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French GPs' willingness to delegate tasks: may financial incentives balance risk aversion?

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Abstract

Delegating tasks to paramedics is a fairly recent development in France. So far it has essentially been developed in hospitals and is incipient in general practice. This paper focuses on the willingness of general practitioner to do so. A 2012 survey of 2,000 GPs might help anticipate GPs' willingness to delegate. This paper tests whether a more favourable funding system might help increase GP willingness. We implement a quasi-experimental design wherein GPs are randomly selected to form three groups of equal size, each of them being exposed to a different funding scheme when declaring their willingness to delegate tasks to nurses: Fully Funded (FF) by the social security administration, self-funded by GPs' revenues (Self-Funded, SF) and half-funded by both the social security administration and GPs (Half-Funded, HF).

GPs' likelihood to favour task delegation is estimated with a probit model that especially considers a GP's attitude towards risk (aversion or tolerance) among a set of covariates, such as age, gender, rural/urban area, GP density and funding scheme. This article shows that, first, GPs are more likely to favour delegation, when they share a lower proportion of the cost. Second, the effect of risk aversion on the likelihood of favouring delegation is not altered by the funding scheme.

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Keywords: skill mix, task shifting, risk aversion, financial incentives

JEL Codes : I12, I18, J33, M55.

1. Introduction

In France, the decade of the 2000s was peppered with numerous public reports concerning the economic, legal and organisational feasibility of task shifting and cooperation between healthcare professionals (Berland, 2003; Berland and Bourgueil, 2006; Haute Autorité de Santé, 2010, 2008). These reports and recommendations resulted in healthcare professionals being given the opportunity to legally delegate some tasks or activities to medical auxiliaries. The law of the 21st of July 2009 allows health professionals to transfer activities between two professions. Such a derogatory scheme may be established for professions for which the French National Authority for Health (HAS in French) has provided an agreement for potential delegation (Law 2013-1203 of 23 December 2013 - art 35, n.d.). It is up to healthcare professionals to propose a scheme to the Regional Health Body (the French ARS). If the funding body (set up by the Ministry of Health and Social Security) accepts the scheme, then the Ministry of Health may authorise it. The scheme may not exceed three years and may be renewed once. For example, a physician may delegate some of his or her usual tasks to a nurse.

The stated goals of this change were the following: counteracting the announced decrease in physician density, favouring cooperation between healthcare professionals, and enabling paramedics to advance in their practice (better recognition of these professions is at stake).

So far, this opportunity has been used only at the hospital level, as the field of ambulatory care has not agreed on the funding of the scheme (Massin *et al.*, 2014). In France, task delegation in general practice has only resulted from experimentation (for an example, see Mousquès *et al.*, (2010). Indeed, most GPs are self-employed (Chevreul *et al.*, 2010), so this new contract would imply both the introduction of team practice for a majority of GPs and the delegation of tasks for everyone. It is expected a loss in GPs' earnings in the short run to be offset by a reallocation in GPs' working time towards activities generating at least equivalent income in the long run, like more recently proposed to GPs through the contribution of 4,000 administrative medical assistants (French Health Ministry, 2018).

Moreover, a definition of a "business model" (*i.e.*, financing plan and remuneration schemes for every task completed) is needed and required by law when implementing this type of cooperation. As a result, the question of whether economic incentives can foster efficient coordination and cooperation between healthcare professionals is central. We know that the decision to delegate tasks depends on both economic and extra-economic factors. Notably, task-shifting involves a financial risk for GPs, as delegating some of their activities implies the funding of another health professional who will receive income accordingly. Task-shifting also involves a risk in terms of the quality of patient care.

Few empirical studies address this issue. Most studies have focused on the outcomes of task-shifting and whether task-shifting is efficient (Buchan and Calman, 2005; Mousquès *et al.*, 2010; Richards *et al.*, 2000). This literature shows that work organisation and gaps in terms of consultation length, productivity and hourly wage are the main drivers of the efficacy or efficiency of task-shifting.

Our main objective is to identify the main economic and extra-economic determinants of GPs' willingness to delegate tasks to other healthcare professionals. More precisely, this paper intends to test whether implementing a funding system that takes into account GPs' risk aversion is likely to induce better coordination between GPs and medical auxiliaries (such as nurses or masseur-physiotherapists) by promoting task-shifting. In this context, financial incentives would be considered an instrument that enables alleviating the uncertainty of the delegation decision.

We find that the more favourable the cost-sharing mechanisms are, the more GPs self-declare their willingness to delegate tasks to medical auxiliaries. However, cost-sharing has no impact on the effect of risk aversion.

The remainder of the paper is organised as follows. Section 2 presents the theoretical and empirical literature related to our research question. Sections 3 and 4 address the data and empirical strategy, respectively. Sections 5 and 6 are dedicated to the results and discussion.

2. Literature review

2.1. French primary health care

Historically, French GPs have been funded by a fee-for-service payment system (either fixed or free fees depending on the conventional sector of practice). Patients pay a fee for each visit, and those fees are partially reimbursed by the National Health Insurance fund. Full coverage is possible, depending on whether the patient holds non-mandatory complementary health insurance (for a comprehensive presentation of the organization and the motives of the French health insurance system, see Nay *et al.*, (2016)). Five percent of the population is eligible for full coverage by the National Health Insurance Fund based on revenues. Also, patients with long-term diseases are fully covered when their doctor diagnoses their long-term illness.

Fees for specialised ambulatory care are higher and depend on the speciality. Referral to specialist care depends on prior visits to GPs, who have been playing the role of gatekeepers since 2004 (Dumontet *et al.*, 2017). If a patient does not have a consultation with a GP before seeing a specialist, he or she pays a higher out-of-pocket cost because reimbursement by the Health Insurance is greatly reduced. The activity of physiotherapists, nurses and other self-employed medical auxiliaries directly depends on GPs' prescriptions.

GPs can locate their practices wherever they wish. One of the main issues resulting from this liberty is that some areas are left with few or no GPs. This issue of 'medical deserts' has been the subject of numerous studies (Lucas-Gabrielli and Chevillard, 2018). However, no government has tried to address this issue directly by requiring GPs to settle in low-density areas. Instead, policies have relied on financial incentives, which can

be tax related (Delattre and Samson, 2013; Dumontet *et al.*, 2016) or provide lump-sums for settling in high-need areas.

The modifying payment system is 10 years-old; beginning in 2009, the opt-in scheme introduced payments for performance. In 2012, the scheme was expanded so that GPs could only opt-out (Massin *et al.*, 2014). In 2016, a regional primary care organisation (Communautés Professionnelles Territoriales de Santé, CPTS) was created to gather GPs in one single regional organisation. This CPTS has just been expanded, and the organisation is funded to recruit salaried GPs and medical assistants to address the lack of primary care in low-density areas (Dormont and Moatti, 2018).

2.2. Theoretical background

Most economists propose that incentives should be fine-tuned for agents to behave efficiently. Where efficiency meets coordination, some instruments that encourage agents to coordinate should be used. In addition to laws, contracts or hierarchy, financial incentives are another option. Some research papers have shown that financial incentives might be working in this setting (Prendergast, 2002, 1999; Robinson, 2001). Below, we summarise this vast literature. First, attention must be paid to the trade-off between financial risk and economic incentives when implementing cost-sharing mechanisms. Then, in the context of multi-tasking, whether contracts should be complete or incomplete is relevant. In the literature on team production, collective payments are regarded as efficient instruments to improve global performance. Finally, to ensure the stability and efficacy of cooperation, the allocation of responsibilities is fundamental: partners must determine who is/are residual claimant(s).

A usual framework with which to study decisions about delegation is the principal-agent model, where asymmetries of information tend to make coordination between the principal and the agent difficult. In our setting, the GP is the principal and the nurse is the agent. In addition to some other factors, such as discrepancies in consultation length, productivity and hourly wage or work organisation (Midy, 2003), task delegation is a decision that, like a wide range of economic behaviours, can be regarded as depending on psychological motives, such as risk attitudes (Dohmen *et al.*, 2011) and/or intrinsic motivations (Frey, 1997). Traditionally, theoretical models interested in task delegation issues in a context of information asymmetry look at the behaviour of a risk-neutral principal who transfers to a risk-averse agent those tasks that s/he cannot perform by her/himself. Financial incentives are used to make the agent perform the task the way the principal would have by counterbalancing the moral hazard problem. In this paper, we consider a different case where a risk-averse principal has to choose whether s/he delegates some tasks s/he is able to perform by her/himself to an agent whose efforts are not fully observable.

2.3. Empirical results

At the international level, skill-mix and task shifting between health professionals is an issue that resulted in the 1978 Alma Ata World Health Organization conference. Some of these recommendations were the appropriate use of the skills of all health professionals (International Conference on Primary Health Care, 1978). In 1980, a study was led in the UK (Miller and Backett, 1980) to investigate the characteristics of GPs favouring the delegation of tasks and the potential use of a nurse practitioner. Back then, this arrangement was supposed to free GPs of tasks that could be performed by nurses.

In the UK, a new GP contract was negotiated in 1990, and a review of the literature by Richards *et al.* (2000) showed that GP attitudes changed before and after the implementation of the new contract. Regarding task delegation, GPs tended to be more fearful before and more willing after the new contract. With this new contract, nursing roles expanded to “travel advice, ECG recordings, suturing, the management of diabetic patients, anxiety and depression management and advice on common illnesses” (Richards *et al.*, 2000 p. 190).

Most of the research into staff mix has focused on the impact of staff mix on the delivery of care and patient outcomes (Aiken *et al.*, 2003; Buchan and Dal Poz, 2002; Cavanagh and Bamford, 1997; Lee *et al.*, 2005; McGillis Hall, 1997; Sibbald *et al.*, 2004; Spilsbury, 2001). In some settings, replacing doctors with less qualified practitioners may even improve patient satisfaction with no adverse impact on patient outcomes (Buchan and Calman, 2005; Laurant *et al.*, 2005; Midy, 2003).

Task shifting is advocated in every region that has experienced shortages of health professionals (Samb *et al.*, 2007; World Health Organisation *et al.*, 2007). Delegation of work from GPs to health professionals other

than physicians is common in countries such as the UK, the USA and Canada. The reduction in GP workload may be substantial: at least 39% of tasks performed in a GP consultation and up to 17% of complete consultations in the UK could be delegated. Such delegation could reduce GP workload by 50%, and patients are generally satisfied with the care performed by non-GP professionals (Richards *et al.*, 2000).

Finally, in the French context, Mousquès *et al.* (2010), using a controlled “before-after” study, highlighted that the delegation from GPs to nurses of two tasks needed to follow patients with type 2 diabetes (a systematic electronic patient registry of these patients and patient education in terms of nutritional-hygienic counselling) is effective and efficient. In fact, patients’ follow-up and health outcomes are better in the intervention group (the team with task delegation) than in the control group (other GPs) without a significant increase in total costs.

Attitudes towards the delegation of tasks from GPs to lower trained staff are essential when creating new policy. This paper informs policy makers on whether a more generous funding scheme might help in favouring task delegation. We make use of data where GPs have been randomly assigned to three hypothetical funding groups with increasing GP financial contributions (none, partial, full). Based on these groups, we test whether reluctance to delegate based on risk aversion may be compensated by a less risky funding scheme (an assumption already partially tested in Højgård *et al.* (2002) for instance).

3. Data

We use survey data matched with administrative data from the national Health Insurance Administration. Our data come from the fifth wave of a bi-annual survey of self-employed GPs that was carried out in autumn 2012 and whose main topic was task delegation between GPs and nurses (for a presentation of the survey, see Massin *et al.* (2014)). GPs were told that a nurse would work at their practice for some day-long or half-day duties. Each GP was randomly assigned to one of three hypothetical funding schemes (see Appendix 2 for more details): fully funded (Fully Funded, FF) by the social security administration (the nurse would be paid by the National Health Insurance Fund); self-funded by the revenues of GPs (Self-Funded, SF) and half of each (Half-Funded, HF). More than 2,000 GPs were in the sample, of which 1,858 answered the question of whether they favoured task delegation. The sample was further reduced to 1476 observations after removing GPs who did not answer the risk-aversion questions.

Opposition to delegation is much larger when GPs are asked to fund at least some of the delegation (Table 1). More than forty percent of GPs who belong to the fully funded group are opposed to the scheme, while this proportion is three quarters for those in the half-funded and 82% in the self-funded. These findings are not very astonishing, as it is economically sensitive not to favour a scheme that either would certainly reduce one's income or is likely to increase it but by an uncertain amount.

Table 1: Opposition to delegation

| | Fully Funded (FF) | Half-Funded (HF) | Self-Funded (SF) | All |
|-------------------|-------------------|------------------|------------------|--------|
| Opposed | 41,18% | 75,10% | 81,80% | 65,99% |
| Favourable | 58,82%* | 24,90%* | 18,20%* | 34,01% |
| Total N | 493 | 494 | 489 | 1476 |

Source: Panel 2, DREES, URPS-ML, ORS.

Each starred proportion is statistically different from each other star proportion at 1% level.

3.1. Risk Aversion

This article investigates whether policy makers can counteract the intrinsic characteristics of individuals. We test whether the three types of funding groups have a different impact on the role played by risk aversion in favouring task delegation. The survey measures the general risk aversion of GPs by asking them about their willingness to take risks on an 11-point scale. A similar scale is used to ask GPs about their willingness to take risks in three specific domains: financial, patients’ health and own health (see Appendix 1 for more details and Nebout *et al.* (2018), Massin *et al.* (2018)). The GPs report whether they are risk-averse (from 0 being very risk-averse to 10 being risk-prone). These questions are said to be good predictors of paid lottery choices (Dohmen *et al.*, 2011), but the question about patients’ health was not addressed. Where one is risk-averse, one should be less likely to favour new institutional settings. We show in a horse race (table available upon

request) that the Patients Health Risk aversion measure is the only one significantly associated with the probability of delegating tasks. We make the assumption that GPs who are risk-averse should be less favourable to task delegation.

By averaging the three previously presented risk-aversion scores, we compute a synthetic score whose value also ranges from 0 to 10. We observe that, as would be expected, GPs who are not in favour of the delegation scheme are more likely to be risk-averse on average (Table 2).

Table 2: Summary statistics for risk aversion depending on GPs' willingness to delegate

| In favour of delegation | General | | | Finance | | | Patients Health | | | Own Health | | | |
|-------------------------|---------|--------|-------|---------|--------|-------|-----------------|--------|-------|------------|--------|-------|-------|
| | N | Mean | Std | CV | Mean | Std | CV | Mean | Std | CV | Mean | Std | CV |
| All | 1476 | 4.772 | 2.270 | 0.476 | 3.782 | 2.347 | 0.620 | 3.312 | 2.281 | 0.689 | 5.133 | 2.410 | 0.469 |
| No | 974 | 4.630 | 2.282 | 0.493 | 3.659 | 2.365 | 0.646 | 3.174 | 2.279 | 0.718 | 5.044 | 2.475 | 0.491 |
| Yes | 502 | 5.048* | 2.223 | 0.440 | 4.024* | 2.294 | 0.570 | 3.582* | 2.262 | 0.632 | 5.303* | 2.271 | 0.428 |

Source: Panel 2, DREES, URPS-ML, ORS.

All the means of the aversion scores are statistically different between the two groups of favouring or not delegation at 1% level.

3.2. Regressors and Controls

Table 3 presents descriptive statistics of our sample of GPs. We observe that 65% of male GPs and 69% of female GPs are opposed to the scheme (Table 3). The Group practice dummy tells whether GPs share offices with other GPs. GPs in group practices ensure continuity of care and share the cost of capital investment but rarely work together (Chevreul *et al.*, 2010). Nearly three quarters of GPs working in solo practice are opposed to the scheme, compared to 60% of those working in group practice.

The data are matched with administrative data on GP activity. For each GP, the number of visits is recorded. A visit is either when a patient comes to the practice or when the GP visited a patient at home (the latter is common in rural areas and for overnight emergency visits). Therefore, we know with certainty the level of activity of the GP for each calendar year. Based on the activity of the GPs, we observe that among the first quartile regarding the number of visits, 73% of the GPs are opposed to the scheme (Table 3). Those who are above the first quartile are more likely to view it favourably (36% vs. 26%).

Table 3: Descriptive Statistics

| | Sex | | Practice | | Activity | | |
|------------|--------|---------|----------|---------|-----------------------------|-------------------------------------------|-----------------------------|
| | Male | Female | Group | Solo | Activity below 1st Quartile | Activity above 1st and below 3rd Quartile | Activity above 3rd Quartile |
| Opposed | 64.97% | 68.59% | 59.70% | 73.22% | 73.49% | 63.67% | 64.05% |
| Favourable | 35.03% | 31.41%* | 40.30% | 26.78%* | 26.51%* | 36.33% | 35.95% |
| Total | 1059 | 417 | 789 | 687 | 332 | 724 | 420 |

Source: Panel 2, DREES, URPS-ML, ORS.

Within sex and practice columns, proportions of medics in favour of the scheme are statistically different.

Among activity columns, the proportion of medics performing less activity is different than the other two groups.

Thus, there may be substantial differences in the characteristics of GPs who are in favour of the delegation scheme compared to those who are reluctant to delegate. The random assignment to a funding group seems to be especially correlated with whether the GP favours the scheme.

In our regression, we use the following controls:

- **GPs demographics:** we control for age and gender.
- **Characteristics of GP's practice at the micro-level:** whether GPs are in solo/group practice and GP's workload with the number of consultations. We expect that the higher the GP's workload, the higher their willingness to delegate tasks. We also controlled for the socioeconomic status of the patients. We use the data available from the *Sniiram*. We know the share of patients covered by Universal Health Coverage (UHC; *Cmu*; *CMU stands for Universal Health Coverage. This health coverage has been introduced to make sure that people with no work and low incomes have access to health*

insurance. French health insurance has been based on work, like all Bismarck-oriented health insurance funding. CMU serves to counteract the effect of large unemployment and transform the national health insurance system to a more Beveridge-style type of health insurance. CMU is available for people with low incomes.) and can use this as a proxy for the socio-economic composition of a GP's practice population. The data also provide a share of patients covered by the long-term disease scheme (the French ALD scheme), which we use as a proxy for a GP's case mix.

- **Geographic variables:** GP's density in the area of practice (captured through the Local Potential Accessibility indicator developed by the IRDES; for more details, see Lucas-Gabrielli and Nestrigue (2016)). According to Delamaire and Lafortune (2010), countries where the majority of GPs are in group practice are more likely to have developed advanced nursing roles in primary care because GPs are used to sharing tasks and therefore are more likely to delegate. At the macroeconomic level, a larger share of group practice within a country should help this country develop advanced nursing roles, such those implied by delegation as considered in this study. We would expect that at the micro level, GPs practising in groups are more favourable toward advanced nursing roles and to delegation.

GPs practising in more GP-dense areas are more likely to both have lower revenues (Dormont and Samson, 2009) and be sensitive to hedonic features of the area rather than income (Delattre and Samson, 2013; Dumontet *et al.*, 2016). A policy that raises income should be more favoured by GPs who are more revenue-motivated. When considering task delegation, we may wonder whether it raises GPs' income. In one way, transferring some tasks to nurses can decrease GPs' income in the short run because it can reduce the number of consultations or because the GP is asked to contribute to the funding of nurses' work. In the long run, task delegation to nurses can enable GPs to recover additional time for medical activities that only they can perform. If one considers that the second effect is dominant and thus assumes that task delegation should increase GPs' income, one should observe that GPs in more GP-dense areas should be more likely to favour delegation because task delegation could loosen the constraint on their income imposed by competition with other health professionals (GPs and/or specialists). We have an administrative measure of the density and a binary perceived density level. Data showing that the two give similar results are available on request. We focus on the effect of the self-perceived variable because fewer observations are lost using the latter.

We also have a set of dummies to control for a GP's region of location (Burgundy, Pays-de-la-Loire and PACA) and whether the practice is located in a rural/semi-rural or urban area. Rural, Semi-Urban and Urban variables are administrative variables created by the National Institute of Statistics and Economic Studies (INSEE in French) in 1999 based on 1998 census data. Urban areas are those that offer at least 5000 jobs and are not in the influence zone of a larger urban area. Semi-Urban areas are communes that are close to an urban area, and at least 40% of the employed and resident population of this commune is commuting to the urban centre or another commune within the influence of the urban area. Semi-Urban and Urban areas form a continuous zone with no rural breaks. Rural areas are remotely and vaguely connected to urban centres, mainly rural communes. The last group represents 70% of France and two-thirds of the communes (INSEE, Institut National de la Statistique et de l'Analyse Economique, 1999). GPs living in Rural and Semi-Urban areas are assumed to be more likely to favour delegation;

4. Model and Hypotheses

4.1. Task delegation

In this article, we test three hypotheses. The first hypothesis is whether cost-sharing has an impact on task delegation. GPs are more likely to accept delegating tasks when they are offered a financially more favourable scheme. Based both on what we observe in descriptive statistics and what economic theory states, we make the assumption that GPs who are in the self-funded group are less likely to accept task delegation.

The second hypothesis is whether risk aversion is associated with willingness to delegate tasks. We expect that when GPs are more risk-tolerant, they are more likely to delegate tasks. Risk aversion should be negatively associated with task delegation because a new policy such as this one may have the potential to thoroughly change how GPs work. In a country where even GPs who are in a group practice do not share a list of patients; they only share bills, capital investment and ensure continuity of care (Chevreul *et al.*, 2010)

introducing a policy that involves working with someone else should affect GPs' habits. Risk-averse GPs are assumed to be less likely to delegate.

Finally, we test whether the cost-sharing schemes can alter the effect of the risk aversion measure. When GPs are offered a more favourable cost-sharing scheme, is the effect of risk aversion modified?

We estimate a Probit model in which the binary variable of interest is the willingness to delegate tasks, as explained by a set of explanatory variables and controls presented above. Not all GPs have answered every question. Therefore, we introduce variables by groups according to whether the number of observations decreases by adding a subsequent variable.

We estimate the willingness to delegate tasks with the following model:

$$y_i^* = \alpha_0 + \alpha_1 HF_i + \alpha_2 SF_i + \beta RA_{PH} + \gamma_k X + \varepsilon_i \quad (\text{Equation 1})$$

where y_i^* is a latent variable that is connected to the observed variable y_i by the following decision rule:

$$\begin{cases} y_i = 1 \text{ if } y_i^* > 0 \\ y_i = 0 \text{ if } y_i^* < 0 \end{cases} \quad (\text{Equation 2})$$

where y_i is observed and equal to 1 when the GP i is in favour of the delegation. We make the usual Probit assumption that the error term in (Equation 1) follows a normal distribution. We are mainly interested in the coefficients of the dummy variables HF_i (half-funded scheme) and SF_i (self-funded scheme). The coefficients of these represent how much GPs are more likely to favour the alternative funding schemes compared to GPs in the Fully Funded scheme (reference). We also estimate the effect of risk aversion by parameter β . Where the latter is positive, it means that when GPs are more likely to take risks, they are more likely to favour task delegation.

We also estimate the vector of k parameters γ_k associated with the matrix (i rows and k columns) of sex, age, age square, practice location, type of area (rural/urban), the proportion of patients with universal health coverage (UHC) and the proportion of patients with a Long Term Condition, and the activity of the GP. We also estimate the effect of perceived density of GPs. We tested a more accurate measure of density based on the density of GPs in the area and the demand for GPs services. This latter measure (produced by the Health Ministry) shows a very similar effect but reduces the sample size by a third. We therefore preferred the self-declared variable. The latter variables are introduced in the model successively.

4.2. Risk aversion and cost sharing schemes

If our risk aversion measures are robust, they truly measure the intrinsic risk aversion of GPs. In other settings, the measures of risk aversion that we use here have been found to be robust compared to other more complex measures (Dohmen *et al.*, 2011). Where a GP is risk averse, s/he should be less likely to delegate tasks to another health professional. Thus, being less favourable toward task delegation because of risk aversion should not be overcome by a less risky funding scheme. In other words, if our assumption is true, a GP for whom task delegation costs are fully supported by the National Health Insurance Fund should not be more likely to delegate than a GP who has the same risk aversion but is part of the self-funded scheme. If our assumption is wrong, then risk aversion should be overcome by the funding scheme.

The following model aims to test whether there are substantial differences in terms of favouring the funding scheme depending on a GP's level of risk aversion:

$$y_i^* = \alpha_0 + \alpha_1 HF_i + \alpha_2 SF_i + \beta_1 RA_{PH} \times FF_i + \beta_2 RA_{PH} \times HF_i + \beta_3 RA_{PH} \times SF_i + \gamma_k X + \varepsilon_i \quad (\text{Equation 3})$$

Compared to (Equation 1), we introduced three parameters that estimate the effect of risk aversion for the three random groups. X is the matrix of the explanatory variables.

5. Results

We analyse whether GPs are in favour of delegation. We first introduce the funding dummies and the risk aversion variable and demographics (age, gender). Then, we introduce practice characteristics and finally area characteristics. Our reference for the funding scheme variable is the fully funded (FF) group.

5.1. Age, Gender and Funding groups

The results in Table 4, column 1, for this first, naïve, specification are robust to the different specifications introduced later. Half-Funded or Self-Funded GPs are less likely to favour delegation by 27% and 34%, respectively. There was no significant effect of age. The effect of gender does not resist to the addition of covariates.

5.2. Aversion to risk

We argued that GPs who are not risk averse should be more likely to favour delegation. Task delegation might become a major game changer in ambulatory care in France. In other countries, delegation has led nurses to develop more advanced roles, something that the French medical profession is unwilling to allow (Delamaire and Lafortune, 2010). If risk-averse, GPs should be less likely to favour delegation.

The results of (Equation 1 in Table 4 show that GPs who are more risk-tolerant are more likely to favour delegation to a nurse. We observe that a risk-tolerant attitude is positively correlated with being in favour of task delegation. An increase of one standard deviation in the GP risk score increases the probability of favouring delegation by 2%.

5.3. Group Practice and patients' characteristics

We find that GPs practising solo are less likely to favour delegation by 9-10% compared to GPs in group practice, which is the expected result. The type of patients the GP receives (low income or patients with long-term diseases) does not have any impact on the likelihood of delegating tasks. GPs with lower activity are less likely to favour delegation.

5.4. Geography

We find no evidence of attitudes toward delegation being different for the different regions – Burgundy, Pays de la Loire and PACA – compared to GPs in other regions. The coefficient for Semi-Urban is not significant in the latter models. GPs who practice in remote places are more likely to be in favour of delegation because they might more easily foresee the effects and advantages of delegation for their practices. Marginal effects show that GPs working in rural areas are 8% more likely to favour task delegation. Working in rural areas is then superseded by density.

We also find that when GPs respond that they live in GP-dense areas, they are less likely to favour delegation by 10%. This finding confirms that the short-term effect seems to dominate. Task delegation seems to be perceived by GPs as a loss in earnings and, in a competitive context, they are less likely to delegate. The interaction between GP density and the funding scheme highlights that only GPs who would be fully funded or half-funded living in more GP-dense areas would be less likely to favour delegation. The impact of competition is stronger for GPs who do not fully bear the cost of task delegation; GPs who fund the cost of task delegation are more willing to see task delegation as an opportunity to cope with a high level of competition.

We now turn to the third assumption that we test regarding risk aversion: can financial incentives override risk aversion to delegation? We test this by introducing interactions between the funding group and risk aversion. If financial incentives can compensate for risk aversion, then those GPs in the fully funded group should be less likely to disfavour the scheme when they are risk averse. Table 5 presents the results for this specification, which is introduced in (Equation 3. We observe that the coefficient for the risk aversion variable is similar across the three groups and is always statistically significant. We only present results for the three variables, as other results do not qualitatively change. Only the standard error changes reflect that the number of observations needed to obtain each parameter is divided by three.

Table 4: Marginal effects of explanatory variables on GPs' willingness to delegate: the impact of the funding scheme

| | 1 | 2 | 3 | 4 | 5 |
|-----------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Half-Funded | -0.27*** (0.02) | -0.27*** (0.02) | -0.27*** (0.02) | -0.27*** (0.02) | -0.27*** (0.04) |
| Self-Funded | -0.34*** (0.02) | -0.34*** (0.02) | -0.33*** (0.02) | -0.34*** (0.02) | -0.35*** (0.03) |
| Risk Aversion | 0.02*** (0.00) | 0.02*** (0.00) | 0.02*** (0.00) | 0.02*** (0.00) | 0.02*** (0.00) |
| Female | -0.06* (0.03) | -0.03 (0.03) | -0.03 (0.03) | -0.04 (0.03) | -0.04 (0.03) |
| Age | -0.01 (0.01) | -0.01 (0.01) | -0.01 (0.01) | -0.00 (0.01) | -0.00 (0.01) |
| Age Square | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Solo-practice | | -0.10*** (0.02) | -0.10*** (0.02) | -0.10*** (0.02) | -0.10*** (0.02) |
| CMU | | -0.00 (0.00) | -0.00 (0.00) | -0.00 (0.00) | -0.00 (0.00) |
| ALD | | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Activity below 1st quartile | | -0.09** (0.03) | -0.08** (0.03) | -0.07* (0.03) | -0.07* (0.03) |
| Activity above 3rd quartile | | -0.00 (0.03) | -0.02 (0.03) | -0.04 (0.03) | -0.04 (0.03) |
| Burgundy | | | -0.01 (0.06) | 0.02 (0.06) | 0.02 (0.06) |
| PACA | | | 0.09 (0.10) | 0.15 (0.10) | 0.15 (0.11) |
| Pays De Loire | | | -0.03 (0.08) | -0.10 (0.07) | -0.11 (0.07) |
| Rural | | | 0.06* (0.03) | 0.06 (0.03) | 0.06 (0.03) |
| Semi-Urban | | | 0.06 (0.03) | 0.06 (0.03) | 0.06 (0.03) |
| Density of GPs | | | | -0.10*** (0.03) | |
| Density of GPs * FF | | | | | -0.10** (0.03) |
| Density of GPs * HF | | | | | -0.10** (0.04) |
| Density of GPs * SF | | | | | -0.07 (0.04) |
| AIC | 1668.65 | 1646.41 | 1646.94 | 1545.80 | 1549.45 |
| BIC | 1705.73 | 1709.98 | 1736.99 | 1640.19 | 1654.33 |
| Log Likelihood | -827.33 | -811.21 | -806.47 | -754.90 | -754.72 |
| Deviance | 1654.65 | 1622.41 | 1612.94 | 1509.80 | 1509.45 |
| Num. obs. | 1476 | 1476 | 1476 | 1400 | 1400 |

Standard errors in brackets

***p < 0.001, **p < 0.01, *p < 0.05

Table 5: Risk Aversion parameters for each cost-sharing scheme

| | Fully Funded (FF) | Half-Funded (HF) | Self-Funded (SF) | All |
|------------------------|-------------------|------------------|------------------|---------|
| Marginal effect | 0.02* | 0.02* | 0.02* | 0.02*** |
| Standard Error | (0.01) | (0.01) | (0.01) | (0.00) |

***p < 0.001, **p < 0.01, *p < 0.05

6. Discussion

This article shows that policy makers in France who would foster delegation of tasks must be aware that a contract with no cost-sharing for GPs substantially increases their likelihood of delegating. However, financial incentives fail to compensate for GPs' risk aversion regarding patient health. In this context, risk aversion might be interpreted as the principal's intrinsic motivation not to delegate tasks to the agent, and financial incentives implemented to enhance GP's willingness to delegate does not seem to succeed in achieving this goal.

The economic literature has usually opposed intrinsic motivations to extrinsic ones (Benabou and Tirole, 2003; Kreps, 1997) and has evidenced that when agents have strong intrinsic motivations to do their work conscientiously, then they may not be willing to change their behaviours in response to a financial incentive (Deci and Ryan, 1985; Fehr and Falk, 2002).

Furthermore, there is substantial literature on whether economic incentives increase performance (See Camerer and Hogarth, 1999). The choice to favour delegation is not a performance choice because there is no clear cut answer to whether delegation will increase performance. Therefore, our study may suffer from a declarative bias because our design is quite consistent with the empirical literature in experimental and behavioural economics about the impact of economic incentives on consumption choices or on votes for candidates for elections (see Harrison and Ruström (2008) for a review of choices in environmental studies), wherein it is well established that individuals tend to over report purchase behaviour and intentions to vote (Camerer and Hogarth, 1999).

Our work is not without some limitations. We do not find any effect of the demand side as of yet. However, the literature has shown that patients with low SES are less likely to be receptive to alternative care provision (Dumesnil *et al.*, 2012) and possibly care organisation (such as task delegation to nurses). A possible explanation could be that these patients tend to live in areas where medical density, and thus consultation length, is low (Videau *et al.*, 2010).

In this paper, the question used to study the coordination between GPs and nurses is quite evasive concerning the true nature of the relationship between both health professionals. It is not clear whether the nurse is salaried by the National Health Insurance fund or the GP. However, knowing the true nature of the subordination relationship among all the parties involved is of great concern. We can even imagine that a self-employed nurse (such as nurse practitioners in the UK) could cooperate with a self-employed GP, both being paid with a fee-for-service scheme. Organisational arrangements and financial incentives interact to influence health professionals' coordination/cooperation.

References

- Aiken, L.H., Clarke, S.P., Cheung, R.B., Sloane, D.M., Silber, J.H., 2003. Educational levels of hospital nurses and surgical patient mortality. *JAMA J. Am. Med. Assoc.* 290, 1617–1623. <https://doi.org/10.1001/jama.290.12.1617>
- Benabou, R., Tirole, J., 2003. Intrinsic and extrinsic motivation. *Rev. Econ. Stud.* 70, 489–520.
- Berland, Y., 2003. *Coopération des professions de santé : le transfert de tâches et de compétences (rapport d'étape)*. Ministère de la santé, de la famille et des personnes handicapées, Paris, France.
- Berland, Y., Bourgueil, Y., 2006. *Cinq expérimentations de coopération et de délégation de tâches entre professions de santé (rapport)*. Observatoire national de la démographie des professions de santé, Paris, France.
- Buchan, J., Calman, L., 2005. Skill-Mix and Policy Change in the Health Workforce: Nurses in Advanced Role. OECD Health Work. Pap. 17.
- Buchan, J., Dal Poz, M.R., 2002. Skill mix in the health care workforce: reviewing the evidence. *Bull. World Health Organ.* 80, 575–580.
- Camerer, C.F., Hogarth, R.M., 1999. The Effects of Financial Incentives in Experiments: A Review and Capital-Labor-Production Function. *J. Risk Uncertain.* 19, 7–42. <https://doi.org/10.1023/A:1007850605129>

- Cavanagh, S.J., Bamford, M., 1997. Substitution in nursing practice: clinical, management and research implications. *J Nurs Manag* 5, 333–339.
- Chevreur, K., Durand-Zaleski, I., Bahrami, S., Hernández-Quevedo, C., Mladovsky, P., 2010. France: Health system review. *Health Syst. Transit.* 12, 1–291.
- Deci, E.L., Ryan, R.M., 1985. *Intrinsic Motivation and Self-Determination in Human Behavior*. Plenum Press, New York.
- Delamaire, M.-L., Lafortune, G., 2010. Les pratiques infirmières avancées (No. 54), *OECD Documents de Travail sur la santé*. OECD, Paris, France.
- Delattre, E., Samson, A.-L., 2013. Stratégies de localisation des médecins généralistes français : mécanismes économiques ou hédonistes ? *Econ. Stat.* 455–456.
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., Wagner, G.G., 2011. Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences. *J. Eur. Econ. Assoc.* 9, 522–550. <https://doi.org/10.1111/j.1542-4774.2011.01015.x>
- Dormont, B., Moatti, S., 2018. Le plan santé évite les sujets qui fâchent. *L'Économie Polit.* 80, 8. <https://doi.org/10.3917/leco.080.0008>
- Dormont, B., Samson, A.-L., 2009. Démographie médicale et carrières des médecins généralistes : les inégalités entre générations. *Econ. Stat.* 414.
- Dumesnil, H., Cortaredona, S., Verdoux, H., Sebbah, R., Paraponaris, A., Verger, P., 2012. General Practitioners' Choices and Their Determinants When Starting Treatment for Major Depression: A Cross Sectional, Randomized Case-Vignette Survey. *PLOS ONE* 7, e52429. <https://doi.org/10.1371/journal.pone.0052429>
- Dumontet, M., Buchmueller, T., Dourgnon, P., Jusot, F., Wittwer, J., 2017. Gatekeeping and the utilization of physician services in France: Evidence on the Médecin traitant reform. *Health Policy* 121, 675–682. <https://doi.org/10.1016/j.healthpol.2017.04.006>
- Dumontet, M., Samson, A.-L., Franc, C., 2016. Comment les médecins choisissent-ils leur lieu d'exercice ? *Rev. Française Econ.* Vol. XXXI, 221–267.
- Fehr, E., Falk, A., 2002. Psychological foundations of incentives. *Eur. Econ. Rev.* 46, 687–724. [https://doi.org/10.1016/S0014-2921\(01\)00208-2](https://doi.org/10.1016/S0014-2921(01)00208-2)
- Frey, B.S., 1997. *Not Just for the Money: An Economic Theory of Personal Motivation*. Edward Elgar Pub, Cheltenham.
- Haute Autorité de Santé, 2010. *Coopération entre professionnels de santé : Conditions de succès et retour sur les expérimentations de 2004 à 2007*. Haute Autorité de Santé, Paris, France.
- Haute Autorité de Santé, 2008. *Délégation, transferts, nouveaux métiers... Comment favoriser des formes nouvelles de coopération entre professionnels de santé (Recommandation HAS en collaboration avec l'ONDPS)*. Haute Autorité de Santé, Paris, France.
- Höjgård, S., Enemark, U., Lyttkens, C.H., Lindgren, A., Troëng, T., Weibull, H., 2002. Discounting and clinical decision making: Physicians, patients, the general public, and the management of asymptomatic abdominal aortic aneurysms. *Health Econ.* 11, 355–370. <https://doi.org/10.1002/hec.674>
- INSEE, Institut National de la Statistique et de l'Analyse Economique, 1999. *Le zonage en aires urbaines et aires d'emploi de l'espace rural*. Institut National de la Statistique et des Etudes Economiques, INSEE, Paris, France.
- International Conference on Primary Health Care, 1978. *Declaration of Alma-Ata*. World Health Organization, Alma-Ata, USSR.
- Kreps, D., 1997. Intrinsic Motivation and Extrinsic Incentives. *Am. Econ. Rev.* 87, 359–64.
- Laurant, M., Reeves, D., Hermens, R., Braspenning, J., Grol, R., Sibbald, B., 2005. Substitution of doctors by nurses in primary care. *Cochrane Database Syst. Rev.* CD001271. <https://doi.org/10.1002/14651858.CD001271.pub2>
- Lee, T.-Y., Yeh, M.-L., Chen, H.-H., Lien, G.-H., 2005. The skill mix practice model for nursing: measuring outcome. *J. Adv. Nurs.* 51, 406–413. <https://doi.org/10.1111/j.1365-2648.2005.03511.x>
- Lucas-Gabrielli, V., Chevillard, G., 2018. « Déserts médicaux » et accessibilité aux soins : de quoi parle-t-on ? *médecine/sciences* 34, 599–603. <https://doi.org/10.1051/medsci/20183406022>
- Lucas-Gabrielli, V., Nestrigue, C., 2016. Analyse de sensibilité de l'Accessibilité potentielle localisée (APL). *Irdes Doc. Trav.*
- Massin, S., Nebout, A., Ventelou, B., 2018. Predicting medical practices using various risk attitude measures. *Eur. J. Health Econ.* 19, 843–860. <https://doi.org/10.1007/s10198-017-0925-3>
- Massin, S., Paraponaris, A., Bernhard, M., Verger, P., Cavillon, M., Mikol, F., Ventelou, B., 2014. Les médecins généralistes face au paiement à la performance et à la coopération avec les infirmiers. *Études Résultats* 873.
- McGillis Hall, L., 1997. Staff mix models: complementary or substitution roles for nurses. *Nurs Adm Q* 21, 31–39.
- Midy, F., 2003. Efficacité et Efficience de la Délégation d'Actes de Médecins Généralistes aux Infirmières. *Revue de Littérature 1970-2002. Quest. Déconomie Santé QeS* 65.
- Miller, D.S., Backett, E.M., 1980. A new member of the team? Extending the role of the nurse in British primary care. *Lancet Lond. Engl.* 2, 358–361.

- Mousquès, J., Bourgueil, Y., Le Fur, P., Yilmaz, E., 2010. Effect of a French experiment of team work between general practitioners and nurses on efficacy and cost of type 2 diabetes patients care. *Health Policy Amst. Neth.* 98, 131–143. <https://doi.org/10.1016/j.healthpol.2010.06.001>
- Nay, O., Béjean, S., Benamouzig, D., Bergeron, H., Castel, P., Ventelou, B., 2016. Achieving universal health coverage in France: policy reforms and the challenge of inequalities. *The Lancet* 387, 2236–2249. [https://doi.org/10.1016/S0140-6736\(16\)00580-8](https://doi.org/10.1016/S0140-6736(16)00580-8)
- Nebout, A., Cavillon, M., Ventelou, B., 2018. Comparing GPs' risk attitudes for their own health and for their patients' : a troubling discrepancy? *BMC Health Serv. Res.* 18, 283. <https://doi.org/10.1186/s12913-018-3044-7>
- Prendergast, C., 2002. The tenuous trade-off between risk and incentives. *J. Polit. Econ.* 110, 1071–1102.
- Prendergast, C., 1999. The Provision of Incentives in Firms. *J. Econ. Lit.* 37, 7–63. <https://doi.org/10.1257/jel.37.1.7>
- Richards, A., Carley, J., Jenkins-Clarke, S., Richards, D.A., 2000. Skill mix between nurses and doctors working in primary care-delegation or allocation: A review of the literature. *Int.J.Nurs.Stud.* 37, 185–197.
- Robinson, J.C., 2001. Theory and practice in the design of physician payment incentives. *Milbank Q.* 79, 149–177, III.
- Samb, B., Celletti, F., Holloway, J., Van Damme, W., Lawson, L., De Cock, K., others, 2007. Task shifting: an emergency response to the health workforce crisis in the era of HIV. Lessons from the past, current practice and thinking. *New Engl J Med* 357, 2510–4.
- Sibbald, B., Shen, J., McBride, A., 2004. Changing the skill-mix of the health care workforce. *J. Health Serv. Res. Policy* 9, 28–38.
- Spilsbury, K., 2001. Defining the nursing contribution to patient outcome: Lessons from a review of the literature examining nursing outcomes, skill mix and changing roles. *J.Clin.Nurs.* 10, 3–14.
- Videau, Y., Saliba-Serre, B., Paraponaris, A., Ventelou, B., 2010. Why patients of low socioeconomic status with mental health problems have shorter consultations with general practitioners. *J. Health Serv. Res. Policy* 15, 76–81. <https://doi.org/10.1258/jhsrp.2009.009034>
- World Health Organisation, PEPFAR, UNAIDS, 2007. Task shifting : rational redistribution of tasks among health workforce teams : global recommendations and guidelines.

Appendix

Appendix 1: Question used to build the risk-aversion variables

“In this part of the questionnaire, we are going to ask questions about your attitude when facing an uncertain situation in order to study how it affects your practice.

For the first question, we ask you to answer by considering your own self-perception.

In the following fields, give your position on a 0-to-10 scale (0 being associated with risk aversion and 10 with risk loving) concerning:

1. Daily life events
2. The management of your own finances
3. Medical decisions influencing patient health
4. Medical decisions influencing your own health”

Appendix 2: Descriptive statistics about GPs' risk attitude

| Values | General risk aversion | | Financial risk aversion | | Risk aversion for patients' health | | Risk aversion for own health | |
|--------|-----------------------|--------|-------------------------|--------|------------------------------------|--------|------------------------------|--------|
| | freq | % | freq | % | freq | % | freq | % |
| 0 | 64 | 4,08% | 136 | 8,67% | 154 | 9,82% | 51 | 3,25% |
| 1 | 51 | 3,25% | 118 | 7,53% | 190 | 12,12% | 58 | 3,70% |
| 2 | 154 | 9,82% | 261 | 16,65% | 330 | 21,05% | 135 | 8,61% |
| 3 | 167 | 10,65% | 209 | 13,33% | 205 | 13,07% | 146 | 9,31% |
| 4 | 222 | 14,16% | 186 | 11,86% | 158 | 10,08% | 169 | 10,78% |
| 5 | 304 | 19,39% | 276 | 17,60% | 215 | 13,71% | 297 | 18,94% |
| 6 | 175 | 11,16% | 122 | 7,78% | 95 | 6,06% | 183 | 11,67% |
| 7 | 195 | 12,44% | 87 | 5,55% | 85 | 5,42% | 214 | 13,65% |
| 8 | 129 | 8,23% | 73 | 4,66% | 53 | 3,38% | 158 | 10,08% |
| 9 | 30 | 1,91% | 16 | 1,02% | 10 | 0,64% | 43 | 2,74% |
| 10 | 28 | 1,79% | 23 | 1,47% | 14 | 0,89% | 59 | 3,76% |
| NSP | 49 | 3,13% | 61 | 3,89% | 59 | 3,76% | 55 | 3,51% |
| Total | 1568 | 100% | 1568 | 100% | 1568 | 100% | 1568 | 100% |

Source: Panel 2, DREES, URPS-ML, ORS

Appendix 3: Questions asked to reveal GPs' willingness to delegate tasks to nurses

The following question is asked to the interviewed GPs:

"Let's admit that a law enables you to offer a part-time job to a nurse who would work at your practice for some day or half day duties. He/She would be paid according to three randomised scenarios:

- A lump-sum fully financed by the National Health Insurance Fund;
- The revenues generated by your self-employed activity for half of the nurse's payment, the other half being funded by the National Health Insurance Fund;
- The revenues generated by your self-employed activity (integrally).

Would you feel favourable toward delegating to him/her at least one task (whatever the type of task)?

1. Not favourable at all
2. Not really favourable
3. Almost favourable
4. Totally favourable
5. Do not know"