Pay less, consume more? Estimating the price elasticity of demand for home care services using French administrative data

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Outline

Context

- In all developed countries : **population aging**
- Increase in **disability-free life expectancy** does not match the increase in life expectancy (Sieurin et al., 2011)
  - **Disability** : inability to perform alone one or more activities of daily living (ADL or IADL)
- **Encouragement of home care solutions** (// institutions)
  - **Home care** : nursing or domestic help provided to the elderly living in the community

$\Rightarrow$ **Growing demand for home care services**

Home care and OOP payments

- **Home care provision**
  - A lot of informal care (relatives)
  - Development of **professional home care** (public services, non-profit or for-profit organizations)
- **Long-term care policies in France** :
  - **home care subsidies** granted to disabled individuals 60+
  - ... but do not cover the full cost of home care

$\Rightarrow$ **Out-of-pocket (OOP) payments** on professional home care services are substantial in France :

- Average OOP for home care subsidy recipients : 300€/month in 2011 (Fizzala, 2016) - a lower bound

Research question

$\Rightarrow$ RQ : **How sensitive to out-of-pocket payments is the consumption of professional home care services** ?

- **Objective** of the paper : **estimate the price elasticity** of demand for home care services of the disabled elderly
  - PE = % increase in hours consumed following a 1% increase in OOP
  - If consumption reacts little to price : home care subsidies as a **pure redistributive policy**
  - If consumption reacts to price : an **efficiency concern** (Barnay & Juin, 2016 ; Rapp *et al.*, 2015)
- **Empirical strategy** : make use of the French *Allocation personnalisée d'autonomie* (APA) program
  - APA = hourly subsidy on professional domestic help
  - Administrative records provide information on home care consumption and copayment

Outline

What do we know ?

- **Literature on home care consumption**
  - Determinants of home care utilization ; substitution between informal care and formal care
  - Price sensitivity : **much less prolific**
    - Data limitations

    $\rightarrow$ **A qualitative result** : home care consumption is sensitive to price
- Get to know more : **the MODAPA project**
  - A team of French researchers working on LTC questions
  - Improve knowledge about the effect of OOP payments on home care consumption
  - Use of alternative methods and data (Bourreau-Dubois *et al.*, 2014 ; Hege, 2016)

Outline

How does APA work ?

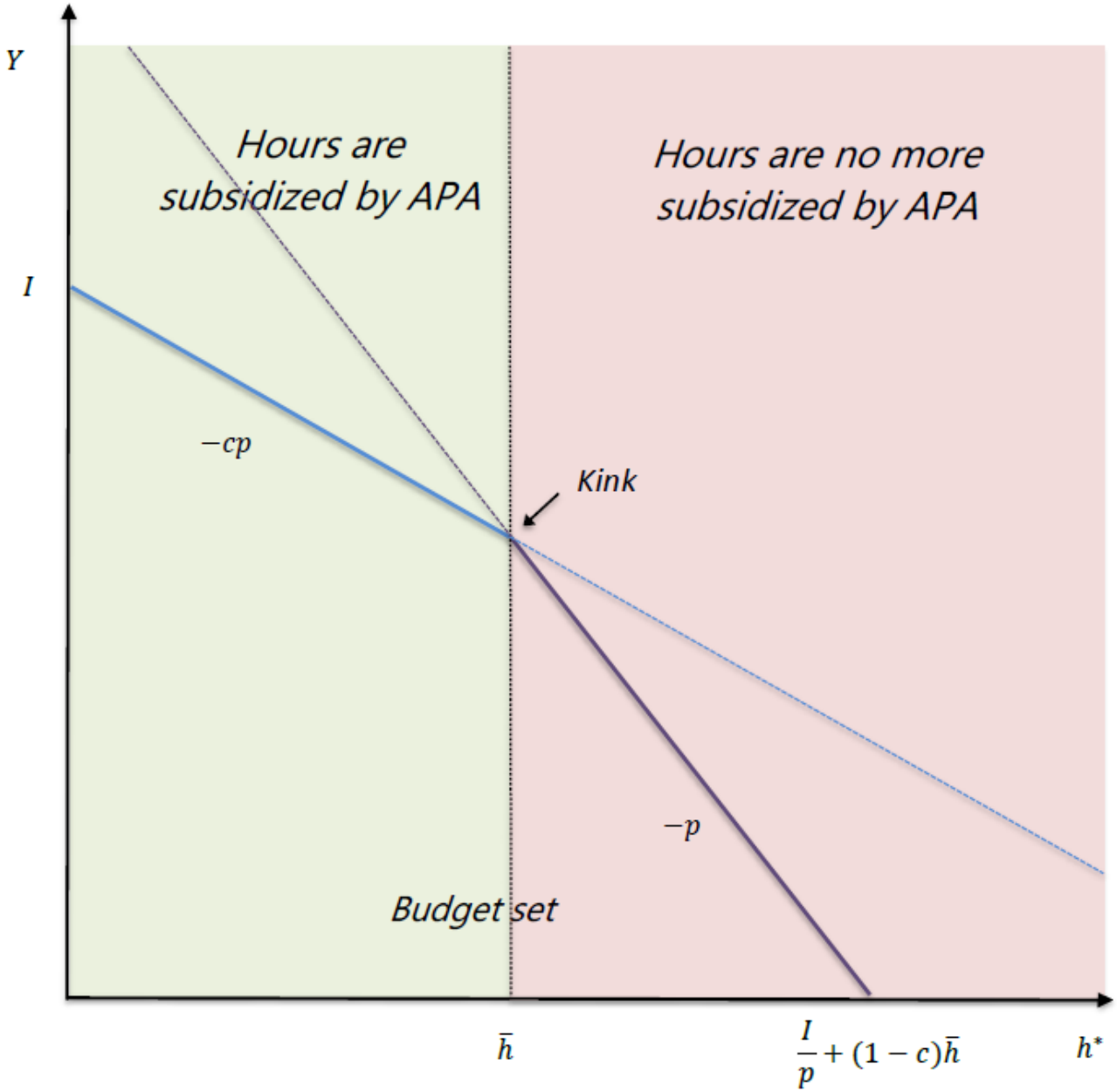
1. Assessment of needs by the District Council (*Conseil départemental*)
   - Defines the **personnalized care plan** : individual's i maximum number of hours of care that can be subsidized, $\bar{h}_i$
2. **Cost-sharing rule** :
   - OOP price on subsidized hours : $OOP_i = c_i p_i$
   - **Price p_i charged** by the home care service chosen by i
   - **Copayment rate** c_i, increasing in disposable income :

$$c_i = c(income_i),\ c' \geq 0$$
$$0\% \leq c_i \leq 90\%$$

▸ Schedule

3. **Actual home care consumption** by individual i, h_i^*
   - Can be less or more than $\bar{h}_i$
   - But no subsidy beyond $\bar{h}_i$

FIGURE 1: APA creates a kinked budget constraint



Modeling home care demand

- General form of **marshallian demand** for home care services :

$$h_i^* = g(OOP_i, income_i; characteristics_i) + \nu_i$$

  - OOP_i : hourly out-of-pocket price of care (equal to $c_i p_i$ or p_i)
  - ν_i : individual preference shifter

- Demand with **kinked budget constraint** (Moffit, 1990) :

$$\begin{cases} h_i^* = g(c_i p_i, I_i^D; X_i) + \nu_i & \text{if } h_i^* < \bar{h}_i \\ g(p_i, I_i^D + (1 - c_i) p_i \bar{h}_i; X_i) + \nu_i < h_i^* < g(c_i p_i, I_i^D; X_i) + \nu_i & \text{if } h_i^* = \bar{h}_i \\ h_i^* = g(p_i, I_i^D + (1 - c_i) p_i \bar{h}_i; X_i) + \nu_i & \text{if } h_i^* > \bar{h}_i \end{cases}$$

  - With I_i^D disposable income, X_i individual characteristics

- What we want to estimate empirically :

$$PE = \frac{\mathrm{d}g(.)}{\mathrm{d}OOP} \frac{OOP}{g(.)}$$

Outline

Data

- ⚠No national administrative or survey data
- An **original dataset**
  - Collected on a French District Council
  - Exhaustive administrative information on APA beneficiaries
    - Hours subdsidized by APA and hours effectively consumed, copayment rate, home care producer chosen
    - Income, disability level, family status
- **Selected sample**
  - APA recipients in October 2014
  - With OOP price exactly recorded

$\Rightarrow$ **Final sample** : 2,862 individuals

▸ Sample selection ▸ Producer types

Descriptive statistics

TABLE 1: Sample descriptive statistics

Variable	Average	Std-dev.
Care plan volume	20.6	10.7
Hours effectively subsidized	17.7	10.9
Under-consumption	59.8%	-
Individualized income	1,314€	422€
Copayment rate	23.7%	17.3 pp.
Hourly OOP price on subsidized hours	5.2€	3.8€
Total OOP payment on subsidized hours	91.3€	98.6€
Age	84.2	7.5
Women	74.0%	-
Disability level 1 (most severe)	1.2%	-
Disability level 2	12.5%	-
Disability level 3	19.7%	-
Disability level 4 (least severe)	66.7%	-
Living alone	66.6%	-
Living with a spouse	33.8%	-
Spouse in institution	0.6%	-
Observations	2,862	

A censored regression framework

- In the administrative records, **home care consumption is censored** at $\bar{h}_i$ ▸ Censoring
- **Observational scheme**, with h_i the observed consumption :

$$\begin{cases} h_i = h_i^* = g(c_i p_i, I_i^D; X_i) + \nu_i & \text{if } h_i^* < \bar{h}_i \\ h_i = \bar{h}_i \leq g(c_i p_i, I_i^D; X_i) + \nu_i & \text{if } h_i^* \geq \bar{h}_i \end{cases}$$

- ML estimation of a **type-1 Tobit model**
  - Assume a **log-linear** specification for home care demand $g(.)$:

$$ln(h_i^*) = \beta_0 + \beta_1 . ln(c_i p_i) + \beta_2 . ln(I_i^D) + X_i' . \theta + \epsilon_i \qquad (1)$$

    - $ln(c_i p_i) \rightarrow$ constant PE along the demand curve
  - Distributional assumption :

$$\epsilon \quad | \quad p, I^D, X \sim \mathcal{N}(0, \sigma^2).$$

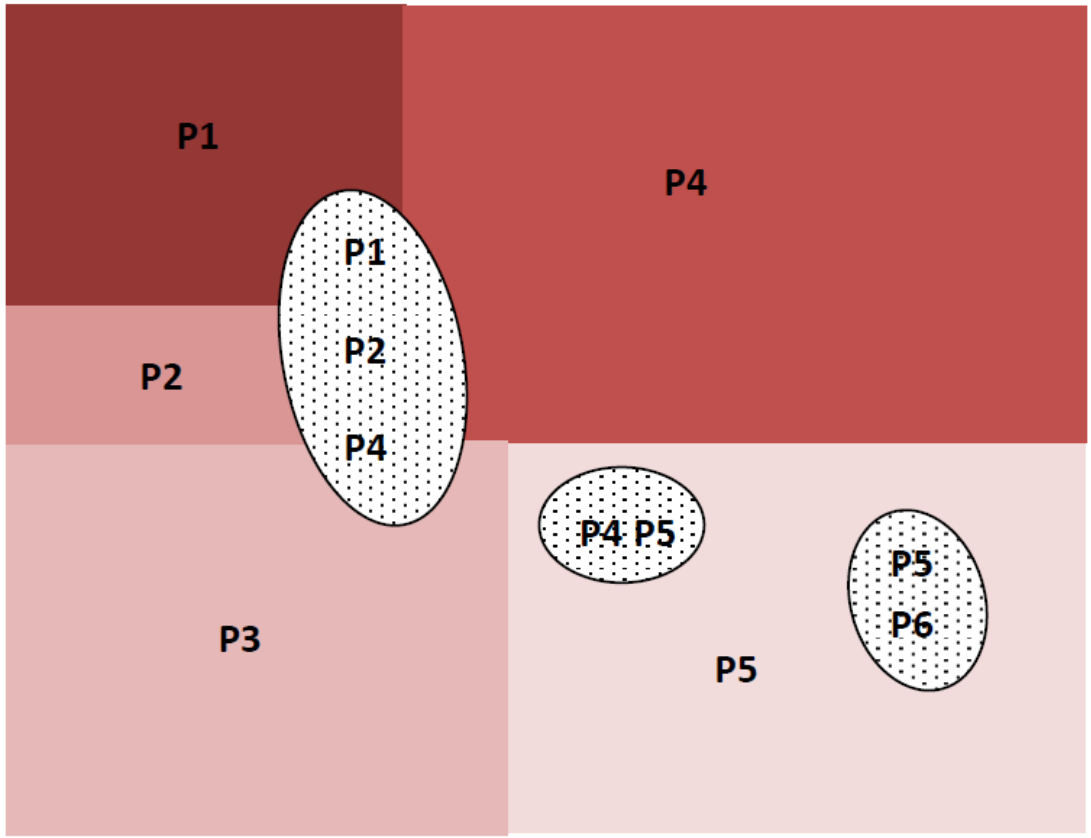
Identification strategy and potential issues

- **Identifying variation** : cross-sectional variations in producer prices
  - for given I_i^D, p_i is the only source of variation in OOP_i $(= c_i p_i)$
  - 23 different prices (standard-deviation of 1.3€)
- **Why do prices differ** ?

  (NB : home care providers are priced by LAs)
  - Status (public/private) ; transportation costs ; weekend service
  - Differential **quality** ?

  → ⚠If APA recipients **can choose producers** on the basis of their price, our estimates may be **biased**
- **However** :
  - For 40% of the sample : **a single producer** operating in their area of residence → **no producer choice**

FIGURE 2: Distribution of producers over the territory



Outline

Empirical results

- Two different types of areas ⇒ **estimation on the two sub-samples** as a test of price endogeneity

TABLE 2: Testing for producer selection effect

	Dependent variable : total hours consumed ($\log h^*$)		
	(1)	(2)	(3)
OOP price (log)	-0.709**	-0.344	-1.054***
	(0.290)	(0.608)	(0.391)
p-value	*0.016*	*0.572*	*0.007*
Controls	Yes	Yes	Yes
Sample (type of area)	*All*	*Single producer*	*Multiple producers*
Observations	2862	995	1867
Censored observations	40.2%	42.9%	38.9%

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Effects of covariates in line with the literature ▸ Covariates
- The least disabled are more sensitive to OOP price ▸ By disability

Outline

Discussion of results

- On average, a 10% increase in the OOP price of home care would decrease consumption by 4%
  - An increase in the OOP price **decreases consumption less than proportionnally**
  - Home care as a **necessity good**
- What about **substitution with informal care** ?
  - Not observed in the administrative data
  - A proxy : hours provided on weekends ▸ IC proxy

    $\rightarrow$ Suggests that taking into account informal care provision should *not* affect our results

Policy implications

- Effects of **home care subsidies policies**
  - $|PE| \neq 0$: allocative and dynamic efficiency implications
  - $|PE|$ quite low : home care subsidies to be analyzed primarily as **redistributive policies**

  $\rightarrow$ **Reforms of home care subsidies** : reducing hourly OOP price should reduce total OOP payments in the budget of the elderly
  - 2016 APA reform in France : decrease of copayment rate for the more severely disabled

- **Unequal spatial coverage** : no price/producer choice for many APA beneficiaries

Thanks for your attention

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Full Working Paper available at :
http://www.york.ac.uk/media/economics/documents/hedg/workingpapers/1616.pdf

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FIGURE 3: APA recipient can choose between different types of home care producers

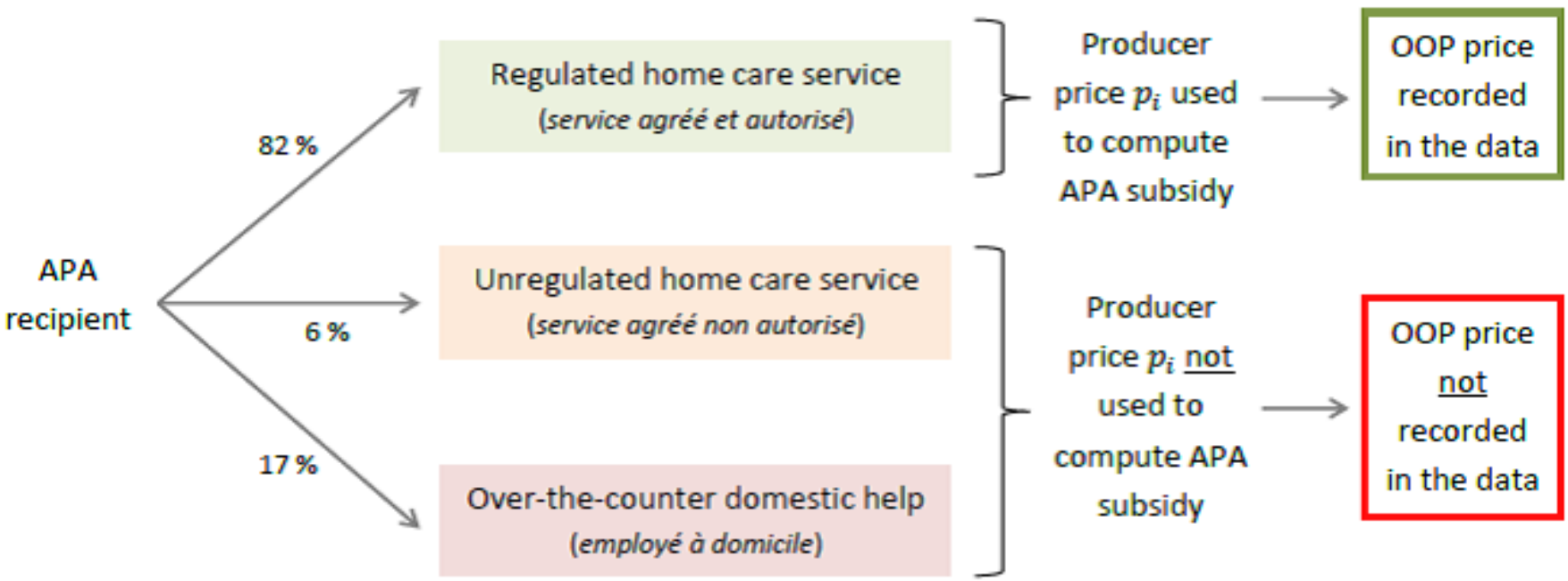

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TABLE 3: Sample selection steps

	All APA recipients	Recipients consuming from a regulated producer *at least*			
		All	"Stable" APA recipients		
			All	Recipients consuming *only from one* regulated producer	
				All	Recipients with $0 < c_i < 90\%$
	(1)	(2)	(3)	(4)	(5)
Observations	5,489	4,202	3,530	3,327	2,862
% of previous step	-	76.5%	83.9%	94.2%	86.0 %
% of initial sample	100%	76.5%	64.2%	60.5%	52.1%

Notes : (i) "Stable" APA recipients in October 2014 are defined as those for which information is available also for the months of September and November 2014. (ii) For additional 86 individuals (not in the numbers here above), our administrative files contained no information on the copayment rate or or the consumption of home care hours. These individuals are presumably former APA recipients not yet erased from the files.

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FIGURE 4: Copayment rate schedule, as a function of monthly individualized disposable income

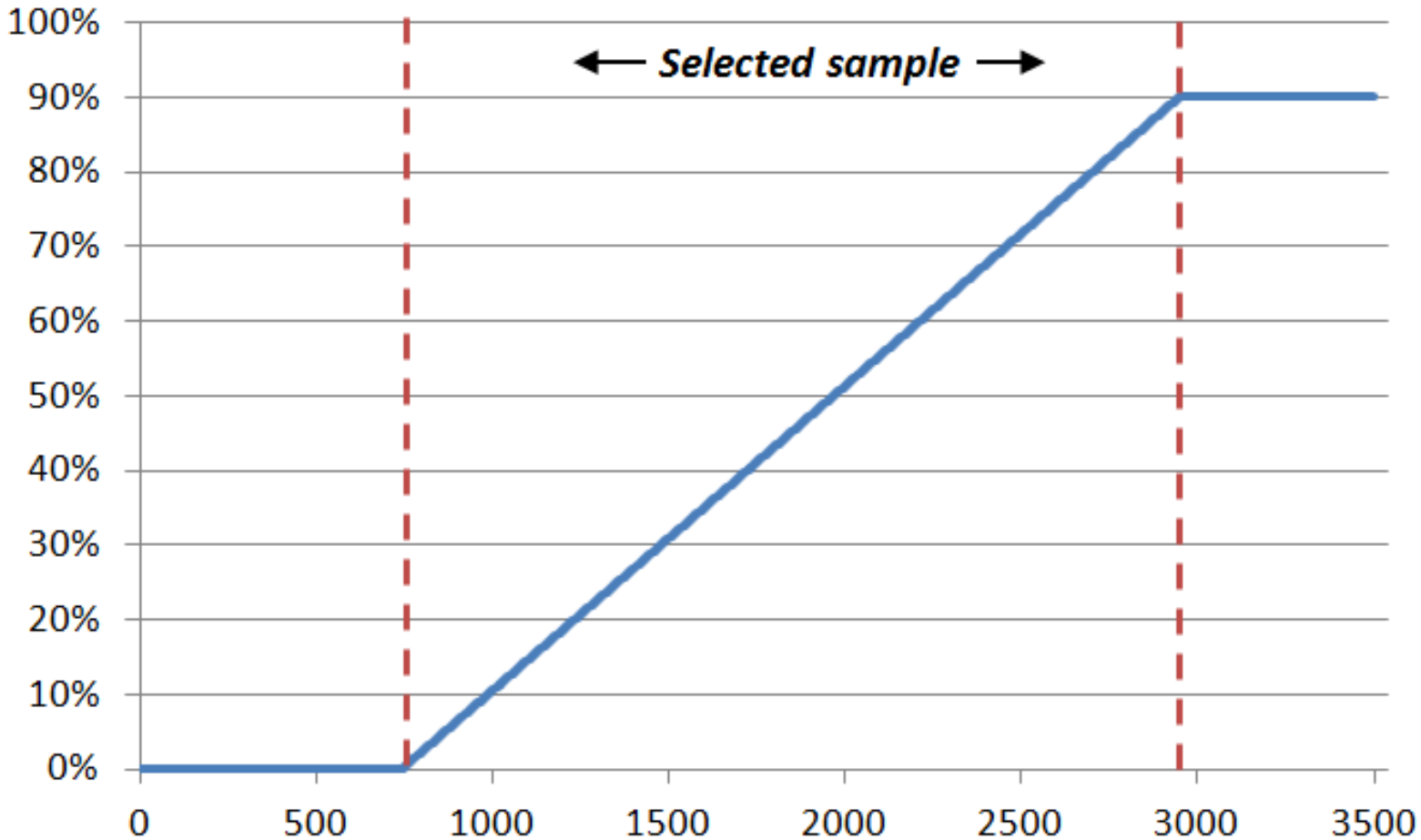

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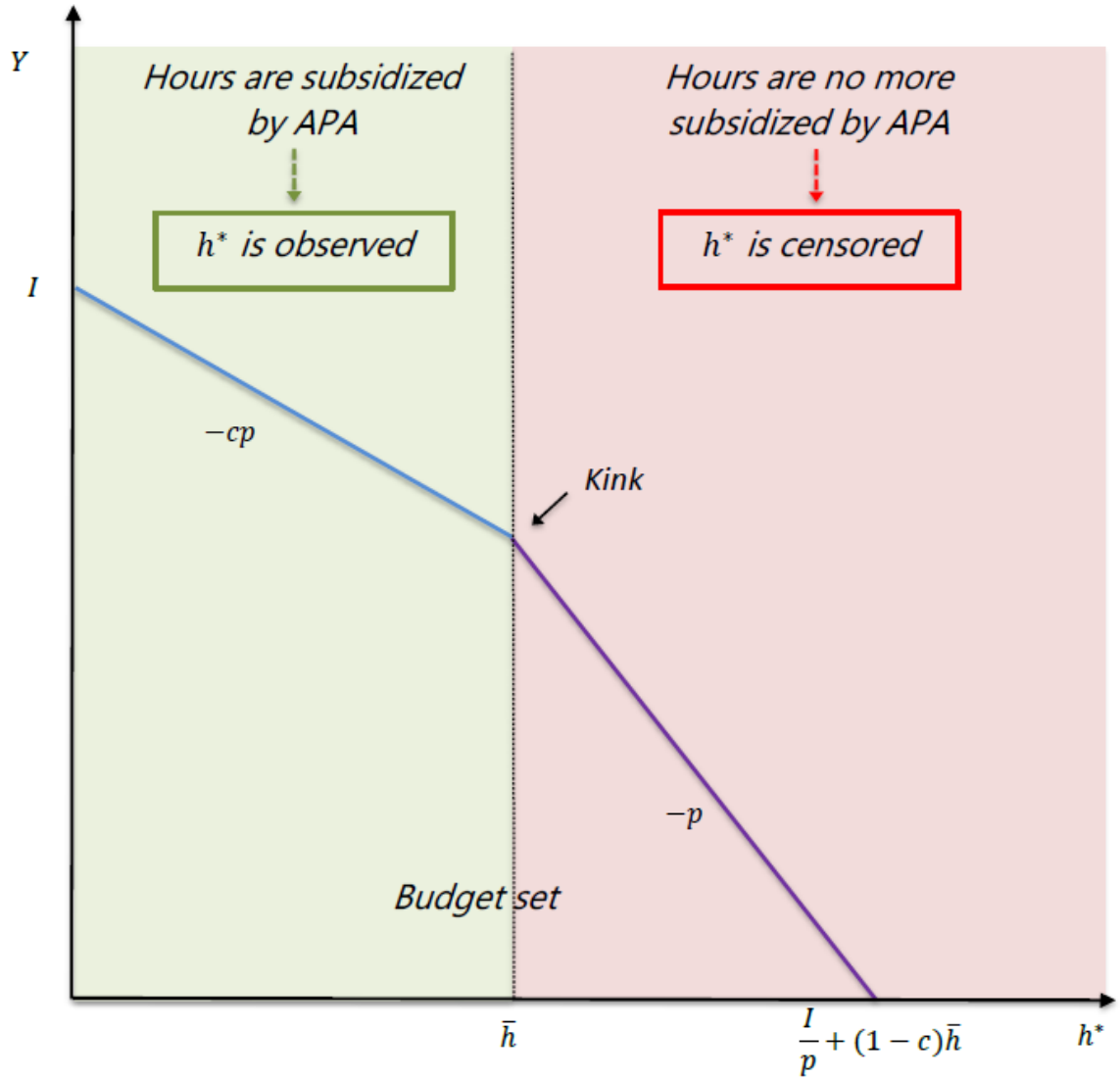
FIGURE 5: A censored measure of home care consumption



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Effects of covariates

TABLE 4: Effects of socio-demographic characteristics

Dependent variable : total hours consumed ($\log h^*$)	(4)
Age : 60-69	-0.265***
	(0.079)
Age : 70-79	-0.070**
	(0.032)
Age : 80-89	*Ref.*
Age : 90 or older	0.072**
	(0.032)
Woman	0.065**
	(0.026)
Disability group : 1	0.729***
	(0.128)
Disability group : 2	0.433***
	(0.045)
Disability group : 3	*Ref.*
Disability group : 4	-0.523***
	(0.023)
Living with no spouse	0.317***
	(0.032)
Spouse receives APA	0.031
	(0.059)
Spouse in institution	0.570***
	(0.127)
Living with non-APA spouse	*Ref.*

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TABLE 5: Robustness checks : Panel estimations

	Dependent variable : total hours consumed ($\log h^*$)			
	— PA model —		— RE model —	
	(1)	(2)	(3)	(4)
OOP price (log)	-0.452***	-1.001***	-0.229	-0.910***
	(0.001)	(0.251)	(0.434)	(0.352)
Controls	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes
Sample (type of area)	Single producer	Multiple producers	Single producer	Multiple producers
Observations	2491	5699	2491	5699
Censored observations	40.6%	39.2%	40.6%	39.2%
Number of clusters	37	60	-	-

Notes : Standard-errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. S-e are clustered at the producer price level in columns (1) and (2), and bootstrapped (25 replications) in columns (3) and (4). Estimations use data from October 2012, 2013 and 2014. Both PA and RE are estimated on the unbalanced panel sample.

TABLE 6: Heterogeneity of price elasticity : estimations by disability level

	Dependent variable : hours consumed (log)		
	GIR 1 & 2	GIR 3	GIR 4
	(1)	(2)	(3)
OOP price (log)	0.122	-0.701***	-0.998***
	(0.656)	(0.002)	(0.248)
Other controls	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes
Observations	1145	1655	5390
Censored observations	44.4%	39.5%	38.6%
Number of clusters	27	28	28

Notes : Standard-errors in parentheses, clustered at the producer level ; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Estimations use pooled data from October 2012, October 2013 and October 2014 (population-average model).

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Table 7: Robustness checks : inclusion of hours received on weekends

	Dependent variable : hours consumed during the week (log)		
	(1)	(2)	(3)
Consumer price (log)	-0.795***	-0.921***	-0.867***
	(0.248)	(0.253)	(0.260)
Consumes care on weekends		0.491***	0.076
		(0.056)	(0.107)
Number of hours received on weekends			0.119***
			(0.031)
Other controls	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes
Observations	8190	8190	8190
Censored observations	39.6%	39.6%	39.6%
Number of clusters	28	28	28

Notes : Standard-errors in parentheses, clustered at the producer level ; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Estimations use pooled data from October 2012, October 2013 and October 2014 (population-average model).