number of days worked, socioeconomic category, part-time/full-time job, date of start and termination of employment in the responding firm) and information on the employing firm (Industry, size, location). When employees work in different firms in a given year (simultaneously or consecutively), we define annual income as the sum of all salaries, and the number of days worked as the sum of all days worked during the year. The characteristics of the firm and of the job recorded for each year are those of the job that provides the greatest share of annual income.

To make our sample comparable to the sample of GPs, we restrict it to the 1980-2004 period and exclude workers working in overseas territories of France.[8] In addition, we wish to select employees with an education level that is comparable to that of GPs. The number of years of education is not recorded in our dataset for employees, so we use the socioeconomic category "executive" to select workers who were highly educated at the beginning of their careers. However, some workers classified as executives during a given year were promoted to an executive position during their careers, without having a high initial level of education. We therefore applied three restrictions to select workers who are comparable to GPs. First, we limit our sample to individuals who are executives at the beginning of their careers. Second, we limit our sample to employees who began their careers between the ages of 22 and 27, in order to exclude atypical individuals with very long studies. Third, we select individuals who are executives during at least the first two years of their careers. Limiting our sample to individuals who are executives during their

[8] We do not require executives in our sample to have only one job at a time (recall that we selected only fully self-employed GPs.) Such a constraint is not necessary for executives since we observe all their wages. Furthermore, this constraint would be too restrictive since it would amount to limiting executives' working hours, a constraint we do not apply to GPs.

whole careers would be too restrictive because employees often change socioeconomic category over the course of their careers.[9]

Thus, we compare GPs to highly-educated executives, defined as employees who are executives during at least the first two years of their careers and who start to work between the ages of 22 and 27. We checked that our criteria led us to select the targeted population by using another data set that records information on individuals' levels of education and qualifications ("*Enquêtes Emploi*").[10] This is indeed the case as nearly 80% of the individuals who meet our two criteria are executives who come from highly selective "*Grandes Ecoles*" or who have between 5 and 9 years of university education.[11]

To sum up, the sample consists of 14,736 executives who began their careers between 1980 and 2004 and are observed over the period 1980-2004 (127,030 observations). This panel is unbalanced since executives could begin their career at any time between 1980 and 2004 and 2% of executives left the sample before 2004 for reasons that are not recorded.

IV Descriptive Analysis

IV.1 Primary Comparison of GPs' and Executives' Incomes

Using these two samples, it is possible to compare GPs' and executives' yearly income (table I and figure 1). As stated above, we apply the same definition of income to GPs and executives, namely, annual income net of expenses and before income tax.[12]

We have chosen an unusual strategy to study incomes in that we do not distinguish between full-time and part-time workers and we do not measure full-time equivalent incomes. Indeed, the variables part-time/full-time and number of days worked during the year are available for executives but not for GPs. Hence our income comparison takes as given the unobserved work duration for each individual, which reinforces the retrospective nature of our analysis.

[9] Using a sensitivity analysis (see Dormont and Samson [2011]), we tested the robustness of the results to more restrictive definitions of executives: (i) individuals coded as executives during at least the first 5 years of their careers, and (ii) executives during their whole career. Our main results remain unchanged. However, we lose a large number of observations with such restrictions (in particular, definition (ii) leads to an under-representation of the oldest executives), mostly because there are some coding errors of the socioeconomic categories. For instance, we often observe individuals recorded as "executives" throughout their observed careers, except for one year in the middle.

[10] These surveys cannot be used for our study because individuals are followed for a maximum of 3 years.

[11] One could argue that focusing on salaried executives might create a selection bias if the most talented executives tend to start their own businesses. However, the fact that 80% of the executives who meet our criteria come from selective "*Grandes Ecoles*" counters this objection. Moreover, income distribution shows very high incomes for executives at the very top of the distribution (as can be seen in figure 1. Finally, there are executives with annual incomes equal to 800,000 and even 3,000,000 euros in our sample, (not shown in figure 1 because they are beyond the scale considered).

[12] Lack of information on fringe benefits prevents us from including them in our definition of income for both GPs and executives, although they may have an impact on the attractiveness of a profession. However, there is no evidence of a marked difference in the value of fringe benefits enjoyed by GPs or executives.

Table I: Distribution of Income for GPs and Executives, 2004 Euros

	D1	Q1	Median	Q3	D9
GPs	15,585	30,038	47,228	69,023	88,076
Executives	21,282	28,969	37,444	49,046	66,327

Table I and figure 1 show that GPs have higher incomes than executives: over the 1980-2004 period, median income was 47,228€ for GPs and 37,444€ for executives. GPs' incomes are higher than executives' in general, except at the bottom of the income distribution and at the very top. Indeed, we find that there is a relatively high proportion of individuals with "low" incomes among GPs and that the value of the first decile of their income distribution is lower than the value of the first decile of executives' income distribution. At the very top of the distribution, Sector 1 GPs' incomes are necessarily limited, because there is a maximum of 24 hours of work in a day and their fee rates are fixed. This is not the case for executives and figure 1 shows a higher proportion of executives with high levels of income. Moreover, our data contain executives who earn incomes that reach up to 3,000,000€ per year. However, except for the bottom and the very top of the distribution, GPs earn more than executives.

Comparisons based on current income distributions as given in figure 1 are referred to in French policy debates about the appropriateness of a rise in National Health Insurance fees for physicians. However, direct comparison of income distributions is not pertinent since it does not take into account composition effects in terms of age, and especially the fact that experience levels are different among today's GPs and executives. Indeed, GPs were older than executives over the 1980-2004 period because of differences in the demographic trends of the two professions (see below) and because they started working later (figure 2). GPs begin their careers between the ages of 25 and 40, while executives begin between the ages of 22 and 27.[13]

This difference in age at the beginning of the career reflects differences in the duration of studies. A comparison of GP and executive incomes should therefore control for differences in the age composition of the two professions and take into account differences in the duration of studies.

[13] Unlike our treatment of executives, we did not restrict GPs' ages at the start of their career. Indeed, GPs who start their practice after age 35 generally started working as locums or as employees before becoming self-employed. Their late beginning is not a signal of inferior ability, which is why we keep these GPs in our analysis, unlike with executives. In any case, robustness checks show that selecting a sub-sample of GPs who begin by age 35 generates very similar results.

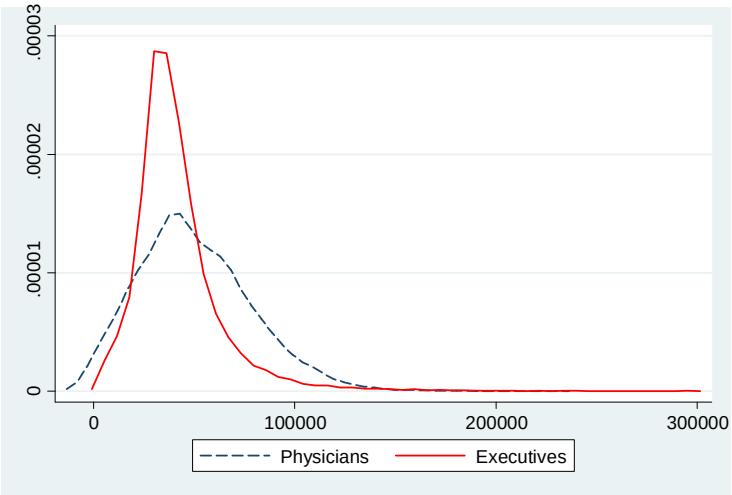


Figure 1: Distribution of GPs and Executives' Income (1980-2004)

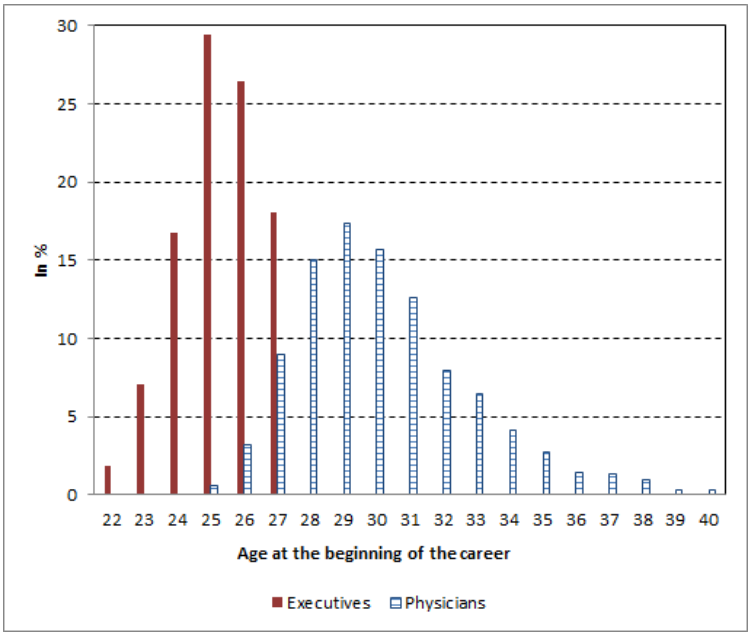


Figure 2: Distribution of Age at the Beginning of the Career for GPs and Executives

IV.2 Allowing for Differences in Length of Studies

Table II shows the trajectories of individuals who decide to become GPs or executives at the end of high school, when they are 18 years old (year 0).

Suppose that an individual decides to become an executive. In general, his or her studies last about 5 years and he or she starts working at age 24. His or her income is denoted I^e, where e denotes an executive position. In practice, executives can begin their careers later, especially if they have to repeat years of secondary school or if they do not pass competitive examinations at the first try, or because they experience difficulties in finding a job. Table II shows an example, but situations vay considerably in our data.

Consider now an individual who decides to become a doctor. The studies are longer than for executives: about 6 years in medical school and 1 to 3 additional years (depending on the time period) in medical school and in training (called "medical internship"). More precisely, a typical trajectory for a GP is the following: he or she earns no income during the first six years, then earns a small remuneration as an intern (internship lasts 2 years in our example: Int_1 and Int_2). After graduation, GPs usually do not begin practicing as self-employed doctors immediately, but replace doctors during holidays or for short periods. During this period, which can last several years (two years in our example), they earn incomes, denoted $R_1, R_2, ...$ Finally, GPs set up their own practices and earn their first income I_1^p,where 1 denotes the first year of practice and p denotes a physician. In our example, the GP sets up a practice at age 29, i.e. 5 years later than the beginning of the executive career.

This five years' difference in the duration of studies, and therefore in the age at which GPs and executives earn their first income must be taken into account when comparing GPs' and executives' wealth, i.e. when adding up their incomes over time. Therefore, our methodology compares GPs' and executives' wealth from the age of 24, the age at which, in general, executives begin working.[14]

The year GPs or executives turn 24 is defined as a "cohort." Cohorts are available for GPs for all years from 1976 to 2000 whereas, for executives, cohorts are available only for even numbered years from 1978 to 2004.[15]

To define a common set of cohorts, with each one containing at least 100 individuals (in order to perform relevant statistical analysis), seven cohorts were selected: 1978, 1980, 1982, 1984, 1986, 1988 and 1990. Our final sample therefore contains 1,389 GPs (19,652 observations over the 1980-2004 period) and 4,825 executives (74,551 observations, see table III). As stated above, we restricted our samples to beginners, and GP and executive earnings are recorded over the 1980-2004 period. Hence, our individuals are not observed over the same portion of their lifetimes. Individuals who belong to the 1978 cohort are observed at most until the age of 50, whereas individuals who belong to the 1990 cohort are observed at most until the age of 38, as shown in table III.

In the following, we consider two definitions of income.

- The income earned from the beginning of the career is denoted I. Executives start by finding a position on the labor market. GPs start by setting up of a practice, which takes place at a much later age because of the extra length of medical studies and because of the period during which beginning doctors replace other doctors. Referring to Table II, the income flow for the executive I_1^e , I_2^e , I_3^e , I_4^e , I_5^e , I_6^e , is received from year 6 in our example. The GP receives income $I_1^p, ...$ from year 11.[16]

[14]In fact, we observe the age at which careers begin. Of course, not all executives begin their careers at age 24, as shown by the spread in the distribution of age at career beginning (figure 2). Some start later, for example at 26. In that case, individual income is set at 0 from age 24 to age 26. Very few executives begin their careers before age 24. Suppose an executive begins a career at age 22, for example. In that case, our main results are obtained considering only the income earned from age 24. In a sensitivity analysis, we also include income earned before age 24.

[15]Recall that employees in our dataset are born in October of even numbered years.

[16]Of course, these particular figures are examples: in our data, we observe the exact time at which individuals begin their careers, and this information is used in our computations.

Table II: Typical beginning of careers for GPs and executives

Year	0	1	2	3	4	5	6	7	8	9	10	11	....
Age	18	19	20	21	22	23	24	25	26	27	28	29	....
Executive Income	0	0	0	0	0	0	I_1^e	I_2^e	I_3^e	I_4^e	I_5^e	I_6^e	...
GP Income	0	0	0	0	0	0	0	Int_1	Int_2	R_1	R_2	I_1^p	...

Table III: Number of observations per cohort

Cohort	Range of Age	Nb. of GPs	Nb. of obs (GPs)	Nb. of executives	Nb. of obs (executives)
1978	24-50	277	5,121	109	2,343
1980	24-48	285	4,777	252	5,250
1982	24-46	223	3,332	481	8,916
1984	24-44	236	3,095	719	12,567
1986	24-42	147	1,571	935	14,834
1988	24-40	113	994	1,112	15,504
1990	24-38	108	762	1,217	15,137
All sample	24-50	1,389	19,652	4,825	74,551

- To compare the monetary value of GP and executive careers, we sum up the present values of individuals' yearly incomes, taking the same age as a starting point (hence, we encompass part of some individuals' periods of education). This gives us a measure of wealth that is comparable for GPs and executives. For this computation, we define income flow as starting from age 24, denoted Inc. Referring to examples from table II: from age 24 on (year 6), the income flow earned by the executive is $Inc = I_1^e\ , I_2^e\ , I_3^e\ , I_4^e\ , I_5^e\ , I_6^e\ , ...$; and the income flow earned by the GP is $Inc = 0\ , Int_1\ , Int_2\ , R_1\ , R_2\ , I_1^p\ , ...$ In other words, in order to take into account differences in the duration of their studies, we compare GP and executive wealth from age 24 on.

IV.3 The Cohort Pyramids

Figure 3 displays the "cohort pyramids" of GPs (on the left hand side) and executives (on the right hand side).[17]

Each cohort is defined by the year individuals turn 24. These pyramids show very different patterns. The number of executives per cohort has been growing rapidly and continuously since 1978. This results from the increase in the number of students with high level qualifications (black line) and not from demographic change (the number of births 24 years before the year considered (dotted line) is very stable across cohorts).[18]

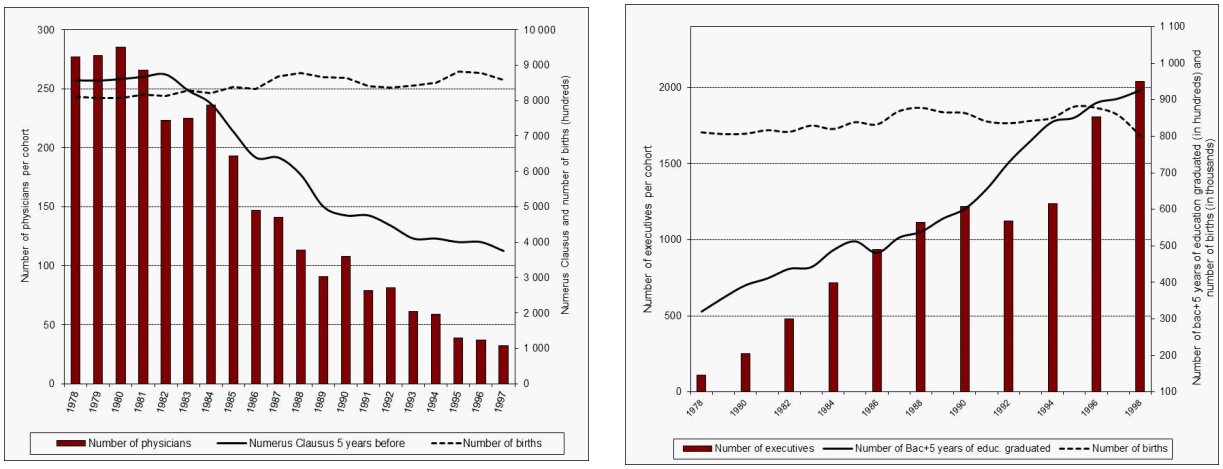
On the contrary, the number of beginning GPs has decreased continuously from 1978 on. This pattern can be explained by changes in the *numerus clausus* 5 years before each

[17] These pyramids cover a larger range of cohorts than the one used for this analysis, which runs from 1978 to1998.

[18] The decrease in the number of executives between cohorts 1990 and 1992 and the increase observed between cohorts 1994 and 1996 might seem atypical. It can be explained by changes in the unemployment rate observed for these years in France.

cohort year. The *numerus clausus* is represented by the continuous line in Figure 3. It is the number of students who are allowed to pursue medical studies at the end of their first year. Introduced in 1971, it remained fairly constant until the end of the seventies (for GPs belonging to cohorts 1982 and earlier). A restrictive policy was then implemented, with a sizeable reduction in the *numerus clausus* (see DORMONT AND SAMSON [2008] for more details).

Table III displays a detailed description of the structure of our samples for each cohort. Table IV presents the main characteristics of two cohorts, 1980 and 1990, for GPs and executives. The proportion of women is higher among GPs at all times, but both professions experienced an increase in the proportion of women. For the 1990 cohort, the proportion of women is 43.7% for GPs and 27.9% for executives. Because of their longer studies, GPs have a lower level of experience than executives in a given cohort (4.7 years versus 7.1 for executives in the 1990 cohort, for example). For each cohort, GPs' average income is higher than executives'. Individuals from the 1980 cohort have a higher income than individuals from the 1990 cohort because of their higher level of experience.



Note: A cohort is defined as the year an individual turned 24.
For GPs and executives, the dotted line represents the number of births 24 years before the cohort.
For GPs, the numerus clausus is the number of students allowed to go on with their medical studies after the first year.
The continuous line represents the level of the numerus clausus 5 years before the cohort.
For executives, the continuous line represents the number of students holding a Master's degree, a Ph.D or a "Grandes Ecoles" diploma, for the cohort.

Figure 3: Cohort Pyramids, GPs (left) and Executives (right)

V Econometric Analysis

To analyze the determinants of differences between GPs' and executives' incomes, we perform an econometric analysis on yearly income earned from the beginning of the career. Referring to the examples shown in table II, the econometric analysis uses, for executives, yearly incomes earned from year 6 on, i.e. I_1^e , I_2^e , I_3^e , I_4^e , I_5^e , I_6^e , ...; ,...; and for GPs, yearly incomes $I_1^p, I_2^p, ..$ earned later, from year 11 on. But these are examples

Table IV: DESCRIPTION OF THE COHORTS

Variable	Cohort	GPs	Executives
% of women	1980	20.6	13.9
	1990	43.7	27.9
Average Experience	1980	9.7	11.3
	1990	4.7	7.1
Average Income (€)	1980	53,189	44,598
	1990	51,191	37,498

since in reality, there is a large variability in the situations future GPs and executives experience from age 18 on, and therefore in the age they start their careers, as shown in figure 2.

V.1 Empirical Specification

Consider I_{ict} the log of income (in 2004 Euros) of individual i (GP or executive) belonging to cohort c, in year t. Our specification is the following:

$$\begin{aligned} I_{ict} &= a + X'_{it}b + Z'_i d + \varphi(t) + \beta_e + \gamma_c + u_{it} \\ &\quad \text{where } u_{it} = \alpha_i + \varepsilon_{it} \\ i &= 1, ...N; c = 1, ..., C; t = 1, ..., T \end{aligned} \tag{1}$$

Vector Z'_i denotes time-invariant variables. For physicians and executives, it includes gender and two dummies characterizing whether the individual experienced a temporary break or left the sample prematurely, during our observation period. Cohort effects γ_c refer also to time-invariant dummies.

Vector X'_{it} includes time-varying variables. More exactly, it includes one genuine time-varying variable which is recorded for executives only: the annual number of days worked. In addition, it includes indicators of location (22 regional dummies for GPs and executives), firm size and industry (for executives), type of practice (for GPs[19]), full-time work for executives. Because a non negligible proportion of individuals move from one region to another one, or switch to another industry, firm size or type of practice, these variables cannot be seen as time invariant.[20]

We have no information on physicians' work duration. Hence, to make estimations on physicians and executives comparable, our main specification does not include the annual number of days worked or the full-time indicator, although it is observed for executives. In what follows, however, to show how the results are influenced by this omission, we

[19] As stated above, GPs can have a *Mode d'Exercice Particulier* (MEP), i.e. practice certain specific activities (acupuncture, homeopathy, dietetics, etc).

[20] Indeed, about 4% of GPs and 45% of executives do not work in the same region throughout our observation period; 68% of executives do not work in the same sector throughout the period; 50% to 70% of executives do not work in a firm of the same size throughout the period. As for type of practice, almost 30 % of MEP GPs are not MEP throughout the period. As for executives, around 8% of full-time executives are not full-time throughout the period.

display the results obtained when estimating a second specification including these two variables for executives.

Our data set allows us to use a more flexible specification of the impact of experience than the traditional polynomial function. We consider experience fixed effects: $\beta_e,\ e = 1, ..., 25$, where experience is defined as the number of years which have elapsed since the beginning of the career (in the examples of table II, year 6 for the executive, and year 11 for the GP). Similarly, we consider cohort fixed effects $\gamma_c,\ c = 1978, 1980, ...1988, 1990$, where the cohort denotes the year the individual turned 24. Because of the design of the executive sample, our cohorts refer to even years only. $\varphi(t)$ is a quadratic function of time.

α_i is an individual specific effect capturing unobserved individual heterogeneity. It can be specified as fixed or random (see below). For physicians, it can refer to their ability to attract and retain patients as well as their preference for leisure in the labor/leisure trade-off. For executives, it can refer to their intrinsic motivation, their ability to negotiate their salaries at the beginning of their careers and their dynamism. These motivations and abilities can influence the age at the beginning of the career for both physicians and executives, inducing a correlation between α_i and experience.

ε_{it} is a disturbance which captures all events that decrease or increase physician or executive incomes in a given year. For physicians, it mainly refers to demand shocks (transitory increase in demand for health care due to epidemics for example) or changes in the physician:population ratio in a GP's practice area. For executives, it refers to transitory periods of unemployment. For both GPs and executives, ε_{it} also reflects transitory changes in working hours that can be voluntary or involuntary.

Model (1) includes experience and cohort fixed effects, together with a quadratic function of time. This kind of specification might occasion identification issues (Deaton [1997]). In addition to the fact that we use a quadratic function to specify time effects, we are able to avoid identification problems because of our definition of cohort and experience, and because of the variability of age at career beginning. Indeed, a cohort is defined as the year the individual turned 24, while experience is defined as the number of years elapsed since the beginning of the individual's career. Career beginning is defined, for executives, by the first year they get a full wage and, for GPs, by the year they set up their practice. As stated above, age at the beginning of the career varies between individuals (see figure 2) which prevents any colinearity between cohort and experience effects.[21]

The structure of the sample is influenced by the fact that we select beginners. In 1980, all individuals have 1 year of experience; in 1981, the sample is composed of these individuals - who then have 2 years of experience - and of newcomers, who begin their careers in 1981 and have 1 year of experience at the end of 1981; and so on until 2004. Every year, each individual's experience increases by 1. Nevertheless, identification of experience and time effects is possible because new beginners arrive every year. However,

[21] The variability in the age of career beginning does not result only from individuals who repeat years of study. For executives, there is also high variability in the number and duration of their internships (recorded in our data). There is also a great deal of variability between GPs in the time which elapses between the year of their MD (end of studies) and the year they start their practices.

time effects must be interpreted with caution since they represent changes in income from 1980 to 2004 for individuals who began their practice between 1980 and 2004 (and not for the whole population of physicians or executives who worked during the period 1980 to 2004). Another consequence of this sample structure is that the impact of every experience level cannot be identified for all cohorts; for instance, a level of experience equal to 24 years can be observed for the 1978 and 1980 cohorts only. Finally, we do not observe GPs and executives over their whole career, as they all have a maximum age of 48.

Model (1) is a random effect model which can be estimated consistently by feasible generalized least squares (FGLS), provided that variables X'_{it} and Z'_i are uncorrelated with the error term. In our case, some variables - like the regional dummies or variables indicating a transitory break or a permanent leave - are likely to be correlated with the individual specific effect α_i; as stated above, experience can also be correlated with α_i. Actually, the Hausman test for fixed effects led to the rejection of the null hypothesis that explanatory variables are uncorrelated with the individual effect α_i, indicating that the FGLS estimator is inconsistent. In this case, the within estimator provides consistent estimates, provided that the regressors are uncorrelated with ε_{it}. However, the within transformation eliminates time invariant variables, which prevents the estimation of cohort effects. The Hausman-Taylor estimator can solve this problem and to estimate cohort effects while taking into account a possible correlation between experience and individual effects α_i, we estimate model (1) by using within transformation of experience dummies as instruments for experience dummies. Because the temporal variation of regional dummies (due to moving) was too limited, we were not able to instrument these variables in the same way. In what follows we display the results given by the Hausman-Taylor estimator.[22]

As mentioned in the data section, less than 2% of executives and 2% of GPs experience a temporary break or leave the sample prematurely. These individuals are similar to the others, except that they have lower earnings, which can induce a selection bias. Because they leave the sample for reasons that are not recorded in either dataset, we cannot deal with this problem using Heckman's selection model because participation cannot be specified by a single participation equation. Following Verbeek and Nijman [1992], we simply added 2 dummies to each regression, indicating whether the GP or the executive left the sample prematurely or experienced a temporary break. This procedure does not correct for attrition bias, but it does test for its existence. Our estimates show that these dummies are jointly significant and negative, confirming that these individuals have lower earnings. However, the selection bias is likely to be negligible since the estimates of the other coefficients are not affected by the introduction of these participation dummies (most probably because very few individuals are concerned).

V.2 Results

The Hausman-Taylor estimates of experience, cohort and time effects are presented in figures 4, 5 and 6. The other estimated coefficients are displayed in the appendix. The estimated profiles of experience, cohort and time effects appeared to be significantly different between physicians and executives.

[22] Fixed-effect estimates are given in Dormont and Samson (2014). As for experience and time effects, they provide similar results to the Hausman-Taylor estimates.

Figure 4 shows that income is an increasing and concave function of experience for both GPs and executives. However, at the beginning of their careers (between 1 and 5 years), physicians have a much steeper career profile than executives. Physicians first engage in patient recruitment and their incomes grow rapidly. After 8 years of experience, they have a flatter career profile than executives. This difference is consistent with Lazear and Moore (1984), who predict that self-employed workers will have a flatter earnings-profile because they do not need productivity incentives, unlike salaried workers.

Cohort effects (figure 5) are very different for GPs and executives. For physicians, they are increasing with years. On the part of careers observed in our data set, physicians belonging to the 1980 cohort earn 10.4% more on average than those belonging to the 1978 cohort (the reference category); physicians of the 1984 and 1990 cohorts earn, respectively, 11.7% and 32.2% more than the reference category. In contrast, cohort effects for executives exhibit a much flatter profile (most cohort effects are not significantly different from 0) and are even slightly decreasing over the years.[23]

What could explain such differences in physician and executive cohort profiles? Individuals belonging to the same cohort turned 24 during the same year. Comparing figures 3 and 4 helps in understanding these cohort effects. The increase in income for recent cohorts of physicians can be explained by the decrease in the *numerus clausus* since less competition for patients between beginners favors higher income at the beginning of the practice and throughout the career (Dormont and Samson [2008]). The contrary occurs for executives where increased competition between a larger number of individuals arriving on the labor market at the same time prevents any cohort-linked increase in income. To check that cohort effects are driven by the demographic context at the beginning of GPs' and executives' careers, we estimated two simple models where these cohort effects are explained by the number of students with high level qualifications and the number of salaried workers in the tertiary sector (for executives) and by the *numerus clausus* and changes in the level of medical density (for physicians).[24] Cohort effects are correlated with these variables (the R-squared is 0.83 for GPs and 0.54 for executives), which confirms that differences in income between cohorts are influenced by the demographic context at the beginning of careers.

The estimates of time effects (figure 6) show a much faster increase in income for physicians than for executives, *ceteris paribus*. Thus, the increases in regulated medical fees that were decided on from 1980 to 2004 were highly advantageous for physicians.

Table A-I in the appendix presents the other estimated coefficients. Among executives, women earn 18.2% less than men, a gap which is consistent with that found in studies

[23] In model (1), experience, time and cohort effects are introduced additively, which comes down to assuming that the experience effect is identical accros cohorts. However, it might be possible that GPs or executives belonging to a cohort with a lower average level of income have steeper experience profiles. To examine if our specification was too constraining, we introduced interaction terms between cohort and experience ; these appeared to be non-significant. For example, over their common range of experience, there is no significant difference between the earnings profile of GPs and executives belonging to the 1978 and 1990 cohorts.

[24] We estimate two simple OLS models. For GPs, we find a negative impact on cohort effects of the numerus clausus and of the change in medical density . For executives, we find a negative impact on cohort effects of the number of students with high level qualifications and a positive impact of the level of employment in the tertiary industry .

that measure the gender gap in pay for salaried workers when controlling for various explanatory variables such as experience, industry, firm size, etc. (MEURS [2014]). As generally found in the literature, a rather small proportion of the gender gap for executives can be ascribed directly to work duration: when we do not control for the number of days worked per year or the difference between part time and full time, the gender pay gap for executives reaches 21.5%. Among physicians, women earn 39.4% less than men. Since our sample concerns Sector 1 physicians, who have fixed fees, this gender gap is entirely due to differences in activity levels, i.e. the number of consultations, since each consultation is paid at the same rate, whatever the GP's gender.

We estimated equation (1) separately for men and women. Men's and women's cohort effects are very similar, for both physicians and executives. Experience effects are very similar for male and female physicians, but differ slightly between male and female executives, with higher returns for women than for men, a result that appears to be robust when we consider within estimates. Higher returns to experience for women are quite unusual in empirical studies devoted to the gender gap. This result may be due to a selection effect, since we consider a specific population of executives.[25]

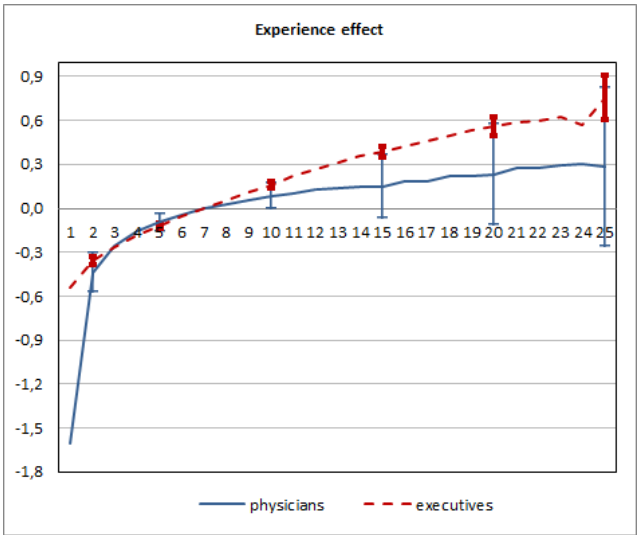
The estimation of specification (1) enables us to compute the standard deviation of disturbance ε_{it} computed at the individual level and denoted $\sigma_i(\varepsilon)$. This statistic measures the "within individual" variability of income, once all explanatory variables have been controlled for. In this case, we do not include labor duration indicators because these variables are not recorded for GPs and we need $\sigma_i(\varepsilon)$ to be comparable between GPs and executives. For self-employed physicians, this variability can be exogenous or partly chosen. Indeed, it can be due to a transitory change in demand or in the physician:population ratio, but can as well result from an individual decision to work more or less over a given year. For executives also this variability can be chosen or constrained as it can refer to transitory periods of unemployment, which may be voluntary or involuntary. The average level of individual variability is always higher for physicians (0.329) than for executives (0.287). This suggests that physicians have much more flexibility in their allocation of time throughout their careers. We find that this variability is always higher for women than for men: for physicians, it is 0.365 for women versus 0.312 for men; for executives, it is 0.312 for women versus 0.277 for men.

This shows that there is more variability in women' careers, especially for physicians. The distributions of $\sigma_i(\varepsilon)$ for men and women are displayed in figures 7 and 8 for physicians and executives. For both professions, the distribution of $\sigma_i(\varepsilon)$ for women is clearly more spread out on the right than for men, showing that a higher proportion of women experience a high level of variability during their careers.[26]

To sum up, this econometric analysis shows that GPs and executives have quite different career profiles. For recent cohorts, GPs' incomes are favored by a low level of *numerus clausus*. In addition, our findings suggest that GPs have more freedom than executives in the allocation of their working time over their lifetimes.

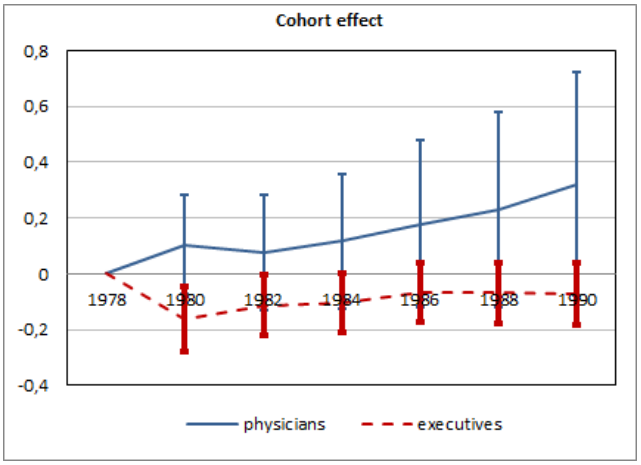
[25] Results are available on request.

[26] Individual variability is always higher for GPs than for executives, whatever their experience level. Interestingly, it does not result from the patient recruitment period at the beginning of GPs' career. For example, a higher within individual variability for GPs is still observed when we compute $\sigma_i(\varepsilon)$ on the years beyond the tenth year, for GPs and executives with experience greater than 10.



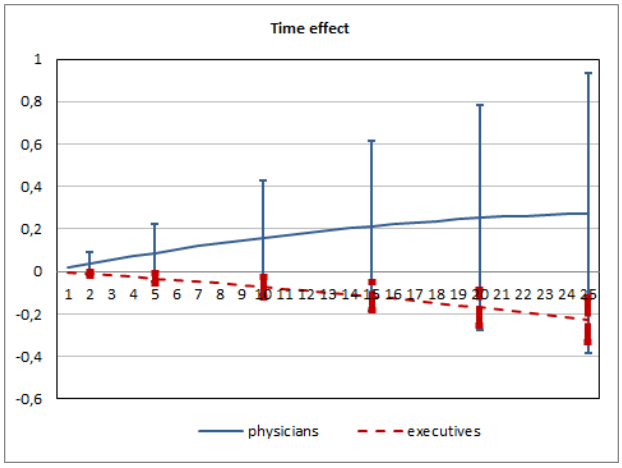
Note: This figure reports experience effects obtained by the estimation of specification (1), for GPs and executives, using the Hausman-Taylor estimator. Reference category: 7 years; 95% confidence intervals are provided for each estimated experience effects. The profiles of experience effects are significantly different for physicians and executives: p-value of the Wald test < 0.0001. Number of observations: 17,976 for GPs and 61,094 for executives

Figure 4: Hausman-Taylor Estimation of Experience Effects for GPs and Executives



Note: This figure reports cohort effects obtained by the estimation of specification (1), for GPs and executives, using the Hausman-Taylor estimator. Reference category: cohort 1978; 95% confidence intervals are provided for each estimated cohort effects. The profiles of cohort effects are significantly different for physicians and executives: p-value of the Wald test= 0.006. Number of observations: 17,976 for GPs and 61,094 for executives

Figure 5: Hausman-Taylor Estimation of Cohort Effects for GPs and Executives

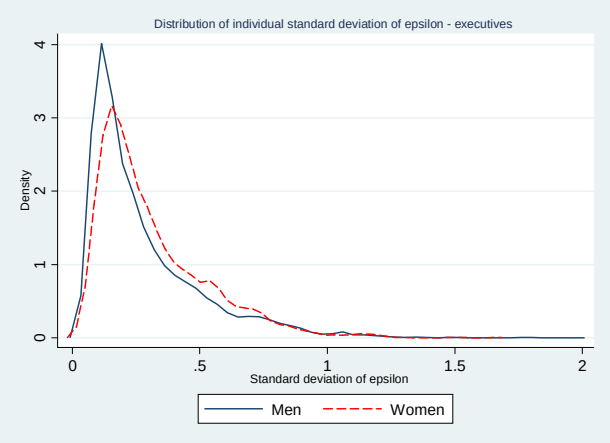


Note: This figure reports time effects obtained by the estimation of specification (1), for GPs and executives, using the Hausman-Taylor estimator. 95% confidence intervals are provided for the estimated time effects. The profiles of time effects are significantly different for physicians and executives: p-value of the Wald test= 0.0001. Number of observations: 17,976 for GPs and 61,094 for executives

Figure 6: Hausman-Taylor Estimation of Time Effects for GPs and Executives

Note: Distribution of the individual standard deviation of ϵ_{it} obtained by the estimation of specification (1) for GPs using the Hausman-Taylor estimator. Number of observations: 17,976

Figure 7: Distribution of Individual Standard Deviation of Epsilon - GPs



Note: Distribution of the individual standard deviation of ϵ_{it} obtained by the estimation of specification (1) for executives (work duration not included) using the Hausman-Taylor estimator. Number of observations: 61,094

Figure 8: Distribution of Individual Standard Deviation of Epsilon - Executives

VI Comparison of Wealth Distributions

The econometric analysis we have performed shows us how the two professions differ as concerns yearly earnings, career profiles and within-individual income variability. However, it does not enable us to compare the present values of GP and executive careers. A wealth comparison can give some insight into the attractiveness of a GP's career, even though our analysis is limited to a monetary approach.

We compute wealth for each individual by totalling yearly incomes. To perform a relevant comparison, we now take the same age as our starting point. While our econometric estimates were performed on income from the beginning of the career (I), we now consider income from the age of 24 on, denoted Inc. In the examples provided in table II, it is the flow of income received from year 6 on, i.e. $Inc = I_1^e\ , I_2^e\ , I_3^e\ , I_4^e\ , I_5^e\ , I_6^e\ , ...$ for the executive, and $Inc = 0\ , Int_1\ , Int_2\ , R_1\ , R_2\ , I_1^p\ , ...$for the GP. This definition of income encompasses periods of education for some individuals: it includes zeros for executives who start their careers after age 24 and for doctors, it takes into account their longer education, with zero incomes until year 6 and low incomes from internships and replacements of other doctors afterwards, before they set up their own practices. This definition of income flow enables us to take differences in the duration of education into account when calculating wealth.

Figure 9 displays the values of median incomes (Inc) by age for GPs and executives. It shows that the median income of GPs is lower than that of executives until age 32. After that age, GP median income is higher, which eventually provides a pay-off for their higher investment in education.

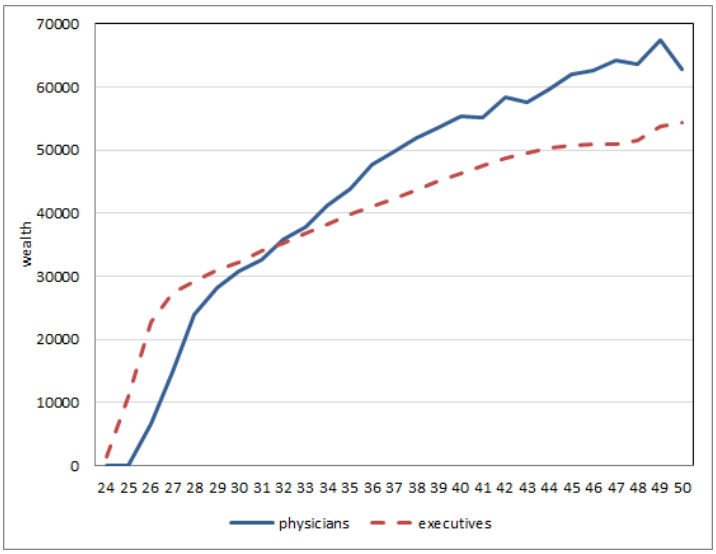


Figure 9: GPs and Executives Annual Income from the Age of 24 on (Including Zeros for Education and Small Revenues from Interships and Replacements). Median by Age.

Wealth is defined as follows:

$$W^j(a) = \sum_{\tau=24}^{a} \left(Inc_\tau^j / (1+r)^\tau \right) \quad , \tag{2}$$

with $j = e$ (executives) or p (physicians). r is a discount rate set at 3 %, with alternative hypotheses of 1% or 5 %. Although the appropriate concept for comparing careers is lifetime wealth, we consider a definition of wealth $W^j(a)$ for different ages. Indeed, we know that doctors are likely to earn less than executives at young ages because of their longer studies. If doctors' higher investment in education pays off at some point, it is important to compare wealth at different ages. The composition of our samples varies when we consider different ages for wealth computation since, while age span lies between 24 and 50, recent beginners are not observed beyond age 38 (see table III).

We compare wealth distributions for GPs and executives using stochastic dominance analysis to see if it pays to be a GP. Stochastic dominance analysis allows us to compare earnings distributions. Indeed, information about the mean and the variance of wealth is not sufficient because, under the "veil of ignorance", an individual choosing between a GP and an executive career does not know where he/she will be situated in the wealth distribution.

Following the methodology set up by Davidson and Duclos [2000] and used by Lefranc et al [2004], we ran non-parametric tests of stochastic dominance to compare and order GP and executive wealth distributions. Consider F and G, the wealth distribution functions of GPs and executives. Consider a given level of wealth $x \geq 0$. $F(x)$ and $G(x)$ give the proportion of GPs and executives whose wealth level is lower than or equal to x. The distribution of GPs (F) dominates that of executives (G) at the first-order if, $\forall x,\ F(x) \leq G(x)$, with one strict inequality ($\exists\, x \mid F(x) < G(x)$). This criterion does not

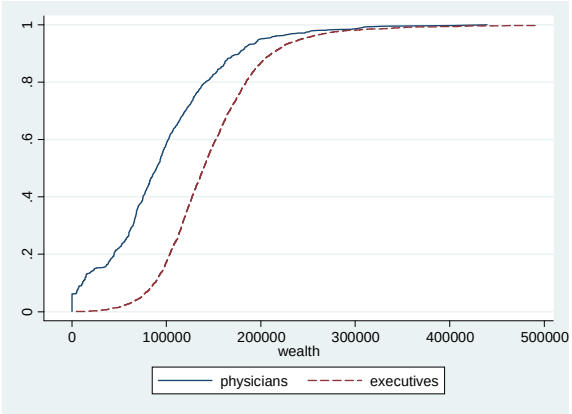
make it possible to order distribution functions which intersect. In this case, we can use the second-order stochastic dominance criterion. The distribution of GPs (F) dominates that of executives (G) at the second-order if $\forall x, \int_0^x F(t)dt \leq \int_0^x G(t)dt$ (with one strict inequality). Stochastic dominance can be interpreted in terms of poverty indices of order s ($s = 1$ or 2 in our case) and defined by: $D^s(z) = \int_0^z (z-x)^{s-1} dF(x)$, where z is a "poverty line". In practice, the stochastic dominance tests of order 1 and 2 involve testing the inequality $D_F^s(z) \leq D_G^s(z)$ for a set of different possible poverty lines z. We used 19 poverty lines: the $5^{th}, 10^{th}, 15^{th}, ..., 95^{th}$ percentiles of the GPs' and executives' wealth distribution functions.

If people with the required capacities can choose freely between a GP and an executive career, long-run equilibrium should imply a higher return to studies for GPs that compensates for their higher investment. Consequently GPs and executives' wealth distributions should not differ significantly at equilibrium.

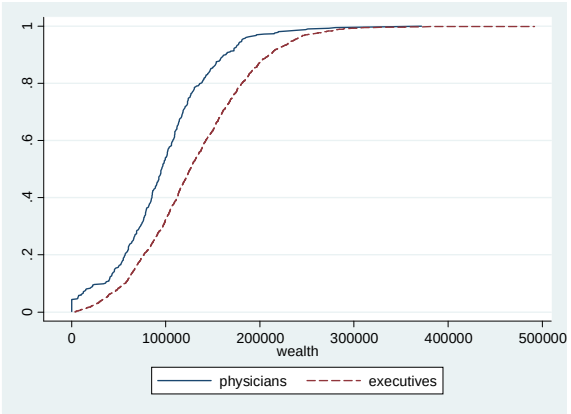
Our stochastic dominance analysis was performed for men and women separately, and for wealth computed at ages 30, 40 and 48. The cumulative distribution functions of wealth are given in figures 10, 11 and 12. When wealth is computed at age 30, we find that the wealth distribution function of executives dominates the wealth distribution function of GPs at the first order for men and women. When people are 40, the wealth distribution function of executive still dominates the wealth distribution function of GPs, but at the second order only, for men and women. At the age of 48 (the oldest age we are able to consider), the results differ strikingly between men and women. For men, GP and executive wealth distribution functions are not significantly different. Conversely, for women, the wealth distribution function of GPs dominates the wealth distribution function of executives at the first order.[27]

These results show that the pay-off for higher investment in education implied by medical studies takes a certain amount of time to become effective: it is not yet realized at the age of 40. At the age of 48, we find that it is more profitable for a woman to be a GP than an executive, whereas, for a man, there is no monetary advantage or disadvantage in being a GP rather than an executive.

[27] Our conclusions might be affected by a cohort effect. We therefore compared the wealth distribution functions of two different groups of cohorts (1978 to 1982 and 1984 to 1990), at the same ages (30 and 40 years old). Our conclusions remain identical at these two ages, when wealth distributions are computed for these two different groups of cohorts.

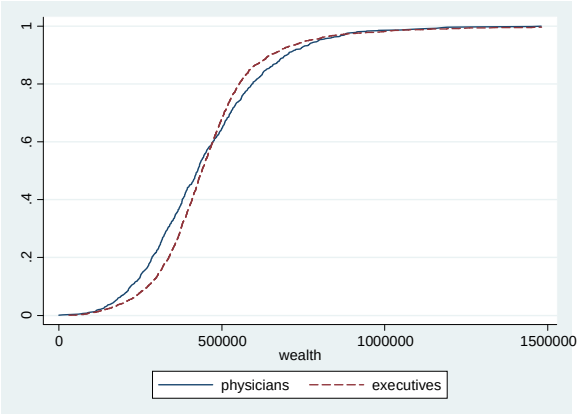


Men - wealth at age 30

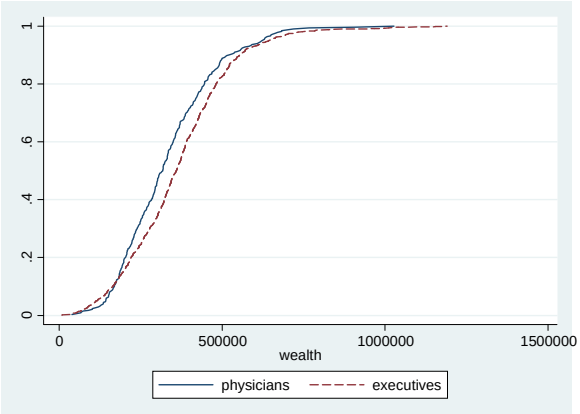


Women - wealth at age 30

Figure 10: Comparison of Wealth Distribution Functions at the Age of 30

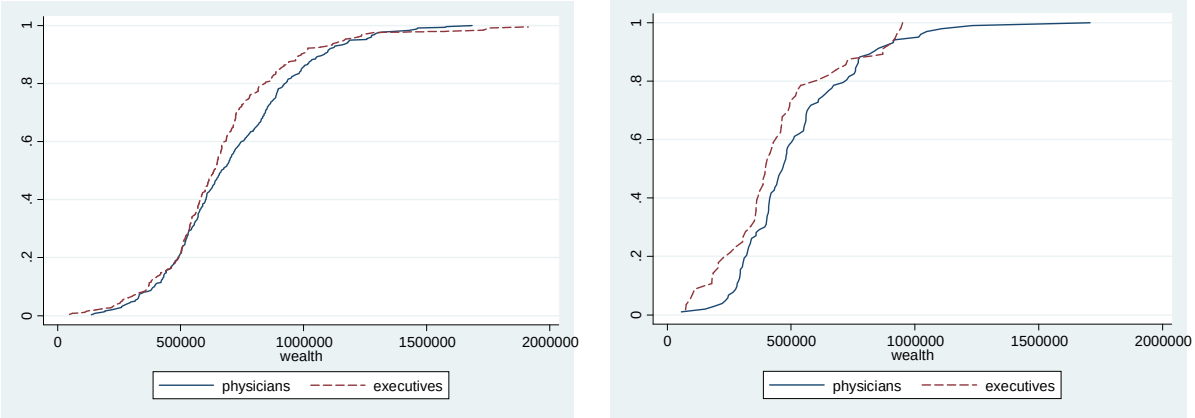


Men - wealth at age 40



Women - wealth at age 40

Figure 11: Comparison of Wealth Distribution Functions at the Age of 40



Men - wealth at age 48

Women - wealth at age 48

Figure 12: Comparison of Wealth Distribution Functions at the Age of 48

VII Conclusion

Does it pay to be a GP in France, or should the National Health Insurance raise doctors' fee rates? For men, our findings show that there is no monetary advantage or disadvantage to being a GP rather than an executive. To justify a demand for higher fees, GPs would have to prove that there are specific disutilities associated with their profession, for example, longer working hours. Compared with executives, however, it does not seem that GPs spend more time working.

Our econometric analysis shows that self-employed GPs have a flatter career profile than executives and that for recent cohorts, GPs' incomes have been favored by a low *numerus clausus*. In addition, our findings suggest that GPs have more freedom than executives in the allocation of their work time over their lifetimes.

It is true that GPs have longer studies than executives. Our findings show that the pay-off in terms of wealth for their higher investment in education takes a long time to become effective and is not yet realized at age 40. At age 48, the wealth distributions of male executives and male GPs do not differ significantly. Moreover, since average GP income exceeds average executive income from age 32 on, it is very likely that male GPs' wealth distribution functions dominate male executives' wealth distribution function at older ages. In France, as in most other countries, GPs have lower incomes than specialists: in 2004, average monthly income for GPs was around 5,000 €, versus 8,500 € for specialists. Hence, specialists most certainly have a monetary advantage with respect to executives.

Despite their favorable monetary situation, GPs recently succeeded in convincing the National Health Insurance that they were treated unfairly. Their fees were raised by 4.5% (2011) and a new payment-for-performance scheme (bonuses linked to indicators of care quality) has resulted in an additional increase in GPs' earnings of about 7.6 % (2012). These measures will probably favor GPs over executives in the future. However, this relative advantage of GPs might be reduced because the *numerus clausus* recently increased. Indeed, our estimations show that there is a link between the value of the

numerus clausus and permanent cohort effects that influence GPs' earnings throughout their careers.

For women, our findings show a clear monetary advantage to being a GP rather than an executive. At age 48, the oldest age our sample allows us to consider, the GP wealth distribution function for women dominates that for executive women at the first order.

But is only a monetary advantage at stake? In fact, a self-employed physician is able to allocate work time freely, over the week and over a lifetime. The causes of the gender gap in pay are different when income depends on the number of consultations with fixed fees rather than on the processes of hiring, wage setting and promotion within a firm. As shown by Goldin [2014], one cause of the gender gap in pay is management techniques that result in earnings that are non-linear with respect to hours. For some professions, including executives, earnings have a non-linear relationship to hours and there is a high penalty for a flexible schedule, which is sought mostly by women who are caring for children. In contrast, being a GP with fixed fees per consultation is close to the perfect linear-in-time earnings (even with fixed expenses for the office, etc.). Our findings show that, for women, being a GP is clearly more advantageous than being an executive.

In France, it is commonly stated that the profession of GP is not financially attractive and that this explains the rise in the proportion of women among GPs. Our findings tell another story. For men, there is no difference in being an executive rather than a GP, but it is more advantageous for women to be a GP. The relative return on medical studies is higher for women. This explains the large proportion of female GPs and the strong increase in the share of women among medical students.

VIII Appendix

Table A.I: Regression Estimates - Hausman-Taylor estimator

	Log(Income) GPs	Log(Income) Executives (1)	Log(Income) Executives (2)
Variables common to GPs and executives			
Experience effects		See figure (4)	
Time trend		See figure (5)	
Cohort effects		See figure (6)	
Female	-0.394***	-0.182***	-0.215***
	(0.056)	(0.013)	(0.014)
Temporary Break: Yes	-0.201	-0.008	-0.042**
	(0.125)	(0.011)	(0.012)
Leave Prematurely the sample: Yes	-0.241***	-0.032**	-0.109***
	(0.070)	(0.013)	(0.014)
Regional Dummies	Yes	Yes	Yes
Variables specific to GPs			
MEP Physician: Yes	-0.029	-	-
	(0.034)		
Nb. of years between MD and	0.006	-	-
1rst year of practice	(0.016)		
Variables specific to executives			
Log (number of days worked)	-	0.639***	-
		(0.004)	
Full time work: Yes	-	0.284***	-
		(0.006)	
Firm size [50-99]	-	0.037***	0.042***
		(0.006)	(0.007)
Firm size [100-199]	-	0.028***	0.055***
		(0.006)	(0.007)
Firm size [200-499]	-	0.021***	0.058***
		(0.005)	(0.006)
Firm size [500-1999]	-	-0.005	0.028***
		(0.005)	(0.057)
Firm size [>2000]	-	-0.018***	0.011***
		(0.005)	(0.006)
Industry Dummies	-	Yes	Yes
Constant	10.469***	6.373***	10.719***
	(0.165)	(0.059)	(0.058)
Number of observations	17,976	61,002	61,094

Notes: *** stands for statistical significance at 1%, ** at 5% and * at 10%. Dependent Variable: Logarithm of income for both GPs and executives, where income is defined as the annual level of income net of all contributions, and before income tax. Method: Hausman-Taylor estimation of model (1). Estimated experience, time and cohort effects are displayed in Figures 4-6. Details on estimated Regional and Industry dummies are given in Dormont and Samson (2014).

IX References

Cutler, David M. and Dan P. Ly (2011). "The (Paper) Work of Medicine: Understanding International Medical Costs", *Journal of Economic Perspectives,* Vol. 25, n°2, p. 3-35.

DAVIDSON, Russell AND Jean-Yves DUCLOS (2000). "Statistical inference for stochastic dominance and for the measurement of poverty and inequality", *Econometrica,* Vol. 68, p.1435–1364.

DEATON, Angus (1997). *The Analysis of Household Survey: a Microeconometric Approach to Development Policy.* The John Hopkins University Press.

DORMONT, Brigitte AND Anne-Laure SAMSON (2008). "Medical demography and intergenerational inequalities in General Practitioners' earnings", *Health Economics*, Vol. 17, p. 1037-1055

DORMONT, Brigitte AND Anne-Laure SAMSON (2009). "Démographie médicale et carrières des médecins généralistes: les inégalités entre générations", *Economie et Statistiques*, Vol. 414, p. 3-30

DORMONT, Brigitte AND Anne-Laure SAMSON (2014). "Does it Pay to be a General Practitioner in France?", *Document de travail Legos,* n°1/2014.

EICHER, JC., LEVY-GARBOUA, L. *et al.* (1979). *Economique de l'éducation: travaux français*, Paris: Economica.

FRIEDMAN, M. AND Simon KUZNETS (1945). *Income from Independent Professional Practice.* National Bureau of Economic Research: New-York.

GOLDIN, Claudia (2014). "A grand Gender Convergence: Its Last Chapter", *American Economic Review*, Vol. 104, n°4, p. 1091-1119

HAMILTON, Barton H. (2000). "Does enterpreneurship pay? An Empirical Analysis of the Returns to self-employment", *Journal of Political Economy,* Vol. 108, n°3, p. 604-631

KETEL, Nadine, Edwin LEUVEN, Hessel OOSTERBEEK AND Bas VAN DER KLAAUW (2013). "The returns to medical school in a regulated labor market: Evidence from admission lotteries", Working Paper

LAZEAR, EP. AND RL. MOORE (1984). "Incentives, productivity, and labor contracts". *Quarterly Journal of Economics,* Vol. 99, p. 275–296.

LEFRANC, Arnaud, Nicolas PISTOLESI AND Alain TRANNOY (2004). "Le revenu selon l'origine sociale", *Economie et Statistiques,* Vol. 371, p. 49–82.

MOEURS, Dominique (2014). Hommes/Femmes: une impossible égalité professionnelle?", Opuscule du CEPREMAP n°32.

NICHOLSON, Sean AND Carol PROPPER (2012). "Medical Workforce" in *Handbook of Health Economics Volume 2*, ed. by M.V. Pauly, T. G. McGuire and P.P. Barros, North Holland, p. 873-925.

VERBEEK, Marno AND Theo NIJMAN (1992). "Testing for selectivity bias in panel data models", *International Economic Review*, vol. 33, p. 681-703

WEEKS, William B., Amy E. WALLACE, Myron M. WALLACE AND H. Gilbert WELCH (1994). "A comparison of the educational costs and incomes of physicians and other professionals", *New England Journal of Medicine,* Vol. 330, n°18, p. 1280-1286

WEEKS, William B. AND Amy E. WALLACE (2002). "The more things change: revisiting a comparison of educational costs and incomes of physicians and other professionals", *Academic Medicine,* Vol. 77, n°4, p. 312-319

WELCH, Finnis (1979). "Effects of Cohort Size on Earnings: The Baby Boom Babies' Financial Bust", *Journal of Political Economy,* Vol. 87, n°5, p. S65-S97