The Supply of Nursing Labor in French Hospitals: Outflows, Part-Time Work and Motherhood*

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Abstract

This paper quantifies the supply of nursing labor in French hospitals over the course of hospital nurses careers, using detailed longitudinal payroll tax data matched with birth certificates and census data. Over the first ten years of a career, nursing hours supplied to hospitals decrease by over a third in average. This is mainly driven by hospital nurses no longer holding this kind of jobs, and to a lesser extent by transitions to part-time schedules within hospital nurses jobs. Hospital nurses who leave their jobs mainly turn to other jobs, usually within the healthcare sector, as opposed to non-employment. Having children frequently results in mothers transitioning to part-time schedules within hospital nurses jobs, but not in female hospital nurses turning to others jobs or leaving the workforce as a whole. Without the effect of motherhood, the prevalence of part-time work among hospital nurses would actually be much lower. Finally, hospitals offset nursing hours losses due to hospital nurses outflows, by hiring new nurses; by contrast nursing hours lost to transitions to part-time work are poorly compensated for.

Keywords: Nursing, hospitals, labor supply, maternal labor supply, event-study.

JEL Classification: I10, I11, J13, J16, J22.

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1 Introduction

The insufficiency in the supply of nurses has been a concern in most advanced economies for over two decades (see Shields, 2004, for instance). Because nursing labor has a direct and positive impact on patients' health outcomes (Propper and Van Reenen, 2010; Gruber and Kleiner, 2012; Friedrich and Hackmann, 2021), this shortage may be conducive to adverse health effects. The Covid-19 crisis, that has further enhanced the pressure on healthcare workers, has made this concern particularly salient, leading both policy makers and experts to worry about potential increases in outflows and decreases in inflows. In France specifically, these considerations triggered substantial pay increases for healthcare workers in the public sector in 2020-2021, that exceed +15% of their net wages, expecting these to discourage current workers to end their careers, and to attract additional workers.

On the supply side of the market for nursing labor, addressing this concern entails three potential margins. The first one regards whether sufficiently many individuals begin a nursing careers, which mainly has to do with nurses' training. The second one deals with the length of these nurses' careers, which is basically driven by how strong outflows are. The last one, deals with how much nursing labor nurses' deliver over the course of their careers.

This paper focuses on the last two margins, that is, taking as a given that some individuals become nurses, how many of them leave nursing over time, and how many hours of nursing labor they provide when they hold nurses jobs.[1] It does so in France over a 30-years time-period (1988-2019), relying on detailed longitudinal data issued from administrative registers. Lastly, it concentrates on hospital nurses and nursing labor supplied to hospitals, which actually covers the majority of the nursing occupation in France. In the end, considering individuals who begin a career as a hospital nurse, it investigates how many hours of nursing labor they supply to hospitals over time. This combines the two margins under scrutiny given that such hours equal 0 once hospital nurses have left hospital nurses jobs.

To this end, I first provide an analysis of nursing hours supplied to hospitals over the course of hospital nurses' lifecycle. The decline in nursing labor supplied to hospitals over time is largely driven by outflows, and to a lesser extent by tran-

[1] In France upon which this paper focuses, the first margin, that is individuals getting training to become registered nurses, is dealt with thanks to a competitive exam system, in which the number of available training slots is fixed each year by the ministry of Health. The number of applicants has been consistently much larger than the number of available slots.

sitions from full-time to part-time schedules within hospital nurses jobs. With respect to papers that have investigated the retention rate of hospital nurses without knowledge of their situation after they left their jobs (Holmås, 2002; Moscelli et al., 2024b), the data allow a characterization of the alternative work options for those who leave hospital nurses jobs.

As it turns out, outflows are driven by transitions to other jobs, as opposed to non-employment. In most cases, these jobs, whether salaried or self-employed, belong to the healthcare sector. An implication of this finding is that policies that impact the retention rate of hospital nurses have implications for the entire healthcare system, beside hospitals. As a result, assessing the benefits of such policies requires not only an estimation of the efficiency of nursing labor in the hospital sector, but also comparisons of the efficiency of nursing labor across settings, and possibly within-nurse across-settings comparisons of the efficiency of nursing labor.

Noting that hospital nurses are a heavily feminized occupation[2], I then build on recent the recent gender inequality literature that shows that, in developed countries, women's labor supply decisions are strongly tied to family-related events (Kleven, Landais, and Søgaard, 2019; Kleven et al., 2019; Cortés and Pan, 2023; Kleven, Landais, and Leite-Mariante, 2024). Specifically, I quantify the contribution of parenthood to the decline in nursing labor supplied to hospitals over hospital nurses' careers. To do so, I resort to an event-study approach akin to that of Kleven, Landais, and Søgaard (2019) to estimate the causal impact of parenthood on hospital nurses labor supply.

I find that motherhood frequently induces female hospital nurses to transition to part-time schedules within hospital nurses jobs, but not to leave hospital nurses jobs for other jobs or non-employment. Actually, this effect combined with the huge share of women and the fact that many of them become mothers over the first years of their careers is sufficient to explain a large share of the overall prevalence of part-time work among hospital nurses. In other words, without this impact of motherhood, the prevalence of part-time work among hospital nurses would be much lower. In the end, motherhood explains up to 20% of the decline in hours worked as a hospital nurse over the first ten years of a career. By contrast, fatherhood has virtually no effect on male hospital nurses' labor supply. In other words, even men who self-select in a very female-dominated occupation do not behave like mothers when it comes to family-work conciliation.

The negative impact of motherhood on female hospital nurses' labor supply

[2]In France, over 85% of nurses are women (Bessière, 2005).

is consistent with previous evidence from Phillips (1995); Askildsen, Baltagi, and Holmås (2003); Nooney, Unruh, and Yore (2010); Hanel, Kalb, and Scott (2014). It differs from other results in the literature, such as Holmås (2002); Estryn-Béhar et al. (2007); Frijters, Shields, and Price (2007); Toren et al. (2012). However, those papers never discuss motherhood specifically as they aim at building more general and structural models of nurses labor supply, which makes the comparison with this paper difficult (see Antonazzo et al., 2003, for a survey of this earlier literature).

While heterogeneity analysis is limited by sample size, it suggests that the impact of motherhood does not vary with paid parental leave reforms, and does not find evidence that the provision of formal childcare moderates the effect. This is consistent with recent evidence that the child penalty is mostly independent of family policies in the general population (Kleven et al., 2024). This and the clear difference between mothers' and fathers' choice within the same occupation point in the direction of gender identity being key to the understanding of children-related labor supply decisions (Andresen and Nix, 2022).

However, the evidence regarding parental leave stands in stark contrast with the Danish case investigated by Friedrich and Hackmann (2021), who find the aggregate provision of nursing services to be greatly affected by generous paid parental leave options. The reason might be that the Danish policy under consideration in their paper is much more generous than paid parental leave allowances in the French case.

The last question to consider is whether these individual-level labor supply decisions have an impact on the provision of nursing services at the hospital level, which is arguably what matters most for patients. Indeed, if the market for nursing labor is frictionless, and newly hired hospitals nurses perfect substitutes for hospital nurses with more experience, then hospitals can simply replace nursing hours lost to outflows or transitions to part-time work by hiring additional nurses.

I investigate this possibility thanks to repeated comprehensive short-panel data issued from the same payroll tax registers upon which my analysis of hospital nurses careers relies. They allow me to compare hospitals that, at a certain point in time, are confronted with more outflows or transitions to part-time work from incumbent nurses than is usual for them or for other hospitals at the same point in time with a counterfactual built based on both what is usual for these affected hospitals (at other points in time) and how non-affected hospitals behave at the same point in time.

Hospitals confronted with more outflows than expected offset the result loss in nursing hours by hiring additional nurses, so that they compensate for this loss almost one to one. By contrast, hospitals confronted with more transitions to part-time work than expected do not seem to compensate for the resulting decrease in nursing hours.

That hospitals are able to offset nursing hours losses due to outflows almost one to one matches recent evidence from Denmark that shows small firms are usually not affected by parental leave take-up by their employees, as they are able to hire temporary workers or increase others' employee hours worked (Brenøe et al., 2024). It stands in contrast however with the fact that in German firms, the labor demand for incumbent employees increases when a salaried employee dies unexpectedly (Jäger and Heining, 2022). Interpreting this finding in light of this literature is not easy, because here outflows encompass a large variety of shocks beside workers' death and parental leave, e.g. retirement and transitions to other jobs. It suggests however that when it comes to hospital nurses outflows, French hospitals behave as if nursing hours worked by different nurses were close substitute, and the market for nursing labor was frictionless. This choice may however bear adverse consequences if there exist strong complementarities across healthcare professionals (Moscelli et al., 2024c) or if a high turnover rate is in itself detrimental to patients (Moscelli et al., 2024a).

The results show however that nursing hours lost at the individual level to transitions to part-time schedules translate almost one to one into nursing hours lost at the hospital level. A reason for this finding could be that nursing labor is not easily divisible. For instance, because it is not feasible to hire a nurse on a 20% basis, offsetting nursing hours lost due to a transition to an 80% part-time schedule is much more difficult than compensating for a hospital nurse that moves to another job.

The data indicate that most transitions to part-time schedules result from children-related decisions made by mothers, whereas outflows are unrelated to this effect. They also suggest that nursing hours losses due transitions to part-time work are not easily compensated for by hospitals, whereas nursing hours due to outflows are. This indicates that the negative impact of motherhood on hospital nurses' labor supply at the individual has an effect on the aggregate provision of nursing services at the hospital level.

If these children-related decisions are indeed tied to gender identity channels, as opposed to family policies and institutions, this implies that greater gender conver-

gence can lead to increases in the aggregate supply of nursing labor. This impact of gender convergence could transit through two channels: (i) a decreased occupational segregation that diminishes the contribution of the impact of motherhood to the lifecycle supply of hospital nursing labor, simply because less hospital nurses could be affected by this effect; and (ii) a decrease in the impact of motherhood on female hospital nurses' labor supply.

From a methodological point of views, this paper emphasizes the benefit of data that covers all potential jobs for hospital nurses, as Frijters, Shields, and Price (2007); Nooney, Unruh, and Yore (2010); Hanel, Kalb, and Scott (2014) do, as opposed to retention studies based on hospital registers only (Holmås, 2002; Moscelli et al., 2024b), as most of the outflows from these jobs are directed towards other jobs in the healthcare system. It also makes it clear that while transitions to part-time schedules are far from explaining the entire lifecycle profile of hospital nurses labor supply, they deserve specific attention as can have more implications for the overall supply of nursing services than retention rates do. When considering the impact of motherhood on labor supply, this paper improves on the now usual event-study developed within the child penalty literature (Angelov, Johansson, and Lindahl, 2016; Kleven, Landais, and Søgaard, 2019) by resorting to more credible estimators based on the recent difference-in-difference literature (de Chaisemartin and D'Haultfœuille, 2020; Callaway and Sant'Anna, 2021; Goodman-Bacon, 2021; Sun and Abraham, 2021). The lesson is that failing to account properly for treatment effect heterogeneity in this context can understate substantially the negative impact of motherhood on women's labor supply.

The remainder of this paper is organized as follows. Next section outlines the institutional context. Section 3 describes the administrative data upon which the analysis is based. Section 4 presents evidence regarding the lifecycle profiles of hospital nurses' labor supply. Section 5 details the empirical framework aimed at estimating the impact of motherhood on hospital nurses' labor supply, and Section 6 presents the corresponding results. Section 7 performs the empirical analysis regarding the hospital-level implications of hospital nurses' individual labor supply decisions and Section 8 concludes.

2 Institutional context

2.1 Nurses careers

2.1.1 Training

As is the case in many countries, in France nursing is a licensed occupation. In other words, there a strong barriers to entry in the nursing market, as one has to meet several requirements to be granted the authorization to work as a registered nurse. The most salient of them is unsurprisingly education: authorization is only granted upon the completion of a curriculum at specific institutions (*Instituts de Formation en Soins Infirmiers*, IFSI). Getting into these institutions usually involves passing a competitive entrance exam, after which students follow a 3-years training program. Since 1979, the number of open positions in these competitive exams is fixed *ex ante* at the national level by the ministry of Health. These programs were part of vocational education up until 2009, but have since moved to higher education, and are nowadays provided by or in partnership with universities. As a result, this initial nurse training now corresponds to a bachelor degree.

This nursing degree grants with the authorization to work as a general care nurse. Over the course of their careers, and usually conditional on experience, nurses can choose to gain additional training to get into one of several nursing specializations. This additional training may either be part of a master degree or a professional degree, depending on the specialization at stake.

2.1.2 Work options

There are two main settings in which nurses may work in France. Firstly, nurses may work as salaried employees, whose employer may be a hospital, a long-term care facility, a health center, a school etc. Secondly, they may work as freelance nurses, in which case they provide healthcare directly to patients. However, freelance nursing is not open to fresh nursing graduates. Indeed, being granted the authorization to work as a freelance nurse requires not only a nursing diploma, but also at least two years of experience as a salaried nurse at a healthcare facility. In 2006, the majority of registered nurses (63%) were salaried employees at a hospital, either public (49%) or private (14%); 4% of them were employed in a long-term care facility, and 21% of them were salaried employees in other settings. Lastly, 12% of them worked as freelance nurses (Barlet and Cavillon, 2010). In this paper, I focus on the lifecycle of nurses who hold a job at a hospital at least once in their

careers. This actually covers the majority of the nursing profession, because over three quarters of nurses begin their careers at a hospital (see Appendix A.1).

2.1.3 Hospital nurses

Lastly, the composition of the hospital nurses workforce has been fairly constant over the time-period under scrutiny in this paper (see Appendix A.2). Specifically, the share of women among hospital nurses is roughly constant around 85%, regardless of whether they work in the public or the private sector. The public sector provides the majority of hospital nursing labor in France: the share of hours worked by hospital nurses in public hospitals amount to 75% of the total, and varied very little from 1988 to 2019.

2.2 Family policies

2.2.1 Part-time work options

In France, children grant their parents with a right to work part-time.[3] In contrast with part-time work for personal convenience, this right is binding for the employer. In the public sector, service requirements cannot be opposed to employees whose part-time work is motivated by children. In the private sector, an employee whose employer refuses a part-time demand due to children can bring the case to the labor court. The exact duration during which this right is open is not the same in the public and the private sector. In the public sector that concentrates the majority of hospital nurses, this right to part-time work is open for three years from the birth (or adoption) of every child. In the private sector, it is open for three years from the birth of the first child; it also covers three years from the birth of the second child,[4] but lasts up to six years after the birth of the third child. After the end of those time-periods, part-time work is still allowed, but depends on an agreement between employer and employee.[5]

In the public sector, children-related part-time work can only be chosen in

[3] This discussion centers around cases where an employee asks to work part-time. In the public sector, it is actually not possible for employers to ask for an employee to work part-time. In the private sector, this possibility is open only in case of temporary economic hardship. In this case, the employee who refuses to transition to part-time work may be laid off for economic motives, which entails severance payents and opens rights to unemployment benefits.

[4] In this, case, it ends as the second child enters preschool.

[5] An exception concerns parents of children with disability whose right to part-time work lasts longer.

discrete steps, that is by choosing amont 50%, 60%, 70% or 80% shedules.[6] The pay is proportional to working time, except at the 80% level where it is slightly higher (about 85% of the full-time salary). Part-time work time-periods grant with the same rights to promotion and training as full-time periods do, and since 2004 they also open the same rights to retirement pensions (i.e. rights to retirement pensions are not proportional to working time). The private sector is less protective of part-time employees than the public sector is. In principle, working time is agreed upon individually by employers and employees; in practice the chosen level usually aligns with those offered in the public sector. Pay is proportional to working time, and the law only guarantees that as a children-related part-time work period ends, employees must be granted with a position at least comparable to the one they held before transitioning to part-time work.

Part-time work is quite common among hospital nurses in France. Over the time-period under scrutiny in this paper, between 20% and 30% of hospital nurses were working on a part-time schedule (see Figure A.4). This is driven by a similar share of female hospital nurses resorting to part-time options, which is only logical given that women form the vast majority of the hospital nurses workforce. However, part-time work does exist among male hospital nurses, as about 10% of them work on a part-time schedule. Lastly, the prevalence of part-time work has increased over time. Even though the data display some fluctuations, it has increased by about 10 percentage points between the end of the 1980s and the beginning of the 2010s.

2.2.2 Parental leave

Employees with children may also choose a full-time parental-leave option instead of these part-time work arrangements. In that case, the employer no longer pays the employee during the time she is out of the workforce. The potential duration of the parental leave is the same in both the private and public sectors: it is open for three years from the birth of the first child; it also covers three years from the birth of the second child,[7] but lasts up to six years after the birth of the third child. Since 2019, in the public sector parental leave periods open the same rights to promotion as full-time work periods do, up to a maximum of five years over the entire career. Since 2004, they also open similar rights to retirement pension, up to a maximum of three years over the course of a career. In the private sector, parental leave

[6] An additional 90% level exists when part-time work is chosen for personal convenience.
[7] In this, case, it ends as the second child enters preschool.

periods open half the rights to seniority premia that full-time working periods do. At the end of the parental leave, public sector workers are guaranteed to get back to their former job, or a job with similar hierarchical responsibilities. For private sector workers, the law states that the employee shall get back either to her past job or to a job with similar pay and responsibilities.

2.2.3 Parental leave subsidies

On top of these considerations regarding the relationship between employer and employee, children-related part-time work or full-time parental leave can also grant parents with public subsidies, in the form of paid parental leave provided by the family branch of the social security. This paid parental leave policy was first introduced in 1985, when it only covered mothers of three children or more, and later expanded to mothers of two in 1994, and finally all mothers in 2004. In 2015 a reform took place to incentivize parents to split the leave between mothers and fathers. The paid part-time option offers parents an income supplement that depends nonlinearly on their working time: it amounts to approximately €200 per month for parents working at a 80% rate. The full-time option grants about €400 per month. The duration of the paid leave depends on the number of children: it lasts at most 6 months for the first child, but up to 24 months from the second child on. The existing literature suggests that all the policy reforms have affected mothers' labor supply in the general population (Choné, Le Blanc, and Robert-Bobée, 2004; Piketty, 2005; Lequien, 2012; Joseph et al., 2013; Périvier and Verdugo, 2024).

2.2.4 Childcare coverage

Among both OECD and EU countries, France ranks high in terms of fertility rate, female employment rate and formal childcare coverage (see e.g. OECD, 2011). In contrast to other countries, childcare arrangements in France are extremely diverse: its long-lasting institutional history has led to the coexistence of paid parental leave and highly subsidized formal childcare services, the latter including a continuum from individual at-home childcare to collective services provided by daycare centers.

France has achieved this broad childcare coverage by fostering very diverse childcare arrangements, with daycare centers representing only a fraction of the total. Formal individualized childcare solutions, such as childminders and, to a

lesser extent, individual at-home childcare are also quite common. Few parents rely heavily on informal solutions in France: less than 3% of families with young children relied on a relative as their primary childcare provider in 2013 (Villaume and Legendre, 2014).

Hospitals frequently offer daycare services to their staff, in order to make family-work conciliation easier for those jobs with long and atypical hours, and with frequent and impredictible changes of schedule (Daune-Richard, Odena, and Petrella, 2007). Unfortunately, quantitative data regarding these services do not seem available.

3 Data

My analysis is based on a combination of labor market data issued from payroll tax forms and fertility data issued from birth registers, all made available by Insee. I merge these datasets thanks to a common individual identifier based on a Social Security number. This allows me to build a sample of qualified healthcare workers who have at least once held a job at a French hospital, either in the public or the private sector, that I am able to track over time in the salaried sector from 1988 to 2018.

3.1 Labor market data

My labor market data are drawn from the *Déclarations Annuelles de Données Sociales* (DADS). By law,[8] French employers have to fill in a DADS form for every employee subject to payroll taxes. The form contains detailed information about days paid, hours paid, occupation, industry, gross and net wages, other job characteristics (beginning, duration and end of a period of employment and part-time employment), employer characteristics (size and location) and individual characteristics (age, gender and municipality of residence).

Throughout the paper, my main variable of interest corresponds to hours worked, measured in full-time units. Specifically, these hours represent the sum of hours worked between January, 1st and December, 31st of a given year. As a result, it amounts to 1 for full-time workers who have been working throughout the entire year. It is lesser than 1 if either (i) they have not been working over the entire year, for instance if their job started in April; or (ii) if they have been

[8]The absence of DADS as well as incorrect or missing answers are punished with fines.

working part-time. During a maternity leave, as an employee is not paid by for any hours by her employer, hours worked are equal to 0.[9] Appendix B provides further details on how time worked is measured.

Hours worked are capped to 1 for individuals working full-time during an entire year, so that it does not incorporate overtime. However, the data make it possible to investigate hours worked beside the usual amount for a full-time worker. I investigate this approximate measure of working time separately, as an additional margin of adjustment beside the full-time / part-time status and the employment status that is well captured by the main measure of hours worked in FTU.[10]

Longitudinal version Most of the results in this paper rely on a longitudinal version of these data. Specifically, I rely on the DADS panel, a longitudinal sample to track mothers' labor supply from 1988 to 2019, thanks to an anonymized personal identifier based on their social security number that allows me to link this information to birth records. A comprehensive cross-sectional is also made available to researchers. I rely on this cross-sectional data to investigate the implications of part-time work at the hospital level. I contrast to the longitudinal version of the DADS data, this dataset cannot be linked to birth registers.

The sampling rate of this longitudinal dataset varied over time: from 1988 to 2001, the data only cover individuals born in October in even-numbered years; as of 2002, it also includes individuals born on January 2-5, April 1-4, July 1-4 and October 1-4 regardless of their year of birth.[11] This creates left-censoring regarding beginning of the career for the latter group of individuals. For this reason, I restrict the analysis to individuals who belong to the former group.

Comprehensive version The comprehensive version of the DADS data does not allow to track salaried employees over the course of their entire careers. Instead, it consists in repeated short-panel data that contain information regarding two consecutive years. For instance, the 2017 file contains information regarding 2017 and 2016. This information is available at the individual × employer level.

[9] This does not imply that hours worked over the year she had her maternity leave are equal to 0 as the maternity leave is usually shorter than a year.

[10] See Appendices F.1 and F.2.

[11] The sample definition only relies on salaried employees' days of birth. Their children's day of birth does not matter here. In other words, these data make it possible to track the lifecycle of hospital nurses born on specific days, regardless of whether their children were born on those days. Additionally, their children's date of birth are recorded and available in the data no matter their values.

In my investigation of the implications of part-time work at the hospital level, I rely on these data that I aggregate at the hospital × year level between 1995 and 2017.

The DADS data have two main caveats with respect to my analysis. The first one is that the most detailed occupation variable is not available before 2009. Indeed, before this employers only had to answer a 2-digits occupation question, as opposed to the 4-digits occupation which is the most detailed level in the occupation classification used by Insee. This impedes resorting to the naive approach to the labor supply of nurses, which would basically select individuals into the sample based on whether or not they have, at one point in their lives, held a job as a nurse, as made salient by the 4-digits occupation variable. Instead, I select individuals based on the combination of the 2-digits occupation variable, and the 5-digits industry variable. Subsection 3.3 details this choice and characterizes the selected individuals in terms of their detailed occupation, when observed.

The second issue is that hours worked are not observed before year 1995. Before this, the data only provide information on days worked, and working-time status, either full-time or part-time. I choose to impute hours worked, measured in full-time units, before 1995, based on those two variables. Specifically, for full-time workers, I consider time worked to be proportional to days worked, and equal to 1 for those who work for a full year – in this there is absolutely no difference with the way time worked is measured after 1995. For part-time workers, I consider them to be on a 50% schedule, which was the most frequent case after 1995 (see Appendix B); as a result, time worked is proportional to days worked, so that for those who work for an entire year time worked is equal to 0.5. My results are nevertheless robust to this particular choice (see Subsection 6.3).

Self-employment While the DADS data offer interesting insights regarding salaried employment, they do not cover self-employed workers. This can prove problematic when investigating hospital nurses careers, given that transitioning to the freelance sector is a possibility that is open to them once they have spent 2 years working as salaried nurses. Information regarding self-employment that can be linked to the longitudinal version of the DADS data has been recently made available. These data are issued from a variety of administrative forms, all of them related to the payment of social security contributions for self-employed workers. It covers the 2006-2019 time-period. In the context of this paper, these data allow me to know (i) whether each individual receives positive labor earnings from the

self-employed sector; and (ii) whether these earnings come from freelance nursing activities (thanks to the 5-digits industry information).

3.2 Fertility data

My analysis also relies on birth records. Births are registered by an individual who was present at the time of birth, usually the father, but in some cases a doctor or a midwife. I take advantage of a longitudinal version of these records at the individual level extracted from the *Échantillon Démographique Permanent* (permanent demographic sample, EDP) to obtain information on the timing of births. Because it displays an anonymized personal identifier based on the same social security number as the DADS data, this dataset can be merged with the longitudinal version of the DADS.

Inclusion in this dataset is based on (potential) parents' date of birth, and does not depend on their children's date of birth. Specifically, it covers all children born to parents born on October 1-4, whatever their parents' year of birth; information regarding individuals born on January 2-5, April 1-4 and July 1-4 is available from 2004. To get around this left-censoring issue, and due to the sampling of the labor market data, I restrict my analysis to individuals born on October 1-4 of even-numbered years.

In the birth certificate data, parenthood is recorded when parents appear on their children's birth certificate. For mothers, this is always the case, except for anonymous births. For fathers, this is the case when fathers recognize their children either before or at the time of their birth. Marriage with the children's mother makes this recognition automatic, without any action from their part other than the birth declaration itself. However, children born outside marriage has become increasingly common in France over the time-period under scrutiny in this paper: in 1990, 30,1% of French children were born to unmarried parents, and this share has increased steadily up to 59,7% in 2019. In such a case, fathers have to explicitly recognize their children. This recognition can take place before birth, at the time of the birth, or afterwards. The data only is only informative as to fatherhood in the first two cases. In 2019, this was the case for 86,6% of children born to unmarried parents, against 65% in 1990. As a result, the share of childbirth events that are tied to fathers in the data is about 90% over the entire time-period.

A caveat of this dataset is that some birth-related data for the 1990s were incomplete in administrative birth records for individuals born on October 2-3

(for details, see Wilner, 2016). For these individuals I use 1990 and 1999 census data to fill in the gaps, as do Pora and Wilner (2024). The quality of these data is comparable to that of those that cover individuals born on October 1 or 4 for whom administrative birth records are available from 1967.

3.3 Sample construction

My analysis relies on a sample of qualified healthcare workers working in a hospital setting, that I follow over the course of their lives. As explained in Subsection 3.1, data regarding the detailed occupation are not available before 2009, which restricts the possibility to base my sample selection on this variable. Indeed, nurses in general cannot be isolated from the rest of the workforce without knowledge of the detailed occupation, as the 2-digits occupation level groups them with social workers. Unfortunately, this detailed occupation information is not available before 2009 in the DADS data. However, when restricting to the hospital workforce, a large majority of those who belong to this 2-digit occupational group are actually nurses. Additionally, even though the focus is specifically on hospital nurses, it is actually relevant to the larger nursing occupation as most nurses begin their careers in the hospital sector.

Specifically, I define hospital nurse jobs as those with (i) 2-digits occupation variable equal to "Qualified healthcare and social workers"[12] and (ii) 5-digits industry variable equal to "Hospital activities". This definition only approximates the usual definition of a hospital nurse job. However, it matches the usual definition quite closely: Table 1 displays the distribution of detailed occupations among jobs that match this criterion, which is observed in the DADS data as of 2009. Over three quarters of these jobs are indeed nurse jobs; the remainder are mostly health related technical jobs. Note that my approach includes nurses managers, but excludes auxiliary nurses who belong to another 2-digit occupation group. Social workers, although nominally included in the criterion, represent a very small share of this population.

Individuals of interest are all those that are observed, between 1988 and 2019, to hold this type of job for at least six months. I then track their labor market trajectories from 1988 to 2019, regardless of whether or not they still hold this kind of job. In other words, hospital nurses who form part of my sample are

[12]Medical doctors do not belong to this category, as they belong to another one that is part of the "Managers and professionals" group.

not necessarily hospital nurses throughout their lives, but it is assured that they have been at some point.[13] This leaves me with 161,723 observations that account for 5,627 individuals. As detailed above, inclusion in this sample is based on individual's birthday. As long as the causal effect of birthday on labor supply is close to 0 it can be treated as a representative sample of the population of interest at rate 0.6%.

The data only allow to follow individuals into salaried employment. When individuals are not observed with a salaried job, I consider their hours worked to be equal to 0. In that way, my estimates regarding hours worked are not conditional on salaried employment, as they do take into account time-periods spent outside employment, but they do not take into account the labor supply in the freelance sector.

Crucial to my analysis are (i) the year during which individuals are first observed to hold a nurse job at a hospital and (ii) the length of the time-period during which they are observed afterwards. That my data only cover the 1988-2019 time-period generates two issues with respect to this. Firstly, a substantial share of individuals who are observed to hold such a job in 1988 are likely to have done so for an unobserved number of years, which creates a left-censoring issue. Secondly, recent cohorts, as defined based on the timing of the first hospital nurse job, are only observed for a restricted time-period afterwards. My identification strategy is entirely based on within-cohort comparisons of nurses who become mothers sooner or later. Hence, for these recent cohorts, some control groups of mothers whose first child is born later are unobserved, because the birth of this child cannot be recovered from the data. This creates a right-censoring issue. I discuss these two concerns in Subsection 6.3 and provide evidence that my results are robust with respect to these issues.

Table 2 displays a few summary statistics regarding the sample. Individuals of interest usually get their first job as a hospital nurse around age 30, usually after a few years in different jobs, either as a nurse in a different work setting, or in a different occupation. By age 45, about 80% of them have children. This rate is comparable to that of the overall French population (81,7% for women, see Reynaud, 2020). By contrast, about 35% of female hospital nurses and 40%

[13] Additionally, the vast majority of individuals who ever hold a nurse position will fall within the universe that I cover, because most of them work at a hospital at some point of their lives. To show this, in Appendix A.1 I quantify the share of workers who ever hold a job at a hospital among those who I can properly identify as beginning their careers as nurses after 2010 thanks to the detailed occupation variable. This share is about 75%.

of male hospital nurses have children as they get their first hospital nurse job. This suggest that about half of newly recruited hospital nurses will go on to have children in the future. The average age at first job is close to the age at which many hospital nurses get their first hospital nurse job: in 2015 in France, mothers' average age when they gave birth to their first child was 28.5. This implies that for a sizable share of hospital nurses, the beginning of their career coincides with child-rearing years.

To investigate the impact of parenthood on hospital nurses labor supply, I restrict the sample to individuals whose first child is born at least two years after they first became hospital nurses. The reason for this restriction is that for those whose first child is born earlier, it is possible that becoming a hospital nurse is actually a consequence of parenthood itself. Table 3 displays summary statistics regarding this subsample of interest. The data allows to investigate 1,765 first birth events for women against 260 for men, which implies that any estimation carried out on the impact of fatherhood on male hospital nurses' labor supply will have much less statistical power. This subpopulation enters the occupation at a younger age than the entire population, around age 25. The first child is usually born a few years later, around age 30. Lastly these individuals end up with 2 children in average.

4 Lifecycle profiles for hospital nurses

This section present evidence regarding the lifecycle of hospital nurses. Longitudinal data regarding hospital nurses employment make it possible to investigate how much labor they supply to various types of employers over the course of their careers. Results in this section are estimated in the entire sample, so that it incorporates: (i) hospital nurses whose first child is born at least two years after they took their first job as a hospital nurse; but also (ii) hospital nurses who already had children at this point; and (iii) hospital nurses who remain without children. Appendix C display the estimated lifecycle profiles for hospital nurses whose first child is born at least two years after they took their first job as a hospital nurse, who are those for which it is possible to identify the impact of parenthood on their labor supply. The profiles look very similar, except that transitions to part-time work as a hospital nurses are more frequent in this subsample.

4.1 Nursing labor supplied to hospitals

Figure 1(a) displays the nursing labor supplied to French hospitals, that is the average hours worked as a nurse in a hospital, measured in full-time units[14] over time relative to the first hospital nurse job, both in the aggregate and across cohorts defined by the timing of the first hospital nurse job. This measure is not conditional on working as a hospital nurse (except by definition at the beginning of one's hospital nurse career): hours worked as a hospital nurse are set to 0 for those who no longer work as a hospital nurse, either because they hold a job in another occupation or because they are not employed. Soon after the first two years, which correspond to a gradual entry into the job,[15] the nursing labor supplied to hospitals starts to decay. This decline amounts to 0.26 full-time units over the first ten years of a career, which is substantial considering that the baseline at the beginning of a career is 0.72 full-time unit. In other words, the average decline over the first ten year of a career amounts to 36% (0.26 / 0.72). Splitting the data across cohorts confirms that this pattern is not driven by changes in the composition of cohorts that are observed at each point of time, given the restricted time-period of observation.

How much of this decay is driven by transition to part-time work? Figure 1(b) answers this question by plotting the share of hospital nurses who hold a full-time or a part-time hospital nurse position over the course of their careers. Once again these shares are not conditional on holding a hospital nurse job.[16] These shares are displayed both in the aggregate and across cohorts defined by the timing of the first hospital nurse job.

This figure shows that the decline in hours worked as a hospital nurses is probably not driven by transitions from full-time job to part-time job. Indeed, 78% of hospital nurses work as full-time hospital nurses as they begin their careers.

[14] This measure does not include overtime hours worked as a hospital nurse. Appendix F.1 investigates hospital nurses working overtime specifically. The lesson is that while working overtime hours is quite common among hospital nurses, these hours only represent a small fraction of the nursing labor they supply to hospitals. As a result, actually including overtime hours worked in this measure would not change the overall picture.

[15] Because hours worked are measured as a sum between January, 1st and December, 31st, if the first job does not start on January, 1st, hours worked in full-time units are usually lesser than 1 even for full-time workers. As a result, the increase between year 0 and year 1 is largely driven by individuals who do not work the entire year on their first year as a hospital nurse. This may be the case for instance for those with no work experience who do not start their first job on January. In other words, this spike at year 1 is rather mechanical.

[16] Some hospital nurses may appear holding both a full-time job and a part-time job for some year in the data, for instance because they transitioned to a part-time job at some point within a given year. In this case I classify them as part-time hospital nurses for this year.

Ten years later, only 36% of them still do so. However, the share of those who hold part-time hospital nurses positions varies much less over the course of their careers. This share amounts to 22% as they begin their careers. It decreases afterwards, and then increases slightly over time, but does not exceed 18% after the first years of a career have passed.

In the end, from an accounting perspective, the main driver of the decline of nursing labor supplied to hospitals over the course of hospital nurses' careers consist in hospital nurses no longer working as hospital nurses. Indeed, ten years after they began their careers, the share who still do so amounts to 54% (36% working full-time + 18% working part-time). In other words, about half of hospital nurses leave this occupation over the first ten years of their careers.

4.2 Transitions to other jobs

Why do those hospital nurses leave this occupation? From an accounting perspective, these outflows could correspond either to transitions to other jobs, or to hospital nurses leaving the workforce. To answer this question, Figure 2 displays the salaried labor supply, that is (a) the average hours worked, measured in full-time units, over all salaried jobs, i.e. including jobs other than hospital nurses jobs, and (b) the salaried employment rate, over time relative to the first hospital nurse job, both in the aggregate and across cohorts defined by the timing of the first hospital nurse job.

Soon after the first two years, which correspond to a gradual entry into the job, hours worked over the entire salaried sector starts to decay. This pattern holds across cohorts and is not driven by changes in composition over time. This decline amounts to 0.17 full-time units over the first ten years of a career: average hours worked amount to 0.84 full-time unit one year after hospital nurses began their careers, and decrease to 0.67 full-time unit ten years after. While this decrease is sizable in itself, it should be compared to that of hours worked as a hospital nurse over the same time-period. As stated above, this quantity is 0.26, that is 0.09 full-time units higher. A very simple accounting approach would therefore attribute about a third (0.09 / 0.26) of the decline in hours worked as a hospital nurse to transitions to other salaried jobs.

Considering the salaried employment rate yields similar results. Indeed, Figure 2(b) shows that ten years after they started they took their first hospital nurse job, 79% of hospital nurses still hold a salaried job, whereas the above discussion

implies that only 54% of them still hold a hospital nurse position (which is always a salaried position). This implies that 25% of them hold salaried jobs in another occupation. A very simple accounting framework would therefore attribute about half (0.25 / 0.46) of hospital nurses outflows over the first ten years of a career to transitions to other jobs, and the other half to hospital nurses leaving salaried employment.

Healthcare jobs Of salaried jobs that are not hospital nurses jobs, those who contribute to the healthcare system more broadly deserve special attention. Indeed, if transitions from hospital nurses jobs to other salaried jobs are directed towards other healthcare jobs, then increasing the retention rate of hospital nurses may be detrimental to other parts of the healthcare system. This is particularly relevant here given that 75% of French nurses begin their career in a hospital.

To shed light on this issue, Figure 3 displays (a) average hours worked as a healthcare worker, including but not limited to hospital nurses jobs and measured in full-time units; and (b) the share of hospital nurses who still hold a healthcare job, over time relative to the first hospital nurse job, both in the aggregate and across cohorts defined by the timing of the first hospital nurse job. Healthcare jobs gather: (i) all jobs in hospitals, nursing homes and other healthcare facilities, including but not limited to nurses positions; and (ii) all nurses positions, even outside hospitals and nursing homes (e.g. working as a nurse at a school). The slight difference with other figures is that the data only goes from 1995 on, because nursing homes and other healthcare facilities cannot be isolated from the rest of employers before this date.

The decline in hours worked in the healthcare system as a whole over the first ten years of a career represents 0.20 full-time units, which places it somewhere between the decline in hours worked as a hospital nurse (0.26) and that of hours worked over all salaried jobs (0.17). This implies that hours worked in the healthcare system, other than as a hospital nurse, increase in average by 0.06 full-time units over the same time-period, against 0.03 for jobs unrelated to healthcare. From an accounting perspective, transitions to other health-related jobs would therefore account for 23% (0.06 / 0.26) of the decline in hours worked as a hospital nurse, while transitions to jobs unrelated to healthcare would account for 10% of this decline.

Considering the extensive margin of labor supply decisions yields similar results. Ten years after they took their first hospital nurse job, 74% of hospital nurses

still hold a job in the healthcare system as a whole. Since at that time, the share who still work as hospital nurses is 54%, and the share in salaried employment 79%, this implies that 20% of them work within the healthcare system, but no longer as a hospital nurse, while 5% of them have moved to jobs outside the healthcare system. As a result, transitions to other health-related jobs would account for 43% (0.20 / 0.46) of the outflows, against 11% (0.05 / 0.46) for transitions to other jobs unrelated to healthcare.

Self-employment This picture is however not complete, because salaried employment does not cover all possible jobs. This omission would prove problematic here because nursing careers entail the possibility to work as a freelance nurse. As a result, it would not be correct to attribute the remainder of the decline in nursing labor supplied to hospitals to hospital nurses leaving the overall workforce in itself. Figure 4 makes the picture more complete by resorting to self-employment data, available from 2006. It displays (a) the share of hospital nurses who still hold a job as a hospital nurse and the share who hold a job as a freelance nurse; and (b) the share of hospital nurse who still hold a salaried job, and the share who hold a self-employed position,[17] from year 2006 by year relative to the first hospital nurse job.

Consistent with the rule that requires at least two years of experience as a salaried nurse to start a freelance nurse practice, the share of hospital nurses who go on to work as freelance nurses is 0 over the first two years of their careers, and begins increasing later on. It reaches a plateau about ten years later: about 7% of hospital nurses then work as freelance nurses. The share who hold a self-employed position more broadly follows a very similar pattern, even though it is slightly higher. Ten years after they began their careers as hospital nurses, about 10% of hospital nurses are self-employed. This implies that about 3% of them are self-employed but do not work as freelance nurses.

Individuals who are not observed neither in salaried employment nor as self-employed workers can be considered outside the workforce. When only data from 2006 on is considered, the share of hospital nurses who still hold a job as a hospital nurse ten years after they began their careers is 52%. The share of those who hold a salaried position is 78%, of which 74% work in the healthcare as a whole and

[17] In this figure, all those who hold at least one salaried position are not included in the share of those who hold freelance jobs. In practice this share is not always negligible even though it remains smaller than that of those who hold "pure" salaried and self-employed position: see Appendix D

the share of those who hold a self-employed position 10%, of which 7% work as freelance nurses. As a result, from an accounting point of view, 75% ((0.78 – 0.52 + 0.10) / 0.48) of the outflows correspond to transitions to other jobs, of which 60% ((0.74 – 0.52 + 0.07) / 0.48) contribute to the healthcare system, while the remaining 25% correspond to hospital nurses leaving the workforce as a whole.

This analysis confirms that a sizable share of the decline in nursing labor supplied to hospitals over the course of hospital nurses careers is tied to transitions to other jobs in the healthcare system as a whole. As a result, policies that aim at improving the retention of hospital nurses can affect other parts of the healthcare system, if the affected nurses are those who would have otherwise transitioned to other health-related jobs, as opposed to transitions to jobs unrelated to healthcare or non-employment. An implication of this fact is that assessing the benefits of such policies requires (i) determining the counterfactual employment choice of the additional retained hospital nurses; and (ii) comparing the efficiency of nursing labor across settings in case the additional retained hospital nurses would have held health-related jobs outside the hospital sector. If such policies additionally induce nurses who would have been hired by hospitals to replace the additional retained hospital nurses to turn to other parts of the healthcare system, then this assessment also requires (iii) making efficiency comparisons within nurses across settings (e.g. is it better to have less experienced nurses work at hospitals, and later turn to other parts of the healthcare system, or the reverse).

4.3 Fertility decisions

As made salient by Table 2, most hospital nurses begin their careers without children. However, by age 45, most of them have children. Additionally, most hospital nurses begin their careers between age 25 and age 30, which often correspond to childbearing ages. This suggest that a sizable share of hospital nurses are likely to have children over the first years of their careers.

Figure 5 investigates this issue. It plots the share of hospital nurses who have children over time relative to the first hospital nurse job, both in the aggregate and separately across cohorts defined by the timing of the first hospital nurse job. The share of parents increases slightly before hospital nurses land their first nurse job at a hospital, but remains quite small: one year before they get their first job as hospital nurse, 24% of them had children

By contrast, after they get their first hospital nurse job, this share rises quickly:

ten years after the said first job as a hospital nurse, the share of parents is 79%. This share is not conditional on gender but actually varies little across genders: among women the proportion is 81%. Given that the vast majority of hospital nurses are women, this implies that at this point, 66% of hospital nurses are mothers, as opposed to women without children, and men regardless of whether they have children.[18] Splitting the data across cohorts confirms that this pattern is not driven by changes in the composition of cohorts that are observed at each point of time, given the restricted time-period of observation.[19]

The question is therefore whether the arrival of children, which often happens at the onset of hospital nurses careers, may explain some part of the decline in nursing labor supplied to hospitals over their lifecycle. This would be the case if motherhood induced a substantial share of hospital nurses to either turn to part-time employment, turn to other, more family-friendly jobs, or to leave the workforce as a whole. Sections 5 and 6 investigate this issue.

5 Empirical analysis: impact of parenthood

My analysis builds on the event-study approach proposed by Kleven, Landais, and Søgaard (2019). It slightly improves on it by: (i) using more restrictive comparison groups and (ii) incorporating insights from the recent difference-in-difference literature (see de Chaisemartin and D'Haultfœuille, 2020; Callaway and Sant'Anna, 2021; Goodman-Bacon, 2021; Sun and Abraham, 2021). Specifically, my approach aims at preventing identification issues related to the use of two-way fixed effects in settings where treatment effects are likely to be heterogeneous. The exposition of my empirical framework is largely based on Callaway and Sant'Anna (2021) and Sun and Abraham (2021).

[18] The data records indeed only two genders and treats gender as a person-constant characteristics. Only women become mothers, and only men become fathers.

[19] There is one outlier with a much higher share of mothers at the beginning of a career than the rest. This is actually the oldest cohort, that is hospital nurses who are first observed holding a job in this occupation in 1989. Due to left-censoring – the public sector is not observed before 1988 – is is plausible that part of them held a hospital nurse job before this date, which would explain why their average fertility at what my approach retains as the beginning of their careers is higher than that of other cohorts. Actually, the average age at the beginning of a career for this particular cohort is 32, for both men and women, against 31.6 and 28.1 for the rest of the sample.

5.1 Model and identification

5.1.1 Setting and definitions

Let $Y_{i,t}$ denote a labor supply outcome – e.g. the total number of hours worked as a hospital nurse – of individual i at time t, which is measured relative to when she took her first job as a hospital nurse. Let G_i denote the group to which individual i belongs, which is defined by (i) her gender; (ii) her year of birth and (iii) the year during which she first took a nurse job at a hospital.[20] Lastly let C_i denote the year during which her first child was born ($C_i = \infty$ if she is without child).

Defining causal effects requires defining potential outcomes. In this setting, let $Y_{i,t}(c)$ denote the potential value of individual i's labor supply outcome at time t, in the hypothetical situation where her first child was born at time c. Consistently, $Y_{i,t}(\infty)$ is her labor supply at time t in the hypothetical situation where she chose to remain childless. By construction:

$$Y_{i,t} = Y_{i,t}(\infty) + \sum_{c} (Y_{i,t}(c) - Y_{i,t}(\infty)) \mathbb{1}\{C_i = c\} \tag{1}$$

My analysis revolves around the causal effect of parenthood on labor supply. In other words, I am interested in (functionals of) the distribution of random variables $Y_{i,t}(c) - Y_{i,t}(\infty)$, with $c < \infty$. Specifically, I define the cohort-specific average treatment effect on the treated:

$$CATT_{g,c,t} = \mathbb{E}[Y_{i,t}(c) - Y_{i,t}(\infty) \,|\, G_i = g, C_i = c] \tag{2}$$

This quantity corresponds to the effect of being $t - c$ years away from the birth of one's first child, for those who gave birth to their first child at time c, and belong to group g. These average treatment effects are not conditional on possible subsequent childbirths. As a result, it incorporates both the causal effect of parenthood at the extensive margin, i.e. choosing to be a parent or not, and that of to the intensive margin, i.e. choosing to give birth to one additional child for those who are already with child. In other words, the causal effect of parenthood mixes that of the first child, and of all subsequent children, with weights that depend on the difference between the time-period t and the timing of the first

[20] Due to the left-censoring if the data, this year is not observed for individuals who got their first hospital nurse job before 1989. These individuals are grouped together in groups defined by (i) their gender; (ii) the year of birth and (iii) having taken the first hospital nurse job in 1988 or before.

child's birth c: short-run effects ($t = c$) relate almost exclusively to the extensive margin of fertility, whereas longer run effects ($t > c$) will integrate a larger share of the consequences of the intensive margin. This is especially true in a context in which most parents choose to have more than one child, as implied by Table 2 and Table3. I discuss these concern, and provide a decomposition of the effect of children between these two margins in the case of women in Appendix F.3.

5.1.2 Identifying assumptions

To identify these quantities from the data, I make two assumptions: (i) a parallel trend assumption and (ii) a limited anticipation assumption.

Assumption 1 (Parallel trends in baseline outcome)**.** *For all g, for all (t, t'), for all (c, c'), if $c, c' > 1$ and $c, c' < \infty$ then:*

$$\mathbb{E}[Y_{i,t}(\infty) - Y_{i,t'}(\infty) \,|\, G_i = g,\, C_i = c] = \mathbb{E}[Y_{i,t}(\infty) - Y_{i,t'}(\infty) \,|\, G_i = g,\, C_i = c'] \quad (3)$$

Assumption 2 (Limited anticipation)**.** *For all t, for all g, for all c, if $t < c - 1$ then:*

$$\mathbb{E}[Y_{i,t}(c) - Y_{i,t}(\infty) \,|\, G_i = g,\, C_i = c] = 0 \quad (4)$$

Assumption 1 states that absent children, the average labor supply of parent of the same gender, who were born at the same time, took their first job at a hospital during the same year and had their first child only afterwards, would evolve in parallel over time. As a result, it would be violated if hospital nurses chose to become parents when they anticipate that their working time going to decrease regardless of children. While the data do not allow to focus on random shocks to fertility that would make this exogeneity assumption more credible, the context provides several reasons why this assumption remains plausible. Firstly, in the public sector the employer cannot require an employee to transition to a part-time schedule, and this possibility is very restricted in the private sector. Additionally, the labor market has been very tight for nurses over the entire period. It is therefore not very likely that some nurses would expect their hours worked to decline in the near future regardless of their own decision to do so. Secondly, in the public sector in which the majority of hospital nurses work, nurses are paid according to a national centralized salary grid. Because the public sector entails such a large share of employment in the sector, the wages in the private sector are usually very close to those offered by the private sector. As such, hospital nurses

who enter the job at the same time at a similar age should expect very similar pay increases. As a result, it is not likely that within such groups some nurses would tend to decrease their hours worked earlier than others due to them anticipating poorer returns on time spent on the job.

The last remaining possibility is therefore that hours worked decline not due to external demand factors, but rather due to hospital nurses own preference for home-production and leisure as opposed to time spent on the labor market. This would be the case if nurses exposed to harsher working conditions decreased their labor supply, for instance due to burn-outs (Estryn-Béhar et al., 2007), and decided to have children at this point. In addition, women who have children earlier in their careers are likely to have higher preferences for children, and may have a different attachment to their job or to the labor force in general, or be less risk-averse with respect to financial provisions and changes in income. Unfortunately, the data do not provide information regarding quasi-random shocks to fertility that have been explored in the earlier literature, such as IVF (Lundborg, Plug, and Rasmussen, 2017), that would make it possible to circumvent this issue.

Assumption 2 states that the average effect of children on their parents' labor supply is 0 up until two years before they are born. The reason for this choice, as opposed to a full no-anticipation assumption is that (i) becoming a parent during year t generally results from fertility decisions that were made during year $t-1$, and (ii) maternity leave may start during the last year before childbirth in case childbirth happens at the beginning of the civil year, which will mechanically affect the mother's labor supply.

5.1.3 Identification

Under these assumptions, provided that, within group, there is sufficient variation in the timing of childbirth, cohort-specific ATTs can be identified from the data.

Proposition 1 (Difference-in-difference estimand)**.** *For all* (g, c, t)*, if* $1 < c < \infty$

then:[21]

$$
\begin{aligned}
CATT_{g,c,t} \;=\; & \mathbb{E}[Y_{i,t} \,|\, G_i = g,\, C_i = c] \\
& - \mathbb{E}[Y_{i,c-2} \,|\, G_i = g,\, C_i = c] \\
& - \mathbb{E}[Y_{i,t} \,|\, G_i = g,\, \max(1,\, c-2\,, t+1) < C_i - 1 < \infty] \\
& + \mathbb{E}[Y_{i,c-2} \,|\, G_i = g,\, \max(1,\, c-2,\, t+1) < C_i - 1 < \infty]
\end{aligned} \tag{5}
$$

Proposition 1 implies that as long as, within a group, there are future parents that can still be observed at least two years before their first child is born, it is actually possible to impute the counterfactual labor supply lifecycle profile of mothers whose first child is already born, so as to identify cohort-specific ATTs. Specifically, let $\{\underline{T(g)},\, \underline{T(g)}+1,\, ...,\, \overline{T(g)}-1,\, \overline{T(g)}\}$ denote the set of time-periods that can be observed for individuals who belong to group g. Then for all c, $CATT(g,c,t)$ is identified from the data provided that:

(i) $\underline{T(g)} \leq c-2 \leq \overline{T(g)}$;

(ii) $\underline{T(g)} \leq t \leq \overline{T(g)}$;

(iii) $\mathbb{P}(\max(1,\, c-2,\, t+1) < C_i - 1 < \infty \,|\, G_i = g) > 0$.

This last condition implies that very long run effects generally cannot be identified under these assumptions, because no counterfactual is available after the last parent is about to have her first child. Specifically, given the profile of Figure 5, cohort-specific effects are very unlikely to be identified for $t > 10$, and even more so for $t > 15$.

5.2 Aggregation and estimation

Aggregation The quantities I am interested in correspond to the causal effect of having been a parent for a certain amount of time, for individuals who, before having children, held a job as a hospital nurse. I recover these quantities by aggregating my cohort-specific ATTs with weights proportional to population

[21] In principle, when $t \leq c-2$, this expression compares the (g,c) cohort to all g-cohorts whose children are born after $c-2$. This includes in particular the (g,c) cohort. However, with finitely many cohorts, this is not a very good test of the validity of the identifying assumptions, because this quantity is biased towards 0 due to the inclusion of the (g,c) cohort on both sides. Instead, when $t \leq c-2$, I consider the comparison where the (g,c) cohort only appears on one side, and is compared to all cohorts whose children are born after $c-1$.

shares. Specifically, for gender f let $\Omega(f)$ be the subset of group-cohort-time-period triplets of gender f for which all three conditions hold, as well as $C_i > 1$, so that $CATT(g, c, t)$ is identified from the data. I define:

$$\tau(f, s) = \mathbb{E}[Y_{i,C_i+s}(C_i) - Y_{i,C_i+s}(\infty) \,|\, (G_i, C_i, C_i + s) \in \Omega(f)] \tag{6}$$

This quantity represents the average treatment effect of being s years away from the birth of one's first child, for a certain subset of individuals of gender f that varies depending on s. By the law of iterated expectations:

$$\tau(f, s) = \sum_{(g,c,c+s)\in\Omega(f)} \mathbb{P}(G_i = g, C_i = c \,|\, (G_i, C_i, C_i + s) \in \Omega(f))\, CATT(g, c, c + s) \tag{7}$$

By Proposition 1, it is therefore possible to express $\tau(f, s)$ as a function of quantities that are all identified from the data.

Lastly, I consider $\bar{\tau}(f, S)$, a quantity that represents the impact of children over the first S years of parenthood for hospital nurses of gender f:

$$\bar{\tau}(f, S) = \frac{1}{s} \sum_{s=0}^{S} \tau(f, s) \tag{8}$$

Estimation Combined with Proposition 1, Equation 7 suggests a very simple plug-in estimator, in which population probabilities and expectations are replaced by their empirical analogues. The same also goes for the estimation of $\bar{\tau}(f, S)$.

Under usual integrability assumptions, these estimators are asymptotically normal (Callaway and Sant'Anna, 2021). To conduct inference, I rely on a bootstrap approach, clustered at the individual level. This level of clustering is justified both from a sampling perspective – as the sampling scheme is defined at the individual level – and from a design perspective – as the treatment, i.e. children, is assigned at the individual level (Abadie et al., 2022).

5.3 Simulation exercise

To quantify the contribution of children to the lifecycle profile of hospital nurses' labor supply, I build a counterfactual profile of hospital nurses' labor supply, if either (i) nurses did not have children; or (ii) motherhood had no impact on the labor supply of nurses. To this end, I first consider the realized lifecycle profile of average labor supply, described by $\mathbb{E}[Y_{i,t} \,|\, \underline{T(G_i)} \leq t \leq \overline{T(G_i)}]$, which corresponds to the average hours worked by nurses observed t years after they get their first

job at a hospital. I consider the counterfactual lifecycle profile of labor supply to be described by the quantity:

$$\Lambda(t) = \mathbb{E}[Y_{it} \,|\, \underline{T(g)} \leq t \leq \overline{T(g)}] - \sum_{s \geq 0} \mathbb{P}(t = C_i + s, C_i > 1 \,|\, \underline{T(G_i)} \leq t \leq \overline{T(G_i)},\, F_i = 1)\, \tau(1, s) \tag{9}$$

where F_i denote individual i's gender, with $F_i = 1$ if she is a woman and 0 otherwise. This approach: (i) only focuses on first children born *after* their mothers get their first job as a hospital nurse; and (ii) abstracts from considerations related to treatment effect heterogeneity across cohorts, and related compositional shifts.

5.4 Comparison with other approaches

Two-way fixed effects The approach upon which this paper is based aims at preventing issues tied to the use of two-way fixed effects regressions in settings where treatment effects are likely to be heterogeneous. Specifically, two-way fixed effects approaches make the same assumptions about parallel trends in potential outcomes and the absence of anticipated effects that I do; they add one more assumption, that states that average treatment effects are the same across cohorts defined by the timing of the treatment. Under this additional assumption, average treatment effects can be identified not only from comparisons between one treated cohort and cohorts that will experience the arrival of children later on, but also from comparisons between this cohort and cohorts who have already entered parenthood. When this assumption is true, this method can therefore result in improved efficiency of the estimator.

To investigate this issue, Appendix E.1 compares my baseline estimates to (i) Kleven, Landais, and Søgaard (2019)'s approach, which is even more simple than TWFE estimators; and (ii) a TWFE approach that makes the exact same assumptions as I do, plus the homogeneity assumption mentioned above. The lesson is that Kleven, Landais, and Søgaard (2019)'s approach and a more restrictive TWFE model lead to very similar results from one another. However, the estimated effects of parenthood on hospital nurses labor supply are much smaller in magnitude than what my approach suggests, which implies that the bias that arises from the additional homogeneity assumption can be sizable.

Stable control group The event-study analysis upon which this papers' results are based uses most individuals as both treated and control units: until two years

before they give birth to their first child, all nurses belong to the control group, after which they become part of the treated group. As a result, the control group changes over time relative to the first child's birth: whereas, within a cohort, the short-run effect of motherhood relies on a control group that gathers almost all nurses but the one who become mothers immediately after they get their first job, the long-run effect relies on a control group that is restricted to nurses who become mothers long after they get their first job.[22]

To assess whether the dynamics of the treatment effects are driven by this compositional shift in the control group, Appendix E.2 replicates my analysis, this time restricting the control group to hospital nurses who have their first child long after they got their first nurse job at a hospital, and restricting the treated group to hospital nurses who have their first child shortly after their first hospital nurse job. This approach is akin to more traditional difference-in-difference approaches in which units do not switch from one group to the other over time. The resulting estimates are very close to my baseline estimates. This implies in particular that before *childbirth*, trends in hours worked are very similar across cohorts.

Childless control group My event-study approach is based on comparisons across parents whose first child is born at different dates. As a result, it does not involve any comparison with individuals who chose to remain childless. The reason for this choice is that selection into parenthood is likely to be even more endogenous with respect to labor supply decisions than selection into the timing at which one chooses to have her first child. Additionally, if the assumptions upon which a difference-in-difference estimand that compares parents to non-parents do indeed hold, then my preferred estimator is consistent, and is likely to be more efficient given that non-parents are less frequent than parents at least as long as short-run effects are concerned.

To compare these two approaches, Appendix E.3 contrasts my preferred estimator with (i) estimates based only on comparisons between mothers and childless women; and (ii) an estimator that builds on both mothers vs. childless women and mothers across cohorts defined by the timing of the first birth. Estimates based

[22]This concern is different from the one that drives the move from TWFE estimator to more credible approaches. Indeed, it deals with how many *pre*-birth cohorts are used to build the counterfactual. By contrast, the difference between my estimand and TWFE methods deals with whether *post*-birth observations also contribute to the identification of the counterfactual. TWFE make an additional assumption regarding treatment effect heterogeneity, that is that average treatment effects are the same for all cohorts. When this assumption holds, comparisons across post-birth cohorts are also informative regarding dynamic treatment effects.

only on mothers vs. childless women comparisons yields much smaller effects of motherhood on hospital nurses labor supply than my baseline estimates. However, the pre-trends are not very well controlled, which suggests that childless women are less convincing as a control group than future mothers are. Results based on both comparisons yield estimates very similar to those obtained mothers vs. childless women comparisons. The reason for this is that the mothers vs. childless women comparison contributes more to the identification of the long-run effect of motherhood than comparisons across cohorts of mothers do.

6 Results

6.1 Children-related labor supply decisions

6.1.1 Nursing labor supply in hospitals

Figure 6(a) displays the results of my event-study framework, that is average changes in hours worked as a hospital nurse, by mothers whose first child is s years old, relative to (i) 2 years before this child was born, and (ii) the change in nursing labor supplied to hospitals by future mothers over the same time-period.[23] Under a parallel trend and a limited anticipation assumptions, these quantities identify the causal impact of motherhood on mothers' nursing labor supplied to hospitals, that is the average treatment effect for a certain subpopulation (see Section 5).

First, before they have children, the dynamics of female hospital nurses' hours worked are close to those of their counterparts who go on to have children later on.[24] Indeed, the corresponding estimates are small, even though they may differ slightly from 0, which implies a slight violation of my identifying assumptions. Specifically, the differences are slightly negative, which implies that female hospital nurses' hours worked increase a little faster just before they have their first child. This might be the case if for instance they wait until they find a more stable

[23] As Subsection 3.3 mentions, when individuals are not observed with a hospital nurse job, I consider their hours worked as a hospital nurse to be equal to 0. In that way, my estimates regarding regarding hours worked as a hospital nurse are not conditional on participation to this sector, as they do take into account time-periods spent outside hospital nurses jobs, either due to transitions to other jobs or to non-employment.

[24] These estimates regarding regarding hours worked as a hospital nurse are not conditional on working as a hospital nurse, as they do take into account time-periods spent outside these jobs, but they do not take into account the labor supply in the freelance sector. In particular, the pre-trends include time-periods before the first hospital nurse job, where hours worked as a hospital nurse are 0 by construction.

position to become mothers (Landaud, 2021).

Second, after they become mothers, the dynamics of nursing labor supplied to hospitals diverge depending on the timing of their first child's birth. Specifically, after the birth of their first child, female hospital nurses decrease their hours worked as hospital nurses relative to those who will have their first child later on. This decrease corresponds both to the causal effect of the extensive margin of fertility, i.e. the decision to become a mother, and to that of the intensive margin of fertility, i.e. the decision to have additional children after the first one is born. Specifically, the short-run effects ($s = 0$) correspond mostly to that of the extensive margin. As time goes by ($s > 0$), these estimates put more and more weight on the intensive margin, given that most mothers choose to have additional children, as shown in Table 2. Overall, over the first 10 years after their first child's birth, the magnitude of the decrease in hours worked a hospital nurse induced by motherhood is about 0.11 full-time units, with respect to a counterfactual average of 0.70 full-time units.[25]

Figure 6(b) displays similar estimates, but this time considers another outcome that is holding a nursing position at a hospital, either on a full-time (left panel) or a part-time schedule (right panel). These two estimations are not conditional on holding a nursing position at a hospital: they do not sum to 1, but rather to a dummy that indicates whether an individual still holds a hospital nurse job.

Consistent with the identifying assumptions, differences before the arrival of the first child are minimal. However, these figures show that after they have children, the probability that female hospital nurses still hold a full-time position as a nurse at a hospital diminishes considerably. The drop is about 10 percentage points immediately after the first child's birth, but becomes stronger over time. Overall, it amounts to a 25 percentage points decrease in the probability of holding a full-time position as a hospital nurse. As a comparison, the counterfactual probability is 67%.

Interestingly, the increase in the probability of holding a part-time hospital nurse position mirrors this decrease almost exactly. It amounts to a 23 percent-

[25]This measure does not include overtime hours worked by hospital nurses. Appendix F.2 investigates this additional margin of adjustment specifically. The lesson is that motherhood leads a substantial share of hospital nurses not to work overtime hours, while they would have absent children. However, this translates in a very small impact of motherhood on overtime hours worked, because as a baseline overtime hours worked correspond to a small fraction of the nursing labor supplied to hospitals. As a result, including overtime hours worked in the main outcome of the paper would make very little difference when it comes to the results on overall hours worked as a hospital nurse.

age points increase, against a counterfactual baseline of 5%. This implies that part-time work as a hospital nurse would remain unfrequent absent children, and is largely driven by motherhood. That the drop in full-time work as a hospital nurse corresponds almost exactly to the increase in part-time work in the same occupation shows that motherhood frequently results in transitions from full-time work to part-time work within the same type of jobs, as opposed to transitions to other jobs or non-employment. Indeed, the differences between the two estimated effects implies that the estimated effect of motherhood on the probability of working as a hospital nurse, that is the difference between the two effects, is less than 2 percentage points.

6.1.2 Transitions to other jobs

To make this point even more explicit, Figure 7 replicates the event-study analysis, this time considering the overall salaried labor supply, as opposed to nursing labor supplied to hospitals as the outcome. Specifically, it considers (a) average hours worked, measured in full-time units, over all salaried jobs, i.e. including jobs other than hospital nurses jobs,[26] and (b) the salaried employment rate.

Consistent with what the identifying assumptions predict, the estimated effects are very close to 0 before the arrival of children. After the first child's birth however, average hours worked over all salaried jobs decrease considerably. The magnitude of this decrease gets larger over time. Overall, over the first ten years after the birth of the first child, it amounts to 0.14 full-time units. Interestingly, this drop is larger than that of hours worked as a hospital nurse. This indicates that motherhood does not usually induce female hospital nurses to shift their labor supply to other salaried jobs. Indeed, if that were the case, then the drop in hours worked as a hospital nurse would be larger than the drop in hours worked over all salaried jobs. The opposite is actually true.

The same holds when considering the extensive margin of salaried labor supply. Indeed, the estimated effect of motherhood on hospital nurses salaried employment rate, all jobs included, is not statistically different from 0, but the point estimate corresponds to a 2 percentage points decrease in the salaried employment rate. The decrease is the same as the estimated effect of motherhood on the probability

[26] As Subsection 3.3 mentions, when individuals are not observed with a salaried job, I consider their hours worked to be equal to 0. In that way, my estimates regarding regarding hours worked are not conditional on salaried employment, as they do take into account time-periods spent outside employment, but they do not take into account the labor supply in the freelance sector.

of holding a hospital nurse position. As a result, the data is not consistent with the idea that motherhood induces nurses to either move to other salaried jobs or leave the salaried workforce as a whole.

Healthcare jobs Figure 8 examines the case of health-related jobs as a whole, including but not limited to hospital nurses jobs, by considering the impact of motherhood on (a) average hours worked as a salaried employee in the healthcare system; and (b) the probability of holding a health-related salaried jobs.[27] In both cases and consistent with my identifying assumptions, the estimated effects are very close to 0 before the arrival of children. However, average hours worked as a healthcare worker drop substantially due to children. My estimated effects imply that children lead female hospital nurses to decrease by 0.14 full-time units their hours supplied to health-related salaried jobs over the first ten years following the birth of their first child, with respect to a counterfactual average of 0.84 full-time units. This effect is slightly larger than it is on hours worked as a hospital nurse. The opposite would be true if motherhood lead female hospital nurses to shift part of their hours worked to other health-related jobs.

The examination of the estimated effects at the extensive margin is consistent with this view. Indeed, the estimated effect of motherhood on the probability of holding a salaried health-related job is 0. Given the statistical uncertainty, the data is compatible with the hypothesis that motherhood does not trigger transition from hospital nurses jobs to other salaried positions, neither health-related nor health-unrelated.

Self-employment The picture is however not entirely complete because self-employment is not observed in the DADS data that only deal with salaried jobs. This may prove particularly problematic in a context where freelance nursing is a possibility open to hospital nurses with sufficient experience. To tackle this issue, I replicate my analysis, this time considering the probability of holding a freelance nurse position as the outcome. Because self-employment data is not available before 2006 and because pre-birth levels have to be observed, the sample is restricted to hospital nurses who started their careers in 2006 or later. Because sufficiently numerous mothers with later born first children have to be observed to identify the counterfactual, this also restricts the time span over which the effects

[27] A slight difference with the previous figures is that here the data only covers the 1995-2019 time-period.

of motherhood can be estimated.

Figure 9 displays my results, contrasting the estimated effect of motherhood on (a) the probability of holding a hospital nurse position and that of holding a freelance nurse position; and (b) the probability of holding a salaried job regardless of occupation and industry, and the probability of holding a self-employed job. Even though the results are less precise than when estimated on more years of data, all the estimated effects are compatible with 0 effect of motherhood along these margins. It therefore confirms that motherhood does not induce hospital nurses neither to turn to other positions, whether salaried or not, nor to leave the workforce as a whole. In the end, the main effect of motherhood for hospital nurses seem to correspond to transitions to part-time schedules while still working in similar jobs.

In Appendix F.2, I delve further into the data to expand these results regarding the impact of motherhood. The main lessons are that (i) motherhood induces many nurses to stop doing overtime work, but the impact of this decision on the overall supply of nursing labor is minimal because as a baseline overtime hours worked only represent a tiny fraction of their hours worked; (ii) motherhood does not seem to impact working conditions in ways that would affect the hourly wages; (iii) these labor supply decisions result in substantial earnings drop; and lastly (iv) the consequences of motherhood are presumably tied to the extensive margin of fertility decisions.

6.1.3 Male hospital nurses

The above results only investigate the effect of motherhood for female hospital nurses. While this occupation is clearly female-dominated, male hospital nurses do exist and have children. Investigating the impact of fatherhood on their labor supply has merit given that these men self-selected in the occupation: it is therefore not obvious that there labor supply decisions should match average men choices, for whom the impact of fatherhood on labor outcomes is usually 0 (see e.g. Kleven, Landais, and Søgaard, 2019).

Figures 10 and 11 replicates me analysis on fathers, that is: Figure 10 considers the impact of fatherhood on (a) hours worked as a hospital nurses; and (b) the probability of holding a full-time (left panel) or a part-time (right panel) hospital nurse position, while Figure 11 investigates (a) average hours worked over all salaried jobs; and (b) the employment rate. In all cases, because men are much

less common than women among hospital nurses, they are also much less numerous in my sample: the available data allows me to study the consequences of 260 first child's birth events. As a result, my estimates are also much less precise than those available for women.

Overall, even though there is sizable statistical uncertainty, all my estimates are compatible with null effects of fatherhood on male hospital nurses labor supply. In other words, having children does not seem to induce male hospital nurses neither to decrease their hours worked as hospital nurses, nor to turn to other jobs, nor to leave the salaried workforce as a whole. While transitions to other jobs and career interruptions are not in general an outcome of motherhood for their female counterparts, the lack of transition to part-time hospital nurses positions stands in stark contrast with the results regarding women. In the end, even men who self-select in a female dominated occupation of the care sector do not seem to adopt mothers' behaviors when it comes to their children-related labor supply decisions.

6.1.4 Heterogeneity

Over time Figure 12 displays estimates of the aggregate effect of motherhood on average hours worked as a hospital nurse depending on the year during which hospital nurses' first child was born. The grouping of these years is chosen to be broadly consistent with parental leave reforms. Indeed, paid parental leave was made available from the second child on in 1994, and from the first child on in 2004. Because the average effects bear on the first ten years of the first child's birth, they cannot be computed for the most recent cohorts.

While due to the small sample size, the comparison is not very precise, this figure does not suggest that the average effect of motherhood on hours worked as a hospital nurse has varied much over time. Overall, the data suggest that for all the cohorts under scrutiny, motherhood results in a 0.15 full-time units decrease in hours worked as a hospital nurse. In particular, paid parental leave extensions do not seem to have made this drop much larger. In Appendix F.4, I display time series of the share of nurses whose behavior during the first three years after a child's birth appear consistent with paid parental leave rules, before and after paid parental leave reform is enforced. The results are also consistent with the idea that paid parental leave reforms have a limited impact on hospital nurses' labor supply. The reason for this finding may be that the actual compensation for this paid parental leave remains limited, in stark contrast with the policy under

scrutiny in Friedrich and Hackmann (2021) that offered allowances that amounted to almost 75% of previous wages.

Over space Figure 13 compares the impact of motherhood on average hours worked as a hospital nurse, depending on whether hospital nurses began their careers in Paris region (*Île-de-France*) or in another region. In both cases, consistent with the identifying assumptions, the effect is basically 0 before the arrival of children. Afterwards, both group experience a decline in hours worked. The data suggest that the impact could be smaller in Paris region than it is in the rest of the country. If this proved true, it would be interesting given that coverage by formal early childcare is low in Paris region compared to other regions (53% against 59% at the national level in 2019). A possibility could be that Paris hospitals may offer childcare services directed specifically towards their employees, but data are not available to assess if it is indeed the case. Additionally, the sample size remains too small to conclude.

Public vs. Private sector Figure 14 displays my estimates of the average impact of motherhood on hours worked as a hospital nurse, comparing hospital nurses who began their career in the public sector with those who did so in the private sector. While the statistical uncertainty is sizable, the estimates suggest that this impact could be lower for those who started their careers in the private sector. It could be that private hospitals are better able than public ones to enforce family-friendly policies aimed at their employees, but additional data is required to conclude.

6.2 Contribution to lifecycle profiles of labor supply

I quantify the contribution of mothers' children-related labor supply decisions to the decline of hospital nurses' labor supply over the course of their career by comparing the observed profiles to counterfactual ones, if female hospital nurses did not decrease their labor supply upon becoming mothers. In practice, I simply subtract the causal effect of children, weighted by the share of mothers, from the observed profiles (see Subsection 5.3).

6.2.1 Nursing labor supply in hospitals

Figure 15 displays the results of this simulation exercise when it comes to (a) hours worked as a hospital nurse, measured in full-time units, and (b) the proportion who hold a position as a full-time (left panel) or a part-time hospital nurse, over the course of their careers.[28] Solid lines represent the observed average lifecycle profiles, as detailed in Section 4, whereas dashed lines represent counterfactual profiles where the causal impact of motherhood is subtracted from the labor supply of women with children.

Hours worked as a hospital nurse decline in both cases, which indicates that motherhood does not explain the entirety of the decrease in nursing labor supplied to hospitals over the course of hospital nurses' careers. However, the the dashed line, which represents the counterfactual lifecycle profile, progressively diverges from the plain line which corresponds to the observed profile. To put it differently, children-related decisions contribute to some extent to the observed decrease. Specifically, my estimates suggest that while average hours worked as a hospital nurse decrease by 0.26 full-time units over the first ten years of a career, this drop would amount to 0.21 full-time units if (i) nurses did not have children or (ii) female nurses made the same decisions as male nurses who do not reduce their hours worked upon becoming fathers. In other words, mothers' children-related labor supply decisions contribute for about 0.05 full-time units, or 20% (0.05 / 0.26) to the observed decline.

Consistent with the above discussion, this contribution is strongly tied to transitions from full-time hospital nurse positions to part-time hospital nurse-positions. Indeed, Figure 15 shows that the share of those who hold such a full-time position decreases by 34 percentage points over the first ten years of a career, whereas the decrease would amount to 24 percentage points absent the causal impact of motherhood. By contrast, the share of increases by 2 percentage points over the beginning of a career. It would decrease substantially, by 8 percentage points, absent mothers' children-related labor supply decisions. This indicates that motherhood contributes for a 10 percentage points increase to the share of hospital nurses who hold such jobs on a part-time schedule. Actually, theses results suggest that ten years after they began their careers, 18% of hospital nurses still work as hospital nurses, but on a part-time schedule. Without the effect of mother-

[28] Figures that display realized or counterfactual profiles of labor supply over the course of a career are always restricted to this population because for those who became hospital nurses in 1988 or earlier the beginning of their career is not observed, as is the case in Section 4.

hood, the counterfactual rate would amount to 6%. In other words, working on a part-time schedule as a hospital nurse is strongly tied to motherhood.

The contribution of motherhood to the dynamics of part-time work for hospital nurses mirrors almost exactly that observed for full-time hospital nurse positions. Those variables are not considered conditional on holding a hospital nurse position, but rather sum up to a dummy that indicates whether a hospital nurse still holds this kind of job. As a result, this implies that motherhood does not contribute to transitions away from hospital nurses jobs. In other words, setting the causal effect of motherhood to 0 would not increase the retention of hospital nurses, but simply increase the share who work on a full-time schedule.

6.2.2 Transitions to other jobs

Figure 16 replicates this simulation exercise, this time considering (a) hours worked over all salaried jobs, including those that are not hospital nurses jobs, measured in full-time units, and (b) the corresponding salaried employment rate. As for hours worked, the dashed line, which represents the counterfactual lifecycle profile, progressively diverges from the plain line which corresponds to the observed profile, similar to that of Figure 2. The comparison between the two profiles suggest that the causal effect of motherhood explains 0.06 full-times of the decrease in hours worked over all salaried jobs over the first ten years of a career. If motherhood induced hospital nurses to shift part of their hours worked to other jobs, then this quantity would be larger than the contribution of motherhood to the dynamics of hours worked as a hospital nurse. The opposite is actually true, and the two quantities are very close from one another. This confirms that the main contribution of motherhood to hours worked in the salaried sector is a decrease in hours worked as a hospital nurse, without any shift to other salaried jobs.

Figure 16(b) strengthen this interpretation when considering the salaried employment rate. The comparison between the observed and the simulated profiles suggest that motherhood contribute for less than a percentage point to the decrease in the salaried employment rate of hospital nurses over the first ten years of a career. Since the data also show that it does not contribute to the decrease in the probability of holding a hospital nurse position, this implies that the increase in the share who hold other salaried jobs is not tied to children-related labor supply decisions.

Healthcare jobs Figure 17 further confirms this view by considering the observed and counterfactual average profiles of (a) hours worked as a healthcare worker, including but not limited to hospital nurses jobs; and (b) the probability of holding a health-related job. The counterfactual profile, where the impact of motherhood is set to 0 diverges progressively from the observed profile. This indicates that motherhood does indeed contribute to the decline in hours worked in the healthcare sector over the course of a career. However, the counterfactual profile also displays a clear decrease, which implies that the observed decline is not entirely explained by children-related decisions. The difference between the observed and counterfactual declines over the first ten years of a career amounts to 0.05 full-time units. This quantity is the same as the difference between observed and counterfactual profiles in hours worked as hospital nurse: shifting hours from hospital nurses jobs to other health-related jobs has little to do with motherhood. Figure 17(b) finally shows that the observed and counterfactual profiles regarding the probability of working as a healthcare worker is totally unrelated to motherhood: the two profiles are exactly the same.

In the end, the consequences of motherhood for hospital nurses consist in transitions from full-time to part-time jobs within the same kind of jobs. As a result, children-related labor supply decisions do indeed explain some part of the decline in hours worked as a full-time hospital nurse over the course of a career, about 20%. Additionally, working on a part-time schedule as a hospital nurse is strongly related to motherhood: doing so would be much less common if children did not change their mothers' labor supply. Motherhood is however unrelated to (i) transitions to other jobs, whether health-related or not; and (ii) transitions to non-employment. Because the largest part of the decline of nursing labor supplied to hospitals over the course of a career is tied to such transitions, the contribution of hospital nurses' family responsibilities to this decline remains limited.

6.3 Robustness checks

Three main issues arise regarding the data upon which this analysis relies. The first two deal with restrictions on the observed time-period in the data; the last one with the measurement of hours worked in the DADS data.

Left-censoring In the DADS data, the beginning of the hospital nurse career is not observed for those who began their career in 1988 or before. This issue is made salient by the fact that the parallel trends assumption (Assumption 1) is only made conditional on both the year of birth and the timing of the beginning of the career. In other words, mothers' counterfactual labor supply if they did not have children is only imputed based on women who were born at the same time and started their career the same year as them. In practice, I choose to gather all individuals who started their career in 1988 or before in one single group, so that among them the parallel trend assumption is only conditional on the year of birth. Appendix G.1 assesses the robustness of my results with respect to this choice by replicating my event-study estimates and the resulting counterfactual profiles while omitting the data on these individuals. The results look extremely similar, confirming that they are immune to this particular issue. It also reports estimates of the average effect of motherhood on hours worked as a hospital nurse while increasingly restricting the sample to hospital nurses who began their careers later in time. The lesson is that these effects are quite stable with respect to these restrictions, which suggest that the left-censoring issue is not critical.

Right-censoring The DADS-EDP dataset does not report childbirth that occurred after 2019. As a result, part of my control groups of mothers who are to have children later are not observed, as they cannot be differentiated from women who remain childless. This impedes the identification of cohort-specific ATTs for the year 2019, and more generally changes the composition of the control groups as one looks at younger individuals. Appendix G.2 assesses whether my results are affected by this issue by replicating my event-study estimates and the resulting counterfactual profiles while restricting to individuals for which the distinction between mothers who have children later and childless women is less problematic. Specifically, I consider this to be the case for individuals who got their first job as a hospital nurse before 2003, as they are likely to have completed their fertility decisions by 2019. The corresponding estimates are very close to my baseline results. Additionally, it reports estimates of the average effect of motherhood on hours worked as a hospital nurse while increasingly restricting the sample to hospital nurses who began their careers earlier in time. The lesson is that these effects are quite stable with respect to these restrictions, which suggest that the right-censoring issue is not critical.

Hours worked measurement Hours worked are not observed before 1995 in the DADS data. Before this, I impute hours worked based on days worked and working-time status (full-time or part-time), under the assumption that part-time workers are on a 50% schedule. This schedule is the most frequent among part-time workers when hours are observed (see Appendix B). To assess the robustness of my results with respect to this imputation, Appendix G.3 replicates my analysis only while restricting to the 1995-2019 time-period. This restricts the set of cohort-specific ATTs that can be identified under my identifying assumptions. The resulting estimates are once again very similar to my baseline results, which suggest that my baseline results are not driven by my choice of imputation.

7 Implications at the hospital level

That nursing labor supplied to hospitals declines over the course of hospital nurses careers is not necessarily an issue at the hospital level, if hospitals manage to maintain an adequate level of aggregate nursing labor, which is arguably what matters for patient-level outcomes. This can be achieved by either (i) compensating for hours lost due to some hospital nurses decreasing their hours worked as hospital nurses, by increasing hours worked by other nurses, of which recruiting new hospital nurses form part; or (ii) increasing the efficiency of the remaining hours of nursing labor. Assessing whether the second mechanism is at play requires a careful analysis of productivity differences within and across nurses and over time, which goes beyond the scope of this particular paper. However, repeated short panel data regarding hours worked by individual hospital nurses at various hospitals during two consecutive years make it possible to put the first mechanism under closer scrutiny. In other words, it makes it possible to estimate the transmission of individual-level labor supply decisions to the hospital-level provision of nursing services.

7.1 Accounting approach

Let $H_{j,t}$ denote the sum of nursing hours at hospital j during year t, and let $h_{i,j,t}$ denote hours worked by nurse i in this hospital during this particular year. Let additionally $f_{i,j,t}$ ($p_{i,j,t}$) denote a dummy that is equal to 1 if nurse i works on a full-time (part-time) schedule at hospital j, and 0 otherwise. Then the change in

nursing hours at hospital j between two consecutive years writes:

$$
\begin{aligned}
H_{j,t+1} - H_{i,t} \quad = \quad & \underbrace{-\sum_i (1 - f_{i,j,t+1} - p_{i,j,t+1}))(f_{i,j,t} + p_{i,j,t}) h_{i,j,t}}_{\text{Outflows}} \\
& \underbrace{+\sum_i (f_{i,j,t+1} - p_{i,j,t+1}))(1 - f_{i,j,t} - p_{i,j,t}) h_{i,j,t+1}}_{\text{Inflows}} \\
& \underbrace{+\sum_i p_{i,j,t+1} f_{i,j,t} (h_{i,t+1} - h_{i,t})}_{\text{FT to PT transitions}} \\
& \underbrace{+\sum_i f_{i,j,t+1} p_{i,j,t} (h_{i,t+1} - h_{i,t})}_{\text{PT to FT transitions}} \\
& \underbrace{+\sum_i p_{i,j,t+1} p_{i,j,t} (h_{i,t+1} - h_{i,t})}_{\text{PT workers}} \\
& \underbrace{+\sum_i f_{i,j,t+1} f_{i,j,t} (h_{i,t+1} - h_{i,t})}_{\text{FT workers}}
\end{aligned}
\tag{10}
$$

To put it differently, the change in nursing hours at the hospital level is simply the difference between hours worked by newly recruited hospital nurses, minus hours formerly worked by those who left the hospital, plus the change in hours for those who transitioned from a full-time to a part-time schedule (likely negative), plus the change for those who transitioned from a part-time to a full-time schedule (likely positive), plus changes for those who remained on the same schedule.

Of these components, those tied most closely to the individual labor supply decisions studied in the other parts of the paper are hours lost due to outflows, and hours lost due to transitions from full-time to part-time jobs. The accounting identity simply states that to compensate for nursing hours lost to either hospital nurses leaving the workforce, or transitioning to a part-time schedule, hospitals can either (i) neutralize the loss thanks to newly recruited hospital nurses; (ii) have hospital nurses formerly on a part-time schedule move to a full-time schedule (for instance because their children-related rights to a part-time schedule are over); (iii) have part-time hospital nurses move to more intensive schedules; or (iv) have full-time hospital nurses work more hours thanks to overtime policies.

7.2 Method

To investigate whether hospital are able to resort to these solutions, one could therefore estimate the regression:

$$
\begin{aligned}
H_{j,t+1} - H_{i,t} \quad = \quad & \alpha + \\
& \underbrace{\beta \sum_i (1 - f_{i,t+1} - p_{i,t+1}))(f_{i,t} + p_{i,t}) h_{i,j,t}}_{\text{Outflows}} \\
& \underbrace{+\gamma \sum_i (f_{i,t+1} - p_{i,t+1}))(1 - f_{i,t} - p_{i,t}) h_{i,j,t+1}}_{\text{FT to PT transitions}} \\
& + \epsilon_{j,t}
\end{aligned}
\tag{11}
$$

The β and γ coefficients would represent of how much of nursing hours lost at the individual level to either outflows or full-time to part-time transitions translate in the end in nursing labor losses at the hospital level.

However, because these as shown above, most individual labor supply decisions that result in these hours losses show some regularity, it is likely that they are to some extent incorporated in hospitals human resources decisions. If the hospital level need in nursing labor is roughly constant over time, hospital have correct anticipations of future labor supply decisions made by nurses, and recruiting new nurses or increasing hours worked by stayers is not too costly, it is expected that these coefficients would be close to 0. They would not however measure how hospital fare with exogenous and unexpected nursing hours losses.

To move closer to this idea, I estimate a modified regression that aims at measuring the impact of nursing hours losses due to outflows and transitions to part-time work, beyond what is usual and expected at the hospital level. Specifically,

I estimate

$$
\begin{aligned}
H_{j,t+1} - H_{i,t} \quad = \quad & \alpha + \\
& \underbrace{\beta \sum_i (1 - f_{i,t+1} - p_{i,t+1}))(f_{i,t} + p_{i,t}) h_{i,j,t}}_{\text{Outflows}} \\
& \underbrace{+\gamma \sum_i (f_{i,t+1} - p_{i,t+1}))(1 - f_{i,t} - p_{i,t}) h_{i,j,t+1}}_{\text{FT to PT transitions}} \\
& + \lambda_j + \mu_t + \epsilon_{j,t}
\end{aligned} \tag{12}
$$

where λ_j and μ_t represent hospital-level and year fixed effects. Here the identification is based on hospital that experience larger (smaller) changes in year-to-year nursing hours losses due to either full-time to part-time transitions, or outflows than their counterparts. As such, the coefficients are more easily interpreted as the effect of one additional nursing hour lost due to either outflows or transitions to part-time work.[29] A coefficient of 1 implies that hospitals do not compensate at all for nursing hours lost due to either outflows or transitions to part-time schedules. A coefficient of 0 indicates that hospitals compensate for theses hours losses one to one, so that these hours losses are without consequence for the overall provision of nursing labor at the hospital level.

7.3 Results

Table 4 display the estimated coefficients of regression 13, as well as similar regressions where the outcome is not the overall hospital-level change in nursing hours, but each of the margin mentioned in accounting identity 11.[30] The data cover 1995 to 2017.[31] The results suggest that nursing hours lost due to transi-

[29] Transitions to part-time work may be more easily interpreted as exogenous individual-level labor supply decisions, because the employer cannot require a hospital nurse to transition to part-time work, whereas departures from hospitals can also incorporate changes in the demand for nursing labor.

[30] When the different margins are considered, a coefficient of 0 implies that this margin does not change in response to hours losses doe to either transitions to part-time work or hospital nurses leaving the hospital. A coefficient of -1 indicates that this margin offsets 1 to 1 these hours losses. The coefficient when the overall hospital-level change is taken as outcome is equal to 1 plus all coefficients related to all possible margins of adjustment.

[31] The data are additionally restricted to hospital × year observations where the variation in relative changes in overall nursing labor provision are not too high or too low, so that situations where a hospital decreases (increases) abruptly its size due to the closing (opening) of a new service are not driving the estimates.

tions to part-time work are seldom compensated at the hospital level. Specifically, they indicate that when one additional hospital nurse decreases her weekly hours worked by 17.5 as she transitions from full-time work to part-time work on a 50% schedule, nursing hours lost at the hospital level amount to 15 weekly hours (0.85 × 17.5). This correspond to a slight increase in nursing labor inflows.

By contrast, hours losses due to nurses leaving a hospital seem almost entirely offset at the hospital level. Indeed, the data suggest that when a hospital nurse leaves a hospital, the resulting loss in nursing labor is compensated for up to 92% (1 - 0.08) at the hospital level. The main channel through which hospitals are able to neutralize these hours losses is through new hires.

The difference between the hospital-level transmission of transitions to part-time work, and that of hospital nurses leaving the workforce is notable. It might be because outflows are more easily foreseen than transitions to part-time work, for instance because outflows include retirement decisions that are based on age and are therefore more predictable than transitions to part-time work. Another possibility is that nursing labor is not easily divisible: replacing a leaving hospital nurse by a new hire is more easily done than compensating for a fraction of nursing labor lost due to a transition to part-time work, if it is not possible to hire a hospital nurse on a low part-time basis (e.g. on a 20% schedule to compensate for a transition to part-time work on a 80% schedule).

8 Conclusion

This paper investigates the labor supply of hospital nurses in France over the time-period 1988-2019 by relying on detailed longitudinal payroll tax data matched with birth certificates and census data. It first performs a descriptive analysis of hospital nurses' lifecycle. The main lesson is that the decline in the supply of nursing labor they provide in hospitals over the course of their careers is mainly driven by outflows, and to a lesser extent by transitions to part-time schedules. Interestingly, outflows mainly correspond to other jobs within the healthcare sector, as opposed to transitions to jobs unrelated to healthcare or non-employment. This implies in particular that policies that may increase the retention of hospital nurses have implications for the entire healthcare system more broadly, besides hospitals, as they are likely to affect the level or the composition of the supply of nursing services in other settings.

Building on insights from the recent gender inequality literature, and consider-

ing that the vast majority of hospital nurses are women, the paper then estimates the impact of mothers' children-related labor supply decisions on the supply of nursing labor in hospitals at the individual hospital nurse level. The resulting estimates show that motherhood induces numerous female hospital nurses to turn to part-time schedules hospital nurses jobs instead of the full-time hospital nurses jobs they would have held otherwise. Actually, this effect combined with the huge share of women and the fact that many of them become mothers over the first years of their careers is sufficient to explain a large share of the overall prevalence of part-time work among hospital nurses. By contrast, motherhood does not lead hospital nurses to turn to other jobs, or to leave the workforce as a whole.

Male hospital nurses make no comparable decisions upon the arrival of their children, and the impact of motherhood seem mostly independent of family policies. This suggests that this effect is mostly tied to gender norms, as the rest of the recent literature regarding the child penalty would suggest (Andresen and Nix, 2022; Kleven et al., 2024; Kleven, Landais, and Leite-Mariante, 2024).

As a last empirical analysis, this paper finally assesses whether these individual-level labor supply decisions made by hospital nurses have an impact in terms of the hospital-level provision of nursing services. Leveraging comprehensive repeated short-panel data regarding hours worked by hospital nurses, it estimates how much of nursing hours losses due to either nurses leaving the hospital workforce, or transition from full-time to part-time schedule actually result in nursing hours losses at the hospital level. The answer is very different along these two margins: nursing hours losses due to outflows are almost completely offset at the hospital level, whereas hours losses due to transition to part-time work are very poorly compensated for. In other words, hospitals react as if the market for nursing labor was frictionless and nursing hours perfectly substitutable across nurses when it comes to outflows, but not when it comes to part-time schedules. The reason for this might be that nursing labor indivisibility limits their ability to make up for the decrease in nursing labor that results from hospital nurses choosing to work on a part-time basis.

The data indicate that most transitions to part-time schedules result from children-related decisions made by mothers, whereas outflows are unrelated to this effect. They also suggest that nursing hours losses due transitions to part-time work are not easily compensated for by hospitals, whereas nursing hours due to outflows are. This indicates that the negative impact of motherhood on hospital nurses' labor supply at the individual has an effect on the aggregate provision of

nursing services at the hospital level. In the end, if this impact of motherhood is indeed driven by a gender identity channel, then policies that promote further gender convergence can increase the provision of nursing labor in hospitals, either by decreasing occupations gender segregation or by lessening the negative effect of motherhood on female hospital nurses labor supply.

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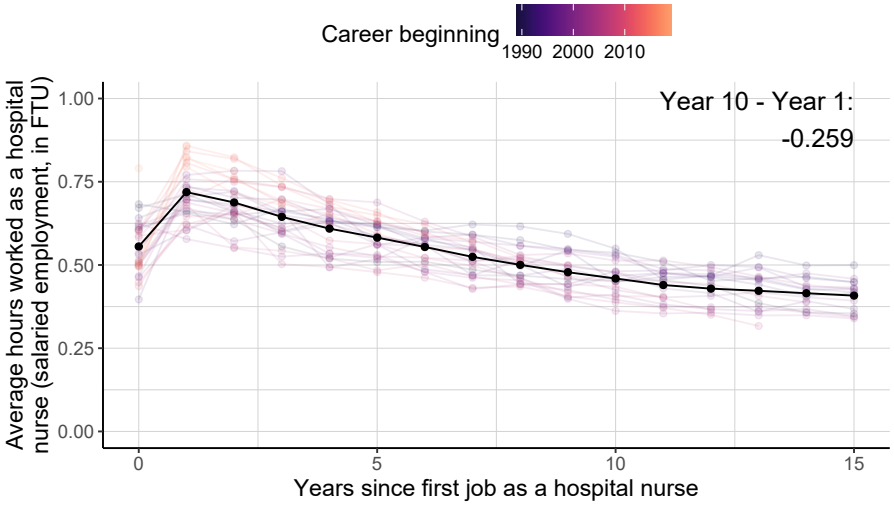
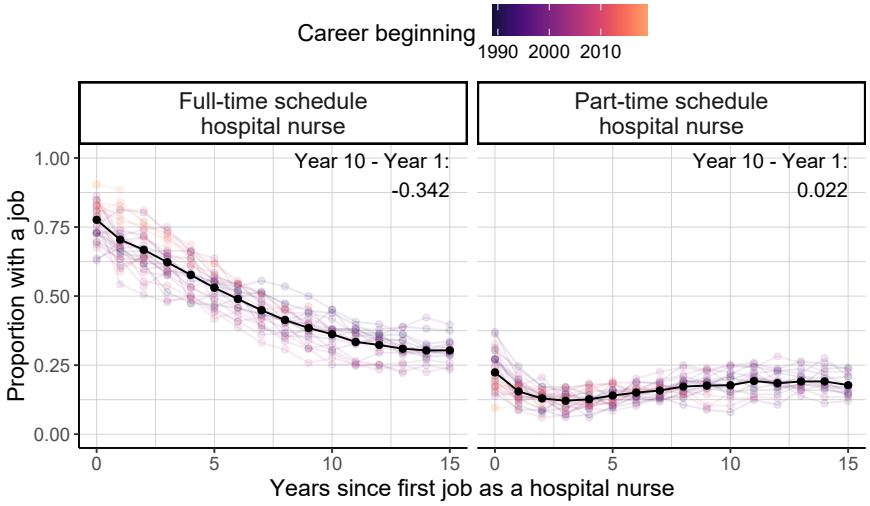
Figures

Figure 1 – Lifecycle profile of hospital nurses' labor supply: nursing labor supplied to hospitals

(a) Hours worked as a hospital nurse



(b) Full-time and part-time work



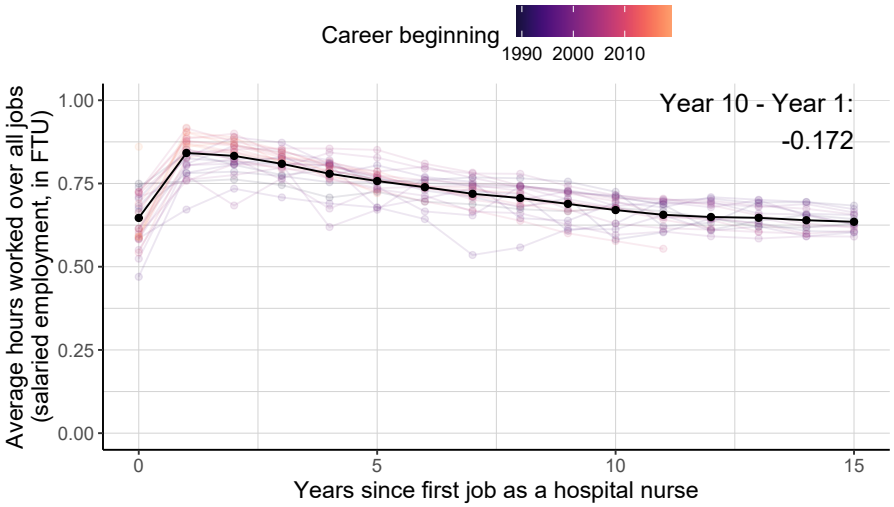
Average hours worked as a hospital nurse, in full-time units, and share working as a full-time or part-time hospital nurse, by time relative to the first qualified healthcare worker job at a hospital. Hours worked are not conditional on holding a hospital nurse position, but incorporate the participation margin (0 hours worked).

Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

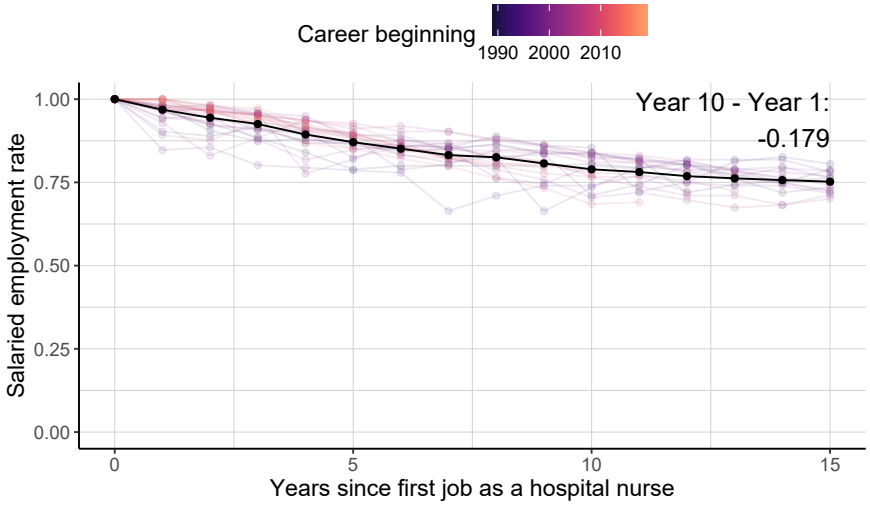
Source. Insee, DADS panel.

Figure 2 – Lifecycle profile of hospital nurses' labor supply: total labor supply in the salaried sector

(a) Hours worked over all jobs



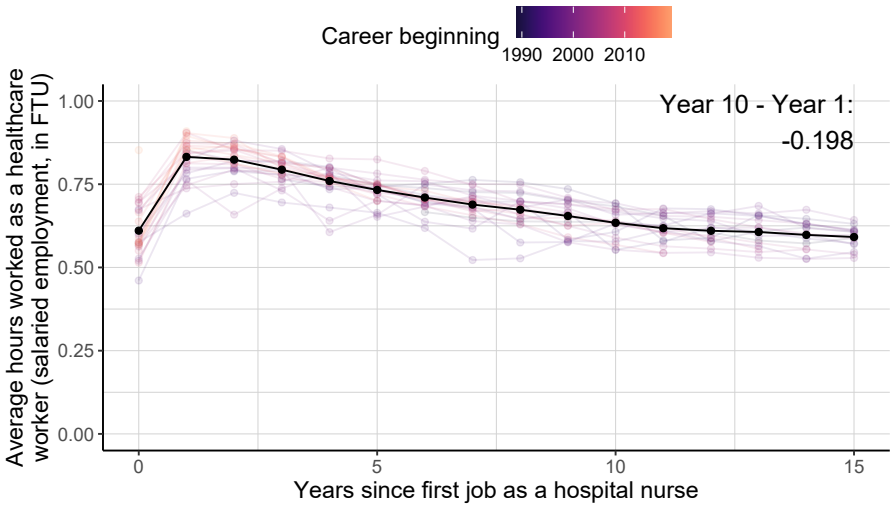
(b) Salaried employment rate



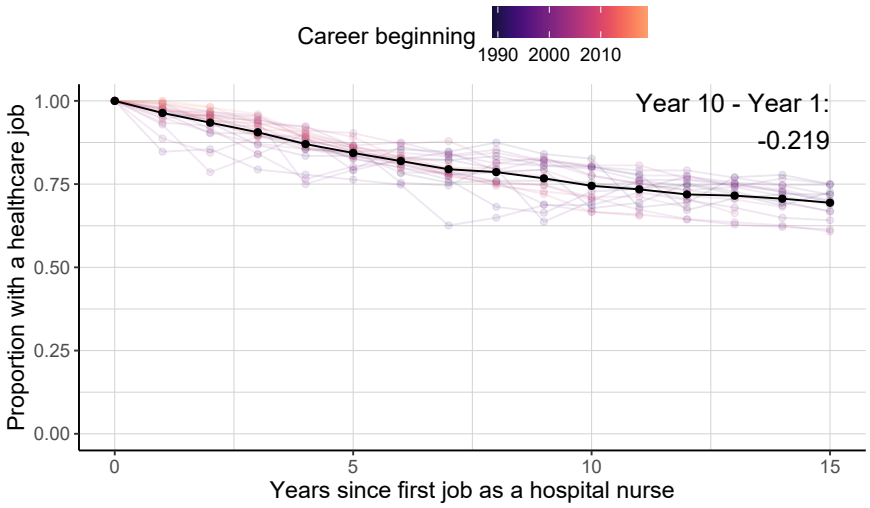
Average hours worked in the salaried sector, in full-time units, and salaried employment rate, by time relative to the first qualified healthcare worker job at a hospital. Hours worked are not conditional on salaried employment, but incorporate the participation margin (0 hours worked).
Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.
Source. Insee, DADS panel.

Figure 3 – Lifecycle profile of hospital nurses' labor supply: labor supply as a healthcare worker

(a) Hours worked as a healthcare worker



(b) Proportion working as a healthcare worker



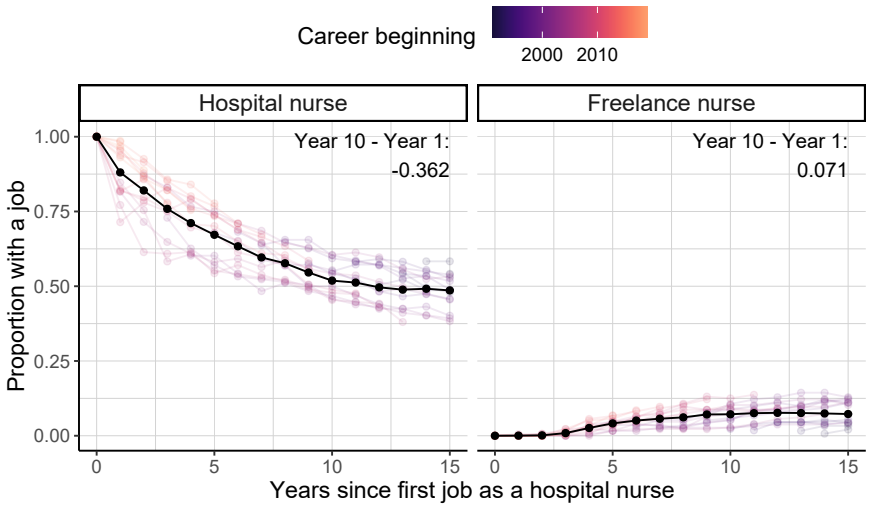
Average hours worked in the salaried sector as a healthcare worker, in full-time units, and proportion with a healthcare-related job, by time relative to the first qualified healthcare worker job at a hospital. Hours worked as a healthcare worker are not conditional on working as a healthcare worker, but incorporate the participation margin (0 hours worked).

Note. Data are not available before year 1995. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

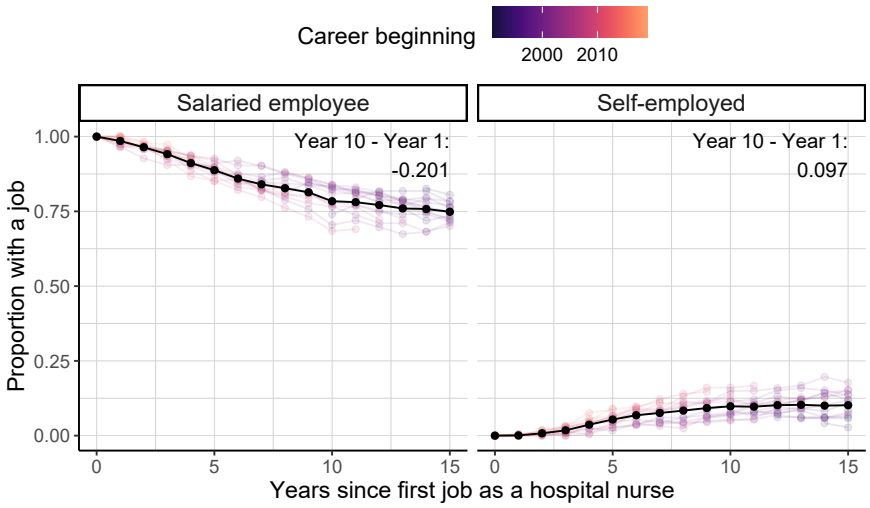
Source. Insee, DADS panel.

Figure 4 – Lifecycle profile of hospital nurses' labor supply: labor supply in the freelance vs. salaried sector

(a) Working as a hospital vs. freelance nurse



(b) Working as a salaried employee vs. self-employed worker

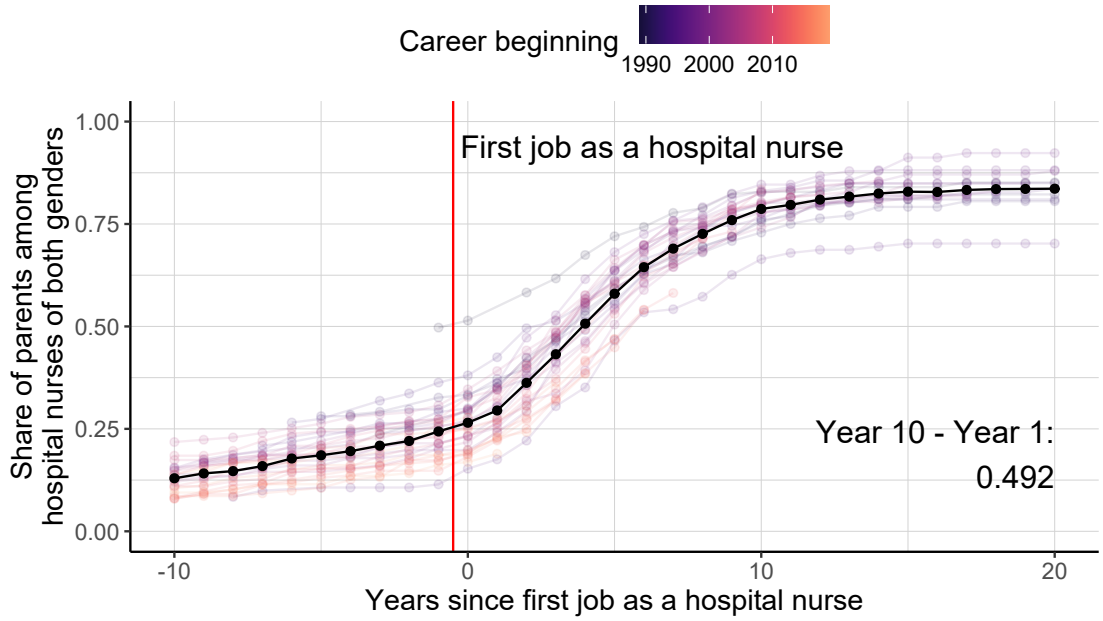


Share of hospital nurses who still hold a job as a hospital nurse, or work as a freelance nurse, and share of hospital nurses who hold a salaried job, or are self-employed, by time relative to the first qualified healthcare worker job at a hospital. Freelance workers are only considered so if they do not hold a salaried job.

Note. Data are not available before year 2006. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

Source. Insee, DADS panel and non-salaried workers panel.

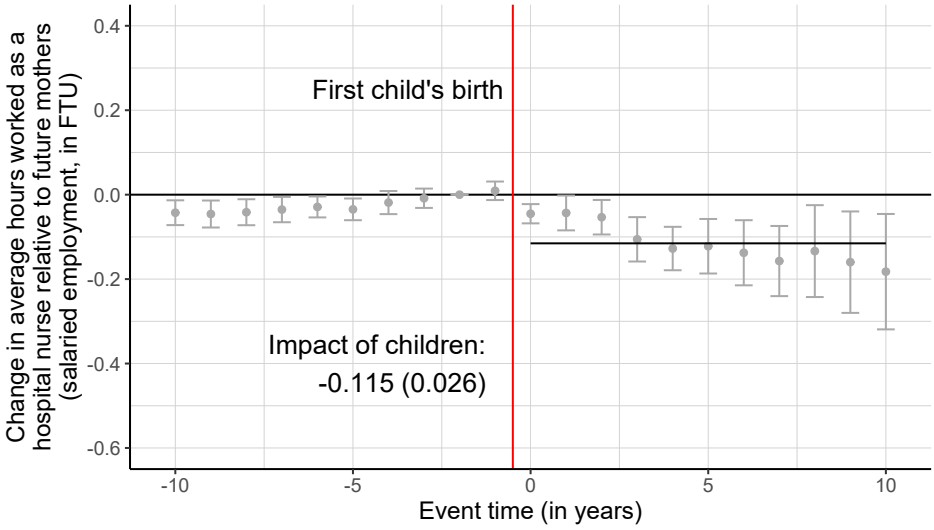
Figure 5 – Lifecycle profile of fertility: share of parents among nurses of both genders



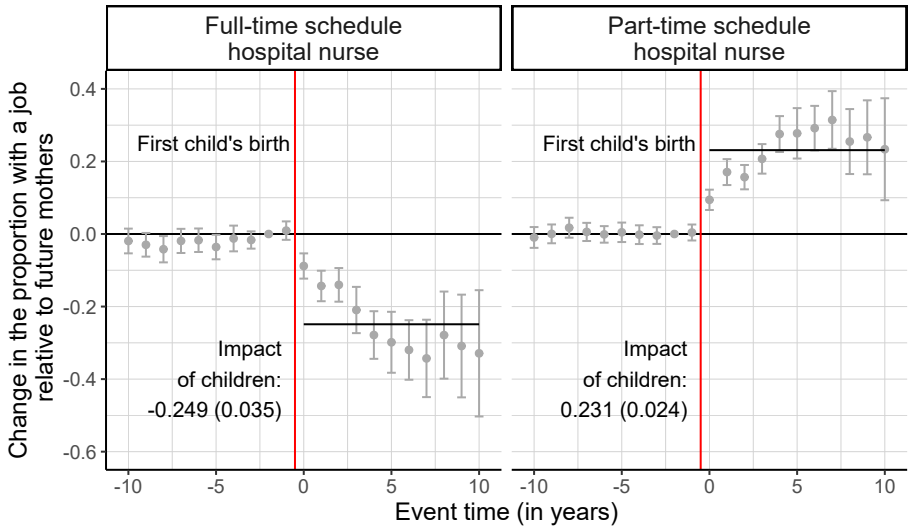
Share of parents, by time relative to the first qualified healthcare worker job at a hospital.
Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.
Source. Insee, DADS-EDP panel.

Figure 6 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals

(a) Hours worked as a hospital nurse



(b) Full-time and part-time work

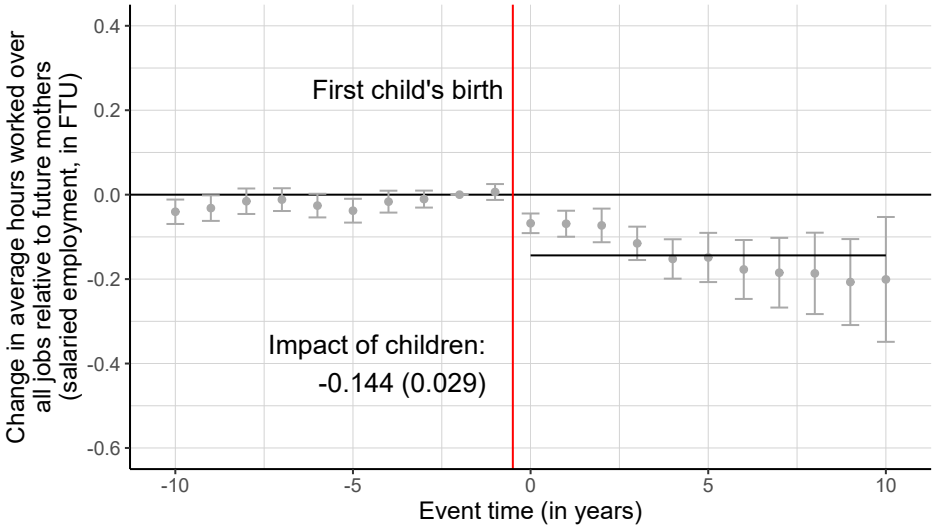


Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse, in full-time units, and share working as a full-time or part-time hospital nurse, by time since first child's birth. Hours worked are not conditional on working as a hospital nurse, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

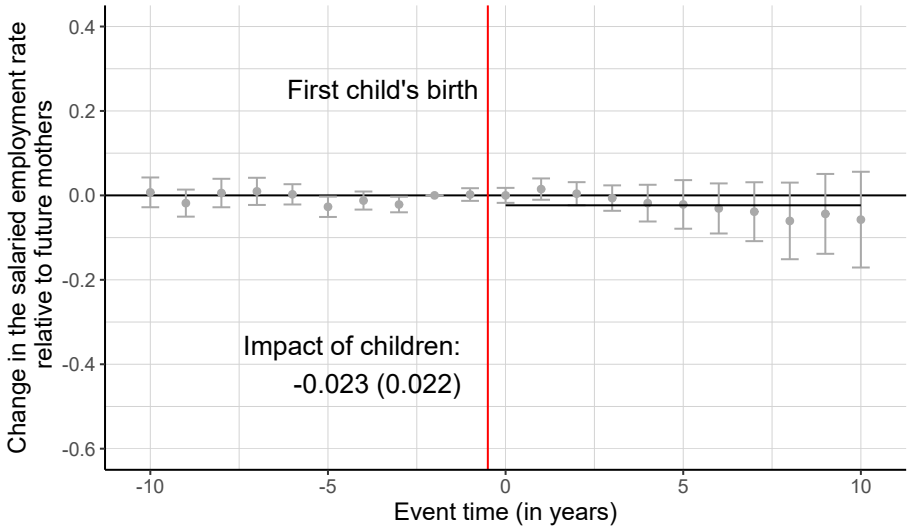
Source. Insee, DADS-EDP panel.

Figure 7 – Event-study estimates of the impact of children on mothers' labor supply: total labor supply in the salaried sector

(a) Hours worked over all jobs



(b) Salaried employment rate

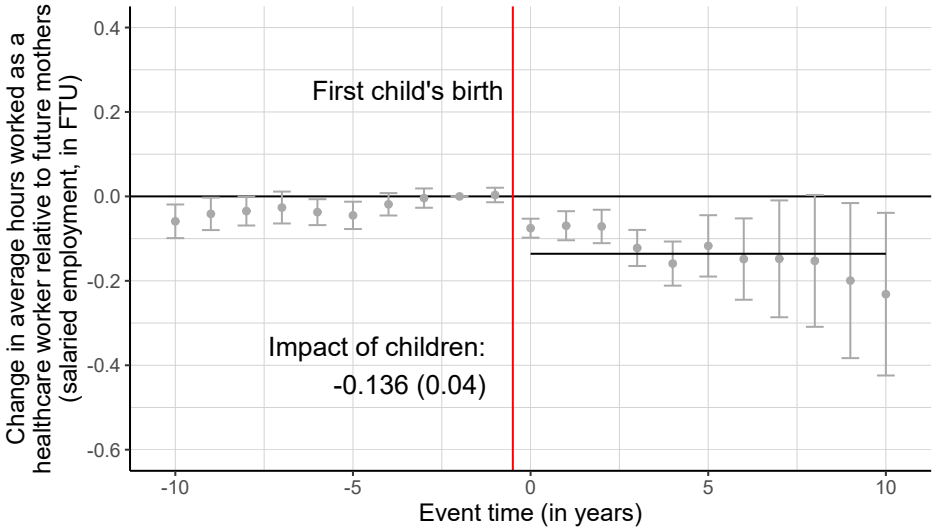


Event-study estimates of the impact of children on mothers' hours worked in the salaried sector, in full-time units, and salaried employment rate, by time since first child's birth. Hours worked are not conditional on salaried employment, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

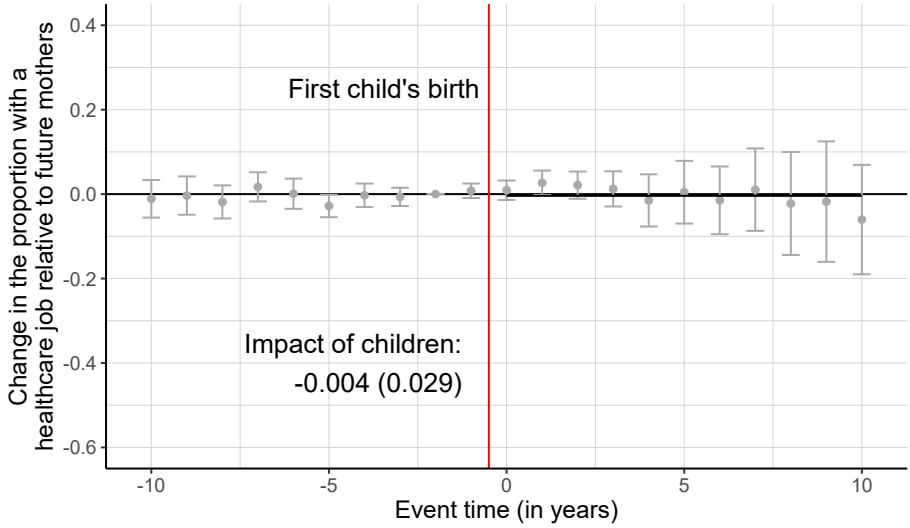
Source. Insee, DADS-EDP panel.

Figure 8 – Event-study estimates of the impact of children on mothers' labor supply: labor supply as a healthcare worker

(a) Hours worked as a healthcare worker



(b) Proportion working as a healthcare worker



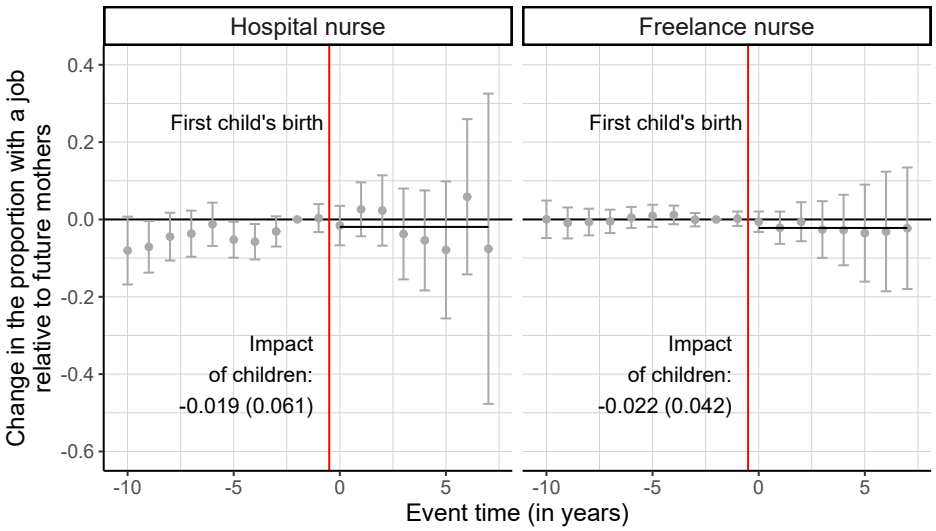
Event-study estimates of the impact of children on mothers' hours worked as a healthcare worker, in full-time units, and proportion with a healthcare-related job, by time since first child's birth. Hours worked as a healthcare worker are not conditional on working as a healthcare worker, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

Note. Data are not available before year 1995.

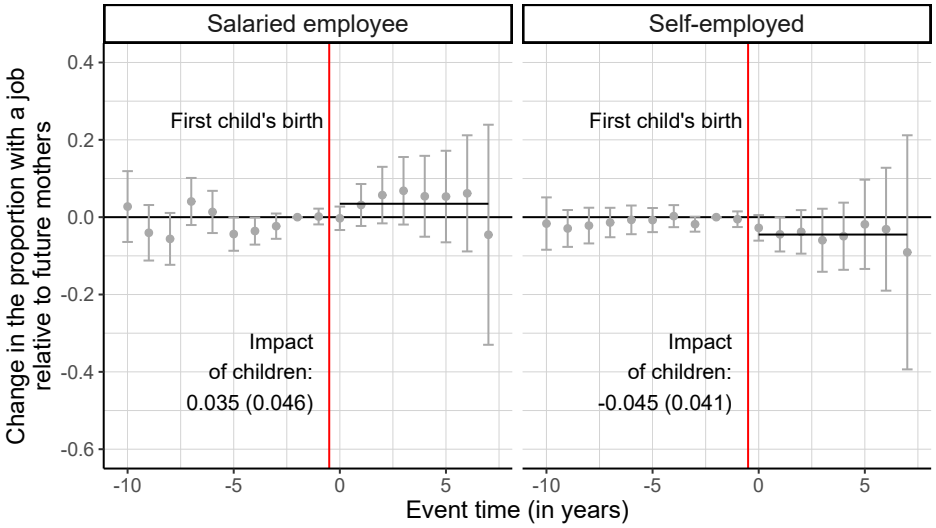
Source. Insee, DADS-EDP panel.

Figure 9 – Event-study estimates of the impact of children on mothers' labor supply: labor supply in the freelance vs. salaried sector

(a) Working as a hospital vs. freelance nurse



(b) Working as a salaried employee vs. self-employed worker



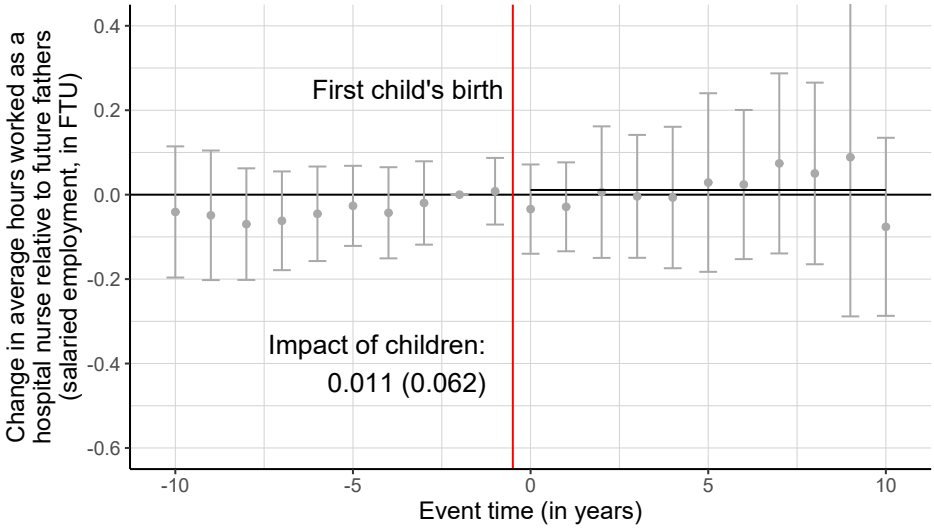
Event-study estimates of the impact of children on the share of hospital nurses still working as hospital nurses, or working as a freelance nurse, and share of hospital nurses who hold a salaried job, or working as self-employed workers, by time since first child's birth. Freelance workers are only considered so if they do not hold a salaried job. Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

Note. Data are not available before year 2006.

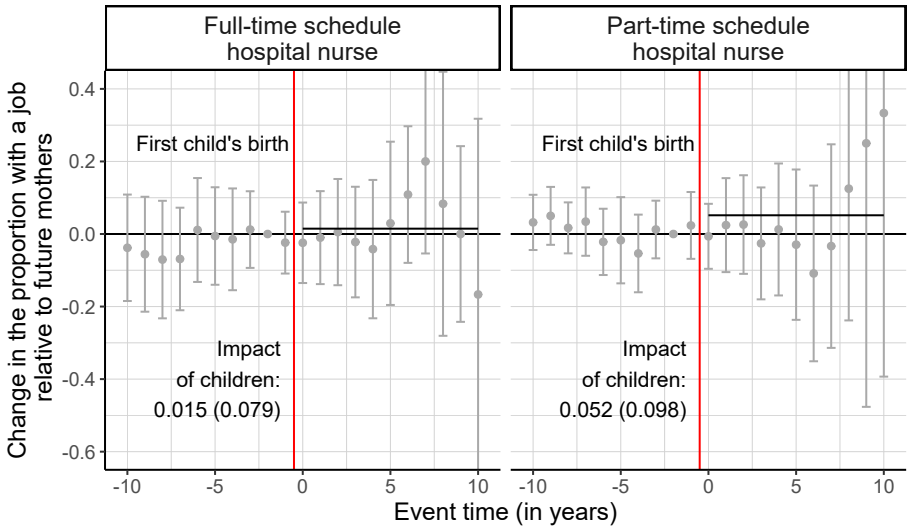
Source. Insee, DADS-EDP panel and non-salaried workers panel.

Figure 10 – Event-study estimates of the impact of children on fathers' labor supply: nursing labor supplied to hospitals

(a) Hours worked as a hospital nurse



(b) Full-time and part-time work

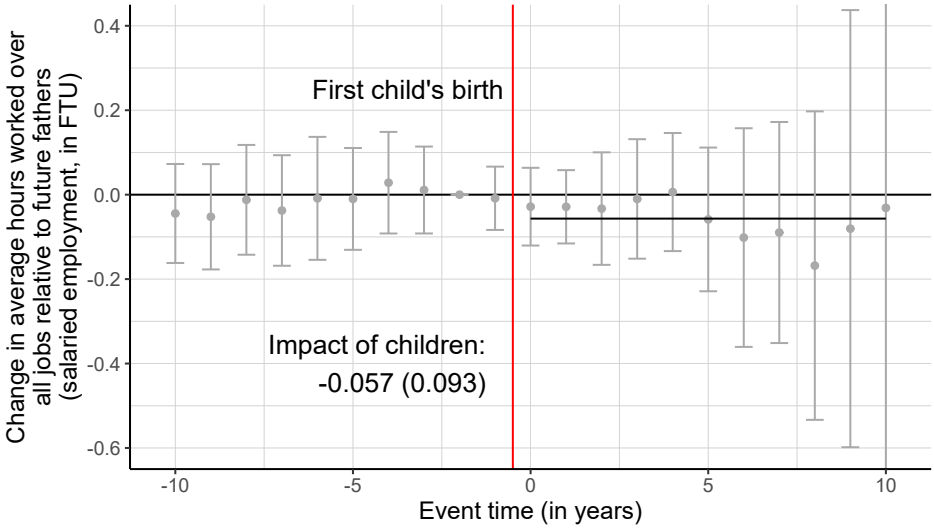


Event-study estimates of the impact of children on fathers' hours worked as a hospital nurse, in full-time units, and share working as a full-time or part-time hospital nurse, by time since first child's birth. Hours worked are not conditional on working as a hospital nurse, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

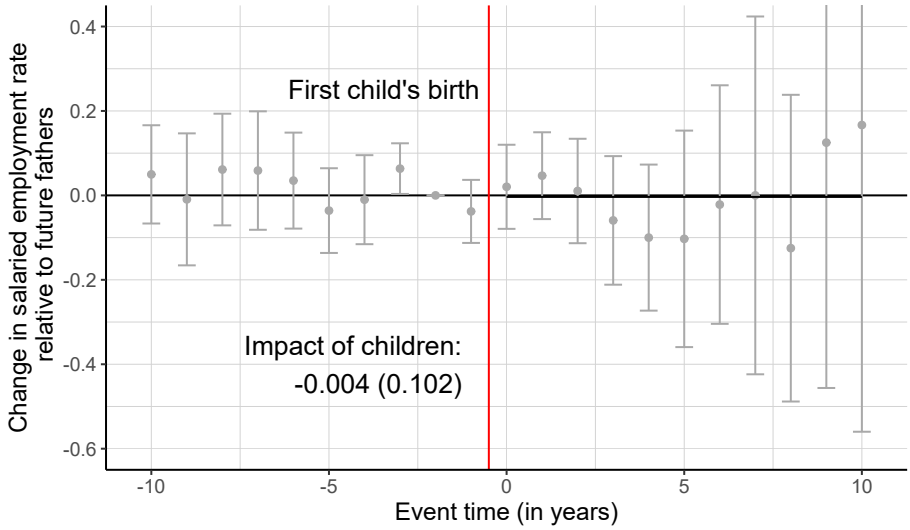
Source. Insee, DADS-EDP panel.

Figure 11 – Event-study estimates of the impact of children on fathers' labor supply: total labor supply in the salaried sector

(a) Hours worked



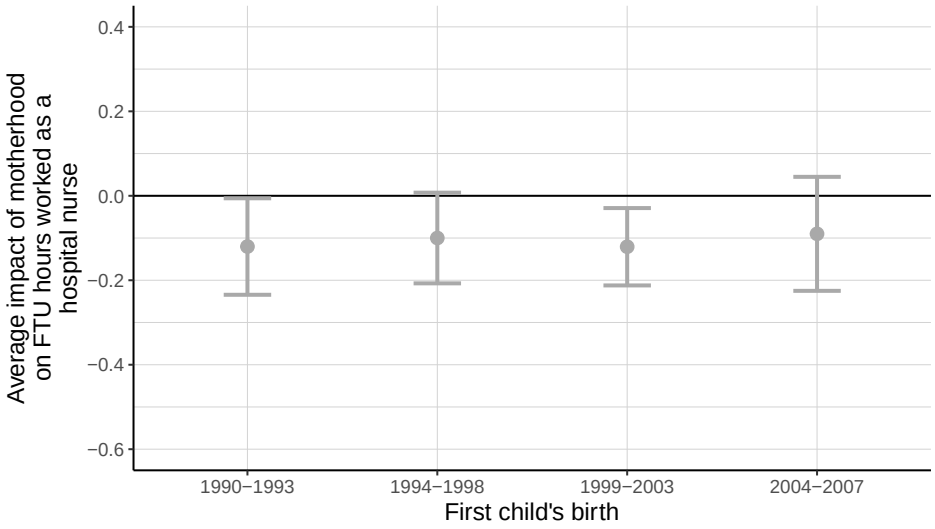
(b) Salaried employment rate



Event-study estimates of the impact of children on fathers' hours worked in the salaried sector, in full-time units, and salaried employment rate, by time since first child's birth. Hours worked are not conditional on salaried employment, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

Source. Insee, DADS-EDP panel.

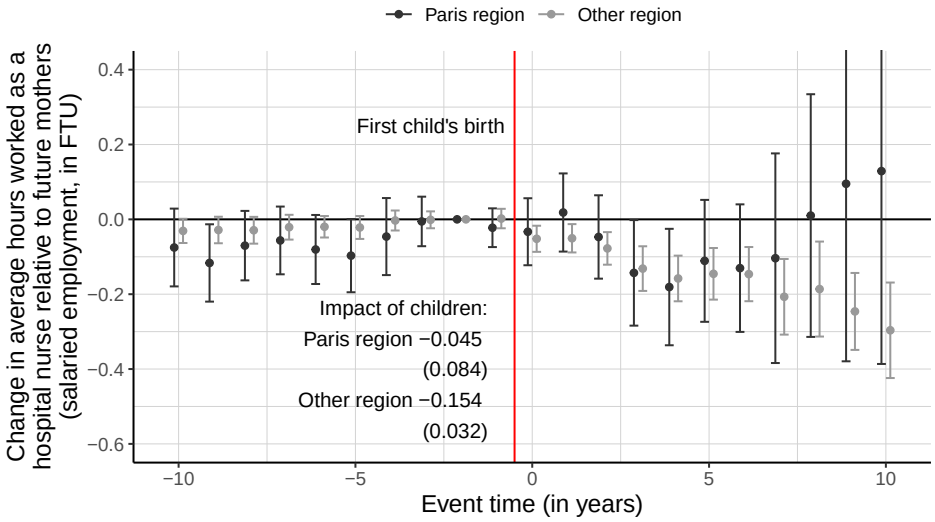
Figure 12 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals – by year of birth of the first child



Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse, in full-time units, and share working as a full-time or part-time hospital nurse, averaged over the first ten years after the arrival of children, by year of birth of the first child. Hours worked are not conditional on working as a hospital nurse, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

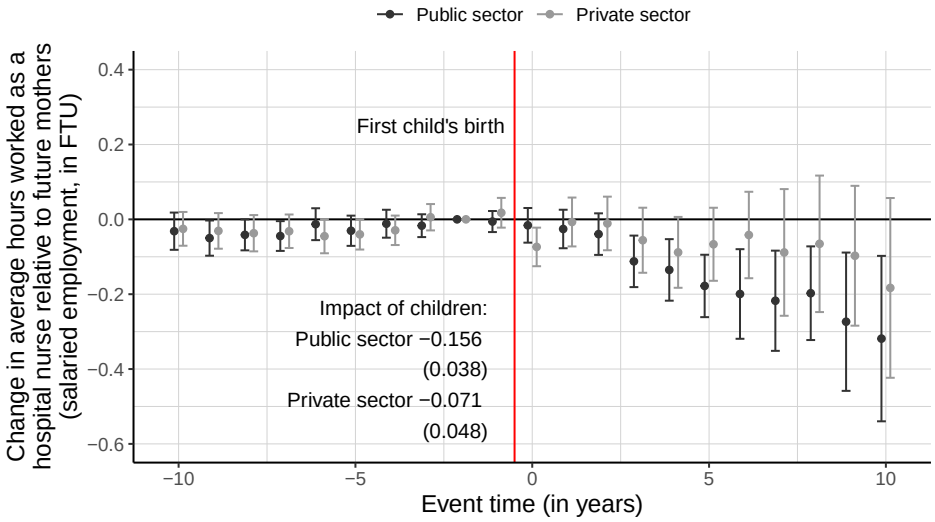
Source. Insee, DADS-EDP panel.

Figure 13 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals – by region of work



Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse, in full-time units, and share working as a full-time or part-time hospital nurse, by time since first child's birth and region of work. Hours worked are not conditional on working as a hospital nurse, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Figure 14 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals – by type of employer

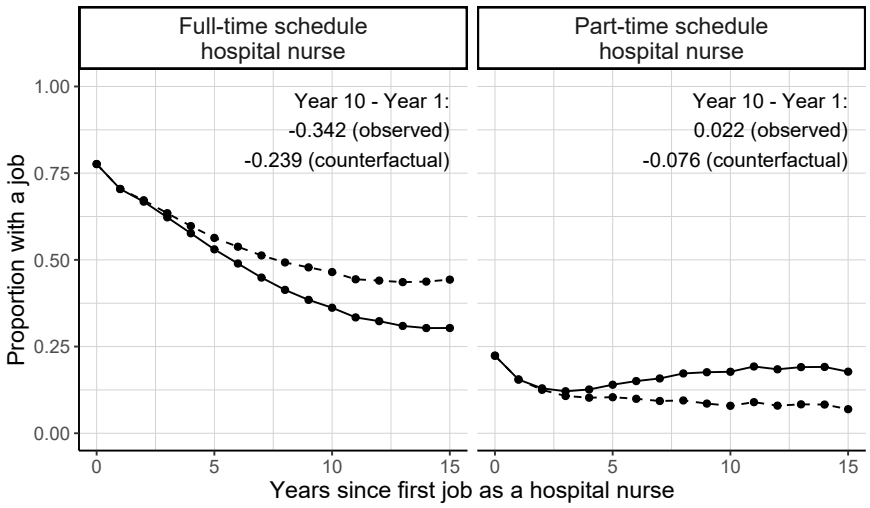


Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse, in full-time units, and share working as a full-time or part-time hospital nurse, by time since first child's birth and type of employer. Hours worked are not conditional on working as a hospital nurse, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Figure 15 – Contribution of children to the lifecycle profile of nurses' labor supply: nursing labor supplied to hospitals

(a) Hours worked as a hospital nurse

(b) Full-time and part-time work



Realized and counterfactual average hours worked as a hospital nurse, in full-time units, and share working as a full-time or part-time hospital nurse, by time relative to the first qualified healthcare worker job at a hospital. Hours worked are not conditional on holding a hospital nurse position, but incorporate the participation margin (0 hours worked).

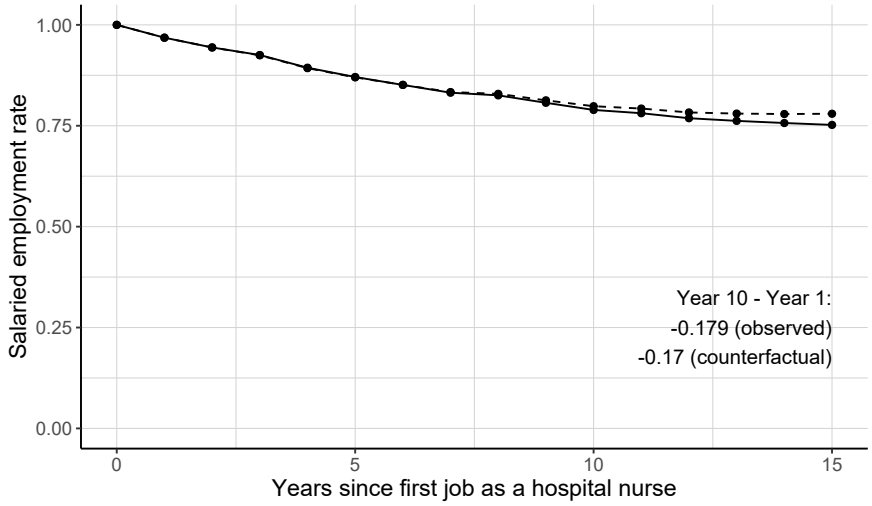
Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

Source. Insee, DADS-EDP panel.

Figure 16 – Contribution of children to the lifecycle profile of nurses' labor supply: total labor supply in the salaried sector

(a) Hours worked over all jobs

(b) Salaried employment rate



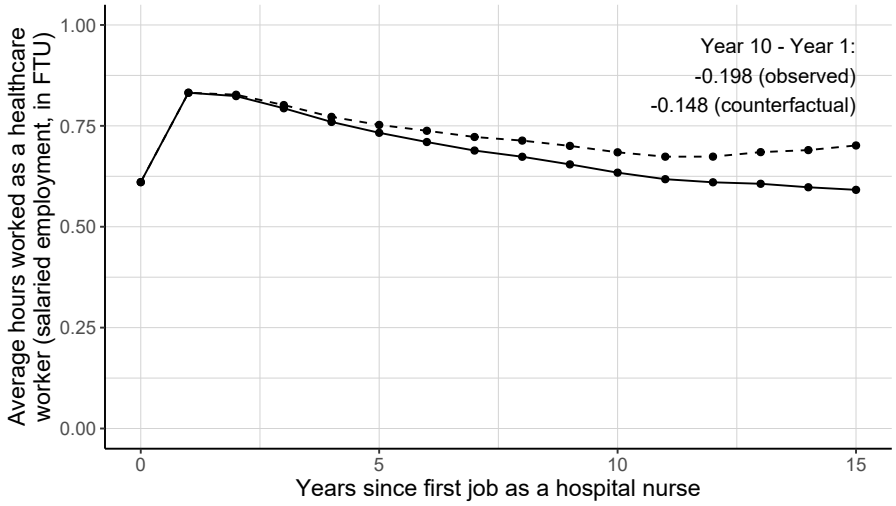
Realized and counterfactual average hours worked in the salaried sector, in full-time units, and salaried employment rate, by time relative to the first qualified healthcare worker job at a hospital. Hours worked are not conditional on salaried employment, but incorporate the participation margin (0 hours worked).

Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

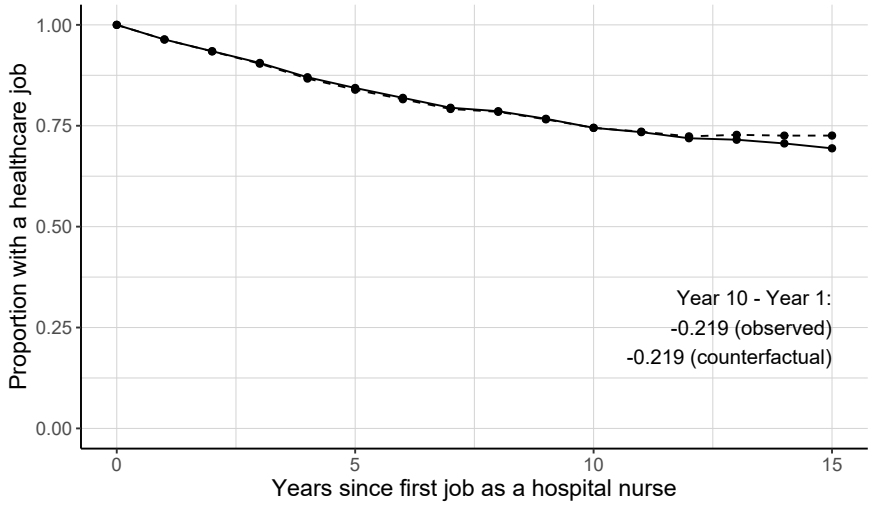
Source. Insee, DADS-EDP panel.

Figure 17 – Contribution of children to the lifecycle profile of nurses' labor supply: labor supply as a healthcare worker

(a) Hours worked as a healthcare worker



(b) Proportion working as a healthcare worker



Realized and counterfactual average hours worked in the salaried sector as a healthcare worker, in full-time units, and proportion with a healthcare-related job, by time relative to the first qualified healthcare worker job at a hospital. Hours worked are not conditional on working as a healthcare worker, but incorporate the participation margin (0 hours worked).

Note. Data are not available before year 1995. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

Source. Insee, DADS-EDP panel.

Tables

Table 1 – Detailed occupations distribution among selected jobs (2009-2017)

Detailed occupation	Share among women (in %)	Share among men (in %)
431A – Nurses managers	5.4	9.8
431B – Mental health nurses	1.9	2.9
431C – Nursery nurses	1.8	0.2
431D – Other specialized nurses	4.0	6.7
431F – General care nurses	63.8	55.6
All nurses occupations	76.9	75.2
431E – Midwives	3.5	1.0
432B – Physical therapists	1.8	3.7
432D – Other rehabilitation specialists	3.9	1.6
433A – Medical technicians	7.0	10.0
433B – Opticians and hearing aid professionals	0.0	0.0
433C – Other specialists in medical equipment	0.0	0.6
433D – Pharmacy technicians	2.6	2.4
434A – Social work managers	0.2	0.3
434B – Social work assistants	1.8	0.6
434C – Family economic counselors	0.1	0
434D – Specialized educators	0.9	2.1
434E – Instructors	0.4	1.4
434F – Specialized technical educators, workshop monitors	0.1	0.3
434G – Early childhood educators	0.3	0.1
435B – Socio-cultural and leisure animators	0.4	1.0

Source. DADS panel, Insee.

Table 2 – Summary statistics

	Women	Men
# Observations	151,822	31,299
# Individuals	4,978	1,021
a. Age at first hospital nurse job[*]		
Mean	28.3	31.7
St.D.	8.3	9.5
b. Potential experience at first hospital nurse job[**]		
Mean	5.5	6.7
St.D.	4.7	5.2
c. Share of parents at first hospital nurse job (in %)[**]	34.8	40.2
d. Share of parents at age 45 (in %)[***]	81.5	78.1
e. Number of children[****]		
Mean	2.2	2.3
St.D.	0.9	1.2

[*] Among those who got their first hospital nurse job after 1988. [**] Among those who got their first job after 1988. Potential experience is defined as the difference between the year during which an individual get her first job as a hospital nurse, and the year during which she holds her first job whatever the industry or occupation. [***] Among those born before 1973. [****] Among those born before 1973 with at least one child. *Source.* DADS-EDP panel, Insee.

Table 3 – Summary statistics – sample restricted to hospital nurses whose first child is born at least two years after they began their careers

	Women	Men
# Observations	54,452	8,035
# Individuals	1,765	260
a. Age at first hospital nurse job[*]		
Mean	24	25.8
St.D.	2.7	4.2
b. Potential experience at first hospital nurse job[**]		
Mean	4	4.9
St.D.	2.8	3.3
c. Age at first child's birth		
Mean	29.8	32.1
St.D.	3.9	4.7
d. Number of children[***]		
Mean	2	2.2
St.D.	0.9	0.9

[*] Among those who got their first hospital nurse job after 1988. [**] Among those who got their first job after 1988. Potential experience is defined as the difference between the year during which an individual get her first job as a hospital nurse, and the year during which she holds her first job whatever the industry or occupation. [***] Among those born before 1973. *Source.* DADS-EDP panel, Insee.

Table 4 – Impact of hospital nurses decreasing their labor supply on the future hospital-level supply of nursing labor

	Hours change, overall	Hours change, full-time to full-time	Hours change, part-time to full-time	Hours change, part-time to part-time	New hours, inflows
Hours change, full-time to part-time	0.85	−0.09	−0.01	0.17	−0.22
	(0.11)	(0.08)	(0.03)	(0.02)	(0.05)
Past hours, outflows	0.08	0.01	0.004	−0.003	−0.94
	(0.02)	(0.01)	(0.002)	(0.001)	(0.01)
N	63,987	63,987	63,987	63,987	63,987

The table displays the estimates of regressions of the overall hospital-level supply of nursing labor, and related adjustment margins, on the yearly change in hospital-level nursing hours due to hospital nurses moving from full-time to part-time schedules, and hospital nurses leaving the hospital workforce. All regressions include hospital fixed effects, as well as year fixed effects. Observations with overall relative changes in nursing labor supply below (over) the first (last) decile of the annual distribution are excluded from the estimation. Standard errors are clustered at the hospital level. *Source.* Insee, DADS.

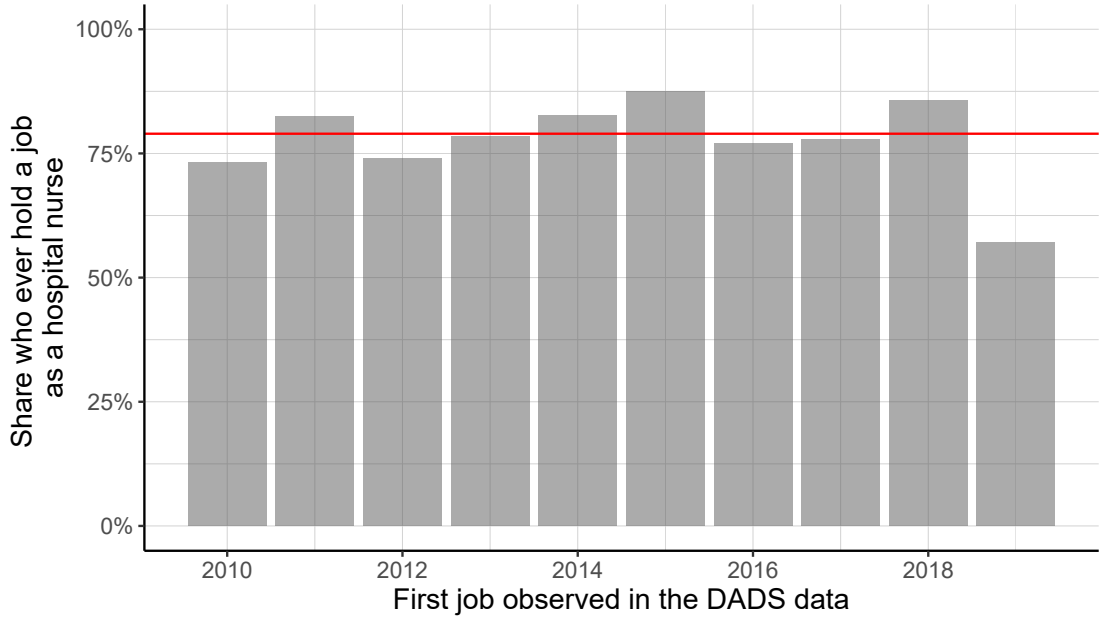
A Hospital nurses in France: additional data regarding the context

A.1 How well does the sample cover the nurse occupation?

Table 1 shows that even though I cannot rely on the detailed occupation variable to delineate my sample, it mostly covers individuals that can reasonably be considered as hospital nurses. Reciprocally, a question is how many nurses do, at some point of their lives, hold a job as a hospital nurse, and thus fall within the population covered by this paper. To investigate this issue, I consider all individuals (i) observed as holding a salaried nurse job, in terms of the detailed occupation variable, at any point in time since 2010; and (ii) whose first job, whatever the industry or occupation, started in 2010 or later. The second condition is meant to capture individuals whose entire career can be observed in terms of the detailed occupation variable, so as to avoid selection issue that would stem from nurses gradually leaving the occupation over time (see Figure 1). Because nurses cannot begin their careers as freelance nurses, but have to hold a job as a salaried nurses, these conditions should include all individuals who began their careers in 2010 or after and hold a nurse job at some point. I then compute the share of these individuals who fall within my sample. This measure gives a lower bound of the share of nurses who hold a hospital nurse job at some point of their lives, given that I can only observe the very beginning of a career for the selected individuals.

Figure A.1 displays my estimates. Even though there is variation from one cohort to the other, which is probably due to small sample size, it suggests that at least 74% of nurses hold a job as a nurse at a hospital at some point of their lives.

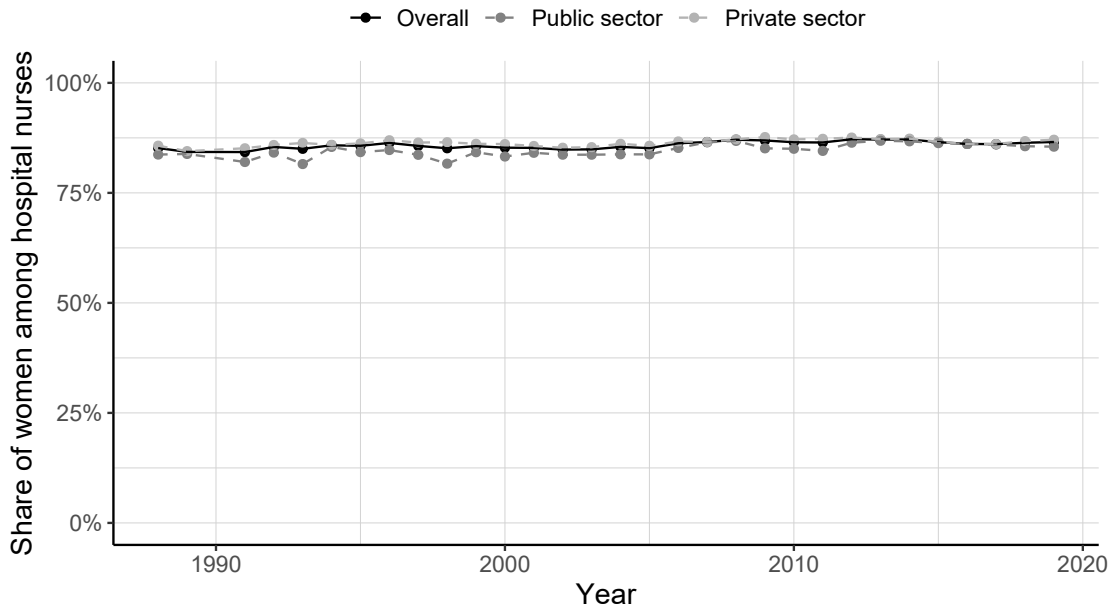
Figure A.1 – Share of nurses who ever hold a job at a hospital



Share of nurses who began their careers in 2010 or later who are observed to hold a job as a hospital nurse at some point of their lives.
Source. Insee, DADS panel.

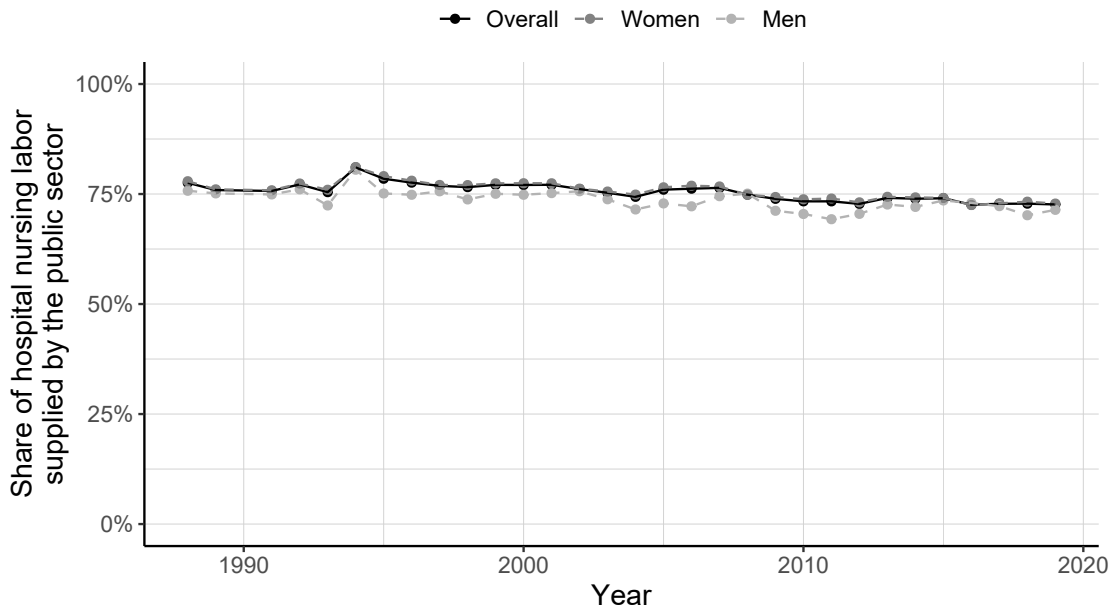
A.2 Composition of the hospital nurse workforce

Figure A.2 – Share of women among hospital nurses



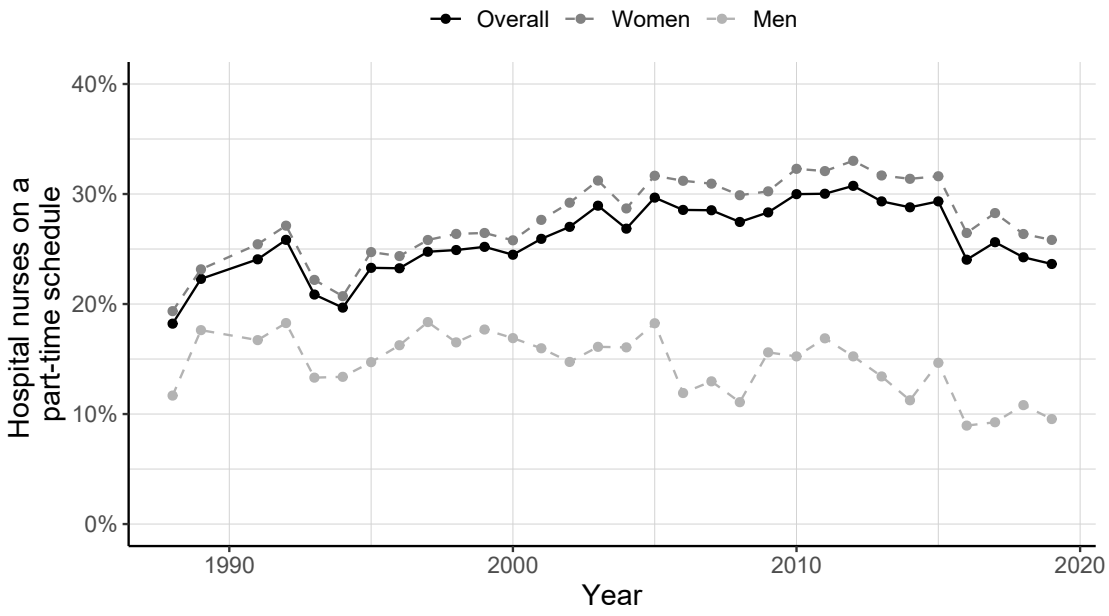
Share of women among hospital nurses, by sector and year of observation.
Source. Insee, DADS panel.

Figure A.3 – Share of hospital nursing labor supplied by the public sector



Share of hours worked by hospital nurses in the public sector, by year of observation.
Source. Insee, DADS panel.

Figure A.4 – Share of hospital nurses working on a part-time schedule



Share of hospital nurses working on a part-time schedule, by year of observation.
Source. Insee, DADS panel.

B DADS panel: labor supply measures

B.1 Hours worked: concept

In the DADS dataset, hours worked refers to hours for which the worker is paid under their labor contract. The data on hours is reported by employers when they fill out payroll tax forms. Before making the data available, Insee performs three checks:

- the total number of hours for a given individual × employer × year observation should not exceed an industry-specific threshold of 2,500 hours per year in a small subset of industries (mostly manufacturing industries, transportation, hotels and restaurants), and 2,200 hours per year elsewhere;
- the implied hourly wages should exceed 80% of the minimum wage;
- the total number of hours should be positive, with the exception of a narrow subset of occupations (mostly journalists and salespersons) working on a fixed-price or commission basis.

If one of these conditions is not met, Insee ascribes hours to the observation to make the hourly wage consistent within narrow cells defined by 4-digit occupation, full-time or part-time status, age and gender.

During a maternity leave, as an employee is not paid by for any hours by her employer but is instead paid by the Social Security (and may receive a top-up payment from her employer), hours worked are equal to 0. Workers not paid by the hour are an exception to this rule because their hours are imputed based on days paid, which do not vary during maternity leave. As a result, the DADS dataset overestimates hours paid – and underestimates hourly wages – for such workers during years when they give birth to children. In general, these workers belong to the "Manager and professionals" occupational group, so that this is not a concern for this particular paper.

B.2 Full-time units conversion

Hours worked are converted in full-time units using a very simple approach, that relies on three variables: working-time status, days worked and lastly hours worked. This approach caps time worked at 1 for individuals who work full-time during an entire year, so that it does not incorporate overtime. The main advantage of this

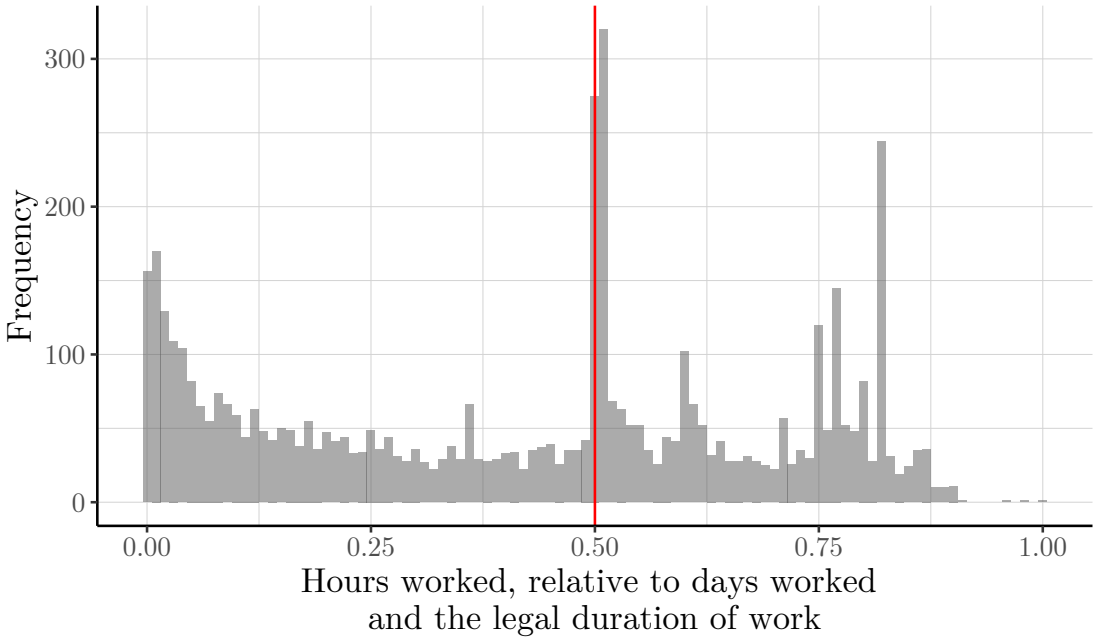
method is that it allows to compare time worked even when the legal duration of work changes, which is the case over my time period of interest as this duration changed from 39h to 35h per week in the beginning of the 2000s.

Full-time workers who are observed to be employed an entire year are assigned 1 full-time unit for this year. Full-time workers who are not observed to be employed for an entire year are assigned a value that is proportional to days worked, so that it would be 1 if they were working for the entire year.[32] Part-time workers are assigned a value proportional to hours worked, so that their time worked would be 1 if their hours worked matched the legal duration of work over an entire year.

An issue with this approach is that hours worked are not observed before 1995 in the DADS data. Before this date, only the working-time status and days worked can be observed. I choose to impute full-time units to part-time workers under the assumption that they are on a 50% schedule, so that their time worked is proportional to days worked and equal to 0.5 if they work an entire year. I make this choice because 50% schedule was likely the most frequent choice among part-time workers. Figure B.1 makes it salient by plotting the distribution of hours worked, relative to (i) the legal duration of work and (ii) days worked, among part-time job spells observed between 1995 and 1998 for workers who at one point in time were observed in hospital nurses positions.

[32] In the DADS data, an entire year corresponds to 360 days worked.

Figure B.1 – Distribution of hours worked for part-time workers, 1995-1998

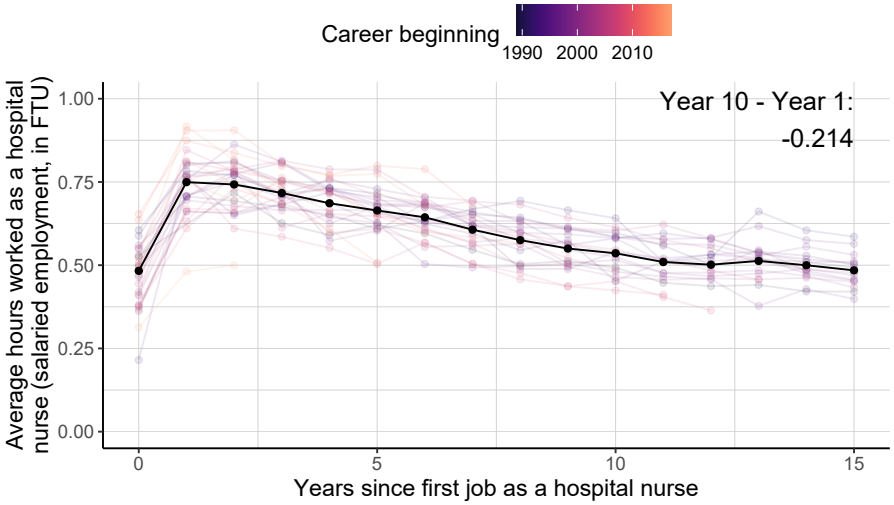


Distribution of hours worked divided by the legal annual duration of work for full-time workers, among individuals who hold a hospital nurse job at least once.
Source. Insee, DADS panel.

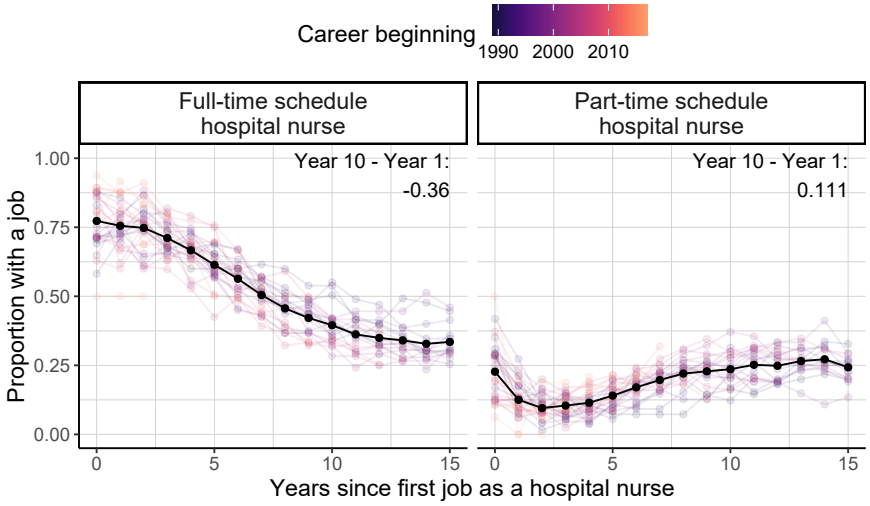
C Lifecycle profiles in the event-study subsample

Figure C.1 – Lifecycle profile of hospital nurses' labor supply: nursing labor supplied to hospitals

(a) Hours worked as a hospital nurse



(b) Full-time and part-time work



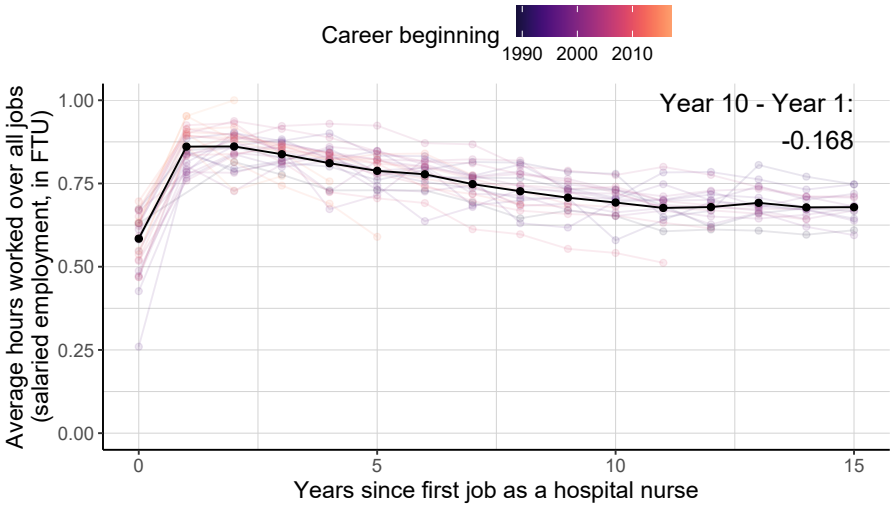
Average hours worked as a hospital nurse, in full-time units, and share working as a full-time or part-time hospital nurse, by time relative to the first qualified healthcare worker job at a hospital. Hours worked are not conditional on holding a hospital nurse position, but incorporate the participation margin (0 hours worked).

Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

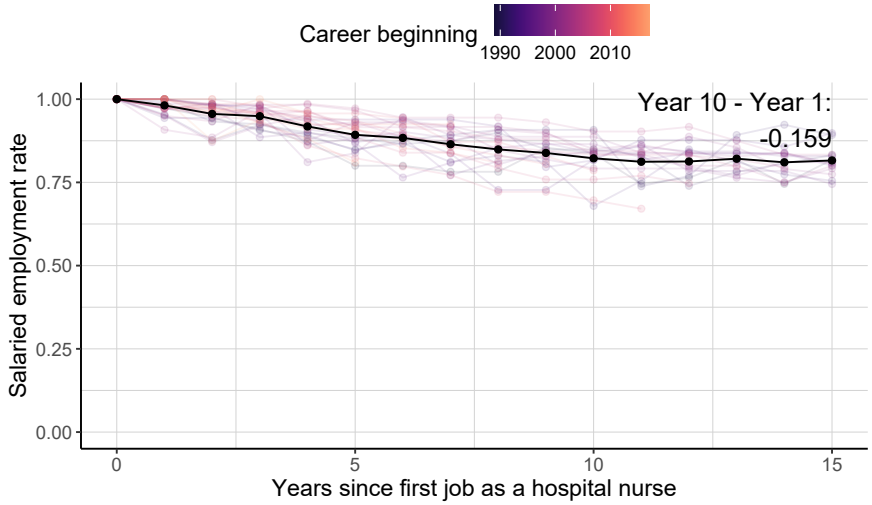
Source. Insee, DADS panel.

Figure C.2 – Lifecycle profile of hospital nurses' labor supply: total labor supply in the salaried sector

(a) Hours worked over all jobs



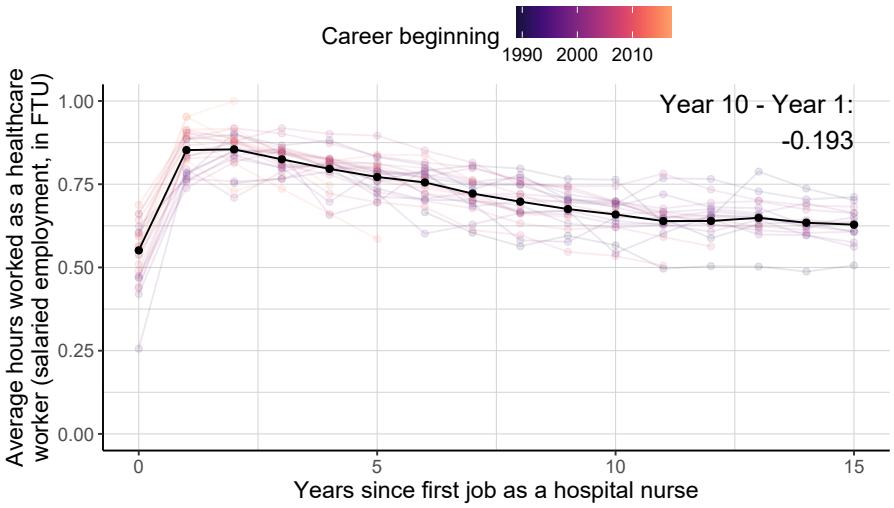
(b) Salaried employment rate



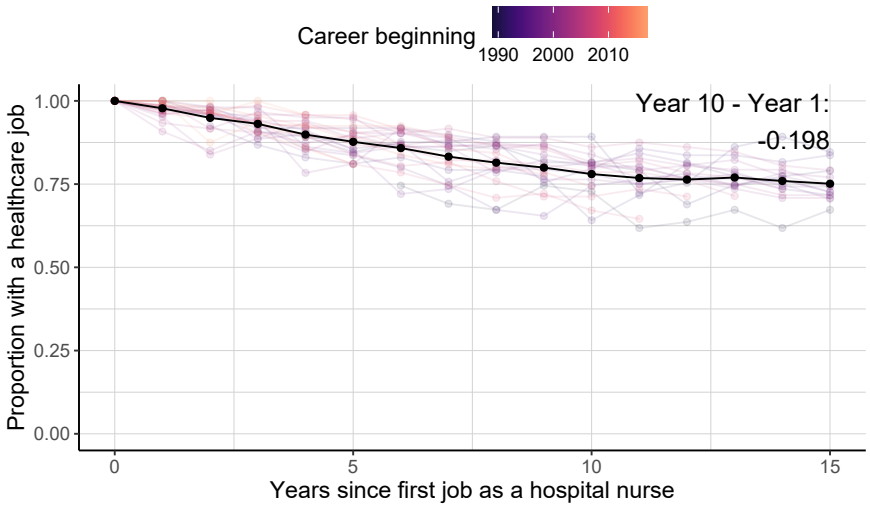
Average hours worked in the salaried sector, in full-time units, and salaried employment rate, by time relative to the first qualified healthcare worker job at a hospital. Hours worked are not conditional on salaried employment, but incorporate the participation margin (0 hours worked).
Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.
Source. Insee, DADS panel.

Figure C.3 – Lifecycle profile of hospital nurses' labor supply: labor supply as a healthcare worker

(a) Hours worked as a healthcare worker



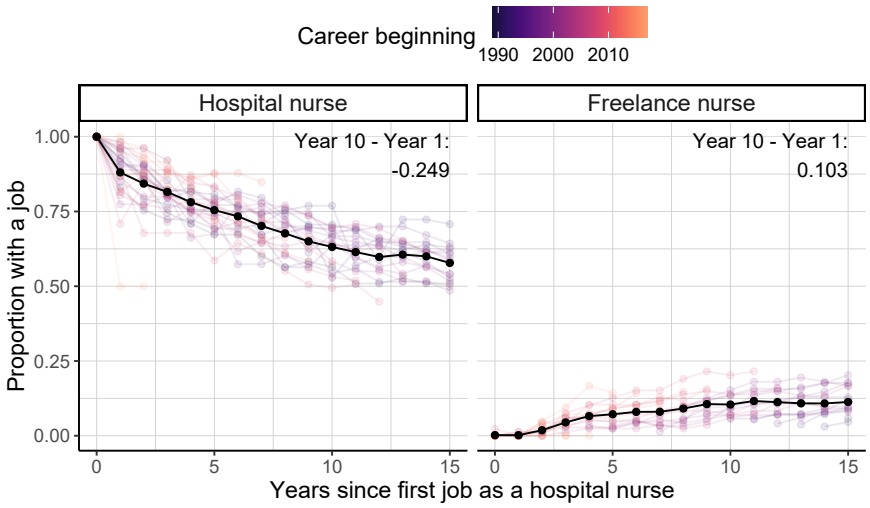
(b) Proportion working as a healthcare worker



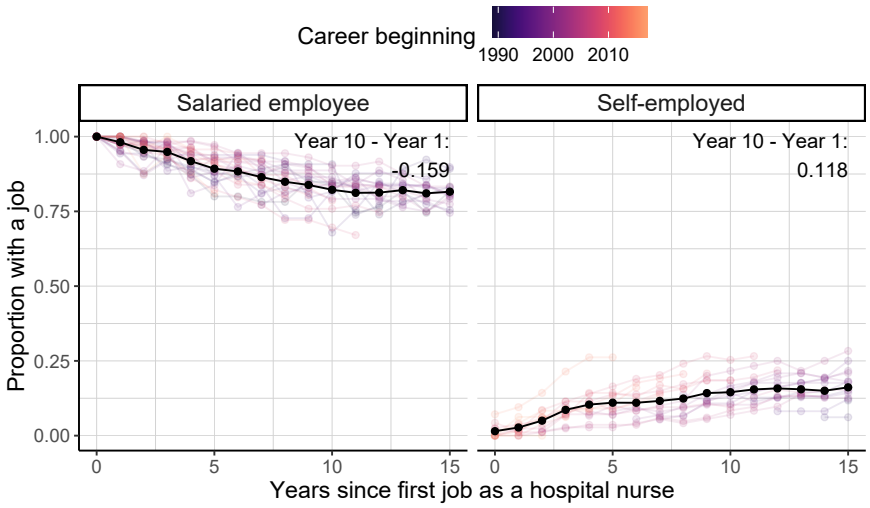
Average hours worked in the salaried sector as a healthcare worker, in full-time units, and proportion with a healthcare-related job, by time relative to the first qualified healthcare worker job at a hospital. Hours worked as a healthcare worker are not conditional on working as a healthcare worker, but incorporate the participation margin (0 hours worked).
Note. Data are not available before year 1995. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.
Source. Insee, DADS panel.

Figure C.4 – Lifecycle profile of hospital nurses' labor supply: labor supply in the freelance vs. salaried sector

(a) Working as a hospital vs. freelance nurse



(b) Working as a salaried employee vs. self-employed worker



Share of hospital nurses who still hold a job as a hospital nurse, or work as a freelance nurse, and share of hospital nurses who hold a salaried job, or are self-employed, by time relative to the first qualified healthcare worker job at a hospital. Freelance workers are only considered so if they do not hold a salaried job.

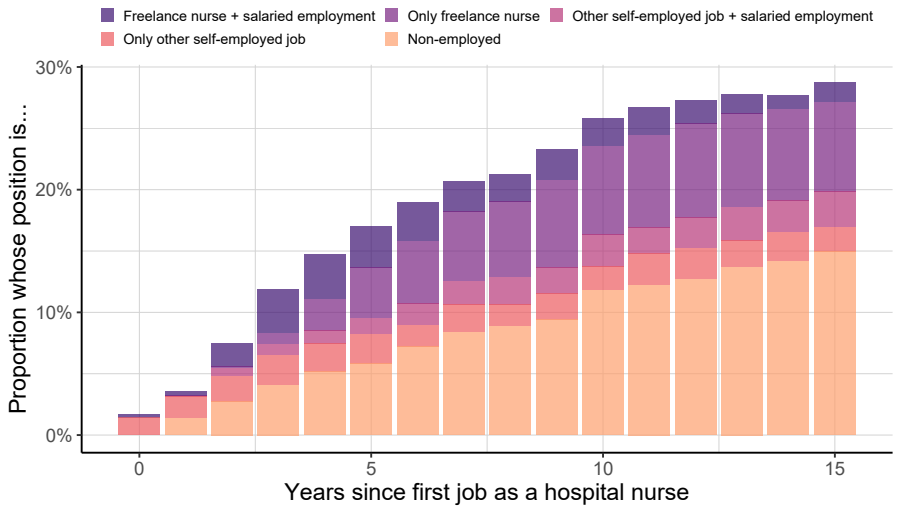
Note. Data are not available before year 2006. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

Source. Insee, DADS panel and non-salaried workers panel.

D Combining self-employment and employment

Figure D.1 displays the position of hospital nurses who are not only observed in the salaried employment data. This population combines: (i) those who hold jobs in both the salaried and freelance sector over the same year; (ii) those who only hold self-employed jobs; and (iii) those without a job. It makes it possible to make part between "pure" freelance nurses (or other self-employed workers) and those who combine jobs in both the freelance and salaried sector. The interpretation is however made more difficult by the fact that most transitions do not happen on January, 1st. Indeed, being considered a freelance worker (salaried) corresponds to having positive self-employed (salaried) earnings during a given year. As a result, those who appear as combining jobs over the two sectors could be either individuals truly working at the same time over two positions, or individuals who transitioned from one sector to the other over the course of the year. The fact that the share of those who combine both types of employment decreases over the course of a career suggests that the latter group can be sizable. In the end, combining jobs over the salaried and freelance sector at the same time is probably not very common.

Figure D.1 – Lifecycle profile of hospital nurses' labor supply: labor supply in the freelance vs. salaried sector



Share of hospital nurses who do not are not observed only as salaried employees, by time relative to the first qualified healthcare workers.

Note. Data are not available before year 2006. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

Source. Insee, DADS panel and non-salaried workers panel.

E Estimators comparisons

E.1 Event-study regressions and TWFE models

My analysis builds on the event-study approach proposed by Kleven, Landais, and Søgaard (2019). It slightly improves on it by: (i) using more restrictive comparison groups and (ii) incorporating insights from the recent difference-in-difference literature (see de Chaisemartin and D'Haultfœuille, 2020; Callaway and Sant'Anna, 2021; Goodman-Bacon, 2021; Sun and Abraham, 2021). To assess the benefits of each of these improvements, I compare my results with those obtained (i) using Kleven, Landais, and Søgaard (2019)'s approach; and (ii) using more restrictive control groups, without taking into account the corrections proposed by the recent difference-in-difference literature regarding bias that arises from treatment effect heterogeneity.

Event-study regression To replicate Kleven, Landais, and Søgaard (2019)'s event-study approach, I restrict to a balanced panel of hospital nurses who are observed from ten years before to ten years after their first child. In this subsample, I estimate:

$$Y_{it} = \sum_{s \neq -2} \alpha_s \mathbb{1}\{t = C_i + s\} + \sum_a \beta_a \mathbb{1}\{t = a - A_i\} + \sum_b \gamma_b \mathbb{1}\{t = b - B_i\} + \mu_t + \nu_{it} \quad (13)$$

where Y_{it} represents hospital nurse i's hours worked during year t, measured relative to the point when she took her first hospital nurse job, C_i represents the year during which her first child is born, A_i represents the age at which she took her first hospital nurse job, and B_i represents the calendar year during which she took her first hospital nurse job. Coefficients α_s represent the effect of motherhood s years apart from the first child's birth, while coefficients β_a represent lifecycle trends in terms of age, γ_b represent time trends such as the business cycle or policy changes, and μ_t represent lifecycle trends in terms of hospital nurse experience. The inclusion of this last trend is a slight difference with Kleven, Landais, and Søgaard (2019). It is motivated by the fact that while their paper considers all women, inclusion in the population of interest is conditional on being a hospital nurse at some point in time.

Two-way fixed effects models Kleven, Landais, and Søgaard (2019) control for lifecycle and calendar trends that are common to all hospital nurses regardless

of the moment when they took their first hospital nurse job or their birth-cohort. In order to restrict the identifying comparisons to hospital nurses who took their first job at the same time and at the same age, I consider the following regression:

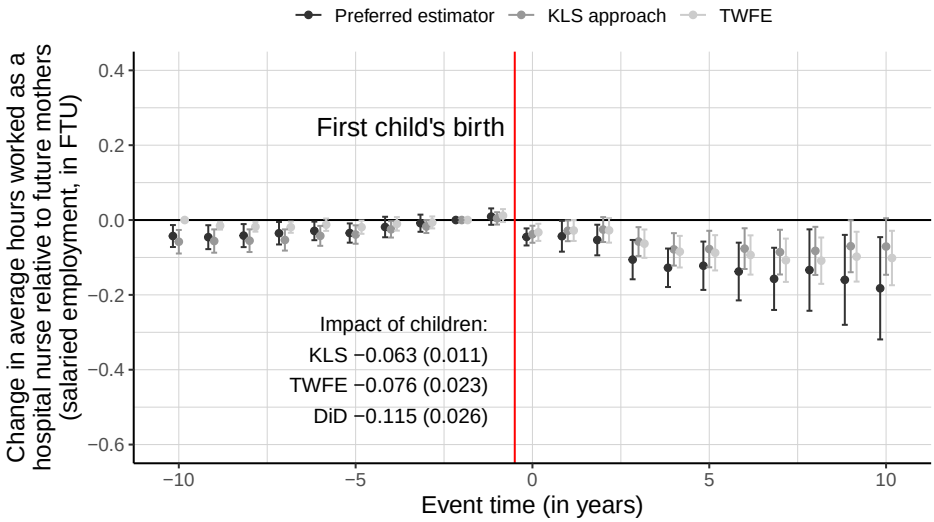
$$Y_{it} = \sum_{s \notin \{-10,-2\}} \alpha_s \mathbb{1}\{t = C_i + s\} + \lambda_i + \mu_{A_i,B_i,t} + \nu_{it} \tag{14}$$

with the same notations as above. Here, λ_i represent individual fixed-effects, and $\mu_{a,b,t}$ represent lifecycle trends that are specific to a cohort defined by taking the first job as a hospital nurse at the same age, during the same calendar year. With respect to regression 13, one more α_s coefficient has to be omitted due to colinearity issues (see Borusyak, Jaravel, and Spiess, 2024, Proposition 1). The $\mu_{a,b,t}$ coefficients encompass all lifecycle and calendar year trends in a more flexible way than regression 13. As a result, it corresponds exactly to the choice to restrict the identifying comparisons to comparisons across hospital nurses of the same birth-cohort who took their first hospital nurse job at the same point, but had their first child at different points in time. I estimate this regression in the exact same sample as I do for my baseline results. In the end, the only difference with my preferred approach is that it makes the additional implicit assumption that average treatment effects are homogeneous across cohorts defined by the arrival of children. When this assumption does not hold, this regression can yield severely biased estimates of average treatment effects, as de Chaisemartin and D'Haultfœuille (2020); Callaway and Sant'Anna (2021); Goodman-Bacon (2021); Sun and Abraham (2021) demonstrate.

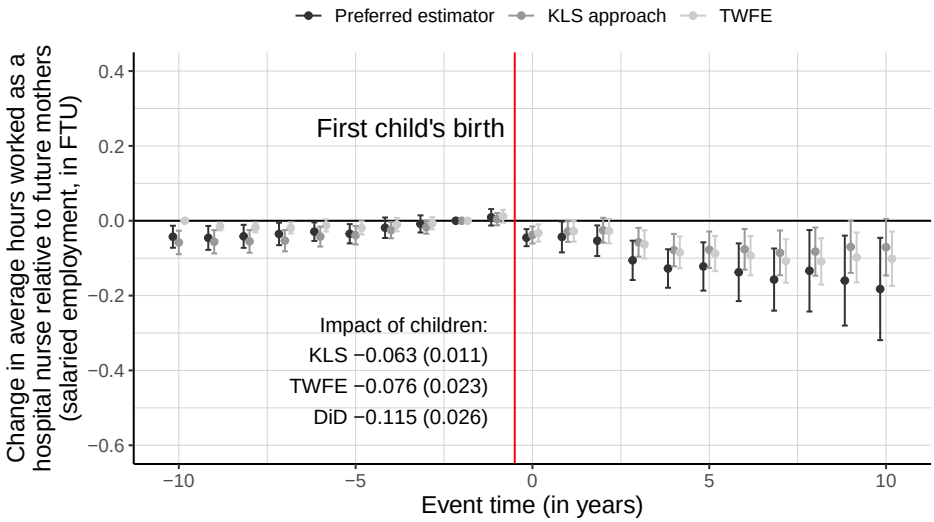
Figure E.1 displays the estimated average treatment effects based on these approaches, plus my preferred estimator, for two outcomes: (a) hours worked as a hospital nurse; and (b) hours worked over all salaried jobs. The main lesson of this exercise is that Kleven, Landais, and Søgaard (2019)'s approach and the more restrictive TWFE model yield very similar results: the benefit of more restrictive comparison sets and more flexible lifecycle trends seems minimal. However, both yield results that appear much more optimistic than my baseline results regarding the negative effect of motherhood on hospital nurses' labor supply. This indicates that the bias that can arise from the implicit treatment effects homogeneity upon which these approaches rely can be sizable.

Figure E.1 – Event-study estimates of the impact of children on mothers' labor supply: comparisons across estimators

(a) Hours worked as a hospital nurse



(b) Hours worked over all salaried jobs



Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse, and hours worked over all salaried jobs, in full-time units, by time since first child's birth. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (as a salaried employee), but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level.
Source. Insee, DADS-EDP panel.

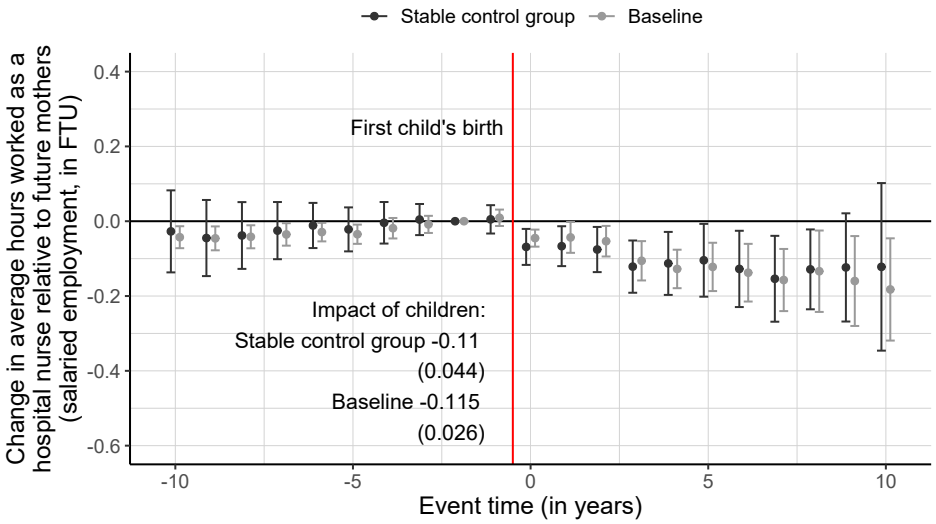
E.2 Stable control group

To assess whether the dynamics of the treatment effects is driven by the fact that the control group changes over time relative to the first child's birth, I replicate my analysis, this time restricting the control group to nurses who have their first child at least 14 years after they got their first nurse job at a hospital, and restricting the treated group to nurses who have their first child at most 13 years after their first job. Additionally, the data are restricted to the 13 years that follow the first hospital nurse job. This approach is akin to more traditional difference-in-difference approaches in which units do not switch from one group to the other over time.

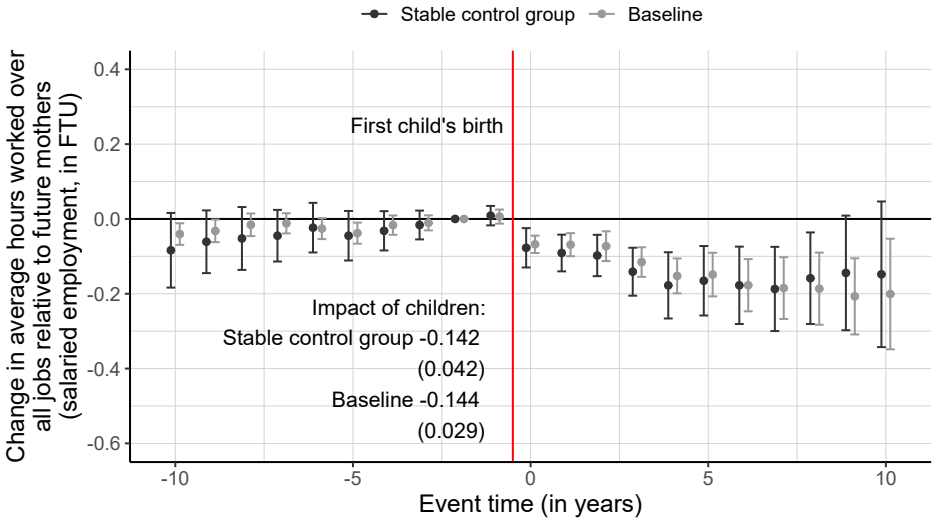
Figure E.2 displays the resulting event-study estimates for (a) hours worked as a hospital nurse; and (b) hours worked over all salaried jobs. They are very close to my baseline estimates. This implies in particular that before childbirth, trends in hours worked are very similar across cohorts. Figure E.3 displays the corresponding counterfactual lifecycle profiles. Given the similarity between the event-study estimates, these counterfactual profiles are almost identical to the ones that result from my baseline estimates.

Figure E.2 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals and hours worked over all salaried jobs – stable control group

(a) Hours worked as a hospital nurse



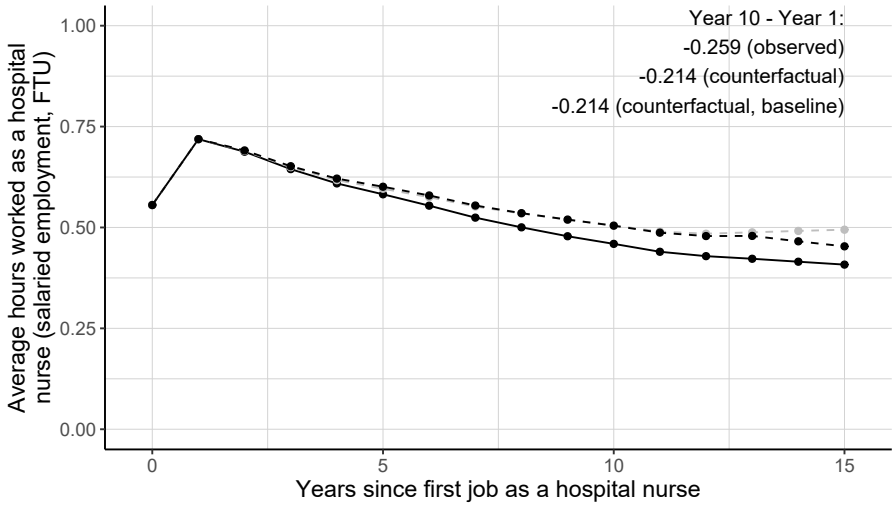
(b) Hours worked over all jobs



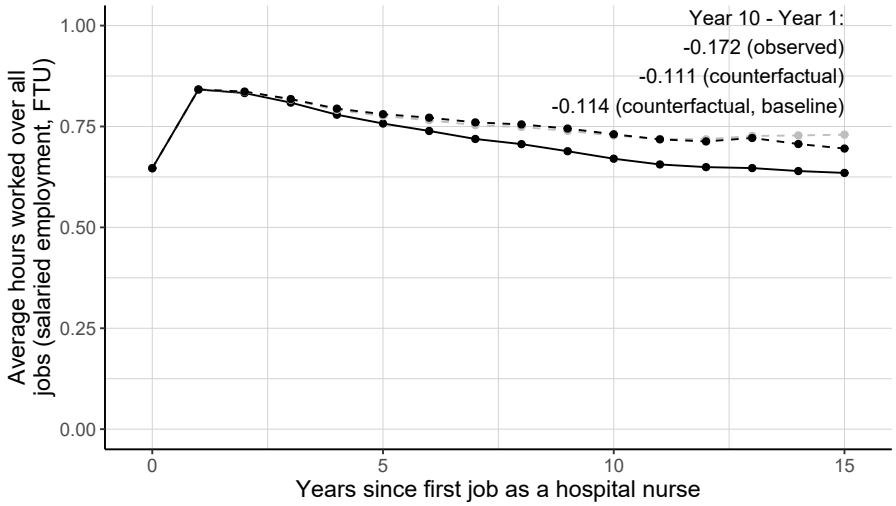
Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Figure E.3 – Contribution of children to the lifecycle profile of nurses' labor supply: nursing labor supplied to hospitals and hours worked over all salaried jobs – stable control group

(a) Hours worked as a hospital nurse



(b) Hours worked over all jobs



Realized and counterfactual average hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units by time relative to the first qualified healthcare worker job at a hospital. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). The counterfactual profile implied by the baseline event-study estimates appears in grey dashed lines.

Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

Source. Insee, DADS-EDP panel.

E.3 Childless control group

Female hospital nurses who choose to remain without children are another potential control group for mothers, in addition to female hospital nurses who are to have children later on which the core of the paper rely. However, relying on this control group may be less credible than relying on future mothers, because endogenous selection into motherhood is likely to be even more severe than selection into the timing of the first child's birth. Additionally, the identifying assumptions when using childless women as a control group imply that future mothers are a good control group. Indeed, these identifying assumptions state that: (i) all cohorts of mothers would move in parallel with childless women if they did not have children; and (ii) the impact of children is 0 before they are born. This implies in particular that all cohorts of mothers would move in parallel with each other absent children, which is precisely the parallel trends assumption upon which my approach is based, and the limited anticipation assumption is the same. In other words, the identifying assumptions required for identification based on mothers vs. childless women comparisons imply the identifying assumptions made in the core of the paper, but the reverse is not true.

To clarify the differences between these two approaches, Figures E.4 and E.6 display event-study estimates regarding (a) hours worked as a hospital nurse and (b) hours worked over all salaried jobs. Figure E.4 compares my baseline estimates with those obtained using only mothers vs. childless women comparisons to identify the impact of motherhood, whereas Figure E.6 considers an estimator that is based on both mothers vs. chidless women and mothers vs. future mothers comparisons. Figure E.5 and E.7 display the corresponding counterfactual lifecycle profiles.

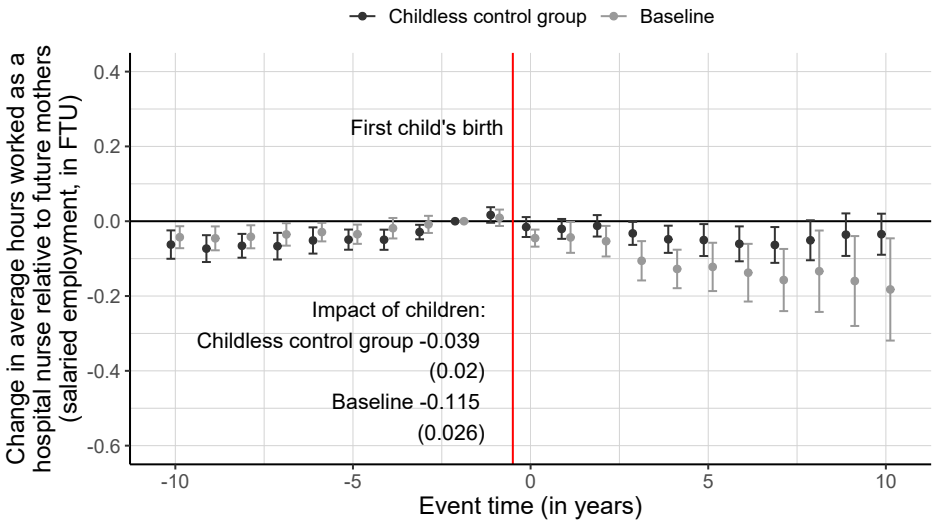
The main lesson is that in both cases, the implied impact of motherhood on hospital nurses labor supply is negative, but much less pronounced that what my baseline estimates suggest. When only childless women are used as a control group, the impact on hours worked as a hospital nurse is divided by three, and the impact on hours worked over all salaried jobs divided by two with respect to my preferred estimator. The difference mainly shows in the long-run, even though it is already present in the short run. However, at least when it comes to hours worked as a hospital nurse, the pre-trends are less successfully controlled, which suggest that non-mothers are less convincing as a control group than future mothers are.

When both childless women and future mothers are used as a control group,

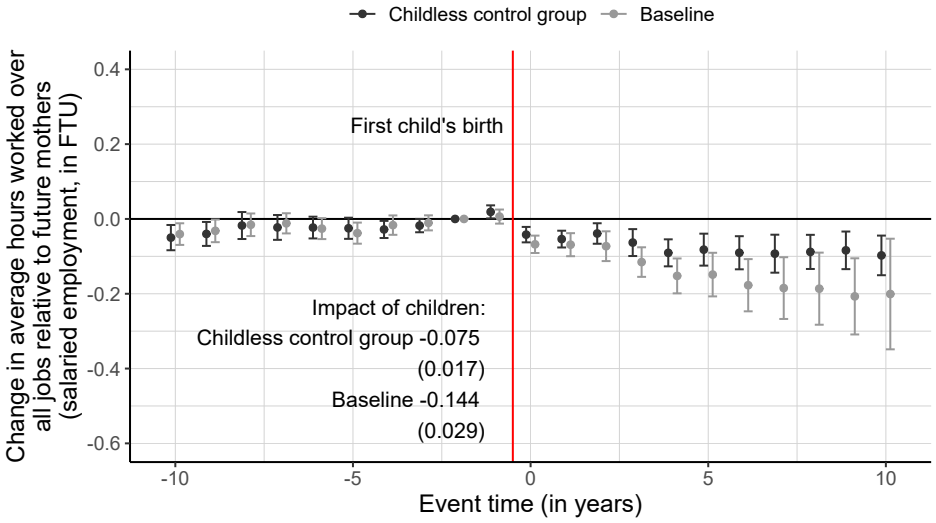
the results stand in between my baseline estimates and those obtained when only relying on childless women for identification, but are much more close to those obtained in the second case. The reason for that is that long-run effects are mostly driven by mothers vs. childless women comparisons. Indeed, identifying long-run effects using mothers vs. future mothers comparisons requires otherwise comparable mothers to have children at very different points in time: effects ten years after the arrival of children compares women who became mothers at least 12 years apart from one another. Such a difference is not that frequent in the data, whereas within a cohort defined by the beginning of a hospital nurse career, the number of childless women who can contribute to the identification of the impact of motherhood does not decrease as long run effects are considered.

Figure E.4 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals and hours worked over all salaried jobs – childless women control group

(a) Hours worked as a hospital nurse



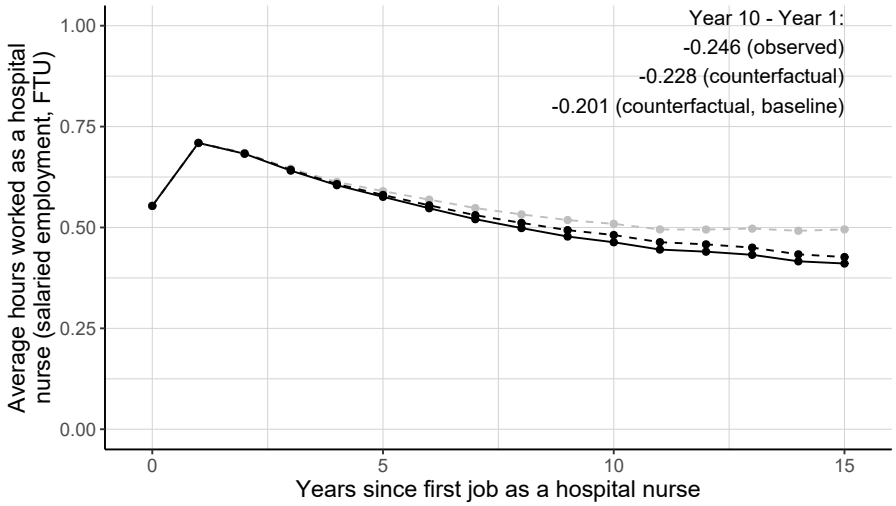
(b) Hours worked over all jobs



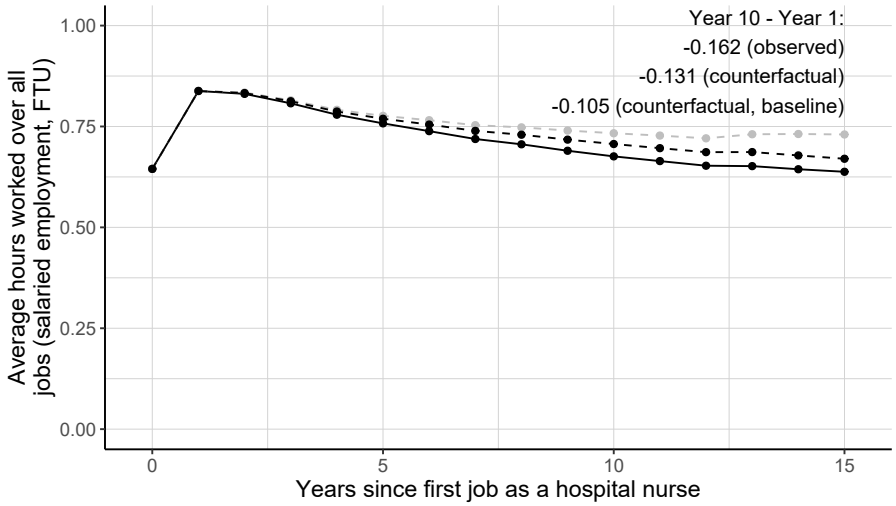
Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Figure E.5 – Contribution of children to the lifecycle profile of nurses' labor supply: nursing labor supplied to hospitals and hours worked over all salaried jobs – childless women control group

(a) Hours worked as a hospital nurse



(b) Hours worked over all jobs



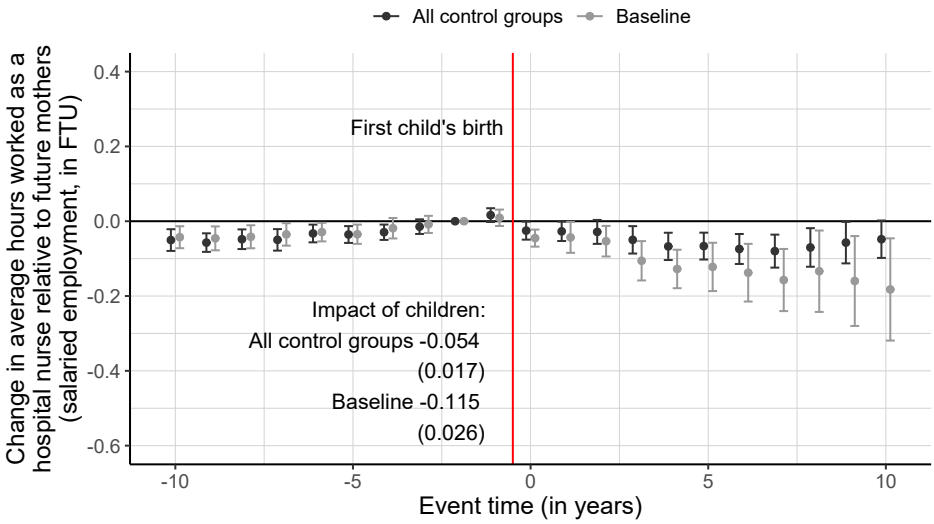
Realized and counterfactual average hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units by time relative to the first qualified healthcare worker job at a hospital. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). The counterfactual profile implied by the baseline event-study estimates appears in grey dashed lines.

Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

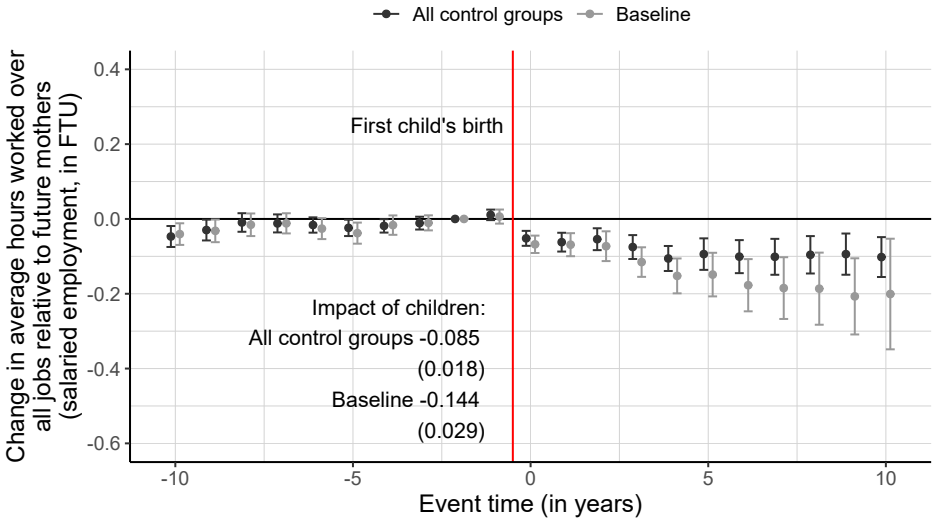
Source. Insee, DADS-EDP panel.

Figure E.6 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals and hours worked over all salaried jobs – future mothers and childless women control group

(a) Hours worked as a hospital nurse



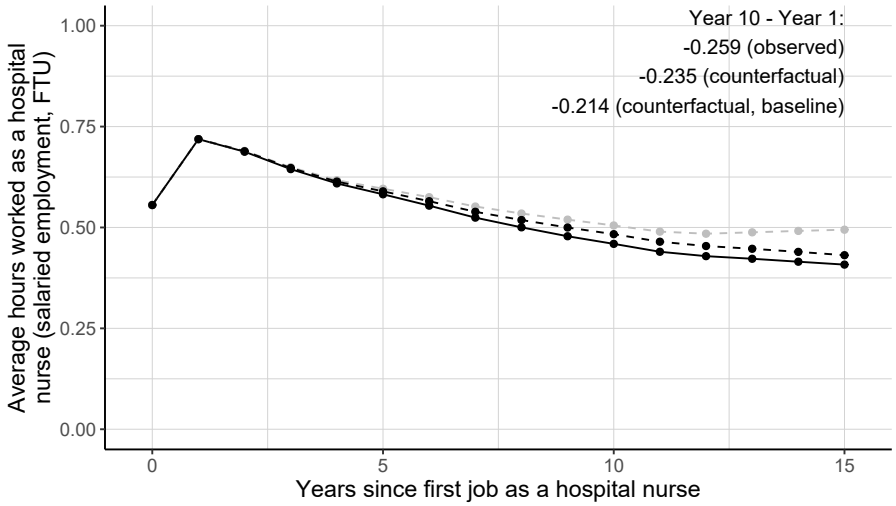
(b) Hours worked over all jobs



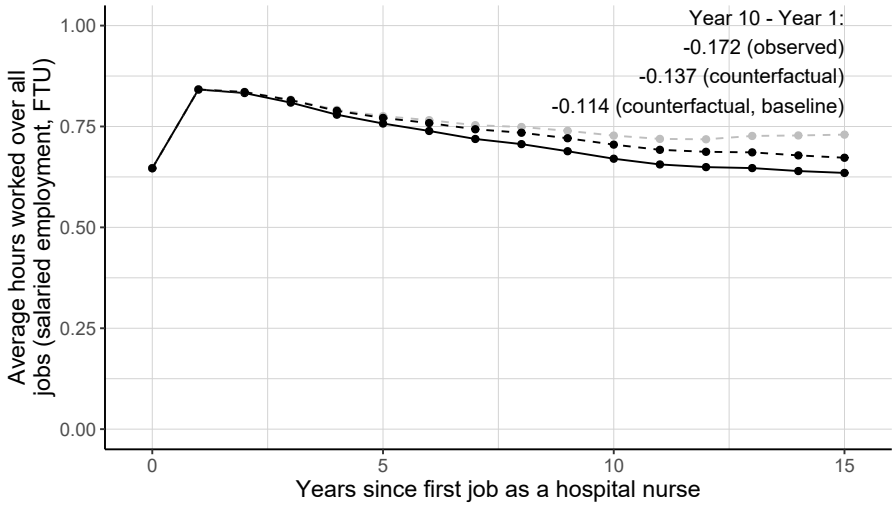
Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Figure E.7 – Contribution of children to the lifecycle profile of nurses' labor supply: nursing labor supplied to hospitals and hours worked over all salaried jobs – future mothers and childless women control group

(a) Hours worked as a hospital nurse



(b) Hours worked over all jobs



Realized and counterfactual average hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units by time relative to the first qualified healthcare worker job at a hospital. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). The counterfactual profile implied by the baseline event-study estimates appears in grey dashed lines.

Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

Source. Insee, DADS-EDP panel.

F Additional results

F.1 Lifecycle profiles: overtime work

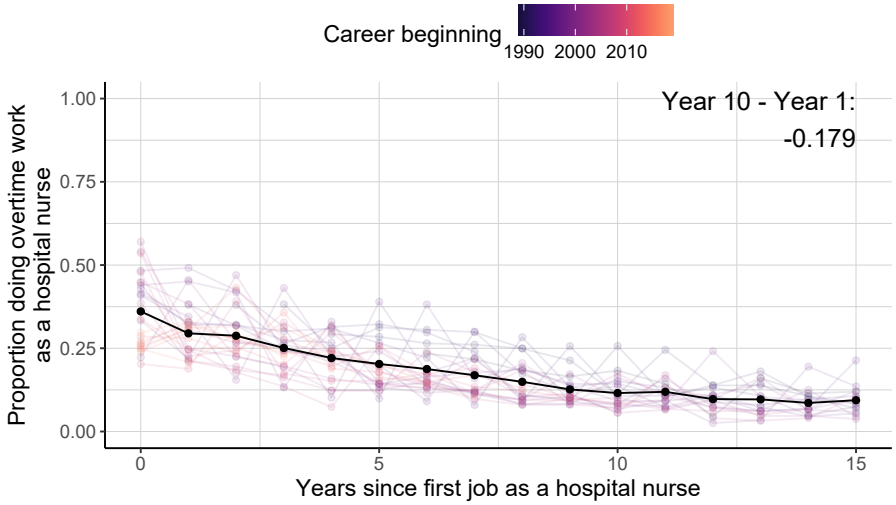
The main outcome chosen in the paper, that is hours measured in full-time units, caps hours to 1 full-time units for all full-time workers working over an entire year. As such, it omits overtime as a potentially relevant labor supply margin. Figure F.1 displays lifecycle profiles aimed at investigating whether hospital nurses work overtime hours: (a) the share working overtime hours as a hospital nurse; and (b) average overtime hours worked as a hospital nurse. This measures are not conditional, neither on working as a hospital nurse nor on working overtime hours. Data regarding overtime hours is only available from 1995 on.

Figure F.1 makes it clear that working overtime hours is relatively common among hospital nurses in France. Indeed, the share doing so amounts to 36% as they begin their careers. Ten years later, this share is 12%. Given that at this point, only 54% of them still hold a hospital nurse position, this implies that among those still working as a hospital nurse, the share working overtime hours is 22%.

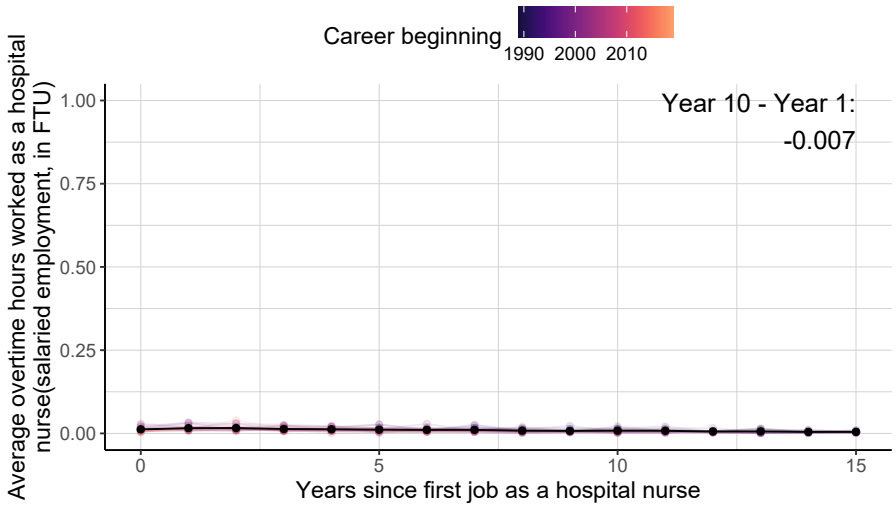
However, overtime hours only represent a small fraction of nursing labor supplied to hospitals. Indeed, the unconditional average is roughly constant, about 0.01 full-time unit over the first ten years of a career. This implies that the average conditional on being a being a hospital nurse who works overtime is 0.044 full-time units at the beginning of a career, and increases up to 0.07 full-time units ten years later. When the full-time basis amounts to 1820 hours a year, this represents 130 overtime hours per year, or slightly less than three hours per week.

Figure F.1 – Lifecycle profile of hospital nurses' labor supply: overtime hours worked

(a) Share working overtime hours as a hospital nurse



(b) Overtime hours worked as a hospital nurse



Share working overtime hours as a hospital nurse, and average overtime hours worked as a hospital nurse, in full-time units, by time relative to the first qualified healthcare worker job at a hospital. Working overtime hours is not conditional on holding a hospital nurse position, but incorporate the participation margin. Overtime hours worked are not conditional neither on holding a hospital nurse position nor on working overtime hours, but incorporate both participation margins (0 overtime hours worked).

Note. Data are not available before year 1995. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.

Source. Insee, DADS panel.

F.2 Children-related labor supply decisions: additional labor supply margins

F.2.1 Overtime work

Hours worked, as measured in full-time units, does not include overtime because this measure is capped to 1 for full-time workers. As such, if some nurses choose to keep their full-time jobs, but cut their overtime hours upon becoming mothers, then my estimates of the magnitude of children-related labor supply decisions will underestimate how important these adjustments are. To investigate this issue, Figure F.2 displays event-study estimates of the impact of motherhood on (a) the probability of being a hospital nurse who works overtime hours; and (b) average overtime hours.

These estimates imply that having children decreases the probability of working overtime hours as a hospital nurse by 11 percentage points over the first ten years after the first child is born. This estimate is not conditional on working as a hospital nurse. However, motherhood has virtually no impact on the share of hospital nurses who keep on working as hospital nurses (see Section 6). As a result, the conditional effect would be the same. Compared to a counterfactual baseline of 24%, this represents a substantial drop.

Figure F.2 shows that the impact of motherhood on unconditional average overtime hours amounts to a 0.01 full-time unit drop, against a counterfactual baseline of 0.02 full-time unit. The estimated effect is significant at usual confidence levels. Because this effect is unconditional, it mixes up the extensive margin, that is hospital nurses no longer working overtime hours, and the intensive margin, that is hospital nurses decreasing their overtime hours while still working overtime hours.

On the one hand, if only the extensive margin were at play, then the average counterfactual overtime hours worked by hospital nurses who do not work overtime hours anymore would amount to 0.1 (0.01 / 0.11) full-time units, slightly more than 3 overtime hours worked per week, which is not very different from the average conditional overtime hours worked by all hospital nurses. On the other hand, another reasonable assumption would be that the counterfactual conditional average is the same across those who make decisions at the extensive margin and other hospital nurses who persist doing overtime work. The conditional counterfactual average is 0.08 (0.02 / 0.24), which is about 3 overtime hours worked per week. Because 11% of hospital nursez make overtime decisions at the extensive margin,

this implies that the extensive margin generates a 0.01 (0.08 × 0.11) full-time units decrease, which almost matches the estimated unconditional effect. The rest of the effect would correspond to a 0.03 full-time units decrease at the intensive margin (0.005 / (0.24 - 0.11)), which corresponds to 1 overtime hour worked per week.

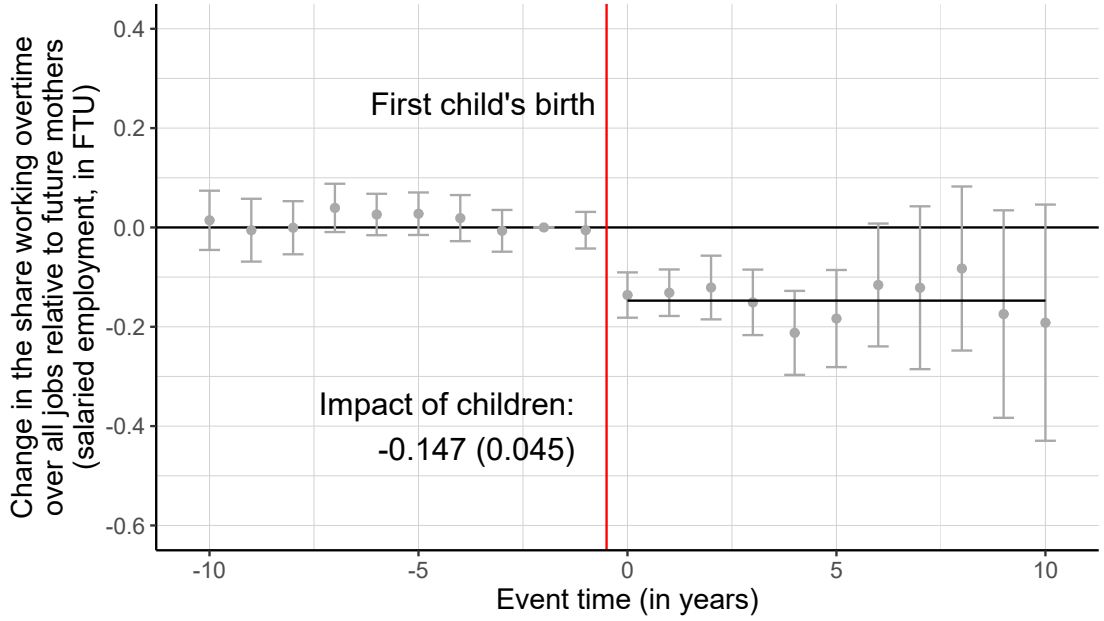
In the end these results show that hospital nurses do make children-related decisions regarding overtime hours. However, the implied changes in hours worked remain small before those generated by decisions along the full-time vs. part-time margin. For this reason, incorporating overtime hours worked in my measure of nursing labor supplied to hospitals would not make much difference.

Hourly wages Additionally, nursing in the hospital sector is characterized by particularly salient constraints regarding working time: because healthcare has to be provided continuously, shift work is a common working time arrangement, which is not always sufficient to prevent unforeseeable planning changes. As a result, hospital nurses may be prone to turn to jobs that are less exposed to these time constraints, and offer better work-family conciliation upon becoming mothers. This margin would not appear in hours worked changes measured in full-time units, as it involves other dimensions of working time, such as effort or flexibility

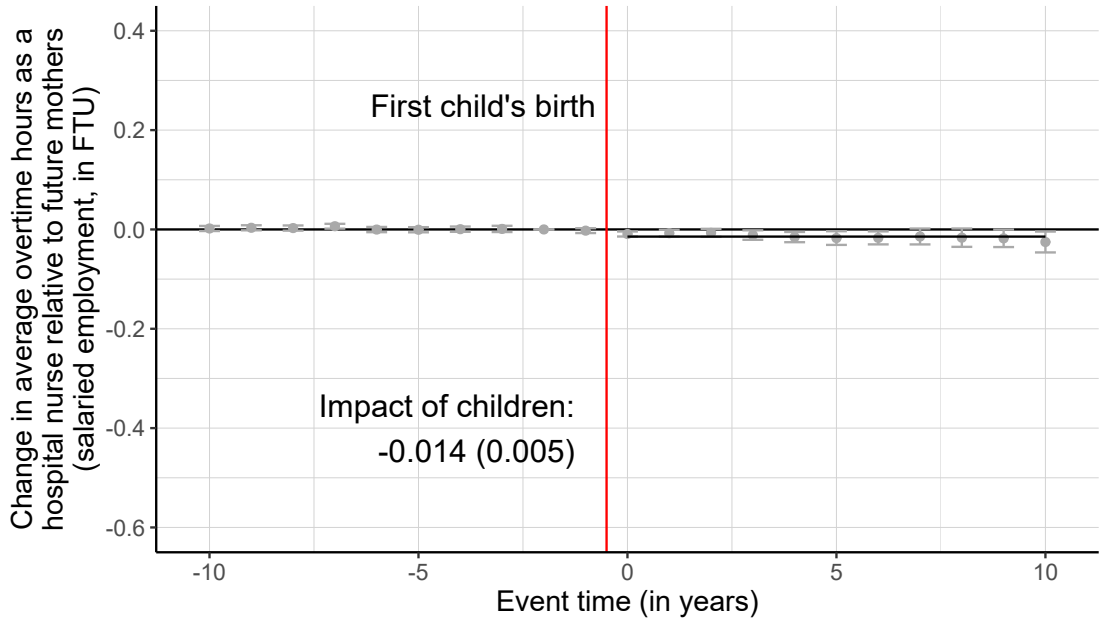
To investigate this possibility, in Figure F.3 I replicate my event-study analysis, focusing on hourly wages. The rationale for this choice is that pay is extremely rigid, especially in the public sector where the baseline wage rate is almost uniformly set as a function of tenure. As a result, conditional on tenure individual differences in hourly wages are almost entirely driven by difference in (i) hours worked, as overtime hours are paid higher than other hours; and (ii) various premiums and bonuses that are tightly linked to the work setting, e.g. shift work or night work. As such, children-related changes in motherhood would be indicative of changes in working conditions, through a compensating differential mechanism. I find that the effect of children on the wage rate is a quite precisely estimated 0 (the baseline wage rate being around €15), except for the very short run. As a result, the compensating differentials that such adjustments would involve do not seem to be at play.

Figure F.2 – Event-study estimates of the impact of children on mothers' labor outcomes: overtime hours worked as a hospital nurse

(a) Share working overtime hours as a hospital nurse



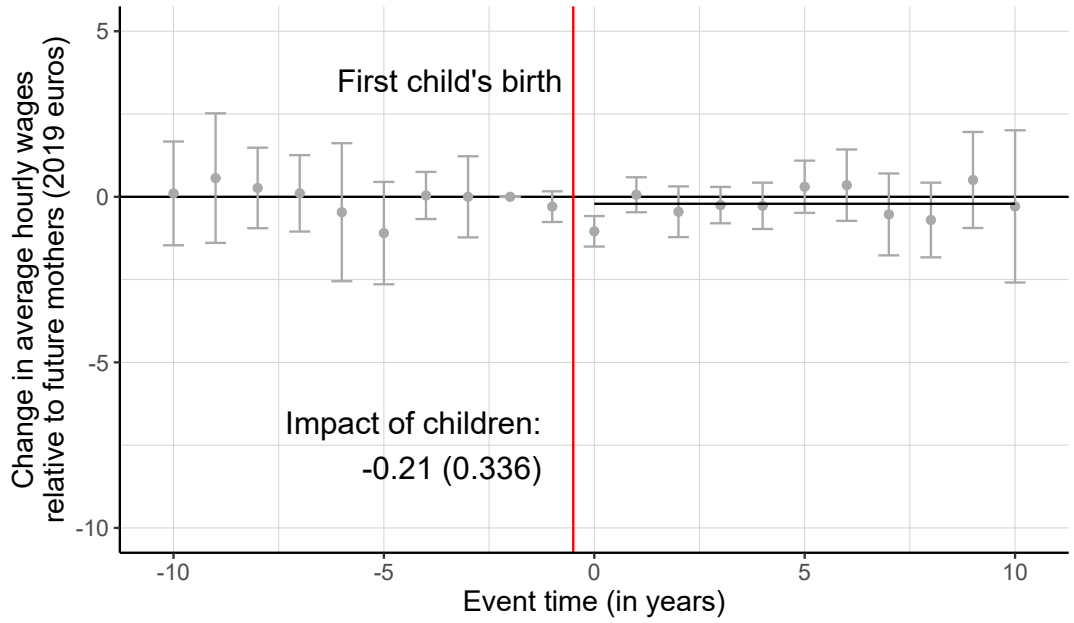
(b) Overtime hours worked as a hospital nurse



Event-study estimates of the impact of children on the share working overtime hours as a hospital nurse, and average overtime hours worked as a hospital nurse, by time relative to the first child's birth. Working overtime hours is not conditional on holding a hospital nurse position, but incorporate the participation margin. Overtime hours worked are not conditional neither on holding a hospital nurse position nor on working overtime hours, but incorporate both participation margins (0 overtime hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

Source. Insee, DADS-EDP panel.

Figure F.3 – Event-study estimates of the impact of children on mothers' labor outcomes: hourly wages

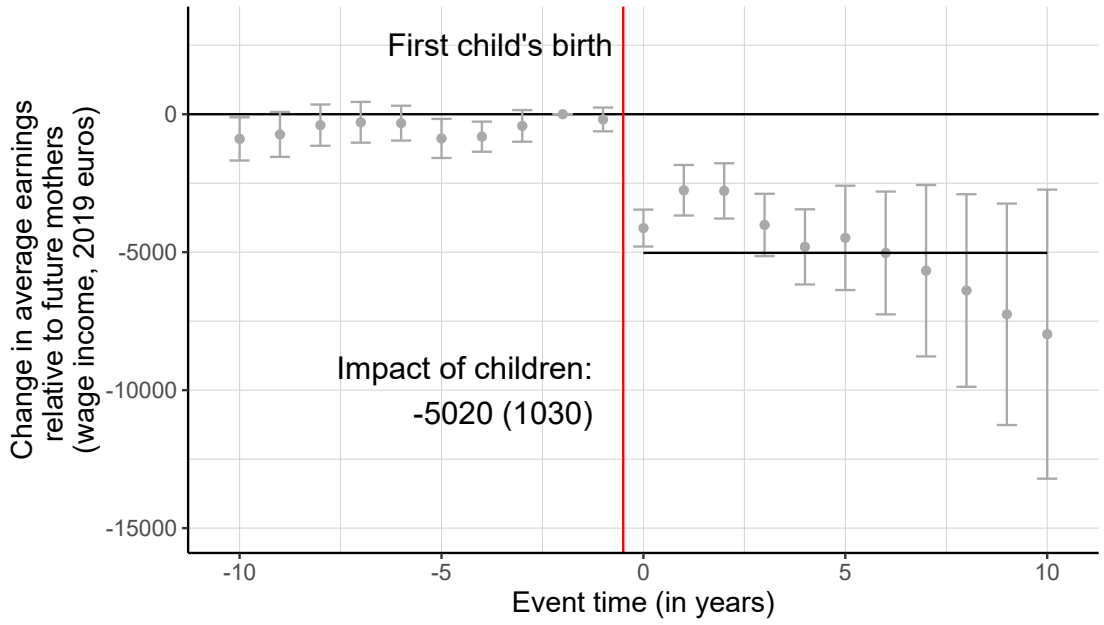


Event-study estimates of the impact of children on mothers' hourly wages, by time since the first child's birth. Average hourly wages are conditional on salaried employment. Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Labor earnings How do these multiple children-related decisions translate in terms of labor earnings? Figure F.4 answers this question by displaying event-study estimates of the impact of motherhood on hospital nurses salaried earnings. While earnings from the freelance sector is omitted from this measure, the fact that motherhood does not translate into more participation to the freelance sector, at least at the extensive margin suggests that this is a fair measure of the overall impact of motherhood on labor earnings.

The estimated effects suggest that having children results in an average €5,000 loss in labor earnings, with respect to a baseline counterfactual average of €25,000. As the rest of the paper shows, this drop is entirely driven by a decrease in hours worked, as opposed to transitions to nonemployment or a drop in the wage rate.

Figure F.4 – Event-study estimates of the impact of children on mothers' labor outcomes: labor earnings



Event-study estimates of the impact of children on mothers' salaried labor earnings, by time since first child's birth. Salaried earnings are not conditional on salaried employment but incorporate the participation margin (€0). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

F.3 Children-related labor supply: comparison between the extensive and intensive margins of fertility decisions

My approach that is based on the child penalty framework of Kleven, Landais, and Søgaard (2019) identifies the causal effect of motherhood on mother's labor outcomes. However, this causal effect mixes up the consequences of two interventions: (i) becoming a mother, as opposed to remaining childless, which correspond to the extensive margin of fertility decisions; and (ii) having additional children for women who are with child, which is the intensive margin of fertility decision. Because they are not conditional on subsequent fertility decisions, my estimates of the impact of motherhood will therefore incorporate the causal effect of both margins. Specifically, the short-run effect of motherhood are likely to reflect the short-run consequences of the extensive margin, because it is uncommon to have additional children the very year one's firt child is born. By contrast, my long-run estimates will mix up (i) the long-run consequences of the extensive margin and (ii) the short-run effect of the intensive margin, with weights that depend on the timing and frequency of subsequent childbirths. This is especially true in this context, in which most mothers choose to have more than one child.

To gain further insights into this issue, I replicate my event-study analysis (a) only relying on observations related to mothers of one or mothers of additional children *at least two years before their second child is born*; and (b) considering the second child's birth instead of the first child's birth as my event of interest *and* only relying on observations related to mothers of two or mothers of additional children *at least two years before their third child is born*. Under parallel trends and limited anticipation assumptions very similar to Assumptions 1 and 2,[33] this allows to distinguish between (a) the dynamic effect of the first child and (b) the dynamic effect of having one additional child (i.e. the second child), i.e. the dynamic effect of (a) the extensive and (b) the intensive margin of fertility, without contamination from subsequent fertility decisions. The interpretation of these estimates is however complicated by the fact that fertility may also be affected by the labor market effects following the first birth.

Figures F.5 and F.6 display the resulting estimates, for hours worked as a hos-

[33]Specifically, I assume that (i) mothers that are to have a second child are a good comparison group for those who just had their second child and (ii) the second and the third child have no effect on their mother's labor supply up until one year before they are born.

pital nurse and hours worked over all jobs respectively. While they may be slightly less precise than the baseline estimates, because they rely on less observations, they are still informative to some extent.

As for hours worked as a hospital nurse, Figure F.5 suggest that the impact of having one additional child is the same as the impact of becoming a mother. By contrast, Figure F.6 shows that while both margins seem to have somewhat similar short-run effects when it comes to hours worked over all salaried jobs, the impact of having one additional child is quite short-lived. In other words, the impact of the second child seems to vanish after a few years, whereas the impact of the first one is long-lasting. Moreover, the magnitude of the impact of the first child is not very different from that of my baseline estimates that mix up all margins. This also implies that while the impact of becoming a mother has little to do with hospital nurses transitioning from hospital nurses jobs to other salaried jobs, it might be the case when it comes to having a second child.

This suggests that when it comes to hours worked over all jobs, my baseline results are mostly driven by the long-run consequences of fertility decisions at the extensive margin, i.e. the decisions to become a mother, rather than the short-run consequences of fertility decisions at the intensive margin, i.e. the decision to have one additional child among women who are already with child. These results are also, to some extent, informative about the origins of such labor supply decisions. Indeed, if these decisions were purely the result of children-related time constraint, as opposed to norms and preferences, one would expect the dynamic path of the effect of the first child to be very similar to that of the second child, because conditional on their age, the needs of children should not be strongly dependent on their rank among their siblings. That they do really differ therefore seems to indicate either (i) large returns to scale in the children production function or (ii) that motherhood-related time allocation decisions involve gender norms and preferences.

F.4 Paid parental leave policy reforms

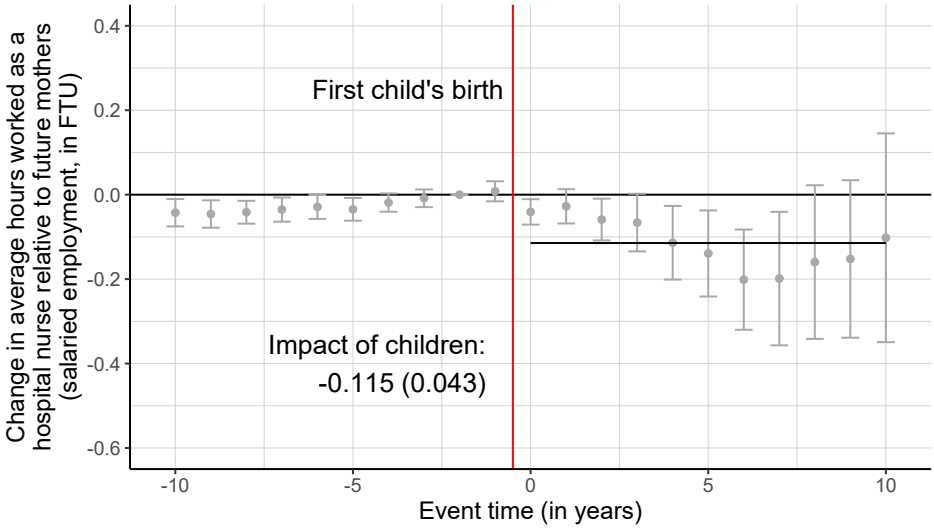
To investigate the contribution of parental leave policy reforms to the children-related labor supply decisions of hospital nurses, I consider, for each female hospital nurse with children, whether she continuously work full-time over the first three years with her first (second) child. I regress this individual-level quantity on a full set of dummies that cover possible years of birth for her children, given that the paid parental leave reforms that took place in 1994, 2004 and 2015 affected parents differently depending on the calendar year of birth of their children: parents whose first child was born on January, 1st 2004 were eligible for paid parental leave, whereas those whose first child was born on December, 31st 2003 were not. My measure of potentially parental-leave related labor supply decision incorporates both the decision to leave salaried employment and to work part-time, given that part-time options have always been available when it comes to French paid parental leave policies.

Figure F.7 display my estimates. While they are quite noisy, and the statistical uncertainty is substantial, they do not feature breaks around the extensions of paid parental leave policies. Even though additional data are needed to be fully conclusive, this suggest that the impact of these parental leave policies on hospital nurses labor supply remains limited at best.

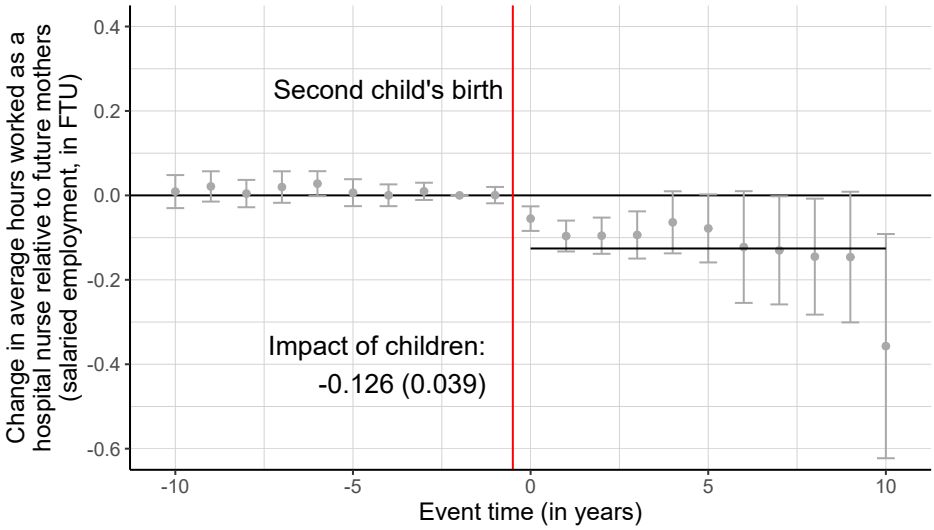
This stands in contrast with recent evidence from Denmark, displayed in Friedrich and Hackmann (2021), who show Danish nurses' labor supply to have substantially decreased due to parental leave policy reforms. The explanation might be that the generosity of the Danish policy was much higher than that of the French setting. Indeed, the Danish parental leave reform they examined offered about 75% of previous wages. By contrast, the French policy offers about €200 a month for part-time options, and €400 a month for the full-time option. By contrast, my estimates suggest that throughout the time-period under scrutiny, average hourly wages for hospital nurses were about €15, so that the decision of moving from full-time to part-time on a 50% corresponds to a €14,000 ($15 \times 1820 \times 0.5$) loss in annual labor earnings, or €1,100 per month, and leaving employment altogether represents a €27,000 annual earnings loss, or €2,300 per month. As a result, making such decisions for a €200 or €400 monthly allowance requires a large preference for child-rearing activities and leisure.

Figure F.5 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals, by fertility margin

(a) Extensive margin (first child)



(b) Intensive margin (second child)

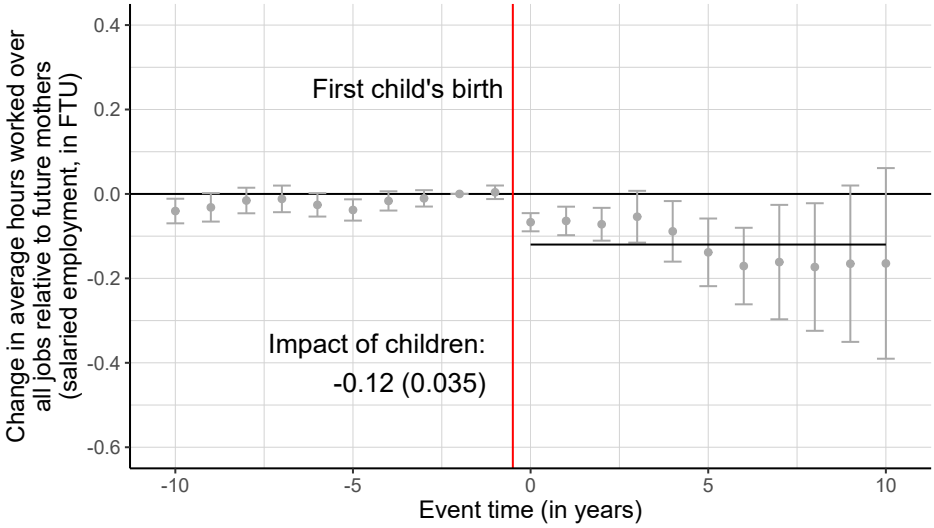


Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse, in full-time units, by time since first child's birth. Hours worked as a hospital nurse are not conditional on working as a hospital nurse, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

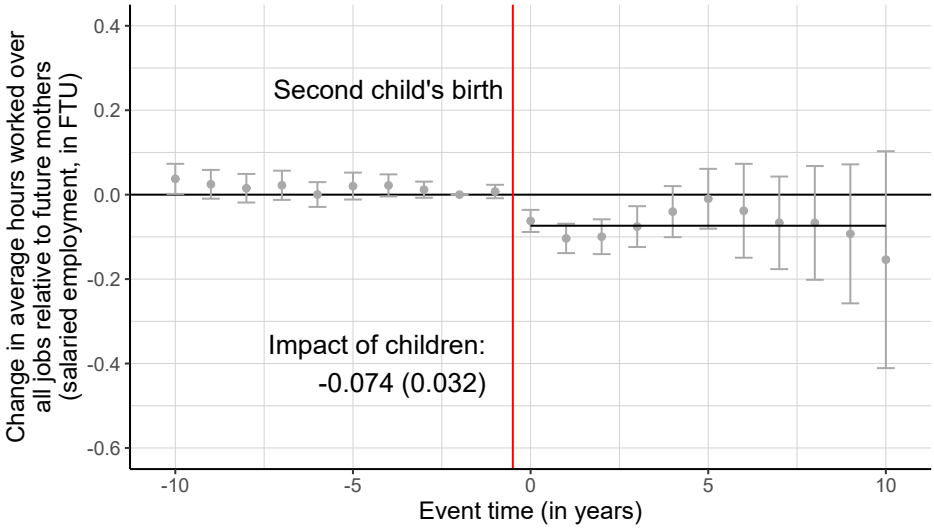
Source. Insee, DADS-EDP panel.

Figure F.6 – Event-study estimates of the impact of children on mothers' labor supply: total labor supply in the salaried sector, by fertility margin

(a) Extensive margin (first child)

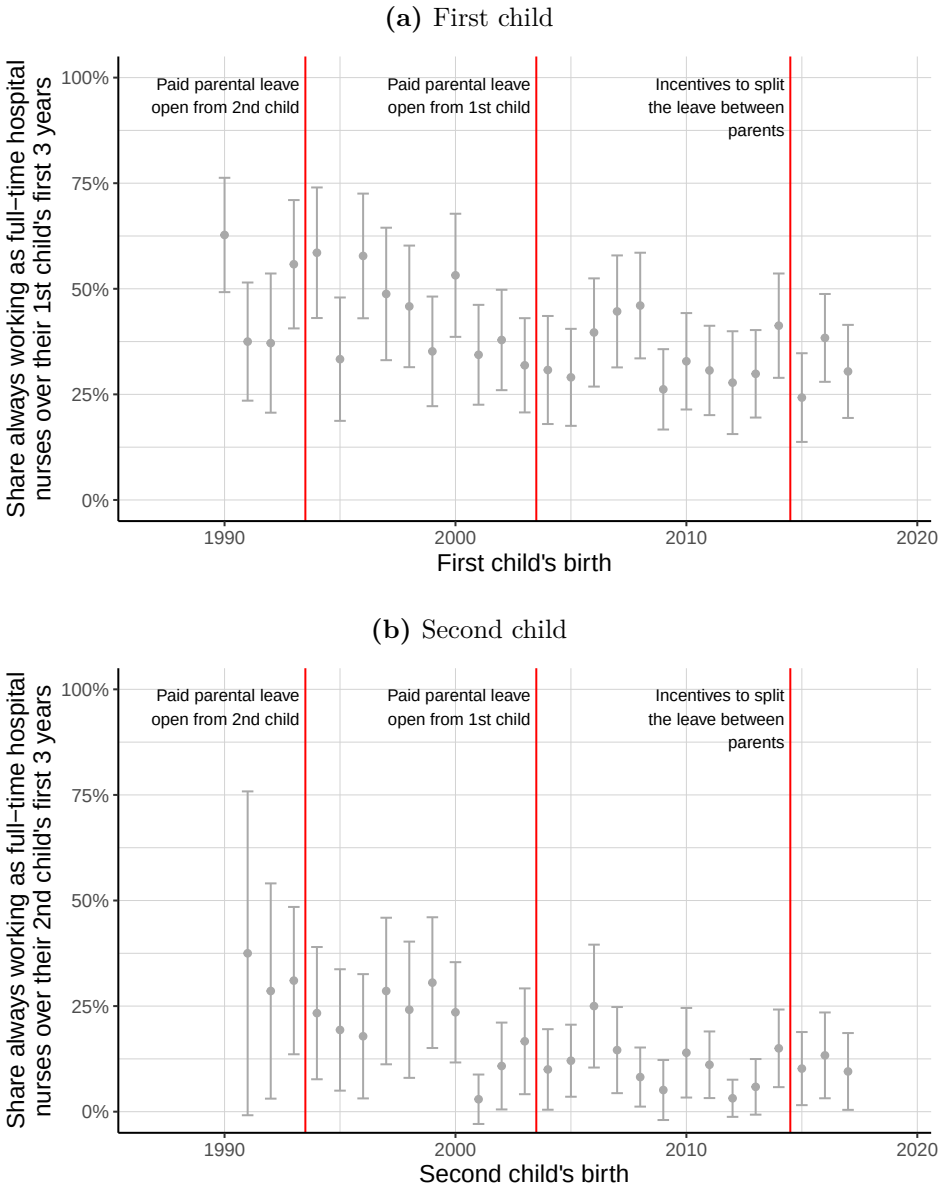


(b) Intensive margin (second child)



Event-study estimates of the impact of children on mothers' hours worked in the salaried sector, in full-time units, by time since first child's birth. Hours worked are not conditional on salaried employment, but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Figure F.7 – Share of hospital nurses with at least one part-time work or non-employment episode over the first three years with children: time-series



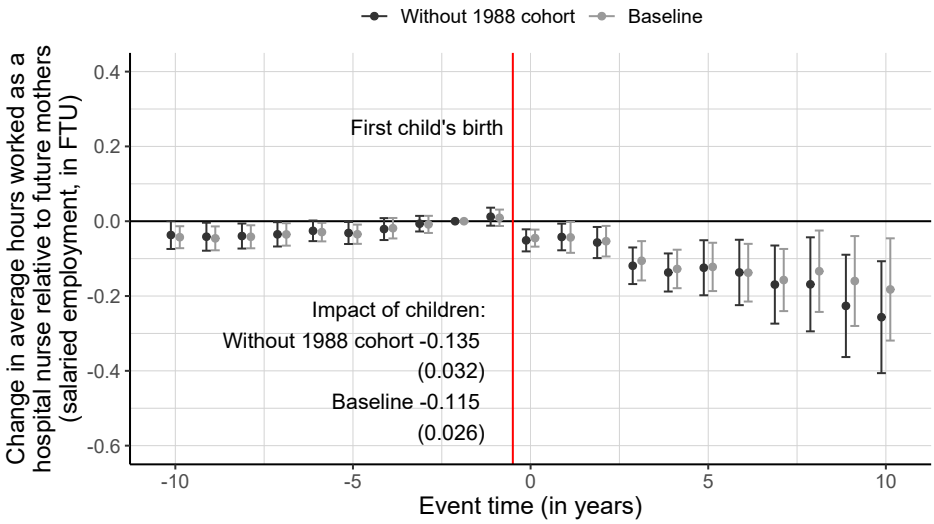
Share of female hospital nurses with children who work continuously full-time as hospital nurses over the first three years with children, by year of birth of their children.
Source. Insee, DADS-EDP panel.

G Robustness checks

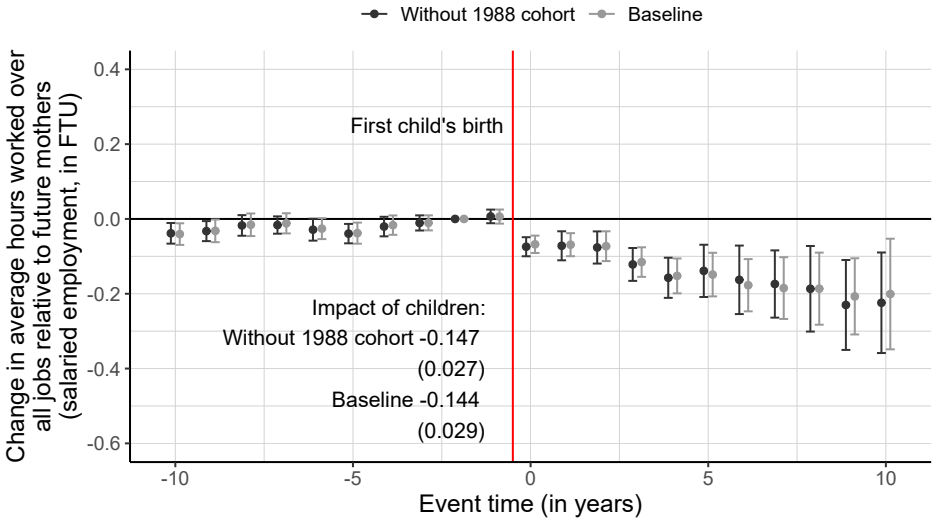
G.1 Left-censoring issue

Figure G.1 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals and hours worked over all salaried jobs – without hospital nurses who began their careers before 1989

(a) Hours worked as a hospital nurse

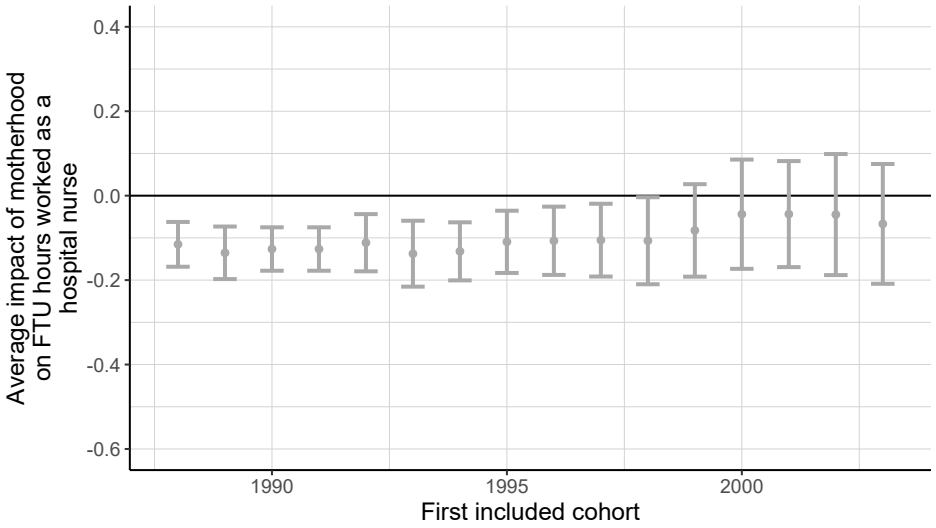


(b) Hours worked over all jobs



Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units, by time since first child's birth. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Figure G.2 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals – varying restrictions on the estimation subsample

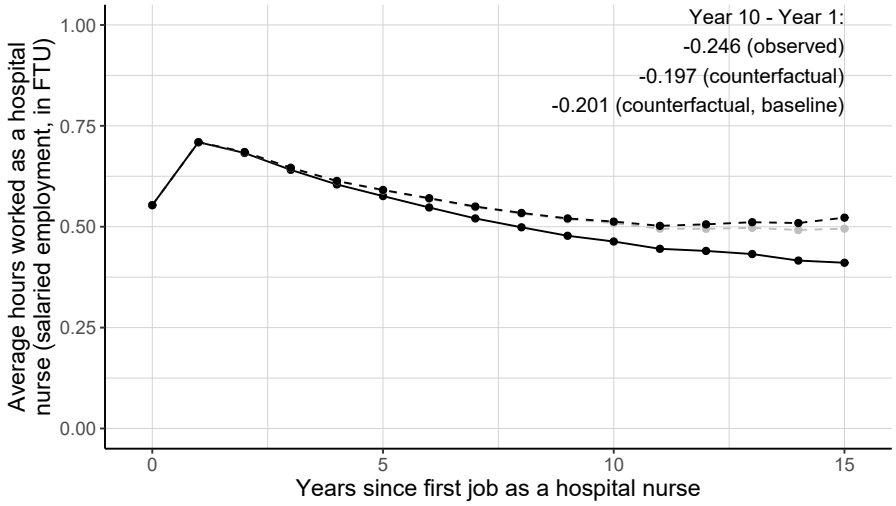


Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units, by first included cohort (first year as a hospital nurse). Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

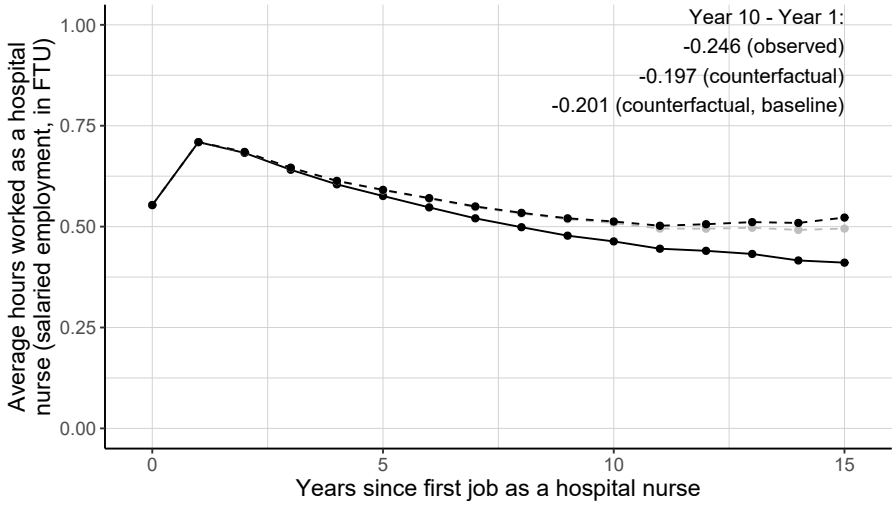
Source. Insee, DADS-EDP panel.

Figure G.3 – Contribution of children to the lifecycle profile of nurses' labor supply: total labor supply in the salaried sector – without hospital nurses who began their careers before 1989

(a) Hours worked as a hospital nurse



(b) Hours worked over all jobs

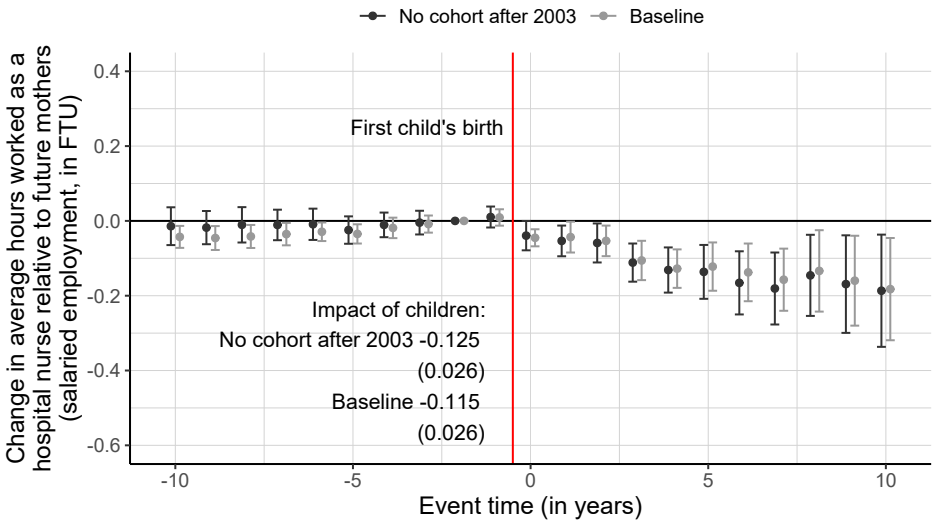


Realized and counterfactual average hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units, by time relative to the first qualified healthcare worker job at a hospital. Hours worked as a hospital nurse are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). The counterfactual profile implied by the baseline event-study estimates appears in grey dashed lines.
Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.
Source. Insee, DADS-EDP panel.

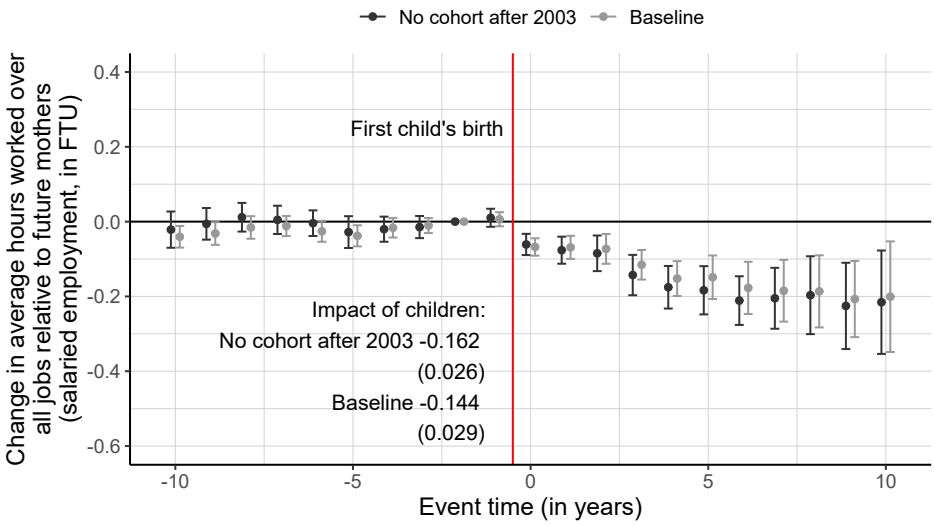
G.2 Right-censoring issue

Figure G.4 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals and hours worked over all salaried jobs – without hospital nurses who began their careers after 2002

(a) Hours worked as a hospital nurse

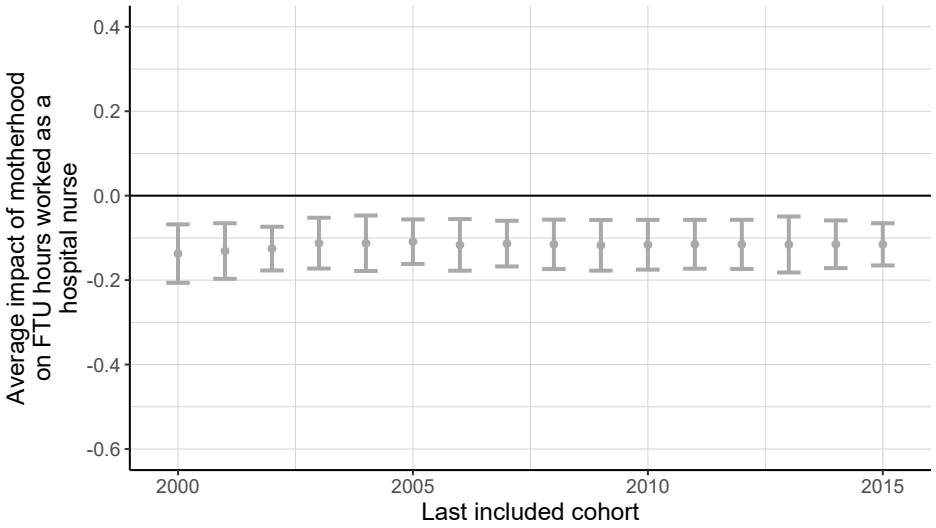


(b) Hours worked over all jobs



Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units, by time since first child's birth. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Figure G.5 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals – varying restrictions on the estimation subsample

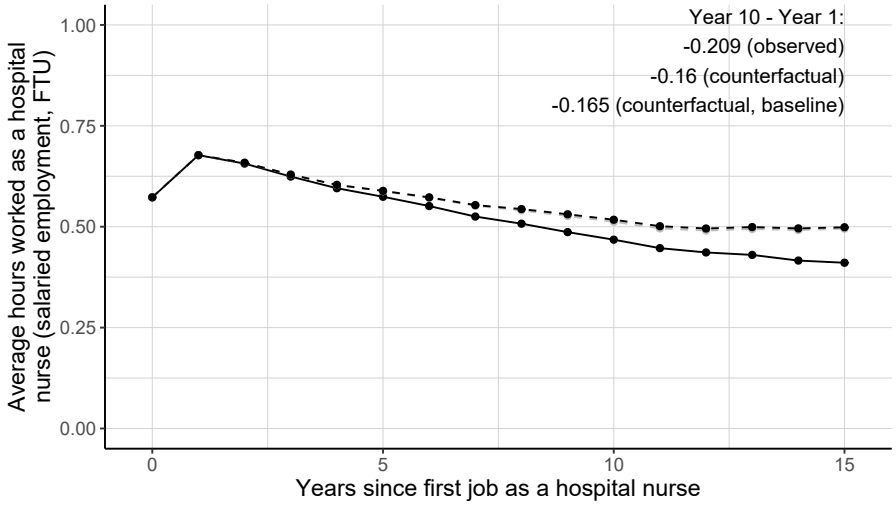


Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units, by last included cohort (first year as a hospital nurse). Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.

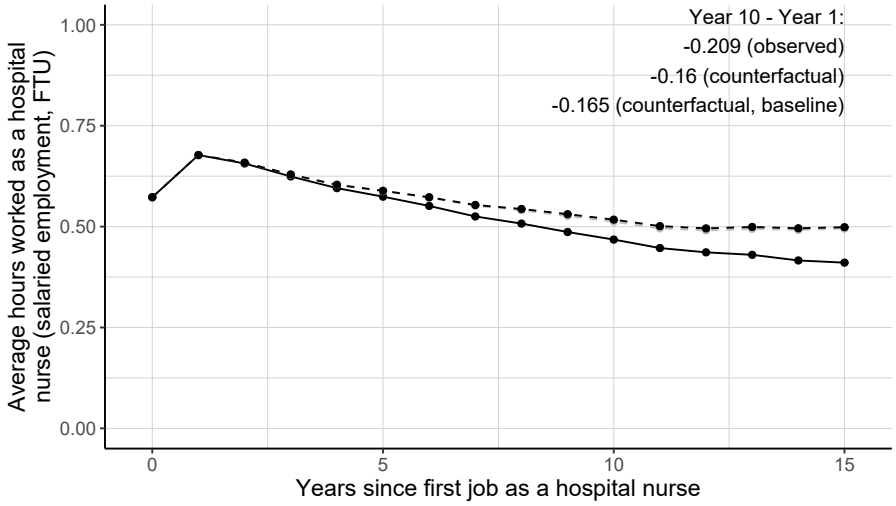
Source. Insee, DADS-EDP panel.

Figure G.6 – Contribution of children to the lifecycle profile of nurses' labor supply: total labor supply in the salaried sector – without hospital nurses who began their careers after 2002

(a) Hours worked as a hospital nurse



(b) Hours worked over all jobs

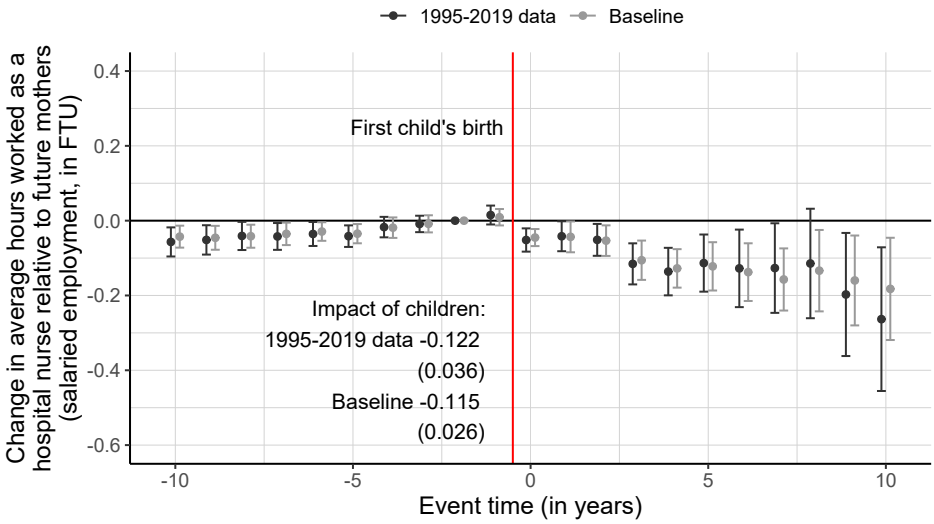


Realized and counterfactual average hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units, by time relative to the first qualified healthcare worker job at a hospital. Hours worked as a hospital nurse are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). The counterfactual profile implied by the baseline event-study estimates appears in grey dashed lines.
Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.
Source. Insee, DADS-EDP panel.

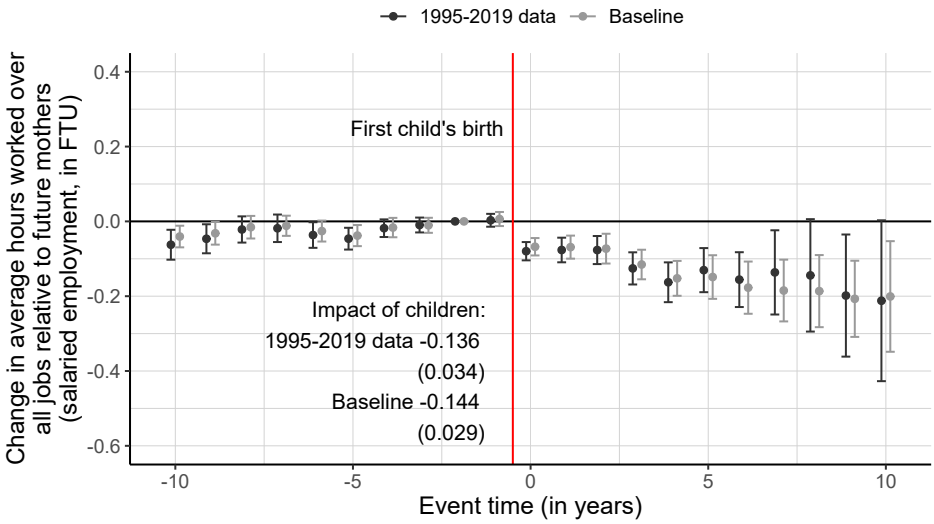
G.3 Hours worked measurement

Figure G.7 – Event-study estimates of the impact of children on mothers' labor supply: nursing labor supplied to hospitals and hours worked over all salaried jobs – 1995-2019 time-period

(a) Hours worked as a hospital nurse



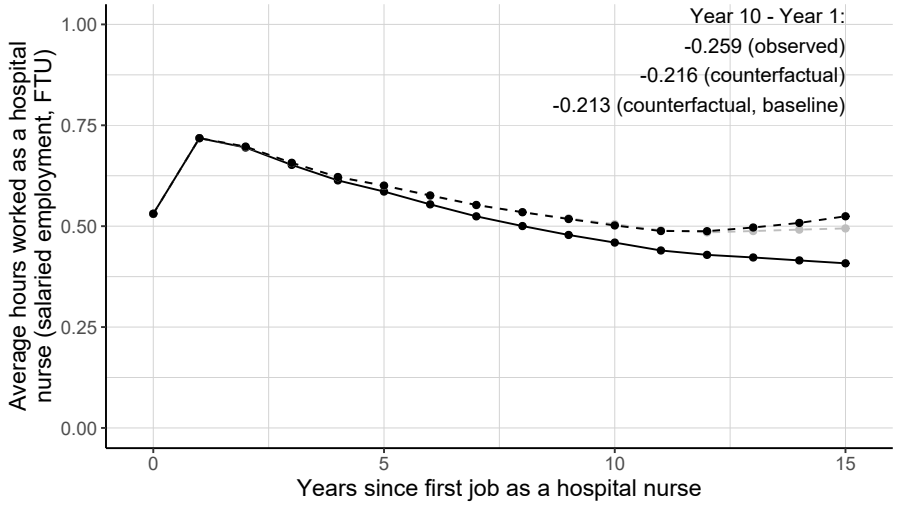
(b) Hours worked over all jobs



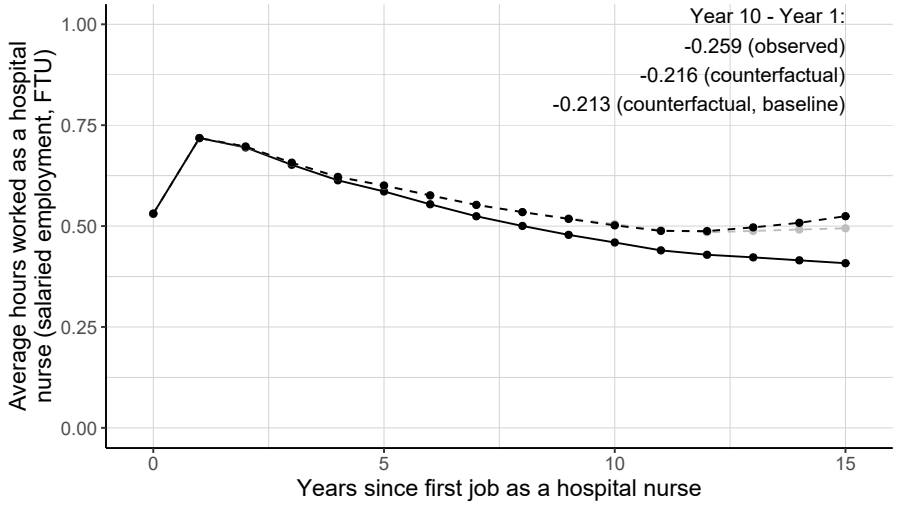
Event-study estimates of the impact of children on mothers' hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units, by time since first child's birth. Hours worked as a hospital nurse (over all salaried jobs) are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). Standard errors are clustered at the individual level and estimated by bootstrap with 200 replications.
Source. Insee, DADS-EDP panel.

Figure G.8 – Contribution of children to the lifecycle profile of nurses' labor supply: total labor supply in the salaried sector – 1995-2019 time-period

(a) Hours worked as a hospital nurse



(b) Hours worked over all jobs



Realized and counterfactual average hours worked as a hospital nurse and over all jobs in the salaried sector, in full-time units, by time relative to the first qualified healthcare worker job at a hospital. Hours worked as a hospital nurse are not conditional on working as a hospital nurse (salaried employment), but incorporate the participation margin (0 hours worked). The counterfactual profile implied by the baseline event-study estimates appears in grey dashed lines.
Note. Data on individuals who got their first hospital nurse job in 1988 or before are omitted from the computation.
Source. Insee, DADS-EDP panel.