Gender Differences in the Incomes of Self-employed French Physicians: The Role of Family Structure

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Abstract:

In France, as in most OECD countries, the average income of female physicians remains much lower than that of their male counterparts. This paper analyses how much of the gender earnings gap among self-employed physicians is due to women's greater family responsibilities taking into account the medical and the opportunity to charge extra-billings.

We identify how a child birth affects the income of female physicians relative to male physicians. This issue is crucial is for regulators because such changes may influence future access to care for patients. We use a rich and exhaustive administrative database that merges information on the medical activity, earnings, and family structure of self-employed doctors for 2005, 2008 and 2011. First, we use the database for 2011 to analyse the gender earnings gap and we show that female physicians exhibit an annual earnings gap that varies according to family structure (demographic and professional characteristics being controlled). In other words, having young children worsens the situation of female physicians, particularly for GPs. Then we use the panel and we show that parenthood does not seem to have a causal effect on men's earnings, whereas the effect is significantly negative for women but does not result from a negative selection effect. The decrease in female physicians' income appears to be largely concentrated around childbirth dates. We do not highlight any real strategic behaviour of female doctors authorized to charge extra fees to increase their extra-billings after a birth to maintain their previous income.

JEL Classification: *I11, J12, C23*

Keywords: *physicians' income, fee-for-service, gender, maternity*

1. Introduction

1.1 Background

More than 200,000 physicians provide care services today in France, the majority of them (60%[1]) being self-employed and owning a private practice. Their earnings, particularly for specialists, are quite high compared with not only other liberal professions but also salaried executives (Drees, 2016) like in the majority of OECD countries (OECD, 2015). However, income disparities between self-employed doctors in France are very large, and one of the most salient disparities is due to gender, regardless of specialty. Women receive significantly less income than men (approximately one-third less; see Dumontet and Franc [2014] or Mikol and Pla [2015]).

Moreover, in France, as in most OECD countries, the share of female physicians has increased significantly over the past two decades (Drees, 2016; OECD, 2006; OECD 2008). In 2015, women represented 43% of all French physicians, compared with 30% in 1990. They now account for the majority of active physicians aged under 55 (Drees, 2016). This feminization trend is also observable among self-employed doctors, although female physicians tend to work more frequently as salaried employees than do their male colleagues.

The gender income gap is obviously not limited to self-employed physicians (Morin and Remila, 2013; Insee, 2015). This issue has been mostly documented for salaried workers, showing that the gender income gap is largely explained by women's lower working hours and more frequent career breaks (INSEE, 2012), which are often driven by family responsibilities. Among salaried workers, the presence of children is associated with strong earnings penalties for women (Meurs, Pailhé and Ponthieux, 2014). Does this association also exist for physicians, particularly for private practitioners, who have more flexibility to choose their level of activity? The objective of this paper is therefore to study the effects of family environment and its changes – particularly the birth of a new child – on young, self-employed physicians' income. More specifically, we study the effects of the physician's family environment on income in terms of the doctor's gender.

1.2 French context

In France, the fee-for-service (FFS) system applies to both regulated-fee and free-billing practitioners and provides an interesting setup to examine this question. More precisely, physicians can sign two different contracts with French Public Health Insurance (PHI): sector 1 or sector 2. Physicians belonging to sector 1 must apply fixed grid prices, referred to as regulated or reference prices, for most of their services and for any patient; they are not permitted to bill freely. By contrast, physicians belonging to sector 2 freely set prices for any service and for any patient (except for the poorest) within "ethical" limits[2]. The final price of each service is then equal to the sum of the corresponding "regulated price" (*i.e.*, what these physicians would have charged for this service had they belonged to sector 1) and what we will call "extra-billings". Sector 2 physicians are essentially specialists[3]. On the patient side, patients freely choose to consult a sector 1 or 2 physician, and PHI will always reimburse 70% of the service reference price, regardless of

[1] Source: French Health Directory of Health Professionals (RPPS), Drees, Ministry of Health.

[2] In exchange, PHI subsidizes a share of social insurance contributions and pension savings for sector 1 physicians only.

[3] Some conditions are required to join sector 2, such as having run a qualifying university teaching and hospital practice for at least 2 years (for instance, ex-clinic supervisors). Such practices are not generally available to GPs, whose duration of studies is shorter than those of specialists.

the physician's sector. The remaining 30% (copayments) and potential supplements (extra fees in sector 2) are covered by the patient himself or through private health insurance contracts[4].

Although women tend to prefer salaried positions, the increasing share of women among self-employed physicians makes identifying the differential effects of changes in family structure on the incomes of male and female physicians a growing concern for regulators. Indeed, in France, where primary care is largely provided by self-employed physicians (general practitioners (GPs) as well as specialists such as ophthalmologists, psychiatrists, gynaecologists and paediatricians), such a demographic trend could become problematic considering the increasing need of the population for primary care services. Providing sufficient financial incentives for female physicians to work as self-employed in the future should thus be considered an important issue, particularly when maternity occurs; in such situations, the financial compensation provided by the maternity allowance is very low compared with the normal income of salaried female physicians. This question is precisely at the core of the actual French debate over the improvement of working conditions of female private physicians, with the recent proposal to implement a new maternity allowance during pregnancy[5]. This maternity allowance is supposed to make this type of practice more attractive by reinforcing the existing modest maternity benefit. Such a new maternity allowance[6] was initially only intended for women who commit themselves not to charge extra fees but is now intended for all self-employed female physicians.

To date, this question about the effect of family structure on income of female physicians has never been studied in France. The corresponding literature on the *"family gap"* focuses primarily on salaried workers and remains quite poor compared with studies based on English or American data, mostly because of a lack of appropriate data in France (Meurs, Pailhé and Pontiheux, 2014). **Our contribution is to use an original and exhaustive administrative database on physicians to study the effect of having a new child on young self-employed physicians' income.** This rich dataset merges individual information on doctors' activity provided by the PHI (Caisse Nationale d'Assurance Maladie des Travailleurs Salariés, CNAMTS) and doctors' individual information on earnings based on household tax income declarations. It covers the entire self-employed physicians' population for 2005, 2008 and 2011. Focusing on doctors, our study eliminates potential income heterogeneity due to high differences in qualifications, unlike the majority of other gender gap studies, which generally cannot afford to do so. Another strength of this work is that it covers all medical specialties, while the vast majority of the French literature on physicians' earnings paths has largely focused on GPs[7]. We restrict our population of interest to "young physicians" (aged 50 or below), who are most likely to have experienced this type of family event in a relatively recent period.

1.3 Brief literature review

Empirical studies on panel data typically find a significant wage penalty for women after the birth of a child, which increases with the number of children (approximately 2% to 10% for the first child and 10% to 15% beyond the second one compared with a situation without children; see Meurs *et al.*, 2014). Among physicians, such a family gap was highlighted by Sasser (2005) in an analysis of US data for self-

[4] Coverage levels for supplements vary considerably between contracts.
[5] Social Security Financing Act Project for 2017 (*Projet de loi de financement de la sécurité sociale pour 2017*).
[6] This new maternity allowance is supposed to be approximately € 3100 per month for at least three months, in addition to the existing modest allowance from PHI.
[7] See, for example, Dormont and Samson (2008, 2011), Samson (2011), Coudin, Pla and Samson (2015), Dumontet (2015).

employed and salaried physicians. The author showed that an increasing number of children significantly increased the pay gap between men and women; the decrease for women was mostly explained by the decline in their annual working hours following a birth, whereas their productivity did not seem to be affected by successive births.

The wage decrease associated with children (referred to as "wage penalty" in the remainder of the paper) for working mothers is driven by several factors. Having a new child generally affects the allocation of time spent between different activities within the household: work, leisure and housework. As a first consequence, the time devoted to caring for and educating the child directly reduces the time allocated to other activities, particularly to professional activity and particularly for self-employed workers. In couples, because women remain the providers of the majority of parenting tasks (Brousse, 2015), women are more often the ones who reduce their professional activity (Regnier-Loilier, 2009). Such a drop in working hours, driven by either career interruptions or part-time schedules, leads to a decrease in earnings. Some "second-order" effects can also magnify this decrease in earnings. The literature on salaried workers shows, for instance, that the loss of seniority and professional experience following such career breaks can significantly contribute to lower wages (Mincer and Polachek, 1974). Becker (1985) adds that the increase in parenting tasks could decrease the amount of "energy" that a worker invests in each hour worked, which could bring down his productivity (and is therefore likely to reduce his pay) or could lead him to quit his job for a less intensive one (but, therefore, often less well paid). These latter mechanisms are most likely less effective in the case of self-employed doctors, at least for those in sector 1, for whom prices are regulated and consultation duration assumed constant. However, in sector 2, extra-billings could be decreased for physicians who must reduce their working hours because such a reduction could deteriorate what patients perceive as the "quality" of the practice. Such a mechanism was particularly highlighted by Goldin (2011) for highly skilled professions, such as lawyers.

Moreover, having a new child tends to increase household financial needs (Hood and Martin, 2015). In other words, it tightens budget constraints, which can also lead to an increase in the number of hours worked, according to any model of utility maximization built on the classical "work/leisure" trade-off. The magnitude of such an effect will also depend upon the spouse's income under the assumption that individual choices regarding work duration are endogenously correlated between spouses; this mechanism is documented in the literature on "collective models" (Chiappori *et al.*, 2002). The "spouse" dimension is even more relevant for physicians because partners of female physicians typically belong to the same socioeconomic status, which is much less the case for male physicians' spouses (Attal-Toubert and Legendre, 2007).

Many other studies have also shown differences in medical practice between male and female physicians. Because these differences are likely to influence the magnitude of the doctor's gender income gap, it is essential to briefly discuss some of them. For example, the results from studies on GPs indicate that consultation lengths are not homogeneous among physicians, and consultations are generally longer for women (Jakoubovitch *et al.*, 2012 and Breuil-Genier and Goffette, 2006 on French data; Martin et *al.*, 1997 on Australian data; Car-Hill *et al.*, 1998 on English data). Moreover, Rizzo and Zeckhauser (2007) show that, compared with female doctors, U.S. male doctors are more likely to shorten their consultation lengths to see more patients for the same worked duration when their income falls below their "income reference" (*i.e.*, the income they consider to be suitable in view of their experience). In France, sector 2 is generally associated with longer consultation durations (Gouyon, 2009 for specialists; Clerc *et al.*, 2011 for GPs). Concerning the content of care provisions, international studies show that female physicians often provide less invasive procedures than do men for the same treatments; in particular, they spend more time than men do to provide prevention (see Borges Da Silva *et al*., 2013 concerning the treatment of

diabetic patients in Quebec). Male and female physicians also differ by their prescribing behaviours; for example, French female GPs tend to prescribe less antidepressants than do their male counterparts (Dumesnil *et al.*, 2012).

Given the differences in both medical practice and trade-offs following a change in family structure, as this brief literature review suggests, the effect of having a new child on income can be quite different between male and female physicians. Our main results confirm that the gender income gap is wider for physicians who have children, to the disadvantage of women. We show that having a new child significantly retards for female married physicians the growing trend of earnings early in the career, regardless of billing sector. In contrast, no downward effect of children is observed on male physicians' earnings. Moreover, no real strategic behaviour of sector 2 female physicians consisting of charging more extra fees after a birth to maintain their income could be highlighted here.

1.4 Schedule

The rest of the paper is structured as follows. After briefly presenting the main trade-off involved in the French self-employed doctor family gap in section 2, we provide summary statistics on the activity and income of male and female self-employed physicians. In section 3, we describe our data and our empirical strategy. Section 4 presents a cross-sectional analysis of the doctor gender gap based on the most recent year of our data (2011). In section 5, we use a fixed-effects model to analyse the panel datasets from 2005, 2008 and 2011 to estimate the child income penalty for male and female married physicians. Section 6 presents a discussion and conclusion.

2. Effect of having children on income: what are the main trade-offs for French doctors?

There are specific dimensions explaining how the birth of a new child is likely to affect the income of French self-employed doctors. Here, we highlight the main factors to consider in our empirical analysis.

Because self-employed doctors are primarily remunerated based on FFS, physicians have considerable flexibility in the choice of labour supply compared with salaried employees. In theory, each physician can adjust the number of working hours based on both time and budget constraints, which are likely to be tighter after the birth of a new child. However, in practice, physicians are also constrained by demand, which is closely related to local medical density; in high-density areas, for instance, thanks to the presence of many other nearby doctors, a physician will have more opportunities to reduce the number of consultations provided. Conversely, it can be more difficult to increase the provision of care in such areas without implying supply-induced demand mechanisms, a well-known drawback of FFS with regulated fees that has been highlighted among French GPs by Delattre and Dormont (2000, 2003).

Moreover, changes in physicians' working hours do not translate into the same changes in earnings. For instance, possibilities exist for doctors to lower working hours but maintain (or avoid too much decrease in) income:

- *Consultation lengths*: A doctor can reduce his average consultation length (home and/or office visits) to provide the same amount of care in a shorter time by increasing his productivity. Such a phenomenon cannot, however, be elucidated here because our data do not contain any information on working hours (see section 3).

- *Content of activity*: Physicians can be encouraged to provide more invasive procedures because they are often more lucrative (*e.g.*, ECG monitoring or other extensive examinations, cervical smears, and biopsies) to keep their earnings high but work fewer hours. However, some of these "technical procedures" (as we will call them in the following sections) also require significant time to implement and can ultimately lengthen the duration of consultations.

- *Case mix*: The implementation of additional annual lump-sum payments to FFS could lead physicians to strategically choose their patient base by choosing the most profitable cases. For instance, because there are specific payments for the management of enrolled patients with chronic diseases, a physician can choose to increase the proportion of these patients to maintain high earnings but provide fewer consultations. In that case, however, the effect on working hours is uncertain because the management of patients with chronic diseases typically requires a longer consultation duration (Breuil-Genier and Goffette, 2006).

- *Side-salaried activities*: Approximately one-third of self-employed physicians choose to spend some of their time providing health care to patients as salaried employees (see below). For example, many French GPs work in a hospital, nursing home, or nursery in addition to their private practice activity (Jakoubovitch *et al*., 2012). However, the received wages are generally very low compared with the earnings derived from private practice (less than 10% on average; see Mikol and Pla, 2015).

Moreover, sector 2 physicians have the possibility to charge extra-billings in addition to regulated fees. For example, increasing their share of extra-billings (relative to regulated fees) could help them to maintain their earnings but work fewer hours, which could be more compatible with new family responsibilities after a child's birth. This statement can be especially true in the case of a very low maternity allowance: when deciding to start a private practice, female doctors could be attracted by sector 2 because it would allow them to compensate for a reduction in their care provision at a certain point in time by an increase in their rates. However, such behaviour may have a potential effect on the demand side of care: patients are not necessarily willing to pay more, and they may consider that by reducing his/her working time, a doctor reduces his/her involvement, and particularly, his/her availability. From a societal perspective, productivity decreases significantly. This mechanism was highlighted by Goldin (2011) and is particularly true for patients whose health insurance contract does not cover extra-billings as well as for those who can easily find cheaper physicians (or sector 1 doctors) (Dormont and Peron, 2015).

Based on the literature, it appears crucial to consider in the analysis of a birth effect on earnings of self-employed physicians the *content* of care provision (*case mix*, share of technical procedures, and side-salaried activities), the amount of extra-billings for sector 2 doctors and demand-related characteristics (*e.g.*, local medical density). Spousal income is also an important variable to consider.

3. Data

We use a French exhaustive administrative file at the doctor's level that merges information on activity provided by the PHI (CNAMTS) and information on income based on household tax income declarations (French Ministry of Finance, DGFiP). The file includes the entire self-employed population for 2005, 2008 and 2011. The panel structure of our data enables us to observe physicians' career and earnings paths over this period.

3.1 Household tax declarations

Tax data are derived from the annual tax income returns of doctors; the total net revenue from private practice[8] and the wages from potential side-salaried activities are available for 2005, 2008 and 2011. The dataset also includes activity-related benefits, if any (for example, maternity allowance).

Some information required to compute taxes is also available: spouse's age and labour income (if any), the number of children and their respective years of birth. For 2011, we also have information on the physician's cohabiting partner (if any) and his/her earnings through the partner's corresponding tax income returns[9]. This information is used in the next two sections (sections 4 and 5), in which we precisely analyse the gender income gap for the entire population of physicians in 2011. Such information on cohabiting partners is unfortunately not available for 2005 and 2008. Therefore, section 6, which explores the panel structure of the data, is restricted to married physicians (including those living under a civil partnership, "PACS").

[8] This revenue largely corresponds to the total fees earned by the private practitioner minus all professional expenses (such as social contributions, office rent, and secretarial services).

[9] In France, only married couples and those living under a civil partnership ("PACS") are allowed to declare income together.

3.2 Activity and fees from PHI

Data from PHI provide detailed information on self-employed doctors' activity and fees[10]. Annual total fees (TF) can be divided into "regulated fees" (RF), extra-billings, if any, and lump-sum payments for specific patients[11]. Note that the sum of RF is a good approximation of the physician's workload because regulated prices are assumed to depend upon, for example, consultation duration and technical difficulty.

PHI data include variables to characterize physicians' activity: number of consultations, share of extra-billings (relative to RF), share of technical procedure compensations relative to TF, patient case mix[12], physician seniority as self-employed (duration from the date of installation in private practice), and location (which can be used to compute the local medical density[13]).

Note that PHI information on a physician owning a private practice refers to the *total activity performed in his name*, whether that activity comes from the physician himself or from a locum. If a physician had to be replaced by a locum doctor for a long portion of the year, PHI information related to the physician's annual fees or provision of care is no longer relevant, which is why we use in our study income-related variables from tax return data. However, variables related to the patterns of activity (*e.g.*, shares of extra-billings, shares of technical procedures, and case mix) remain used as factors explaining the TF. Such ratios would indeed be relatively unaffected by locum temporary placements, assuming that the locum type of practice is very close to that of an established physician.

3.3 Physician population

To target physicians around childbearing age, we limit our study to doctors 50 years old or less in 2011. This restriction reduces by two-thirds the size of our sample, leaving 37,000 doctors in 2011 because of the advanced age of doctors today. However, narrowing the age range of our population of interest is also useful to remove some disturbances that are not linked to such family event effects, such as structural differences that exist today between young physicians and their elders in terms of activity and income (Mikol and Pla, 2015).

All medical specialties are represented in our population, except those for which owning a private practice is too unusual (internal medicine, neurology, geriatrics, nephrology, haematology, oncology, cytopathology, pathology, endocrinology, and stomatology) or for which the share of men is too low (such as non-surgical gynaecologists). Such specialties account for less than 5% of self-employed physicians aged below 50. Full-time hospital employees are then also excluded even when they report a side self-employed activity (4% of the sample), as are physicians who do not report any income from their private practice in their tax return during the current year of observation (*i.e.*, full-time salaried or inactive doctors, who represent only 3% of the remaining physicians). Our final sample includes 32,700 physicians in 2011.

[10] We have information only on doctors who received at least 1 euro from private practice during the current year.

[11] Lump-sum payments for specific patients include lump-sum payments for children and for patients with chronic diseases (see section 2) as well as some other regulated surcharges.

[12] Share of older patients (aged 65 or more), of patients with chronic diseases ("ALD" patients), and of low-income patients whom physicians are not permitted to charge extra fees ("CMU-C" patients).

[13] Local medical density is computed for each medical specialty at the zip code level following the two-step floating catchment area method used to construct the *"Accessibilité Potentielle Localisée"* (Barlet, Coldefy, and Collin (2012)). The number of physicians at a particular location is compared with the potential demand in their entire influential zone, not only their zip code. Hence, the medical density at zip code *z* is obtained as the number of physicians located at *z* or in neighbouring zip codes divided by the population in the entire area.

4. Empirical strategy

First, using simple descriptive statistics, we study our population of young doctors to illustrate the heterogeneity of self-employed physicians in terms of professional and personal characteristics, depending upon their gender.

Then, to understand better the link between gender income gap and family responsibilities, **we initially conduct an OLS regression of physicians' earnings over all observable characteristics for the year 2011.** This year is the only one for which we have detailed information on the household structure of all physicians, regardless of whether they are married. This rich dataset enables us to consider *all* physicians from our population of interest. The cross-sectional analysis allows us to study differences in income level among doctors according to their family structure, all else equal, without considering the causal effect of a child's birth on an individual's earning path. Women with fewer labour market opportunities (or less wage-enhancing characteristics) are believed more likely to have children because of the opportunity costs of devoting more time to household production. According to these models, part of the gender earnings differential associated with marital status and the presence of children may arise from differences among women physicians with respect to unobservable characteristics, such as career commitment or underlying productivity.

Finally, **using the panel datasets in 2005, 2008 and 2011, we used a fixed-effects model to control for selection into parenthood.** Although this approach leads to restricting our study sample, such an analysis will provide more-robust estimates of the effects of family structure on male and female physicians' earnings.

5.1 OLS regression

This gender income gap analysis is based on the method used by Sasser (2005). We estimate the following equation for log earnings using OLS for any *i* physician in 2011:

$$\ln W_i = \beta_0 + \beta_1 X_i + \beta_2 FEMALE_i + \beta_3 MARITAL\ STATUS_i + \beta_4 (MARITAL\ STATUS_i \bullet FEMALE_i)$$
$$+ \beta_5 CHILD_i + \beta_6 (CHILD_i \bullet FEMALE_i)$$
$$+ \beta_7 SPOUSE'S\ EARNINGS_i + \beta_8 (SPOUSE'S\ EARNINGS_i \bullet FEMALE_i)$$
$$+ \beta_9 Z_i + \beta_{10} (Z_i \bullet FEMALE_i) + \varepsilon_i$$

where $\ln W_i$, is the log **total income** corresponding to the sum of TF (total fees) and the income from his side-salaried activities, if any, which are reported on his tax returns.

- X_i is a vector of observable characteristics commonly known to influence physicians' income (Bellamy, 2014; Mikol and Pla, 2015), among which are age, field of specialty, seniority as self-employed (*i.e.*, number of years since the physician initially established his practice) and its square, case mix[14] and contribution of technical procedures to fees. For GPs, we also add a dummy variable identifying sector 2 physicians and another dummy identifying those who declared special practices to PHI[15].
- *FEMALE* is a dummy variable equal to 1 for female physicians and 0 otherwise. To capture the effect of family responsibilities on the gender gap, **we also include dummies for marital status,**

[14] Shares of older patients (aged 65 or more), patients with chronic diseases ("ALD" patients), and low-income patients whom physicians are not permitted to charge extra fees ("CMU-C" patients).
[15] Special practices refer to, for example, homeopathy, acupuncture, and allergy expertise.

spouse's earnings (if any) and the presence of children, and we interact these variables with the female dummy. Given that additional children can produce greater demands upon one's time and that large families are common among doctors, the regression includes separate dummy variables for having one, two or three or more children. A more detailed specification for the *CHILD* variable will also be implemented in the corresponding section by interacting the number of children with the age of the youngest child (2 years old or below, 3 to 5 years, and 6 years old or more).

- *MARITAL STATUS* defines whether the physician is married, divorced (or widowed), single but living with a cohabiting partner, or single and living alone.
- Finally, Z_i represents a second set of observable characteristics that should influence labour earnings differently depending upon gender: a dummy for practicing (or not) a side-salaried activity and the local medical density. The latter variable, Local Potential Accessibility (or "LPA"), has been standardized, meaning that a 1-unit variation is equivalent to 1 standard deviation of the original index (see Barlet *et al.*, 2012)[16]. As with the previous family structure variables, Z_i is thus also interacted with the female dummy.

5.2 Fixed-effects model

This specification allows measurement of the effect of the birth of a new child on the evolution of annual labour income by gender, medical specialty (generalist vs. specialist) and sector (1 or 2) among married physicians.

To do so, we use a fixed-effects estimator to eliminate time-invariant unobservable characteristics of individuals who may be correlated with selection into parenthood. Because individuals are only observed at three points in time, the basic equation is a first-difference specification for two periods, 2005-2008 and 2008-2011:

$$\Delta \ln W_{it} = \beta_0 + \beta_1 \Delta X_{it} + \beta_2 \Delta \tau_t + \beta_2 \Delta CHILD_{it} + \Delta \alpha_{it} + \Delta u_{it}$$

where $\Delta \ln W_{it} = (\ln Wi_{2011} - \ln Wi_{2008})$ or $\Delta \ln W_{it} = (\ln Wi_{2008} - \ln Wi_{2005})$ is the difference in the individual's log total income over a period of three years, and X_{it} is the vector of time-varying observable characteristics used in the OLS regression: seniority in private practice and its square, legal category of the private practice, share of technical procedures, case mix, local medical density, dummy for the practice of a side-salaried activity, and spousal earnings. The variable τ_t equals 1 in 2011 and 0 otherwise to identify the period of observation (2005-2008 or 2008-2011). We do not include controls for specialty field or sector because they are, in almost all cases, time-invariant characteristics that then drop out of the equation. $CHILD_{it}$ is a categorical variable that describes both the number and ages of children in the household as in the OLS model, except that here, the "2 years old or below" category is divided in two parts: children born in the current year (2005, 2008 or 2011) vs. children aged 1 or 2 years. The year of birth[17] is very particular concerning a parent's activity and earnings, at least for mothers, for whom a certain period of rest is necessarily required (maternity leave or equivalent). During this period, women are likely not to

[16] The Local Potential Accessibility (LPA) index measures the supply of and demand for services by considering doctors' volume of activity on the one hand and service use rates differentiated by population age structure on the other hand. Although this local indicator is calculated at the municipal level, it also considers supply and demand factors in neighbouring municipalities.

[17] We would rather discuss the few months around a birth; unfortunately the available information on tax returns only reports children's year of birth (not month).

receive any fees, most likely leading to a sharp drop in their earnings, although they should also receive a maternity allowance (paid by the French PHI). However, such an allowance is quite small, with a maximum of approximately € 7,000[18] (for the first and second children), representing only 6% to 11% of the average annual total income of female physicians (see Figure 1). Observations for which a child's year of birth exactly coincides with the current year are therefore likely to heavily influence our estimates, which is why the corresponding category is isolated.

Thus, our aim is to estimate the full effect of children after controlling for human capital. The individual fixed effect α_{it} is assumed to vary across individuals but not over time; thus, the first-difference specification effectively removes it. This assumption is reasonable if the unobserved variables correspond to individual characteristics, such as motivation and skills.

For sector 2 physicians (allowed to set prices freely), the effect is also measured on the share of extra-billings (relative to regulated fees) to measure whether extra-billings is used as a means to financially compensate for any decline in activity and income following such family events. The specification of the fixed-effect model remains the same, except that $\Delta \ln W_{it}$ is replaced by ΔS_{it}, where S_{it} corresponds to the share of extra-billings.

5. Results

5.1 Descriptive statistics

5.1.1 Gender-based medical practice differentials

In 2011, of the 32,700 self-employed physicians aged 50 or below listed in our sample, 41% are women (Table 1). GPs have settled at 33 years on average, and specialists have settled at 34 years on average in sector 1 and at 35 years in sector 2[19]. Female physicians are particularly well represented in certain specialties, such as paediatrics (75%), dermatology (74%), and rheumatology (57%). Conversely, other specialties still have very few women, such as surgery (10%), anaesthesia (23%) and otorhinolaryngology ("ENT", 20%). Women represent 45% of GPs (Table 1).

On average, women belong to sector 2 less often than do men; except for GPs, 46% of female physicians belong to sector 2, 13 points less than their male counterparts. Extra fees charged in sector 2 can be very high for some specialties, regardless of the physician's gender, despite the existence of uniform regulated fees for all specialties (except for psychiatrists). The share of extra fees exceeds 70% of regulated fees in specialties such as surgery, dermatology, gynaecology, and psychiatry. Gender differences in charging extra-billings depend upon medical specialty. The structure of medical activity also differs with gender; consistent with the literature, the contribution of technical procedures to total fees is lower among women in most specialties. Finally, the proportion of physicians having a side-salaried activity mostly depends upon medical specialty but not on gender.

[18] In gross terms, the actual maternity allowance paid by the French PHI corresponds to a lump sum of approximately € 3,000 plus a daily allowance of approximately € 50 – conditional on total cessation of activity – up to 16 weeks (fewer than two children) or 26 weeks (three or more children).

[19] Some conditions are required to join sector 2, such as having run a qualifying university teaching and hospital practice for at least 2 years (for instance, ex-clinic supervisors), which explains why the establishing age of practice in sector 2 is on average slightly higher than that in sector 1.

Table 1 – Gender medical practice differentials among young self-employed physicians in 2011

	Obs.	Share of Women (%)	Belong to Sector 2 (%)		Have a side-salaried activity (%)		Contribution of technical procedures to fees (%)		Share of extra-billings in Sector 2	
			Fem.	Males	Fem.	Males	Fem.	Males	Fem.	Males
GPs	**19 875**	**45%**	**1%**	**1%**	**19%**	**22%**	**6%**	**6%**	**56%**	**37%**
Anesthetist	1 087	23%	51%	62%	13%	17%	76%	80%	53%	51%
Cardiologist	1 279	27%	28%	25%	43%	45%	72%	77%	23%	18%
Surgeon	2 336	10%	87%	92%	37%	28%	70%	70%	99%	73%
Dermatologist	805	74%	36%	45%	33%	43%	20%	24%	71%	72%
Gastroenterologist	608	30%	54%	44%	50%	50%	65%	69%	32%	36%
Surgical Gynecologist	721	48%	80%	92%	36%	31%	50%	59%	73%	73%
Psychiatrist	1 298	45%	49%	48%	44%	51%	0%	1%	90%	88%
Ophthalmologist	1 017	36%	61%	83%	36%	34%	61%	69%	61%	57%
ENT Specialist	496	20%	74%	79%	57%	55%	67%	69%	44%	55%
Pediatrician	549	75%	37%	53%	50%	59%	10%	13%	67%	62%
Pulmonologist	295	45%	25%	21%	46%	54%	82%	83%	25%	29%
Radiologist	1 886	34%	20%	20%	26%	25%	86%	87%	35%	34%
Rheumatologist	465	57%	50%	56%	51%	53%	44%	51%	48%	54%
SPECIALIST DOCTORS	**12 842**	**35%**	**46%**	**59%**	**38%**	**35%**	**47%**	**66%**	**65%**	**62%**
ALL PHYSICIANS	**32 717**	**41%**	**16%**	**27%**	**25%**	**28%**	**20%**	**32%**	**64%**	**61%**

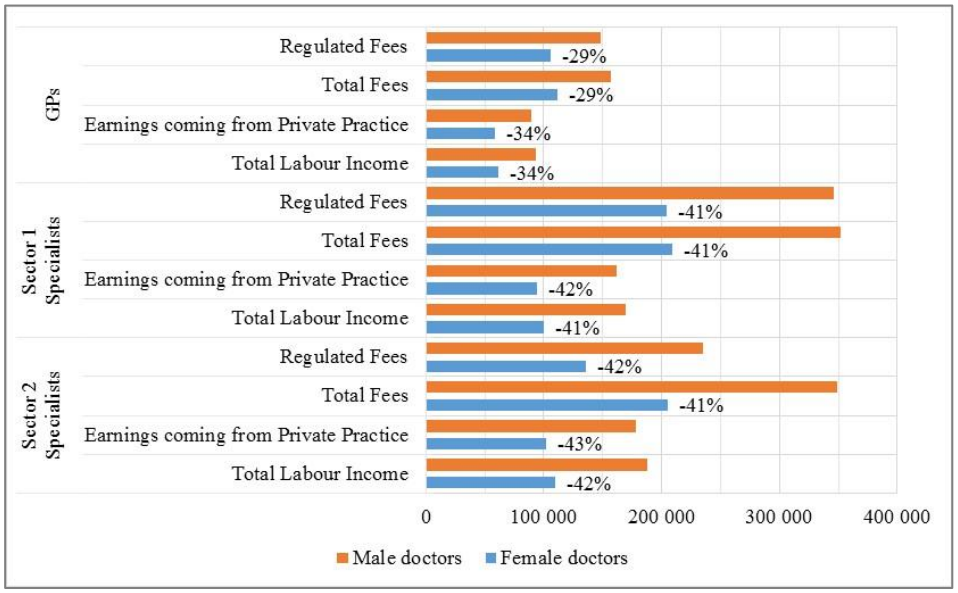
Source: Insee-Cnamts-DGFiP 2011. Study sample: Self-employed physicians aged 50 years old or below declaring at least €1 of private practice income in 2011. Full-time hospital employees who report a side self-employed activity are excluded, as are physicians in certain specialties (see section 3).

In our analysis, **we include doctors in three distinct classes of consistent size: GPs (whether they belong to sector 1 or sector 2), sector 1 specialists and sector 2 specialists**.

5.1.2 Gender gaps in income and provision of care

Beyond the diversity of medical practices mentioned above, the greatest gender differences among self-employed physicians are those related to activity level and earnings; the annual RF (regulated fees) are significantly lower for female GPs (-30%), and the gap is widening, even for specialists (-40%) (Figure 1). The gap is of the same magnitude for TF (total fees significantly differ from RF for sector 2 doctor only) and therefore for total income (W_i). Note that the salary component of income is relatively marginal compared with the private practice component and therefore plays no significant role in the gender income gap.

Figure 1: Gender differences in fees and earnings (in €) in 2011



Source: Insee-Cnamts-DGFiP 2011 – Study sample.
Note: The figures in % on the side are equal to the difference between the earned amounts of regulated fees (resp. total fees/income coming from private practice/total labour income) of women relative to men.

5.1.3 Physician household composition

The question of the effect of family obligations on gender income gap is even more relevant because the vast majority of young, self-employed physicians live as couples (nearly 9 men in 10 and 8 women in 10), whether in civil unions or marriage (Table 2). Only a minority of the physicians under study appear to be childless, regardless of their gender, a statistic true for only 20% of GPs and 15% of specialists. The others are often living with several children in their household; doctors who have three or more children are even somewhat numerous, particularly among male specialists (33%). Note that more than 75% of physicians already have one child or more when they initially establish their practice. Consequently, children identified in physicians' household tax returns in 2011 are often more than 6 years old. However, 13% of sector 1 female specialist households and 27% of sector 2 male specialist households declare at least one child aged 2 years or below, and such configurations will be of crucial importance when studying the short-term effects of a child's birth in the following sections.

5.1.4 Gender differences between living standards at the household level

Female physicians' earnings are well below those of their male colleagues (Table 2). However, when living as a couple, the spouse's income appears to partially compensate for such a financial disadvantage. Spouseal earnings are indeed much higher for female physicians – on average between 52,000 and 90,000 euros in 2011 – than those for their male colleagues whose partner earned between 24,000 to 33,000 euros the same year. Overall, the living standards (*i.e.*, total household income) reported by female physicians are actually quite close to those of their male counterparts, which reflects a potential adaptation of physicians' activity level to that of their spouses.

Table 2 – Household structure description in 2011

	GPs		Sector 1 Specialists		Sector 1 Specialists	
	Fem.	**Males**	**Fem.**	**Males**	**Fem.**	**Males**
Obs.	8 934	10 940	2 404	3 402	2 040	4 996
Age (mean)	42,1	43,5	43,4	44,5	41,7	42,5
Marital Status						
Single	22,2	11,8	18,9	8,0	20,2	10,7
Divorced or Widower	10,4	8,3	10,6	7,9	10,2	7,4
Married or Living under Civil Partnership	67,4	79,9	70,5	84,1	69,5	82,0
Total	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*
Presence of a Spouse (whether married, living under civil partnership, or not) [%]	77,7	87,4	78,7	90,0	79,4	88,9
Number of children under 18 in the household (%)						
No child	21,0	20,0	16,3	15,0	14,9	16,7
1 child	22,4	19,8	19,4	17,6	18,5	14,9
2 children	35,6	34,2	37,4	34,0	39,3	35,7
3 children or more	21,0	25,9	27,0	33,4	27,3	32,7
Total	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*
Age of the youngest child, if any* (%)						
2 years old or below	18,9	19,8	12,9	15,6	21,6	26,9
Between 3 and 5 years old	18,7	17,2	18,3	18,0	21,8	21,9
6 years old or above	62,3	63,0	68,8	66,4	56,6	51,3
Total	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*
Had a child when first settled as a private practionner* (%)	74,0	67,0	78,0	78,0	85,0	83,0
Spouse (if any) is also physician (%)**	18,7	10,1	32,2	13,3	31,2	14,5
Spouse's earnings (€)**	51 806	24 400	75 749	28 541	90 025	32 622
Total household income (€)	111 536	119 690	177 580	208 889	197 850	230 340

** Among physicians whose household includes at least 1 child under 18 years.*

*** Among doctors living as couples.*

Source: Insee-Cnamts-DGFiP 2011. Study sample.

5.2 OLS results: a gender income gap that is clearly widening with the number of children

The results of the OLS estimates are presented in Table 3. Compared with descriptive statistics, we show that the income gap associated with being female is significantly lower when considering the interaction terms for marital status and the presence of children. The remaining gap (*i.e.*, once such family characteristics are considered) is approximately 16% and 20% to women's disadvantage for GPs and sector 2 specialists, respectively and is insignificant for sector 1 specialists. A significant premium is associated with marriage (or civil partnership). Such a premium is, however, much higher for men than for women, at least for GPs and sector 1 specialists – +31% and +24% for men (compared with singles living alone) against +22% and +12% for women, respectively.

The spouse's earnings also have a more negative effect on women's total income than on men's. Consistent with Rizzo and Blumenthal (1994), income elasticity to spouse's earnings (percentage change in income declared by the physician following a 1% increase in the spouse's pay) is approximately -0.02 for female physicians against -0.01 for their male counterparts

When all else is equal, the gender income gap significantly widens in the presence of children, regardless of specialty or sector. For GPs, the gap is significant from the first child in the household (-7% to the disadvantage of women) and becomes the highest for three or more children (-16%). For specialists, the gap becomes significant from two or more children in the household (approximately -10%).

To investigate whether such gaps differ according to the children's ages and thus whether the effect is transient, we implement a second specification considering the age of the youngest child (Table 4).

From two children in the household, the gender income gap is higher when the youngest is less than three years old, particularly for GPs. The "child penalty" for women becomes quite low when the youngest child reaches the age of six, except in large families. Indeed, from three children, the gender gap remains quite high, regardless of the youngest child's age.

Characteristics other than family structure have little influence on the gender income gap. Only the local medical density of GPs appears to play a role in the gender gap for GPs; if a high medical density appears to be associated with a lower income for all physicians, the effect only persists for GPs when considering the difference between males and females. Due to competition effects, when the density is higher, the demand for doctors is lower, particularly for female GPs, which could be the result of a selection effect, given that the choice of location can be potentially endogenous. Female GPs who anticipate working less may prefer to settle in urban centres, in which medical density is high and working in groups is more common (a practice more convenient for adjusting labour supply).

The practice of a side-salaried activity has a significantly positive effect on income for GPs and a negative one on specialists (regardless of the sector) but does not appear to have a different influence on total income for men and women. For sector 2 specialists, the negative effect is particularly high (8%), most likely because the possibility of charging extra-billings makes the practice of side-salaried activities less attractive. Note that, as mentioned above, wages received from such side activities are on average very low compared with private practice income. This difference could explain why performing salaried activity has so little effect on the gender income gap and that the results on the *child penalty* are similar if we conduct the OLS regression on only the income derived from the private practice[20].

[20] We do not show those regressions here (but they are available on request).

Table 3 – Effect of family structure on the gender earnings gap in 2011: OLS estimation, first specification of family structure (number of children)

		GPs		Sector 1 Specialists		Sector 2 Specialists	
Having a side-salaried activity (>1000€/year)		0,046	***	-0,025	ns	-0,077	***
Medical density (LPA) of the corresponding specialty		-0,049	***	-0,027	***	-0,016	*
Marital status	Single, but living as a couple	0,149	***	0,195	***	0,101	*
	Divorced or Widower	0,164	***	0,217	***	0,128	***
	Married or Living under Civil Partnership	0,308	***	0,244	***	0,241	***
	Single, living alone (REF)	*0,000*		*0,000*		*0,000*	
Spouse's earnings *(in LOG)*		-0,014	***	-0,007	***	-0,010	***
Number of children	1 child	0,022	ns	0,020	ns	0,021	ns
	2 children	0,014	ns	0,057	*	0,049	*
	3 children or more	0,052	***	0,082	**	0,097	***
	No child (REF)	*0,000*		*0,000*		*0,000*	
FEMALE		-0,159	***	-0,082	^	-0,195	***
Having a side-salaried activity (>1000€/year) * FEMALE		-0,016	ns	-0,016	ns	-0,001	ns
Medical density (LPA)*FEMALE		-0,038	***	0,002	ns	-0,001	ns
Marital status	Single, but living as a couple	0,055	ns	-0,095	ns	0,047	ns
***FEMALE**	Divorced or Widower	-0,044	ns	-0,196	***	0,027	ns
	Married or Living under Civil Partnership	-0,089	**	-0,125	*	0,000	ns
	Single, living alone (REF)	*0,000*		*0,000*		*0,000*	
Spouse's earnings (in LOG)*FEMALE		-0,007	***	-0,010	**	-0,011	**
Number of children	1 child	-0,065	***	-0,013	ns	-0,052	ns
***FEMALE**	2 children	-0,063	***	-0,094	**	-0,085	*
	3 children or more	-0,155	***	-0,112	**	-0,112	**
	No child (REF)	*0,000*		*0,000*		*0,000*	
R-Square		**0,266**		**0,451**		**0,395**	
Number of observations		**19 875**		**5 806**		**7 036**	

****Statistically significant at the 1% level; **significant at the 5% level; *significant at the 10% level; + significant at the 15% level.*

For LPA: A coefficient of -0.04 related to the standardized medical density variable for women reflects the fact that, all else being equal, the female physician in the district with the largest LPA will on average receive an income 4% below that of her male colleague.

Source: Insee-Cnamts-DGFiP 2011. Study sample.

Note: other demographic and occupational characteristics are included in the regression but are not reported here (see tables in Appendix I): age, seniority as self-employed (level and squared), medical specialty, case mix, legal category of the private practice and contribution of technical procedures to fees. For GPs, we also add a dummy variable for identifying sector 2 physicians and another dummy identifying those who declare special practices to PHI (such as homeopathy and acupuncture).

Table 4 – Effect of family structure on the gender earnings gap in 2011: OLS estimation, second specification of family structure (number AND ages of children)

		GPs		Sector 1 Specialists		Sector 2 Specialists	
Having a side-salaried activity (>1000€/year)		0,046	***	-0,026	ns	-0,076	***
Medical density (LPA) of the corresponding specialty		-0,049	***	-0,028	***	-0,016	*
Marital status	Single, but living as a couple	0,152	***	0,200	***	0,107	**
	Divorced or Widower	0,172	***	0,222	***	0,138	***
	Married or Living under Civil Partnership	0,314	***	0,252	***	0,249	***
	Single, living alone (REF)	*0,000*		*0,000*		*0,000*	
Spouse's earnings *(in LOG)*		-0,014	***	-0,007	***	-0,010	***
Age of the youngest child	2 y.o. or below, <=2 children	-0,019	ns	-0,003	ns	0,024	ns
***Number of children**	2 y.o. or below, >=3 children	0,046	**	0,060	ns	0,049	ns
	Between 3 and 5 y.o., <=2 children	0,015	ns	0,073	*	0,010	ns
	Between 3 and 5 y.o., >=3 children	*0,035*	^	*0,084*	**	*0,115*	***
	6 y.o. or above, <=2 children	0,028	*	0,047	^	0,058	**
	6 y.o. or above, >=3 children	0,065	***	0,086	**	0,118	***
	No child (REF)	0,000		0,000		0,000	
FEMALE		-0,160	***	-0,076	ns	-0,192	***
Having a side-salaried activity (>1000€/year) * FEMALE		-0,011	ns	-0,014	ns	-0,003	ns
Medical density (LPA) *FEMALE		-0,037	***	0,002	ns	0,000	ns
Marital status	Single, but living as a couple	0,063	^	-0,100	ns	0,041	ns
***FEMALE**	Divorced or Widower	-0,061	*	-0,209	***	0,007	ns
	Married or Living under Civil Partnership	-0,089	**	-0,138	*	-0,006	ns
	Single, living alone (REF)	*0,000*		*0,000*		*0,000*	
Spouse's earnings (in LOG)*FEMALE		-0,007	***	-0,010	**	-0,010	*
Age of the youngest child	2 y.o. or below, <=2 children	-0,161	***	-0,131	**	-0,118	**
***Number of children**	2 y.o. or below, >=3 children	-0,245	***	-0,127	*	-0,131	*
***FEMALE**	Between 3 and 5 y.o., <=2 children	-0,054	*	-0,089	^	-0,053	ns
	Between 3 and 5 y.o., >=3 children	-0,125	***	-0,086	ns	-0,151	**
	6 y.o. or above, <=2 children	-0,045	**	-0,049	ns	-0,068	ns
	6 y.o. or above, >=3 children	-0,138	***	-0,112	**	-0,094	^
	No child (REF)	*0,000*		*0,000*		*0,000*	
R-Square		**0,270**		**0,451**		**0,396**	
Number of observations		**19 875**		**5 806**		**7 036**	

****Statistically significant at the 1% level; **significant at the 5% level; *significant at the 10% level; + significant at the 15% level.*

Source: Insee-Cnamts-DGFiP 2011. Study sample.

Note: see Table 3.

6. Accounting for unobserved heterogeneity: longitudinal evidence

6.1 Sample restriction

Among our population of self-employed physicians aged 50 years or below in 2011, we only consider physicians married or living under civil partnership for the three dates. The intent is to identify the evolution of physicians' spousal income and number of children over this period. Our subpopulation includes approximately 12,650 physicians (39% of our population studied for the year 2011), for whom we observe the complete income trajectory in 2005-2008-2011. The main cause of attrition is *de facto* the exclusion of physicians who recently established a private practice (after 2005). Such attrition is particularly severe for sector 2 female specialists, who are relatively young, thus calling for caution when interpreting the results obtained for this restricted study sample.

6.2 Results

Table 5 reports the fixed-effects estimates for men and women physicians separately for the three groups of physicians (GPs and sector 1 and sector 2 specialists). Only coefficients for the main variables of interest, in particular those concerning the number and ages of children in the household, are reported here (whole estimates are presented in Appendix 2). Figure 2 provides simplified illustrations of some of these

results by comparing the different possible earning paths when a birth does or does not occur in a given year (assuming other fixed characteristics).

Table 5 – Effect of family structure on the total labour income of male and female physicians and on the share of extra-billings for sector 2 physicians: results from the fixed-effects model (panel 2005-2008-2011)

	TOTAL INCOME *(in LOG)*						SHARE OF EXTRA-BILLING	
	GPs		Sector 1 Specialists		Sector 2 Specialists		Sector 2 Specialists	
	Male	Female	Male	Female	Male	Female	Male	Female
Seniority	0.0389***	0.0688***	0.0448***	0.0493***	0.0825***	0.0525***	0.0253***	0.0378***
Seniority^2	-0.000320***	-0.00138***	-0.000963***	-0.00143***	-0.00224***	-0.00124**	0.000478***	-0.0000833
Age of the youngest child*Number of children (ref=No child)								
Born in the year, <=2 children	-0.000206	-0.267***	0.0182	-0.247***	0.00815	-0.285*	0.00665	0.0691*
Born in the year, >=3 children	0.0473***	-0.332***	0.0154	-0.291*	0.00840	-0.328**	0.124*	0.0344
1 or 2 y.o., <=2 children	0.0118	0.0234	0.0106	-0.0691+	0.0126	0.0170	0.0553	-0.0336
1 or 2 y.o., >=3 children	0.0601***	-0.0538*	0.0216	-0.141**	0.0397	-0.000890	0.0997*	0.0181
Between 3 and 5 y.o., <=2 children	0.0419***	0.00587	0.0230	-0.0666**	0.0359	-0.0320	0.0646+	0.00306
Between 3 and 5 y.o., >=3 children	0.0655***	-0.0595**	0.0355	-0.0794+	0.0373	-0.0789	0.104**	0.00545
6 y.o. or above, <=2 children	0.0351***	-0.00155	0.0295	-0.0558*	-0.00131	0.00316	0.0713**	0.00254
6 y.o. or above, >=3 children	0.0565***	-0.0627**	0.0206	-0.0543	0.0360	-0.0391	0.0838**	-0.0115
Spouse's earnings (in LOG)	-0.00255***	-0.00772***	0.00199+	-0.0164**	-0.00234+	-0.0107	-0.00168*	-0.00299
R-Square within (FE)	0.125	0.150	0.112	0.186	0.231	0.282	0.184	0.293
Number of observations	5404	2850	1551	813	1501	426	1501	426

****Statistically significant at the 1% level; **significant at the 5% level; *significant at the 10% level; + significant at the 15% level.*

Source: Insee-Cnamts-DGFiP 2005, 2008 and 2011. Restricted study sample (see §6.1).

Note: other demographic and occupational characteristics are included in the regression but are not reported here (see table in Appendix II): case mix, legal category of the private practice, contribution of technical procedures to fees, having (or not having) a side-salaried activity, and a dummy variable indicating the observation period.

Result 1: All else being equal, there is a strong trend towards growing income for physicians early in their career.

First, these results confirm that the earnings of doctors in their early years of practice increase rapidly, between +4 and +8% per year at constant prices. Such an increase is driven by a rapid rise in private practice earnings; the first years of a physician's practice are characterized by a process of patient recruitment, and their income grows rapidly, reaching a peak after 10 to 15 years (Bellamy, 2013). Simultaneously, the 2005-2011 period is also characterized by a structural increase in French doctors' nominal fees (Mikol and Pla, 2015), which may also contribute to the positive and high return of the seniority coefficient in our estimations. As suggested by the results presented in Table 5, the underlying growth in women's income is at least as dynamic as that of their counterparts for GPs and sector 1 specialists. For sector 2 specialists, the growth is particularly strong among men for each supplementary year of seniority (+8%). These doctors seem to leverage their working experience with an increase in their extra-billing rates, which may also be true for sector 2 female specialists, for whom the average share of extra-billings increases very significantly with each supplementary year of practice.

Result 2: Having a new child significantly slows the growing trend of earnings for married female physicians, particularly in the year of the child's birth.

Result 3: The "child penalty" for female physicians is much larger for the third and subsequent child in the household.

Result 4: The drop in female physicians' income that occurs immediately after a child's birth can be compensated more rapidly in sector 2 than in sector 1.

However, the rapid rise in income generally observed in early career years appears significantly slowed by the birth of a new child for married female physicians (Table 5 and Figure 2). Throughout this group's career, having a child is associated with a significant drop in income, which is predictably concentrated around the year of birth. The negative effect in the year of birth is of the same magnitude between female GPs and specialists, regardless of the sector; income falls by 25% in the year of birth of a first or second child and by 30% for a third child (or beyond). In subsequent years, income growth rates tend to return to their previous value, although some financial penalty seems to significantly persist over time following births, particularly that of a third child. For instance, five years after the birth of a third child, women doctors still receive an income 10% to 15% lower than that income they would have had without this child, all else being equal. Again, the magnitude of this medium-term gap ultimately differs little between GPs and specialists (and sectors). However, the gap is more rapidly compensated for sector 2 female physicians compared with other female doctors. This result can be explained by the fact that the level of activity of doctors belonging to sector 2 – measured here by the amount of regulated fees earned (see Figure 1) – is on average lower than in sector 1, whereas the level of total income is rather equivalent due to the possibility of charging extra-billings. The corresponding workload in sector 2 may then be already quite compatible with family responsibilities. Consequently, these female doctors may find it easier to quickly return to their previous level of medical activity after the birth of a new child. Finally, for female physicians, the "*child penalty*" in terms of income in the medium term is almost equivalent to the amplitude of income growth when seniority increases by two years (Figure 2)[21].

Result 5: There does not appear to be a downward effect of children on male physicians' earnings.

Male GPs tend to intensify their workload following a birth in the household, perhaps in response to the tightening of their household budget constraints. However, such an increase in activity is not observed among specialists. One interpretation could be that male specialists receive a higher income on average, which may be already sufficient to cover any financial supplementary needs following childbirth.

Result 6: Sector 2 male specialists are more likely to increase extra-billings after childbirth than are their female counterparts.

As we mentioned earlier, increasing the level of extra-billings could theoretically allow sector 2 physicians to counterbalance the general effect on income of a decrease in working hours after the birth of a child. Such behaviour does not seem to be observed for female physicians, at least in the medium term. Actually, for female doctors, the share of extra-billings is sensitive to the arrival of a new child only in the year of birth and only if it is a first or a second child (the rise is approximately 6 points). Except in the year of a first or second birth, we cannot highlight any real strategic behaviour of sector 2 female physicians in terms of charging more extra fees to maintain their previous income[22]. In contrast, male specialists appear to significantly increase the share of extra-billings to increase their income in the years following a birth, particularly that of a third child; sector 2 male physicians' share of extra-billings is 10 to 15 points higher than that in the absence of such an event. Such differences in how men and women belonging to sector 2 set their fees seem quite consistent with the observations made by Goldin (2011);

[21] Here, we compare the medium-term effects (after 3 to 5 years) of the birth of a child on labour income (shown in Figure 2), with the effect of each additional year of seniority estimated in the model.

[22] In addition, variables linked to activity level, fees or extra-billings could be biased during the period surrounding the birth of a child, when physicians (mostly women) are more likely to be replaced by locum doctors (see section 3); such results must therefore be considered very cautiously.

sector 2 women must reduce their working hours (at least in the short term) following a birth, as do other female doctors. In this situation, they can hardly increase the share of extra-billings to compensate for the corresponding income loss, to the extent that their reduced working availability may have a negative effect on their patients' willingness to pay. In contrast, the working hours of men are quite unchanged after a birth; thus, men could be more "legitimate" than their female counterparts to keep increasing the share of extra-billings over time.

Result 7: Childbirth predominantly affects the private practice component of labour income.

Because many self-employed doctors have a side-salaried activity, it is also interesting to study how the corresponding component of total income (wages) is affected by the birth of a new child compared with the main income component coming from private practice. To do so, we now implement our fixed-effects model on a more restrictive output variable, private practice income (Appendix 3)[23]. As expected, the comparison between these results and the previous ones (in which the output variable was the *total* labour income) suggests that private practice income is much more affected by a new birth for women than other income (wages). The corresponding coefficients are generally higher in absolute terms, particularly among female GPs and sector 1 specialists. In fact, working hours are necessarily more flexible for self-employed activities. When an adjustment to these hours is needed due to increased family responsibilities, the private practice activity seems to be the first affected. Moreover, salaried workers on maternity leave generally continue to earn the same amount of wages in this period[24], which can significantly reduce the effect of a new child on the observed salaried component of female physicians' income, at least in the year of childbirth.

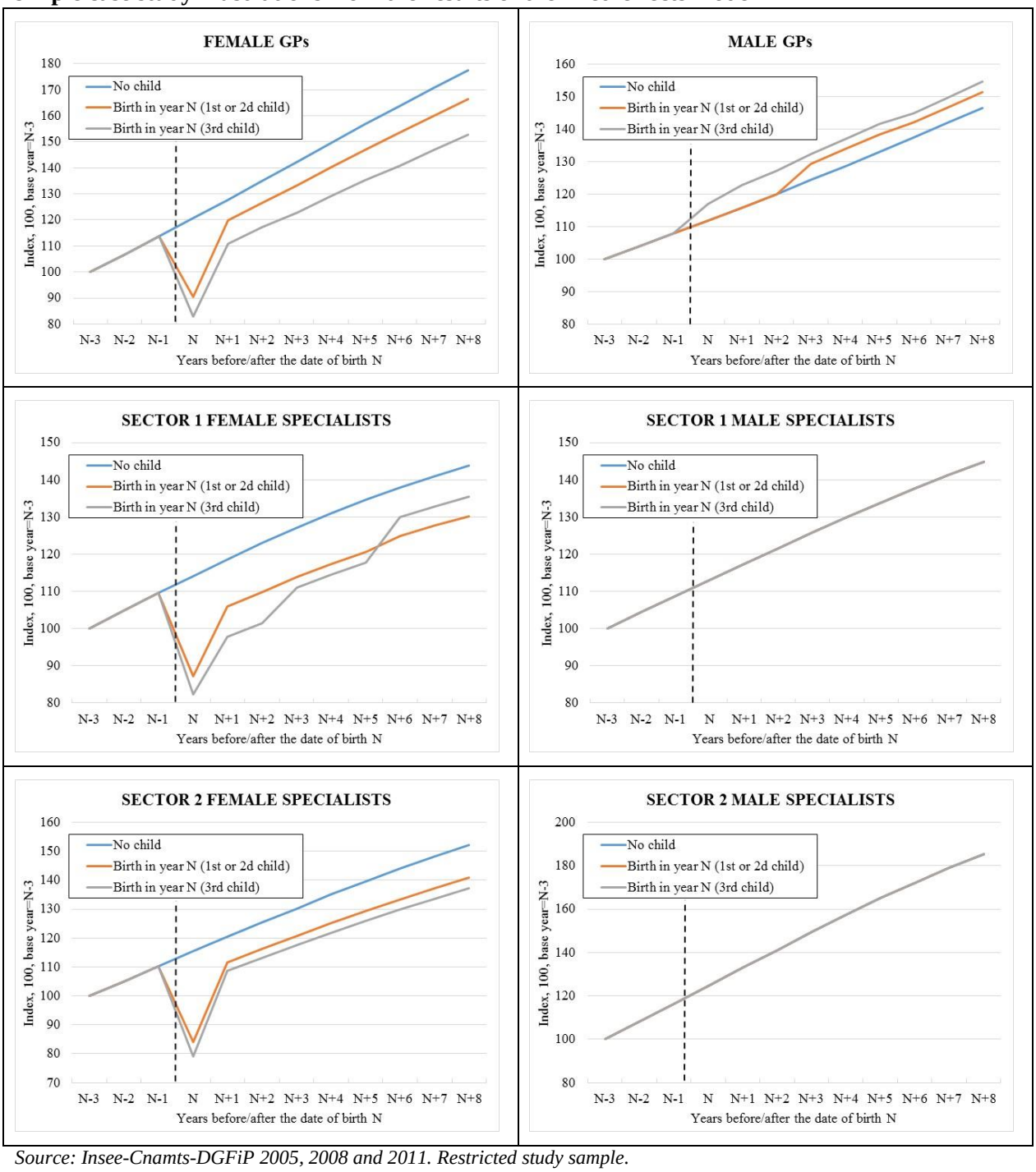
Complementary results for GPs: The "child penalty" magnitude depends upon the initial level of income.

The ability to adjust one's income to exogenous events such as childbirth can also depend upon the initial level of income. Thus, it is pertinent to compare the effect of childbirth between low-income physicians and high-income ones. We focus here on GPs because they represent a more numerous and more homogeneous population than specialists, which allows us to make quite robust comparisons between income classes. In our study, the GP's "initial" income corresponds to the income received in 2005, at the beginning of the period under study. To test this relationship, we compute separate fixed-effects regressions between the first and last quartiles of the income distribution. The results (which are not reported here but are available on request) are not equivalent between genders. **The "child penalty" is less important for low-income female GPs than for high-income ones**, whether in the year of birth or later. One interpretation is that low-income female physicians may already have adapted their activity and workload to family constraints at the beginning of the period (2005). In contrast, high-income women cannot afford to maintain their high level of activity after childbirth. Male GPs react quite differently in terms of income distribution. We previously showed that on average, male GPs tend to intensify their workload following childbirth. The analysis here suggests **that this result is primarily driven by the behaviour of low-income GPs, which is particularly pronounced compared with high-income GPs.** Low-income male GPs indeed have more flexibility to increase their workload than do others. They most likely also face greater financial needs following childbirth. From one perspective, high-income male GPs are more comparable with their specialist colleagues concerning their income-setting behaviour than with low-income male GPs.

[23] Because only approximately 30% of physicians have a side-salaried activity (see section 4), we do not implement a model on the output variable corresponding to the single *salaried* income component. The sample size would be too small to interpret any effect of the family structure on the outcome variable.

[24] If the maternity leave does not exceed the legal duration of 4 to 6 months, depending upon the number of children.

Figure 2 – Effect of family structure on the total labour income of male and female physicians: simple case study illustrations from the results of the fixed-effects model



Source: Insee-Cnamts-DGFiP 2005, 2008 and 2011. Restricted study sample.
Reading: Here, we simulate the physician's income path over a 1-year period in 3 situations: no new child in the period; a first or second child born in year N; and a third child born in year N. The period starts in N-3 and ends in N+8. We assume that the doctor starts his/her practice at the beginning of the period (in N-3, initializing his seniority to 0 at that time). We assume that apart from seniority and number of children, all other characteristics used in the fixed-effects model remain constant over time. Only the child-related coefficients that are at least significant at the 15% level are used to build these figures; the others are then assumed to be zero.

7. Discussion

In this study, we analyse the role of motherhood in the gender income gap of French self-employed physicians. We confirm that as in the rest of the economy, maternity plays a major role in the gender income gap; after controlling for other observable characteristics, such as medical specialty, sector and seniority, we show that having children contributes significantly to the gender income gap. This result reflects a greater involvement of female physicians in family responsibilities compared with their male colleagues, regardless of whether it is voluntary (through the choice of a self-employed job that offers greater flexibility).

French female physicians face a clear and sharp drop in their labour income in a child's birth year, primarily driven by a strong decrease in private practice income, which takes years to be reversed. This result is consistent with the literature (Sasser, 2005 on American self-employed physicians). The female physician's income drops from 25% to 30% in the child's birth year, and moreover, the maternity allowance female physicians generally receive in the same period is rather low. In 2016, for sector 1 doctors, the maternity allowance consists of a lump-sum payment of €3,218 and daily allowances for a minimum of 8 weeks and a maximum of 16 weeks (or 26 weeks from the birth of a third child). This mechanism may partially explain why the drop in a female's earnings is sharper from the third child. This situation is quite common among married physicians, a majority of whom were already living with one child or more when they initially established their practice. Considering the strong income growth in their early career, we can conclude that the effect of every new child born in this period is equivalent for women to a "delay" of nearly two years of experience. For male doctors, there is an increasing effect of childbirth for GPs from the year after the birth, but there is no effect on male specialists, regardless of the sector to which they belong. Note, however, that male specialists belonging to sector 2 significantly increase the share of extra-billings in their labour income (see below).

However, unlike Sasser (2005), our data do not allow us to attribute the drop in female physicians' labour income following childbirth to a drop in working hours; our data only provide detailed information on income. However, this drop is very likely to be the situation in the French context of fee-for-service, in which fees are strongly linked to activity level, at least for GPs and sector 1 specialists. For sector 2 female physicians, who can theoretically bill freely, the results fail to highlight a strategic behaviour consisting of charging higher extra fees after childbirth to maintain their previous income while working less. Sector 2 male physicians, in contrast, do seem to use the extra-billings lever to significantly increase their income for several years following childbirth.

The labour incomes of sector 2 female physicians seem to be as strongly affected by this type of family event as are the earnings of their sector 1 female counterparts, at least in the short term. In the medium term, the income of sector 2 female specialists again begins to increase more rapidly. Although this result should be viewed with caution due to the small sample size of sector 2 female specialists who recently had a child, it nevertheless confirms the financial advantage offered by this choice of billing sector. For equivalent incomes, sector 2 physicians generally work fewer hours than do their sector 1 counterparts due to the possibility of charging extra-billings. Such a financial advantage most likely offers more flexibility to sector 2 female physicians to adapt their working time to new family responsibilities while maintaining their income at a high level.

Our main results appear to be quite robust due to the combination of an exhaustive dataset and very detailed variables, such as the medical density at the local level, despite limits due to a lack of information (*e.g.*, no information on working hours, no distinction of the activity provided by locum physicians, and no data on group practices). However, these limits could be overcome in the future with the rapid growth

of information collected in the French health economic system, providing additional material for future works.

To summarize, the demand for health private practitioners will continue to grow in the coming years in France, particularly in certain geographical areas (Drees, 2016). With the share of women in the young physician population remaining very high, this increasing need for care must necessarily be supported more often by female physicians. To adequately plan and organize the provision of care, it is necessary to consider either the conditions under which women doctors still find an interest in owning a private practice in sector 1 that promotes access to care or the conditions under which a salaried medical position may or may not be a solution. However, we show that private practice is less advantageous for female doctors than for their male counterparts, particularly when family responsibilities are growing. The recent creation of a new, generous "maternity allowance" for French female private physicians to "enhance the attractiveness of private practice" in the period surrounding a pregnancy[25] represents, in this respect, a step in the right direction.

[25] Social Security Financing Act Project for 2017 (Projet de loi de financement de la sécurité sociale pour 2017); see Section 1.

APPENDIX 1 – Effect of family structure on the gender earnings gap in 2011: complete OLS estimation

1 First specification of family structure: *number of children*

		Dependent variable: TOTAL INCOME (in LOG)								
		GPs			Sector 1 Specialists			Sector 2 Specialists		
PARAMETERS		**Est.**	**P-value**	**Sign.**	**Est.**	**P-value**	**Sign.**	**Est.**	**P-value**	**Sign.**
Intercept		10,658	0,000	***	10,831	0,000	***	11,068	0,000	***
Age	46 to 50 y.o.	-0,146	0,000	***	-0,096	0,000	***	-0,066	0,003	***
	41 to 45 y.o.	-0,066	0,000	***	-0,084	0,000	***	-0,074	0,000	***
	40 y.o. or less (REF)	*0,000*			*0,000*			*0,000*		
Female		-0,159	0,000	***	-0,082	0,128	+	-0,195	0,000	***
Specialty	Anesthetist				0,616	0,000	***	0,775	0,000	***
	Cardiologist				0,133	0,002	***	0,300	0,000	***
	Surgeon				0,305	0,000	***	0,515	0,000	***
	Dermatologist				0,058	0,114	+	0,094	0,020	**
	Gastroenterologist				0,216	0,000	***	0,335	0,000	***
	Surgical Gynecologist				0,211	0,000	***	0,471	0,000	***
	ENT Specialist				0,218	0,000	***	0,216	0,000	***
	Ophthalmologist				0,474	0,000	***	0,672	0,000	***
	Pulmonologist				0,007	0,887	ns	0,023	0,749	ns
	Pediatrician				0,095	0,015	**	0,141	0,002	***
	Radiologist				0,716	0,000	***	0,870	0,000	***
	Rheumatologist				-0,245	0,000	***	-0,067	0,151	ns
	Psychiatrist				*0,000*			*0,000*		
Seniority		0,041	0,000	***	0,033	0,000	***	0,058	0,000	***
Seniority²		-0,001	0,000	***	-0,001	0,000	***	-0,002	0,000	***
GPs declaring special practice (homeopathy, etc.)		-0,120	0,000	***						
Sector 2		0,049	0,111	+						
Legal category of private practice: SEL (y/n)		-0,005	0,816	ns	-0,118	0,000	***	-0,115	0,000	***
Case-mix	Share of patients aged >=65 y.o.	-0,001	0,282	ns	0,005	0,000	***	0,003	0,001	***
	Share of patients with chronic disease	0,006	0,000	***	0,005	0,000	***	0,000	0,966	ns
	Share of low income patients	0,010	0,000	***	0,006	0,005	***	-0,003	0,077	*
Technical procedures contribution to total fees		0,072	0,000	***	0,133	0,000	***	0,165	0,000	***
Number of children	1 child	0,022	0,183	ns	0,020	0,550	ns	0,021	0,497	ns
	2 children	0,014	0,347	ns	0,057	0,069	*	0,049	0,071	*
	3 children or more	0,052	0,001	***	0,082	0,010	**	0,097	0,000	***
	No child (REF)	*0,000*			*0,000*			*0,000*		
Marital status	Single, but living as a couple	0,149	0,000	***	0,195	0,003	***	0,101	0,053	*
	Divorced or Widower	0,164	0,000	***	0,217	0,000	***	0,128	0,003	***
	Married or Living under Civil Partnership	0,308	0,000	***	0,244	0,000	***	0,241	0,000	***
	Single, living alone (REF)	*0,000*			*0,000*			*0,000*		
Spouse's earnings (in Log)		-0,014	0,000	***	-0,007	0,000	***	-0,010	0,000	***
Having a side-salaried activity (>1000€/year)		0,046	0,000	***	-0,025	0,196	ns	-0,077	0,000	***
Having a side-salaried activity (>1000€/year) * FEMALE		-0,016	0,367	ns	-0,016	0,585	ns	-0,001	0,967	ns
Number of children	1 child	-0,065	0,006	***	-0,013	0,790	ns	-0,052	0,336	ns
***FEMALE**	2 children	-0,063	0,004	***	-0,094	0,043	**	-0,085	0,090	*
	3 children or more	-0,155	0,000	***	-0,112	0,022	**	-0,112	0,033	**
	No child (REF)	*0,000*			*0,000*			*0,000*		
Marital status	Single, but living as a couple	0,055	0,206	ns	-0,095	0,307	ns	0,047	0,615	ns
***FEMALE**	Divorced or Widower	-0,044	0,186	ns	-0,196	0,005	***	0,027	0,702	ns
	Married or Living under Civil Partnership	-0,089	0,012	**	-0,125	0,089	*	0,000	0,996	ns
	Single, living alone (REF)	*0,000*			*0,000*			*0,000*		
Spouse's earnings (in LOG)*FEMALE		-0,007	0,002	***	-0,010	0,021	**	-0,011	0,048	**
Medical density of the corresponding specialty		-0,049	0,000	***	-0,027	0,008	***	-0,016	0,058	*
Medical density *FEMALE		-0,038	0,000	***	0,002	0,899	ns	-0,001	0,958	ns
Region of location	Alsace	0,128	0,000	***	0,109	0,018	**	0,083	0,034	**
	Aquitaine	0,015	0,401	ns	-0,032	0,361	ns	-0,082	0,004	***
	Auvergne	0,084	0,001	***	0,018	0,702	ns	0,004	0,946	ns
	Basse-Normandie	0,150	0,000	***	0,044	0,366	ns	-0,018	0,764	ns
	Bourgogne	0,143	0,000	***	0,064	0,226	ns	0,079	0,102	+
	Bretagne	0,069	0,000	***	-0,012	0,711	ns	-0,174	0,000	***
	Centre	0,131	0,000	***	0,075	0,080	*	-0,040	0,362	ns
	Champagne-Ardenne	0,143	0,000	***	0,188	0,001	***	0,096	0,069	*
	Corse	0,073	0,158	ns	-0,073	0,408	ns	-0,065	0,476	ns
	Franche-Comté	0,088	0,001	***	0,022	0,708	ns	-0,039	0,607	ns
	Haute-Normandie	0,139	0,000	***	0,196	0,000	***	0,019	0,679	ns
	Languedoc-Roussillon	0,026	0,168	ns	-0,021	0,535	ns	-0,125	0,000	***
	Limousin	0,020	0,505	ns	0,145	0,040	**	-0,036	0,613	ns
	Lorraine	0,166	0,000	***	0,182	0,000	***	0,059	0,200	ns
	Midi-Pyrénées	0,003	0,851	ns	0,022	0,501	ns	-0,080	0,031	**
	Nord-Pas-de-Calais	0,196	0,000	***	0,178	0,000	***	0,133	0,000	***
	Pays-de-la-Loire	0,075	0,000	***	0,045	0,191	ns	-0,071	0,036	**
	Picardie	0,248	0,000	***	0,205	0,000	***	0,167	0,003	***
	Poitou-Charentes	0,064	0,004	***	0,015	0,768	ns	-0,061	0,204	ns
	Provence-Alpes-Côte-d'Azur	-0,048	0,002	***	-0,081	0,008	***	-0,172	0,000	***
	Rhône-Alpes	0,016	0,273	ns	0,053	0,088	*	-0,036	0,101	+
	Ile-de-France (REF)	*0,000*			*0,000*			*0,000*		
R-Square		**0,266**			**0,451**			**0,395**		
Number of observations		**19 875**			**5 806**			**7 036**		

2 Second specification of family structure: *number AND ages of children*

		Dependent variable: TOTAL INCOME (in LOG)								
		GPs			Sector 1 Specialists			Sector 2 Specialists		
PARAMETERS		**Est.**	**P-value**	**Sign.**	**Est.**	**P-value**	**Sign.**	**Est.**	**P-value**	**Sign.**
Intercept		10,691	0,000	***	10,849	0,000	***	11,083	0,000	***
Age	46 to 50 y.o.	-0,168	0,000	***	-0,110	0,000	***	-0,089	0,000	***
	41 to 45 y.o.	-0,088	0,000	***	-0,096	0,000	***	-0,092	0,000	***
	40 y.o. or less (REF)	*0,000*			*0,000*			*0,000*		
Female		-0,160	0,000	***	-0,076	0,156	ns	-0,192	0,000	***
Specialty	Anesthetist				0,614	0,000	***	0,777	0,000	***
	Cardiologist				0,133	0,002	***	0,306	0,000	***
	Surgeon				0,308	0,000	***	0,520	0,000	***
	Dermatologist				0,057	0,121	+	0,098	0,016	**
	Gastroenterologist				0,215	0,000	***	0,339	0,000	***
	Surgical Gynecologist				0,210	0,000	***	0,474	0,000	***
	ENT Specialist				0,216	0,000	***	0,219	0,000	***
	Ophthalmologist				0,474	0,000	***	0,678	0,000	***
	Pulmonologist				0,004	0,934	ns	0,026	0,712	ns
	Pediatrician				0,100	0,011	**	0,143	0,002	***
	Radiologist				0,715	0,000	***	0,873	0,000	***
	Rheumatologist				-0,245	0,000	***	-0,061	0,188	ns
	Psychiatrist				*0,000*			*0,000*		
Seniority		0,038	0,000	***	0,031	0,000	***	0,056	0,000	***
Seniority²		-0,001	0,000	***	-0,001	0,000	***	-0,002	0,000	***
GPs declaring special practice (homeopathy, etc.)		-0,122	0,000	***						
Sector 2		0,050	0,108	+						
Legal category of private practice: SEL (y/n)		-0,004	0,822	ns	-0,118	0,000	***	-0,115	0,000	***
Case-mix	Share of patients aged >=65 y.o.	-0,001	0,319	ns	0,005	0,000	***	0,003	0,002	***
	Share of patients with chronic disease	0,005	0,000	***	0,005	0,000	***	0,000	0,939	ns
	Share of low income patients	0,010	0,000	***	0,006	0,004	***	-0,003	0,099	*
Technical procedures contribution to total fees		0,071	0,000	***	0,133	0,000	***	0,165	0,000	***
Age of the youngest	2 y.o. or below, <=2 children	-0,019	0,343	ns	-0,003	0,953	ns	0,024	0,458	ns
child	2 y.o. or below, >=3 children	0,046	0,049	**	0,060	0,196	ns	0,049	0,161	ns
***Number of children**	Between 3 and 5 y.o., <=2 children	0,015	0,476	ns	0,073	0,083	*	0,010	0,765	ns
	Between 3 and 5 y.o., >=3 children	0,035	0,132	+	0,084	0,047	**	0,115	0,001	***
	6 y.o. or above, <=2 children	0,028	0,060	*	0,047	0,131	+	0,058	0,037	**
	6 y.o. or above, >=3 children	0,065	0,000	***	0,086	0,012	**	0,118	0,000	***
	No child (REF)	*0,000*			*0,000*			*0,000*		
Marital status	Single, but living as a couple	0,152	0,000	***	0,200	0,003	***	0,107	0,041	**
	Divorced or Widower	0,172	0,000	***	0,222	0,000	***	0,138	0,001	***
	Married or Living under Civil Part.	0,314	0,000	***	0,252	0,000	***	0,249	0,000	***
	Single, living alone (REF)	*0,000*			*0,000*			*0,000*		
Spouse's earnings (in Log)		-0,014	0,000	***	-0,007	0,000	***	-0,010	0,000	***
Having a side-salaried activity (>1000€/year)		0,046	0,000	***	-0,026	0,177	ns	-0,076	0,000	***
Having a side-salaried activity (>1000€/year) * FEMALE		-0,011	0,512	ns	-0,014	0,619	ns	-0,003	0,930	ns
Age of the youngest	2 y.o. or below, <=2 children	-0,161	0,000	***	-0,131	0,045	**	-0,118	0,047	**
child	2 y.o. or below, >=3 children	-0,245	0,000	***	-0,127	0,089	*	-0,131	0,064	*
***Number of children**	Between 3 and 5 y.o., <=2 children	-0,054	0,069	*	-0,089	0,145	+	-0,053	0,387	ns
***FEMALE**	Between 3 and 5 y.o., >=3 children	-0,125	0,000	***	-0,086	0,202	ns	-0,151	0,029	**
	6 y.o. or above, <=2 children	-0,045	0,036	**	-0,049	0,279	ns	-0,068	0,178	ns
	6 y.o. or above, >=3 children	-0,138	0,000	***	-0,112	0,032	**	-0,094	0,109	+
	No child (REF)	*0,000*			*0,000*			*0,000*		
Marital status	Single, but living as a couple	0,063	0,143	+	-0,100	0,285	ns	0,041	0,658	ns
***FEMALE**	Divorced or Widower	-0,061	0,072	*	-0,209	0,003	***	0,007	0,918	ns
	Married or Living under Civil Part.	-0,089	0,012	**	-0,138	0,058	*	-0,006	0,934	ns
	Single, living alone (REF)	*0,000*			*0,000*			*0,000*		
Spouse's earnings (in LOG)*FEMALE		-0,007	0,002	***	-0,010	0,024	**	-0,010	0,053	*
Medical density of the corresponding specialty		-0,049	0,000	***	-0,028	0,008	***	-0,016	0,055	*
Medical density *FEMALE		-0,037	0,000	***	0,002	0,912	ns	0,000	0,988	ns
Region of location	Alsace	0,125	0,000	***	0,108	0,019	**	0,081	0,038	**
	Aquitaine	0,011	0,522	ns	-0,030	0,388	ns	-0,082	0,004	***
	Auvergne	0,083	0,001	***	0,026	0,586	ns	0,008	0,891	ns
	Basse-Normandie	0,146	0,000	***	0,044	0,368	ns	-0,019	0,758	ns
	Bourgogne	0,139	0,000	***	0,063	0,232	ns	0,075	0,119	+
	Bretagne	0,069	0,000	***	-0,011	0,737	ns	-0,171	0,000	***
	Centre	0,130	0,000	***	0,077	0,069	*	-0,043	0,323	ns
	Champagne-Ardenne	0,140	0,000	***	0,187	0,001	***	0,096	0,068	*
	Corse	0,074	0,153	ns	-0,079	0,370	ns	-0,064	0,487	ns
	Franche-Comté	0,083	0,001	***	0,022	0,708	ns	-0,045	0,544	ns
	Haute-Normandie	0,137	0,000	***	0,196	0,000	***	0,017	0,711	ns
	Languedoc-Roussillon	0,023	0,220	ns	-0,021	0,530	ns	-0,126	0,000	***
	Limousin	0,018	0,563	ns	0,141	0,047	**	-0,033	0,644	ns
	Lorraine	0,162	0,000	***	0,182	0,000	***	0,054	0,243	ns
	Midi-Pyrénées	0,003	0,881	ns	0,024	0,463	ns	-0,081	0,028	**
	Nord-Pas-de-Calais	0,192	0,000	***	0,178	0,000	***	0,127	0,000	***
	Pays-de-la-Loire	0,070	0,000	***	0,042	0,218	ns	-0,071	0,037	**
	Picardie	0,240	0,000	***	0,206	0,000	***	0,164	0,003	***
	Poitou-Charentes	0,061	0,006	***	0,017	0,734	ns	-0,059	0,217	ns
	Provence-Alpes-Côte-d'Azur	-0,050	0,002	***	-0,080	0,008	***	-0,173	0,000	***
	Rhône-Alpes	0,015	0,303	ns	0,054	0,083	*	-0,036	0,099	*
	Ile-de-France (REF)	*0,000*			*0,000*			*0,000*		
R-Square		**0,270**			**0,451**			**0,396**		
Number of observations		**19 875**			**5 806**			**7 036**		

****Statistically significant at the 1% level; **significant at the 5% level; *significant at the 10% level; + significant at the 15% level.*

***Source:** Insee-Cnamts-DGFiP 2011. Study sample (see section 3). Here, the legal category variable only identifies whether the private practice is registered as a limited liability company for non-commercial services (in French: "Sociétés d'exercice liberal" or SEL; see footnote no. 13). Low-income patients correspond to patients covered by the "CMU-C" French health insurance, whom doctors are not permitted to charge extra fees. The local medical density variable ("APL") has been standardized before being introduced in the model (see footnote no. 16).*

APPENDIX 2 – Effect of family structure on the total labour income of male and female physicians and on the share of extra-billings for sector 2 physicians: results from the fixed-effects model

		Dependent variable: TOTAL INCOME (in LOG)						SHARE OF EXTRA BILLINGS	
		GPs		Sector 1 Specialists		Sector 2 Specialists		Spécialistes secteur 2	
		Male	Female	Male	Female	Male	Female	Male	Female
Seniority		0.0389***	0.0688***	0.0448***	0.0493***	0.0825***	0.0525***	0.0253***	0.0378***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)	(0.000)	(0.001)
Seniority2		-0.000320***	-0.00138***	-0.000963***	-0.00143***	-0.00224***	-0.00124**	0.000478***	-0.0000833
		(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.028)	(0.002)	(0.776)
Legal category of private practice: SEL (y/n)		-0.306***	-0.437***	-0.269***	-0.456+	-0.231***	-0.914**	-0.00384	-0.0383
		(0.000)	(0.000)	(0.002)	(0.131)	(0.002)	(0.045)	(0.911)	(0.727)
Medical density of the corresponding specialty		0.0000288	-0.00969	-0.0136***	0.00303	-0.00781	-0.0308	0.00393	-0.0283
		(0.988)	(0.408)	(0.003)	(0.310)	(0.365)	(0.203)	(0.783)	(0.512)
Case-mix	Share of patients aged >=65 y.o.	0.0102***	0.0129***	0.00865	0.00503	0.00400	0.00444	0.000487	0.00909***
		(0.000)	(0.000)	(0.251)	(0.707)	(0.342)	(0.611)	(0.931)	(0.010)
	Share of patients with chronic disease	0.00512***	0.00779***	0.00152	0.00658*	0.00114	0.000984	-0.00463***	-0.00689**
		(0.000)	(0.000)	(0.350)	(0.088)	(0.250)	(0.740)	(0.002)	(0.011)
	Share of low income patients	-0.00566***	0.00257	0.00424***	0.00942*	0.00242	0.0150***	-0.00117	0.00995**
		(0.000)	(0.179)	(0.001)	(0.074)	(0.326)	(0.004)	(0.557)	(0.011)
Technical procedures contribution to total fees		0.0315***	0.0502**	0.0780***	0.204*	0.108***	0.0349	0.00270	-0.0639**
		(0.004)	(0.014)	(0.000)	(0.088)	(0.009)	(0.184)	(0.947)	(0.048)
Age of the youngest child	Born in the year, <=2 children	-0.000206	-0.267***	0.0182	-0.247***	0.00815	-0.285*	0.00665	0.0691*
		(0.990)	(0.000)	(0.676)	(0.008)	(0.853)	(0.082)	(0.883)	(0.087)
***Number of children** (REF = No child)	Born in the year, >=3 children	0.0473***	-0.332***	0.0154	-0.291*	0.00840	-0.328**	0.124*	0.0344
		(0.006)	(0.000)	(0.805)	(0.062)	(0.867)	(0.019)	(0.091)	(0.381)
	1 or 2 y.o., <=2 children	0.0118	0.0234	0.0106	-0.0691+	0.0126	0.0170	0.0553	-0.0336
		(0.387)	(0.410)	(0.699)	(0.101)	(0.708)	(0.797)	(0.253)	(0.455)
	1 or 2 y.o., >=3 children	0.0601***	-0.0538*	0.0216	-0.141**	0.0397	-0.000890	0.0997*	0.0181
		(0.000)	(0.088)	(0.743)	(0.034)	(0.285)	(0.992)	(0.079)	(0.628)
	Between 3 and 5 y.o., <=2 children	0.0419***	0.00587	0.0230	-0.0666**	0.0359	-0.0320	0.0646+	0.00306
		(0.001)	(0.813)	(0.609)	(0.024)	(0.266)	(0.669)	(0.124)	(0.930)
	Between 3 and 5 y.o., >=3 children	0.0655***	-0.0595**	0.0355	-0.0794+	0.0373	-0.0789	0.104**	0.00545
		(0.000)	(0.040)	(0.525)	(0.148)	(0.293)	(0.359)	(0.018)	(0.895)
	6 y.o. or above, <=2 children	0.0351***	-0.00155	0.0295	-0.0558*	-0.00131	0.00316	0.0713**	0.00254
		(0.001)	(0.941)	(0.511)	(0.082)	(0.966)	(0.965)	(0.023)	(0.945)
	6 y.o. or above, >=3 children	0.0565***	-0.0627**	0.0206	-0.0543	0.0360	-0.0391	0.0838**	-0.0115
		(0.000)	(0.020)	(0.598)	(0.249)	(0.320)	(0.567)	(0.017)	(0.790)
Observation period REF = 2005-2008)	2008-2011	-0.0436***	-0.0741***	-0.0340	-0.0323	-0.0219	-0.0256	0.0137	-0.0286*
		(0.000)	(0.000)	(0.151)	(0.285)	(0.325)	(0.326)	(0.668)	(0.092)
Spouse's earnings (in LOG)		-0.00255***	-0.00772***	0.00199+	-0.0164**	-0.00234+	-0.0107	-0.00168*	-0.00299
		(0.001)	(0.002)	(0.101)	(0.012)	(0.101)	(0.185)	(0.083)	(0.658)
Having a side-salaried activity (>1000€/year)		0.0527***	0.0527***	0.00955	0.0403	0.0106	-0.00439		
		(0.000)	(0.002)	(0.713)	(0.361)	(0.309)	(0.927)		
Intercept		10.87***	10.24***	11.31***	10.81***	11.37***	10.93***	0.307***	0.148
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.194)
R-Square within (FE)		0.125	0.150	0.112	0.186	0.231	0.282	0.184	0.293
Number of observations		5404	2850	1551	813	1501	426	1501	426

****Statistically significant at the 1% level; **significant at the 5% level; *significant at the 10% level; + significant at the 15% level.*

***Source**: Insee-Cnamts-DGFiP 2011. Restricted study sample (see section 3).*

Here, the legal category variable only identifies whether the private practice is registered as a limited liability company for non-commercial services (in French: "Sociétés d'exercice liberal" or SEL; see footnote no. 13). Low-income patients correspond to patients covered by the "CMU-C" French health insurance, whom doctors are not permitted to charge extra fees. The local medical density variable ("APL") has been standardized before being introduced in the model (see footnote no. 16).

APPENDIX 3 – Effect of family structure on the single labour income component coming from private practice of male and female physicians: results from the fixed-effects model

		Dependent variable: Income coming from PRIVATE PRACTICE (in LOG)					
		GPs		Sector 1 Specialists		Sector 2 Specialists	
		Male	Female	Male	Female	Male	Female
Seniority		0.0432***	0.0771***	0.0565***	0.0648***	0.0895***	0.0973***
		(0.000)	(0.000)	(0.006)	(0.001)	(0.000)	(0.000)
Seniority^2		-0.000408***	-0.00170***	-0.00141***	-0.00222***	-0.00285***	-0.00296***
		(0.000)	(0.000)	(0.006)	(0.000)	(0.000)	(0.000)
Legal category of private practice: SEL (y/n)		-0.217***	-0.302***	0.0380	0.142	0.0509	-0.662
		(0.000)	(0.000)	(0.645)	(0.643)	(0.641)	(0.232)
Medical density of the corresponding specialty		0.00129	-0.00627	-0.0142**	0.00671+	-0.0109	-0.0107
		(0.568)	(0.629)	(0.015)	(0.120)	(0.394)	(0.762)
Case-mix	Part CMU	0.0141***	0.0150***	0.0218*	0.00505	0.0108*	0.00494
		(0.000)	(0.000)	(0.088)	(0.740)	(0.084)	(0.679)
	Part ALD	0.00766***	0.0120***	0.00507	0.00921*	0.00954***	-0.00361
		(0.000)	(0.000)	(0.169)	(0.073)	(0.001)	(0.375)
	Part >=65 ans	-0.00687***	0.00294	0.00945***	0.0204**	0.00727	0.0180***
		(0.000)	(0.166)	(0.000)	(0.030)	(0.241)	(0.003)
Technical procedures contribution to total fees		0.0329***	0.0542**	0.133**	0.279+	0.282***	0.0454
		(0.010)	(0.016)	(0.020)	(0.101)	(0.000)	(0.211)
Age of the youngest child	né dans l'année, <=2 enfants	-0.00984	-0.280***	0.0505	-0.307***	0.0310	-0.239
		(0.608)	(0.000)	(0.354)	(0.004)	(0.569)	(0.290)
***Number of children**	né dans l'année, >=3 enfants	0.0446**	-0.384***	0.0231	-0.324*	0.0255	-0.336*
(REF = No child)		(0.024)	(0.000)	(0.782)	(0.068)	(0.678)	(0.067)
	1 ou 2 ans, <=2 enfants	0.0163	0.0287	0.0218	-0.0945+	-0.00754	0.0471
		(0.299)	(0.361)	(0.564)	(0.137)	(0.836)	(0.656)
	1 ou 2 ans, >=3 enfants	0.0606***	-0.0799**	0.0598	-0.200***	0.115**	-0.0602
		(0.000)	(0.022)	(0.335)	(0.004)	(0.035)	(0.685)
	3 à 5 ans, <=2 enfants	0.0455***	0.00716	0.0541	-0.0863**	0.0604	0.0276
		(0.001)	(0.795)	(0.220)	(0.020)	(0.176)	(0.818)
	3 à 5 ans, >= 3 enfants	0.0686***	-0.0803**	0.0593	-0.130*	0.0671+	-0.0875
		(0.000)	(0.012)	(0.292)	(0.090)	(0.146)	(0.496)
	6 ans ou plus, <=2 enfants	0.0383***	-0.00460	0.0633+	-0.0897***	0.0229	0.0409
		(0.002)	(0.844)	(0.122)	(0.008)	(0.525)	(0.684)
	6 ans ou plus, >=3 enfants	0.0608***	-0.0736**	0.0485+	-0.105*	0.0546	-0.0483
		(0.000)	(0.014)	(0.131)	(0.058)	(0.267)	(0.663)
Observation period	2008-2011	-0.0542***	-0.0854***	-0.0565+	-0.0625*	-0.0173	-0.0390
REF = 2005-2008)		(0.000)	(0.000)	(0.134)	(0.057)	(0.462)	(0.243)
Spouse's earnings (in LOG)	Log du revenu du conjoint	-0.00254***	-0.00761***	0.00285+	-0.0195**	-0.00134	-0.0115
		(0.003)	(0.006)	(0.115)	(0.016)	(0.409)	(0.184)
Having a side-salaried activity (>1000€/year)							
Intercept	Cste	10.75***	10.09***	10.75***	10.40***	10.82***	10.57***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-Square within (FE)	**R2 within (FE)**	0.101	0.139	0.138	0.220	0.268	0.258
Number of observations	**Nombre d'individus**	5404	2850	1551	813	1501	426

****Statistically significant at the 1% level; **significant at the 5% level; *significant at the 10% level; + significant at the 15% level.*

***Source**: Insee-Cnamts-DGFiP 2011. Restricted study sample (see section 3).*

Here, the legal category variable only identifies whether the private practice is registered as a limited liability company for non-commercial services (in French: "Sociétés d'exercice liberal" or SEL; see footnote no. 13). Low-income patients correspond to patients covered by the "CMU-C" French health insurance, whom doctors are not permitted to charge extra fees. The local medical density variable ("APL") has been standardized before being introduced in the model (see footnote no. 16).