



**THÈSE DE DOCTORAT**

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**Investir dans le secteur médico-social pour améliorer  
l'efficacité des soins des seniors**

**Investing in long-term care for improving care efficiency  
for older adults**

Soutenue par

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Anne



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<sup>1</sup> <https://www.irdes.fr/recherche/projets/effets-de-l-organisation-et-du-financement-des-soins-de-longue-duree-sur-qualite-de-prise-en-charge-sanitaire-des-personnes-agees-dependantes.pdf>

### Reading guide / Guide de lecture

This thesis is written in English. For French readers, a summary in French is proposed at the beginning of the manuscript. This summary, which is available in the following section in English, provides also a general introduction to the thesis. It presents the economic and institutional framework of long-term care in France and at internationally, specifies the research questions addressed in the thesis and places them in the theoretical and empirical literature. A last section of the introduction summarizes the contributions, main results and conclusions of each chapter of the thesis. The following three chapters develop the three major analysis of the thesis. Each chapter presents an empirical paper that could be read independently from the rest of the thesis. Therefore, some explanations or references can be found in different parts. The thesis ends with a General Conclusion discussing the main results, highlighting implications for policy makers, and introducing future research projects on the topic.



# **Summary in French / Présentation de la thèse en Français**

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## 1. Introduction

L'efficacité des soins de longue durée, appelés en France soins médico-sociaux, représente un enjeu important. En effet, près de 2,5 millions de seniors ont besoin d'aide pour réaliser les actes de la vie quotidienne, chiffre est amené à augmenter dans les années à venir pour représenter près de 4 millions de personnes à l'horizon 2050 (Larbi and Roy, 2019). L'inadéquation des soins médico-sociaux et l'inefficacité du secteur peuvent représenter des coûts financiers et sociétaux très élevés et aussi impacter le secteur sanitaire dont les coûts de prise en charge ne cessent d'augmenter.

En France comme dans la majeure partie des pays, le secteur médico-social et le secteur sanitaire représentent deux secteurs économiques différents avec des organisations, politiques et financements distincts. Ainsi traditionnellement, les questionnements sur l'efficacité de ces deux secteurs ont généralement été étudiés séparément. Avec, par exemple, d'un côté, les études questionnant l'efficacité des hôpitaux (Giancotti et al., 2017; Ravaghi et al., 2019; Tabrizi, 2012) et de l'autre les études questionnant l'efficacité des établissements de soins de longue durée (ESLD) de type « nursing homes » (Shimshak et al., 2009; Tran et al., 2019; Weech-Maldonado et al., 2006). La question de l'intégration des soins et de l'interdépendance entre les secteurs sanitaire et médico-social pour prendre en charge les seniors en situation de perte d'autonomie commence à émerger dans la littérature (Barrenho et al., 2022; Nolte and Pitchforth, 2014). La relation entre les modalités de financement et d'organisation du secteur médico-social et l'efficacité des soins reste cependant encore largement à explorer, d'autant plus en France où les études économiques sur le sujet sont rares (Dormont and Martin, 2011; Martin, 2014; Martin and Jérôme, 2016; Martin and Ramos-Gorand, 2017; Rapp et al., 2015; Roquebert-Labbé, 2018).

Ma thèse vise à questionner l'efficacité des soins reçus par les seniors en France au regard des modalités de financement, d'organisation et de fixation des prix des soins et services médico-sociaux. Elle s'articule en trois chapitres. Le premier chapitre interroge la relation entre inégalités territoriales d'offre et de financement du secteur médico-social avec les dépenses hospitalières des seniors atteints de démence. Le second chapitre questionne l'organisation des soins dans les établissements d'hébergement pour personnes âgées dépendantes (Ehpad), plus spécifiquement l'impact d'une intervention permettant d'améliorer l'articulation des soins entre l'établissement, l'hôpital et les médecins traitants. Et le troisième chapitre questionne les déterminants des variations de prix d'hébergement payé par les

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résidents en Ehpad et leurs liens avec la qualité des soins reçus dans ces établissements.

L'objectif de ce résumé est de présenter le cadre économique et institutionnel dans lequel s'inscrit la thèse ainsi que sa contribution à la recherche économique du domaine étudié. La première section présente les spécificités du marché de soins médico-sociaux en termes de demande et d'offre. La section suivante précise les questions de recherches abordées dans la thèse en les situant dans la littérature théorique et empirique, ainsi que la contribution, les principaux résultats et les conclusions de chacun des chapitres de la thèse.

### **2. Le marché des soins médico-sociaux**

Le marché de soins médico-sociaux est en pleine expansion dans l'ensemble des pays de l'Organisation de coopération et de développement économiques (OCDE). En effet, depuis plusieurs décennies, la demande de soins médico-sociaux est augmentée par le vieillissement des populations, mais également par les évolutions sociétales (travail des femmes, éloignements familiaux, etc.). L'offre de soins évolue également en fonction de l'attractivité du secteur, des politiques de financement et de régulation. Dans cette section, je vais présenter les spécificités du marché des soins médico-sociaux. Dans un premier temps, je reviendrai sur les caractéristiques de la demande de soins médico-sociaux ainsi que sur les préférences des consommateurs. Dans un second temps, j'aborderai l'évolution de l'offre, des politiques de financement et de régulation en France. Troisièmement, je présenterai le contexte international et les problématiques communes aux marchés de soins de longue durée.

#### **2.1 Demande de soins et préférences**

Une maladie chronique ou un accident peut altérer l'autonomie d'une personne pour réaliser les actes de la vie quotidienne (se laver, s'habiller, etc.) de manière durable. Ces personnes vont ainsi avoir besoin de soins de longue durée, appelés soins médico-sociaux en France. On distingue trois catégories de soins de longue durée (OECD, 2018). Les soins médicaux et infirmiers (*medical and nursing care*) qui correspondent au traitement des plaies, à l'administration de médicaments, aux conseils de santé, aux soins palliatifs, au soulagement de la douleur et au diagnostic médical en rapport avec une affection de longue durée. Les soins personnels (*personal care*) qui caractérisent l'aide à la réalisation des activités de la vie quotidienne (AVQ) telles que manger, se laver, s'habiller, se mettre au lit, aller aux toilettes et gérer

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l'incontinence. Les soins sociaux (*social care*<sup>2</sup>) qui correspondent à l'assistance pour les activités instrumentales de la vie quotidienne (AIVQ) telles que les courses, la lessive, la cuisine, les travaux ménagers, la gestion des finances, etc.

### 2.1.1 Les facteurs déterminant la demande de soins

Le premier facteur lié à la demande de soins médico-sociaux est le vieillissement des populations largement expliqué par les changements démographiques intervenus au *XX<sup>e</sup>* siècle tels que le taux de natalité élevé de l'après-guerre et la hausse de l'espérance de vie (Spillman and Lubitz, 2000). Il y a près de 2,5 millions de seniors en France qui ne peuvent pas réaliser seuls les actes de la vie quotidienne et ce chiffre est amené à augmenter dans les années à venir pour représenter près de 4 millions de personnes à l'horizon 2050 (Larbi and Roy, 2019). En effet, l'avancée en âge, principalement après 65 ans, est associée à un accroissement des risques de maladies chroniques tels que les maladies neurodégénératives (Alzheimer, etc.) ou pouvant laisser des séquelles à long terme telles que les accidents vasculaires cérébraux (Guzman-Martinez et al., 2019). Ainsi, on estime qu'il y a 1,2 million de seniors atteints de la maladie d'Alzheimer et syndrome apparenté en France, et cette population devrait représenter 2 millions de personnes d'ici 2050 (Carcaillon-Bentata et al., 2016). On estime des évolutions similaires dans les autres pays de l'OCDE d'ici à 2050 (OCDE, 2021)

Un second facteur expliquant la hausse de la demande de soins médico-sociaux des dernières décennies est l'évolution du modèle familial dans les pays de l'OCDE (Colombo et al., 2011). En effet, les premiers pourvoyeurs de soins médico-sociaux sont les proches des personnes en situation de perte d'autonomie, ainsi aujourd'hui, plus de 60 % des soins médico-sociaux sont fournis par l'entourage en France<sup>3</sup>(Brunel et al., 2019a). La disponibilité des proches pour réaliser ces soins impacte la demande de soins médico-sociaux fournie par des professionnels et donc le marché des soins médico-sociaux. Dans l'ancien modèle patriarcal de la famille d'avant la Seconde Guerre mondiale, les femmes qui restaient dans leurs foyers pour s'occuper de leurs enfants procuraient également bien souvent les soins quotidiens dont avaient besoin les aînés de la famille. L'entrée des femmes dans le monde du travail a réduit leur disponibilité pour réaliser ces soins quotidiens, même si elles

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<sup>2</sup> Le terme *social care* peut recouvrir des services différents en fonction des pays. En Angleterre c'est un terme qui recouvre à la fois l'accompagnement pour réaliser les soins personnels et les soins sociaux tels que définis ici.

<sup>3</sup> Une enquête de 2015 a montré que les personnes âgées de 60 ans recevant de l'aide pour réaliser les actes de la vie quotidienne ont un nombre médian hebdomadaire d'aides reçu de 8h dont 5h sont apportées par l'entourage.

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restent les principales pourvoyeuses de soins auprès de leurs proches en situation de perte d'autonomie (Sharma et al., 2016). De même, l'éclatement des familles (les aînés résidant plus souvent seuls) réduit le niveau de soins réalisés par l'entourage (Sokolovsky, 2001).

### 2.1.2 Utilité et préférences

De manière plus globale, la demande de soins médico-sociaux répond à un arbitrage des ménages, qui vont déterminer leurs choix de consommation en fonction de leurs préférences et de l'utilité qu'ils attribuent à différents biens et services. Dans la théorie du consommateur de Keynes (Keynes et al., 1936), le consommateur est rationnel et capable d'établir un classement de ses préférences qu'il attribue à différents biens et services, il va ainsi maximiser sa fonction d'utilité en fonction du prix de ces biens et services et de sa contrainte de revenu.

Contrairement au secteur médical, où les médecins prescrivent les soins, restreignant en partie la liberté de choix des patients, dans le secteur médico-social, les aînés et leurs proches ont une liberté de choix plus étendue, la majorité des soins n'étant pas prescrits par un médecin<sup>4</sup>. Il existe cependant des préférences de consommation communes à l'ensemble des pays. La littérature montre que la grande majorité des personnes préfèrent recevoir des soins de longue durée dans leur environnement physique et social connu lorsque les besoins de soins sont modérés, et des soins en établissement adapté lorsque les besoins sont importants (Lehnert et al., 2019). De même, on observe un consensus international sur les conséquences néfastes de l'hospitalisation pour ces personnes fragiles. Cette littérature montre, à partir d'études quantitatives et qualitatives, que l'hospitalisation des seniors peut conduire à une détérioration de leur état de santé psychique et physique (Aminzadeh and Dalziel, 2002; Boyd et al., 2008).

Un élément central pour la rationalité des choix des consommateurs est le niveau d'information sur les services disponibles ainsi que leur qualité. Norton (2000<sup>5</sup>) suggérait que les consommateurs de soins médico-sociaux en établissement de soins de longue durée (ESLD) ont plus de facilité pour faire un choix informé qu'en secteur hospitalier grâce à une moins grande technicité des soins (*« les ESLD ne sont pas techniques et peuvent donc être évalués plus facilement par les consommateurs que*

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<sup>4</sup> Même si certains soins médico-sociaux peuvent être prescrits par les médecins généralistes tels que les services de soins infirmiers à domicile (SSIAD) ou encore l'intervention d'infirmières libérale à domicile

<sup>5</sup> Handbook, 2000, volume 1B, p. 955

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*par exemple, un service de chirurgie. Les consommateurs peuvent observer l'odeur, la taille des chambres, l'ambiance, les activités proposées, les repas, etc.»* (Norton, 2000). Cependant, cette approche ignore le fait que dans les ESLD il y a également besoin d'un suivi médical et que malgré la moins grande technicité des soins, apprécier leur qualité demeure un exercice difficile, car il dépend de nombreux facteurs pas toujours observables facilement.

La demande de soins va également dépendre de son élasticité-prix et revenu. La littérature est relativement restreinte sur cette question. Une étude française a montré que la consommation de soins médico-sociaux à domicile des Français est sensible au prix qu'ils payent, la consommation étant réduite quand le prix payé par les ménages augmente (Roquebert and Tenand, 2017). Cependant, l'ajustement de la consommation est proportionnellement plus faible que la hausse de prix observée soulignant ainsi l'effort financier que les ménages sont prêts à réaliser pour en bénéficier. Cette étude, en analysant la relation entre les revenus et la consommation de soins médico-sociaux, montre que les ménages aux revenus plus élevés ne consomment pas significativement plus de soins. En France, les allocations perçues par les ménages pour financer les soins médico-sociaux à leur domicile étant inversement proportionnelles à leur revenu pourraient expliquer qu'une hausse de revenu n'augmente pas significativement la consommation de ces soins.

### **2.1.3 La production de bien-être**

Une distinction majeure entre les soins médicaux et les soins médico-sociaux est liée à la fonction curative des soins médicaux beaucoup moins prégnante pour les soins médico-sociaux. En effet, les soins médico-sociaux permettent d'améliorer le bien-être de la personne (son intégrité physique et psychique, son confort, la réduction de la douleur, etc.), de prévenir les risques sanitaires (chutes, déshydratations, dépression, etc.) mais pas la guérison qui permettrait de retrouver un bon état de santé.

La théorie de Grossman (1972) introduit la santé comme un capital dans lequel chaque individu peut investir. Il révolutionne ainsi les théories du consommateur classique en plaçant les consommateurs comme producteurs de leur propre santé et la demande de soins comme un investissement en santé. L'investissement en santé passé (demande de soins médicaux, éducation, comportements à risques, etc.) détermine le capital santé de la personne et peut donc influencer sur la demande future de soins médico-sociaux. Les soins médico-sociaux pourraient aussi rentrer dans la fonction d'investissement en santé en améliorant la qualité de vie (production de bien-

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être physique et psychique) et le capital santé par la prévention des risques sanitaires (chutes, etc.). Grossman identifie deux formes de bénéfices marginaux du capital santé, un relatif à la jouissance de la santé résultant de l'investissement, l'autre relatif au retour sur l'investissement monétaire que cela produit (moins important chez les seniors qui sont à la retraite). A la fin de la vie, il arrive un moment où l'investissement en santé ne permet pas de retrouver un bon état de santé, il permet cependant d'améliorer la qualité de vie de la personne, et ce principalement par l'investissement dans les soins médico-sociaux. L'utilité retirée de l'investissement dans les soins curatifs diminue<sup>6</sup> tandis que celle des soins médico-sociaux augmente. Par exemple, les soins palliatifs peuvent parfois amener à raccourcir la durée de vie de la personne par l'arrêt des soins curatifs, mais permettre d'améliorer ses conditions de vie et de bien-être. Dans ce cas, l'objectif du soin n'est plus la production de santé future, mais bien du bien-être à court terme.

Une autre spécificité des arbitrages liés au choix de consommer des soins médico-sociaux est qu'ils ne dépendent pas uniquement de la personne elle-même, mais bien souvent également de sa famille. Malgré la place importante des médecins dans les choix de consommation médicale, une personne adulte réalisera généralement elle-même ses arbitrages en fonction de ses préférences, son aversion au risque, et son utilité propre. Les personnes en situation de perte d'autonomie n'ont souvent plus la capacité de décider pour elles-mêmes de leurs arbitrages économiques, ce sont donc les proches (souvent la famille) qui vont réaliser ces arbitrages pour eux. Cela va même plus loin, le choix de consommer des soins médico-sociaux va impacter la famille elle-même, la famille étant tenue par la loi d'apporter une aide financière pour l'hébergement en Ehpad si la personne ne peut y subvenir seule. De plus, les membres de la famille produisent souvent eux-mêmes des soins médico-sociaux auprès de leurs proches, ce qui fait entrer le temps pour réaliser ces soins dans leur arbitrage travail/loisir. Ces arbitrages économiques, qui dépendent des préférences et de l'aversion au risque de chacun des membres de la famille, peuvent ainsi rentrer en confrontation dans le choix des soins médico-sociaux de leurs proches en fin de vie pouvant expliquer certains conflits familiaux.

### **2.2 Offre, régulation et financements**

Le secteur médico-social est composé d'organismes privés ou publics qui réalisent des soins à domicile ou en institution auprès de personnes qui ne peuvent réaliser

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<sup>6</sup> Les bénéfices sur l'état de santé de certains soins curatifs diminuent lorsque l'état de santé de la personne est trop détérioré.



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seules les actes essentiels de la vie quotidienne. Dans la loi française, la dépendance, qualifiée aujourd'hui de perte d'autonomie, est définie comme "l'état de la personne qui, nonobstant les soins qu'elle est susceptible de recevoir, a besoin d'être aidée pour l'accomplissement des actes essentiels de la vie ou requiert une surveillance régulière" (art. 2 de la loi du 24 janvier 1997). La sémantique de cette définition distingue les soins de l'aide apportée pour réaliser les actes de la vie quotidienne. Dans l'esprit collectif français, les soins font généralement référence au curatif, alors qu'à l'étranger le terme « *care* » peut également correspondre au fait de prendre soin de quelqu'un au quotidien. Ainsi, les personnes qui réalisent ces soins médico-sociaux auprès des personnes en perte d'autonomie sont qualifiées d'aidants (formels, informels, professionnels, ou familiaux) quand à l'étranger on parle de « *caregivers* », littéralement donneurs de soins (ou soignants).

L'offre de soins médico-sociaux en France est marquée par cette frontière entre les secteurs médical et social. L'objectif premier de ces soins est social car il permet d'améliorer la qualité de vie et le bien-être quotidien des personnes ne pouvant réaliser seules les actes essentiels de la vie quotidienne. Pourtant leurs impacts importants sur la santé physique et psychique de ces populations fragiles, ainsi que les besoins de connaissance médicale pour la réalisation de certains de ces soins (soins infirmiers, traitement de la douleur, soins palliatifs, etc.) en font des soins à la frontière entre les compétences médicales et sociales, d'où le terme français « médico-social ». En France, les soins qui nécessitent une connaissance médicale vont être organisés et financés par le secteur sanitaire (assurance maladie et agences régionales de santé) tandis que les soins quotidiens qui ne nécessitent pas de formations médicales sont organisés et financés par le secteur social (département). Ainsi, un producteur de soins médico-sociaux en fonction des soins fournis et de la formation de ses professionnels peut recevoir des financements mixtes (assurance maladie/département) ou uniquement des financements de l'assurance maladie ou du département.

Dans cette section, je vais tout d'abord revenir sur l'évolution historique de l'offre de soins médico-sociaux en France, puis j'apporterai quelques éléments de contexte sur les modalités de financement et de régulation de ces soins.

### **2.2.1 Evolution de l'offre de soins en France**

La question de la place du secteur médico-social dans le système de santé et le niveau de médicalisation des établissements médico-sociaux a été remise en question de nombreuses fois dans l'histoire de ces établissements. En effet, les

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institutions qui accueillent des seniors remontent à l'époque du Moyen Age avec la création des hospices par les institutions charitables religieuses. Étymologiquement, l'hospice est le lieu où l'on donne l'hospitalité. Pendant longtemps, on ne distinguait pas les hospices des hôpitaux. Dès la fin du Moyen Age, la création à Paris de l'Hôtel-Dieu a permis un début de différenciation, l'Hôtel-Dieu accueillait les personnes malades tandis que les hospices accueillaient de préférence les enfants trouvés ou abandonnés, mais aussi les vieillards, infirmes, aveugles et incurables (Yang and Dubois, 2019). Malgré une séparation plus nette dans les siècles qui ont suivi entre l'hôpital et l'hospice, pendant longtemps on a assisté à une coexistence du sanitaire et du social, les hospices étant souvent gérés par l'hôpital (Verdier, 2003). C'est la loi du 31 décembre 1970 qui va recentrer l'hôpital sur sa fonction première, les soins médicaux, et initier un clivage entre le sanitaire et le social.

Cinq années plus tard est créé le secteur médico-social, avec la loi fondatrice du 30 juin 1975, dont la gouvernance et le financement sont donnés aux départements<sup>7</sup>. Elle va réformer le système des hospices afin de « mettre les locaux en harmonie avec les exigences de confort [contemporain] ; apporter les soins nécessaires en renforçant la présence médicale et paramédicale ; supprimer les promiscuités choquantes d'âges ou de handicaps très différents »<sup>8</sup> (Delattre et al., 2016). Il est ainsi institué deux sortes d'établissements à destination des sujets âgés, les « services de longs séjours », ancêtres des actuelles unités de soins de longue durée (USLD) qui sont rattachés au domaine sanitaire (hospitaliers) afin d'élever le niveau de soins garantis et se distinguer des maisons de retraite qui ne sont pas conçues pour délivrer des soins médicaux. Pourtant, dans les années qui vont suivre, le besoin de médicalisation des maisons de retraite se fait de plus en plus sentir, ce qui conduira à l'instauration de financements par l'assurance maladie de places en section de cure médicale en maison de retraite.

### **Création de l'Ehpad**

La loi du 2 janvier 2002 réforme le secteur avec une volonté de médicaliser les maisons de retraite. Ainsi sont créés les établissements d'hébergement pour personnes âgées dépendantes (Ehpad) qui perçoivent un forfait soins par l'assurance

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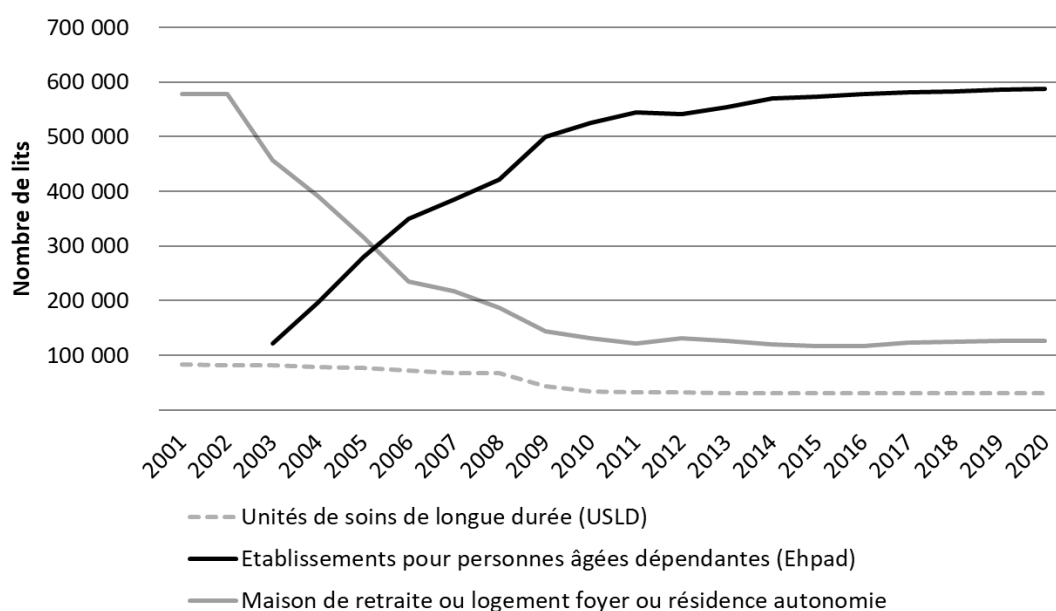
<sup>7</sup> La loi du 30 juin 1975 organise le système des autorisations et des répartitions de compétence entre État et départements. C'est la loi du 6 janvier 1986 qui constitue la grande loi de décentralisation en matière d'action sociale et qui fait des Conseils généraux les chefs de file de l'action sociale.

<sup>8</sup> Rapport du groupe de travail "Soins aux personnes âgées" remis au ministre de la Santé et de la Sécurité sociale en décembre 1980 page 38.

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maladie et un forfait dépendance par le département<sup>9</sup>. Entre 2002 et 2012, le secteur se transforme donc, la majorité des maisons de retraite vont devenir des Ehpad mais également la moitié des USLD (Figure 1). L'Ehpad devient le principal établissement médico-social à accueillir des seniors en situation de perte d'autonomie en France avec environ 600 000 lits en hébergement permanent. Il reste environ 30 000 places en USLD et un pool d'établissements non médicalisés, d'environ 120 000 lits, qui ne perçoivent pas de financement de l'assurance maladie et qui accueillent des personnes plus autonomes. Ces établissements vont prendre des dénominations différentes en fonction des périodes, ils se nomment aujourd'hui les résidences autonomes.

**Figure 1. Evolution du nombre de lits dans les établissements médico-sociaux**



Sources : Données Statiss 2001 à 2020. Hors accueil de jours et temporaire en Ehpad.

### Objectif/politiques de maintien à domicile

La prise en charge médico-sociale au domicile s'est également développée depuis les années 70. En effet, dès 1962, le rapport Laroque pose les principes fondateurs d'une politique de maintien à domicile des seniors : « Il est essentiel de maintenir les personnes âgées dans la société au contact avec les autres générations et d'éviter toute rupture brutale dans leurs conditions de vie » (Laroque et al., 2014). L'aide à domicile, tout comme la prise en charge institutionnelle, sont issues des lois

<sup>9</sup> Via l'allocation personnalisée d'autonomie (APA), prestation également créée en 2002 et qui se substitue à la prestation spécifique dépendance (PSD) créée en 1997.

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fondatrices du secteur médico-social de 1975 et de 2002. La loi du 30 juin 1975 crée la première forme de financement public versé aux ménages pour financer les soins personnels et sociaux réalisés par un aidant familial ou professionnel au domicile, l'allocation compensatrice pour tierce personne financée par les départements. En 1997, cette allocation va devenir spécifique aux personnes âgées de moins de 60 ans en situation de handicap tandis qu'est créée pour les personnes âgées de plus de 60 ans la prestation spécifique dépendance (PSD), ancêtre de l'actuelle allocation personnalisée d'autonomie (APA) créée par la loi de 2002 (tableau 1).

**Tableau 1. L'allocation personnalisée d'autonomie à domicile**

<b>Sources de financement</b>	Environ 60 % de l'APA est financée par les départements via les impôts locaux et 40 % par la Caisse nationale de solidarité pour l'autonomie (CNSA).
<b>Critères d'éligibilité nationaux</b>	Avoir plus de 60 ans Dépendance moyenne à forte : les quatre premiers niveaux du score national de dépendance (GIR) basés sur dix variables d'activité physique et mentale et sept variables d'activité domestique et sociale <sup>10</sup> .
<b>Définition des besoins</b>	Les équipes pluridisciplinaires des conseils départementaux évaluent le score de dépendance (GIR) et définissent un "plan de soins"
<b>Montant de l'indemnité : règles nationales</b>	Montant maximal du " plan de soins " selon le niveau de dépendance : - 674 euros par mois en niveau 4 (faible dépendance). - 1 011 euros par mois en niveau 3 - 1 399 euros par mois en niveau 2 - 1 742 euros par mois au niveau 1 (niveau de dépendance le plus élevé).  Reste à charge des ménages : en fonction des revenus. En moyenne, 20 % du "plan de soins". En dessous de 800€, les bénéficiaires n'ont pas de ticket modérateur, au-dessus de 2900€, ils participent à 90 % du coût.
<b>Définition du montant du "plan de soins"</b>	Pour chaque type de prestataires médico-sociaux (SAAD, aide-ménagère indépendante, accueil de jour en établissement, etc.), les conseils départementaux fixent les prix de référence. Ces prix sont utilisés par les équipes pluridisciplinaires pour calculer le montant du "plan de soins" (nombre de jours ou d'heures multipliées par le prix de référence).

Sources : Extrait de (Or and Penneau, 2021)

L'éligibilité à l'APA est définie par le département à l'aide d'un outil national d'évaluation de la dépendance (Grille AGGIR). L'allocation à domicile est versée pour financer un "plan de soins" spécifique à la personne élaboré par une équipe

<sup>10</sup> Le document officiel présente ainsi le grille AGGIR mais en réalité il y a uniquement 8 variables d'activités physiques et mentales prises en compte (ADL) pour déterminer le score GIR

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interdisciplinaire (généralement composée d'assistants sociaux et d'infirmiers) du département. Le "plan de soins" définit le nombre d'heures de soins personnels et/ou sociaux nécessaires, ainsi que les besoins en matière d'accueil de jour, et autres besoins nécessaires au maintien de la personne à son domicile. Pour chaque niveau de dépendance, un montant maximal d'APA est fixé au niveau national (tableau 1).

En 2015, il a été estimé qu'environ 180 000 intervenants en équivalent temps plein (ETP) fournissaient des soins médico-sociaux au domicile auprès de personnes âgées de plus de 60 ans<sup>11</sup> (Carrère et al., 2021). Ces professionnels travaillaient comme indépendants ou salariés d'un service médico-social, et exerçaient des professions avec des niveaux de qualification variés (aides-soignants, aides à domicile, aides ménagères, auxiliaires de vie, infirmiers, etc.). Avec 6 700 services et 98 000 ETP, les services d'aide et d'accompagnement à domicile (SAAD) sont les acteurs principaux des soins personnels et sociaux à domicile. Les SAAD et le personnel d'aide à domicile indépendants agréés par le département peuvent être financés par l'APA (tableau 1).

Par ailleurs, les services de soins infirmiers à domicile (SSIAD), moins nombreux (2 100 services et 28 000 ETP) sont des services d'aide à domicile médicalisés avec une coordination des soins réalisée par une infirmière tandis que les soins personnels et sociaux sont réalisés par des aides-soignantes qui représentent près de 90 % des intervenants dans ces services<sup>12</sup> (FEHAP, 2014). On y accède par prescription médicale et l'ensemble des frais sont pris en charge par l'assurance maladie. Très peu répandus, il existe aussi des SPASAD (services polyvalents d'aide et de soins à domicile), regroupant SSIAD et SAAD. Ainsi, ces différents types de services peuvent réaliser des soins équivalents tels que les soins personnels (toilettes, habillage) avec des modalités de financement et d'organisation très différents. Un récent décret, fin 2021, a toutefois annoncé une réforme majeure visant à remplacer les structures existantes par un unique modèle de service d'aide à domicile (SAD) avec pour objectif d'uniformiser les modalités de financement et d'organisation dans le secteur.

### **2.2.2 Financement et régulation de l'offre**

#### **Le financement des soins**

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<sup>11</sup> à partir de l'enquête capacités, aides et ressources des seniors (CARE) de la DREES

<sup>12</sup> Les aides-soignants effectuent 90 % des interventions des SSIAD

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Les financements publics du secteur médico-social représentent environ 20 milliards d'euros par an (figure 2). Ainsi, l'assurance maladie dépensait 10 milliards d'euros pour financer les soins en Ehpad, en SSIAD et en USLD en 2019. Les départements déboursaient près de 5,5 milliards d'euros pour financer l'allocation personnalisée d'autonomie (APA) à domicile et en établissement ainsi que l'aide sociale à l'hébergement des résidents d'Ehpad les plus défavorisés. La Caisse nationale de solidarité pour l'autonomie (CNSA) dépensait 3,5 milliards d'euros pour financer l'APA (transfert au département), le forfait d'accompagnement de certains établissements médico-sociaux comme les résidences « autonomie » ou encore le financement de plans d'aide à l'investissement à destination des établissements médico-sociaux. Enfin, l'État finançait 1 milliard d'euros d'exonérations fiscales et de financement de programmes dans le secteur. On observe un taux d'évolution annuel moyen entre 2010 et 2019 de 1,8 % principalement porté par une hausse constante des dépenses de l'assurance maladie et de la CNSA sur la période. L'année 2020 a été caractérisée par une hausse très élevée des dépenses de l'assurance maladie liée aux mesures financières de soutien au secteur médico-social pendant la crise sanitaire du Covid-19. Ainsi entre 2019 et 2020, les dépenses de l'assurance maladie ont augmenté de 23 % (de 10,2 à 12,6 milliards d'euros en un an). L'ensemble des analyses réalisées dans la thèse portent sur une période antérieure à la crise du Covid-19.

Le budget total de l'assurance maladie en 2017 s'élève à 170 milliards d'euros (hors financements médico-sociaux). Cela permet ainsi de relativiser le coût du secteur médico-social. En effet, une journée en Ehpad coûte moins de 50 euros par jour pour les pouvoirs publics<sup>13</sup> quand une journée en soins de suite et de réadaptation coûte environ 200 euros par jour et une journée en soins palliatifs en Médecine-Chirurgie en moyenne 455 euros par jour<sup>14</sup>.

Cependant, il manque dans le décompte des dépenses médico-sociales les soins réalisés par les infirmières libérales au domicile. En effet, les infirmières libérales rémunérées à l'acte par l'assurance maladie peuvent fournir une aide pour les activités de la vie quotidienne (AVQ), comme la toilette, qui sont également assurées par les professionnels du secteur médico-social (SAAD, SSIAD, etc..). En principe, cela ne devrait concerner que des cas complexes tels que la toilette de personnes ayant des

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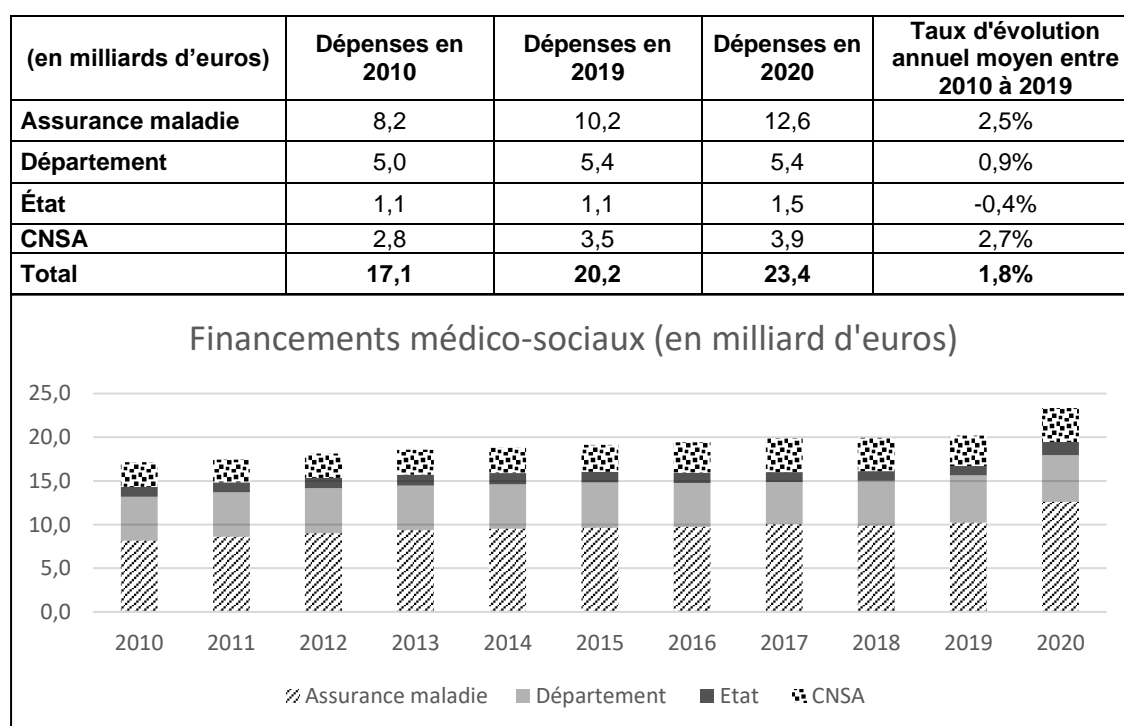
<sup>13</sup> Médiane du forfait soins payé par l'assurance maladie additionné au forfait dépendance payé par le département en 2017 : 53,3 euros par jours pour une personne en GIR 1-2 ; 45,3 euros par jour pour une personne en GIR 3-4 et 32,9 euros par jours pour une personne en GIR 5-6. Source CNSA (Moreau ; 2018).

<sup>14</sup> Source ATIH

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escarres, mais dans la pratique, de nombreuses infirmières libérales fournissent régulièrement ce type de soins, faisant de cette catégorie professionnelle un acteur central des soins médico-sociaux au domicile, en particulier dans les régions où le nombre d'infirmières est élevé (Suchier et al., 2021). Les dépenses d'actes infirmiers de soins correspondant à ces soins personnels réalisés par des infirmières libérales représentent environ 2 milliards d'euros par an financés par l'assurance maladie (LFSS 2022, 2021, 2020<sup>15</sup>).

**Figure 2. Financements publics du secteur médico-social**



**Champs :** sécurité sociale (Objectif national de dépenses d'assurance maladie (ONDAM) médico-social, personnes âgées + USLD) ; département (dépenses nettes totales d'aide aux personnes âgées<sup>16</sup> moins le montant du transfert CNSA pour financer l'APA) ; Etat (Exonérations de dépenses fiscales + exonération de cotisation sociale+ programmes (projet autonomie, mutation économique, développement de l'emploi ...)) ; CNSA (transfert du financement APA au département + Plan d'aide à l'investissement + financements établissements et services accueillants des personnes âgées)

**Sources :** LFSS 2012 à 2022 ; DREES enquête aide sociale ;

### Le reste à charge

En France, les restes à charge liés aux soins médicaux sont relativement faibles en moyenne pour les seniors alors que les restes à charge médico-sociaux peuvent être assez conséquents. En effet, malgré une croissance des dépenses

<sup>15</sup> <https://www.securite-sociale.fr/la-secu-en-detail/loi-de-financement/annees-passees>

<sup>16</sup> APA à domicile et en établissement, dépenses d'aide-ménagère, aide sociale à l'hébergement

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sanitaires avec le niveau de perte d'autonomie, le système d'assurance maladie, principalement grâce au système d'exonération pour les affections de longue durée (ALD), maintient les restes à charge à un montant moyen de 900 euros annuels, quel que soit le niveau de perte d'autonomie (Penneau et al., 2018). De plus, les postes qui pèsent le plus sur le reste à charge sont bien couverts par les complémentaires santé, ce qui devrait réduire d'autant plus ces restes à charge<sup>17</sup>. Dans le secteur médico-social, le montant des restes à charge est moins bien connu et peut potentiellement varier de manière importante en fonction des modalités de prise en charge ou du fournisseur de soin.

En Ehpad, les résidents paient le coût d'hébergement qui est en moyenne de 2 000 euros par mois, mais peut varier de 1 400 à 6 000 euros en fonction des établissements. Au domicile, le reste à charge réel des personnes est mal connu, mais il est susceptible de varier de manière importante en fonction de l'offre disponible. Par exemple, pour la réalisation de la toilette quotidienne, les coûts des infirmières libérales ou de SSIAD sont généralement financés entièrement par la Sécurité sociale<sup>18</sup>, alors que pour les soins réalisés par un SAAD, le reste à charge dépendra de la politique départementale.

### **Les politiques de régulation**

Les producteurs de soins médico-sociaux en fonction de leurs financements peuvent dépendre de la gouvernance des agences régionales de santé (ARS) et/ou des départements. En effet, les ARS sont chargées d'implémenter les politiques sanitaires nationales dans leurs territoires tandis que les politiques sociales sont décentralisées au niveau départemental. Ainsi, les SAAD et les résidences « autonomie » dépendent uniquement des politiques départementales tandis que les Ehpad ont une double gouvernance (ARS/département). Enfin, les SSIAD ainsi que les infirmières libérales ne dépendent que des politiques sanitaires.

Les ARS sont des établissements publics de l'État à caractère administratif sous tutelle ministérielle. Créées en 2009, elles ont pour mission de gérer les services de santé ainsi que les actions de promotion de la santé. Dans le secteur médico-social, elles redistribuent les financements versés par l'assurance maladie aux Ehpad et aux USLD (forfait soins) ainsi qu'aux services de soins infirmiers à domicile (SSIAD) sur la

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<sup>17</sup> Plus de 90 % des Français étant couvert par une complémentaire santé.

<sup>18</sup> Si la personne âgée n'est pas en affection de longue durée, elle payera 40 % des coûts d'infirmières libérales, mais si elle est en ALD la sécurité sociale prendra à sa charge l'ensemble des coûts. Les SSIAD sont pris en charge intégralement pour tous les patients.



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base de contrats pluriannuels d'objectifs et de moyens (CPOM). Ces contrats sont les principaux outils de l'ARS pour réguler le nombre de places et le niveau des ressources en soins de ces établissements et services.

À l'instar des établissements hospitaliers, les réformes entamées depuis 2002 ambitionnent de réformer les modalités de régulation et de pilotage afin d'assurer une plus grande efficacité dans l'allocation des ressources. Les financements des établissements médico-sociaux vont ainsi passer progressivement d'un financement rétrospectif (plutôt inflationniste) à un financement prospectif considéré comme plus efficace et équitable. Le forfait soins en Ehpad est le premier à être modifié, dès les années 2006, il va dorénavant dépendre du profil d'état de santé mesuré par l'outil Pathos et du niveau de dépendance des résidents mesuré par l'outil AGGIR pour définir le groupe iso-ressources moyen pondéré soins (GMPS) de l'établissement. Le financement des soins dépendra ensuite de la formule tarifaire choisie (forfait global ou partiel, pharmacie à usage interne ou pas) et de la valeur du point GMPS de chacune de ces formules tarifaires définies au niveau national par arrêté ministériel chaque année.

Les ARS jouent également un rôle de contrôle de qualité et d'utilisation des fonds publics versés aux établissements médico-sociaux. La qualité et la fréquence des inspections réalisées par les ARS ont cependant été récemment remises en question à la suite de plusieurs scandales de maltraitance et de détournement de fonds publics dans les Ehpad privés lucratifs (De Saint-Martin et al., 2022).

### **La décentralisation des politiques sociales**

Les politiques sociales sont décentralisées au niveau des départements qui financent et régulent les soins personnels et sociaux des seniors de leur territoire. Il y a quatre-vingt-quinze départements en France métropolitaine, chacun étant administré par un organe élu, appelé conseil départemental, ayant le pouvoir de lever des impôts. La loi de modernisation de l'action publique territoriale et d'affirmation des métropoles de 2014 a renforcé le rôle des départements en tant que "chefs de file" de la politique sociale et de la dépendance. Le niveau de financement de l'APA, qui est la principale source de financement des soins médico-sociaux à domicile et qui finance également une partie des soins en établissement (forfait dépendance), varie selon les départements.

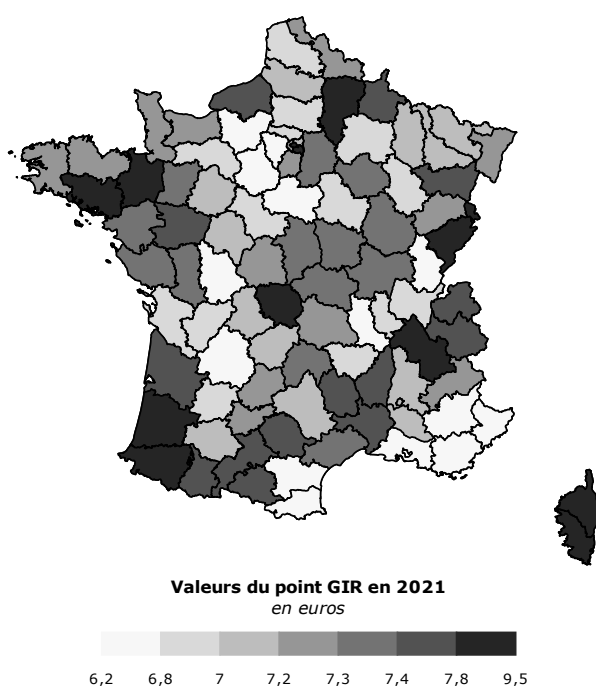
À domicile, les conseils départementaux peuvent se montrer plus ou moins généreux dans l'application des critères d'éligibilité nationale et dans l'évaluation du montant du plan d'aide financé par l'APA, soit par une estimation plus généreuse du

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nombre d'heures de soins nécessaires, soit par une fixation du tarif horaire plus ou moins généreuse (ces prix varient de 18 à 29 euros de l'heure pour une prise en charge par un SAAD en fonction des départements en 2015<sup>19</sup>). Ainsi, les restes à charge des personnes varient en fonction des départements où ils résident.

En Ehpad, le montant du forfait dépendance des établissements versé au titre de l'APA<sup>20</sup> varie également en fonction des politiques départementales. À l'instar du forfait soins financé par l'assurance maladie, la réforme de la tarification du forfait dépendance entamée en 2017 a permis de passer d'un financement basé sur les dépenses passées à une formule tarifaire nationale qui dépend du niveau de perte d'autonomie des résidents (grille AGGIR) et de la valeur du point GIR dans le département. Ainsi, cette réforme uniformise les modalités de financement du forfait dépendance des Ehpad tout en laissant la possibilité aux départements de pratiquer une politique de financement différencié par une libre fixation de la valeur du point GIR qui sera plus ou moins généreuse en fonction de leur richesse et de leurs orientations politiques (carte 1).

**Carte 1. Variation de la valeur du point GIR en fonction des départements**



<sup>19</sup> Une loi récente (L. 314-2-1) entrée en vigueur le 1<sup>er</sup> janvier 2022 a fixé un tarif minimum à 22 euros de l'heure.

<sup>20</sup> Pour financer une partie des coûts liés aux soins personnels des résidents. En théorie, le forfait soins financé par l'assurance maladie prend en charge les 2/3 des coûts pour réaliser les soins personnels des résidents tandis que le forfait dépendance financé par le département au titre de l'APA finance le tiers restant.

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Source : Données 2021 Caisse nationale de solidarité pour l'autonomie (CNSA)

Les politiques départementales jouent également un rôle central dans les variations d'offre médico-sociale dans leur territoire. En effet, les départements régulent l'offre dans le territoire et donnent l'autorisation d'ouvrir de nouvelles places parfois en accord avec les ARS.

### **2.3 Paysage international : des marchés différents avec des problématiques communes**

L'histoire, les évolutions démographiques, la richesse, les politiques sociales et sanitaires, ainsi que la culture sont autant d'éléments susceptibles de modifier l'offre et la demande de soins de longue durée d'un pays. Ainsi, les caractéristiques de ces marchés peuvent varier de manière importante d'un pays à l'autre. Pourtant, malgré ces différences, la majeure partie des problématiques rencontrées sont communes à l'ensemble des pays.

#### **La qualité des soins**

La qualité des soins de longue durée préoccupe les sociétés et décideurs politiques de nombreux pays, elle apparaît également depuis quelques années de plus en plus souvent dans les réflexions et rapports internationaux de l'Organisation mondiale de la santé (OMS) (Barrenho et al., 2022; WHO, 2008). De plus, les études qualitatives et quantitatives qui interrogent la qualité des soins en ESLD se multiplient dans la plupart des pays (Burke and Werner, 2019; Grabowski et al., 2014; Wang et al., 2019). Dans la littérature internationale, les indicateurs de qualité les plus répandus pour comparer les ESLD sont les taux d'encadrement (nombre de professionnels par résident), et l'outil RAI (*Resident Assessment Instrument*) basé sur l'évolution clinique de l'état de santé et de bien être des résidents (escarres, déclin fonctionnel, dépression, etc.). Le RAI a été traduit et validé dans plus d'une dizaine de pays (Rahman et al., 2009). Récemment, de plus en plus de pays utilisent également des données administratives de consommation de soins médicales (hospitalières et ambulatoires) afin de développer des indicateurs de qualité sur les fréquences d'hospitalisation des résidents et les prescriptions inappropriées (Graverholt et al., 2014; Jokanovic et al., 2015). Certains pays souhaitent inciter les établissements à améliorer leur qualité de prise en charge par des incitations financières en finançant à la qualité, les établissements ayant les meilleurs indicateurs reçoivent des financements publics plus importants (Kane et al., 2007), ou par la concurrence en affichant publiquement ces indicateurs (Werner et al., 2012). Les recherches portant

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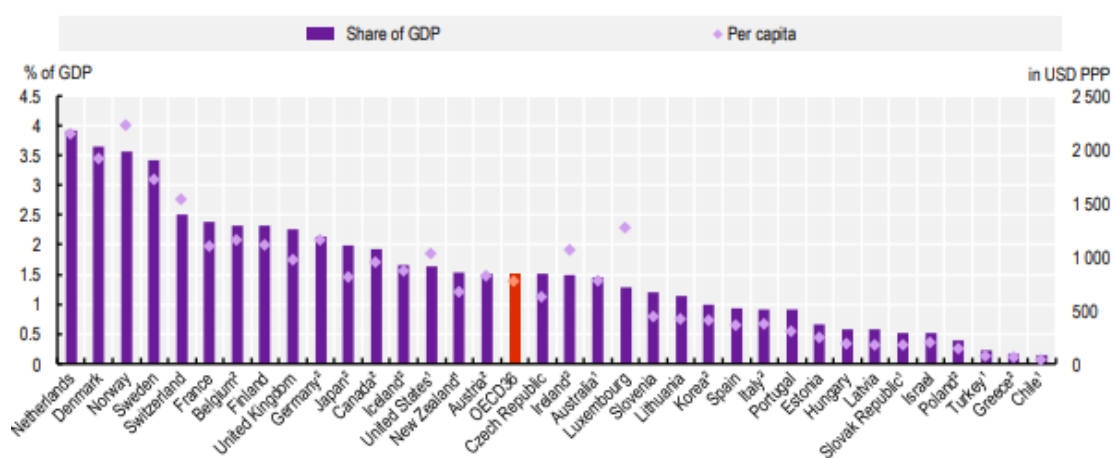
sur la qualité des soins à domicile sont quant à elles beaucoup moins développées surtout au niveau quantitatif.

Les difficultés rencontrées par les pays pour améliorer la qualité des soins sont communes et peuvent s'expliquer par plusieurs facteurs tels que la fragmentation et le sous-financement de ces soins, le manque d'attractivité des emplois dans les marchés de soins de longue durée, ou encore le manque de coordination des soins entre différents secteurs.

### Des financements souvent insuffisants, et inégalement distribués

Les systèmes assurantiels et les niveaux de financements publics des soins de longue durée varient en fonction des pays. Les pays qui ont les dépenses publiques les plus élevées en soins de longue durée sont les Pays-Bas et les pays scandinaves avec des dépenses totales représentant environ 3,5 % du produit intérieur brut (PIB), tandis que la France se trouve dans le second groupe de pays ayant les dépenses les plus élevées qui représentent environ 2,5 % du PIB avec le Royaume-Uni, la Belgique, l'Allemagne, etc. (figure 3). Les pays européens du Sud-Est et d'Amérique latine sont les pays pour lesquelles les dépenses sont les moins importantes, ce qui peut s'expliquer par une population plus jeune, mais également par une forte contribution de l'entourage familial aux besoins de soins quotidiens de leurs aînés dans ces pays. Dans la majeure partie des pays, les restes à charge médico-sociaux sont importants et représentent des coûts très élevés pour les ménages, surtout en institution où il faut payer le prix d'hébergement qui est souvent bien largement supérieur aux coûts d'un hébergement ordinaire.

**Figure 3. Dépenses totales de soins de longue durée par habitant en % du PIB, 2018 (ou année la plus proche)**



Extrait OECD, 2020 (<https://www.oecd.org/health/health-systems/Spending-on-long-term-care-Brief-November-2020.pdf>)

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Un autre point commun à plusieurs pays est la fragmentation et la décentralisation des financements des soins médico-sociaux, qui sont souvent inégalement distribués. En effet, une étude récente montre que de nombreux systèmes de santé ne permettent pas une équitable distribution des financements publics des soins de longue durée (Waitzberg et al., 2020). Un système avec une distribution équitable des financements de soins de longue durée est défini comme un système ayant des critères d'éligibilité aux financements des soins nationaux (donc identiques pour tous) et une distribution des financements basée sur des formules tarifaires de besoins (et non les dépenses passées ou des décisions politiques).

### **Crise d'attractivité des emplois**

Dans tous les pays, les marchés médico-sociaux sont également marqués par une crise d'attractivité des emplois, qui s'est aggravée depuis la crise sanitaire du Covid-19 (Scales, 2021). Les pays ayant des caractéristiques d'offre très différentes, le nombre de travailleurs des soins de longue durée varie de 0,5 pour 100 personnes de plus de 80 ans en Slovaquie à plus de 3,5 en Norvège, en Suède et aux États-Unis (Colombo et al., 2011). Les qualifications de ces professionnels peuvent également différer en fonction des pays, la part d'infirmières peut ainsi varier de 16 % au Japon à 85 % en Hongrie. Pourtant, malgré ces différentes caractéristiques d'offre, on observe partout des difficultés d'embauche dans ce secteur en pleine expansion. Les conditions de travail difficiles et les bas salaires entraînent souvent une forte rotation du personnel, ce qui contribue à donner une image négative et compromet l'accès aux services et l'amélioration de leur qualité.

### **Un manque de coordination des soins**

Enfin une autre problématique commune aux marchés des soins de longue durée et à leur qualité est la capacité de coordination/intégration des soins avec les producteurs de soins médicaux (médecins généralistes et hôpitaux). Chez les seniors, la nécessité de réaliser des soins intégrés croît internationalement avec des concepts tels que les soins centrés sur le patient et des politiques visant à inciter à la coopération/coordination entre les différents producteurs de soins (médecins généralistes, hôpitaux, infirmiers, etc.) (Barrenho et al., 2022). Si les acteurs médico-sociaux sont les parents pauvres de cette littérature, c'est aussi parce que nombre d'entre eux n'ont pas de formation médicale, pour autant la nécessité de les prendre en compte est souvent signalée. Ainsi l'interdépendance entre le secteur sanitaire et médico-social fait de plus en plus l'objet de sujets de recherches et de politiques publiques.

### **3. Efficience des soins des seniors : questions de recherche, contributions et principaux résultats**

Dans cette thèse, je questionne l'efficience du système de soins français à destination des seniors. Je vais plus spécifiquement questionner le rôle joué par les modalités de financement, de fixation des prix et d'organisation du secteur médico-social sur l'efficience des soins.

L'efficience économique implique que la société fasse des choix qui maximisent les résultats de soins obtenus à partir des ressources disponibles. En économie, on distingue deux types d'efficience : l'efficience productive (ou technique) et l'efficience allocative (Papanicolas and Smith, 2013). L'efficience productive consiste à minimiser les coûts de production d'un bien ou d'un service en choisissant la combinaison optimale de ressources et en maximisant les résultats. Tandis que le concept d'efficience allocative fait référence à une répartition optimale des ressources de manière à maximiser les résultats, mais aussi à répondre à la demande de la société (préférences). Face à des ressources limitées, le concept d'efficience allocative peut éliminer certaines allocations de ressources productivement efficaces qui n'optimiseraient pas les préférences des consommateurs (Charlesworth et al., 2016). Dans ce contexte, quantifier les coûts d'opportunité, c'est-à-dire évaluer la perte de bénéfice liée au choix d'un soin (ou d'un investissement en santé) par rapport à un autre, peut aider les décideurs publics à accroître l'efficience allocative de leur système de soins.

Une des questions les plus étudiées dans la littérature empirique est l'efficience productive des établissements (hospitaliers ou ESLD) qui permet de mesurer la capacité de ces établissements à optimiser leur production étant donné les financements qu'ils perçoivent. La première difficulté rencontrée pour mesurer l'efficience productive des ESLD est de définir et de quantifier la production de ces établissements. Dans la littérature, la production (le résultat) est mesurée par le volume d'activité (nombre de résidents) dans l'établissement. Ainsi, les premières études ne prennent pas en compte la qualité dans les fonctions de production et se focalisent uniquement sur le nombre de personnes accueillies. Aujourd'hui, dans la majorité des études, la qualité est introduite a minima comme variable de contrôle pour questionner le lien entre le coût et la production (Giorgio et al., 2016; Laine et al., 2005; Shimshak et al., 2009; Weech-Maldonado et al., 2006). Les indicateurs de qualité utilisés mesurent, soit la qualité de la structure souvent par le taux d'encadrement, soit la qualité dite de résultat généralement grâce aux indicateurs cliniques de résultats

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(tels que la présence d'escarres, la dépression, la perte d'autonomie, ...) (Tran et al., 2019). En France, on trouve peu d'études sur le coût-efficacité des Ehpad. L'une de ces rares études suggère que la prise en compte de la qualité des soins dans le modèle d'efficacité impacte les résultats de façon significative, et qu'en France, les Ehpad privés à but non lucratif sont plus efficaces que les Ehpad publics (Dormont and Martin, 2011). Une autre étude montre que le manque de concurrence dans le secteur privé lucratif impacte l'efficacité de ces établissements, une plus grande taille des chaînes d'établissements privés lucratifs étant associée à un score d'efficacité plus faible (Martin and Jérôme, 2016).

Il existe également des études empiriques qui estiment les coûts économiques liés aux différentes modalités d'organisation et de financement des soins des seniors (Desmedt et al., 2016; Rocks et al., 2020). Elles questionnent généralement les alternatives de soins primaires ou médico-sociaux ou changements d'organisation pouvant réduire les hospitalisations des seniors et leurs coûts associés. Elles sont basées sur un consensus international sur les conséquences néfastes de l'hospitalisation pour les seniors. En effet, l'hospitalisation est une source de stress, de perte de repères pouvant conduire à l'aggravation ou au développement de troubles cognitifs ainsi qu'un lieu d'infections (grippes, nosocomiales, ...) susceptible d'aggraver l'état de santé des seniors (Aminzadeh and Dalziel, 2002; Boyd et al., 2008). Aussi, des enquêtes réalisées dans de nombreux pays montrent que les personnes âgées préféreront un soin réalisé dans un environnement qu'elles connaissent (à son domicile, en établissements médico-sociaux, etc.) à un séjour hospitalier (Lehnert et al., 2019)

L'une des principales explications identifiées dans la littérature concernant la prise en charge inappropriée des seniors à l'hôpital est liée au manque de coordination des soins entre les différents producteurs de soins. Ainsi, un nombre croissant d'études évaluent l'impact économique d'une meilleure articulation des soins sur les recours et les dépenses hospitalières des seniors (Nolte and Pitchforth, 2014). On observe également un développement de politiques (ou d'expérimentations) visant à améliorer la coordination (ou l'intégration) des soins des seniors (à l'hôpital, dans les établissements médico-sociaux ou dans un territoire). La question de l'interdépendance entre les secteurs sanitaire et médico-social pour prendre en charge les seniors en situation de perte d'autonomie émerge également (Barrenho et al., 2022; Nolte and Pitchforth, 2014). La plupart des études empiriques sur cette thématique visent à évaluer l'impact de nouvelles politiques d'intégration ou de coordination entre ces différents secteurs de soins avec des outils tels que des

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interventions et financements pluriprofessionnels ou la télémédecine (Fan et al., 2015; Groom et al., 2021; Kwa et al., 2021; Nazir et al., 2013; Szczepura et al., 2008).

Plus rares sont les études qui questionnent plus globalement l'impact du financement et de l'organisation du secteur médico-social dans un pays sur l'efficacité et la qualité de prise en charge des seniors. Récemment, des études ont pourtant relevé le rôle majeur joué par le secteur médico-social sur l'efficacité hospitalière. Ces études montrent ainsi l'impact des financements des soins médico-sociaux ou de l'organisation des soins dans les établissements médico-sociaux sur le recours hospitalier (Bostick et al., 2006; Costa-Font et al., 2018; Forder, 2009; Froggatt et al., 2020; Gaughan et al., 2015; Grabowski et al., 2008; Graverholt et al., 2014; Spilsbury et al., 2011; Walsh et al., 2020). La relation entre les modalités de financement et d'organisation du secteur médico-social et l'efficacité des soins des seniors reste cependant encore largement à explorer, d'autant plus en France où les études économiques sur le sujet sont rares.

Cette thèse contribue à la littérature économique sur le sujet, en apportant des éléments d'analyses empiriques sur des questions de recherche encore peu développées. Dans cette section je vais tout d'abord présenter la contribution de la thèse à l'exploitation et à l'appariement inédit de bases de données françaises. Je présenterai ensuite la contribution de chacun des chapitres de la thèse à la littérature sur l'efficacité des soins des seniors. Pour chaque chapitre je présenterai les fondements théoriques, la littérature empirique, la contribution de la thèse à cette littérature avant de présenter les principaux résultats du chapitre et sa conclusion.

### **3.1 Exploitation et appariement de bases de données inédites**

#### **3.1.1 De nombreuses sources de données encore sous-exploitées**

Depuis quelques années, on assiste à un développement de nouvelles sources de données administratives et d'enquêtes sur les Ehpad en France. Tout d'abord, l'enquête auprès des établissements d'hébergement pour personnes âgées (EHPA) de la Direction de la recherche, des études, de l'évaluation et des statistiques (Drees) est la principale source d'information sur les ressources humaines et matérielles dans ces établissements<sup>21</sup>. Deuxièmement, les enquêtes nationales de la Drees sur la santé des personnes en situation de handicap ou de perte d'autonomie (enquête handicap-santé de 2008, enquête CARE de 2016 et la future enquête autonomie de 2023)

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<sup>21</sup> Enquête réalisée en 2011, 2015 et 2019



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disposent d'un volet institution qui interroge les résidents d'Ehpad<sup>22</sup>. Ces enquêtes apportent très peu d'informations sur l'établissement, mais de nombreuses données sur les résidents en matière d'état de santé, de niveau de dépendance, de niveau social, mais également sur les caractéristiques de leurs aidants<sup>23</sup>. Troisièmement, la Haute Autorité de santé (HAS) a également développé une enquête sur les Ehpad, l'enquête Bientraitance de 2015, qui apporte des informations sur les processus de soins au sein des établissements (formation du personnel, recours à des équipes mobiles hospitalières, processus internes de sécurisation des soins, de signalement, etc.). Enfin, depuis peu s'est également développé le tableau de bord de la performance, piloté par l'Agence nationale d'appui à la performance (ANAP) et l'Agence technique de l'information sur l'hospitalisation (ATIH), qui répertorie principalement des informations sur les caractéristiques administratives de l'établissement, sa situation financière, ainsi que des indicateurs de structure (ressources matérielles et humaines).

À ces données d'enquête viennent s'ajouter des données administratives. Les données Résid-Ehpad, recueillies par la Caisse nationale de l'assurance maladie (CNAM) informe des dates de séjours en Ehpad des résidents de près de 80 % des établissements en France. Cette base de données est appariée aux données de consommations de soins du Système national des données de santé (SNDS) à partir du numéro de sécurité sociale de la personne. Cela permet de disposer des informations de consommation de soins sanitaires de la personne (utilisation et dépense d'hospitalisation et de soins ambulatoires), mais également de mortalité avant, pendant et après l'entrée du résident en Ehpad. C'est une source de données très riche qui pourra permettre de développer de nombreuses études et recherches dans les années à venir. La deuxième source principale de données administratives provient de la Caisse nationale de solidarité pour l'autonomie (CNSA), qui dispose de données administratives sur les financements et les prix en Ehpad.

Toutes ces données sont largement sous-exploitées, car elles sont difficilement accessibles. En effet, la multiplicité des sources, ainsi que les longues et fastidieuses démarches administratives, rendent difficiles l'accès et l'appariement de ces données tant pour l'administration que pour les chercheurs. À cela viennent s'ajouter des questions de représentativité et de qualité des données qui peuvent compliquer leurs exploitations et leurs appariements. De plus, la dimension de qualité des soins en

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<sup>22</sup> Ces enquêtes sont composées généralement d'un échantillon de moins de 1 000 établissements. La Drees réalise également une pondération pour que les données soient représentatives.

<sup>23</sup> Professionnels ou entourage réalisant des soins personnels ou sociaux auprès de la personne.

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termes de résultats pour le résident tels que son bien-être ou l'évolution de son état de santé (psychique et physique) manque dans toutes ces sources de données qui ne proposent aucun indicateur de résultat.

Dans le secteur des services à domicile, on fait face à un manque cruel de données que ce soit pour décrire les personnes prises en charge par les services d'aide à domicile (en SAAD ou en SSIAD), ou sur la qualité des soins reçus. En effet, aucune enquête nationale n'interroge la prise en charge dans ces services (ni la future enquête autonomie ni les enquêtes établissements sociaux (ES)<sup>24</sup>). A ce jour, il n'existe pas non plus, à ma connaissance, de base de données administratives sur les soins à domicile. Dans le futur, les données Resid-ESMS devraient fournir des informations sur les consommations médicales des personnes prises en charge par les services d'aide à domicile. Cependant, ces données ne sont pas encore consolidées. Les informations sur la file active des personnes prises en charge par les services d'aide à domicile et la qualité de leurs soins mériteraient donc d'être développées. On peut espérer une évolution sur le sujet dans la mesure où le récent décret sur les modalités de financement du futur modèle de services d'aide à domicile prévoit une partie de financement dédié à la qualité.

### **3.1.2 Contribution de la thèse à l'exploitation des données**

Cette thèse contribue à l'amélioration de l'exploitation de ces bases de données, à leurs appariements et à la création de nouveaux indicateurs quantitatifs de qualité. Dans le premier chapitre de la thèse, j'ai mobilisé deux bases de données distinctes afin de suivre l'utilisation et les dépenses de santé par territoire de vie des seniors atteints de démence (maladie d'Alzheimer ou syndrome apparenté, MASA). La première source de données exploitée est une cohorte (FRA-DEM) qui regroupe tous les individus atteints de MASA nouvellement identifiés en 2012 dans le SNDS<sup>25</sup>. L'algorithme d'identification de la population cible et la mesure d'indicateurs de consommation de soins hospitaliers de cette population sur les cinq années suivantes ont été réalisés par l'équipe UMR INSERM 1027 de Toulouse (Gardette V., Renoux A., Gallini A.) en collaboration avec la CNAM. Cette cohorte regroupe 80 372

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<sup>24</sup> Enquête auprès des établissements et services pour enfants et adultes handicapés (ES « handicap »). Ces enquêtes interrogent la file active de service à domicile spécifique au champ du handicap (enfant ou adulte), mais pas les SAAD et les SSIAD qui n'ont pourtant pas de distinction d'âge et qui peuvent réaliser des soins personnels et sociaux auprès des personnes en situation de handicap tout comme auprès des personnes âgées.

<sup>25</sup> Les critères d'identification de la population MASA sur l'année 2012 portent sur les nouveaux cas, âgés de 65 ans et plus, identifiés MASA<sup>25</sup> en 2012, mais n'étant pas identifiés MASA sur les cinq années précédentes (entre 2006 et 2011).

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nouveaux cas de MASA en 2012. Ces données ont permis de mesurer la consommation dans le temps et au niveau du territoire de vie, de ces nouveaux cas de MASA, notamment les séjours hospitaliers, en soins de suite et de réadaptation (SSR) ainsi que les recours aux urgences non suivis d'hospitalisation.

J'ai également utilisé les données de cartographie des pathologies de la CNAM disponibles sur le portail SNDS pour calculer cette fois-ci les dépenses de santé (hospitalières et ambulatoires) des patients atteints de démence<sup>26</sup> par territoire de vie. Il y a deux avantages principaux à l'utilisation de ces données par rapport à la cohorte FRA-DEM. Le premier est la puissance statistique et leur représentativité. En effet, la cohorte FRA-DEM permettait d'identifier 80 000 nouveaux cas de personnes atteintes de MASA en 2012, puis de calculer les indicateurs sur les années qui suivent. Rapporté au territoire de vie, le nombre de personnes nouvellement identifiées MASA dans la cohorte était en moyenne de 31 individus, ce qui est relativement restreint. Le fait que ce soit une cohorte de nouveaux cas introduisait également des questions sur la mortalité des populations, mais également sur l'effet de sélection de cette population en fonction des territoires. Les données du portail permettent d'identifier annuellement l'ensemble des personnes repertoriées par l'algorithme, soit près de 600 000 personnes chaque année, ce qui permet une puissance statistique plus importante au niveau territoire de vie et de réduire le potentiel effet de sélection lié à l'identification de la population. Le deuxième avantage est que les données de la cartographie informent sur les dépenses de santé (hospitalières et ambulatoires) des personnes atteintes de démence identifiées dans le SNDS chaque année. Ainsi, l'une des contributions du chapitre 1 est d'étudier à la fois les dépenses hospitalières, ambulatoires et le recours au soin en volume pour comprendre leurs relations avec les inégalités d'accessibilité territoriales aux soins médico-sociaux (voir partie 2.2.3). Dans le chapitre 1 je présente l'ensemble des résultats obtenus grâce à ces deux sources de données afin de montrer le travail réalisé. A ces données sur l'utilisation et les dépenses de santé des personnes atteintes de démence au niveau du territoire de vie, j'ai apparié des données sur les caractéristiques des personnes atteintes de démences disponibles dans le SNDS (âge, score de comorbidité, etc.), mais également d'autres données disponibles en libre accès telles que l'accessibilité aux soins médicaux et médico-sociaux, l'offre hospitalière, les distances aux urgences ou le niveau socio-économique des territoires.

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<sup>26</sup> Démences (dont maladie d'Alzheimer) : top\_NDemenc\_ind ([https://assurance-maladie.ameli.fr/sites/default/files/2022\\_methode-reperage-pathologies\\_cartographie\\_0.pdf](https://assurance-maladie.ameli.fr/sites/default/files/2022_methode-reperage-pathologies_cartographie_0.pdf))

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Dans le deuxième chapitre de la thèse, j'ai retravaillé les bases de données construites pour une évaluation de politique publique dans le cadre du projet parcours santé des aînés (Paerpa) à l'Irdes. Nous avons réalisé un important travail de data management pour calculer un panel d'indicateurs de consommation de soins (utilisation et dépenses hospitalières et ambulatoires par postes) sur l'ensemble des personnes âgées de plus de 65 ans dans 12 régions françaises à partir des données du SNDS. Cette base m'a permis de construire une cohorte d'individus en Ehpad et d'identifier les établissements ayant pour la première fois eu recours à l'hospitalisation à domicile (HAD), puis de calculer les indicateurs de résultats par semestre avant et après le premier semestre d'utilisation de l'HAD.

Dans le troisième chapitre de la thèse, j'ai utilisé des données spécifiquement extraites par la CNAM pour le projet de recherche Finehpad<sup>27</sup>. L'accès à cette base de données a nécessité trois années de démarches administratives. Elle apparie pour la première fois les données administratives individuelles de Resid-Ehpad et du SNDS avec des données sur les établissements provenant de l'enquête EHPA 2015 ainsi que des données de prix et de financement de la CNSA. A ce jour, l'exploitation de la base est encore en cours et les analyses pour le projet Finehpad continueront dans les mois et années qui vont suivre. J'ai toutefois réussi à exploiter cette base pour réaliser les analyses du troisième chapitre de ma thèse. La richesse des données m'a permis de calculer pour la première fois en France une batterie d'indicateurs de qualité des soins en Ehpad sur plusieurs dimensions (qualité d'encadrement, du bâtiment, de processus, etc.). Ces indicateurs sont utilisés dans le chapitre 3 pour analyser les déterminants du prix d'hébergement et leurs liens avec la qualité des soins.

### **3.2 L'inefficience des inégalités**

#### **3.2.1 Fondements théoriques**

Okun, en 1975, dans son livre intitulé « Equality and Efficiency: The Big Tradeoff » (Okun, 2015), développe l'idée selon laquelle il faudrait payer un coût de croissance économique pour réduire les inégalités de revenu et donc faire un compromis entre égalité et efficacité. Cependant, cette hypothèse est de plus en plus contestée dans la littérature économique (Acemoglu et al., 2015; Bárcena et al., 2018). Un nouveau consensus est en train d'émerger sur le fait qu'un inégal accès aux ressources (éducation, santé, ...) peut être un obstacle au développement

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<sup>27</sup> Projet de l'Irdes dans lequel s'inscrit ma thèse, intitulé : Effets de l'organisation et du financement des soins de longue durée en France sur la qualité de prise en charge sanitaire des personnes âgées dépendantes (Finehpad).

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économique d'un pays. Ainsi, des économistes étudient les différents mécanismes de l'offre par lesquels l'inégalité crée des freins à l'innovation et à l'investissement (Bowles, 2012).

En santé, l'idée de compromis entre équité<sup>28</sup> et efficience signifie que plus l'équité en matière de santé est atteinte plus le niveau d'efficience diminue (en gains de santé de la population dans sa globalité) (Reidpath et al., 2012; Sandiford et al., 2018). Cela fait principalement référence au fait qu'il serait plus difficile (couteux) d'améliorer la santé de certaines populations par rapport à d'autres. Sandiford et co-auteurs (2018) spécifient cependant qu'il n'existe pas toujours de compromis entre équité et efficience et qu'un gain d'efficience peut améliorer l'équité. Tandis que Reidpath et co-auteurs (2012) soulignent que l'équité en matière de santé peut être un résultat désiré d'un système de santé modifiant ainsi la relation entre efficience et équité (un système de santé qui améliorerait l'équité en santé de sa population à moindre coût serait ainsi plus efficient).

De plus, il peut exister des mécanismes d'offre par lesquels l'inégalité peut créer des freins à l'efficience du système de santé. Par exemple, par le biais d'une hausse de la demande hospitalière et le coût d'opportunité que cela peut représenter. Ainsi, un inégal accès aux soins primaires ou préventifs des populations peut retarder les soins, aggraver l'état de santé et donc nécessiter a posteriori des soins plus coûteux souvent à l'hôpital. Outre le retard de soins, les inégalités peuvent également entraîner une substitution entre soins ambulatoires (médicaux ou médico-sociaux) et hospitaliers. En effet, on observe dans la littérature une association forte entre inégalités (de revenu et d'accès aux soins) et hospitalisation évitables (Cartier et al., 2014; Thwaites et al., 2017). Ainsi, les inégalités d'accessibilité aux soins sont susceptibles d'impacter l'efficience allocative des ressources d'un système de santé par une hausse des recours hospitaliers plus coûteux.

La politique médico-sociale étant en partie décentralisée en France, les niveaux d'investissements financiers et les politiques de régulation de l'offre peuvent varier d'un territoire à l'autre. Ainsi, il peut y avoir d'importantes variations d'accessibilité aux soins médico-sociaux (financière et géographique) en fonction des territoires susceptibles d'impacter les dépenses de santé par deux mécanismes. Premièrement, il peut y avoir une substitution entre l'offre du secteur médico-social et

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<sup>28</sup> Il existe dans la théorie économique, principalement en économie de la santé, une importante distinction faite entre inégalité et iniquité. Les dépenses de santé peuvent ainsi être inégalement réparties, cette inégalité si elle est injustifiée sera qualifiée d'inéquitable.

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sanitaire. Cette substitution pouvant parfois être imposée lorsque les alternatives aux soins de santé font défaut dans le secteur médico-social, par exemple en retardant le retour au domicile après une hospitalisation faute de disponibilité de soins médico-sociaux (Gaughan et al., 2015). Deuxièmement, il peut également y avoir un effet de compensation : le manque d'accès aux soins médico-sociaux peut créer des besoins de soins non satisfaits qui contribuent à la détérioration de l'état de santé des personnes fragiles (provoquant des chutes, de la déshydratation, etc.), et augmenter le besoin de soins sanitaires et donc leurs dépenses.

### **3.2.2 Littérature empirique**

Des études récentes confirment l'existence d'une substitution des soins entre le secteur médico-social et hospitalier. En effet, les seniors qui bénéficient d'un financement public plus élevé pour financer leurs soins de longue durée ont une utilisation et des coûts hospitaliers plus faibles (Bakx et al., 2020; Chen and Ning, 2022; Fernandez and Forder, 2008; Gaughan et al., 2015; Lin and Imanaka, 2020; Rapp et al., 2015; Walsh et al., 2020). Cette relation entre financement des soins médico-sociaux et recours hospitalier est soit estimée au niveau individuel à l'aide de variables instrumentales (Rapp and al. 2015, Forder, 2009), soit par le changement d'une politique assurantielle dans le pays qui permet d'estimer avec des méthodes de différence de différence l'impact de ce changement de couverture sur le recours et les dépenses hospitalières (Lin and Imanaka, 2020; Chen and Ning, 2022; Costa-font et al., 2018, Moura 2020; Bakx et al, 2020). Quelques études ont étudié le lien entre les disparités d'offre de soins médico-sociaux et le recours hospitalier. Deux études anglaises et une étude irlandaise ont montré que les disparités territoriales dans les services de soins de longue durée jouent un rôle important dans l'explication des variations territoriales de performance du secteur hospitalier, mesurées par les sorties retardées de l'hôpital, les réadmissions en urgence, ou les durées de séjours.

De manière plus générale, la littérature étudiant les variations régionales des dépenses de santé est beaucoup moins développée que la littérature économique étudiant les déterminants individuels et hospitaliers, ou encore l'impact des politiques publiques. Pourtant, dans l'ensemble des pays, on observe d'importantes variations de dépenses de santé en fonction des régions. Si une part de cette variation est « justifiée » par les différences d'état de santé et de préférences des populations dans ces territoires, il reste une part importante de variations régionales « injustifiées ». Etudier ces variations régionales de consommations de soins et de dépense de santé peut permettre de questionner l'efficacité allocative des ressources ainsi que les coûts

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d'opportunité associés aux différents modèles d'organisation des soins dans ces territoires. Dans la littérature, la majeure partie des études porte sur la comparaison régionale des variations de pratiques médicales hospitalières ou de soins primaires « injustifiées », c'est-à-dire non-expliquées par les variations d'états de santé au niveau local (Wennberg, 2014). Certaines études comparent les différences de coût-efficacité en fonction des régions afin de réaliser des benchmarking régionaux des dépenses de santé puis d'étudier leurs liens avec les différences de politiques publiques dans ces territoires (Rizzi and Zanette, 2021; Rosko et al., 1995). En France, très peu d'études ont questionné les variations d'efficacité territoriales (Bardey and Pichetti, 2004), de pratiques hospitalières (Or and Verboux, 2014) ou les déterminants territoriaux des variations de dépenses de santé des seniors (Or and Penneau, 2018).

Enfin, la littérature analysant les inégalités territoriales d'accessibilité aux soins médicaux sociaux est assez peu développée par rapport aux études portant sur l'accessibilité territoriale aux producteurs de soins médicaux (hôpitaux, médecins généralistes, infirmiers, etc.) (Chevallard and Mousquès, 2021; Duchaine et al., 2025a; Grobler et al., 2015). Ainsi, si la problématique de désert médicaux en France est assez bien connue, les problématiques d'inégalité d'accès à l'offre de soins médico-sociaux en fonction du territoire de résidence des seniors sont encore assez peu étudiées.

### **3.2.3 Question de recherche et contributions**

Dans le premier chapitre de la thèse, je questionne la relation entre inégalités territoriales d'accessibilité aux soins médico-sociaux et dépenses de santé des seniors. Je me concentre sur les personnes atteintes de démence pour analyser les conséquences de deux types d'inégalités territoriales de soins médico-sociaux : physique et financière.

Ce chapitre contribue à la littérature à plusieurs titres. Tout d'abord, il participe au développement de la connaissance internationale sur les disparités régionales des dépenses de santé et leurs liens avec les inégalités d'accessibilité aux soins. En France, c'est à ma connaissance la première étude qui analyse les déterminants territoriaux des dépenses de santé des patients atteints de démence. Deuxièmement, la méthode empirique mobilisée dans le chapitre est une analyse multiniveau qui permet d'étudier simultanément deux formes d'inégalités territoriales d'accessibilité aux soins médico-sociaux, sur deux niveaux territoriaux différents, et leurs liens avec les dépenses de santé. Le niveau d'accessibilité de l'offre aux soins médico-sociaux (accessibilité physique) des seniors est analysé au niveau du territoire de vie où réside

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la personne tandis que les disparités de financement (accessibilité financière) aux soins médico-sociaux sont étudiées au niveau du département qui détermine la politique de financement. J'ai utilisé une méthode de classification pour caractériser des groupes de territoires de vie avec des profils d'accessibilité à l'offre médico-sociale homogènes. De plus, j'ai adapté une méthode d'analyse des frontières stochastiques afin d'estimer la générosité des politiques de financement dans les départements. Cela permet d'identifier les territoires qui procurent le plus de financement médico-social étant donné le niveau de dépendance et de richesse de leurs populations. Troisièmement, cette analyse permet d'étudier à la fois les dépenses hospitalières, et les dépenses ambulatoires des patients atteints de démence. Cela est un apport à la littérature qui centre généralement les analyses sur le recours hospitalier. Cette concentration sur le recours et les dépenses hospitalières se justifie pour vérifier l'hypothèse selon laquelle un manque de disponibilité des soins médico-sociaux pourrait augmenter les besoins hospitaliers. Pourtant, la moindre dépense hospitalière associée à un financement médico-social plus élevé identifiée dans la littérature pourrait s'accompagner d'une hausse des dépenses sanitaires ambulatoires (consultations médicales, etc.). Cette étude permet d'examiner à la fois la relation entre inégalités d'accessibilité aux soins médico-sociaux avec les dépenses hospitalières et les dépenses ambulatoires.

### **3.2.4 Principaux résultats et conclusions**

Les résultats complètent la littérature suggérant qu'un meilleur financement des soins médico-sociaux peut réduire le recours à l'hôpital des personnes âgées fragiles. En effet, toutes choses égales par ailleurs, les personnes résidant dans les départements les plus généreux en matière de financements médico-sociaux ont des fréquences d'hospitalisation, des recours aux urgences et des dépenses hospitalières significativement plus faibles. Mes résultats montrent également que la disponibilité géographique des ressources de soins médico-sociaux dans la zone de résidence des patients atteints de démence est un déterminant important de recours et de dépenses hospitalières. En effet, un Français sur quatre de plus de 75 ans vit dans une zone mal desservie par l'ensemble des prestataires médico-sociaux. Or, les patients atteints de démence dans ces territoires ont en moyenne des recours et des dépenses hospitalières significativement plus élevés, toutes choses égales par ailleurs. Ainsi, réduire les inégalités dans l'accès financier et géographique aux soins médico-sociaux dans le pays pourrait permettre de réduire le recours et les dépenses hospitalières des seniors atteints de maladies chroniques neurodégénératives. Les résultats mettent également en lumière les importantes variations de recours et de dépenses de soins



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de suite et de réadaptation (SSR) par les patients atteints de démence en fonction des territoires ainsi qu'une substitution de ces soins avec les soins médico-sociaux. En effet, dans les départements qui ont un niveau de financement médico-social plus élevé et dans les zones résidentielles avec un meilleur accès aux plateformes de soins à domicile, les dépenses de SSR sont en moyenne plus faibles. Enfin, un résultat central du chapitre 1 porte sur la relation entre dépenses médico-sociales et dépenses ambulatoires. Mes résultats suggèrent une complémentarité entre soins médico-sociaux et soins médicaux en ville pour se substituer aux soins hospitaliers. En effet, l'absence de dépenses totales plus faible dans les territoires à forte accessibilité aux soins médico-sociaux s'explique par des dépenses médicales ambulatoires significativement plus élevées compensant les plus faibles dépenses hospitalières. Ainsi, les politiques départementales et le niveau d'accessibilité locale à l'offre médico-social semblent être des éléments déterminant la capacité des territoires à réaliser un virage ambulatoire pour les soins des seniors.

Dans l'ensemble, cette étude confirme la forte interdépendance entre les secteurs des soins primaires, hospitaliers et médico-sociaux et la nécessité d'évaluer l'efficacité relative des différents modèles de soins afin de réduire les inégalités sociales et économiques dans l'accès aux soins médico-sociaux et d'améliorer l'efficacité du système de soins pour les seniors.

### **3.3 Modalités de financements, incitations et efficience**

#### **3.3.1 Fondements théoriques**

L'ensemble des Ehpad qu'ils soient, publics, privés, lucratifs ou non, reçoivent des financements de l'Assurance maladie et du département pour assurer les soins des seniors qu'ils hébergent. Il s'agit d'une relation d'agence où les instances de gouvernance donnent pour mission aux établissements médico-sociaux de réaliser des soins de qualité (Shapiro, 2005). Ceux-ci vont d'ailleurs signer un contrat appelé contrat pluriannuel d'objectif et de moyen (CPOM) qui fixe les activités spécifiques et missions de service public de l'établissement ainsi que les financements octroyés. Ce contrat permet principalement de financer les soins infirmiers et personnels des personnes hébergées en Ehpad (toilette, habillage, distribution des médicaments, bandage, etc.)<sup>29</sup>. L'une des principales difficultés rencontrées dans ce type de relation

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<sup>29</sup> Si certains établissements bénéficient d'un financement global des soins par l'assurance maladie pour financer en interne les médecins généralistes et les médicaments dans la majeure partie des Ehpad en France les agents économiques responsables des prescriptions médicales des résidents d'Ehpad ne sont pas directement financés par l'établissement.

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d'agence est liée à l'asymétrie d'information pouvant exister entre les financeurs et le producteur de soins (phénomènes d'anti-sélection ou d'aléa moral<sup>30</sup>).

Cependant, la qualité et l'efficacité des soins des résidents dépendent également d'autres agents économiques externes à l'établissement qui ont leurs propres missions et financements tels que les médecins généralistes et l'hôpital. Ainsi, l'efficacité des soins en Ehpad ne va pas dépendre uniquement des financements et de l'organisation des soins dans l'établissement, mais également de l'articulation et de la coordination avec les médecins généralistes et l'hôpital. Un système de santé aura une allocation efficace de ses ressources s'il trouve une organisation des soins qui optimise la répartition des ressources entre ces différents agents économiques afin de maximiser le résultat de soins des résidents (qualité) et de répondre à leurs préférences. Cela revient à questionner l'adaptation des missions et des modalités de financement de ces agents économiques pour répondre aux besoins de soins des résidents. La littérature identifie les fréquents transferts hospitaliers des résidents comme le reflet de l'inadaptation des soins fournis aux résidents dans ces établissements (Saliba et al., 2000). Ainsi, trouver des alternatives de soins à l'hospitalisation des résidents est l'objectif de nombreuses expérimentations et de politiques publiques (télémédecine, intervention d'équipe pluridisciplinaire, formation médicale du personnel, etc.) pour améliorer la qualité et l'efficacité des soins.

### 3.3.2 Littérature empirique

La littérature empirique suggère qu'un nombre important d'hospitalisations peuvent être évitées par une meilleure prise en charge ambulatoire (Lloyd et al., 2019; McDermott et al., 2012), mais aussi en augmentant les compétences médicales du personnel dans les ESLD (Kwa et al., 2021; Szczepura et al., 2008). Certaines études soulignent également l'importance d'une meilleure coordination des soins entre l'établissement et l'hôpital pour réduire les hospitalisations (Fan et al., 2015; Harvey et al., 2014; Hulleck et al., 2016). Il existe également une littérature croissante examinant l'impact des interventions ciblant une meilleure coordination des soins de santé dans les ESLD tels que la télémédecine (Groom et al., 2021) ou les équipes mobiles multidisciplinaires (Lau et al., 2013; Nazir et al., 2013). Ces équipes fournissent rarement des soins aux résidents eux-mêmes, mais font référence à l'implication d'une équipe multidisciplinaire externe, généralement hospitalière, pour soutenir le

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<sup>30</sup> Dans la théorie économique on parle d'anti-sélection, si une instance finance plus un établissement de moins bonne qualité dans la mesure où il ne dispose pas de toutes les informations pour évaluer sa qualité. Et d'aléa moral, si un établissement communique une information erronée à l'instance de financement pour disposer de financements complémentaires.

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personnel des ESLD par une expertise spécifique sur les soins gériatriques, palliatifs et/ou psychiatriques. Enfin, une récente littérature questionne plus spécifiquement la place des soins palliatifs et le rôle des modalités de financement de ces soins dans les ESLD. Les études soulignent leur importance pour améliorer la qualité des soins, la qualité de vie et éviter les hospitalisations en fin de vie (Chapman et al., 2018; Froggatt et al., 2020; Hui et al., 2014; Luk and Chan, 2018; Tropea et al., 2019).

### **3.3.3 Question de recherche et contributions**

Dans le deuxième chapitre de la thèse, je questionne l'impact de l'intervention d'équipes mobiles hospitalières sur l'efficacité des soins en Ehpad. J'examine une politique française qui permet aux équipes hospitalières mobiles, appelées hospitalisation à domicile (HAD), de prodiguer des soins en Ehpad. Les équipes d'HAD sont majoritairement composées d'un médecin coordonnateur<sup>31</sup>, d'une infirmière coordonnatrice, d'une infirmière praticienne et d'un travailleur social. Ils apportent les moyens médicaux et techniques complémentaires nécessaires à certains traitements en Ehpad pour éviter le transfert du résident à l'hôpital. En étudiant l'impact du recours à l'HAD sur l'efficacité des soins en Ehpad, je questionne l'allocation des ressources entre les équipes hospitalières et l'Ehpad pour répondre aux besoins de soins des résidents. Ce chapitre contribue à la littérature à plusieurs titres. Tout d'abord, il participe au développement de la connaissance internationale sur les recours hospitaliers des résidents d'ESLD et leurs liens avec les modalités de financement et de coordination des soins. Deuxièmement, il permet de mesurer l'impact de l'HAD sur l'efficacité des soins en Ehpad. J'analyse les différences de résultats de soins (fréquence des hospitalisations, recours aux urgences, soins palliatifs en fin de vie et les dépenses hospitalières des résidents) entre les Ehpad qui utilisent l'HAD pour la première fois au cours de la période d'étude (groupe traité) et ceux qui n'ont jamais utilisé l'HAD avec un modèle de double différence (DID). Je questionne également les incitations des différents agents économiques (établissement, médecins traitants et hôpital) à investir dans l'HAD ainsi que la capacité des instances publiques à accroître le recours à ce dispositif dans l'ensemble des établissements. Troisièmement, cette analyse permet d'interroger la place des soins palliatifs et les modalités de financement de ces soins en Ehpad pour assurer une fin de vie de qualité pour l'ensemble des résidents.

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<sup>31</sup> Généralement un médecin généraliste

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### 3.3.4 Principaux résultats et conclusions

J'observe une baisse significative du nombre d'hospitalisations des résidents sur les semestres suivants la première utilisation de l'HAD dans ces établissements. Ce résultat est cohérent avec la littérature montrant que les interventions d'équipes pluridisciplinaires dans les établissements médico-sociaux peuvent réduire les transferts hospitaliers des résidents. L'HAD en Ehpad s'avère être un outil intéressant, car il nécessite une collaboration et une concertation médicale entre plusieurs agents économiques responsables des soins des résidents. Ainsi, le résultat obtenu sur la réduction du nombre de visites aux urgences (suivies ou non d'hospitalisation) dans les établissements traités, semble indiquer que l'amélioration de la prise en charge n'est pas seulement liée à une substitution des soins entre l'hôpital et l'équipe mobile hospitalière, mais pourrait permettre un meilleur suivi des patients et ainsi réduire les besoins de soins urgents. Les résultats de cette étude montrent également une augmentation significative du recours aux soins palliatifs dans les établissements traités. En effet, le recours aux soins palliatifs est doublé sur les deux ans et demi qui suivent une première utilisation de l'HAD. Ce résultat suggère une amélioration de la qualité de la prise en charge des soins de fin de vie des résidents dans ces établissements. Cependant, l'inégalité d'accès à l'HAD remet en cause l'équité de la qualité des soins de fin de vie pour l'ensemble des résidents en France. De plus, on peut se questionner sur la capacité des politiques incitatives et de régulation de l'offre à réduire l'effet de sélection des établissements recourant à l'HAD lié aux caractéristiques de leurs médecins généralistes et de leurs hôpitaux afin d'assurer un équitable accès à ces soins pour tous les résidents d'Ehpad en France. Les besoins spécifiques de soins en fin de vie ne sont pas pris en compte dans le financement des Ehpad en France. Dans une perspective d'améliorer l'efficacité allocative des ressources publiques, il pourrait être plus efficace d'intégrer ces besoins de soins dans le financement des Ehpad afin d'augmenter la qualité de la fin de vie de l'ensemble des résidents, en complément d'intervention d'équipes mobiles hospitalières mobiles, comme l'HAD, permettant une prise en charge dans l'établissement des cas les plus complexes et ainsi réduire au maximum les transferts hospitaliers plus coûteux.

Cette étude montre l'intérêt des équipes d'HAD pour améliorer la prise en charge dans les Ehpad et plus largement apporte de nouveaux éléments pour reconsidérer le modèle de financement des Ehpad en France. L'alignement des incitations économiques et des responsabilités en matière de soins entre les prestataires de soins est essentiel pour parvenir à une meilleure qualité et efficacité des soins.

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### **3.4 Déterminants des prix d'hébergement et liens avec la qualité**

#### **3.4.1 Fondements théoriques**

Dans un marché concurrentiel, le prix dépend de l'interaction entre la demande et l'offre de biens/services (ici les soins résidentiels) sur le marché. La façon dont les acheteurs/consommateurs perçoivent la valeur du produit, le nombre d'acheteurs et leur sensibilité aux changements de prix détermineront le prix. Si la demande excède l'offre de service dans un territoire donné, l'établissement pourra augmenter son prix sans pour autant améliorer sa qualité. En effet, dans un contexte de demande excédentaire, lorsque le choix est limité, les résidents et leurs familles peuvent faire leur choix en fonction du prix et de la disponibilité des chambres plutôt que de la qualité. Le prix fixé et la qualité associée peuvent donc être impactés par les politiques de réglementation qui affectent l'entrée et la concurrence sur le marché. En France, la réglementation du marché des Ehpad est décentralisée au niveau des départements, ce qui peut entraîner des différences significatives dans la concurrence sur le marché et dans la demande excédentaire selon les autorités locales.

Sur un marché où les vendeurs sont hétérogènes quant à la qualité de leurs services et sont mieux informés que les acheteurs, les vendeurs de haute qualité pourraient utiliser les prix comme un dispositif de signalisation de la qualité des biens qu'ils offrent. Ils peuvent également souhaiter se différencier et augmenter leur pouvoir de marché et leurs prix en fournissant une qualité de soins supplémentaire. Ainsi, selon la théorie de la différenciation des produits (Chamberlin, 1933), chaque entreprise cherchera à recréer une situation de monopole dans un environnement concurrentiel en distinguant ses produits pour augmenter son pouvoir de marché, ses prix et ses bénéfices. Les Ehpad fournissent un logement, des repas, des divertissements, des soins infirmiers et un accompagnement social à leurs résidents. Ils peuvent se différencier par leur emplacement, par la qualité de leur bâtiment, de la nourriture, de l'animation, mais aussi par la qualité des soins. Lorsque le prix est fixé par une instance publique, d'après les théories d'agences, l'instance publique (le principal) va fixer un prix en fonction du service rendu et de la qualité souhaitée (Shapiro, 2005). Dans cette relation d'agence, les instances publiques font souvent face à une forte asymétrie d'information lors de la fixation du prix, car généralement elles ne disposent pas de toutes les informations leur permettant d'évaluer la qualité de l'établissement ou elles peuvent parfois disposer d'informations erronées. Dans le marché de santé, l'asymétrie d'information est un déterminant important du prix, et son lien avec la qualité (Arrow, 1963). Si les financeurs publics et les consommateurs ne

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peuvent pas mesurer la qualité, l'établissement n'aura aucun intérêt à se différencier par la qualité. En revanche, les établissements auront intérêt à améliorer les dimensions les plus facilement observables par les résidents et leurs familles. Pour réduire l'asymétrie d'information, plusieurs pays investissent dans la mesure et la publication des indicateurs de qualité des soins de longue durée (Werner et al., 2012 ; Schmitz et Stroka-Wetsch, 2020), mais en France, il n'existe pratiquement aucune information ou indicateur de qualité des soins en Ehpad.

Les stratégies tarifaires vont également dépendre du statut de l'établissement. Dans le secteur à but lucratif, les établissements vont chercher à maximiser leurs profits, le prix fixé sera optimisé pour répondre à la demande locale et à l'offre concurrentielle tout en minimisant les coûts de production afin de maximiser le profit. Dans le secteur non-lucratif, les établissements chercheront à maximiser leur taille, en minimisant leurs coût de production, sous la contrainte de qualité et de non déficit (Scanlon, 1980). En France, trois types d'établissements présents sur le marché sont susceptibles de développer des stratégies de prix variables. Tout d'abord, les établissements à but lucratif fixeront leurs prix de manière à maximiser leur profit. Parmi les établissements à but non lucratif, on peut distinguer les établissements publics et les établissements privés à but non lucratif qui négocient leurs prix (prix sociaux) des établissements à but non lucratif qui fixent librement leurs prix. Ce dernier groupe peut développer une stratégie de prix plus réactive en fonction de la concurrence sur le marché.

### **3.4.2 Littérature empirique**

La plupart des études empiriques portent sur l'impact de la concurrence sur le prix et la qualité des établissements avec des résultats mitigés (Yang et al., 2021). Certaines études suggèrent que la concurrence conduit à une meilleure qualité (Bowblis and Applebaum, 2017; Fayissa et al., 2020; Grabowski, 2004, 2001), et d'autres le contraire (Bowblis, 2012; Bowblis and Vassallo, 2014; Zinn, 1994). Cependant, la plupart des études trouvent qu'une plus grande concurrence est associée à une baisse des prix (Allan et al., 2021; Ching et al., 2015; Forder and Allan, 2014; Huang and Hirth, 2016).

Il existe également tout un pan de littérature provenant des États-Unis qui interroge l'effet d'une augmentation du remboursement de Medicaid sur la qualité des établissements dans le cadre d'une demande excédentaire (Cohen and Spector, 1996; Gertler, 1992, 1989; Grabowski, 2004, 2001; Grabowski et al., 2004; Grabowski and Angelelli, 2004; Nyman, 1989, 1988, 1985). Elles testent empiriquement le paradigme

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de la théorie de la demande excédentaire de Scanlon, selon lequel une augmentation du taux de remboursement de Medicaid (prix public) entraînerait une réduction de la qualité dans un contexte de demande excédentaire (Scanlon, 1980). Les résultats soutiennent cette relation contre intuitive en cas de demande excédentaire. Dans les années 1970 et 1980, lorsque la demande était excédentaire au Etats-Unis, un taux de remboursement Medicaid plus élevé était associé à une qualité réduite (Gertler, 1992, 1989; Nyman, 1985). Puis après les années 1990, avec plus de concurrence dans le marché, les résultats ne sont plus significatifs (Nyman, 1989, 1988) la relation devient positive dans les années 2000, un taux de remboursement plus élevé étant associé à une qualité plus importante (Grabowski, 2004, 2001; Grabowski et al., 2004; Grabowski and Angelelli, 2004; Reichert and Stroka, 2018).

En Allemagne et en Suisse, des études ont montré une relation positive entre les prix et la qualité mesurée par le taux d'encadrement (Heger et al., 2022; Herr and Hottenrott, 2016). En revanche, aux Pays-Bas, une étude flamande récente estime le lien entre le prix et la qualité de vie dans les ESLD et trouve un effet négatif et faible du prix sur la qualité de vie (Raes et al., 2020). En France, il existe assez peu de recherche empirique sur les prix et la qualité, à l'exception des modèles de coût-efficience estimés dans la thèse de Cécile Martin. Ses travaux ont montré qu'en France les Ehpads privés à but non lucratif sont plus efficaces que les Ehpads publics (Dormont and Martin, 2011) et que le manque de concurrence dans le secteur privé lucratif impacte l'efficacité de ces établissements, une plus grande taille des chaînes d'établissements privés lucratifs étant associée à un score d'efficacité plus faible (Martin and Jérôme, 2016). De plus, les stratégies de tarification des prix d'hébergement ont été peu questionnées. En effet, les prix d'hébergement ne sont connus que depuis le décret de 2016 (décret n° 2016-1814, Art. R. 314-180).

### **3.4.3 Question de recherche et contributions**

Le troisième chapitre de la thèse vise à éclairer les stratégies tarifaires des Ehpads publics et privés en France en examinant les déterminants des prix d'hébergement. Je questionne également le lien entre le prix d'hébergement et la qualité des soins dans ces établissements. En France, les soins des résidents sont financés par des fonds publics (forfaits soins et dépendance) fixés par des formules tarifaires nationales basées sur l'état de santé et de dépendance des résidents. Le prix d'hébergement étudié dans ce chapitre correspond au reste à charge payé par le résident. Je distingue trois types d'établissements susceptibles de développer des stratégies tarifaires différentes. Les établissements lucratifs se distinguent par une

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fonction de prix optimisée pour maximiser le profit. Au sein des établissements non lucratifs je distingue les établissements pouvant fixer librement leur prix des établissements ayant l'ensemble de leurs prix négociés avec les départements. Les Ehpad qui fixent leur prix librement (lucratifs ou non) peuvent choisir de développer une stratégie tarifaire de différenciation sur le marché en offrant un niveau de qualité de soins supplémentaire à celui fourni par les fonds publics afin de gagner en pouvoir de marché et d'attirer de nouveaux résidents, et ainsi maximiser leur taille (établissements non lucratifs) ou leurs profits (établissements lucratifs). Pour les établissements qui négocient l'ensemble de leur prix d'hébergement avec le département, le prix d'hébergement représente la seule marge pour accéder à un revenu complémentaire. Les établissements peuvent négocier une hausse de leurs financements privés (prix d'hébergement payé par le résident) afin d'assurer une meilleure qualité des soins sachant que les financements publics des soins ne sont pas négociables.

L'étude présentée dans ce chapitre contribue à la littérature à plusieurs titres. Tout d'abord, elle est la première étude française étudiant les variations de prix d'hébergement payés par les résidents d'Ehpad et ses déterminants. Ce prix d'hébergement représente un coût très élevé pour les ménages français (en moyenne 2000 euros par mois) pourtant on a très peu d'informations sur la manière dont ces prix sont fixés et sur les déterminants qui explique les importantes variations de prix en fonction des établissements (ratio pouvant varier de 1 à 6). Deuxièmement, ce chapitre permet de mesurer et d'analyser pour la première fois plusieurs dimensions de qualité des soins en Ehpad à partir d'un riche panel d'indicateurs. Le niveau d'asymétrie d'information étant variable selon les dimensions de la qualité, les stratégies tarifaires peuvent varier en fonction des dimensions de qualité. J'ai calculé trois indices de qualité des soins (personnel/structure, processus et résultats) mais également des indicateurs permettant d'approcher la qualité du bâtiment et de l'animation. Troisièmement, j'ai introduit des indicateurs départementaux permettant de rendre compte des variations de concurrence dans les territoires. Or, peu d'études analysent ces variations de concurrence qui peuvent être liées à la fois à l'attractivité de ces territoires et aux politiques départementales de régulation de l'offre médico-sociale dans ces départements.

### **3.4.4 Principaux résultats et conclusions**

Cette première étude sur les déterminants du prix d'hébergement, permet d'apporter de nouvelles connaissances sur les déterminants des restes à charges



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payés par les résidents d'Ehpad en France. Les résultats montrent qu'il y a peu de différenciation par la qualité, la plupart des variations des prix d'hébergement sont expliquées par des facteurs de production externes (prix du mètre carré dans la commune de l'établissement) et le statut de l'établissement (à but lucratif ou non). En effet, les variations de qualité mesurées (des soins, du bâtiment ou de l'animation) expliquent une faible part de la variation des prix d'hébergement. Malgré tout, on observe un lien plus important sur les dimensions plus facilement observables (taux d'encadrement et qualité du bâtiment). L'analyse de la concurrence dans les départements français met en lumière d'importantes variations d'offre d'Ehpad mais également de concentration d'établissements lucratifs en fonction des départements. En accord avec la littérature empirique sur le sujet, je trouve que les prix sont plus bas dans les départements où la concurrence sur le marché est plus forte (concentration d'offre importante). Cependant à offre équivalente, les prix des établissements non-lucratifs sont plus élevés dans les départements ayant une concentration d'établissements lucratifs forte. Cela semble indiquer un ajustement des prix des établissements non-lucratifs au marché local. De plus les importantes variations d'offre et de concentration d'établissements lucratifs en fonction des territoires français peut questionner sur l'équitable accès aux Ehpad en fonction des territoires. En effet, j'estime des coûts d'hébergement pour les résidents, toutes choses égales par ailleurs, plus élevés en moyenne de presque 700 euros par mois dans les établissements lucratifs. Ainsi, par exemple, pour les seniors résidant en région parisienne qui comprend une faible offre médico-sociale et une forte concentration d'établissements lucratifs à des prix plus élevés, cela pourrait engendrer du non-recours aux soins ou d'accepter de payer un prix élevé pour accéder à un établissement de moindre qualité (paradigme de la demande excédentaire de Scanlons). Enfin un dernier résultat de cette étude porte sur la nécessité d'afficher et de questionner les modalités de fixation des prix d'hébergement négociés avec les départements. En effet, il n'y a pas de critères nationaux, ni d'affichage local sur les modalités de fixation de ces prix. De plus mes résultats montrent que seules 27% des variations de prix sont expliquées par les facteurs observables introduits dans le modèle quand ceux-ci expliquent 53% des variations de prix dans les établissements lucratifs.

Ce chapitre fournit un premier aperçu des facteurs expliquant les variations de prix d'hébergement en Ehpad et montre que les prix sont peu liés à la qualité des soins reçu dans l'établissement. Les résultats appellent à davantage de recherches pour comprendre les variations de politique de régulation de l'offre d'Ehpad et les pratiques de fixation des prix d'hébergement dans les départements qui peuvent avoir un impact

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significatif sur les restes à charges payés par la population française pour accéder aux soins en fin de vie. Les résultats soulignent également le besoin d'améliorer l'information du public sur la qualité des soins en Ehpad pour réduire l'asymétrie d'information.

### **4. Conclusion**

Compte tenu de la demande croissante de soins médico-sociaux émanant d'une population vieillissante, la capacité d'adapter le financement et l'offre des soins médico-sociaux constitue un défi politique et social majeur. Cette thèse examine le lien entre l'offre et le financement des soins médico-sociaux avec l'efficacité du système de santé pour les seniors en France, en mobilisant des données et méthodes économétriques originales. Elle montre qu'il existe de fortes inégalités d'accessibilité à l'offre et aux financements médico-sociaux en fonction des territoires et que ces inégalités sont directement liées aux dépenses médicales des personnes atteintes de démence. Dans les établissements d'hébergement pour personnes âgées dépendantes (Ehpad), les soins réalisés par une équipe mobile hospitalière améliorent la qualité des soins en réduisant les transferts hospitaliers et en développant les soins palliatifs sans augmenter les coûts. Enfin, les prix d'hébergement en Ehpad sont peu liés aux indicateurs de qualité des soins. Ces résultats montrent la forte interdépendance entre le secteur médico-social et sanitaire, le besoin d'améliorer l'adéquation des financements, de l'offre de soins ainsi que la mesure de la qualité.

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### 1. Introduction

The efficiency of long-term care (LTC) is an important issue. In France, nearly 2.5 million people over 65 years old need assistance with activities of daily living (ADLs), and this number is expected to increase to nearly 4 million by 2050 (Larbi and Roy, 2019). The inadequacy and inefficiency of LTC can represent very high financial and societal costs and impact the health sectors, which are under increasing financial pressure.

In France, as in most countries, the LTC and health sectors represent two different economic sectors with distinct organizations, policies, and funding. Thus, traditionally, questions about the efficiency of these two sectors have generally been studied separately. For example, on the one hand, some studies have questioned the efficiency of hospitals (Giancotti et al., 2017; Ravaghi et al., 2019; Tabrizi, 2012), and on the other hand, some studies have questioned the efficiency of residential aged care facilities (RACFs), such as nursing homes (Shimshak et al., 2009; Tran et al., 2019; Weech-Maldonado et al., 2006). The issue of care integration and interdependence between the health and LTC sectors in caring for older adults is beginning to emerge in the literature (Barrenho et al., 2022; Nolte and Pitchforth, 2014). The relationship between the funding and organization of the LTC sector and the efficiency of health care remains to be explored, especially in France, where economic studies on the subject are rare (Dormont and Martin, 2011; Martin, 2014; Martin and Jérôme, 2016; Martin and Ramos-Gorand, 2017; Rapp et al., 2015; Roquebert-Labbé, 2018).

My thesis aims to question the efficiency of care received by older adults in France in terms of the funding, organization and pricing of LTC services. It is divided into three chapters. The first chapter examines the relationship between geographic inequalities in LTC provision and health expenditures for seniors with dementia. The second chapter examines the organization of care in French residential aged care facilities (RACFs) and, more specifically, the impact of an intervention to improve the coordination of care between a residential facility, primary care physicians, and hospital. The third chapter explores the determinants of accommodation prices paid by RACF residents and their association with the quality of the care received in these facilities.

The aim of this general introduction is to present the economic and institutional framework of the thesis and its contribution to economic research in the field. The first section presents the specificities of the LTC market in terms of demand and supply.

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The next section outlines the research questions addressed in the thesis by situating them in the theoretical and empirical literature, and the last section summarizes the contributions, main results, and conclusions of each chapter in the thesis.

## 2. Long-term Care Market

For several decades, LTC markets have been expanding in OECD countries. LTC demand is increased by the aging of populations and by societal changes (women's work, living arrangements<sup>32</sup>, etc.), while LTC supply is affected by the attractiveness of sector, funding, and regulation policies. In this section, first, I review LTC market specificities of demand characteristics and consumer preferences. Second, I describe the evolution of LTC supply, funding and regulation policies in France. Finally, I present the international framework and introduce common issues in LTC markets.

### 2.1 Demand for care and preferences

A chronic illness or an accident can alter a person's autonomy in performing activities of daily living (washing, dressing, etc.). These people will therefore need LTC. There are three categories of LTC (OECD, 2018). Medical and nursing care corresponds to wound care, drug distribution, health advice, palliative care, pain relief and medical diagnosis of a long-term condition. Personal care involves assistance with activities of daily living (ADLs), such as eating, bathing, washing, dressing, getting to and from the toilet and managing incontinence. Social care is assistance with instrumental activities of daily living (IADLs), such as shopping, laundry, cooking, housework, and managing finances.

#### 2.1.1 Factors determining the demand for care

The first factor linked to the demand for LTC is the aging of the population, largely explained by the demographic changes that occurred in the 20th century, such as the high birth rate after World War II and the increase in life expectancy (Spillman and Lubitz, 2000). There are nearly 2.5 million seniors in France who cannot carry out the activities of daily living unaided, and this number is expected to increase to nearly 4 million by 2050 (Larbi and Roy, 2019). Indeed, advancing age, mainly after 65 years, is associated with an increased risk of chronic diseases, such as neurodegenerative diseases (Alzheimer's, etc.), or diseases or events with long-term consequences, such as stroke (Guzman-Martinez et al., 2019). There are an estimated 1.2 million seniors

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<sup>32</sup> Living arrangements refers to the structure and composition of a household, including the number of household members and their relationships to each another.

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with Alzheimer's disease and related syndromes in France, and this population is expected to grow to 2 million by 2050 (Carcaillon-Bentata et al., 2016). Similar trends are estimated in other OECD countries by 2050 (OECD, 2021).

A second factor explaining the increase in demand for LTC in recent decades is societal changes in OECD countries (Colombo et al., 2011). The primary providers of LTC are relatives. Indeed, a recent study showed that more than 60% of LTC was provided by relatives in France (Brunel et al., 2019). The availability of relatives to provide this care can impact the demand for formal LTC and therefore the LTC market. In the pre–World War II patriarchal model of the family, women who stayed at home to care for their children often also provided the daily care needed by older family members. The entry of women into the workforce has reduced the availability of women to perform such daily care, even though they remain the main informal providers of care to their frail relatives (Sharma et al., 2016). Similarly, the splitting up of families (with elders more often living alone) has reduced the level of care provided by relatives (Sokolovsky, 2001).

### 2.1.2 Utility and preferences

More generally, the demand for LTC reflects consumption choices that are determined by preferences and the utility attributed to different goods and services. In Keynes' consumer theory (Keynes et al., 1936), consumers are rational and able to rank their preferences for different goods and services and thus to maximize the utility function of these goods and services as a function of the price and their income constraints.

In contrast to the medical sector, where physicians prescribe care that partly restricts patients' freedom of choice, in the LTC sector, older adults and their relatives have more freedom of choice, as care is generally not prescribed by a physician. However, some consumer preferences are common across countries. The literature shows that most seniors prefer to receive LTC in their known physical and social environment when their care needs are moderate and in residential facilities when their needs are high (Lehnert et al., 2019). Similarly, there is an international consensus on the adverse consequences of hospitalization for these frail persons. This literature shows, based on quantitative and qualitative studies, that hospitalization of older adults can lead to a deterioration in their psychological and physical health (Aminzadeh and Dalziel, 2002; Boyd et al., 2008).

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A central element in the rationality of consumer choices is the level of information on available services and their quality. Norton (2000) suggested that consumers of RACFs have a better ability to evaluate quality than consumers in the hospital sector because of the less technical nature of the care ("Nursing homes are not technical and can therefore be evaluated more easily by consumers than, for example, a surgical service. Consumers can observe the smell, the size of the rooms, the atmosphere, the activities offered, the meals, etc." (Norton, 2000). However, this approach ignores the fact that in LTC facilities, there is also a need for medical follow-up and that despite the less technical nature of the care, assessing its quality remains a difficult exercise, as it depends on many factors that are not always easily observable.

The demand for care also depends on its price and consumers' income elasticity. The literature on this issue is relatively limited. A French study showed that home care demand is sensitive to the price paid by households, as home care use decreases when the price paid by households increases (Roquebert and Tenand, 2017). However, the adjustment in home care use is proportionally smaller than the observed price increase, underlining the financial effort that households are willing to make to benefit from it. Roquebert and Tenand analyzed the relationship between income and home care use and found that households with higher incomes do not consume significantly more care. The fact that in France, public subsidies received by households to cover the cost of home care are inversely proportional to their income could explain why an increase in income does not significantly increase home care use.

### 2.1.3 The production of well-being

A major distinction between LTC and medical care is linked to the curative function of medical care, which is more limited in LTC. In fact, LTC improves a person's well-being (his or her physical and psychological integrity, comfort, reduction of pain, etc.) and prevents health risks (falls, dehydration, depression, etc.) but does not allow him or her to recover a good state of health, as most medical treatments do.

Grossman's theory (1972) introduces health as a form of capital in which everyone can invest. It thus revolutionized classic consumer theories by considering consumers to be producers of their own health and the demand for care to be an investment in health. Past health investment (demand for medical care, education, risk behaviors, etc.) determines an individual's health capital and can therefore influence future demand for LTC. Moreover, LTC could also be part of the health investment



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function by improving quality of life (production of physical and psychological well-being) and health capital by preventing health risks (falls, etc.). Grossman identified two forms of marginal benefits of health capital, one related to the benefit of health resulting from the investment and the other related to the monetary return (less important in the case of seniors who are retired). At the end of life, there is a time when investment in health does not allow the recovery of a good state of health, but it does allow for an improvement in quality of life, mainly through investment in LTC. The utility of investing in curative care decreases, while the utility of LTC increases. For example, palliative care could shorten life expectancy by stopping curative care, but it improves living conditions and well-being at the end of life. In this case, the objective of care is no longer the production of future health but rather short-term well-being.

Another specificity of LTC demand is that it often depends on family choices. Despite the important role played by physicians in medical consumption choices, an adult will generally make his or her own choices according to his or her preferences, risk aversion and personal utility. Most older adults with neurodegenerative diseases do not have the capacity to decide for themselves, and their relatives therefore choose for them. Moreover, the choice to consume LTC has an impact on the family itself, as in France, the family is required by law to provide financial assistance for accommodation in residential aged care facilities (RACFs) if the patient cannot pay for it him- or herself. In addition, family members often provide care for their relatives, which means that the time required to provide this care is part of their "labor-leisure" trade-off. These economic trade-offs, which depend on the preferences and risk aversion of each family member, can conflict when family members must make an LTC choice, which may explain the many family conflicts at a relative's end of life.

### **2.2 Supply, regulation, and funding**

The LTC sector is composed of private and public organizations that provide care at home or in institutions to older adults who need assistance with activities of daily living. In French law, dependence, now called loss of autonomy, is defined as "the state of a person who, despite the care he or she is receiving, needs to be helped to perform the essential acts of daily living or requires regular supervision" (art. 2 of the law of January 24, 1997). The semantics of this definition distinguish care from help provided to carry out acts of daily life. In France, care generally refers to curative care, whereas in other countries, care is not necessarily curative but can also correspond to daily personal care. Thus, in France, LTC providers are qualified as

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“helpers” (formal, informal, professional or family), whereas in other countries, they are qualified as “caregivers”, which literally means those who give care (or care for).

The provision of LTC in France is characterized by this boundary between the medical and social sectors. The primary objective of this care is social, as it improves the quality of life and the daily well-being of people who cannot perform the essential acts of daily life on their own. However, its significant impact on the physical and psychological health of these frail people as well as the need for medical skills to carry out some LTC tasks (nursing care, pain management, palliative care, etc.) place LTC at the borderline between medical and social skills; hence the French term “medico-social”. In France, care that requires medical skills is organized and funded by the health sector (health insurance and regional health agencies), while daily care that does not require medical skills is organized and funded by the social sector (local authorities). Thus, an LTC provider, depending on the care provided and the status of the provider, may receive funding from the health insurance fund, from local authorities, or from both.

In the following section, I first review the historical evolution of the LTC supply in France and then provide background on French funding and regulation policies.

### 2.2.1 Evolution of long-term care provision in France

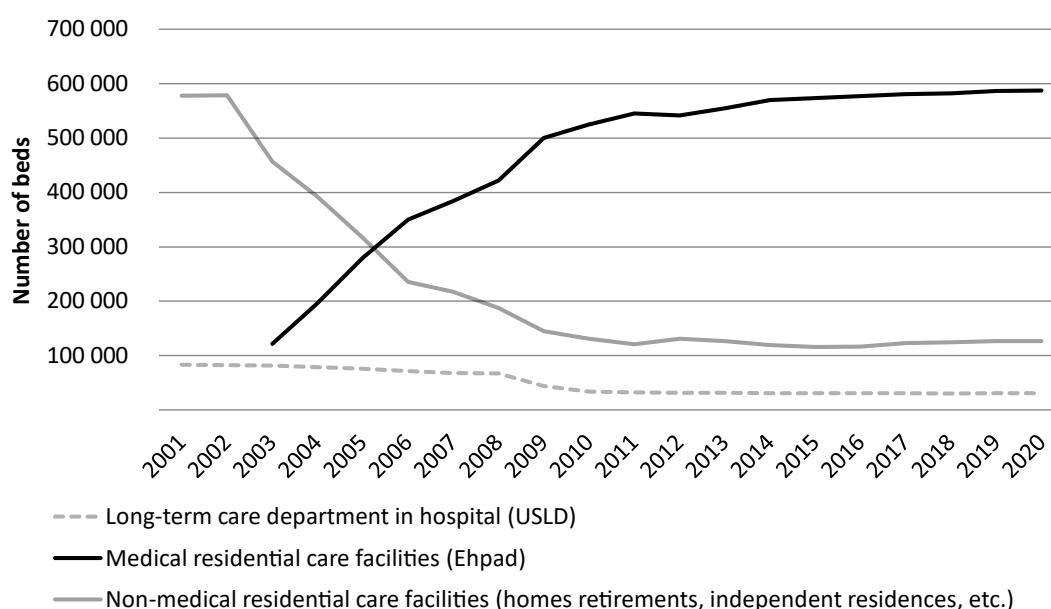
The position of the LTC sector in the health system and the level of medicalization of LTC facilities have been questioned many times in French history. In fact, the institutions that take care of older adults date back to the Middle Ages, with the creation of hospices by religious charitable institutions. Etymologically, a hospice is a place where hospitality is given. For a long time, hospices were not distinguished from hospitals. At the end of the Middle Ages, the creation in Paris of the Hôtel-Dieu led to the beginning of a differentiation; the Hôtel-Dieu received sick people, while hospices preferably received foundlings or abandoned children; older adults; and infirm, blind and incurable patients (Yang and Dubois, 2019). Despite a clearer separation between hospitals and hospices in the centuries that followed, health and social services coexisted for a long time, and hospices were often managed by hospitals (Verdier, 2003). It was the law of 31 December 1970 that focused hospitals on their primary function, medical care, and initiated a split between health and social services.

Five years later, the founding law of June 30, 1975, created the LTC sector, in French named the “medico-social sector”, and the governance and funding of this

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sector were assigned to local authorities. This law would reform the hospice system in order to "bring the facilities into harmony with [contemporary] comfort requirements; to provide the required care by reinforcing the medical and paramedical provision; and to abolish the shocking promiscuity of very distinct ages or disabilities" (Delattre et al., 2016). It instituted two types of facilities for older adults: "long-stay services", the predecessor of the current LTC department (*unite de soins de longue durée* (USLD)), which were attached to the health sector (hospitals) to raise the level of guaranteed medical care and to distinguish them from retirement homes, which were not designed to provide medical care. However, in the years that followed, the need for medicalization of retirement homes increased, which led to the introduction of health insurance funding for beds in medical cure sections in retirement homes.

**Figure 1. Evolution of the number of beds in residential aged care facilities**



Sources : open-sources Statiss 2001 to 2020 databases.

The law of January 2, 2002, reformed the sector with the aim of medicalizing retirement homes. This led to the creation of medical residential care facilities named "Etablissements d'hébergement pour personnes âgées dépendantes" (Ehpad), which receive a care package from the social health insurance and a dependency bundle from the local authority. Between 2002 and 2012, the sector was transformed, with most retirement homes and half of USLDs becoming Ehpad (Figure 1). The Ehpad is becoming the main residential aged care facility for seniors in France, with approximately 600,000 beds in permanent accommodations. There are approximately 30,000 beds in USLDs and a pool of nonmedical residential care facilities with approximately 120,000 beds, which do not receive funding from the health insurance

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system and accommodate people who are more independent. These facilities have taken different names depending on the period; they are now called “independent residences” (“residences autonomie”).

In the rest of the introduction as well as in chapters 2 and 3 of the thesis, I will refer to “*Ehpads*” by the generic term, residential aged care facilities (RACFs). Only in chapter 1, where I distinguish between medical and nonmedical facilities, will *Ehpads* be called medical residential care facilities.

### Home care providers

LTC at home has also developed since the 1970s. Indeed, in 1962, the Laroque report set out the founding premises of a policy for maintaining seniors at home: “It is essential to keep older adults in society in contact with other generations and to avoid any abrupt break in their living conditions” (Laroque et al., 2014). Home care, like institutional care, stems from the founding laws of the LTC sector in 1975 and 2002. The law of June 30, 1975, created the first form of public funding from local authorities to households to cover costs of home care provided by a family or professional caregiver. In 1997, this allocation became specific to disabled people under the age of 60, while the specific dependency benefit (PSD), the predecessor of the current personalized autonomy allowance (APA) created by the law of 2002, was created for people over 60 (Table 1).

Eligibility for the APA is defined by local authorities using a national dependency assessment tool (GIR grid). The allowance covers a person-specific “care plan” evaluated by an interdisciplinary team (usually composed of social workers and nurses) from the local authority. The “care plan” defines the number of hours of personal and/or social care needed to maintain the person at home. For each level of dependency, a maximum amount of APA is set at the national level, and copayment varies according to income (Table 1).

In 2015, it was estimated that approximately 180,000 full-time equivalent (FTE) caregivers provided home care to people aged over 60 (Carrère et al., 2021). These home care providers worked as self-employed or salaried employees of LTC services and had professions with various levels of medical skills (nursing assistants, housekeepers, home health aides, nurses, etc.). With 6,700 services and 98,000 FTEs, home care and support services (“*services d’aide à domicile*” (SAAD)) are the main providers of home care services in France. SAAD and self-employed home care providers approved by local authorities can be funded by the APA (Table 1).

## Summary of the thesis

**Table 1. Personalized autonomy allowance (APA) to fund LTC services at home**

Funding sources	Approximately 60% of APA is funded by decentralized local authorities ( <i>département</i> ) via local taxes, while 40% comes from the National Solidarity Fund for Autonomy (CNSA)
Eligibility criteria defined nationally	Over 60 years old Mid- to high dependency: the first four levels on the national dependency score (GIR) based on 10 variables of physical and mental activity and seven variables of domestic and social activity
Evaluation of “care plan” by local authorities	Multidisciplinary teams of local authorities evaluate the dependency score (GIR) and define a “care plan” (medical and social)
Amount of the allowance: national rules	Maximum amount for “care plan” by dependency level: <ul style="list-style-type: none"> <li>• 674 euros per month in level 4 (low dependency)</li> <li>• 1011 euros per month in level 3</li> <li>• 1399 euros per month in level 2</li> <li>• 1742 euros per month in level 1 (highest level of dependency)</li> </ul> <p>Copayment: depending on income. On average, 20% of “care plan”. Recipients of less than 800€ have no copayment; those who receive over 2900€ contribute 90% of the cost.</p>
Definition of “care plan” amount	For each type of LTC provider at home (SAAD, self-employed domestic help, day care), local authorities fix the reference prices. These prices are used by the interdisciplinary teams to calculate a “care plan” amount (number of days or hours multiplied by the reference price). Reference prices vary significantly across local authorities.

Sources: Extracted from (Or and Penneau, 2021)

In contrast, home nursing services (SSIADs), which are fewer in number (2,100 services and 28,000 FTEs), are medicalized home assistance services with care coordination performed by a nurse and care provided by caregivers (FEHAP, 2014). These services are prescribed by a physician, and all costs are covered by social health insurance. Very uncommon are SPASADs (multipurpose home care and assistance services) which are on the borderline between SSIADs and SAADs. Thus, these different types of services can provide equivalent care, such as personal care (washing, dressing), with very different funding sources, organization, and out-of-pocket payments for seniors. However, a decree at the end of 2021 announced a major reform aimed at replacing the existing structures with a single model of home help service (SAD) with the objective of standardizing the funding and organization of the sector.

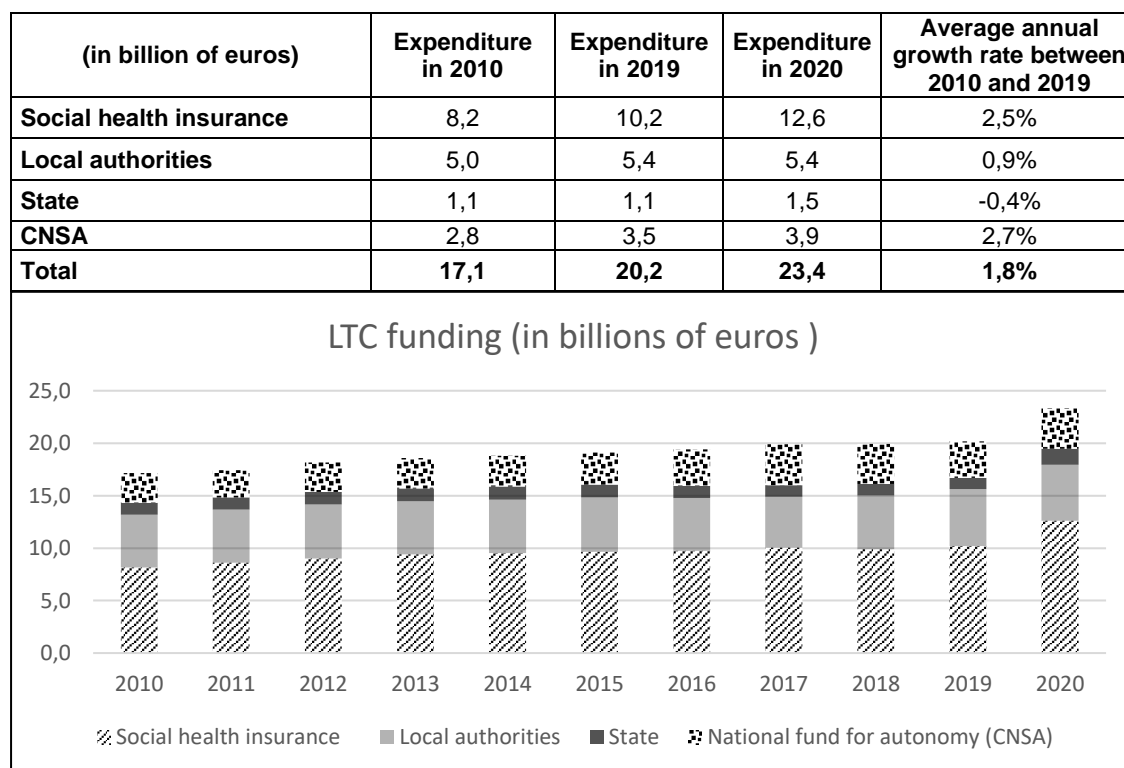
### 2.2.2 Funding and regulation of supply

#### LTC funding

## Summary of the thesis

Public funding of the LTC sector costs approximately 20 billion euros per year in France (Figure 2). Social health insurance spent 10 billion euros to fund care in RACFs, SSIADs and USLDs in 2019. Local authorities spent 5.5 billion euros to fund the personalized autonomy allowance (APA) at home and in institutions and social assistance to pay accommodation costs for the poorest RACF residents. The National Fund for Autonomy (CNSA) spent 3.5 billion euros to fund the APA (transfer to the local authority), the support package for nonmedical residential facilities, and building investment aid plans for all types of not-for-profit residential aged care facilities (medical or nonmedical residential facilities). Finally, the state spent 1 billion euros in tax exemptions and program funding in the sector. The average annual growth rate between 2010 and 2019 was 1.8%, due mainly to a small but constant increase in spending by social health insurance and the CNSA. The year 2020 was characterized by a substantial increase in social health insurance spending related to financial measures to support the LTC sector during the COVID-19 crisis. Thus, between 2019 and 2020, social health insurance spending increased by 23% (going from 10.2 to 12.6 billion euros in one year). All the analyses conducted in this thesis are based on data from before the COVID-19 crisis.

**Figure 2. Public funding of the LTC sector in France**



**Notes :** social health insurance (ONDAM médico-social, older adults + USLD) ; Local authorities (total net expenditure on assistance to the older adults minus the amount of the CNSA transfer to fund the APA) ; State ((Tax expenditure exemptions + social contribution exemptions + programs (autonomy project,

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economic change, employment development, etc.); CNSA (transfer of APA funding to local authorities + building investment aid plan + funding non-medical residential facilities)

**Sources:** LFSS 2012 à 2022 ; DREES social aid survey ;

The total social health insurance budget in 2017 was 170 billion euros (excluding LTC funding). This puts the cost of the LTC sector into perspective. Indeed, a day in an RACF costs less than 50 euros per day for public funders, while a day in post-acute (rehabilitation) facilities costs approximately 200 euros per day and a day in palliative care in an acute care hospital on average costs 455 euros per day.

However, the LTC expenses in Figure 2 do not include care provided by self-employed nurses. Indeed, self-employed nurses paid on a fee-for-service basis by social health insurance can provide assistance for activities of daily living (ADL), such as washing, which are also provided by caregivers in the LTC sector (SAADs, SSIADs, etc.). In principle, this should concern only complex cases, such as washing people with pressure sores, but in practice, many self-employed nurses regularly provide personal care at home, particularly in regions where the number of nurses is high (Suchier et al., 2021). Expenditure on nursing acts corresponding to personal care performed by self-employed nurses represents approximately 2 billion euros per year funded by social health insurance (LFSS 2022, 2021, 2020).

### Out-of-pocket payments

In France, the average out-of-pocket payment for medical care is relatively low for seniors, whereas out-of-pocket payments for LTC can be substantial. In fact, despite a growth in health expenditures with the level of loss of autonomy, the health insurance system, owing mainly to the exemption system for long-term conditions (ALD), maintains out-of-pocket payments for medical care at an average amount of 900 euros per year, regardless of the level of loss of autonomy (Penneau et al., 2018). In addition, the items that cost most in residual medical expenses are well covered by complementary health insurance, which should reduce the final residual expenses even more. In the LTC sector, the amount of out-of-pocket expenses is less well known and can potentially vary significantly depending on the type of care provider. In RACFs, residents pay the accommodation cost, which is on average 2000 euros per month but can vary from 1400 to 6000 euros depending on the facility. At home, the actual out-of-pocket payments are not well known, but they can vary significantly depending on the care providers available. For example, for daily washing, the costs of self-employed nurses or SSIADs are fully covered by social health insurance, whereas for those receiving care from an SAAD, the remaining costs will depend on local authority policy.

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### Regulatory policies

LTC providers, depending on their funding, may depend on the governance of regional health agencies (ARSs) and/or local authorities. Indeed, ARSs are responsible for implementing national health policies in their territories, while social policies are decentralized to the departmental level. Thus, the home care and support platform (SAADs) and nonmedical residential care facilities depend exclusively on local authority policies, whereas RACFs have a dual governance system (ARSs/local authorities). Finally, home nursing services (SSIADs) and self-employed nurses depend only on health policies.

ARSs are public administrative agencies under the direct supervision of the Ministry of Health. They were created in 2009 with the mission of managing local health services and health promotion actions. In the LTC sector, they redistribute the funding provided by the social health insurance scheme to RACFs and home nursing services (SSIADs) based on multiyear funding contracts (CPOMs). These contracts are the main tools used by ARSs to regulate the number of beds/places and the level of care resources funded by social health insurance for these facilities and services. Following the example of hospitals, the reforms initiated in RACFs since 2006 aim to reform regulatory and steering procedures to ensure greater efficiency in the allocation of resources. The medical care package funded by social health insurance and distributed by the ARS has shifted from retrospective funding (which is rather inflationary) to prospective funding, which is considered to be more efficient and equitable. It is now calculated for each facility using a synthetic indicator, called the iso-weighted care group (GMPS), that corresponds to the average care needs<sup>33</sup> and dependency level<sup>34</sup> of people living in the facility. The amount of the medical care package for each facility is the average GMPS score multiplied by a reference/index price per point defined at the national level by the Ministry of Health. The ARS also controls the quality and adequate use of public funds received by facilities. However, the quality and frequency of inspections conducted by the ARS have recently been questioned following several scandals of abuse and misappropriation of public funds in private for-profit facilities (De Saint-Martin et al., 2022).

### Decentralization of social policies

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<sup>33</sup> Care needs are measured by the coordinating doctor of the facility using a classification called "pathos" that identifies 50 clinical conditions with 12 profiles of care required by these conditions, thus constituting 238 couples of "condition profiles" (Ducoudray and al, 2017).

<sup>34</sup> The dependency score (GIR) is based on 8 variables of physical and mental activity (coherence, orientation, toilet, dressing, food, etc.).



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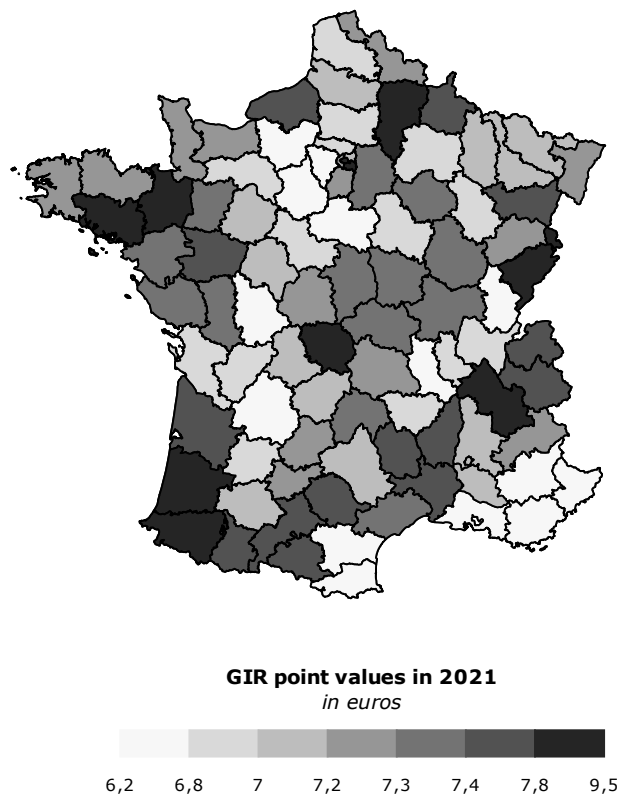
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Social policies are decentralized to local authorities, which fund and regulate LTC providers. There are ninety-five local authorities (departments) in metropolitan France, each administered by an elected body, called the departmental council, with the power to raise taxes. The level of LTC costs covered by the APA, which is the main source of funding for home care and funds a portion of RACFs, varies across departments. At home, departmental councils can be more or less generous in applying national eligibility criteria and in assessing the amount of the assistance plan financed by the APA, either by estimating the number of hours of care required more generously or by setting a more generous hourly rate (these costs varied from 18 to 29 euros per hour for care provided by an SAAD, depending on the department, in 2015). Thus, seniors' out-of-pocket payments vary according to the department where they live. In RACFs, the APA funds the dependency bundle, which finances the cost of caregivers who help with activities of daily living (personal and social care). Similar to the medical care package, the price setting of the dependency bundle was reformed in 2017 to shift to past budget funding based on a national formula. Now, the payment is calculated according to the GMP (average dependency score (GIR)) of the facility and the value of the departmental GIR point fixed by the local council (*Conseil départemental*). While this funding reform helped to harmonize payments among facilities within a local authority, it did not reduce disparities in funding between local authorities, as the value of the GIR point can vary significantly depending on the wealth and policies orientation of the local authority (Map 1). Departmental policies also affect variations in the supply of LTC providers in a specific territory. Indeed, the departments authorize the opening of new places/beds for all LTC providers (for-profit or not), sometimes in agreement with the ARS.

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**Map 1. Variation in the value of the GIR point across local authorities**



Source: Data from the National Fund for Autonomy (CNSA), 2021

### **2.3 International landscape: Different markets with common issues**

History, demographics, wealth, social and health policies, and culture can affect the supply of and demand for LTC in a country. Market characteristics vary significantly from one country to another, but despite these differences, most of the issues faced are common to all countries.

#### **Care quality**

The issue of the quality of LTC is of concern to societies and policy-makers in many countries, and it has increasingly been included in international discussions and reports (Barrenho et al., 2022; WHO, 2008). The difficulties encountered by countries in improving the quality of care are common and can be explained by several factors, such as fragmented and underfunded care provision, the lack of attractiveness of jobs in LTC markets, and the lack of coordination of care among different care sectors. Therefore, qualitative and quantitative studies questioning the quality of residential aged care facilities (RACFs) are increasing in most countries (Burke and Werner, 2019; Grabowski et al., 2014; Wang et al., 2019). In the international literature, the

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most common quality indicators used to compare LTC facilities are staffing ratios (number of professionals per resident) and the Resident Assessment Instrument (RAI), which is based on the clinical evolution of the health and well-being of residents (pressure ulcers, functional decline, depression, etc.). The RAI has been translated and validated in more than ten countries (Rahman et al., 2009). A growing number of countries also use administrative data on medical care consumption (inpatient and outpatient) to develop quality indicators for residents in facilities following hospitalizations and inappropriate prescriptions (Graverholt et al., 2014; Jokanovic et al., 2015). Some countries encourage facilities to improve their quality through financial incentives for quality (Kane et al., 2007) or through yardstick competition based on public reporting of quality indicators (Werner et al., 2012). Research on the quality of home care is much less developed, especially at the quantitative level.

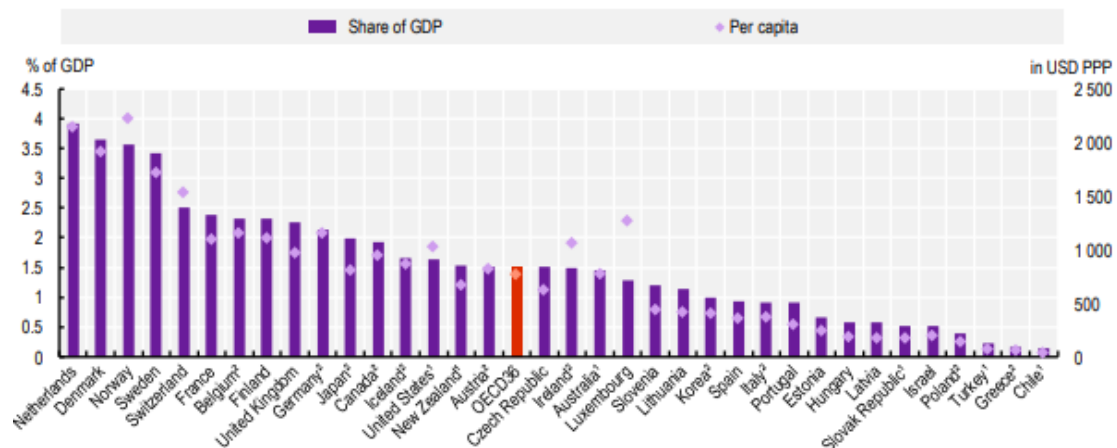
### **Underinvestment and inequitable distribution**

Insurance systems and levels of LTC public funding vary across countries. The countries with the highest public LTC expenditure are the Netherlands and the Scandinavian countries, with total expenditures representing approximately 3.5% of gross domestic product (GDP), while France is in the second group of countries with high expenditure representing approximately 2.5% of GDP, along with the United Kingdom, Belgium, Germany, etc. (Figure 3). The Southeast European and Latin American countries are those with the lowest expenditure, which can be explained by a younger population but also by the important contribution of the family circle to the daily care needs of older adults in these countries. In most countries, out-of-pocket expenses for LTC are high and represent very high costs for households, especially in institutions, where the cost of accommodation is often much higher than the cost of standard lodging.

Another common issue in several countries is the fragmentation, decentralization, and unequal distribution of LTC funding within the country. Indeed, a recent study showed that many health care systems do not allow for equitable distribution of LTC public funding (Waitzberg et al., 2020). A system with equitable distribution of LTC funding is defined as a system with a unique national eligibility criterion for care funding and an allocation formula based on local needs (not on past expenditures or political decisions).

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**Figure 3. Total long-term care expenditure per capita as % of GDP, 2018 (or closest year)**



Extracted from OECD, 2020 (<https://www.oecd.org/health/health-systems/Spending-on-long-term-care-Brief-November-2020.pdf>)

### Job attractiveness crisis

In all countries, LTC markets are also affected by a crisis of job attractiveness, which has worsened since the COVID-19 pandemic (Scales, 2021). Countries have varying LTC supply provision, with the number of LTC workers ranging from 0.5 per 100 people over 80 in Slovakia to more than 3.5 in Norway, Sweden and the United States (Colombo et al., 2011). Medical skills also differ across countries, with the share of nurses in the caregiver workforce ranging from 16% in Japan to 85% in Hungary. However, despite these varying supply characteristics, employment difficulties in this expanding sector are observed everywhere. Poor working conditions and underpaid staff often lead to high staff turnover, which contributes to a negative image and affects service access and quality improvement.

### Lack of care coordination

Another issue shared by all LTC markets is the difficulty of coordinating/integrating LTC and medical care providers (general practitioners and hospitals) and sometimes assuring coordination between LTC providers. The need to achieve integrated care for older adults is growing internationally with concepts such as patient-centered care and policies to encourage cooperation/coordination among different care providers (Barrenho et al., 2022). Even though social caregivers are often forgotten in a large part of this literature, more specifically when caregivers do not have medical training, the need to take them into account is often pointed out. Thus, the interdependence between the health and LTC sectors is increasingly becoming the subject of research and public policies.

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### 3. Efficiency of care for older adults: Research questions, contributions, and main results

In this thesis, I question the efficiency of the LTC sector in France. More specifically, I examine the effect of the organization and funding of the LTC sector on the efficiency of care for older adults.

Economic efficiency implies that society makes choices that maximize the results of care obtained from the available resources. In economics, there are two types of efficiency: productive (or technical) efficiency and allocative efficiency (Papanicolas and Smith, 2013). Productive efficiency consists of minimizing the costs of producing a good or service by choosing the optimal combination of resources and maximizing output. The concept of allocative efficiency refers to an optimal allocation of resources in order to maximize outcomes but also to meet society's demand (preferences). With limited resources, the concept of allocative efficiency may eliminate some productively efficient resource allocations that would not optimize consumer preferences (Charlesworth et al., 2016). In this context, quantifying opportunity costs, i.e., assessing the loss of benefit associated with choosing one type of care (or health investment) over another, can help to increase the allocative efficiency of the health care system.

One of the issues most studied in the empirical literature is the productive efficiency of health care facilities (hospitals or RACFs), which is the capacity of these facilities to optimize their production given the funding they receive. The first difficulty encountered in measuring the productive efficiency of RACFs is how to define and quantify the output of these facilities. In the literature, production (output) is often measured by the volume of activity (number of residents) in the facility. Thus, the first studies did not consider quality in the production function, focusing solely on the number of people accommodated. Today, in the majority of studies, quality is introduced as a control variable to investigate the link between cost and production (Weech-Maldonado et al. 2006, Shimshak et al. 2009, Laine et al. 2005, Di Gorgio, 2016). The quality indicators used measure either the quality of the structure, often by the staffing rate, or the outcome quality, generally through clinical outcome indicators (pressure sores, depression, loss of autonomy, etc.) (Tran et al., 2019). In France, there have been few studies of the cost-efficiency of RACFs. One of these rare studies examining French nonprofit facilities showed that the inclusion of quality indicators in the efficiency model has a significant impact on the estimated efficiency score and that private nonprofit facilities are more efficient than public facilities

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(Dormont and Martin, 2012). Another study focusing on private for-profit facilities suggested that the lack of competition in the private for-profit sector impacts the efficiency of these facilities, as larger facility chains are associated with lower efficiency scores (Martin and Jérôme, 2016).

Empirical studies have also estimated the economic costs associated with alternative arrangements for organizing and funding LTC (Desmedt et al., 2016; Rocks et al., 2020). Generally, they examine which primary care or LTC alternatives or organizational changes can reduce older adults' hospitalizations and the associated costs. They are based on an international consensus about the adverse consequences of hospitalization as a source of stress, anxiety and disorientation that can lead to a deterioration of both cognitive and physical health for seniors (Aminzadeh and Dalziel, 2002; Boyd et al., 2008). Additionally, surveys carried out in many countries show that older adults prefer to receive care in known physical and social environments (Lehnert et al., 2019).

One main factor identified in the literature as a source of “inappropriate” hospital use by older people is the lack of coordination of care between hospital and ambulatory care providers. Thus, a growing body of research evaluates the economic impact of better care coordination on hospital use and spending by seniors (Nolte and Pitchforth, 2014). The number of policies (or experiments) aimed at improving the coordination (or integration) of elderly care (in hospitals, in RACFs or in a territory) is also growing. Another emerging issue is the interdependence between the health and LTC sectors when caring for frail older adults (Barrenho, 2022; Nolte, 2014). Most empirical studies on this topic have aimed to evaluate the impact of new integration or coordination policies between these different care sectors with tools such as multiprofessional interventions, integrated funding or telemedicine (Kwa et al., 2020; Szczepura et al., 2008; Fan et al., 2015; Groom et al., 2021; Nazir et al., 2013). Fewer studies have questioned the impact of the funding and organization of LTC providers in a country on the efficiency and quality of health care. Recent studies have highlighted the role played by the LTC sector in hospital performance. These studies have shown that hospital use can be reduced among older adults who receive higher LTC benefits and a higher staff ratio and medical skills in RACFs (Bostick et al., 2006; Costa-Font et al., 2018; Forder, 2009; Froggatt et al., 2020; Gaughan et al., 2015; Grabowski et al., 2008; Graverholt et al., 2014; Spilsbury et al., 2011; Walsh et al., 2020). Nevertheless, the relationship between the funding and organizational arrangements of the LTC sector and the efficiency of care for older adults remains largely unexplored, especially in France, where economic studies on the subject are rare.

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My thesis contributes to this economic literature by providing new empirical evidence on the relations between the characteristics of the LTC market and the efficiency and quality of care provision for older adults. In the following section, I first present the contribution of the thesis to the development of data for research on this subject by matching several French databases. Then, I present the contribution of each chapter to the literature before summarizing the main results and conclusions.

### 3.1 Exploitation and matching of original databases

#### 3.1.1 Numerous data sources that remain underexploited

In recent years, new sources of administrative and survey data on RACFs in France have been developed. The main source of information on human and material resources in RACFs come from a national exhausted survey on RACFs conducted each 4 years by the statistic department of health ministry (Drees) named EHPA (*enquête auprès des établissements pour personnes âgées*). National surveys on the health of people with disabilities or loss of autonomy from Drees (2008 disability-health survey, 2016 CARE survey and the future autonomy survey in 2023) have an institutional component that interviews RACFs residents. These surveys provide very little information on the facility, but a large amount of information on the residents in terms of health status, level of dependence, socio-economic level, but also on the characteristics of their informal caregivers. Moreover, these surveys are carried out on a representative sample of about 3,000 residents or less according to the survey.

In addition to these survey data, there are administrative data. The Resid-Ehpad data, collected by the National Health Insurance Fund (CNAM), provide information on the dates of residents' stays in RACFs for nearly 80% of these facilities in France. This database is matched with data on health care consumption from the national health data system (SNDS) using residents' social security numbers. This provides information on the consumption of health care by a person (use and expenditure on hospitalization and outpatient care) as well as on mortality before, during and after his or her entry into an RACF. This is a very rich source of data that could be used to develop numerous studies and research in coming years. The second main source of administrative data is the CNSA, which has administrative data on RACF funding and prices.

All these data are largely underused, as they are difficult to access. Indeed, the multiplicity of sources and the long and intricate administrative procedures complicate access to and matching of these data for the administration and for researchers. There

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are also issues related to the representativity and quality of these data that can complicate their use and matching. In addition, the dimension of care quality in terms of outcomes for residents, such as well-being or changes in state of health (psychological and physical), is missing in all these data sources.

In the home care sector, there is a critical lack of data either on the seniors using these services (in SAADs or SSIADs) or on the care quality. In fact, no survey has questioned the care provided in these services. To my knowledge, there is no administrative database on home care either. In the future, Resid-ESMS data should provide information on the medical consumption of people using home care services. However, these data have not yet been consolidated. Information on the active files of seniors using home care services and the quality of their care should therefore be developed. The recent decree on the future funding model of home care services includes some funding based on quality, so we can hope that this lack of data will change.

### 3.1.2 Thesis contribution to the exploitation of databases

This thesis contributes to the improvement of these databases for research by matching them and creating new quantitative indicators of quality. The first chapter of the thesis mobilizes two separate databases to track health care utilization and expenditures by residential area of seniors with dementia (Alzheimer's disease or related disorders (ADRD)). The first data source exploited is a cohort (FRA-DEM) that includes all individuals with ADRD newly identified in 2012 in the SNDS. The algorithm for identifying the target population and measuring indicators of hospital care consumption by this population over the following five years was carried out by the team of the Center for Epidemiology and Research in Population Health (Inserm – University of Toulouse) in collaboration with the CNAM (Elyn et al., 2022). This cohort included 80,372 new cases of ADRD in 2012. Using these data, I measure three indicators of hospital care utilization of newly identified patients with dementia at the residential level: average cumulative stays in acute care hospitals and post acute facilities and average number of ED visits without hospitalization.

I also use the CNAM pathology data available on the SNDS platform to calculate the average health care expenditures (hospital and ambulatory) of patients with dementia by residential area. There are two main advantages to using these data compared to the FRA-DEM cohort. First, there is greater statistical power and representativity. Indeed, the FRA-DEM cohort identified more than 80,000 new cases of people with ADRD in 2012; per residential area, there were on average 31



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individuals, which is a relatively small number. Moreover, a cohort of new cases also introduced questions about population mortality and the selection effect of this population. The data from the SNDS platform allow the annual identification of all dementia patients detected by the algorithm, i.e., nearly 600,000 persons each year, which enables greater statistical power at the residential area level and reduces the potential selection effect related to the identification of the population. The second advantage is that the platform data provide information on the health expenditures (hospital and ambulatory) of people with dementia identified in the SNDS each year. Thus, one of the contributions of chapter 1 is the study of both hospital and ambulatory expenditures and the use of care in volume to understand their relationship with inequalities in territorial accessibility to LTC (see part 2.2.3). Then, I present all the results based on these two data sources to show the work carried out in this chapter. To realize the chapter 1 analyses, I add other open-source data, such as LTC and primary care accessibility, hospital supply, distances to emergency departments and the socioeconomic level of older adults in the territory.

In the second chapter of the thesis, I revisit the databases constructed for a public policy evaluation at Irdes. For the project "Parcours Santé des Aînés" (Paerpa), we performed an important work of data management to calculate a panel of indicators of health care consumption (inpatient and outpatient use and expenditure by item) for all seniors in 12 French regions from the SNDS data. This database allowed me to build a cohort of individuals in RACFs, to identify the facilities that used hospitalization at home (HAH) for the first time, and then to calculate the result indicators by semester before and after the first semester of HAH use.

In the third chapter of the thesis, I use data specifically extracted by the CNAM for the Finehpad research project. Access to this database required three years of administrative procedures. This project is the first to match individual administrative data from Résid-Ehpad with resident RACF dates of stays and individual health consumption data from SNDS (2014 to 2019) with data on facility characteristics from the 2015 EHPA survey and pricing information from the CNSA databases. To date, the exploitation of the database is ongoing, and analyses for the Finehpad project will continue in the coming months and years. However, I was able to exploit this database to conduct the analyses presented in the third chapter. The wealth of data allows me to calculate, for the first time in France, a battery of indicators of care quality in RACFs in several dimensions (quality of management, of the building, of processes, etc.). These indicators are used in chapter 3 to analyze the determinants of the accommodation prices and their links with the quality of care.

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### 3.2 Inefficiency of inequalities

#### 3.2.1 Theoretical background

In economics, equality and efficiency are often presented as conflicting goals, as reducing inequality has an economic cost (Okun, 1975). However, a new consensus has been emerging that unequal access to resources (education, health, etc.) can be a barrier to national economic development (Acemoglu et al., 2015; Bárcena et al., 2018). Thus, various supply-side mechanisms by which inequality creates obstacles to innovation and investment are increasingly being questioned (Bowles, 2012). In health, the idea of an equity-efficiency trade-off means that as health equity is achieved, the level of efficiency decreases (in terms of population health gains) (Reidpath et al., 2012; Sandiford et al., 2018) since it would be more difficult (costly) to improve the health of some populations compared to others. Nevertheless, Reidpath and coauthors pointed out that health equity can be defined as a desired outcome of the health system, thus altering the relationship between efficiency and equity (i.e., a health system that improved the health equity of its population at a lower cost would be more efficient). Moreover, there could be supply-side mechanisms through which inequality could create obstacles to the efficiency of the health system. For example, lack of access to primary care can reduce system efficiency through an increased demand for expensive hospital care and can have a high opportunity cost for patients (Cartier et al., 2014; Thwaites et al., 2017). Thus, inequalities in access to primary care and LTC are likely to have an impact on the allocative efficiency of a health system's resources through an increase in more costly/invasive treatments.

In France, the LTC policy is partly decentralized, and the funding levels for investing in LTC resources and supporting LTC needs at the local level vary from one territory to another. Reducing inequalities in the local accessibility of LTC services could potentially improve the system-wide efficiency through two mechanisms. First, there could be a substitution between LTC and health care providers when alternatives to health care are lacking in the LTC sector, for example, when the lack of care support at home or in a facility creates bed blocking in acute care hospitals (Gaughan et al., 2015). Second, there could be a compensation effect: lack of access to regular and timely LTC can create unmet care needs, which can contribute to the deterioration of the health status of frail older adults (provoking falls, dehydration, etc.) and increase the need for expensive health care. This represents the opportunity cost of not providing LTC in a timely manner.

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### 3.2.2 Empirical literature

Recent studies have shown that older adults who receive higher LTC benefits have lower hospital utilization (Rapp and al. 2015, Forder, 2009; Gaughan et al., 2015; Costa-font et al., 2018, Moura 2020, Walsh et al., 2019; Bakx et al., 2020; Lin and Imanaka, 2020; Chen and Ning, 2022; Fernandez & Forder, 2008). The impact of LTC funding on hospital use is established at the individual level using instrumental variables (Rapp et al. 2015, Forder, 2009) and by studies examining the impact of changes in LTC insurance policies using difference-in-difference methods for hospital use and expenditure (Lin and Imanaka, 2020; Chen and Ning, 2022; Costa-font et al., 2018, Moura 2020; Bakx et al., 2020). Studies investigating the links between geographical variations in LTC supply and hospital use are scarce. Two papers from England and one from Ireland have shown that territorial disparities in LTC services (measured by nursing home or home care supply) play a significant role in explaining geographic variations in acute hospital performance measured by delayed discharges from hospital, emergency readmissions, and length of stay in acute care hospitals (Fernandez & Forder, 2008; Gaughan et al., 2015; Walsh et al., 2019). None of these studies have examined the relationship between territorial inequalities in LTC provision (financial and geographic) and the total health care spending of patients.

Generally, the literature on regional variations in health expenditure is much less developed than the economic literature on hospital utilization. A few studies have compared differences in the cost-effectiveness of regions by carrying out regional benchmarking of health care expenditures and studying links between local health expenditure and differences in local public policy (Rizzi and Zanette, 2021; Rosko et al., 1995). In France, only one study has examined variations in the efficiency of health expenditure (Bardey and Pichetti, 2004), while a few studies have explored geographical variations in hospital practices and consumption (Or and Verboux, 2014; Or and Penneau, 2018).

### 3.2.3 Research questions and contributions

In the first chapter of the thesis, I study regional variations in health care consumption and expenditure to explore the allocative efficiency of health care resources in different areas and to understand the opportunity costs associated with different mixes of health care resources. More specifically, I question how local inequalities in LTC funding and supply are linked to the total health care spending of frail older adults by concentrating on patients with dementia, a high-needs older patient group with high health care costs (Long & al, 2017; NAM 2019). This analysis

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contributes to the literature in several ways. First, I simultaneously evaluate the associations between financial and geographical LTC accessibility and health expenditures, controlling for other determinants of health care spending. Second, to assess geographical disparities in the accessibility of LTC, I produce an original typology of LTC providers and map the level of LTC resources across residential areas of patients. Third, to distinguish LAs that are more (or less) generous in funding LTC for their residents, I estimate a stochastic frontier (SF) model. I exploit the variations in LTC funding (APA expenditures), controlling for LTC needs and income at the local level. SF models are typically used to estimate the productivity margin given the resources of a production unit. Here, they are used to identify LAs' LTC spending margin (underspending or overspending) given the LTC needs and wealth in each local area. Fourth, to establish the link between local LTC supply and funding and health expenditures of dementia patients, I specify a hierarchical linear model recognizing that where patients live impacts their expenditures and that residential areas are nested in local authorities.

### 3.2.4 Main results and conclusions

These results complement the literature suggesting that inpatient care utilization is lower for people receiving higher LTC allocations or in areas with better LTC supply. Indeed, I find that dementia patients living in areas with less generous LTC funding have significantly higher acute and post-acute hospital utilization and spending. Moreover, LTC funding is necessary but not sufficient for reducing inequalities in LTC access. Indeed, my typology of LTC supply shows that one in four French people older than 75 years lives in an area underserved by all LTC providers. In addition, I show that when LTC funding remains constant, patients living in areas where there are not enough LTC providers still have higher hospital care and spending. Thus, reducing inequities in financial and geographic access to LTC providers across the country could reduce hospital use and expenditures for seniors with chronic neurodegenerative diseases.

The results also highlight significant variations in the use of and spending on post-acute care by patients with dementia by territory. Indeed, there seems to be a substitution between LTC at home and facility-based post-acute care funded from the health budget. In local authorities with a low level of LTC funding and in residential areas with low access to home care platforms, the use of and spending on post-acute care in facilities is higher. Finally, a central finding of chapter 1 concerns the relationship between LTC accessibility and ambulatory care spending (nurses, general

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practitioners, physical therapists, etc.). Indeed, areas with high accessibility to LTC providers have significantly higher ambulatory medical expenditures. The results suggest that different primary and LTC providers are complementary in avoiding hospitalizations. Thus, integrating funding policies (incentives) can help to reduce local inequalities in care provision in the community and improve the quality of care for older adults.

Overall, this study confirms the strong interdependence of the primary care, acute care and LTC sectors and the need to assess the relative effectiveness of different care models to reduce social and economic inequalities in access to LTC and to improve systemwide efficiency.

### **3.3 Funding Modalities, Incentives and Efficiency**

#### **3.3.1 Theoretical background**

All RACFs, whether private, public, for-profit or not-for-profit, are funded by the social health insurance system and local authorities to provide care for their residents. It is an agency relationship when the funding agencies contract with a facility to provide care for their residents (Shapiro, 2005). Indeed, they sign a contract called a multiyear contract of objectives and resources (CPOM), which sets out the specific activities and public service missions of the facility as well as the funding allocated. This contract mainly finances the nursing and personal care (washing, dressing, drug distribution, etc.) of people living in an RACF. One of the main difficulties encountered in this type of agency relationship is the asymmetry of information that can exist between the funders and the care providers (anti selection or moral hazard issues).

Moreover, the quality and efficiency of care for residents also depend on other economic agents that have their own missions and funding: primary care physicians and hospitals. Thus, the efficiency of care in an RACF does not depend exclusively on the funding and organization of care in the facility but also depends on articulation and coordination with general practitioners and the hospital. A care system efficiently allocates its resources if it finds a care organization that optimizes the distribution of resources between these economic agents in order to maximize the output (care quality) and respond to societal preferences. This leads to the issue of how to adapt the missions and funding arrangements of these economic agents to meet the care needs of their residents for the best cost. In RACFs, the literature has identified frequent hospital transfers of residents as a reflection of low care quality and efficiency (Saliba et al., 2000). Thus, reducing avoidable hospitalizations of residents is a

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common objective of many public interventions (telemedicine, multidisciplinary teams, etc.).

### 3.3.2 Empirical literature

Many studies examining public policies to reduce hospitalizations of aged care residents (Grabowski et al., 2008; Graverholt et al., 2014; Intrator et al., 2004; Saliba et al., 2000) have suggested that a significant number of hospitalizations can be avoided by better outpatient care (Lloyd et al., 2019; McDermott et al., 2012) and by increasing the level of personnel with medical skills in RACFs (Kwa et al., 2021; Szczepura et al., 2008). Some studies have pointed to the importance of better coordination of care between RACFs and hospitals for reducing hospital admissions (Fan et al., 2015; Harvey et al., 2014; Hulleck et al., 2016). There is also a growing literature examining the impact of interventions targeting better health care coordination of aged care residents, such as telemedicine (Groom et al., 2021) or multidisciplinary teams (Lau et al., 2013; Nazir et al., 2013). These teams rarely provide care to the residents themselves; rather, they are external, mostly hospital-based multidisciplinary teams that support RACF staff with specific expertise on geriatric, palliative, and/or psychiatric care. In this article, I examine a specific French policy that allows mobile hospital teams, called hospitalization at home (HAH), to provide care in RACFs. HAH teams usually consist of a coordinating doctor<sup>35</sup>, a coordinating nurse, a nurse-practitioner, and a social worker. They provide additional medical and technical resources necessary for some treatments in RACFs to avoid inpatient hospital admission.

### 3.3.3 Research question and contributions

In the second chapter of the thesis, I estimate the impact of the intervention of mobile hospital teams on care outcomes in RACFs. Studying the impacts of HAH on the care outcomes in RACFs allowed me to question the allocation of resources between hospital teams and RACFs to meet residents' care needs. This chapter contributes to the literature in several ways. First, it contributes to the development of international knowledge on the hospitalization of RACF residents and their links with funding arrangements and care coordination with other care providers. Second, the empirical strategy used aims to estimate the impact of HAH teams in treatment facilities on residents' health care quality and costs (frequency of hospitalizations, use of emergency rooms, palliative care at the end of life, and residents' hospital

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<sup>35</sup> Usually GPs.

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expenditures). I use a quasi-experimental (double difference) method to compare outcome evolution between facilities that used HAH for the first time between 2015 and 2017 (new users of HAH) and facilities that had never used HAH. I also question the incentives of economic agents (HAH teams, RACFs, primary care physicians and hospitals) to invest in HAH as well as the capacity of public authorities to increase the use of this practice in all facilities. Third, this analysis raises questions about palliative care and end-of-life care quality and funding in RACFs.

### 3.3.4 Main results and conclusions

I find a significant decrease in the average number of hospital admissions in the two years and a half following the first HAH intervention. The results are consistent with the literature showing that interventions from multidisciplinary teams in residential aged care facilities can reduce the hospital transfers of residents. Multidisciplinary mobile teams in RACFs have proven to be an interesting tool, as they require collaboration and medical consultation between many care providers from various care sectors. The results obtained on the reduction of the number of emergency visits in treatment facilities indicate that the improvement in care is linked not only to a substitution of care between acute care and HAH but also possibly to better follow-up of patients, which can reduce emergency visits. The results of this study also show that there is a significant increase in palliative care in RACFs linked to HAH. Indeed, palliative care utilization doubled in facilities using HAH in the two and a half years after the first HAH utilization. This result suggests a significant improvement in the quality of end-of-life care for residents of these facilities. However, the inequality in access to HAH points to possible inequity in end-of-life care quality for all residents in France. This challenges the capacity of incentive policies and supply regulation to reduce the facility selection effect linked to GPs and hospital characteristics and to ensure equity in access to HAH teams for all French facilities. To reduce hospital transfers, it may be more efficient to integrate end-of-life care needs into RACF funding to help these facilities invest in medical and social resources and upscale their competencies to improve end-of-life quality for all facilities and residents, while mobile hospital teams, such as HAH teams, can be used for the most complex care needs.

## 3.4 Determinants of accommodation prices and links to quality

### 3.4.1 Theoretical background

In a competitive market, the price is dependent on the interaction between the demand for and supply of goods/services (here, residential care) in the market. How

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buyers/consumers perceive the value of the product, how many buyers there are, and how sensitive they are to changes in price will determine the price. If the demand exceeds the supply of services, the facility may increase its price without improving its quality. Indeed, in a context of excess demand, when choice is limited, residents and their families may make their choice based on the price and availability of rooms rather than quality. The price set and the associated quality can therefore be impacted by regulatory policies that affect market entry and competition. In France, regulation of the RACF market is decentralized to the local authority level, which can lead to significant differences in market competition and excess demand across local authorities.

In a market where sellers are heterogeneous with respect to the quality of their services and are better informed than buyers, high-quality sellers might use prices as a signaling device about the quality of the goods they offer. They may also wish to differentiate themselves and increase their market power and prices by providing additional quality of care. According to product differentiation theory (Chamberlin, 1933), each firm will seek to recreate a monopoly situation in a competitive environment by distinguishing its goods to increase its market power, prices, and benefits. RACFs provide housing, meals, entertainment, nursing care, and social care for older adults. They can be differentiated by their location; by the quality of their building, food, and activities; and by their quality of care. When accommodation prices are set by a public authority, according to agency theory, the public authority (the principal) will set a price according to the value of the services provided and the desired level of quality (Shapiro, 2005). In this agency relationship, the public authorities often face a strong asymmetry of information when setting the price because they generally do not have all the information needed to assess the quality of the facility, or they may sometimes have incorrect information. Thus, in the health care market, asymmetric information is an important factor determining price and its relationship to quality (Arrow, 1963). If the funding agency or consumers are not able to measure quality, facilities will have no interest in differentiating itself by quality. Instead, they will have an interest in improving the dimensions most easily observable by residents and their families and may reduce costs in dimensions of quality that are less easily observed. To reduce information asymmetry in health and LTC markets, countries are increasingly monitoring and publicly disseminating indicators of quality (Werner et al., 2012; Schmitz et Stroka-Wetsch, 2020), but in France, there is almost no information or indicator of LTC quality in RACFs.



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Pricing strategies also depend on the ownership type of the facility. In the for-profit sector, facilities maximize their profits, and the price set will be optimized to meet local demand and competitive supply while minimizing production costs to maximize profit. In the nonprofit sector, facilities are assumed to desire to maximize their size and minimize their production costs under the constraints of quality and nondeficit operation (Scanlon, 1980). In France, the three types of facilities in the market are likely to develop varying pricing strategies. First, for-profit facilities will set their prices in a way that maximizes their profit. Among nonprofit facilities, public facilities and private nonprofit facilities that negotiate their prices (social prices) can be distinguished from those that set prices freely. The last group may develop a more reactive price strategy depending on market competition.

### 3.4.2 Empirical literature

Most empirical studies have focused on the impact of competition on RACF prices and quality, with mixed results (Yang et al., 2021a). Some studies have suggested that competition leads to higher quality (Grabowski (2001, 2004); Bowblis & Applebaum (2017); Fayissa et al., 2020), and others have suggested the opposite (Bowblis, 2012; Bowblis & Vassallo, 2014; Zinn, 1994). However, most studies have found that greater competition is associated with lower prices (Allan et al., 2021; Ching et al., 2015; Forder and Allan, 2014; Huang and Hirth, 2016). There is also a body of literature from the United States that questions the effect that an increase in Medicaid reimbursement may have on nursing home quality (Nyman, 1985; Nyman, 1988; Nyman, 1989; Gertler, 1989; Gertler, 1992; Cohen & Spector, 1996; Grabowski, 2001; Grabowski, 2004; Grabowski, Angelelli, & Mor, 2004; Grabowski & Angelelli, 2004). Several studies have empirically tested Scanlon's theory of excess demand paradigm, where an increase in the Medicaid reimbursement rate (public price) would result in a quality reduction in an excess demand context (Scanlon, 1980)<sup>36</sup>. The results supported this counterintuitive relationship in the excess demand context in the 1970s and 1980s in the US: higher Medicaid reimbursement rates were associated with lower quality (Nyman, 1985; Gertler, 1989; Gertler, 1992). However, in the 1990s, when there was more competition in the market, these results were no longer significant (Nyman,

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<sup>36</sup> Scanlon's theory expected that policy regulation in the US (bed constraints) would place the market in "excess Medicaid demand". If the number of beds is lower than the total demand, facilities will prioritize private beds, for which higher fees can be charged than the fees for Medicaid beds (for which the reimbursement rate is negotiated). The number of Medicaid beds available for eligible people may be insufficient, placing the market in excess Medicaid demand. Because of this excess demand, an increase in Medicaid reimbursement may discourage the provision of high-quality services by increasing the opportunity cost of providing high-quality services to privately paying patients.

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1988; Nyman, 1989), and a higher reimbursement rate was associated with higher quality (Grabowski, 2001; Grabowski, 2004; Grabowski et al., 2004; Grabowski & Angelelli, 2004, Reichert and Stroka, 2018).

In Germany and Switzerland, several studies have suggested that there is a positive relationship between prices and quality measured by staffing level (Herr & Hottenrott, 2016, Heger et al., 2022). In contrast, in the Netherlands, a recent Flemish study estimated the link between the accommodation price of RACF and the quality of life of residents and found a small negative association between price and quality of life (Raes et al., 2020). In France, only a few studies have examined the cost efficiency of RACFs, and none have investigated the determinants of accommodation prices. One of these rare studies of French nonprofit facilities showed that the inclusion of quality indicators in the efficiency model has a significant impact on the estimated efficiency score and that private nonprofit facilities are more efficient than public facilities (Dormont and Martin, 2012). Another study focusing on private for-profit facilities suggested that the lack of competition in the private for-profit sector impacts the efficiency of these facilities, as larger facility chains (creating monopolistic markets) were associated with lower efficiency scores (Martin and Jérôme, 2016). Most of these studies have examined the relationship between public funding and care quality and have not considered the accommodation prices paid by residents. Generally, in France, there is a lack of research on the pricing strategies of RACFs. The public notification and publication of accommodation prices have been available only since the 2016 decree (decree n° 2016-1814, Art. R. 314-180).

### 3.4.3 Research question and contributions

The third chapter of the thesis aims to highlight the pricing strategies of public and private RACFs in France by examining the determinants of accommodation prices. More specifically, there is a link between accommodation price and care quality in RACFs. In France, elderly care (medical and social care) in these facilities is publicly funded for all facilities (for-profit or not), while residents must pay the cost of accommodation themselves. I expect that facilities will define their prices as a function of competition in the market. I also test the hypothesis that facilities may differentiate themselves in the market by offering an additional level of care quality that can be provided by public funds in order to gain market power, attract new residents and increase their prices. This chapter contributes to the literature in several ways. First, it is the first French study to examine variations in the price of accommodation paid by RACF residents and its determinants. This price of accommodation represents a very

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high cost for French households (on average 2000 euros per month), yet we have very little information on how these prices are set and how to explain the significant variations in price depending on the facilities (with a ratio from 1 to 6). Second, in this chapter, I use a rich panel of indicators to measure and analyze several dimensions of quality of care in RACFs for the first time. Given that the level of information asymmetry varies across quality dimensions, I match several administrative and survey data to measure different dimensions of care quality. Following Donabedian's framework (Donabedian, 1988), I calculate three care quality indexes (staffing/structure, processes, and outcomes). Third, I measure market competition in the local authority where the facility is placed. Few French studies have analyzed these variations in market competition across local areas, which may be linked both to the attractiveness of these areas and to local authorities' regulation policies.

### 3.4.4 Main results and conclusions

This study provides new empirical evidence on the determinants of variations in accommodation prices in French RACFs. In particular, I test the hypothesis that facilities aim to differentiate themselves in the market by offering additional care quality that is provided by public funding to gain market power, attract new residents, and increase their prices. However, this differentiation strategy appears to be rarely used in France since the links between accommodation prices and care quality indexes are weak. Price variations are determined mainly by the prices of production factors (real estate), ownership status (for-profit or not) and market competition. Despite a generally weak association between quality and price, the results suggest that the link between price and quality varies by the quality dimension considered. As suggested by the theoretical literature, the aspects of quality that are more easily observable by residents and their families, such as staffing levels and building quality, are significantly linked to prices. The results show that there are significant disparities in LTC market characteristics across local authorities in France. The significant disparities in supply accessibility and for-profit share observed between local authorities and regions suggest that different regulatory practices have a significant impact on market competition and excess demand across local areas. In agreement with the empirical literature on the subject, I find that prices are lower in departments where competition in the market is stronger (high concentration of supply). Moreover, in local authorities where the share of private for-profit facilities is high, the prices of RACFs are lower. Nevertheless, I also find that, controlling for the level of competition in the market, a higher proportion of private for-profit facilities in the market is associated with higher prices in public and nonprofit facilities. This suggests that nonprofit providers adapt to

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the local market by increasing their accommodation prices. Overall, a main result of this analysis is that there is a need for more transparency in price setting by public and nonprofit facilities negotiating their prices with local authorities in France. A relatively small part of the variations in accommodation prices is explained by the observable variables introduced in the regression model compared to private facilities.

The analysis in this chapter provides new insights into variations in accommodation prices in RACFs and, more generally, LTC policy in France by questioning the relations between prices, quality of care and market characteristics. The results call for more research on the impact of variations in LTC policy and price-setting practices across local authorities on out-of-pocket payments and LTC quality and for better public information on LTC quality in France.

## **4. Conclusion**

Given the increasing demand for LTC from an aging population, the ability to adapt the funding and supply of LTC is a major political and social challenge. This thesis provides new insights into the quality and efficiency of care for older adults and their relation with the characteristics of the LTC market in France. Based on original data and econometric analysis, the results show that there are significant inequalities in the accessibility of LTC across regions in France and that the availability of LTC resources in an area determines the need for health care and hence health expenditures. In residential aged care facilities (RACFs), mobile hospital teams can improve the quality of care for residents by reducing hospital transfers and ensuring palliative care without increasing costs, and accommodation prices are weakly linked to care quality in facilities. Taken together, these results highlight the strong interdependency between LTC and health sectors, the necessity to align funding with older adults' care needs, and the need for better care integration and quality measurement in France.

# Chapter 1

## Link between local disparities in long-term care provision and healthcare expenditure: evidence from dementia patients in France

This chapter is based on an article co-authored with Zeynep Or

### Abstract

**Context.** Availability of Long-term care (LTC) services at local level are essential for maintaining the health and well-being of frail elderly and for avoiding adverse events which may require more costly healthcare services. However, the funding and organisation of LTC supply are often decentralised within countries, and there are significant disparities in accessibility of LTC services by elderly population depending on where they live. **Objective.** In this article I aim to evaluate the associations between local disparities in LTC supply and funding and health care utilization and expenditure of frail elderly population, concentrating on dementia patients. **Methods.** I used two different data sets to follow care consumption and expenditure of dementia patients. Geographical disparities in LTC supply are studied at patients' residential area level (2708 life areas), while disparities in LTC funding are studied at local authority (LA) level (94 LAs) since LAs have the responsibility to manage LTC allocations in France. To measure the relative level of LTC funding across LAs, I estimated a stochastic frontier model and calculated an index measuring the generosity of LTC allocations controlling for the local care needs and income of the elderly. I then specified hierarchical linear models for estimating the link between the health expenditure/utilisation of dementia patients across residential areas and LTC supply and funding. **Results.** Dementia patients living in residential areas with low level of LTC supply and those in areas with less generous LTC funding have significantly higher acute and post-acute hospital utilisation and spending and lower primary care utilisation/spending. **Conclusion.** Results suggest that securing LTC together with primary health care appears to be necessary to reduce the demand for inpatient care for dementia patients. Reducing inequalities in LTC supply and funding within countries together with an integrated assessment of health and LTC needs would help to shift care in community settings and to improve health system efficiency.

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# Chapter 1

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## 1. Introduction

Ageing of the population increases the demand for health care but also shifts the focus on other care needs beyond treatment of diseases for maintaining individuals' core capacity and functional ability in older ages (Barrenho et al., 2022; Nolte and Pitchforth, 2014). A growing and important issue for frail older people is assuring non-medical long-term care (LTC) needs which cover a wide range of services to support the daily needs of individuals. The intent of long-term care is to improve the quality of life and to help individuals to live as independently as possible either in long-term care facilities, in community or at home. Most OECD countries devote an increasing share of their national income to a range of nursing, personal care and assistance services for people dependent on others for activities of daily living (OECD, 2020). The organization and funding of long-term care and its articulation with health care delivery is an important public policy issue (Barber et al., 2021; Kelly et al., 2020). In many countries, long-term care policies are decentralized under the responsibility of local governments and often the funding of long-term care is separated from healthcare budgets (Fernandez and Forder, 2015; Waitzberg et al., 2020). Thus, the provision and funding of LTC services can vary within a country depending on the local policies, along with the attractiveness of the area for long-term caregivers (Colombo et al., 2011). While geographic inequalities in access to healthcare providers is widely studied in France and abroad, the inequalities in access to long-term care and its consequences for the health system is little questioned.

In economics, equality and efficiency are often presented as two conflicting goals as reducing inequality has an economic cost (Okun, 1975). However, a new consensus has been emerging in that unequal access to resources (education, health, ...) can be a barrier to national economic development (Acemoglu et al., 2015; Bárcena et al., 2018). Thus, various supply-side mechanisms by which inequality creates obstacles to innovation and investment are increasingly questioned (Bowles, 2012). In health, the idea of an equity-efficiency trade-off means that as health equity is achieved, the level of efficiency decreases (in terms of population health gains) (Reidpath et al., 2012; Sandiford et al., 2018) since it would be more difficult (costly) to improve the health of some populations compared to others. Nevertheless, Reidpath and co-authors point out that health equity can be defined as a desired outcome of the health system, thus altering the relationship between efficiency and equity (i.e., a health system that improves the health equity of its population at lower cost would be more efficient). Moreover, there could be supply-side mechanisms through which inequality can create obstacles to the efficiency of the health system. For example, lack of access



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to primary care reduces system efficiency through an increased demand for expensive hospital care and can have a high opportunity cost for patients (Cartier et al., 2014; Thwaites et al., 2017). Thus, inequalities in access to primary and LTC are likely to have an impact on the allocative efficiency of a health system's resources through an increase in more costly/invasive treatments.

In France the LTC policy is partly decentralized and the funding levels for investing in LTC resources and supporting LTC needs at local level vary from one territory to another. Reducing the inequalities in local accessibility of long-term care services could potentially improve the system wide efficiency by two mechanisms. First there can be a substitution between long-term care and health care providers, which means that some of the services provided by healthcare providers can be provided by LTC providers which are sometimes in competition. For example, some LTC services at home can be provided by dedicated social-care platforms or by various healthcare providers, in particular nurses which will have different costs to health system. Substitution can also be imposed when alternatives to healthcare is missing in long-term care sector, for example when the lack of care support at home or in a facility creates bed blocking in acute hospitals (Gaughan et al., 2015). Second, there can be a compensation effect: lack of access to regular and timely LTC can create unmet care needs which can contribute to the deterioration of the health status of frail older persons (provoking falls, dehydration, ...), and increase the need for expensive health care. This represents the opportunity cost of not providing LTC on a timely manner.

Recent studies shown that elderly persons who receive higher long-term care benefits have lower hospital utilization (Rapp and al. 2015, Forder, 2009; Gaughan et al., 2015; Costa-font et al., 2018, Moura 2020, Walsh et al., 2019; Bakx et al, 2020; Lin and Imanaka, 2020; Chen and Ning, 2022; Fernandez & Forder, 2008). The impact of LTC funding on hospital use is established at the individual level using instrumental variables (Rapp and al. 2015, Forder, 2009) but also by studies examining the impact of a change in LTC insurance policy, using difference-in-difference methods on hospital use and expenditure (Lin and Imanaka, 2020; Chen and Ning, 2022; Costa-font et al., 2018, Moura 2020; Bakx et al, 2020). Studies looking at the links between geographical variations in LTC supply and hospital use are scarce. Two papers from England and one from Ireland have shown that territorial disparities in long-term care services (measured by nursing home or home care supply) play a significant role in explaining geographic variations in acute hospital performance measured by delayed discharges from hospital, emergency readmissions, and length of stay in acute care hospital (Fernandez & Forder, 2008; Gaughan et al., 2015; Walsh et al., 2019). None

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of these studies examine the relationship between territorial inequalities in long-term care provision (financial and geographic) and total health care spending of patients.

Generally, the literature on regional variations in health expenditure is much less developed than the economic literature on hospital utilisation. A few studies compared the differences in cost-effectiveness of regions by carrying out regional benchmarking of healthcare expenditures and studying the links between local health expenditure and differences in local public policy (Rizzi and Zanette, 2021; Rosko et al., 1995). In France, there is only one study that examined variations in efficiency of health expenditure (Bardey and Pichetti, 2004), while a few studies explored the geographical variations in hospital practices and consumption (Or and Verboux, 2014; Or and Penneau, 2018).

Studying the regional variations in health care consumption and expenditure allows to question the allocative efficiency of healthcare resources in different areas and understand the opportunity costs associated with different mix of healthcare resources. In this article, I question how local inequalities in long-term care funding and supply is linked to total health care spending of frail elderly by concentrating on patients with dementia, a high-need older patient group with high healthcare costs (Long et al., 2017). In France long-term care provision is decentralized and long-term care resources are unequally distributed throughout the country. Hence, depending on where they live, the elderly people would have more or less difficulty in access to long-term care services. First, LTC allocations are distributed by local authorities (LAs) which decide on the number of beneficiaries and the level of allocations depending on their political priorities. The key policy for funding personal and social care services is a cash-for-care scheme called "personal allowance for autonomy" (Allocation personnalisée d'autonomie - APA). The allowance, a need and means tested allocation for older people (60+), can be used at home or in residential care facilities. Second, LTC providers are regulated and funded by LAs, together with regional health agencies. Therefore, local policies would impact the attractiveness of LTC sector in an area.

This analysis contributes to the literature in several ways. First, I evaluate simultaneously the associations between financial and geographical LTC accessibility and health expenditures, controlling for other determinants of healthcare spending. Second, to assess geographical disparities in accessibility of long-term care, I produced an original typology of long-term care providers and mapped the level of long-term care resources across residential areas of patients. The main LTC providers

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in France are home-care and support services at home, medicalized residential care facilities (equivalent of nursing homes), nonmedical residential facilities, and self-employed nurses. Third, to distinguish LAs that are more (or less) generous in funding long-term care for their residents I estimated a stochastic frontier (SF) model with random-effects time-varying efficiency decay model (Battese and Coelli, 1992). I exploit the variations in long-term care funding (APA expenditures) controlling for long-term care needs and income at local level, since LTC allocations (APA) are adjusted by the level of need (dependency) and income of the beneficiaries. Those on the top of income scale pay about 90% of the cost of their LTC at home, while the lowest income groups pay about 20% of the cost of their LTC services. SF models are typically used to estimate the productivity margin given the resources of a production unit. Here they are expended to identify LAs long-term care spending margin (underspending or overspending) given the long-term care needs and wealth in each local area. Forth, to establish the link between local LTC supply and funding and health expenditures of dementia patients I specify a hierarchal linear model recognizing that where patients live impact their expenditure and residential areas are nested in local authorities. The results show that dementia patients living in residential areas with higher level of LTC providers and those in LAs with more “generous” LTC funding have lower acute and post-acute hospital spending but higher ambulatory (primary care) spending. This suggest that better LTC provision may reduce the need for hospital use but may require strengthening [or shifting resources towards] ambulatory care system. The rest of this article is organized as follows. The next section introduces data and the empirical approach used, section 3 describes results while section 4 questions limits of the analysis and provides robustness checks before discussing the results in the last section.

## 2. Data and methods

### 2.1 Data

I used two sets of data for these analyses. The indicators of hospital utilisation and emergency visits are calculated for a cohort of new cases of dementia patients older than 65 years (Alzheimer's disease and related disorders) identified in 2012. Dementia patients are identified in National Health Insurance Information System (SNDS) using an algorithm based on the information on diagnostics coded (in primary and secondary care settings), and the history of care consumption specific to the disease across settings (CNAM, 2020; Elyn et al., 2022). The algorithm was developed and validated by a group of researchers and the National Health Insurance Fund (see

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Annex 1 for more details). New cases are seniors identified by the algorithm who do not have any dementia related consumption in the five previous years (between 2006 and 2011). These patients identified in 2012 are followed for 60 months (5 years) from their date of identification to track their care consumption across care settings. In the data base there are also patients' postcodes which allows me to calculate indicators at patient residential area, called "life areas" (*territoires de vie*). These are geo-statistical units defined by INSEE to study local living conditions by dividing large urban areas and territories of more than 50,000 inhabitants around service centres (Reynard and Vialette, 2014). They are considered to be the right territorial level for studying local living conditions. The analyses are carried out in mainland France, excluding Corsica, corresponding to 2708 residential areas and to 94 LAs. The final cohort consists of 80,372 dementia patients identified in 2012 correspond to an average of 31 dementia patients per residential area (minimum of 5<sup>37</sup> and maximum of 819 patients) and 852 patients per LA (minimum of 81 and maximum of 3796).

Health expenditures indicators are based on all dementia patients aged 60 years and older identified between 2014 and 2018 in National Health Insurance Information System (SNDS) using the same algorithm (CNAM, 2020; Tuppin et al., 2017). I aggregated health care expenditure per year at patients' residential area. Around 600,000 dementia patients 60 years old and over were identified per year between 2014 and 2018 (see table 10 Annex 1) which correspond to an average of 208 dementia patients per residential area (minimum of 10 and maximum of 5,577 patients in 2014) and 5916 patients per LA (minimum of 660 and maximum of 22,950).

To calculate the level of local long-term care supply, I used the indicators of geographical accessibility of LTC providers which were recently calculated by the Ministry of Health based on both administrative and survey data from 2015 (Carrère et al., 2021). Data on long-term care expenditures (APA), healthcare supply and socio-economic context in local areas come from open-source databases of the National Institute of Statistics and Economic Studies (INSEE) and Ministry of Health.

### 2.2 Empirical approach

I assume that health care expenditures/utilization of patients with dementia in a given residential area are determined by their health and socio-economic status, and the mix of health and long-term care supply in their place of residence. From the perspective of territorial organisation and administration residential areas are grouped

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<sup>37</sup> Residential areas with less than 5 dementia patients were removed from the analyses performed on the cohort of new dementia patients, bringing the number of residential areas to 2677.

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in LAs. On average, there are 28 residential areas per LA. In order to explain the territorial variations in health expenditure/utilization of patients with dementia, I specify the following multilevel random effects regression model which takes into account that residential (life) areas are clustered within LAs:

$$Y_{ij} = \beta_{0j} + \alpha X_{ij} + \varepsilon_{ij} \quad (1)$$

$$\text{Where,} \quad \beta_{0j} = \beta_0 + \gamma Z_j + \omega_j \quad (2)$$

where,  $Y_{ij}$  corresponds to the average health care expenditures/utilization of dementia patients in residential area  $i$  (level 1) and LA  $j$  (level 2);  $X$  corresponds to the matrix of variables measured at patients' residential area, and  $\varepsilon_{ij}$  is the residual value of residential area  $i$  in LA  $j$  distributed according to a normal distribution.  $\beta_{0j}$  corresponds to the random effect associated with each LA while  $Z$  corresponds to the matrix of variables measured at the LA level and  $\omega_j$  is an inter LA error term allowing for unobserved heterogeneity.

### Hospital utilisation

I measured three indicators of hospital care utilization over 48 months for each patient of the cohort: total number of days (of cumulated stays) in acute care hospitals; total number of days spent in post-acute (rehabilitation) care facilities; and number of ED visits without hospitalization. In France, the post-acute care facilities provide short-term rehabilitation and medical support services usually after a hospitalization, but they can also care for people with cognitive problems, when there is no alternative at home or in residential care facilities. These indicators are calculated over four years (48 months) following the first year patients' identification in administrative data. I excluded the data from the first-year (2012) because hospital utilisation was one of the identification criteria (see figure 3 in appendix 2) in the algorithm. To account for deaths over this period (figure 4 in appendix 2), I calculated, per area, the mean number of days in hospital or ED visits per month on patients alive during that month. I then summed total number of hospital days or ED visits over the period and divided it by four to have a yearly average.

### Health care expenditures

Total health care expenditure for each dementia patient per year corresponds to the total health spending, in all care settings, reimbursed by the social health insurance (SHI) fund. SHI covers hundred per cent of the population and provides a comprehensive basket of care but requires cost sharing for all services. Dementia

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patients are mostly exempted from co-payment for treatments associated with their disease but there may be out-of-pocket payments for some other services that we cannot capture<sup>38</sup>. Total expenditure covers all expenditure items across the care pathway including care consumed at home, outpatient consultations, prescriptions, biology, radiology, health transport, acute hospital care, post-acute (rehabilitation) care in facility, hospitalization at home and in psychiatric facilities. I distinguish three expenditure items: acute inpatient care, post-acute inpatient care and ambulatory care expenditures.

### **Explanatory variables at residential area level**

The main variable of interest at the residential area level is the level of long-term care supply, that is social and personal care providers available for elderly population. Four key providers represent the majority of the LTC supply in France: medical and non-medical residential facilities, homecare platforms for the elderly, and self-employed nurses (Carrère et al., 2021). The density of residential care facilities is measured by the number of beds in medical residential care facilities located within one hour drive per 100 000 prospective residents<sup>39</sup> and the number of beds in non-medical residential care facilities located within 30-minute drive per 100 000 people aged 60 or older. The density of long-term care supply at home correspond to the number employees in home-care and support services located within 30-minute drive per 100,000 people aged 60 years or older and the number of full-time equivalent (FTE) self-employed nurses per 100,000 inhabitants.

To characterize LTC resource profiles across life areas I produced a typology of the availability of these four major LTC providers by residential area. The idea behind the typology is to define homogeneous groups of life areas with similar levels of LTC providers. For this, I performed a multiple correspondence analysis (MCA), followed by an ascending hierarchical clustering (AHC) using the Ward method.

In addition, I control for patient-level factors (aggregated at residential area level) which may impact dementia patients' health care utilisation and expenditures: mean age in the residential area, share of women, annual death rate, and average co-

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<sup>38</sup> Health expenditure for the elderly varies from €3,000 to €18,000 per year according to dependency level measured by activities of daily living (ADL). SHI covers between 70% and 95% of these which keeps out-of-pocket payments at around €900 per year on average for all levels of ADL (Penneau et al, 2020).

<sup>39</sup> The number of prospective residents is estimated by the Ministry of Health using the age-specific facility utilization rate at the national level. This is applied to the population structure of each municipality (Carrère et al. 2021).

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morbidity score (excluding dementia). Finally, I control for the differences in socio-demographic and healthcare contexts across residential areas (share of population over 75 years old, share of older people (75+) living alone, median household income, density of GPs and the average time to the nearest emergency department).

### Explanatory variables at LA level

At local authority level the main parameter of interest is the level of LTC funding based on total APA spending in the territory. I reported the funding to the number of people over 60 years old. In principle, the level of LTC funding depends on the local LTC needs (dependency level of the elderly) and the wealth of those who need LTC since the level allocation varies by recipients' income. But the generosity of these allocations (number of beneficiaries and allocations) can vary depending on local policy. To benchmark the relative level of LTC spending across LAs controlling for LTC needs and wealth of elderly residents, I estimated a stochastic frontier (SF) model with random-effects and time-varying efficiency decay (Battese and Coelli, 1992). SF is generally used to estimate technical efficiency of firms defined as the ratio of observed output to maximum feasible output given the inputs, considering the production of a sample of other firms. It gives therefore a relative measure of a firm's output as a proportion of the corresponding frontier output. While the techniques have been developed primarily to estimate efficiency, they can be readily modified to represent capacity utilization. Estimating the full utilization production frontier allows me here to measure the differences in LAs' LTC spending, given their LTC needs and income. Hence, the production frontier indicates the maximum potential LTC spending (output) for a set of inputs (LTC needs, local wealth) (Green, 1993). Some white noise is accommodated (pure randomness), and an additional one-sided error represents any other reason LAs would be away from the boundary. I specify the following stochastic production frontier model:

$$e_{it} = f(x_{it}; \beta) + \varepsilon_{it}$$

$$\varepsilon_{it} = v_{it} - u_{it}$$

$$u_{it} = G(t) u_i$$

Where  $e_{it}$  is the LTC spending in the LA  $i$  the year  $t$ , with  $\{i=1, \dots, 94\}$  and  $t = \{2012, \dots, 2018\}$ .  $f(x_{it}; \beta)$  is a linear function of the variables in the vector  $x_{it}$ , with  $x_{it}$  the variables of input describing local LTC needs (rate of persons over 60 years old with high LTC needs living at home, rate of persons 60 years and over in residential care) and median income of people aged 60 and over. High LTC needs score (higher

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than 30) is calculated by the Ministry of Health, based on a nationally representative survey of healthcare needs for activities of daily living, restrictions with functional activities and perceived health status at the LA level in 2015 (Brunel et al., 2019);  $v_{it}$  is a normal error term representing pure randomness and  $u_{it}$  is the technical inefficiency term composed in two distinct component;  $G(t)$  is a non-stochastic time component and  $u_i$  is unit-specific time-invariant unobserved heterogeneity. LA's efficiency score, estimated by  $u_i$  and calculated through the estimator of Jondrow et al., (1982), varies from 0 to 1. When the estimator is equal to 1, the LTC spending of the LA correspond to the optimal spending frontier given the local LTC needs and wealth; the closer the estimator to 0 the further away from the optimal frontier the level of LTC spending of the LA.

At LA level, I further control for the number of acute care and rehabilitation beds per 1000 inhabitants since previous studies have shown that in areas where hospital supply is high the demand for hospital care is higher (Henneman et al., 2011; Kroneman and Siegers, 2004). Therefore, I expect that in LA where the number of hospital beds is higher hospital expenditure per capita would be higher.

### 3. Results

#### 3.1 Descriptive statistics

Table 1 presents the outcome variables aggregated at residential area level healthcare expenditures are calculated from exhaustive national database while hospital utilization is monitored for a cohort of patients identified in 2012. Between 2014 and 2018, the average health spending of patients with dementia was about 11,000 euros per person/year of which 4000 euros for acute care hospitalization, 2,000 euros for post-acute care and 4600 euros for outpatient care. The total expenditure varied widely depending on the residential area from 5500 euros to 22400 euros per year. Most of the variation comes from the cost of post-acute (rehabilitation) care in facility, which ranged from an average of 390 euros to 12500 euros per patient. Patients newly identified having Alzheimer disease spent on average 7 days per year in an acute care hospital and 6 days per year in post-acute care facilities. On average there are 41 emergency department visits per 100 dementia patients per year.



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**Table 1. Outcome variables at residential area level**

	N	Mean	STD	Min	Médian	Max
Health expenditure (1)						
Total	2708	11168	2096	5526	10941	22434
Acute care	2708	4004	812	1795	3939	7526
Post-acute (rehabilitation) care	2708	1980	964	391	1769	12546
Ambulatory care	2708	4638	1433	2104	4337	11384
Hospital use (2)						
Number of days in acute care hospitals per dementia patient	2677	7	4	0	6	70
Number of days in rehabilitation care per dementia patient	2677	6	5	0	5	76
Number of ED visits without hospitalization per 100 dementia patients	2677	41	17	0	40	241

**(1) Scope:** The 2708 French residential areas. All Dementia patients identified between 2014 and 2019 in the National Health Insurance Information System (SNDS).

**(2) Scope:** 2677 residential areas, areas with less than 5 new cases of dementia patients are excluded. Cohort of new cases identified in 2012 in SNDS and followed over 48 months.

Table 2 presents variations across residential areas in dementia patients' characteristics, and the socio-economic and health care accessibility contexts of the area. The average age of dementia patients is 85 years, 71% of patients are women, with an annual mortality rate of 16% and a comorbidity score (excluding dementia) of 1.6. However, depending on residential area, the average age varies from 81 to 89 years, the proportion of women amongst dementia patients from 48% to 87%, the death rate from 5% to 29% and the comorbidity score from 1 to 2.2. There is slight variation in age, share of women and co-morbidity score in the cohort data of new cases in comparison to the data with all dementia patients describe in table 1. New Alzheimer's patients were slightly younger by an average of 2 years, less often women (68% vs. 71%), and had slightly higher comorbidity scores (1.7 vs. 1.6). Disparities in socio-economic situations and primary care supply are important across residential areas. For example, the median annual income of the elderly (base 100 equal to the national average) varies from 57 to 381 depending on the area.

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**Table 2. Explanatory variables at residential areas level**

	N	Mean	STD	Min	Médian	Max
Dementia patients' characteristics (1)						
Mean age	2708	84,9	1	80,6	84,9	88,6
Share of women	2708	71,50%	4,20%	47,90%	71,60%	86,90%
Average annual death rate	2708	16,10%	2,20%	5,30%	16,20%	29,50%
Average co-morbidity score	2708	1,6	0,1	1	1,6	2,2
Dementia patients newly identified (2)						
Mean age	2677	83	1,9	75	83	92
Share of women	2677	68%	12%	17%	68%	100%
Average co-morbidity score	2677	1,7	0,4	0,4	1,7	3,2
Residential area characteristics						
Median taxable income in living area (base 100 in relation to the national average)	2708	98,5	26,6	57,2	91,5	380,7
Share of persons aged 75 and over living alone	2708	36,70%	5,30%	7,60%	36,50%	56,30%
Number of full time equivalent of GPs (per 100 000 inhabitants)	2708	68,8	16,3	0	68,3	160,1
Distance to nearest emergency department (in minutes)	2708	14,7	10,6	0	12,9	67,1
Variables used in LTC supply classification						
No. of bed in medical residential care facilities (per 100 000 prospective residents*)	2708	97764	28149	11697	95108	354766
No. of bed in non-medical residential care facilities (per 100 000 people aged 60 or older)	2708	679	481	0	606	3069
No. of FTE self-employed nurses (per 100 000 inhabitant)	2708	94	48	6	84	662
No. of employees in home-care and support services (per 100 000 people aged 60 or older)	2708	1109	726	0	995	10122

\*The number of prospective residents is estimated by the Ministry of Health using the age-specific facility utilization rate at the national level. This is applied to the population structure of each municipality (Carrère et al. 2021).

**(1) Scope:** The 2708 French residential areas. All Dementia patients identified between 2014 and 2019 in the National Health Insurance Information System (SNDS).

**(2) Scope:** 2677 residential areas, areas with less than 5 new cases of dementia patients are excluded. Cohort of new cases identified in 2012 in SNDS and followed over 48 months.

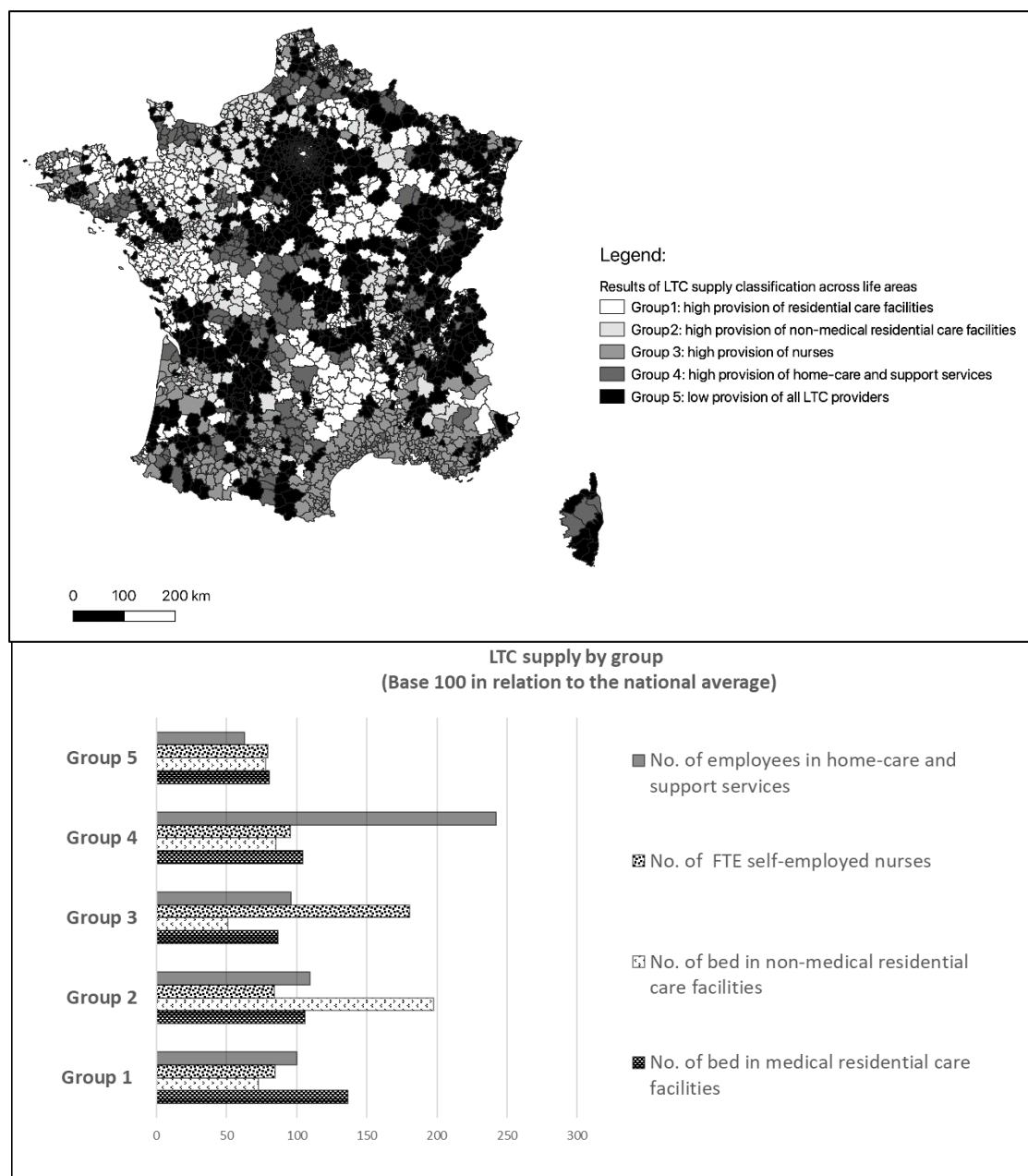
### LTC resource profiles across life areas

The MCA with classification allowed identifying five homogeneous long-term care supply profiles across residential areas (Figure 1). The first group corresponds to the areas that have high supply of institutional care or residential facilities (nursing homes). About one quarter (25%) of people 75 years and older live in these high - supply territories, mainly in the west of the country (Brittany, Pays de la Loire) and in a few central areas (Burgundy and north of Languedoc-Roussillon). The second group of territories is characterized by high supply of non-medical residential facilities and an average supply of other long-term care providers (around the national average). The third group corresponds to areas with high supply of self-employed nurses and slightly low residential care facilities (both medical and non-medical), below the national

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average. Self-employed nurses are mostly concentrated in the south of France and near the coastal areas. The fourth group is characterized by high supply of home-care and support services, with other long-term care providers around the national average. About 0.5 million (around 9%) of people 75 years old and over live in these territories. Finally, the last group is characterized by a low-level of all long-term care providers studied. There are 1.5 million people 75 years old and over (or 25% of population over 75) live in these territories mostly concentrated in the Parisian region, the Alps, Jura and Alsace-Moselle region.

**Figure 1. Results of LTC supply classification across life areas**



**Scope:** The 2708 French residential areas. **Source:** Open-source data from the Ministry of Health

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### Variations in long-term care funding across local authorities

Table 3 presents the variables introduced at local authority level. Between 2012 to 2018, the average LTC spending (APA allocations) was about 365 euros per person over 60 years (table 3). Note that this does not correspond to the average amount of APA per person, since many elderly people do not need/receive APA, but gives us an approximation of the average level of LTC spending by local area which varied from 191 euros to 643 euros depending on the LA. The rate of people over 60 years with high LTC needs at home varies from 4% to 9% by LA while the rate of older people in medical residential homes ranges from 2% to 6%, and the median income of people over 60 years old vary from about 18800 to 29500 euros per year depending on the LA.

**Table 3. Explanatory variables at local authority variables**

	N	Mean	STD	Min	Médian	Max
Number of acute care hospital beds (per 1000 inhabitants)	94	3,5	0,8	1,6	3,5	6,3
Number of rehabilitation beds (per 1000 inhabitants)	94	1	0,4	0,2	0,9	2,7
Variables used in SF model						
Average LTC spending : APA expenditure per elderly aged 60 and over (in euros per year)	94	365	78	191	359	643
Rate of persons aged 60 and over with high LTC needs living at home (in %)	94	5,80%	1,10%	3,60%	5,70%	9,30%
Rate of persons aged 60 and over residing in institutions (in %)	94	3,40%	0,70%	1,80%	3,40%	6,40%
Median income of people aged 60 and over (in euros per year)	94	21736	1987	18801	21359	29536
SF model result: LTC spending score given LTC needs and local wealth (in %)	94	71,10%	10,80%	50,90%	69,60%	97,80%

**Scope:** 94 French local authorities (excluded Corsica).

**Source:** Open-source data from the national institute of statistics and economic studies (INSEE) and Ministry of Health

The results of stochastic frontier analysis confirm that the level of long-term care funding across LAs is significantly associated with the share of persons in the area who declare that they need help with ADL at home or in institution (Table 4). A 10% increase in the rate of persons with high long-term care needs at home is associated with a 6% increase in long-term care spending while a 10% increase in elderly living in institution is associated with a 3% increase in LAs long-term care spending. This difference is coherent with the fact that the amount of APA benefit is not the same at home and in nursing homes where the allocations are lower. As expected, higher the income of elderly people in the area, lower the long-term care allocations: a 10% increase in median income of the elderly is associated with a 3% decrease on LA's LTC allocations. Over the period of 2012-2018, long-term care

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allocations increased on average by 3% each year, and, the average LTC spending score is 71% (table 3). This means that on average long-term care spending of LAs is 29% below the estimated stochastic frontier considering local LTC needs and wealth. LTC spending score varies from 49% in Hauts-de-Seine area to 98% in Seine-Saint-Denis (figure 2).

**Table 4. Results of stochastic frontier analysis model**

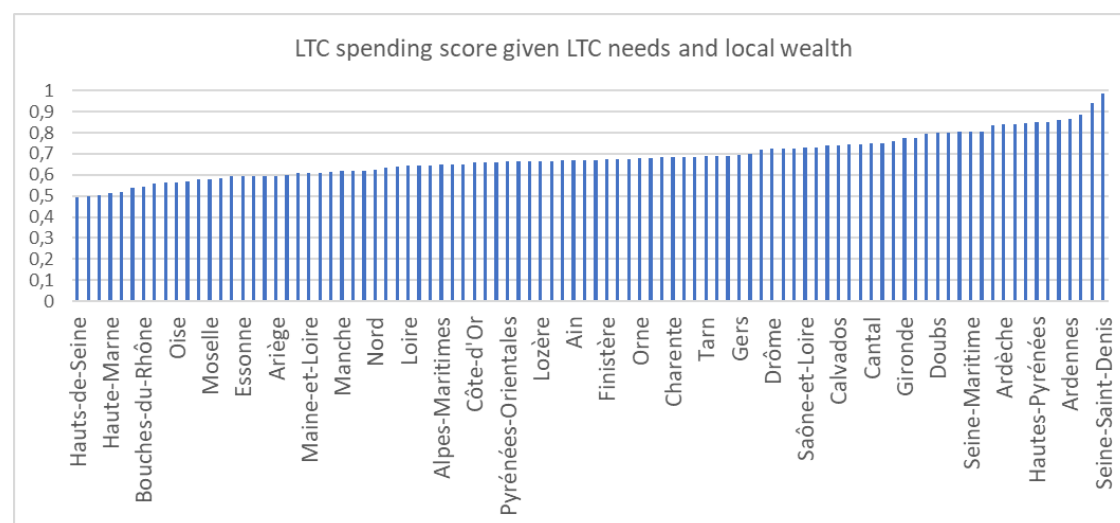
	LTC spending (in log)
Rate of persons aged 60 and over with high LTC needs <sup>40</sup> living at home (in log)	0,6485 *** (0,0765)
Rate of persons aged 60 and over residing in institutions (in log)	0,2786 *** (0,0612)
Median income of people aged 60 and over (in log)	-0,3245 *** (0,1082)
Years	0,0284 *** (0,0025)
Constante	-48,0625 *** (4,5984)

\*, \*\*, \*\*\* indicate 10%,5%, and 1% significance, respectively

**Scope:** 94 French local authorities (excluded Corsica).

**Source:** Open-source data from the national institute of statistics and economic studies (INSEE) and Ministry of Health

**Figure 2. Results of stochastic frontier: LTC spending score by LAs**



**Scope:** 94 French local authorities (excluded Corsica).

**Source:** Open-source data from the national institute of statistics and economic studies (INSEE) and Ministry of Health

<sup>40</sup> High LTC needs is defined by LTC needs score higher than 30 based on declaration of help needs in activity of daily living, restriction of functional activities and perceived health status, calculated by DREES in a nationally representative survey at the LA level.

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### Share of variance explained by departmental variations

Table 5 presents the distribution of the variance in health care utilisation and expenditure, for each dependant variable across two territorial levels of the analysis, based on empty multilevel models. I note that a higher share of variance is explained by department level, rather than residential area, for health expenditure compared to hospital utilisation based on the cohort of new cases of dementia patients. Indeed, around 46% of the variation of acute care expenditures, 53% of post-acute care expenditures, and 72% of ambulatory care expenditure was associated to the department, while this is about 8% for total days in acute care hospital, 18% for the days in poste-acute care facilities and 10% for the number of emergency room visits. These results confirm that the departmental level variance is significant and that using multilevel models is appropriate.

**Table 5. Share of variance explained by departmental variations: Results of empty model**

	Variance explained by departments ( <i>intra-class correlation</i> )	P-value
<b>Health expenditure (1)</b>		
Total	57%	<.0001
Acute care hospitals	46%	<.0001
Post-acute care hospitals	53%	<.0001
Ambulatory care	72%	<.0001
<b>Hospital use (2)</b>		
Days in acute care hospitals	8%	<.0001
Days in rehabilitation care	18%	<.0001
Number of emergency visits without hospitalization	10%	<.0001

**Note:** There are significant variation explained by departmental level.

**(1) Scope:** The 2708 French residential areas and 94 local authorities All Dementia patients identified between 2014 and 2019 in the National Health Insurance Information System (SNDS).

**(2) Scope:** 2677 residential areas, areas with less than 5 new cases of dementia patients are excluded. 94 local authorities. Cohort of new cases identified in 2012 in SNDS and followed over 48 months.

## 3.2 Multilevel regression results

### 3.2.1 Determinants of variation in health expenditures

Table 6 presents the results from multilevel models estimating the determinants of healthcare expenditures of patients with dementia aggregated at residential area level controlling for local context at two territorial level (residential areas and LAs). First of all, the results confirm that health expenditure of patients with dementia is largely determined by their age, gender and health status. All else being equal, in residential areas where patients are younger, have multiple morbidities, and the share of male is

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higher, healthcare spending is significantly higher. Patients' mortality rate is positively associated with acute care hospitalization expenditures, while post-acute (rehabilitation) spending is lower in areas with high mortality.

Second, the socio-economic and care context of the area in which patients live is strongly associated with healthcare expenditures. In areas where the share of elderly living alone is high, both the inpatient and outpatient spending is significantly higher. Moreover, patients living in richer neighborhoods have significantly lower inpatient care spending with a higher level of ambulatory spending (including care provided by nurses at home).

Similarly, patients living in areas with high primary care supply (density of GPs) have higher ambulatory care expenditures, while both inpatient and outpatient expenditure are significantly higher for patients living closer to an emergency department.

Third, all else being equal, health care spending of patients with dementia depend on the LTC supply, that is LTC resources available in their residential area. In territories with high rates of nursing homes, health care spending is about 3% lower per year per patient, compared to territories underserved by all types of LTC providers (group 5). In areas with high provision of self-employed nurses (group 3) the total health spending is higher mainly due to a significantly higher ambulatory spending. Overall, the results are coherent in suggesting that in residential areas where LTC provision is high, inpatient spending of dementia patients are lower. In fact, in areas with high LTC provision (group 1, 3, and 4), acute hospital care spending is about 3% lower than areas underserved by all LTC providers. Concerning post-acute care expenditures, there seems to be also a substitution between the use of post-acute facilities and LTC at home. In residential areas with a high number of homecare and support platforms (group 4) the inpatient post-acute expenditure is significantly lower (by 6%). At the same time, ambulatory care spending is higher in areas with high LTC provision at home (groups 2, 3, and 4), confirming the multiple health and personal care needs of this particular population. Moreover, the composition of LTC providers have a direct impact on health expenditures. In areas with high number of non-medical residential facilities (group 2) and homecare platforms (group 4), patients' ambulatory spending is around 2% higher, while in areas with high density of self-employed nurses, ambulatory care spending is 10% higher compared to those in areas with low LTC supply.

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**Table 6. Determinants of territorial variations in health care expenditure of dementia patients: Results from the full multilevel model**

	Total Health spending (in log)	Inpatient spending (in log)		Outpatient spending (in log)
		Hospital acute care	Post-acute (rehabilitation) care	
Residential area variables (level 1)				
Intercept	<b>9.724 ***</b> (0.2028)	<b>8.799 ***</b> (0.2599)	<b>7.3287 ***</b> (0.5787)	<b>7.6137 ***</b> (0.2742)
Mean age of dementia patients	<b>-0.0144 ***</b> (0.0024)	<b>-0.0067 **</b> (0.0032)	-0.00045 (0.0070)	<b>-0.0141 ***</b> (0.0032)
Share of women of dementia patients (in %)	<b>-0.0024 ***</b> (0.0005)	<b>-0.0048 ***</b> (0.0006)	<b>-0.00240 *</b> (0.0014)	0.0003 (0.0006)
Average annual death rate of dementia patients (in %)	<b>0.0033 ***</b> (0.0010)	<b>0.0119 ***</b> (0.0013)	<b>-0.00480 *</b> (0.0028)	0.0015 (0.0013)
Average co-morbidity score (excluding dementia) of dementia patients	<b>0.5131 ***</b> (0.0195)	<b>0.4618 ***</b> (0.0250)	<b>0.7168 ***</b> (0.0555)	<b>0.4985 ***</b> (0.0253)
Median taxable income in living area (in log)	-0.0145 (0.0121)	<b>-0.1370 ***</b> (0.0156)	<b>-0.1643 ***</b> (0.0346)	<b>0.1719 ***</b> (0.0158)
Share of persons aged 75 and over living alone (in %)	<b>0.0034 ***</b> (0.0005)	<b>0.0032 ***</b> (0.0006)	<b>0.0053 ***</b> (0.0013)	<b>0.0045 ***</b> (0.0006)
Number of Full time equivalent of general practitioner (per 100 000 inhabitants)	<b>0.0003 ***</b> (0.0001)	-0.0002 (0.0002)	-0.0003 (0.0004)	<b>0.0010 ***</b> (0.0002)
Distance to nearest emergency department (in minutes)	<b>-0.0015 ***</b> (0.0002)	<b>-0.001 **</b> (0.0003)	-0.0005 (0.0007)	<b>-0.0015 ***</b> (0.0003)
Typology of LTC supply (ref. Group 5 Low access to all LTC providers)				
Group 1 High access to medical residential care facilities (nursing homes)	<b>-0.0292 ***</b> (0.0067)	<b>-0.0328 ***</b> (0.0086)	-0.0246 (0.0191)	<b>-0.0391 ***</b> (0.0087)
Group 2 High access to non-medical residential care facilities	0.0065 (0.0066)	-0.0066 (0.0086)	-0.0269 (0.0189)	<b>0.0176 **</b> (0.0086)
Group 3 High access to self-employed nurses	<b>0.0396 ***</b> (0.0078)	<b>-0.0264 **</b> (0.0101)	-0.0291 (0.0223)	<b>0.1055 ***</b> (0.0102)
Group 4 High access to home-care and support services	-0.0121 (0.0090)	<b>-0.0382 ***</b> (0.0116)	<b>-0.0685 ***</b> (0.0257)	<b>0.0195 *</b> (0.0117)
<b>LA variables (level 2)</b>				
Number of acute care hospital beds (per 1000 inhabitants)	0.0015 (0.0121)	0.0102 (0.0141)	-0.02768 (0.0347)	0.0129 (0.0244)
Number of rehabilitation beds (per 1000 inhabitants)	0.0380 (0.0264)	0.0203 (0.0307)	<b>0.1737 **</b> (0.0754)	-0.0063 (0.0527)
LTC spending score given LTC needs and local wealth (min-max normalization(1))	-0.0222 (0.0482)	<b>-0.1109 **</b> (0.0558)	<b>-0.3552 **</b> (0.1377)	<b>0.1747 *</b> (0.0970)

\*, \*\*, \*\*\* indicate 10%, 5%, and 1% significance, respectively

(1)  $(\text{value} - \text{min}) / (\text{max} - \text{min})$  : varied from 0 (LA with the least LTC spending score) to 1 (LA with the best LTC spending score) : estimator can be interpreted as the average health care spending variation of dementia patients between the territory with the least and territories with the best LTC spending score (All other things being equal)

**Scope:** The 2708 French residential areas and 94 local authorities. Outcome indicators calculated on all Dementia patients identified between 2014 and 2019 in the National Health Insurance Information System (SNDS).



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Finally, the results suggest that controlling for the local disparities in LTC supply and other control variables, living in a LA that is more “generous” in terms of LTC allocations (closer to the optimum spending estimated by stochastic frontier given LTC needs and local wealth) is associated with lower inpatient care spending and higher ambulatory care spending. All else being equal, in the most “generous” LA, which has the highest LTC spending score, the hospital acute care spending is about 11% lower than the least “generous” LA, while the post-acute care spending is 35% lower, and the outpatient spending is 17% higher. Considering that an average dementia patient spends about €4000 per year in acute care hospital, €2000 in post-acute care facilities and about €4600 in outpatient care, this represents an economy of €450 per year/patient in acute hospital, €700 per year/patient for post-acute care facilities against €800 more per year/patient spent for outpatient care.

The number of acute hospital beds at LA do not have a significant impact on health spending of dementia patients, but in LAs where the number of post-acute care beds are high the post-acute care expenditure is higher.

Table 7 presents the same equations when the level of LTC providers are introduced separately one by one instead of the typology of LTC supply by area. This allows to disentangle, the contribution of different LTC providers to health expenditure controlling for the level of other types of LTC supply. All other things being equal, a higher supply of all types of LTC providers are associated with a lower acute hospital expenditure, except for non-residential facilities. Home care platforms contribute reducing all types of expenditure, except ambulatory care expenditure (0.1%). I also find higher ambulatory care expenditure in areas with higher self-employed nurses’ provision. In contrast, higher medical residential care facilities’ provision is linked to lower ambulatory care expenditure. These results confirm the findings with the LTC supply classification and highlight the relevance of the home care platforms for dementia patients.

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**Table 7. Determinants of territorial variations in health care expenditure dementia patients: Results with LTC supply indicators instead of LTC supply classification**

	Total Health spending (in log)	Inpatient spending (in log)		Outpatient spending (in log)
		Hospital acute care	Post-acute (rehabilitation) care	
<b>Residential area variables (level 1)</b>				
Intercept	<b>9.827 ***</b> (0.230)	<b>9.224 ***</b> (0.2991)	<b>7.6218 ***</b> (0.6653)	<b>7.6662 ***</b> (0.2910)
Mean age of dementia patients	<b>-0.0146 ***</b> (0.0024)	<b>-0.008 **</b> (0.0031)	-0.0025 (0.0070)	<b>-0.0118 ***</b> (0.0030)
Share of women of dementia patients (in %)	<b>-0.0027 ***</b> (0.0005)	<b>-0.0046 ***</b> (0.0007)	<b>-0.0023</b> (0.0014)	-0.0004 (0.0006)
Average annual death rate of dementia patients (in %)	<b>0.0038 ***</b> (0.0010)	<b>0.0125 ***</b> (0.0012)	<b>-0.0030</b> (0.0027)	0.0012 (0.0011)
Average co-morbidity score (excluding dementia) of dementia patients	<b>0.5054 ***</b> (0.0194)	<b>0.4672 ***</b> (0.0252)	<b>0.7370 ***</b> (0.0555)	<b>0.4712 ***</b> (0.0240)
Median taxable income in living area (in log)	-0.0101 (0.0122)	<b>-0.1477 ***</b> (0.0159)	<b>-0.1692 ***</b> (0.0347)	<b>0.1833 ***</b> (0.0151)
Share of persons aged 75 and over living alone (in %)	<b>0.0034 ***</b> (0.0005)	<b>0.0028 ***</b> (0.0006)	<b>0.0036 ***</b> (0.0013)	<b>0.0044 ***</b> (0.0006)
Number of Full time equivalent of general practitioner (per 100 000 inhabitants)	<b>-0.00001</b> (0.00015)	-0.00003 (0.0002)	0.0001 (0.0004)	<b>-0.0000004</b> (0.0002)
Distance to nearest emergency department (in minutes)	<b>-0.0021 ***</b> (0.0003)	<b>-0.0012 **</b> (0.0003)	<b>-0.0020 ***</b> (0.0007)	<b>-0.0019 ***</b> (0.0003)
<b>LTC supply (in log)</b>				
No. of bed in medical residential care facilities	<b>-0.0311 ***</b> (0.0099)	-0.0114 (0.0128)	0.0154 (0.0282)	<b>-0.0928 ***</b> (0.0123)
No. of bed in non-medical residential care facilities	0.0045 * (0.0027)	<b>0.0065 *</b> (0.0035)	0.0052 (0.0077)	<b>0.0064 *</b> (0.0033)
No. of employees in home-care and support services	<b>-0.0089 ***</b> (0.0029)	<b>-0.0195 ***</b> (0.0039)	<b>-0.0433 ***</b> (0.0085)	<b>0.0124 ***</b> (0.0037)
No. of FTE self-employed nurses	<b>0.0815 ***</b> (0.0071)	-0.0152 (0.0093)	-0.0084 (0.0204)	<b>0.1881 ***</b> (0.0089)
<b>LA variables (level 2)</b>				
Number of acute care hospital beds (per 1000 inhabitants)	0.0029 (0.0115)	0.0127 (0.0141)	-0.02796 (0.0342)	0.0146 (0.0206)
Number of rehabilitation beds (per 1000 inhabitants)	0.0373 (0.0255)	0.0137 (0.0314)	<b>0.1626 **</b> (0.0757)	-0.0100 (0.0451)
LTC spending score given LTC needs and local wealth (min-max normalization(1))	-0.0409 (0.0457)	<b>-0.1004 *</b> (0.0561)	<b>-0.3427 **</b> (0.1361)	<b>0.1244 *</b> (0.0822)

(1)  $(\text{value} - \text{min}) / (\text{max} - \text{min})$  : varied from 0 (LA with the least LTC spending score) to 1 (LA with the best LTC spending score) : estimator can be interpreted as the average health care spending variation of dementia patients between the territory with the least and territories with the best LTC spending score (All other things being equal)

**Scope:** The 2708 French residential areas and 94 local authorities. Outcome indicators calculated on all Dementia patients identified between 2014 and 2019 in the National Health Insurance Information System (SNDS).

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### 3.2.2 Determinants of dementia patients' hospital utilization

Table 8 and 9 presents the results from multilevel models estimating the determinants of hospital utilization of patients newly identified with Alzheimer. Results concerning the characteristics of dementia patients (age, genders, comorbidity scores) and hospital utilisation are coherent with the previous findings with health expenditure despite the difference in data or populations studied. The results concerning the LTC are also confirmed: all else being equal, the number of hospital acute care days of dementia patients living in the most "generous" LA, is about 10% lower, than those in the least "generous" LA, while the number of post-acute care days is 31% lower. Moreover, the number of emergency visits without hospitalization are also lower in more generous LAs (5% difference between the most and the least "generous" LA). While the estimates of the links between LTC supply and hospital use are close to the estimations with health expenditure, the coefficients are not significant. Given the low number of individuals per residential, this may be linked to a power issue at the level of the residential area.

## 4. Limits of the analysis and robustness checks

I should note some of the limits of this analysis. First, LTC typology might suffer from missing data on LTC providers in France. While I have data on all long-term care providers of residential care, and most important homecare services, I miss data on Home-care nursing services which provide more technical nursing services at home (injections, bandages, preparation of drugs, etc.) as well as basic hygiene and comfort care, upon prescription from a physician. The data on these services are only available at LA level and no data is available at residential area level which is used in the typology. Therefore, I carried out a classification at the LA level, including the home-care nursing services in LTC providers, and I found similar LTC supply profiles at the LA level, albeit less precise. Moreover, the LAs with the lowest LTC supply have a higher level of inpatient spending for dementia patients.

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**Table 8. Determinants of territorial variations of dementia patients' health care utilisation: Results from the full multilevel model**

	No. Of days in acute care hospital	No. Of days in post-acute care facilities	Emergency visit without hospitalisation
Residential area variables (level 1)			
Intercept	<b>2.8653</b> *** (0.4028)	<b>3.2807</b> *** (0.6547)	<b>0.3882</b> *** (0.1159)
Mean age of dementia patients	<b>-0.0094</b> ** (0.0042)	<b>-0.02133</b> *** (0.0067)	0.00118 (0.0012)
Share of women of dementia patients (in %)	<b>-0.2564</b> *** (0.0672)	<b>-0.0048</b> *** (0.0006)	<b>-0.1018</b> *** (0.0191)
Average co-morbidity score (excluding dementia) of dementia patients	<b>0.1790</b> *** (0.0204)	<b>0.0515</b> (0.1058)	<b>0.0389</b> *** (0.0058)
Median taxable income in living area (in log)	-0.1153 (0.0416)	<b>-0.0520</b> *** (0.0690)	<b>-0.0373</b> *** (0.0121)
Share of persons aged 75 and over living alone (in %)	<b>0.0057</b> *** (0.0017)	<b>0.0063</b> ** (0.0027)	<b>0.0011</b> *** (0.0005)
Number of Full time equivalent of general practitioner (per 100 000 inhabitants)	0.0005 (0.0005)	0.0002 (0.0008)	-0.0001 (0.0001)
Distance to nearest emergency department (in minutes)	<b>-0.0015</b> * (0.0008)	<b>-0.0027</b> ** (0.0014)	<b>-0.0010</b> *** (0.0002)
Typology of LTC supply (ref. Group 5 Low access to all LTC providers)			
Group 1 High access to medical residential care facilities (nursing homes)	-0.0193 (0.0243)	-0.0159 (0.0401)	<b>-0.0148</b> ** (0.007)
Group 2 High access to non-medical residential care facilities	-0.0075 (0.0245)	-0.0241 (0.0402)	-0.0100 (0.0071)
Group 3 High access to self-employed nurses	-0.04517 (0.0279)	0.0611 (0.0467)	-0.0061 (0.0081)
Group 4 High access to home-care and support services	-0.0036 (0.0333)	-0.0838 (0.0546)	0.01087 (0.0096)
<b>LA variables (level 2)</b>			
Number of acute care hospital beds (per 1000 inhabitants)	0.0156 (0.0150)	-0.0029 (0.0367)	0.0072 (0.0050)
Number of rehabilitation beds (per 1000 inhabitants)	0.03620 (0.0348)	0.1232 (0.0820)	0.0022 (0.01159)
LTC spending score given LTC needs and local wealth (min-max normalization(1))	<b>-0.1049</b> * (0.0741)	<b>-0.3127</b> ** (0.1449)	<b>-0.0494</b> ** (0.0199)

(1) (value-min)/(max-min) : varied from 0 (LA with the least LTC spending score) to 1 (LA with the best LTC spending score) : estimator can be interpreted as the average health care spending variation of dementia patients between the territory with the least and territories with the best LTC spending score (All other things being equal)

**Scope:** 2677 residential areas, areas with less than 5 new cases of dementia patients are excluded. 94 local authorities. Outcome indicators calculated on cohort of new cases identified in 2012 in SNDS and followed over 48 months.

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**Table 9. Determinants of territorial variations in health care utilization: Results with LTC supply indicators instead of LTC supply classification**

	No. Of days in acute care hospital	No. Of days in post-acute care facilities	Emergency visit without hospitalisation
<b>Residential area variables (level 1)</b>			
Intercept	<b>3.0608</b> *** (0.6063)	<b>3.1491</b> *** (0.9924)	<b>0.5623</b> *** (0.1772)
Mean age of dementia patients	<b>-0.0100</b> ** (0.0043)	<b>-0.0247</b> *** (0.0068)	0.0012 (0.0012)
Share of women of dementia patients (in %)	<b>-0.2677</b> *** (0.0679)	<b>0.04705</b> (0.1073)	<b>-0.0950</b> *** (0.0195)
Average co-morbidity score (excluding dementia) of dementia patients	<b>0.1793</b> *** (0.0206)	<b>0.1119</b> *** (0.0328)	<b>0.0390</b> *** (0.0059)
Median taxable income in living area (in log)	-0.1290 *** (0.0416)	-0.0402 (0.0028)	<b>-0.0398</b> *** (0.0126)
Share of persons aged 75 and over living alone (in %)	<b>0.0051</b> *** (0.0017)	0.0043 (0.0028)	<b>0.0010</b> ** (0.0005)
Number of Full time equivalent of general practitioner (per 100 000 inhabitants)	0.0003 (0.0006)	0.0003 (0.0009)	-0.0001 (0.0001)
Distance to nearest emergency department (in minutes)	<b>-0.0019</b> * (0.0010)	<b>-0.0045</b> *** (0.0016)	<b>-0.0010</b> *** (0.0003)
<b>LTC supply (in log)</b>			
No. of bed in medical residential care facilities	0.0073 (0.0247)	0.0535 (0.0596)	<b>-0.0202</b> ** (0.0104)
No. of bed in non-medical residential care facilities	0.0078 (0.0096)	0.01344 (0.0165)	0.0047 (0.0029)
No. of employees in home-care and support services	<b>-0.0206</b> *** (0.0114)	<b>-0.0655</b> *** (0.0189)	0.0041 (0.0033)
No. of FTE self-employed nurses	-0.0111 (0.0236)	0.0500 (0.0420)	0.0020 (0.0072)
<b>LA variables (level 2)</b>			
Number of acute care hospital beds (per 1000 inhabitants)	0.01743 (0.0150)	-0.0042 (0.0360)	0.0065 (0.0051)
Number of rehabilitation beds (per 1000 inhabitants)	0.0267 (0.0366)	0.1084 (0.0840)	0.0004 (0.0123)
LTC spending score given LTC needs and local wealth (min-max normalization(1))	<b>-0.1063</b> * (0.0590)	<b>-0.3142</b> ** (0.1434)	<b>-0.0501</b> ** (0.0204)

(1)  $(\text{value}-\text{min})/(\text{max}-\text{min})$  : varied from 0 (LA with the least LTC spending score) to 1 (LA with the best LTC spending score) : estimator can be interpreted as the average health care spending variation of dementia patients between the territory with the least and territories with the best LTC spending score (All other things being equal)

**Scope:** 2677 residential areas, areas with less than 5 new cases of dementia patients are excluded. 94 local authorities. Outcome indicators calculated on cohort of new cases identified in 2012 in SNDS and followed over 48 months.

The reliability of results concerning the impact of LTC funding depends on the robustness of LA scores estimations. Therefore, I tested the sensitivity of efficiency scores and multilevel estimations to different specification of the SFA model. There are three main approaches to estimate technical efficiency in stochastic frontier panel models based on the assumptions made on the temporal behaviour of efficiency. First group of models assume that efficiency effect is time-invariant and individual-specific. This is not widely used in the literature because in general it is assumed that efficiency

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change across time whether we study industries or territories. Second group of models, the most used in the literature, allows to separate time varying efficiency and individual-specific efficiency (measure by time-invariant unobserved heterogeneity). More recently, (Greene, 2005) proposed a model that distinguishes time-invariant unobserved heterogeneity from the unobserved individual effect. In this study, I used time-varying efficiency decay model with random-effect, (Battese and Coelli, 1992). I tested technical efficiency estimation (time-invariant or time-varying models) with different model specifications: fixed effects or random effects; change in explanatory variables. The results appear to be stable and remain unchanged. However, the models do not converge when I estimate the third type of method that disentangle time-invariant inefficiency from time-invariant unobserved heterogeneity. Belotti and Ilardi, (2012), shown that this approach appears to be appropriate only when the length of the panel is large enough (more than 10-year panel), which may explain my difficulties with this specifications.

Ambulatory health care expenditure includes the expenditure on self-employed nurses. But a portion of this can be considered as LTC expenditure rather than primary health care expenditures when nurses provide personal care ( daily toilets, etc.). I removed nursing expenditure from the ambulatory care expenditures to test whether there is still a significant association between LTC provision and ambulatory expenditure . Ambulatory care expenditures (excluding nursing care) remain higher in residential areas characterized by a high level of accessibility to self-employed nurses and home care platforms. However, at the level of the LA, the relationship between ambulatory expenditure and the generosity of LTC funding is no longer significant, even if the coefficient remains positive.

Finally, multicollinearity between variables could be a a concern for these models. I tested the level of multicollinearity in the model using the variation inflation factors and tolerance tests and found no major problem of multicollinearity even in the models integrating the LTC supply indicators one by one (table 7 and 9).

## 5. Discussion

In this paper I examine the relation between the accessibility of long-term care across French residential areas and health care expenditure of older people with dementia. The results contribute to the literature on the links between health care and LTC by examining simultaneously regional inequalities in financial and physical accessibility of LTC. In France, it is to my knowledge the first study which analyze the local variations in LTC supply and funding. Different from most studies in this literature,

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I study, beyond hospital utilization, variations in health expenditure including also ambulatory care expenditure, by focusing on a group of high-need, high-cost patients with dementia. Results highlight the critical importance of long-term care providers for avoiding hospital utilisation for frail elderly.

These results complement the literature suggesting that inpatient care utilisation is lower for people receiving higher LTC allocations (Rapp and al. 2015, Forder, 2009; Lin and Imanaka, 2020; Chen and Ning, 2022; Costa-font et al., 2018, Moura 2020; Bakx et al, 2020) or in areas with better LTC supply (Fernandez & Forder, 2008; Gaughan et al., 2015; Walsh et al., 2019). In addition to this literature, I show that increasing LTC allocations alone will not forcibly solve the access issues: holding LTC funding constant, both the level and composition of LTC supply is directly linked to hospital utilisation and expenditure. Patients living in areas where there are not enough LTC providers still have higher hospital care and spending, including emergency care

More generally, the results from this analysis may help to think about the consequences of inequalities in LTC on the allocative efficiency of health care system. The concept of allocative efficiency refers to the optimal allocation of resources in a way that maximizes outcomes, but also meets societal demand (preferences) (Papanicolas and Smith, 2013). Concerning care for older adults, there is an international consensus about the adverse consequences of hospitalization as a source of stress, anxiety and disorientation that can lead to a deterioration of both cognitive and physical health state of patients (Aminzadeh and Dalziel, 2002; Boyd et al., 2008). Thus, care provided in an environment known to the person (at home, in residential care institutions, etc.) would be preferable to a hospital stay. In this context, avoidable hospital care represents a high opportunity cost (a significant loss of benefits in resources and quality of life compared to outpatient care). Therefore, reducing the geographical inequalities in LTC provision would increase system-wide efficiency not only by reducing hospital expenditures but also increasing the quality of life older patients.

However, reducing inequalities in access to LTC is not a priority for most health systems where the funding and management of LTC is decentralized or shared between different instances. In France the governance of LTC resources is shared between the SHI fund and local authorities (département). The theoretical and empirical literature on the impact of decentralization on efficiency and equity of health system is mixed (Arends, 2020). In France, for many years public policies have aimed to improve the equitable distribution of LTC funding while maintaining the political

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power of the departments in terms of LTC policy. For example, concerning residential care homes, a funding reform in 2017 introduced a national tariff formula to move from retrospective funding to prospective funding considered to be more efficient and equitable. While this funding reform helped to harmonize payments between facilities within a local authority, it did not reduce the disparities in funding between local authorities. The main advantage of decentralizing funding is to respect local preferences, but it can be questioned whether these local preferences affect the overall efficiency of the health system.

Moreover, LTC funding is necessary but not sufficient for reducing inequalities in LTC access. My typology of LTC supply shows that one in four French people older than 75 years lives in an area underserved by all LTC providers. Yet, reducing inequalities in LTC care supply within the country is not a national policy objective since LAs are responsible for assuring the LTC needs of their population. Little is known about the decision rules and disparities in regulatory policies between LAs. While geographical inequalities in primary care providers are well-known and several policies have been introduced to encourage installation in under-supplied areas, most of ambulatory care providers (nurses, general practitioners, physiotherapists, etc.) are self-employed and the impact of incentives have been limited until now. Therefore self-employed nurses are concentrated on coastal areas and in the south of France (Duchaine et al., 2022). The results of this chapter confirm that different primary and long-term care providers are complementary in avoiding hospitalizations. Thus, integrating the funding policies (incentives) can help to reduce local inequalities in care provision in community and improve the quality of care for older adults.

Overall, this study confirms the strong interdependence between primary care, acute care and LTC sectors and the need for assessing the relative effectiveness of different care models to reduce social and economic inequalities in access to LTC and to improve systemwide efficiency.

## **6. Appendix.**

### **6.1 Identification of patients with Dementia in the SNDS**

The French National Health Insurance Information System (SNDS) includes all the individualizable health care expenditure which may be reimbursed by the health care insurance. Each French person is registered by a single ID allowing me to follow up his health utilization and expenditures over time. In addition to the health utilization and expenditures, there are patients' information as gender and the date of birth, but also on any others information necessary to calculate the amount reimbursable by the



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health insurance such as benefit of an exemption scheme. The primary way to be identify as dementia patients in this data is related to receiving an exemption scheme for Alzheimer's disease or other dementias (declared by physicians). The other way to be identify is related to elderly consumption and/or the associated diagnosis codes: persons with at least 3 deliveries of Alzheimer's disease drugs in year n or n-1, and/or persons hospitalized in acute care hospital for Alzheimer's disease or other dementias in years n to n-4 (principal or associated diagnosis), and/or persons hospitalized in acute care hospital in year n for any other reason with dementia as a complication or associated morbidity and/or persons hospitalized in psychiatry for Alzheimer's disease or other dementias in years n to n-4 (principle or associated diagnosis) and/or persons hospitalized in Rehabilitation care for Alzheimer's disease or other dementias in years n to n-4.

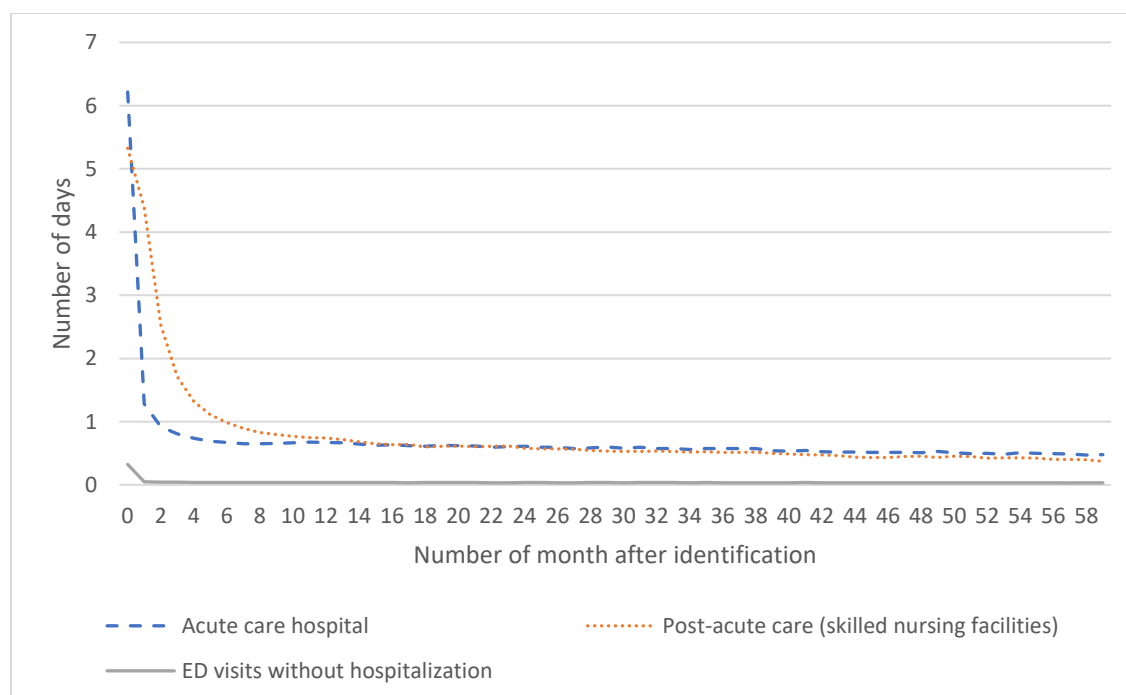
**Table 10. Number of dementia patients identified in SNDS between 2014 and 2018 in métropolitain France excluding Corsica**

	2014	2015	2016	2017	2018
Dementia patients	572 650	594 494	611218	624 587	629 655

Source : National Health Insurance Information System (SNDS).

### 6.2 New cases of dementia patients identified in French national claims database in 2012

**Figure 3. Mean number of days per month\* in hospital after dementia patients' identification in databases in 2012**



\* Average based on dementia patients alive during the month

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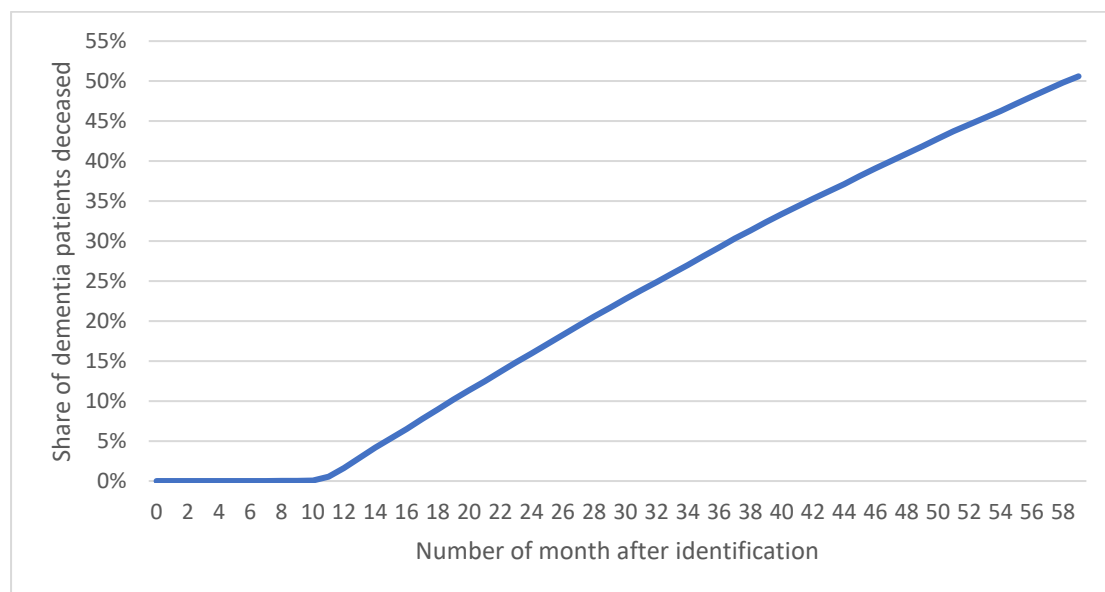
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**Note:** During the first month after dementia patient's identification, dementia patients were hospitalized on average 6 days in acute care hospital and 5 days in post-acute care hospital. After 6 months, dementia patients spend less than one day per month in acute and post-acute care hospital.

**Scope:** 80 372 new cases of dementia patients identified in French national claims database in 2012.

**Source:** French Statutory Health Insurance Fund (SHIF) claims database (2012 -2017)

**Figure 4. Share of population deceased per month after identification in databases in 2012**



**Note:** During the first year there are no deceased patients (patients who died in the first year were excluded from the study). Then, the share of patients who died each month increases increasingly between the 12th month and the 60th month after identification.

**Scope:** 80 372 new cases of dementia patients identified in French national claims database in 2012.

**Source:** French Statutory Health Insurance Fund (SHIF) claims database (2012 -2017)

### Chapter 2

#### **Do mobile hospital teams in residential aged care facilities increase health care efficiency: an evaluation of French residential care policy**

This chapter has been published in the European Journal of Health Economics. <https://doi.org/10.1007/s10198-022-01522-1>

##### **Abstract.**

**Context.** Patients in residential aged care facilities (RACF) are frequently admitted to hospital since the RACF often lack adequate medical resources. Different economic agents, whose missions and funding may conflict, provide care for RACF residents: residential facility, primary care physicians, and hospital. In this article, I estimate the economic impact of employing a mobile hospital team (MHT) in RACF, which modifies the relationship between these three agents by providing care directly in RACF.

**Method.** A national, patient level database on RACF from 2014 and 2017 is used to calculate RACF outcome indicators. I analyse the difference between RACFs, that use MHT for the first time during the period (treatment group), and those that did not use MHT at all in the same period using a difference in difference (DID) model. **Results.**

The MHT had a significant impact on health care quality in treated RACFs and reduced the number of patients transferred to hospital and the number of emergency department visits, and increased palliative care utilisation at the end-of-life, without increasing total hospital expenditure. **Conclusion.** MHT appear improve care quality in RACFs by filling the gap in care needs including better end of life care, without increasing health expenditure. Given the high number of hospital transfers especially towards the end of life, securing the right level and mix of social and medical resources in RACFs is essential. Transferring some competencies of MHT teams to residential facilities may improve the quality of life of residents while improving allocative efficiency of public resources.

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## Chapter 2

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### 1. Introduction

Residential aged care facilities (RACF) take care of elderly people who have significant health care needs usually towards the end of their lives. While the characteristics of these facilities, sometimes called nursing homes, and their level of medicalization vary widely across countries, they are always on the frontiers of health and social care systems. The care of residents in RACF involves different economic agents: those in the residential facility, from outpatient care (mainly primary care physician), and from the hospital. These economic agents have different tasks, funding sources, economic incentives, that are sometimes contradictory. The complementarity of these agents, which provide jointly health care for RACFs residents, has been little studied in the literature (Grabowski et al., 2015). The covid-19 pandemic has highlighted, in many OECD countries, the significant deficiencies in the articulation of care between these three main economic agents and the necessity of examining their roles to improve the efficiency of care provision across health and social care sectors (Menéndez-Colino et al., 2021; Stall et al., 2020).

In France, about half of RACF residents are over 87 years old; two-thirds of them have dementia, and three-quarters of the residents live there until end of their life for about median length of stay of 14 months (Muller, 2017). The RACFs receive funding from the social health insurance (SHI) for ensuring the medical needs of their residents, but the level of medical personnel remains low. The personnel in RACFs are mainly composed of social caregivers (helping with bathing, dressing, meals, activities, etc.) with a few nurses who provide daily nursing care (drug distribution, injections, bandages, etc.). Some facilities have a general practitioner (GP) as care coordinator; although most patients have their own GP and specialists in ambulatory setting or see hospital physicians when necessary.

Many studies examining the public policies to reduce hospitalizations of aged care residents (Grabowski et al., 2008; Graverholt et al., 2014; Intrator et al., 2004; Saliba et al., 2000) suggest that a significant number of hospitalizations can be avoided by better outpatient care (Lloyd et al., 2019; McDermott et al., 2012), but also by increasing the level of personnel with medical skills in RACF (Kwa et al., 2021; Szczepura et al., 2008). Some studies point to the importance of better coordination of care between RACF and hospital for reducing hospital admissions (Fan et al., 2015; Harvey et al., 2014; Hullick et al., 2016). There is also a growing literature examining the impact of interventions targeting better health care coordination of aged care residents, such as telemedicine (Groom et al., 2021) or multidisciplinary teams (Lau et

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al., 2013; Nazir et al., 2013). These teams rarely provide care to the residents themselves, but refer to the involvement of an external, mostly hospital-based, multidisciplinary team to support RACF's staff with specific expertise on geriatric, palliative, and/or psychiatric care. In this article, I examine a specific French policy which allows mobile hospital teams, called hospital at home (HAH), to provide care in RACF. HAH teams are mostly consisting of a coordinating doctor<sup>41</sup>, a coordinating nurse, a nurse practitioner, and a social worker. They provide additional medical and technical resources necessary for some treatments in RACFs to avoid inpatient hospital use.

The intervention of HAH in RACF gives also the possibility for providing palliative care, which is essential for improving the quality of care and avoiding hospitalisations at the end-of-life (Chapman et al., 2018; Froggatt et al., 2020; Hui et al., 2014; Luk and Chan, 2018; Tropea et al., 2019). Palliative care aims to relieve pain and psychological distress, safeguard the dignity of the person, and support his or her entourage but has been developed very little in France since the 1980s (Bohic et al., 2019). Currently, it is only provided and funded in a hospital setting in France (acute and post-acute care or in HAH). Therefore, extending HAH to residential facilities permits funding palliative care in RACFs.

To evaluate this policy, I use a quasi-experimental (double difference) method, often used in the literature to evaluate non-randomized experiments (Wing et al., 2018). The method consists of comparing the evolution of outcome indicators before and after a treatment or intervention between two groups: treated group who had the intervention (here the HAH) and the control groups which did not benefit from the intervention. I expect that utilisation of HAH in RACF would improve the care quality and efficiency of resource use in different ways. First, I expect that there will be a substitution between acute care hospitalisation days and HAH. Using HAH in the facility avoids hospital admissions of residents (inpatient care replaced by HAH). Avoiding hospitalisations, which are always a source of stress, and can deteriorate the health of frail elderly people would improve the quality of life of residents (Boyd et al., 2008). Second, HAH should reduce total hospital expenditure as the same care in HAH cost less than in acute care hospitals for the SHI. Third, the HAH may help to improve the communication between hospital providers, the primary care physician and RACF personnel, thereby allow better follow up of patients. Hence the introduction of HAH in the facility may avoid some visits to emergency departments. Emergency room visits

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<sup>41</sup> Usually, GPs

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and emergency admissions to acute-care hospitals are identified in the literature as a great source of stress for the elderly (Aminzadeh and Dalziel, 2002). Finally, the HAH allow the facilities to put in place palliative care which can improve their expertise in end-of-life care. Lack of palliative care at the end of life is recognized as an indicator of poor care quality (Dwyer et al., 2014; Froggatt et al., 2020). I expect that more people benefit from palliative care in RACF which are using HAH.

HAH teams were allowed in RACFs since 2007, but their employment has been very slow since then. Therefore, to evaluate the impact of introducing HAH in RACF, I focus on the facilities who have used HAH as a first time between 2015 and 2017, in other words I consider new users of HAH as treated facilities and the facilities that have never used HAH in this period as control facilities. This empirical strategy aims to estimate the impact of HAH teams in treated facilities on residents' health care quality and costs. The rest of the article is structured as follows. The next section describes the expected costs and benefits of using HAH teams for RACFs but also for the hospital and the primary care physicians. The section 3 presents data and methods used to estimate the impact of HAH on facilities that used HAH teams, section 4 presents the results, section 5 notes some limitations of this research and presents sensitivity analysis. A last section provides a discussion of the results.

### **2. Costs and benefits of HAH teams in residential care**

The HAH must be prescribed by an outpatient physician (generally the regular GP of the resident) or by a hospital specialist. To employ HAH, the RACF and the HAH team must first define together a care contract which defines the responsibilities of each. Thus, the use of HAH in RACF will depend on the motivation and financial incentives of these actors to introduce HAH in RACF (de Stampa et al., 2014; Hoffmann, 2012; Robillard, 2020). In this section, I summarize the costs and benefits that may be associated with HAH intervention for the facility, the hospital, the HAH team and the primary care (referring) physician (Cours des comptes, 2016; Durand et al., 2010).

For RACF, there are more benefits than costs associated with the use of HAH. Although the administrative process to contract with an HAH team can be time-consuming, it would be profitable on several levels. First, the collaboration with an HAH team is encouraged by the Regional Health Agency (ARS) which finances healthcare in these facilities. Second, RACF can potentially gain in revenue by reducing the number of missing days of residents: the amount of the care package paid by the ARS to the RACF is adjusted by the number of days those residents are present. The social



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care financed by the local authorities and the daily accommodation fees paid by the resident are no longer paid when resident is in hospital <sup>42</sup> more than 4 days. Although it is difficult to know if these rules are applied, in theory, RACFs may have a financial incentive to use HAH which also means having extra medical resources for a patient.

For the HAH providers, RACF represent an important patient pool. However, there is no specific financial incentives for HAH teams to intervene in a RACF, on the opposite, the prices (based on diagnosis related group) are lower when the intervention is in RACF compared to home (Cours des comptes, 2016; Durand et al., 2010; Robillard, 2020). For acute care hospitals owning their services, prescribing HAH can be beneficial if the hospital is overcrowding, as it can allow discharging complex patients quicker to RACF after a hospitalization, when the profit margin of HAH is higher. However, they are also paid on their volume of patients (activity-based payment), hence may prefer to have an inpatient stay rather than HAH if they do not have their own HAH services.

For primary care physicians, paid on fee-for-service, HAH is potentially interesting for following their patients. But if the primary care physician has already a large patient base or his involvement in the RACF is weak (few patients in the facility), coordinating HAH can be more time costly than regular patients, which does not require coordination with HAH and RACF.

HAH in RACF necessarily involves collaboration between the HAH team, the person's primary care physician, and the caregivers in RACF, but also sometimes the hospital physicians when they prescribed the HAH. This interaction between care providers in community, hospital, and RACF can improve care coordination and quality (de Stampa et al., 2014) although, it is difficult to measure the cost/benefit ratio of HAH in RACF for these care providers. For all care providers (RACF staff, HAH team and the primary care physician), the need to coordinate care and work together can be costly (administrative burden, differences in culture, hierarchy, etc.) while it can have positive externalities in the long term (improved communication between them, transfer of skills, etc.).

In this article, I assume that the residents do not have an active role in the decision concerning HAH in RACF. While in principle the residents and their family can be involved in care decisions, for example by refusing or proposing HAH, their role is very limited in practice, and the decision concerning HAH in the facility will mainly be

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<sup>42</sup> 23 euros per day in acute care hospital covered by private complementary health insurance of persons

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made by care providers. Moreover, for the resident, the use of HAH in RACF is financially neutral because it is fully funded by the SHI. However, qualitative studies in France report that there are benefits for the residents since HAH allows residents to stay in a familiar environment with the personnel they know compared to a hospital admission (de Stampa et al., 2014; Hoffmann, 2012; Robillard, 2020). Caregivers of RACF residents can also prefer HAH because they do not have to manage a hospital transfer and they remain in contact with the same care providers in the facility.

### 3. Data and method

#### 3.1 Data

The analysis is based on patient level claims data from the National health data system (SNDS) matched with the national RACF database for the years 2014 to 2017. The database allows identifying all RACFs residents and following their care consumption in different care settings. I used a sample of 12 French regions representative of the population (nearly two-thirds of the elderly population in France) and retained only the RACFs which were present over the entire period of the analysis (from July 2014<sup>43</sup> to December 2017). The final sample consists of 5373 RACFs that received 696,370 elderly people over the study period.

Overall, five outcome indicators are measured for each semester. The first one, measure acute care hospital utilization, by the number of admissions per 100 RACF residents per semester. Two other indicators, the number of emergency admissions per 100 RACF residents and the number of emergency room visits not followed by hospitalization per 100 RACF residents, are indicators of care quality in RACF. The fourth indicator measures the number of residents who received palliative care at the end of life (in hospital, in post-acute care, or in HAH) per 100 deceased residents per semester. The last indicator is the average total hospital expenditure per resident and per semester. Total hospital expenditure includes expenditure in acute and post-acute care facilities, in HAH as well as expenditure related to emergencies rooms visits and medical transports.

#### 3.2 Empirical approach

To estimate the impact of HAH on facilities that used HAH teams, I perform a double-difference analysis (DID) by comparing facilities (RACFs) that made use of HAH for the first time to facilities that did not develop HAH. I assume that after the first

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<sup>43</sup> The first semester of 2014 is excluded from the analysis due to poor data quality. The database became representative from mid-2014 onwards.

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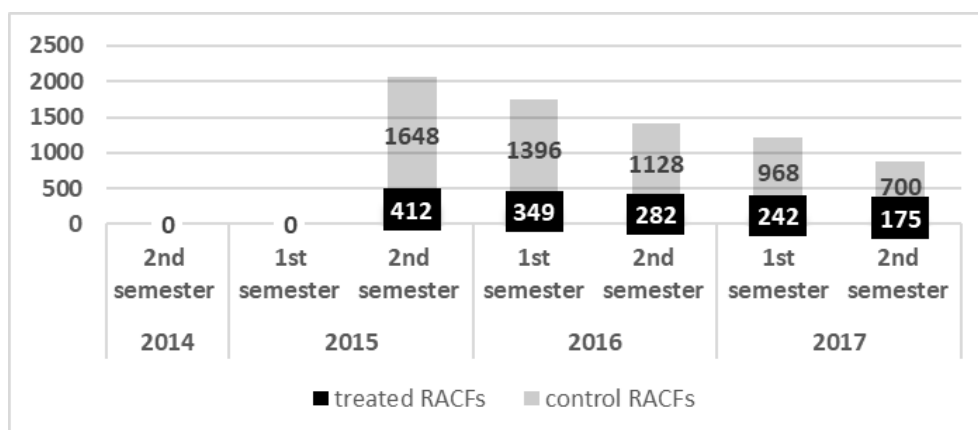
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use of HAH, these facilities will gain experience in certain medical issues and will continue to use HAH. Using DID, I estimate the impact of this new practice on outcomes indicators. The period studied (between 2014 and 2017) is a period during which HAH in RACFs have been gradually diffused in France. Therefore, I had a good sample of facilities that used it for the first time, with however a fairly large number of facilities that do not use it at all. 2,060 RACFs, 38% of the facilities in the cohort, have not used HAH in the facility for any residents between July 2014 and December 2017. This will be my “control” pool. In the remaining 3313 RACFs that used HAH teams between July 2014 and December 2017, to have a homogeneous treatment group, I identify those facilities which did not have any HAH, in the 12 months preceding the first observed HAH. Thus, I exclude the facilities which already used HAH in the second semester of 2014 and the first semester of 2015. I have 1460, 27% of the facilities of the initial cohort, as “new users” between July 2015 and December 2017 which are the “treated” sample. Depending on these treated facilities, the treatment semester (semester of the first use of HAH) can vary from the 2nd semester of 2015 to the 2nd semester of 2017.

The objective of the method is to identify the treated facilities in each semester and year (from the 2nd semester of 2015 to the 2nd semester of 2017) and establish the trends in healthcare consumption before and after this treatment semester. The number of treated facilities selected each semester varies between 412 and 175 facilities (figure 1). In order to select control facilities in the same period of time (with the same pre- and post-treatment semesters) and avoid the selection bias linked to the semester where treated facilities are identified, I constructed a counterfactual by randomly drawing 4 control facilities for each treated unit from the pool of control facilities (those that have never employed HAH) and give them the same semester of treatment (sometimes referred to as reference semester). For example, in the 2nd half of 2015, there are 412 treated RACFS and 1648 control RACFs (randomly selected from the 2,060 RACFS that have never employed HAH) with the same pre-treatment period (from the 2<sup>nd</sup> half of 2014 to the 1<sup>st</sup> half of 2015) and the same post-treatment period (from the 2nd half of 2015 to the 2<sup>nd</sup> half of 2017), while there are 175 treated RACFs and 700 control RACFs (randomly selected) on the 2nd half of 2017 with the same pre-treatment period (from the 2<sup>nd</sup> half of 2014 to the 1<sup>st</sup> half of 2017) and one post-treatment period (the 2<sup>nd</sup> half of 2017) (figure 1). Finally, I identify 1460 treated RACFs and 5840 control RACFs.

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**Figure 1. Number of RACFs in treated and control group per calendar semester**



**Note:** In the 2<sup>nd</sup> half of 2015, there are 412 treated residential aged care facilities (RACFs) that made use for the first-time hospital at home (HAH) and 1648 control RACFs (randomly selected from the 2,060 RACFs that have never employed HAH).

**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

I measure the outcome indicators in the semesters before (T-6, T-5, T-4, T-3, T-2, T-1) and after (T2, T3, T4, T5) the treatment semester (T1). For all the RACFs (1460 treated RACFS and 5840 control RACFs), I observe at least the treatment semester (T1) and the two previous semesters (T-1 and T-2). But the data are censored on the right (T2, T3, T4, T5) and on the left (T-6, T-5, T-4, T-3) depending on the calendar treatment semester of the RACF. For treated and control facilities identified on the 2<sup>nd</sup> semester of 2015, I can only observe 2 semesters before (T-2, T-1) and 5 semesters after the treatment (T1, T2, T3, T4, T5), while I observe 6 semesters before (T-6, T-5, T-4, T-3, T-2, T-1) and only the first treatment semester (T1) when the treatment is in 2<sup>nd</sup> semester of 2017. However, the number of treated and control facilities per semester remains sufficiently large over all semesters studied.

To measure the treatment effect with double-difference analysis, I specify a panel linear regression model with facility fixed effects (RACF) as follows:

$$Y_{it} = \alpha + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 Treat_i * Post_t + \beta_4 Var_{it} + \beta_5 S_{it} + \delta_i + \varepsilon_{it}$$

Where,  $Y_{it}$  the outcome indicator in semester t for facility i, with t the semester of observation before or after the treatment with  $t = -6, -5, -4, -3, -2, -1, 1, 2, 3, 4, 5$  ( $t=1$  corresponds to the treatment semester or reference semester).  $Treat_i$  corresponds to the treated facilities, and  $Post_t$  is the post-treatment periods introduced in a binary

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variable with  $Post_t = (0$  for semesters before and 1 for semesters after treatment) to estimate the average semester impact at 2.5 years and introduced in a categorical variable to estimate each semester impact  $Post_t = (0$  for semesters before treatment and 1, 2, 3, 4, 5 for each semester after treatment).  $\delta_i$  is the facility fixed effect and  $\varepsilon_{it}$  is a random term.  $Var_{it}$  corresponds to the characteristics of the facility (RACF) not fixed in time.  $S_{it}$  is the calendar semester of facility  $i$  at treatment time  $t$ . The coefficient vector  $\beta_3$  of the interaction term  $TREAT_i * Post_t$  measures the difference in trend after treatment between treated and control facilities (estimation of HAH effect on treated facilities). Considering that the data are censored (i.e, I do not observe all pre- and post-treatment value according to treatment semester) to calculate the average treatment impact without overweighted the impact of the first semesters, I weighted the coefficients by treatment semester (or reference semester) with the proportion of censored data.

The introduction of the facility fixed effects allows to control for unobserved characteristics fixed over time between the treated and control facilities, such as, legal status (for profit or not). Characteristics of the facilities, notably the case-mix, which change over time, may also affect the evolution of the outcome indicators. Therefore, the models include three variables to control the variations in the case-mix over time: average age and average number of chronic illnesses of residents by semester and the proportion of residents who died in each semester. I further control for the number of residents in the facility in each semester of analysis as the total number of residents in the facility in any semester vary over time.

## 4. Results

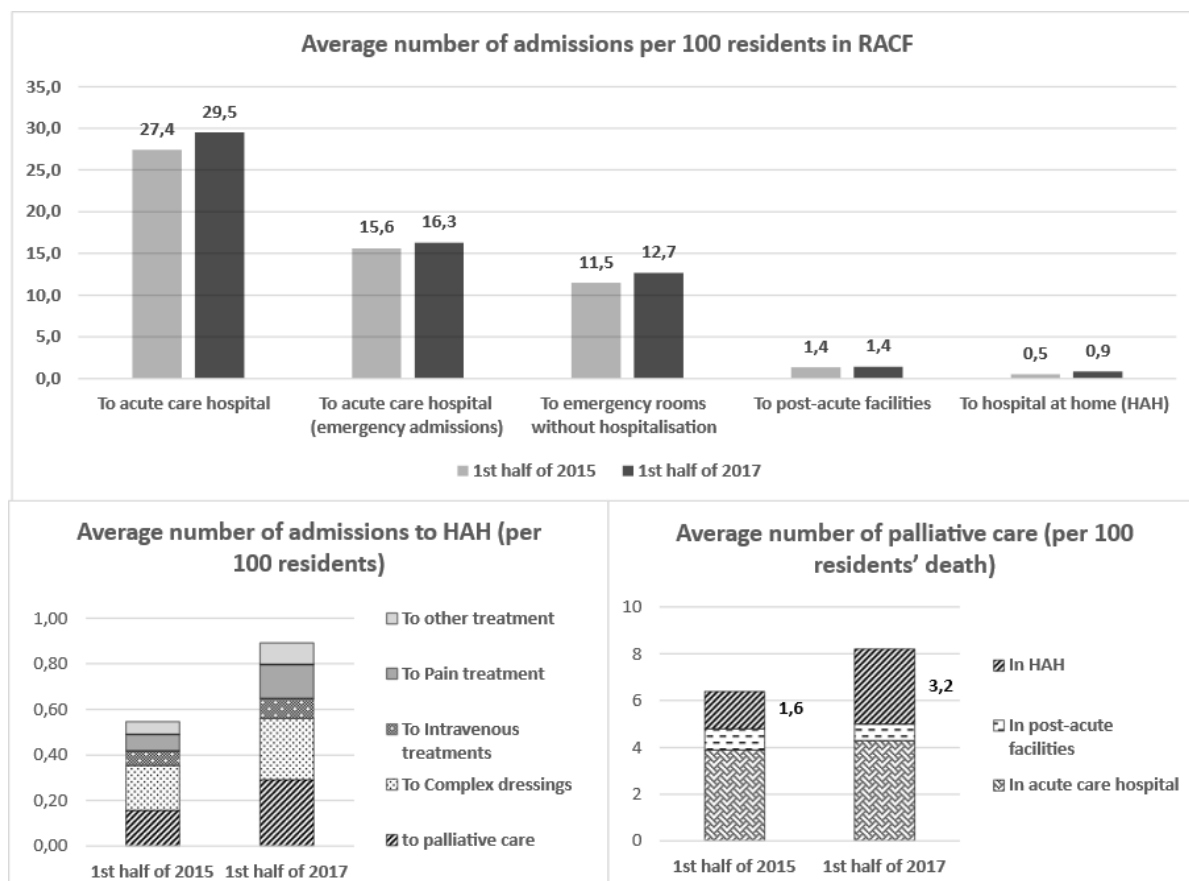
### 4.1 Hospital admissions and development of HAH between 2015 and 2017

The number of HAH interventions for RACFs residents per semester nearly doubled between 2015 and 2017 from 0,5 cases per semester per 100 residents to 0,9 cases (Figure 2). In contrast, in first semester 2015, on average, there were 27 admissions in acute care hospitals per 100 RACF residents of which 16 through emergency department, against 29 admissions and 16 through emergency department in first semester 2017. In addition, in first semester 2015 on average, there were 11 emergency room visits not followed by a hospitalization per 100 residents, against 13 in first semester 2017. The most frequent treatments provided in HAH between 2015 and 2017 were palliative care and complex wound (bedsores, leg wounds, healing problems, etc.), each accounting for about 30% of HAH admissions in RACFs, followed

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by pain treatment (18% of admissions) and by intravenous treatments (10% of admissions). The proportion of RACFs residents who deceased in palliative care increased slightly between the first half of 2015 and 2017 from 6.1% of those died to 8.1% in the first half of 2017. This is mainly explained by an increase in palliative care in HAH setting, admissions to palliative care in acute or post-acute care hospitals remained constant over the same period.

**Figure 2. Number of hospital and palliative care admissions in RACF between the first half of 2015 and 2017**



**Note:** In first semester 2015, on average, there were 27 admissions in acute care hospitals per 100 residential aged care facility (RACF) residents, against 29 admissions in first semester 2017.

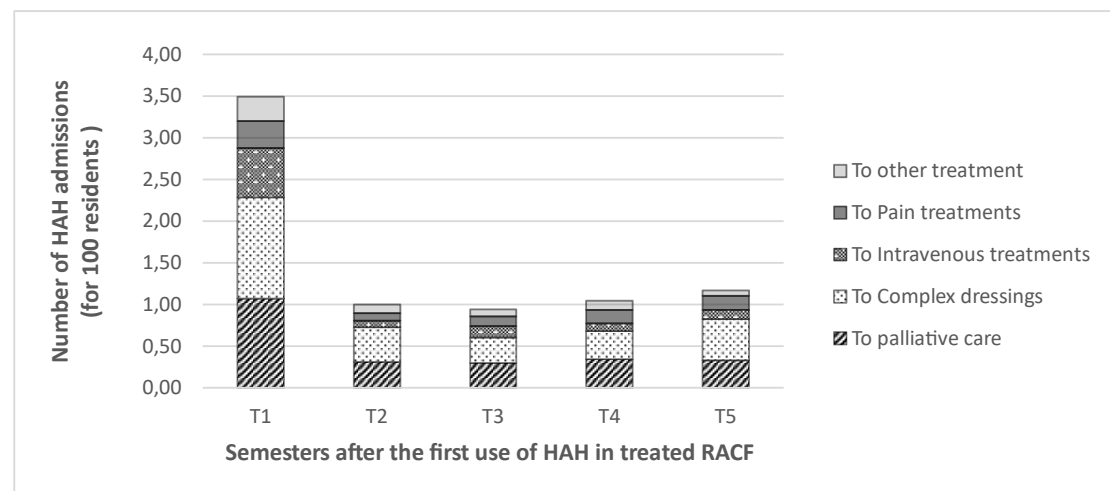
**Scope:** 5373 French RACFs which were present over the entire period of the analysis

**Source:** French National health data system (SNDS) claims database (2014 -2017)

Treated facilities using the HAH for the first time during the study period had an average of 3.5 HAH admissions per 100 residents the treatment semester (T1) and then an average of one HAH admission per 100 residents in the following semesters (T2, T3, T4, T5) (Figure 3).

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**Figure 3. Number and type of treatments in HAH per 100 residents in treated facilities (for each semester after the first use of HAH)**



**Note:** Treated facilities using the HAH for the first time during the study period had an average of 3.5 HAH admissions per 100 residents the treatment semester (T1).

**Scope:** 1460 treated RACFs

**Source:** French National health data system (SNDS) claims database (2014 -2017)

### 4.2 Characteristics of treated and control facilities

Table 1 presents the main attributes of the treated and control facilities. The treated facilities are slightly larger: on average 87 residents per semester in the treated facilities versus 78 residents in the control ones. The average morbidity profiles, the number of chronic illnesses of the residents are not different between the treatment and control facilities, but the average age of residents and death rates in treated facilities are slightly higher than in control facilities.

There are significant differences in the level of most pre-treatment outcomes between treated and control facilities. The average number of hospitalizations per semester, before treatment, was 30 admissions per 100 residents in the treated RACFs versus 25 admissions per 100 residents in the control RACFs. Emergency room use and overall hospitalization spending were also higher in treated than in control facilities. There are no significant differences in the number of palliative care treatments in treated and control facilities prior to treatment, with an average of 5 out of 100 residents receiving palliative care at the end of life (in any setting).

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**Table 1. Description of treated and control RACFs before treatment**

Semi-annual averages before treatment	Treated RACF	Control RACF	Difference	
			value	P-value
Number of residents	86,9	77,8	-9,1	***
Mean age of residents	87,4	86,7	-0,7	***
Average co-morbidity score of residents	1,5	1,5	0,0	
Average death rate of residents each semester (in%)	7,9	6,5	-1,4	***
Number of admissions to acute care hospital (per 100 residents)	29,6	25,3	-4,3	***
Mean length of stay in acute care hospital (in days)	7,6	6,4	1,3	***
Number of emergency admissions to acute care hospital (per 100 residents)	17,4	13,4	-4,0	***
Number of emergency room visits without hospitalization (per 100 residents)	12,8	10,2	-2,6	***
Number of palliative care (per 100 residents' death)	4,5	5,0	0,5	
Total hospital expenditure per resident (in euros)	1393,8	1225,9	-167,9	***

**Note:** The treated facilities are slightly larger with more 9 residents per semester on average than control facilities (87 residents per semester in the treated facilities versus 78 residents in the control ones).

**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

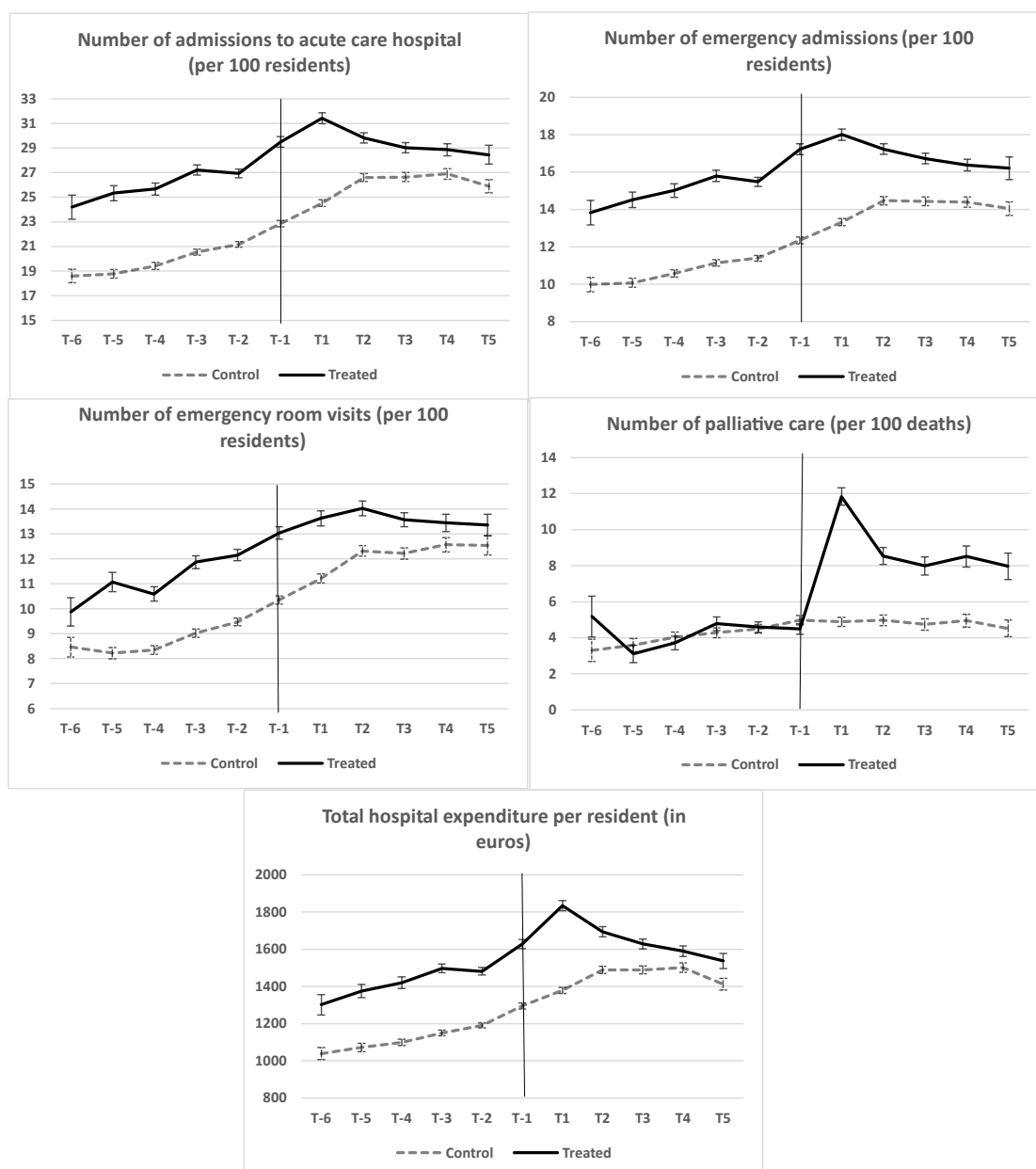
**Source:** French National health data system (SNDS) claims database (2014 -2017)

Despite these differences in level, the hypothesis of common pre-treatment trends is verified (Figure 4). I also tested this hypothesis using an econometric model (same as Equation 1 by replacing post-treatment term by pre-treatment semesters in the interaction term ( $TREAT_i * Pre_t$ ) to estimate variations in trend between treated and control facilities before treatment; results in table 1 and 2 in Appendix). These models shows that there is no difference in pre-treatment trends between treated and control facilities. Thus, the assumption of common trends is well met.



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**Figure 4. Pre- and post-treatment trends in outcome indicators**



**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

### 4.3 Impact of HAH use in RACFs on hospital use and expenditure

Tables 2 and 3 present the results of the double-difference model with facility fixed effects and controlling for the differences in case mix and volume of residents in each semester. As expected, the higher morbidity score and age of people living in the RACF are associated with an increase in hospital use and expenditure by residents. Moreover, surprisingly, facilities which have higher death rates use less palliative care for their residents.

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**Table 2. Impact of the HAH in RACF on residents' hospital use: results from DID estimations**

	No of admissions to acute care hospital (per 100 residents)	No of emergency admissions (per 100 residents)	No of emergency room visits (per 100 residents)	No of palliative care stays (per 100 death)
Estimated effect of HAH use (mean semester effect after 2.5 years)	<b>-1.984***</b> (0.338)	<b>-1.259***</b> (0.233)	<b>-1.090***</b> (0.221)	<b>4.377***</b> (0.380)
Control variables				
Number of residents	<b>-0.017**</b> (0.008)	<b>-0.010**</b> (0.005)	-0.003 (0.005)	-0.011 (0.008)
Mean age of residents	<b>0.105*</b> (0.058)	<b>0.115***</b> (0.036)	-0.014 (0.044)	-0.107 (0.101)
Average co-morbidity score of residents	<b>7.625***</b> (0.503)	<b>4.102***</b> (0.305)	<b>2.914***</b> (0.298)	-0.514 (0.854)
Average death rate of residents (in %)	<b>37.774***</b> (2.000)	<b>24.982***</b> (1.302)	1.782 (1.200)	<b>-24.350***</b> (2.982)
Semester calendars (reference 2 <sup>nd</sup> half of 2014)				
1st half of 2015	<b>0.397**</b> (0.191)	<b>0.436***</b> (0.135)	<b>0.319**</b> (0.129)	<b>0.572**</b> (0.261)
2 <sup>nd</sup> half of 2015	-0.023 (0.217)	0.015 (0.152)	<b>0.300**</b> (0.152)	<b>1.033***</b> (0.284)
1st half of 2016	<b>4.610***</b> (0.355)	<b>2.319***</b> (0.232)	<b>2.867***</b> (0.227)	<b>1.239***</b> (0.362)
2 <sup>nd</sup> half of 2016	<b>3.101***</b> (0.386)	<b>2.002***</b> (0.258)	<b>2.664***</b> (0.250)	0.444 (0.417)
1st half of 2017	<b>4.750***</b> (0.441)	<b>2.290***</b> (0.286)	<b>2.793***</b> (0.280)	<b>0.848*</b> (0.445)
2 <sup>nd</sup> half of 2017	<b>3.252***</b> (0.446)	<b>1.763***</b> (0.291)	<b>3.186***</b> (0.292)	-0.008 (0.430)
Constant	0.631 (5.239)	-4.664 (3.245)	6.397 (3.891)	16.951* (8.933)
R-square	0.064	0.044	0.038	0.018

**Note:** In the facilities which used HAH as a first time, the number of admissions in acute care hospital decreased by 1,6 admissions per 100 residents per semester over the two and a half years following the first utilisation.

**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

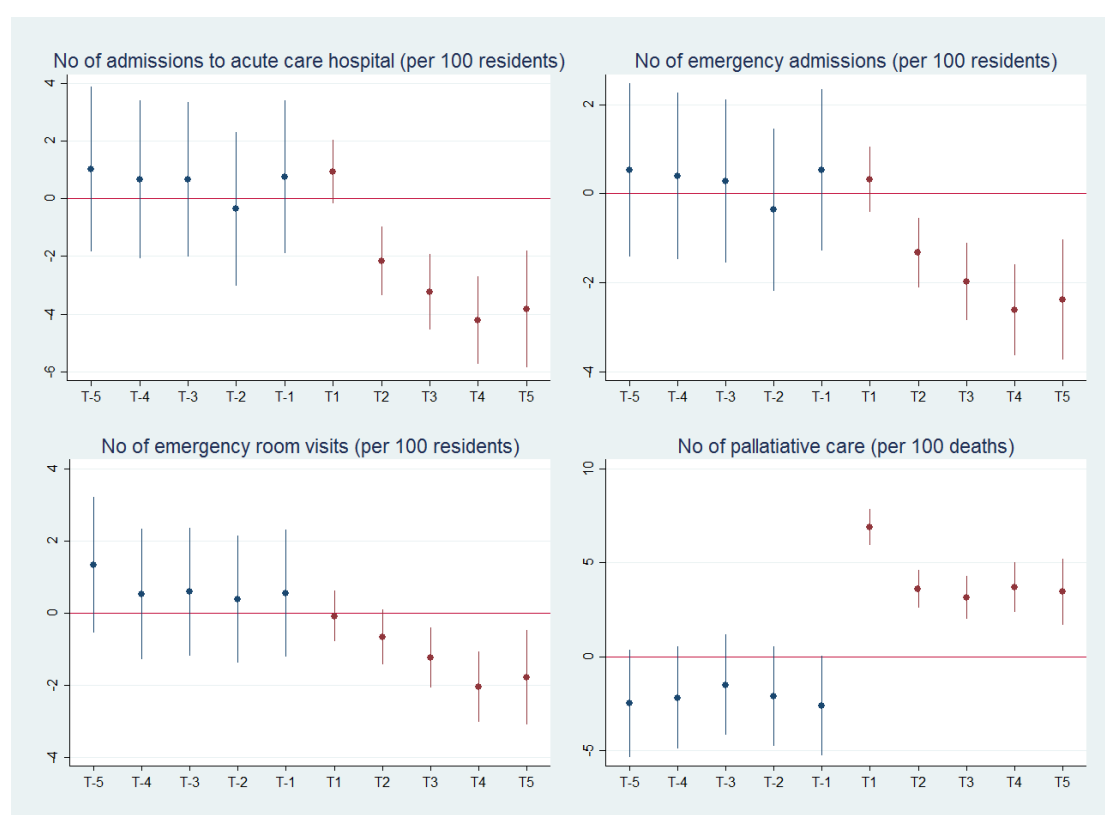
In the facilities which used HAH as a first time, the number of admissions in acute care hospital decreased by 2 admissions per 100 residents per semester over the two and a half years following the first utilisation (table 2). The admissions to emergency department are significantly declined in treated facilities: on average one emergency admission and one emergency room visit less per 100 residents each semester over the two and a half years following the first use of HAH. The number of residents at the end of life who were managed by a palliative care team increased by 4 percentage point per semester following the first HAH intervention in the treated facilities compared to the control facilities. This doubles the number of palliative care deaths in treated facilities over the study period.

Figure 5 gives the HAH effect on treated facilities by semester after the first utilisation (T1, T2, T3, T4, T5). The acute hospital use, emergency admissions and

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emergency rooms visits were not significantly different in the first semester of HAH use between treated and control facilities, but there is a significant reduction from the second semester onwards with a higher effect in each semester, ranging from a reduction of 2,2 acute care admissions, of 1,2 emergency admissions and 0,8 emergency rooms visits in the second semester to a reduction of 3,8 acute care admissions, of 2,4 emergency admissions and 1,9 emergency rooms visits in the fifth semester. For palliative care, the increase is more significant in the first semester (T1), and it remains stable over the following semesters, with an increase of about 3.5 palliative care utilisation per 100 residents died.

**Figure 5. Impact of the HAH in RACF on residents' hospital use: results from DID estimations per semester**



**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

Table 3 gives the results on total health expenditure of residents by care settings. The average expenditure per semester over the two and a half years following the first HAH intervention was significantly reduced by 60 euros per semester and resident in the treated compared to control RACFs. Thus, on average over the two and a half years following the first HAH, acute care expenditure is reduced by 80 euros per semester, emergency rooms expenditure is reduced by 5 euros per semester and per

## Chapter 2

resident, and transport expenditure is reduced by 15 euros per semester and per resident, while HAH increased the expenditures by 43 euros per semester and per resident. There is no significant variation in post-acute care expenditures.

**Table 3. Results of the impact of the use of HAH in RACF in treated facilities on residents' hospital expenditures.**

	Health expenditure by setting (per resident and per semester, in euros)					Total expenditure
	Acute care	Post acute care	Emergency rooms	Transport	HAH	
Estimated effect of HAH use (mean semester effect after 2.5 years)	<b>-79.272***</b> (18.749)	-0.038 (1.802)	<b>-4.739***</b> (1.824)	<b>-15.512***</b> (3.641)	<b>43.305***</b> (2.463)	<b>-59.995***</b> (21.556)
Control variables						
Number of residents	<b>-1.809***</b> (0.480)	<b>-0.158***</b> (0.061)	-0.007 (0.016)	0.022 (0.090)	<b>-0.048**</b> (0.019)	<b>-2.058***</b> (0.558)
Mean age of residents	5.008* (3.014)	-0.054 (0.323)	-0.437* (0.228)	-1.591*** (0.426)	-0.188* (0.103)	2.860 (3.328)
Average co-morbidity score of residents	<b>346.429***</b> (29.706)	<b>5.581**</b> (2.181)	-2.668 (4.768)	<b>79.284***</b> (6.814)	<b>2.214**</b> (1.035)	<b>423.851***</b> (36.610)
Average death rate of residents (in %)	<b>1945.422***</b> (116.796)	15.380 (13.032)	<b>11.906***</b> (2.245)	27.926 (18.978)	7.095 (6.710)	<b>2015.957***</b> (127.105)
Semester calendars (reference 2 <sup>nd</sup> half of 2014)						
1st half of 2015	<b>31.916***</b> (10.716)	2.813 (1.742)	<b>3.253***</b> (0.450)	<b>9.864***</b> (1.561)	0.131 (0.114)	<b>48.462***</b> (11.595)
2 <sup>nd</sup> half of 2015	1.601 (12.414)	-2.229 (1.358)	<b>1.427***</b> (0.478)	2.247 (1.897)	-0.186 (0.468)	0.019 (13.519)
1st half of 2016	<b>202.438***</b> (18.859)	<b>4.750**</b> (2.380)	<b>7.515***</b> (1.417)	<b>44.012***</b> (3.332)	<b>-3.390***</b> (1.091)	<b>259.623***</b> (21.076)
2 <sup>nd</sup> half of 2016	<b>114.923***</b> (21.298)	0.163 (2.448)	<b>11.170***</b> (4.171)	<b>33.862***</b> (3.902)	<b>-7.940***</b> (0.986)	<b>160.136***</b> (25.368)
1st half of 2017	<b>225.977***</b> (24.054)	-0.816 (2.448)	<b>9.066***</b> (1.403)	<b>47.174***</b> (4.564)	<b>-8.846***</b> (1.175)	<b>278.341***</b> (26.735)
2 <sup>nd</sup> half of 2017	<b>82.003***</b> (23.097)	<b>-4.920**</b> (2.490)	<b>7.352***</b> (1.281)	<b>40.768***</b> (4.438)	<b>-11.719***</b> (1.178)	<b>117.626***</b> (25.528)
Constant	48.106 (273.508)	28.989 (27.018)	<b>54.534**</b> (25.646)	<b>195.71***</b> (39.474)	15.710 (9.813)	361.955 (304.785)
R-square	0.047	0.001	0.003	0.070	0.040	0.057

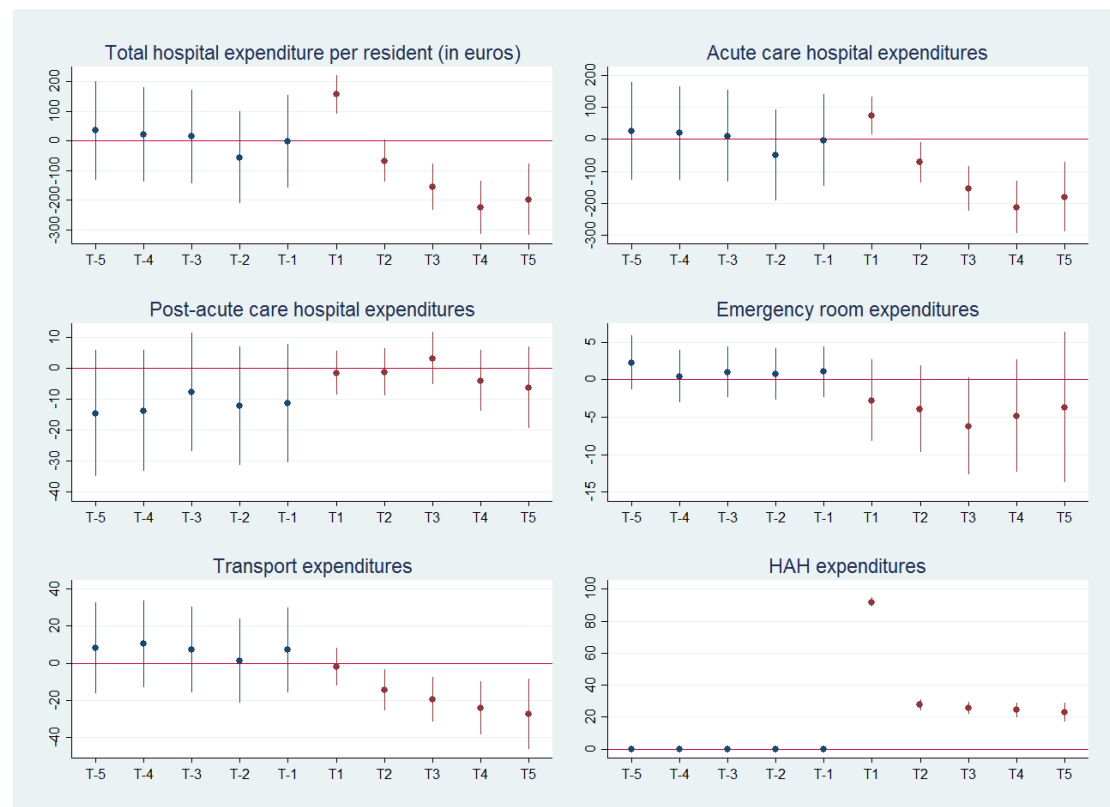
**Note:** In the facilities which used HAH as a first time, the hospital acute care expenditure decreased by 60 euros per residents per semester over the two and a half years following the first utilisation.

**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

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**Figure 6. Results of the impact of the use of HAH in RACF in treated facilities on residents' hospital expenditures per semester**



**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

## 5. Limits and sensitivity analysis

I should note some limitation of this analysis. First, the impact of the treatment may vary according to treatment dates and HAH teams may become more/less efficient over time. Recent literature pointed out that using a fixed-effect regression model to estimate DID may introduce measurement bias with heterogeneous treatment effects (Callaway and Sant'Anna, 2021; de Chaisemartin and D'Haultfoeuille, 2020; Goodman-Bacon, 2021). To test the heterogeneity of treatment effect according to treatment semester, I produced separate analysis for each treatment semester (from 2<sup>nd</sup> semester of 2015 to 2<sup>nd</sup> semester of 2017). The results are consistent despite data censoring, which seems to indicate homogeneity of the effects of HAH according to the semester treatment. I also applied the corrections proposed by Callaway & Sant'Anna (2021) as well as De Chaisemartin & D'Hautfoeuille (2020). The results are mainly coherent with a few differences (table 3, figures 7 and 8 in the appendix). The correction of negative weights with the method of De Chaisemartin and D'Hautfoeuille resulted in increasing the magnitude of impact coefficients while the impacts are

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slightly lower with the method of Callaway & Sant'Anna. However, in both methods' estimation of difference in trends before treatment is significant except for the palliative care outcome with the two methods<sup>44</sup> and total hospital expenditure with De Chaisemartin & D'Hautfoeuille estimation (table 3 in the appendix). The results are therefore robust for the rise in palliative care. The results on hospitalizations (use and expenditure) are less robust because the trends are not perfectly parallel before treatment. However, the reduction after treatment is observed by all estimation methods and the impact increases over time (see figures 7 and 8 in the appendix). In addition, the higher variation observed in semesters before treatment after the application of the negative weight correction methods might be partly explained by the reduction in the number of observations linked to these methods, leaving few observations at the extreme dates (where there are a lot of censored data) and therefore averages can be drawn easily by extreme values.

Second, the difference-in-difference model estimate the impact of HAH used on treated facilities, which questions the external validity of my results. The external validity can be examined by the selection effect linked to my treatment. If the treatment studied is exogenous, the results found can be extrapolated to all the facilities but if there is a selection effect of treated facilities, these results are only valid for this selection of facilities and might change to other facilities. The treated facilities identified seem to have different characteristics: they have higher numbers of hospital and emergency admissions than control facilities without any difference in palliative care utilisation before treatment. This may suggest that lower performers were more likely to adopt HAH or the case-mix of the facilities is different. Nevertheless, the RACF do not decide by themselves to use HAH, the decision is made by the GP sometimes with a prescription from a hospital physician. Therefore, both willingness of GPs to prescribe or accept HAH for their patients and the characteristics of the HAH teams providing can be important determinants of HAH treatment selection. The geographical location may also be linked to the selection of these facilities (if the facilities are located near a HAH team which provide care in RACFs<sup>45</sup>). These explain why HAH mayn't be available to everyone and differences in treated RACFs characteristics but does not necessarily challenge the results in the sense if they could have HAH the impact might be the same as RACF do not decide themselves to provide HAH. However, it cannot be excluded that the impact would be different if GPs or hospitals that could not or did

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<sup>44</sup> Significant at 10% with Callaway & Sant'Anna estimation

<sup>45</sup> Some HAH teams do not provide care in RACFs, while others are more specialized in this type of care.

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not wish to provide HAH were encouraged to provide it (through incentive policies). Indeed, there may be differences in HAH impact between professionals who take over a procedure by themselves and professionals who are pushed to use it, or if they provide the same care in more difficult conditions (in facilities away from them, with less interaction and collaboration, etc.).

### 6. Discussion

Residential facilities care for elderly people with multiple care needs. The lack of adequate medical competencies in RACFs results in hospital transfers, which are costly, and have negative consequences on mental and physical health of the elderly people. To reduce repeated hospitalisations and provide better care for older persons in RACFs, the French government authorized HAH teams to provide certain treatments in RACFs. In this study, I estimate the economic impact of employing HAH in RACFs and show that facilities that use HAH for the first time between 2015 and 2017 have a positive change in quality indicators without increasing the costs of care for the public payer. The results of this analysis suggest that the task distribution between different economic agents providing care for these elderly people may not be the optimum. Supporting RACFs to provide certain types of medical care, especially the end-of-life care, can improve systemwide efficiency.

In 2017, there were on average 40 hospital acute care admissions for 100 persons aged 80 and over in France, while there were 58 admissions for 100 residents in RACFs (ATIH, 2017). Reducing hospital transfers for these vulnerable populations is a care quality and efficiency issue in all OECD countries. This article questions the impact of mobile hospital teams in RACFs on hospital transfers and shows that on average hospital admissions decreased by 2 admissions per semester in the two years and a half following the first HAH intervention. Results are consistent with the literature showing that interventions from multidisciplinary teams in residential aged care facilities can reduce hospital transfer of residents (Lau et al., 2013; Nazir et al., 2013). Multidisciplinary mobile team in RACFs proves to be an interesting tool as it requires collaboration and medical consultation between many care providers from various care sectors. The result obtained on the reduction in the number of emergency visits in treated facilities, seems to indicate that the improvement in care is not only linked to a substitution of care between acute care and HAH but possibly to better follow-up of patients which can reduce emergency visits.

The impact of HAH intervention on outcomes (reduction of hospital transfer and emergency visits) appear to increase over time. This is not the results of an increase

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in the HAH utilization in RACFs over time since the number of HAH admissions remain constant in the four semesters following the first HAH used in the facility. The increase in impact over time could be linked to a cumulative learning effect in RACF or HAH becoming more effective over time within a RACF. The learning effect may come from knowledge sharing between HAH teams and nurses in RACF, on common care issues such as complex dressings for example. This means that the RACF nurses will be able to manage alone some situations which could reduce hospital use without increasing admission to HAH. Therefore, an increase in HAH impact over time in treated facilities could be explained by a combination of the medium-term effect of the first residents treated in the first semester and the short-term effect of the new residents treated in the following semesters.

However, both at home and in institution, the number of HAH admissions seem relatively low compared to the number of hospital transfers. There is less than one HAH admission per 100 people older than 80 in the general population and less than two admissions for 100 residents in RACFs in 2017 (ATIH, 2017). The demand for HAH may be linked to multiple factors not directly related to care needs of older adults living at home or in institution, such as disparities in geographical access to HAH teams and the financial incentives for RACF and other care providers in investing in HAH versus sending patients to hospital. Both increasing accessibility and incentives to provide HAH care are public policy levers that can be used to increase HAH utilisation in RACFs. Few policy incitive has been put in place in the last ten years in France, except the expansion of the list of treatments that can be provided by HAH teams in RACFs and a few increases in HAH prices for HAH teams (without modifying the lower prices in RACF compared to home interventions). Another barrier to the development of HAH teams is the lack of availability and implication of self-employed GPs to provide this care in RACFs in collaboration with the HAH.

The results of this study show that there is a significant increase in palliative care in RACFs linked to HAH. Indeed, palliative care utilisation is doubled in facilities using HAH in the two years and a half after a first HAH utilisation. This result suggests a significant improvement in the quality of end-of-life care for residents of these facilities. However, the inequality in access to HAH questions the equity in end-of-life care quality for all residents in France. This challenges the capacity of incentive policies and supply regulation to reduce the facilities selection effect linked to their GPs and hospital characteristics and ensure equity in access to HAH teams for all French facilities.



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Overall, these results highlight the need to examine the optimal management and funding of end-of-life care in RACFs. As palliative care is exclusively funded in hospital settings in France, HAH teams are the only alternative for providing palliative care by a multidisciplinary team outside hospitals. There are other hospital mobile teams specialised in palliative care in France which intervene in RACFs, but they do not provide care directly to residents; they give advice to the staff in RACF to support their end-of-life practices and for difficult situations. The GPs can also support a palliative approach and prescribe treatments for pain. However, it is generally recognized that there is a lack of palliative care culture among GPs and staff in RACFs in France (Bohic et al., 2019) even though more than half of deaths in RACFs would require palliative support (Ferley et al., 2018; ONFV, 2013). This study shows that more than 90% of residents who died in RACFs did not have palliative care. Specific care needs at the end-of-life are not considered in RACFs funding in France. Some countries, such as Japan, adjust the payments to RACFs for the last days of life of residents to account for the costs of specific care at the end of life (Barber et al., 2021). To reduce hospital transfers, it may be more efficient to integrate end-of-life care needs in RACF funding to help them invest in medical and social resources and upscale competencies to increase end-of-life quality for all facilities and residents, while mobile hospital teams, as HAH, can be used in the most complex care needs.

This study shows the interest of HAH teams to improve care in RACFs and more broadly provides new evidence for reconsidering the skill-mix and funding model of residential aged care facilities in France. Aligning economic incentives and care responsibilities between health and social care providers is essential everywhere for achieving better care models for an aging population in a sustainable way.

### 7. Appendix

**Table 4. Estimated trend difference before treatment between treated and control facilities on residents' hospital use outcomes**

	No of admissions to acute care hospital (per 100 residents)	No of emergency admissions (per 100 residents)	No of emergency room visits (per 100 residents)	No of palliative care stays (per 100 death)
Trend difference between treated and control facilities before treatment (ref: T-6)				
T-5	0.653 (2.134)	0.366 (1.457)	1.318 (1.400)	-2.627 (2.229)
T-4	0.423 (2.048)	0.225 (1.398)	0.576 (1.343)	-2.194 (2.141)
T-3	0.720 (2.019)	0.367 (1.379)	0.459 (1.324)	-1.772 (2.113)
T-2	-0.207 (2.010)	-0.371 (1.373)	0.218 (1.319)	-2.170 (2.104)
T-1	1.064 (2.012)	0.703 (1.374)	0.573 (1.320)	-2.451 (2.105)
Control variables	yes	yes	yes	yes

**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

**Table 5. Estimated trend difference before treatment between treated and control facilities on residents' hospital expenditure outcomes.**

	Health expenditure by setting (Per resident and per semester, in euros)				Total expenditure
	Acute care	Post-acute care	Emergency rooms	Transport	
Trend difference between treated and control facilities before treatment (ref: T-6)					
T-5	7.665 (114.371)	-12.090 (16.250)	2.147 (2.713)	6.465 (17.828)	18.305 (124.392)
T-4	9.570 (109.752)	-14.109 (15.594)	0.484 (2.603)	8.824 (17.108)	8.321 (119.376)
T-3	1.785 (108.212)	-7.867 (15.375)	0.757 (2.567)	7.115 (16.868)	4.931 (117.702)
T-2	-36.969 (107.738)	-12.777 (15.308)	0.702 (2.556)	2.262 (16.795)	-42.646 (117.189)
T-1	14.077 (107.815)	-14.072 (15.319)	1.223 (2.557)	9.892 (16.806)	16.248 (117.271)
Control variables	yes	yes	yes	yes	yes

**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

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**Table 6. Impact estimations with De Chaisemartin & D’Hautefoeuille and Callaway & Sant’Anna corrections.**

		No of admissions to acute care hospital (per 100 residents)	No of emergency admissions (per 100 residents)	No of emergency rooms visits (per 100 residents)	No of palliative care (per 100 death)	Total hospital expenditure (in euros per resident)
De Chaisemartin & D’Hautefoeuille	Estimations (SE)	-2,69*** (0,49)	-1,88*** (0,32)	-1,12*** (0,31)	4,53*** (0,38)	-93,4*** (28,2)
	Control variables	yes	yes	yes	yes	yes
	P-value Pre-trend*	0,014	0,007	0,03	0,578	0,208
Callaway & Sant’Anna	Estimations (SE)	-1,367*** (0,424)	-0,803*** (0,296)	-0,461* (0,261)	4,42*** (0,424)	-31,9 (27,7)
	Control variables	yes	yes	yes	yes	yes
	P-value Pre-trend*	0,001	0,05	0,01	0,08	0,02

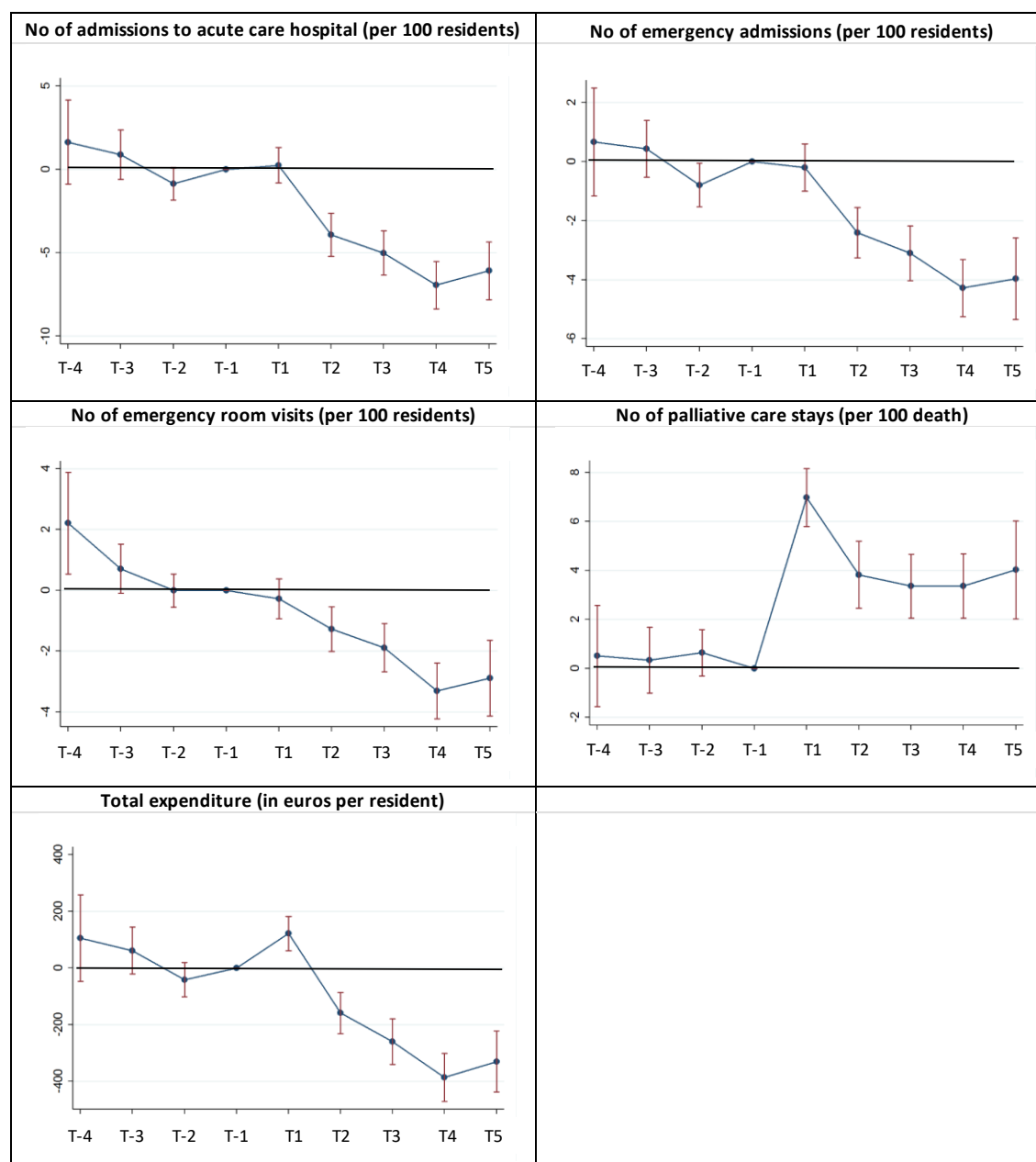
\* Test. H0 All Pre-treatment are equal to 0

**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

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**Figure 7. Impact estimations per semester with De Chaisemartin & D'Hautfoeuille correction**

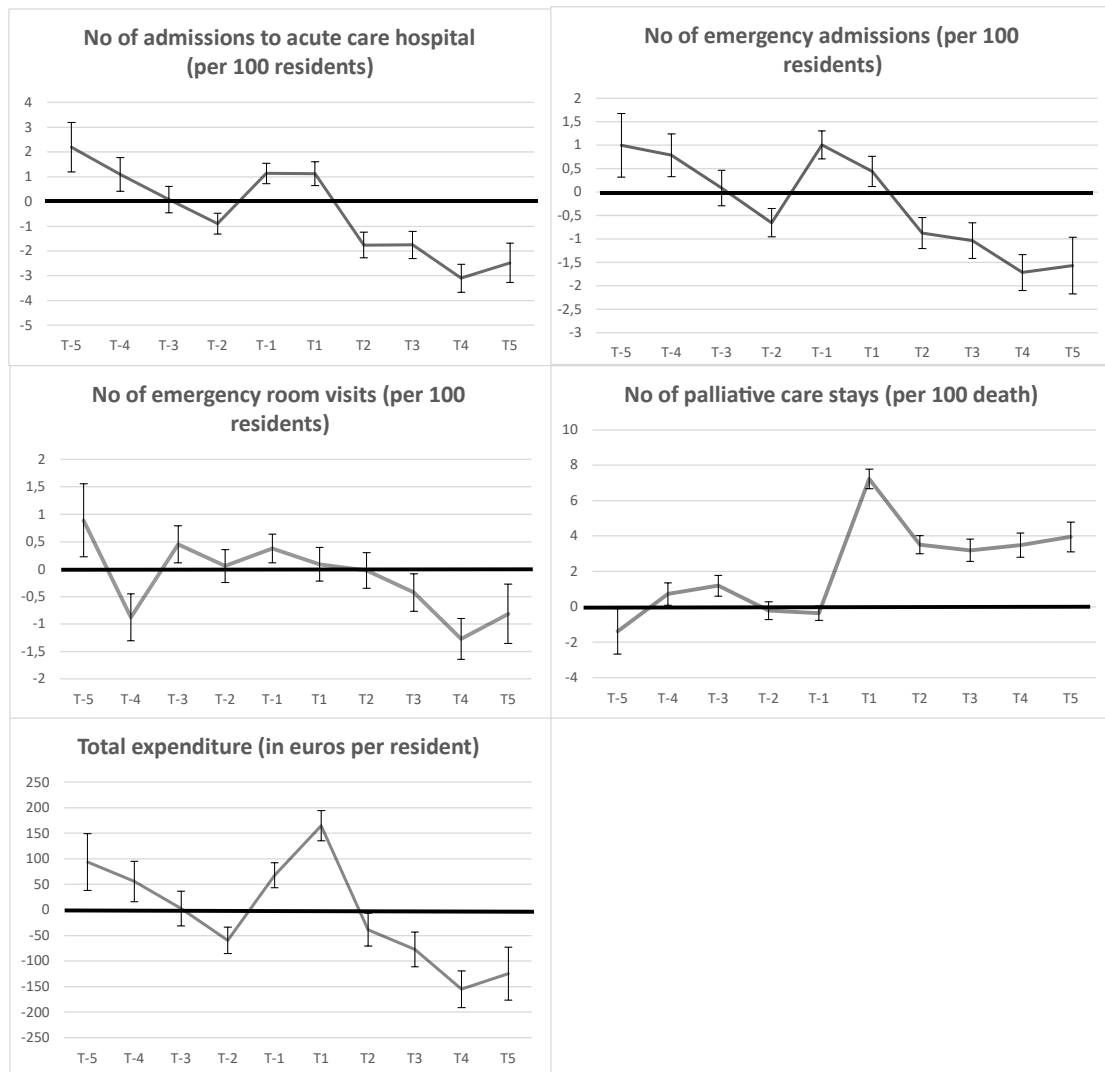


**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

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**Figure 8. Impact estimations per semester with Callaway & Sant'Anna correction**



**Scope:** 7300 French RACFs, 1460 treated and 5840 control RACFs (randomly selected), see part 3.2 for more details.

**Source:** French National health data system (SNDS) claims database (2014 -2017)

### Chapter 3

#### Determinants of accommodation prices in residential aged care facilities

This chapter is based on an article co-authored with Zeynep Or

##### **Abstract.**

**Context.** In France one over ten persons older than 75 years lives in Residential Aged Care facilities (RACF). The costs of medical and social care in RACF are funded by the public health insurance fund and local authorities based on their case-mix using the same tariffs across all public and private facilities, while the cost of accommodation is paid by the resident. Accommodation prices vary significantly in a competitive market where there is no public information on the care quality in RACFs. The objective of this article is to estimate the determinants of accommodation prices in RACFs questioning specifically the link between the price and care quality. **Method.** I use a unique database matching a representative sample of residents in RACF with claims data from the health insurance database from 2014 to 2019. I matched this database with a survey of RACFs providing information on their characteristics, funding, and accommodation prices, and calculated a number of new care quality indicators to compute three indexes of RACF quality (staffing, process, outcomes). I specify a linear regression model to estimate the link between accommodation prices and care quality scores, controlling for the level of public funding received by the facility, observable determinants of accommodation prices (entertainment activity, building quality and input prices) and the level of competition in the market. **Results.** All else being equal, higher staffing and process quality is associated with higher accommodation prices. In contrast, higher care outcomes, measured by the frequency of hospital transfers and emergency admissions of residents are associated with lower prices. Globally, care quality scores explain a small portion of the variation observed in prices which are mainly determined by the prices of production factors (real estate), ownership status (for profit or not), and competition in the local area of the facility. RACFs in more competitive markets have significantly lower prices. **Conclusion.** Results show that the relationship between quality and accommodation price is weak and there is a need to improve transparency in price setting and regulation by local authorities, and better monitoring and publishing care quality indicators.

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### 1. Introduction

Residential aged care facilities (RACF) take care of older adults living with a deteriorating health status who need support with activities of daily living (Muller, 2017). In France, elderly care (medical and social care) in these facilities is funded by public funds while residents need to pay the cost of accommodation by out-of-pocket. In 2019, the average RACF price for accommodation was more than 2,000 euros per month, which is higher than the average French retirement pension of about 1,500 euros per month (Arnaud et al., 2021). The prices vary significantly depending on the facility, ranging from 1400 euros per month to more than 6000 euros per month in the most expensive facilities. Yet very little is known about what these large price variations reflect and how they relate to the quality of care in these facilities.

The amount of public funding or prices paid to facilities for funding medical and social care in these facilities are regulated through national formulas based on residents' health and dependency status, with no distinction between private for-profit or public facilities<sup>46</sup>. The prices of accommodation are not regulated nationally and are either negotiated between facilities and local authorities or set freely by private facilities. The residents with very low-income (about 20% of French RACFs residents) receive financial support from the local authorities to pay the all or part of their accommodation costs depending on their income. Local authorities negotiate with each facility a price for these places and all facilities (for-profit or not) can have both private and "social assistance" places. Three quarters of all French facilities have negotiated social assistance prices for all their places (all public facilities and 77% private not for profit facilities) and this price varies from one facility to other without any clear criteria on its determinants. Private for-profit facilities (and 23% of private not-for-profit facilities) set most of their prices freely but often have some "social" places for which they negotiate a different price with local authorities. Cost items which must be covered by the accommodation price (meals, laundry, entertainment, property, etc.) are defined by a decree (decree n° 2016-1814, Art. R. 314-180). This decree explicitly specifies that the accommodation price "cannot be used to cover costs of care that are funded by the medical and social care funding provided by the SHI and local authorities". Thus, in principle, the accommodation price should not be used to finance nursing and personal care. However, from the facility's perspective, prices paid by residents and public funding complement each other to ensure a target level of care quality. Moreover,

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<sup>46</sup> There are two sources of funding, the largest is from the Social Health Insurance for nursing care and the second is from local authorities for personal care (help with activities of daily living).

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residents and their family chose the facility based on their perceived quality, their accessibility and the accommodation price.

### **Theoretical background**

In a competitive market the price is dependent on the interaction between demand for and supply of goods/services (here residential care) in the market. How buyers/consumers perceive the value of the product, how many buyers there are, and how sensitive they are to changes in price will determine the price. If demand exceeds the supply of services, the facility may increase its price without improving its quality. Indeed, in a context of excess demand, when choice is limited, residents and their families may make their choice based on price and availability of rooms rather than quality. The price set and the associated quality can therefore be impacted by regulatory policies that affect market entry and competition. In France, regulation of the RACF market is decentralized to the local authority level, which can lead to significant differences in market competition and excess demand across local authorities.

In a market where sellers are heterogeneous with respect to the quality of their services and are more informed than buyers, high quality sellers might use prices as a signaling device about the quality of the goods they offer. They may also wish to differentiate themselves and increase their market power and prices by providing an additional quality of care. According to product differentiation theory (Chamberlin, 1933) each firm will seek to recreate a monopoly situation in a competitive environment by distinguishing their goods to increase their market power, prices, and benefits. RACFs provide housing, meals, entertainment, nursing care, and social care for older adults. They could be differentiated by their location, by the quality of their building, food, animation, but also the quality of care. When accommodation prices are set by a public authority, according to the agency theory, the public authority (the principal) will set a price according to the value of service provided and the desired level of quality (Shapiro, 2005). In this agency relationship, the public authorities often face a strong asymmetry of information when setting the price, because they generally do not have all the information needed to assess the quality of the facility, or they may sometimes have incorrect information. Thus, in the health care market, asymmetric information is an important factor determining price and its relationship to quality (Arrow, 1963). If the funding agency or consumers are not able to measure quality, the facility will have no interest in differentiating itself by quality. Instead, facilities will have an interest in improving the dimensions most easily observable by residents and their families, and

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reduce costs in not-easily observed dimensions of quality. To reduce information asymmetry in health and LTC markets, several countries monitor and diffuse publically indicators of care quality (Schmitz and Stroka-Wetsch, 2020; Werner et al., 2012), but in France there is almost no information or indicator of LTC quality in RACFs.

Pricing strategies will also depend on the ownership type of the facility. In for-profit sector, facilities maximize their profits, the price set will be optimized to meet local demand and competitive supply while minimizing production costs to maximize profit. In non-profit sector, facilities are assumed to desire to maximize their size, and minimize their production costs, under the constraint of quality and non-deficit (Scanlon, 1980). In France, the three types of facilities in the market are likely to develop variable pricing strategies. First, for-profit facilities will set their prices in a way to maximize their profit. Among non-profit facilities, public facilities and private-non-profit facilities which negotiate their prices (social prices) can be distinguished from those non-profit facilities which set prices freely. The last group may develop a more reactive price strategy depending on the market competition

### Empirical literature

Most empirical studies focus on the impact of competition on RACF prices and quality with mixed results (Yang et al, 2021). Some studies suggest that competition leads to higher quality (Grabowski (2001, 2004); Bowblis & Applebaum (2017); Fayissa et al., 2020), and others the opposite (Bowblis, 2012; Bowblis & Vassallo, 2014; Zinn, 1994). However, most studies find that greater competition is associated with lower prices (Allan et al., 2021; Ching et al., 2015; Forder and Allan, 2014; Huang and Hirth, 2016). There is also a body of literature from the United States that questions the effect of an increase in Medicaid reimbursement may have on Nursing homes quality (Nyman, 1985; Nyman, 1988; Nyman, 1989; Gertler, 1989; Gertler, 1992; Cohen et spector, 1996; Grabowski,2001; Grabowski, 2004; Grabowski, Angelelli, & Mor, 2004; Grabowski & Angelelli, 2004). Several studies tested empirically Scanlon's Theory of excess demand paradigm where an increase in the Medicaid reimbursement rate (public price) would result in a quality reduction in an excess demand context (Scanlon, 1980)<sup>47</sup>. The results supported this counterintuitive relationship in excess demand context in the 1970s and 1980s, in the US: higher Medicaid reimbursement rates were

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<sup>47</sup> Scanlon's theory expected that policy regulation in the US (bed constraint) placed the market in "excess Medicaid demand". If the number of beds is lower than the total demand, facilities will give priority to private beds which can be charged higher than Medicaid beds (for which reimbursement rate is negotiated). The number of Medicaid beds available for people eligible may be insufficient placing the market in excess Medicaid demand. Because of this excess demand an increase in Medicaid reimbursement may discourage the provision of quality services by raising the opportunity cost of providing quality to private-pay residents.

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associated with lower quality (Nyman, 1985; Gertler, 1989; Gertler, 1992). However, in the 1990s, when there was more competition in the market, these results were no longer significant (Nyman, 1988; Nyman, 1989), a higher reimbursement rate was associated with higher quality (Grabowski, 2001; Grabowski, 2004; Grabowski et al, 2004; Grabowski & Angelelli, 2004, Reichert and stroka, 2018).

In Germany and Switzerland, several studies suggested that there is a positive relationship between prices and quality measured by staffing levels (Herr & Hottenrott, 2016, Heger et al, 2022). In contrast, in the Netherlands, a recent Flemish study estimated the link between accommodation price of RACF and the quality of life of residents and found a small negative association between price and quality of life (Raes et al., 2020). In France, there are only a few studies on the cost efficiency of RACFs and none examines the determinants of accommodation price. One of these rare studies looking into French non-profit facilities showed that the inclusion of quality indicators in the efficiency model has a significant impact on the estimated efficiency score and that private non-profit facilities are more efficient than public facilities (Dormont and Martin, 2012). Another study, focusing on private for-profit facilities, suggested that the lack of competition in the private for-profit sector impacts the efficiency of these facilities, as larger facility chains (creating monopolistic markets) were associated with a lower efficiency score (Martin and Jérôme, 2016). Most of these studies examine the relationship between public funding and care quality and do not consider the accommodation price paid by the resident. Generally, in France and in literature, there is a lack of research on pricing strategies of RACFs. In France, the public notification and publication of accommodation prices are available only since 2016 decree (decree n° 2016-1814, Art. R. 314-180).

in this study, I question the pricing strategies of RACFs in France by examining the determinants of accommodation prices, and more specifically, the link between accommodation price and care quality in RACFs. I expect that facilities will define their prices as function of competition in the market. I also test the hypothesis that facilities may differentiate themselves in the market by offering an additional level of care quality to that can be provided by public funds to gain market power, attract new residents and increase their prices. Given that the level of information asymmetry varies across quality dimensions, I matched for the first time in France several administrative and survey data to measure different dimensions of care quality. Following Donabedian's framework (Donabedian, 1988), I calculated three care quality indexes (staffing/structure, processes, and outcomes) and specified a linear regression model to estimate the link between accommodation prices and quality-of-care indexes

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controlling for the level of public funding received by the facility, observable determinants of accommodation price (entertainment level and building quality), input prices (price per square meter in the RACF municipality) and market competition in the local authority where facility is placed. I also examined the link between the ownership type and quality. Results show that there is little differentiation by quality in the market, most of the variation in accommodation prices are explained by external production factors and ownership status (for-profit or not). The prices are lower in local authorities where market competition is higher. But, the association between accommodation prices and care quality indexes, as well as accommodation quality indicators is weak.

The rest of the chapter is organised as follows. The next section presents the data and methods used to estimate the link between accommodation prices and care quality, section 3 presents the main results, section 4 notes some limitations of this research and present sensitivity analysis carried out. The last section provides a discussion of the results.

## 2. Data and Methods

### 2.1 Data

The analysis is based on individual level data from residential care facilities (Resid-Ehpad administrative database) which is matched with healthcare consumption data from the National Health Data System (SNDS) from 2014 to 2019. This database is matched further with the national facility database (Finess), and the survey of RACFs (“Enquête auprès des établissements d’hébergement pour personnes âgées”, EHPA) from 2015 which provides information on the characteristics of the facilities (building quality, staff ratio, ect.). Quality indicators are calculated over the years 2014 to 2019 for which data are available both in the Resid-Ehpad and the EHPA survey<sup>48</sup>, while accommodation price come from the 2019 National Solidarity Fund for Autonomy (CNSA) database<sup>49</sup>. Analysis focuses on facilities which present over the entire 2014-2019 period and includes 3259 RACFs that care 708,008 residents between 2014 and 2019. I lose nearly 40% of the facilities after matching the Resid-Ehpad data to the EHPA survey, but my sample is representative of the facilities in France. I used a

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<sup>48</sup> These databases are exhaustive, but there are missing facilities that did not respond to the EHPA survey (30%) or that do not have an information system that allows them to record the stays of their residents in Resid-Ehpad (20%).

<sup>49</sup> Between 2016 first year of accommodation price data available in France and 2019 accommodation prices have not changed significantly

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missing value imputation method to deal with missing data in EHPA survey<sup>50</sup>. Prices per square meter by municipality in 2019 and long-term care providers supply in 2015 are extracted from open-source databases.

### 2.2 Estimation strategy

I assume that the accommodation price will be a function of the average care quality of the facility (staffing, process, outcomes), accommodation quality (entertainment level and building quality), input prices, and case-mix of residents, public funding received, ownership type of the facility and market competition in the local area of the facility, estimated by the following linear regression :

$$P_{ij} = \alpha + \beta_1 SQ_{ij} + \beta_2 PQ_{ij} + \beta_3 OQ_{ij} + \beta_4 AQ_{ij} + \beta_5 F_{ij} + \beta_6 IP_{ij} + \beta_7 C_{ij} + \beta_8 O_{ij} + \beta_9 C_{oj} + \varepsilon_{ij}$$

Where,  $P_{ij}$  is the monthly accommodation price for a single room in facility  $i$  and local authority  $j$  measured in euros, with  $i = 1, \dots, 3259$  facilities and  $j = 1, \dots, 95$  local authorities;  $SQ_{ij}, PQ_{ij}, OQ_{ij}$  are care quality indexes (staffing quality index, process quality index, and outcome quality index);  $AQ_{ij}$  denotes the vector of observable indicators of accommodation quality in the facility (entertainment, building quality).  $F_{ij}$  is the Public funding received by the facility to provide nursing and social care.  $IP_{ij}$  is the input price measured by price per square meters in the municipality of the facility.  $C_{ij}$  is the size and casemix of the facility and  $C_{oj}$  is competition in the local authority  $j$  where facility is located of the facility measured by the number of RACF in the area and the share of for-profit facilities in total supply.  $O_i$  is the ownership type of the facility (for-profit, not-for profit with private price, and public price facilities). I estimated separate equations across ownership type of the facility as I expect different pricing functions.

#### Explanatory variables

The major variable of interest is care quality in RACF that I measured across three dimensions following Donabedian, (1988): human resource structure (staffing), process, and outcome. For each of these dimensions, I calculated a pool of indicators and used a factorial analysis (multiple correspondence analysis (MCA)<sup>51</sup>) to compute

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<sup>50</sup> From EHPA survey, I only use data with more than 75% of values completed. The imputation method used is the hotdeck method, which consists of randomly imputing a missing value per class of facilities. The groups of facilities are defined by a typology that defines seven groups of facilities using three variables for which there are no missing values and characterize the type of facility: the ownership category; the facility size and the level of urbanization of the municipality where the facility is located.

<sup>51</sup> The continuous variables are introduced into the MCA by quartile.

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an index. The quality indexes are the first factorial axis of the MCAs and range from approximately -1 to +1 with a mean of 0. The indexes were then normalized to range from 0 for the facility with the lowest quality to 1 for the highest quality using the "min-max normalization" method<sup>52</sup>.

To calculate the staffing quality index, I used five indicators relating to the human resources available in the facility to carry out care. Three concern caregivers and nurses ratio per 100 residents (during the day, at night, and during the weekend). The staffing ratio is one of the most frequently used indicators of quality of care in RACF in the literature (Tran et al, 2019). Availability of care on weekends and at night is also an important quality indicator (Bostick et al., 2006; Fourcade, 2011). Two other indicators measure recruitment difficulties and attractiveness of employment in the facility: reported recruitment difficulties and annual turnover of caregivers and nursing staff (in %). Recruitment difficulties may constrain facilities to work with under-resourced or to employ under-qualified staff. Turnover is identified in the literature as being linked to poorer quality of care (Gandhi et al., 2021; Martin and Ramos-Gorand, 2017).

The process quality index is based on three indicators which track the level collaboration between the facility and primary care and hospital providers. Two measures for supporting care coordinating in RACFs were developed during the period studied (teleconsultation and intervention by mobile hospital teams). The first indicator measures the use of telemedicine in the facility by having used at least once telemedicine for residents between 2017, first year of telemedicine funding of French RACFs, and 2019. The second to use hospitalization at home (average number of cases per year between 2014 and 2019) which can reduce hospital transfers by allowing hospital care to be performed in the facility by a hospital at home team. The third indicator is the use of other mobile teams which do not provide care to the residents but give advice and support the facility staff for the geriatric, psychiatric or palliative care. I expect that these interventions improve the care process for the residents by strengthening the collaboration between the nursing staff in the facility and hospital and community care teams.

In France, there are no data on the clinical health status of residents (bedsores, deterioration in the level of dependence, etc.) or on quality of life in residential facility. However, I have data on care consumption and hospitalizations of residents. Repeated hospitalizations and emergency room visits by frail elderly people in RACFs can

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<sup>52</sup>  $(x - \min(x)) / (\max(x) - \min(x))$

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worsen their mental and physical health and must therefore be avoided as much as possible (Aminzadeh and Dalziel, 2002; Gombault Datzenko, 2020). I calculated four indicators: the average number of acute care admissions per 100 residents per year, the average 30-day rehospitalization rate (per 100 resident hospitalizations per year)<sup>53</sup>, the average number of potentially avoidable acute care hospitalizations<sup>54</sup> (per 100 residents per year), and the average number of emergency admissions to acute care hospital (per 100 residents per year). The literature suggests that better discharge management, better communication between care providers in hospital and in facility, and post-hospital follow-up can reduce avoidable and emergencies admissions and rehospitalizations (Nolte and Pitchforth, 2014; Shepperd et al., 2013).

### Control variables

I control for several variables that could explain the differences in accommodation prices across facilities: local input prices, quality of the building and accommodation, other observable facility characteristics and market competition. Local variations in input prices are measured by using the price per square meter in the municipality of the facility<sup>55</sup>. I measure the quality of building based on the time of the last renovations or construction of the building, number of square meters per resident, having a garden, the ratio of rooms with wheelchair accessible showers, the ratio of rooms that can accommodate a medical bed, and the ratio of rooms with air-conditioned. In addition, I control for the ratio of animation/social staff per 100 residents as a proxy of observable entertainment quality.

Facilities could adjust their accommodation price to the health status profile of their residents and their care needs. Therefore, I controlled for the case-mix of the facility (average dependency and diagnostic scores of residents). The size of the facility (average number of residents per year) could also have an impact on the price through economies of returns to scale. Finally, I assume that facilities can adjust their prices depending on public funding perceived for medical and social care and by ownership status (for profit or not). I approach the competition in the local area of the

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<sup>53</sup> The 30-day rehospitalization rate is the number of acute care rehospitalizations within 30 days of a resident's first admission.

<sup>54</sup> Potentially avoidable hospitalizations correspond to hospitalization profiles that could potentially have been avoided by good outpatient management or care in RACFs. They define three types of pathologies: pathologies for which vaccination would allow the disease to be avoided; acute pathologies for which ambulatory medicine has the therapeutic means to avoid an aggravation; chronic pathologies whose acute manifestations could be avoided by better ambulatory management. The selection of hospitalizations comes from two main sources (AHRQ, 2001; Weeks et al.2016).

<sup>55</sup> I tested other input prices as the wages of women employees in the employment area but this is too correlated to the price per square meter in the municipality and leads to multicollinearity in the model.



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facility by the number of RACF beds within one hour drive per 100 prospective residents<sup>56</sup> and the share of for-profit facilities in the local area.

### 3. Results

#### 3.1 Descriptive statistics

##### Description of the RACF sample

Table 1 describes facilities characteristics according to their ownership type (public and private non-profit facilities which negotiated prices with local authorities (called facilities with public prices for simplicity), non-profits facilities with private prices, and for-profit facilities. On average, 30% of places in private non-profit and 7% of places in for-profit facilities have also publicly negotiated prices. Accommodation price is on average 1900 euros per month in facilities with all beds with public prices, 2100 euros in not-for profit facilities with mostly private prices, and 2800 euros in private for-profit facilities. Price variation (standard deviation) is lower in facilities with social assistant prices than those with private price (Table 1).

The residents in for-profit facilities have slightly higher dependency and diagnostics score than in other facilities. The level of public funding is on average 1600 euros per month per resident and varies relatively little depending on the type of facility, even if it is slightly higher in facilities with public prices<sup>57</sup>. Private facilities, for profit or not, with private prices have newer or more recently renovated building and more often have gardens and air-conditioned rooms. While the average living space per resident is slightly smaller in for-profit facilities, wheelchair accessibility in showers is higher (85% of the rooms in for-profit facilities compared to 76% in public prices facilities). In contrast, the proportion of rooms with a medical bed is higher in facilities with public prices. Non-profit facilities are located, on average, in municipalities where the real estate prices are the lowest.

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<sup>56</sup> The number of prospective residents is estimated by the Ministry of Health using the age-specific facility utilization rate at the national level. This is applied to the population structure of each municipality (Carrère et al. 2021).

<sup>57</sup> This difference can be explained by the fact that more public facilities have a pharmacy for internal use financed by SHI, which is less often the case in private facility.

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**Table 1. Facilities characteristics according to their categories of ownership**

Mean (std)	Public prices N=2448	Not-for-profit with private price N=329	For-profit N=482	All facilities N=3159
Accommodation price paid by the resident (in euros/month)	1924 (244,1)	2126 (355,2)	2768 (539,4)	2069 (434,4)
Share of beds with public prices	100% (0%)	30,20% (3,30%)	7,20% (13,90%)	79,20% (38,30%)
Average number of residents in the facility/year*	85,6 (47,1)	77,7 (34,3)	69,43 (25,2)	82,4 (43,7)
Average dependency score**	705 (83,7)	682,9 (90,8)	733,5 (60,6)	707 (82,4)
Average diagnostic score**	215,7 (94,5)	201 (62,3)	221,2 (69,4)	215,1 (88,5)
Public funding (in euros/month per resident)	1656 (783,7)	1616 (2414,8)	1569 (1776,9)	1639 (1231)
Real estate price per square meter in the local area (in euros)	1942 (1167)	2369 (1566)	2993 (1582)	2141 (1337)
No. of residential care beds within one hour drive/100 prospective residents**	111,9 (18)	108,6 (16,9)	97,5 (16,9)	109,5 (18,5)
Share of private for-profit facilities in the territory (in %)	18% (16%)	24% (18%)	39% (18%)	22% (18%)
Indicators of accommodation quality				
Rate of animation and social staff (FTE per 100 residents)	1,2 (0,01)	1,2 (0,009)	1,2 (0,09)	1,2 (0,01)
Age of the building or last renovation (in years)	18,9 (28,3)	15,4 (20,4)	16,5 (22,2)	18,2 (26,8)
Square meters of living space per resident	57,4 (22,9)	60,6 (23,2)	54,6 (28,1)	57,3 (23,9)
Share of facilities with a garden	86,80% (34%)	91,50% (30%)	94,00% (24%)	88,40% (32%)
Ratio of rooms with air-condition	3,70% (18%)	3,50% (17%)	16,00% (34%)	5,50% (21%)
Ratio of rooms with wheelchair accessible showers	76,10% (38%)	82,70% (34%)	85,40% (33%)	78,20% (37%)
Ratio of rooms that accommodate a medical bed	72,10% (42%)	63,90% (47%)	58,90% (47%)	69,30% (44%)

\*Averages are calculated over 2014 and 2019

\*\*Averages are calculated in 2015

\*\*\* The number of prospective residents is estimated by the Ministry of Health using the age-specific facility utilization rate at the national level. This is applied to the population structure of each municipality (Carrère et al. 2021).

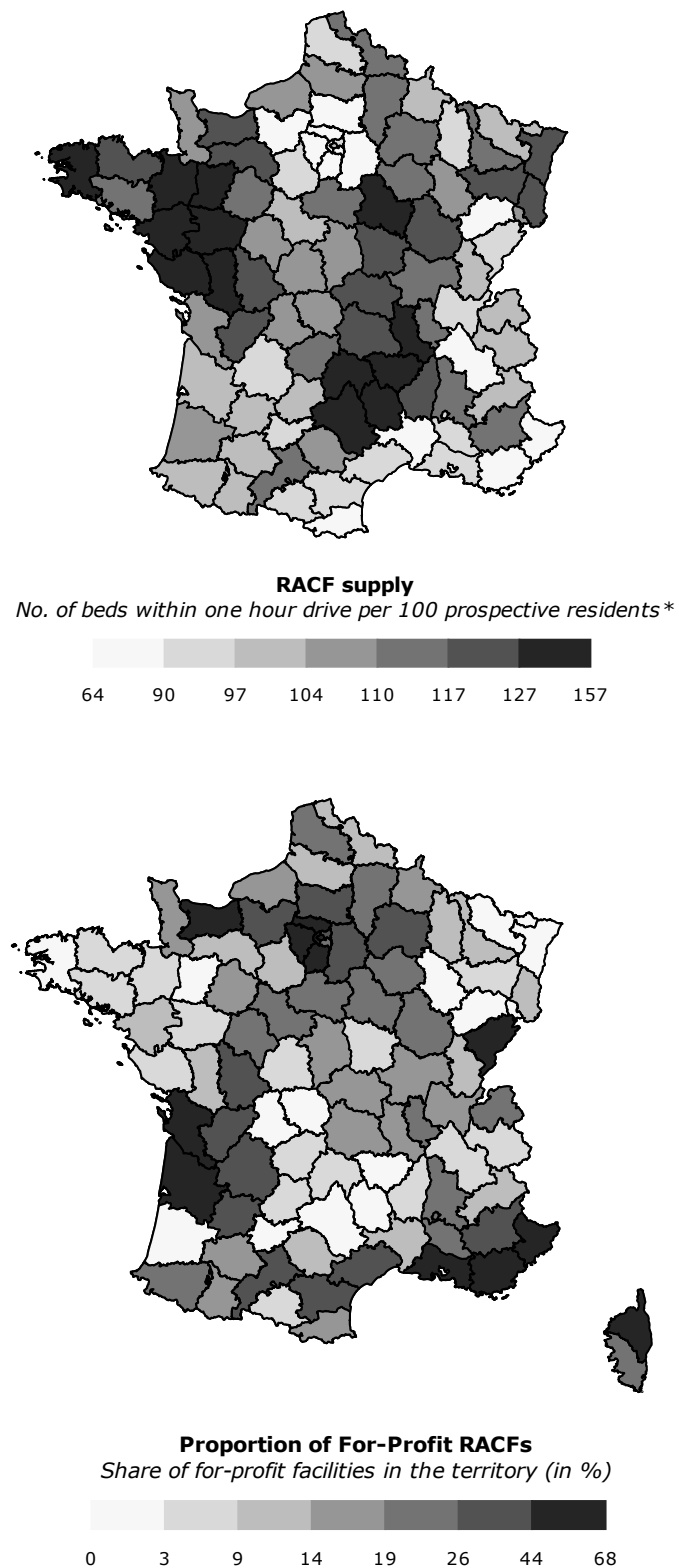
**Scope:** 3259 French residential aged care facilities.

**Source:** based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.

Figure 1 shows the variations in the level supply and hence competition across local authorities. Some territories such as the Paris region and the southeast of France have a low supply of residential care with a high concentration of for-profit facilities. At the opposite, Western France (Brittany) is composed of local authorities with a high RACF supply and very low concentration of private for-profit facilities in the territory).

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Figure 1. Maps of RACFs competition across local authorities



\* The number of prospective residents is estimated by the Ministry of Health using the age-specific facility utilization rate at the national level. This is applied to the population structure of each municipality (Carrère et al. 2021).

**Scope:** 94 French local authorities (excluded Corsica)

**Source:** open-source databases from the French research department of the ministry of health (Drees)

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### Care quality indexes

Table 2 presents the variables used for calculating care quality indexes and their variation across facilities. Annex, Figures 2, 3, and 4 in Appendix present the results of the MCA for each index, describing the contribution of each variable to the index and the change in the index value by variable introduced.

On average, there are 50 FTEs of caregivers and nurses per 100 residents, with a slightly higher average staff ratio in facilities with public prices than in private for-profit facilities (51 FTEs versus 47 FTEs per 100 residents). In contrast, the staff ratio at night and on weekends is slightly higher in private for-profit facilities. The average turnover rate is 11% and 44% of the facilities report difficulties in recruiting. Turnover and hiring difficulties are slightly higher in private facilities. Figure 2 in annex presents the contribution of each of these variables to the measured staffing quality index. The three staff ratio variables contribute 90% to the index while the hiring difficulties and job attractiveness variables contribute 10% to the measured index. The variation in the value of the quality index according to the variables used shows that the index allows to discriminate as expected the facilities with higher staff ratio and lower turnover and recruitment difficulties.

On average, there are 1.6 hospital-at-home stays per year for 100 residents in RACFs (care provided by a hospital mobile team), with a slightly higher average number in private facilities (2.3 admissions in for-profit facilities versus 1.5 in facilities with public prices). Telemedicine is practiced in 20% of RACFs on average, and lucrative facilities have a higher use of this tool (27% of lucrative RACFs used it). On average, 66% of facilities received advice from other mobile teams. The variables contributing the most to the process quality index are the number of hospital-at-home stays (42%), the use of a mobile team advice (31%) and the use of telemedicine in the facility (26%) (Annex figure 3).

On average, between 2014 and 2019, there were 52 acute care admissions per year per 100 residents, two-thirds of which are entered through the emergency department (ED) and more than one-tenth of which are identified as potentially preventable hospitalizations (table 2). The number of acute care admissions, potentially preventable hospitalizations, and 30-day readmissions are slightly higher in for-profit facilities than in non-profit facilities.

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**Table 2. Indicators used to measure care quality**

Mean (std)	Public prices N=2448	Not-for-profit with private price N=329	For-profit N=482	All facilities N=3159
<b>Staffing quality index</b>	0,43 (0,23)	0,35 (0,20)	0,42 (0,21)	0,43 (0,22)
Caregivers and nurses staff ratio (per 100 residents)				
During the day	50,9 (12,2)	46,9 (11,7)	46,5 (11,9)	49,8 (12,3)
At night	2,3 (1,6)	2,2 (1,3)	2,8 (1,6)	2,4 (1,6)
During the weekend	12,9 (5,9)	11,6 (4,5)	13,8 (5,0)	12,9 (5,6)
Annual turnover rate of caregivers and nursing staff	10,5% (5,6%)	12,3% (5,8%)	14,2% (5,3%)	11,2% (5,7%)
Percentage of facilities reporting recruitment difficulties	43,3% (49%)	49,2% (50%)	48,5% (50%)	44,7% (49%)
<b>Process quality index</b>	0,53 (0,25)	0,57 (0,24)	0,60 (0,24)	0,54 (0,24)
Interventions by Mobile hospital team care (number of hospitals at home stays per 100 residents)	1,5 (1,9)	1,8 (2,3)	2,3 (2,4)	1,6 (2,0)
Mobile hospital team advice for palliative, psychiatric or geriatric pattern (in % of facilities reporting support)	66,1% (47,2%)	67,7% (46%)	64,2% (48%)	66,0% (47%)
Using telemedicine (in % of facilities using it between 2017 and 2019)	19,1% (39,6%)	19,7% (40%)	27,0% (44%)	20,3% (40%)
<b>Outcome quality index</b>	0,52 (0,32)	0,47 (0,32)	0,46 (0,31)	0,50 (0,32)
No. of admissions to acute care hospital (per 100 residents per year)	51,0 (16,8)	54,6 (17,6)	53,9 (15,3)	51,8 (16,7)
No. of readmissions to acute care hospital (per 100 hospitalisation)	5,5 (3,0)	5,9 (3,2)	5,9 (2,9)	5,6 (3,0)
No. of potentially preventable hospitalisations (per 100 residents per year)	7,5 (3,6)	7,8 (3,6)	7,9 (3,4)	7,5 (3,6)
No. of emergency admissions to acute care hospital (per 100 resident per year)	31,0 (13,3)	33,0 (12,7)	33,4 (12,0)	31,6 (13,1)

Footnote: Indexes varies between 0 and 1 with 0 being the facility with the lowest quality and 1 being the facility with the highest quality

Scope: 3259 French residential aged care facilities.

Source: based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.

### 3.2 Determinants of the accommodation prices

Table 3 presents the results from the linear regression models estimating the link between the accommodation price and the care quality indexes controlling for input prices, observable accommodation quality, and the observable characteristics of the facilities which may impact accommodation prices. The last column of the table presents the results for the whole sample while the other columns present the results by ownership type of the facility.

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**Table 3. Determinants of accommodation Prices: Linear regression estimations**

	Accommodation price			
	Public prices	Not-for-profit with private price	For-profit	All Facilities
Staffing quality index	69.9*** (20.8)	103.4 (77.1)	206.5** (83.0)	102.2*** (22.7)
Process quality index	58.3*** (18.1)	99.2 (67.2)	139.7* (73.7)	84.9*** (19.5)
Outcome quality index	-31.9** (14.0)	-131.3*** (46.4)	15.2 (59.1)	-42.4*** (14.9)
Animation and social staff ratio (ref: < 0,4 FTE)				
Between 0.4 and 1.2 FET	0.1 (11.9)	83.8** (41.9)	55.7 (52.5)	21.7 (13.0)
Between 1.2 and 1.7 FET	6.8 (12.8)	109.1** (43.3)	-20.4 (50.8)	20.1 (13.4)
> 1,7 FET	10.9 (11.9)	46.3 (45.2)	-22.7 (49.7)	16.5 (13.4)
Having all rooms with wheelchair accessible showers	37.1*** (10.2)	87.2** (39.1)	121.8*** (41.5)	48.8*** (10.9)
Having all rooms that can accommodate a medical bed	-6.6 (9.9)	-0.6 (34.4)	16.5 (37.1)	-1.7 (10.7)
Age of the building or last renovation (Ref: <5 years)				
Between 5 and 10 years	0.3 (13.2)	105.7** (47.7)	76.8 (50.4)	23.6* (14.1)
Between 10 and 20 years	-40.9*** (11.2)	18.9 (40.7)	91.8* (46.9)	-4.2 (12.9)
>20 years	-24.8** (11.7)	13.4 (43.4)	-26.3 (47.7)	-17.2 (12.5)
M <sup>2</sup> of living space per resident (Ref: <45 M <sup>2</sup> )				
Between 45 M <sup>2</sup> and 54 M <sup>2</sup>	10.1 (12.7)	-13.6 (53.1)	-15.8 (43.6)	3.7 (13.9)
Between 54 M <sup>2</sup> and 64 M <sup>2</sup>	23.7* (12.7)	32.6 (56.2)	85.4* (50.1)	32.9** (13.9)
> 64 M <sup>2</sup>	41.5*** (12.8)	30.3 (54.7)	125.9** (51.9)	53.5*** (14.2)
Facilities with a garden	14.3 (10.8)	75.2 (48.2)	73.2 (64.3)	9.7 (11.3)
All rooms with air-conditioned	28.7 (28.1)	-12.0 (82.9)	75.3 (61.5)	53.9 (34.4)
Number of residents in the facility	-0.3** (0.1)	-0.6* (0.4)	2.2*** (0.8)	-0.2* (0.1)
Average dependency score of residents	115.9*** (29.4)	293.6*** (95.6)	-553.3*** (204.6)	100.1*** (32.9)
Average pathology score of residents	4.4 (11.4)	44.7 (27.9)	63.3 (40.9)	15.5 (11.7)
Public funding (in euros per month per resident)	0.012 (0.011)	-0.001 (0.002)	-0.01*** (0.004)	-0.001 (0.002)
Real estate price per M <sup>2</sup> in the facility municipality (in euros)	0.079*** (0.006)	0.087*** (0.022)	0.238*** (0.022)	0.116*** (0.009)
No. of beds within one hour drive per 100 prospective residents	-1.72*** (0.28)	0.37 (0.97)	-2.68** (1.35)	-1.52*** (0.30)
Share of for-profit facilities in the territory (in %)	1.1*** (0.360)	4.1*** (1.165)	-4.6*** (1.399)	0.4 (0.406)
Ownership type (ref: public price facilities)				
not-for profits facilities with private price				135.4*** (16.8)
for-profit facilities				671.3*** (20.6)
Constance	1076*** (207.1)	-588.9 (660.5)	5249*** (1357.0)	996.9*** (228.7)
N	2448	329	482	3259
R-square	0.277	0.381	0.531	0.631

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Scope: 3259 French residential aged care facilities.

Source: based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.

All else being equal, higher staffing and process quality are associated with higher accommodation prices. By contrast, higher outcome quality index is associated with lower accommodation prices. In facilities with the highest staffing quality index (equal to 1), the accommodation price is 102 euros/ month higher than in facilities with the lowest staffing quality index (equal to 0). Similarly, the difference in accommodation price between the facilities with the lowest and the highest index value is 85 euros/month for the process quality and 42 euros per month lower for the outcome quality index.

Against my expectations prices are not significantly linked to observable quality of entertainment since there was no significant relationship between the animation and social staff ratio and accommodation price. On the other hand, prices are significantly and positively related to the characteristics of the building, particularly living space per resident, and wheelchair accessibility of showers. The size and the case-mix of the facility and input prices are significant determinants of the accommodation price: a larger number of residents is associated with lower accommodation prices, while the average dependency score is positively related to the accommodation price. All else being equal, 1000 euros more per square meter in the municipality of the facility is associated with an increase in average in price of 116 euros per month. As expected, a higher competition (number of RACFs in the residence area) is associated with lower accommodation prices, but there is no significant link with the share of for-profit RACFs in the area on average because there is an inverse relationship according ownership type of the facility. Indeed, local authorities where the share of private for-profit facilities is high the prices of private for-profit RACFs are lower. In contrast, a higher proportion of private for-profit facilities in the market is associated with higher prices in public and non-profit facilities.

There is no significant relationship between the accommodation price and the public funding received by the facility for medical and social care. As expected, the ownership status of the facility is strongly associated with the accommodation price. All other things being equal, accommodation prices are 135 euros higher per month in private non-profit facilities and 671 euros/month higher in for-profit facilities than in public and non-profit facilities with public prices.

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Overall, variables introduced in the model explain 63% of the variation in accommodation prices in France. A relatively small part of variation (3%) is linked to care quality indexes and accommodation quality (see partial correlation table 1 in appendix). The two most important determinants of accommodation prices are building prices per square meter in the municipality of the facility and the ownership type (respectively 20% and 38% of accommodation price variation).

### 4. Limits and sensitivity analysis

Despite my efforts to calculate a wide range of indicators that capture different dimensions of quality in RACFs, there are still important dimensions of quality that are not captured in the analysis, such as the health status and quality of life (bedsores, loss of autonomy, etc.), the quality of food, or the experience and satisfaction of residents and their families. Unfortunately, these data are not available yet in France. Moreover, the quality-of-care indexes might be correlated with each other, which could introduce multi-collinearity into the model. Therefore, I tested the level of correlations between these indexes which is quite low, less than 23%, and should not imply a risk of multi-collinearity in the model.

It is possible that the relationship between the quality of care and the price of accommodation is subject to circular causality. In this paper, the objective is not to disentangle the direction of causality between price and quality but to measure the determinants of accommodation prices. Nevertheless, the link estimated between accommodation price and care quality indexes could be biased if there are unobserved factors of the accommodation price correlated with quality of care not accounted for in the model. Other factors financed by the price of accommodation, such as the quality of meals or laundry, may have an impact on the quality. I tested several variables to control different aspects of quality in RACF: the ratio of service agents, outsourcing the preparation of meals and the laundry. The introduction of these variables had no impact on the results observed and not significantly varied with prices

I also tested the robustness of my results using an instrumental method on the outcome quality index which, I expect, would be sensitive to a correlation between price and unobserved accommodation factors. The instrument used is a proxy for GP expertise or quality for care in RACFs, which is, in any case, not linked with accommodation price of the facility. GPs are self-employed and funded by the SHI fund, they are free to work (or not) in RACFs and the residents are free to choose their GPs. The level of competence of these GPs to work with complex elderly patients within a RACF can be highly variable as a function of the number of patients they have



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in a RACF. I measured the annual average number of residents followed by the same general practitioners (GPs) who intervene in the facility<sup>58</sup> and calculated an indicator of the volume of patients in RACF for each GP. I assume that a higher number of patients followed in RACF would increase the ability of GPs to improve care organisation and reduce hospital admission of residents. The impact of the volume of care on quality has been widely demonstrated both in primary care and hospital settings (Gandjour et al., 2003). GPs who intervene in RACFs have on average 23 patients across 7 different RACFs per year (table 4). The number of RACFs patients per GP varies from 4 patients per year to 76 patients per year. First stage results are presented in table 5. All else being equal, a higher number of 100 RACFs patients per year per GP involved in the facility is associated with a higher outcome quality index of 0.2. The results in Table 6 show that after instrumentation the results for staffing index remained unchanged but the link between the outcome and process quality indexes are no longer significantly related to changes in accommodation prices (table 6).

**Table 4. Average number of RACFs patients per GP**

	N	Mean	std	Min	Q1	Median	Q3	Max
Average number of RACFs patients per GP which intervene in the facility (per year)	3259	23,2	10,2	4,3	16,1	21,6	28,4	76,3

Scope: 3259 French residential aged care facilities.

Source: based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.

**Table 5. First stage analysis results**

	Outcome care quality index			
	Public prices	Not-for-profit with private price	For-profit	All facilities
Average number of RACFs patients per GP which intervene in the facility (per year)	0.002*** (0.001)	0.004* (0.002)	0.003* (0.001)	0.002*** (0.001)
N	2448	329	482	3259
F-test (Cragg-donald wald F statistic)	13.86	4.22	3.80	22.50
Control variables (other care quality indexes, Indicators of accommodation quality, and facility characteristics)	yes	yes	yes	yes
Control for ownership type	No	No	No	yes

Scope: 3259 French residential aged care facilities.

<sup>58</sup> First, I calculated the average number of RACFs patients per GP per year between 2014 and 2019 (from all RACFs in the Resid-Ehpad database<sup>58</sup>). Then we identified, for each facility included in this study, GPs that realized at least one consultation in the facility between 2014 and 2019 and calculated the average number of RACFs patients of these GPs per facility (this average is weighted by the number of different patients by GP in the facility during the study period).

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Source: based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.

**Table 6. Results with instrumental variable**

	Accommodation price							
	Public prices		Not-for-profit with private price		For-profit		All facilities	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Staffing quality index	69.9*** (20.8)	106.3*** (33.8)	103.4 (77.1)	16.3 (113.1)	206.5** (83.0)	230.3** (94.2)	102.2*** (22.7)	158.7*** (44.4)
Process quality index	58.3*** (18.1)	-14.0 (60.3)	99.2 (67.2)	180.9 (102.1)	139.7* (73.7)	137.2* (73.8)	84.9*** (19.5)	-0.255 (58.7)
Outcome quality index	-31.9** (14.0)	-287.7 (202.9)	-131.3*** (46.4)	322.9 (424.2)	15.2 (59.1)	-240.8 (679.1)	-42.4*** (14.9)	-304.1 (225.7)
N	2448	2448	329	329	482	482	3259	3259
R-square	0.277	0.276	0.381	0.370	0.531	0.532	0.631	0.631
Control for indicators of accommodation quality and facility characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control for ownership type	No	No	No	No	No	No	Yes	Yes

Scope: 3259 French residential aged care facilities.

Source: based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.

## 5. Discussion

This study provides new empirical evidence on the determinants of the variations in accommodation prices in French RACFs. I tested in particular the hypothesis that facilities would like to differentiate themselves in the market by offering additional care quality to that would be provided by public funding to gain market power, attract new residents, and increase their prices. However, this differentiation strategy appears to be little used in France since the links between accommodation prices and care quality indexes are weak. Prices variations are mainly determined by the prices of production factors (real estate), ownership status (for profit or not) and the market competition.

The results of this study show that there are significant disparities in LTC market characteristics across local authorities in France which also determine accommodation prices. There is very little information on the differences in LTC policies across local authorities as well as the impact of decentralisation on LTC market characteristics, prices, and quality in France. The significant disparities in supply accessibility and for-profit share observed between local authorities and regions suggest that different

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regulation practices have a significant impact on market competition and excess demand across local areas. The results confirm that, all else being equal, facilities in more competitive markets have lower prices. Moreover, local authorities where the share of private for-profit facilities is high the prices of RACFs are lower. These results are coherent with the literature suggesting that competition contributes to reduce prices (Huang & Hirth, 2016 ; Ching et al., 2015; Forder and Allan 2014; Allan et al., 2021). Nevertheless, I also found that, controlling for the level of competition in the market, a higher proportion of private for-profit facilities in the market is associated with higher prices in public and non-profit facilities. This suggests that non-profit providers adapt to the local market by increasing their accommodation prices.

Despite a generally weak association between quality and price, the results suggest that the link between price and quality varies by the quality dimension considered. As suggested by the theoretical literature, the aspects of the quality more easily observable by the residents and their families are significantly linked to prices. I find a positive and significant relationship between staffing levels in the facility and accommodation price as well as between the accommodation price and observable dimensions of accommodation targeted by the funding: living space and wheelchair accessibility in the showers. However, the share of variance explained by the building quality and entertainment indicators remains small (2%). Quality differentiation may be related to other dimensions of accommodation which are more easily observable by consumers and not considered in the model, such as decoration or food quality. In contrast, concerning quality measured by care outcomes I find that higher accommodation prices are associated with lower care outcomes. The quality of care in RACF is difficult to evaluate for the residents and their families but also for the public payers in France since there is no regular monitoring of care outcomes in RACFs. . While this link is weak, and become insignificant with IV estimation, still suggests that public payers do not consider care outcomes while negotiating accommodation prices with facilities. The inverse relationship between quality outcomes and accommodation price has already been observed in a Flemish study, which finds a higher quality of life in facilities with lower prices (Raes et al., 2020). In any case, all else being equal, increasing the level of public information on different dimensions of quality in RACFs would contribute to reduce the asymmetry of information and might improve the overall quality.

Finally, the results suggest that controlling for building prices, market characteristics and other characteristics of the facilities, the private-for-profit facilities have higher prices, of about 670 euros on average per month. Nevertheless, care

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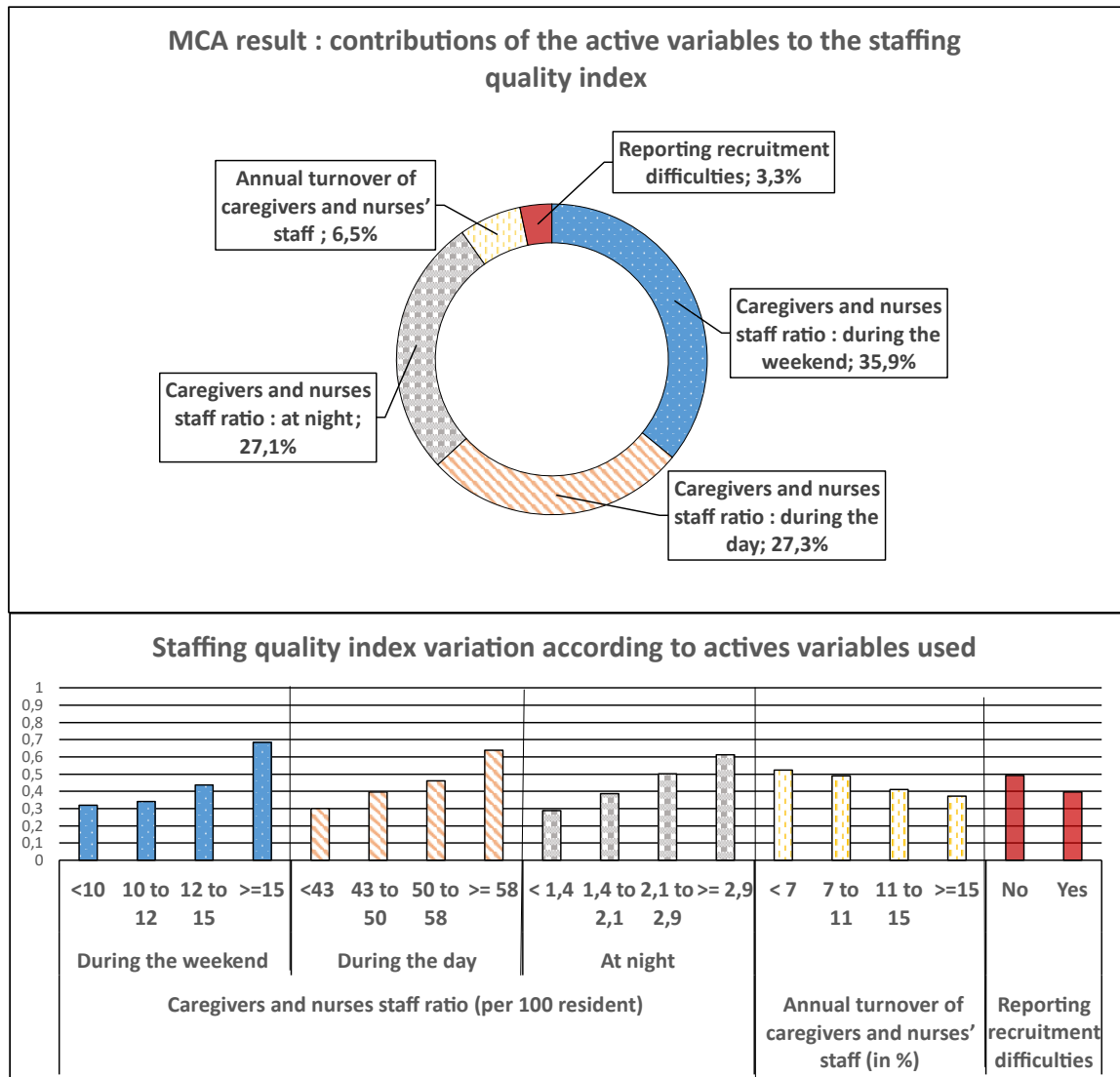
quality does not appear to be higher in these facilities. Several other studies in literature also suggested that the quality of care in the for-profit sector can be lower than that of the non-profit sector (Geraedts et al., 2015; Barron and West, 2017; Comondore et al., 2009). Several countries regulate also private accommodation prices in RACFs, either by negotiating with them as in Germany, or by imposing a price cap per resident profile as in Australia (Barber et al. , 2021).

Overall, a main result of this analysis is that there is a need for more transparency in price setting in public and non-profit facilities negotiating their prices with local authorities in France. A relatively small part of the variations in accommodation prices is explained by the observable variables introduced in regression model compared to other private facilities. This result is consistent with the results of a recent qualitative study which investigated how accommodation prices are set by local authorities. This study shows that price setting process is arbitrary, not based on explicit criteria, often linked to historical factors and poorly documented (Xing, 2018).

The analysis in this chapter provides new insights into the variations in accommodation prices in RACFs and more generally LTC policy in France by questioning the relations between prices, quality of care and market characteristics. The results call for more research on the impact of variations in LTC policy and in price setting practices across local authorities on out-of-pocket payments and LTC quality, but also for better public information on LTC quality in France.

6. Appendix

Figure 2. Multiple correspondence analysis result for staffing quality index

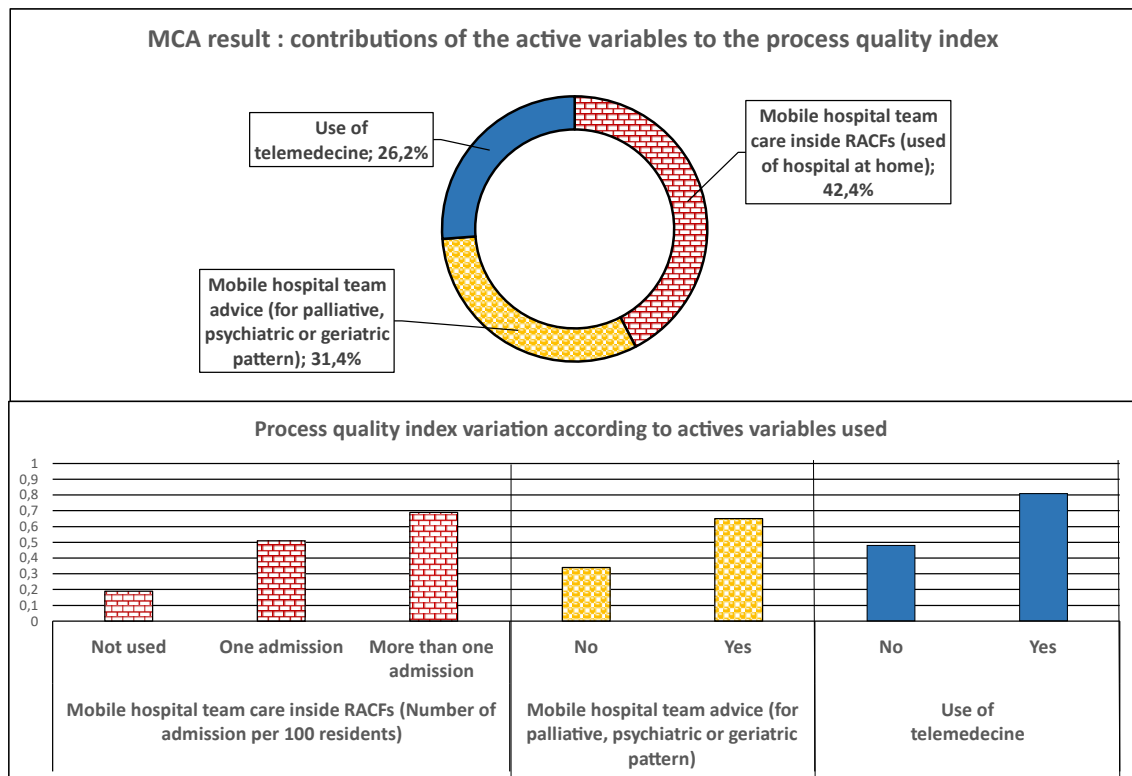


Scope: 3259 French residential aged care facilities.

Source: based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.

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**Figure 3. Multiple correspondence analysis result for process quality index**

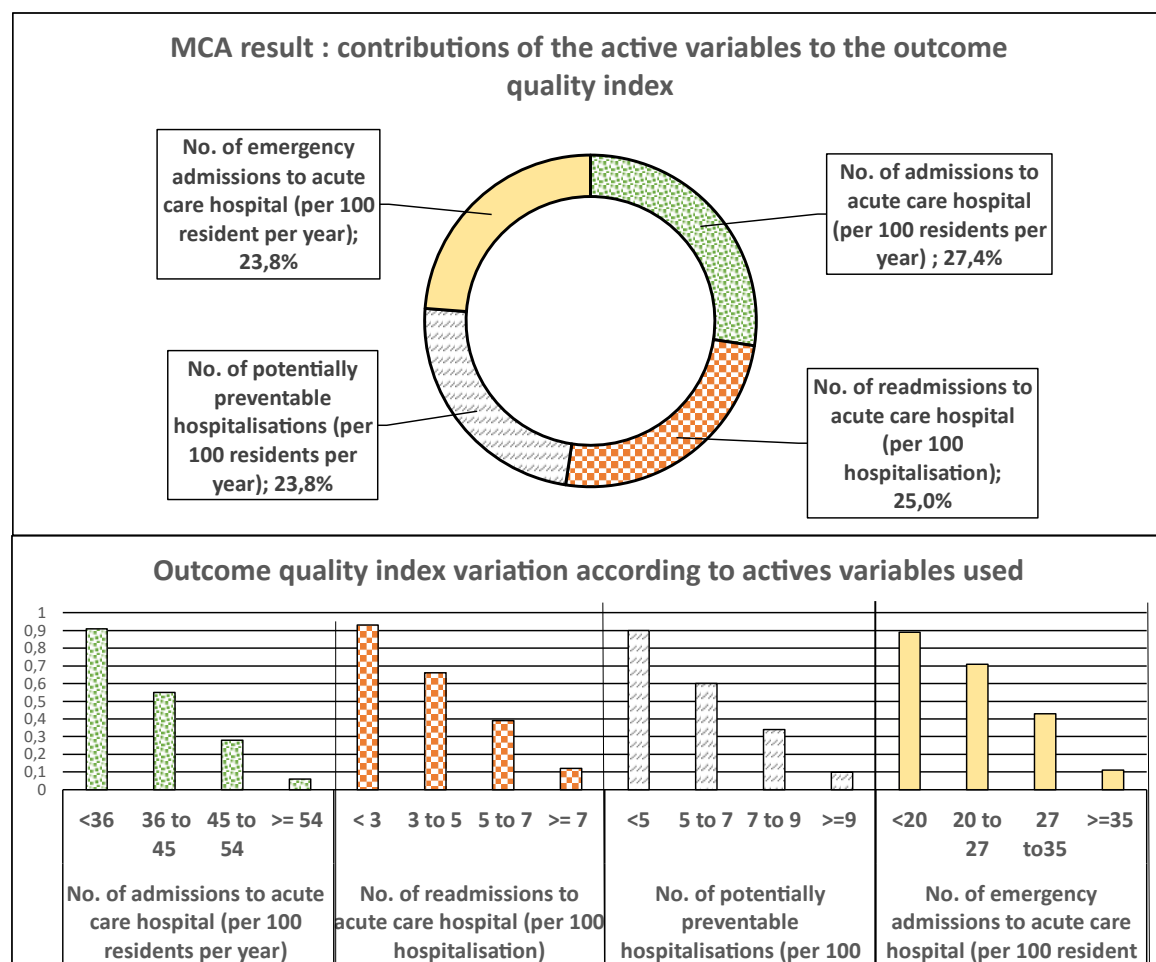


Scope: 3259 French residential aged care facilities.

Source: based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.

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Figure 4. Multiple correspondence analysis result for outcome quality index



Scope: 3259 French residential aged care facilities.

Source: based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.

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**Table 7. Partial correlation**

	Partial correlation (in%)			
	All beds at social assistance price	Private price beds in the facility		All Facilities
		Not-for profit	For profit	
<b>Staffing quality index</b>	0,49%	0,47%	1,09%	0,64%
<b>Process quality index</b>	0,43%	0,66%	0,74%	0,57%
<b>Outcome quality index</b>	0,21%	1,92%	0,01%	0,24%
Animation and social staff ratio (ref: < 0,4 FTE per 100 residents)				
Between 0.4 and 1.2 FET	0,00%	0,98%	0,25%	0,08%
Between 1.2 and 1.7 FET	0,01%	1,86%	0,04%	0,07%
> 1,7 FET	0,03%	0,28%	0,04%	0,05%
Having all rooms with wheelchair accessible showers	0,56%	1,52%	1,74%	0,60%
Having all rooms that can accommodate a medical bed	0,02%	0,00%	0,04%	0,00%
Age of the building or last renovation (Ref: <5 years)				
Between 5 and 10 years	0,00%	1,65%	0,47%	0,09%
Between 10 and 20 years	0,48%	0,05%	0,78%	0,00%
>20 years	0,20%	0,03%	0,07%	0,06%
Square meters of living space per resident (Ref: <45 M <sup>2</sup> )				
Between 45 M <sup>2</sup> and 54 M <sup>2</sup>	0,03%	0,02%	0,03%	0,00%
Between 54 M <sup>2</sup> and 64 M <sup>2</sup>	0,16%	0,11%	0,63%	0,19%
> 64 M <sup>2</sup>	0,47%	0,10%	1,41%	0,49%
Facilities with a garden	0,05%	0,57%	0,21%	0,01%
All rooms with air-conditioned	0,06%	0,00%	0,42%	0,17%
Number of residents in the facility	0,32%	0,54%	1,70%	0,08%
Average dependency score for acts of daily living of residents	0,53%	2,29%	1,40%	0,24%
Average pathology score of residents	0,00%	0,34%	0,28%	0,04%
Public funding (in euros per month per resident)	0,20%	0,01%	0,27%	0,00%
Real estate price per M <sup>2</sup> in the facility municipality (in euros)	13,29%	14,43%	42,43%	19,77%
No. of beds within one hour drive per 100 prospective residents	0,40%	4,13%	2,47%	0,03%
Share of for-profit facilities in the territory (in %)	1,43%	0,03%	0,87%	0,69%
Ownership type (ref: Facilities with all beds at social assistance price)				
not-for profits facilities with private beds				2,19%
for-profit facilities				37,97%

Scope: 3259 French residential aged care facilities.

Source: based on French individual level data from residential care facilities (Resid-Ehpad) matched with the National Health Data System (SNDS) from 2014 to 2019 and the survey of RACFs ("Enquête auprès des établissements d'hébergement pour personnes âgées", EHPA) from 2015.





# General Conclusion

Considering the increasing demand for LTC from an aging population, the ability to adapt the funding and supply of LTC is a major political and social challenge. In this thesis, by mobilizing multiple new data sources that are matched for the first time, I question the link between LTC funding and supply and the efficiency of care for older adults. The analyses of the organization and funding of the LTC sector conducted in this thesis are based on innovative data sources and not only allow a better understanding of the variations in resources devoted to LTC and in the quality of LTC in France but also highlight the strong interdependence between the LTC and health care sectors. The results show the need to reduce geographical inequalities in funding and access to LTC and call for better measurement of the quality of LTC to improve health system efficiency. They also show the importance of improving the skill mix in RACFs considering their missions and the care needs of their residents, particularly in ensuring better end-of-life care.

In the first chapter, a regional analysis of health expenditure for people with dementia shows that there are significant inequalities in LTC funding and supply across French territories and that patients living in local areas with better LTC supply and funding have lower hospital expenditure with higher ambulatory care spending. This suggests complementarity of care between care providers in the primary care and LTC sectors that could substitute for hospital care. Thus, developing public policies that improve the equitable distribution of LTC resources to improve the accessibility of care in the community (both LTC and primary care) can reduce hospital use and improve the efficiency of care provision. Moreover, a better understanding of the inequalities in LTC care provision in France is a necessary condition for promoting policies to reduce these inequalities. There is a growing literature on the determinants of unmet LTC needs. This literature is fed by studies from the United States, Asian countries (Hu and Chou, 2022; Zhu and Österle, 2017), Northern countries (Kröger, 2022; Kröger et al., 2019) and Europe (Albuquerque, 2022; García-Gómez et al., 2015; Rummery, 2022) that question the factors contributing to the nonuse of medical and social care by those who need it. To my knowledge, this subject has been little studied in France despite the data available in French disability surveys on older adults and their unmet LTC needs. In the future, I would like to develop research on inequalities in LTC supply and funding and unmet care needs in France as well as their impacts on health care consumption and life expectancy.

## General Conclusion

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An underlying issue raised in the thesis is how to better fund RACFs to cover care needs and improve quality of care in these facilities. In chapters 2 and 3, I question the funding and organizational model of RACFs in France and their relationship to quality and efficiency. Chapter 2 addresses questions about the efficiency of public funding, while chapter 3 discusses disparities in private funding (paid by residents) and its relationship to the quality of these facilities. Regarding the efficiency of public funding, my analyses in chapter 2 show that mobile hospital teams in RACFs improve the quality of care for residents by reducing hospital transfers and ensuring palliative care without increasing the overall costs for the health system. Palliative care and end-of-life care quality in RACFs are important issues. Today, palliative care is not specifically funded in these facilities, even though they have an important role in providing care at the end of life. Palliative care is funded only in the hospital setting. To improve the quality and efficiency of end-of-life care, it is essential to reconsider the missions, organization, and funding of different care providers to optimize the allocation of public resources and to meet care needs. I would like to continue studying this issue by examining the impact of care locations on cost and quality at the end of life.

Regarding private funding, the first results in chapter 3 on the determinants of accommodation prices paid by residents call for more research on the impact of variations in excess demand by local area on prices and quality in RACFs. My results suggest that excess demand for not-for-profit facilities may be high in some local areas, such as the Paris region, which has a low RACF supply and a high concentration of private for-profit facilities. My results show that accommodation prices are determined mainly by the cost of factor prices and market competition and are very weakly related to observable dimensions of quality, while there is no, or an inverse, relation with outcome quality. I would like to further develop the analysis of the link between market characteristics and quality of care in RACFs by testing Scanlon's paradigm theory to investigate whether higher prices are associated with lower quality in the excess demand context in France. This may have important public policy consequences for local authorities in regulating the supply of not-for-profit facilities.

Overall, this thesis contributes to empirical economic research on a topic that remains underdeveloped in France and could provide useful insights for policy-makers to improve the efficiency and quality of care for older adults.

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## RÉSUMÉ

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Cette thèse examine le lien entre l'offre et le financement des soins médico-sociaux avec l'efficacité du système de santé pour les seniors en France, en mobilisant des données et méthodes économétriques originales. Elle montre qu'il existe de fortes inégalités d'accessibilité à l'offre et aux financements médico-sociaux en fonction des territoires et que ces inégalités sont directement liées aux dépenses médicales des personnes atteintes de démence. Dans les établissements d'hébergement pour personnes âgées dépendantes (Ehpad), les soins réalisés par une équipe mobile hospitalière améliorent la qualité des soins en réduisant les transferts hospitaliers et en développant les soins palliatifs sans augmenter les coûts. Enfin, les prix d'hébergement en Ehpad sont peu liés aux indicateurs de qualité des soins. Ces résultats montrent la forte interdépendance entre le secteur médico-social et sanitaire, le besoin d'améliorer l'adéquation des financements ainsi que la mesure de la qualité.

## MOTS CLÉS

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Politique médico-sociale ; Qualité et efficacité ; Vieillesse ; Offre de soins ; Inégalités territoriales

## ABSTRACT

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This thesis examines the link between long-term care (LTC) funding and supply and the care efficiency for older adults in France, using original data and econometric analysis. Results show that there are significant inequalities in accessibility of LTC across regions in France and that the availability of LTC resources in an area determines the need for health care hence health expenditures. In residential aged care facilities (RACF) mobile hospital teams can improve the quality of care for the residents by reducing hospital transfers and ensuring palliative care without increasing costs; and the accommodation prices are weakly linked to care quality in facilities. These results highlight the strong interdependency between LTC and health sectors, the necessity to align the funding with older adults' care needs, and the need for better care integration and quality measurement.

## KEYWORDS

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Long-term care policy; Quality and efficiency; Ageing population; Care supply; Territorial inequality