

# School's out for summer, school's out forever: the long-term health consequences of leaving school in a bad economy

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# Motivation

- Growing literature on the consequences of early-life conditions on health (Banerjee and al. (2009); Van Den Berg et al. (2006))
  - Epidemics, famines, war episodes, state of the business cycle at birth (GDP variation, recession) etc.
- More generally, it relates to the life-course approach in epidemiology :
  - Focus on the long-term effects on health of physical and social exposures during gestations, childhood, adolescence, young adulthood and later adult life.
- We focus on a critical period in life : first entry on the labour market (after graduation).

# Motivation

- Evidence that graduating in a bad economy negatively affects :
  - wages (Khan, 2010; Oreopoulos et al., 2012)
  - employment prospects (Stevens, 2007; Genda, 2010; Gaini et al., 2012)
  - inactivity patterns (Hershbein, 2012).
  - possibly job quality, job stress, working hours, job prestige, work expectations etc.
- Labour market outcomes are linked to health outcomes. Both theoretical and empirical evidence.
  - Income may improve health (Grossman, 1972);
  - job loss is associated with lower health, adverse health behaviours and higher mortality rates (Browning and Heinesen, 2012);
  - other job dimensions – such as job stress, perceived job insecurity, harmful working conditions – have been shown to deteriorate health (Caroli and Godard, 2014; Fisher and Sousa-Poza, 2009).

# Research question

- Does leaving school in a bad economy deteriorate health in the long-run?
- Cumulative effect or initial shock?
- Relevant question in the actual context :
  - where the Great recession has a disproportionate impact on youth.
  - and young cohorts leaving school face historically high unemployment rates.

# Literature

- Recent and increasing interest in the health consequences of leaving school in a bad economy.
  - Maclean (2013) on the NLSY79.
  - Cutler et al. (2014) on Eurobarometer data.
  - Hessel and Avendano (2013) on SHARE.
- Recent papers focusing on specific outcomes : drinking behaviour, body weight and the probability of having an employer-provided insurance (Maclean 2014a,b,c) .

# Our paper

- **We focus on low-educated individuals** who represent a substantial share (50%) of pupils in the 1970s.
  - individuals born in 1958 and 1959 in England and Wales who left full-time education in their last year of compulsory schooling immediately after the 1973 oil crisis – between 1974 and 1976 .
- **Our identification strategy**  $\Rightarrow$  comparison on very similar individuals – born the same calendar year – whose school-leaving behaviour in worse economic conditions was exogeneously induced by compulsory schooling laws.
- **Data**  $\Rightarrow$  we use a repeated cross section of individuals over 1983-2001 from the General Household Survey (GHS).

## Contribution to the literature

- Evidence in our data that pupils' decisions to leave school at compulsory age in 1974-1976 were not endogeneous to the contemporaneous economic conditions at labour-market entry – unlike school-leavers during the 1980s and 1990s recessions.
- Country/state-specific cohort effects cannot possibly bias our results.
- Life-course perspective (1983-2001 data)
- Focus on low-educated individuals

## Identification strategy

- **Within a same birth cohort pupils born at the end of the calendar year are forced to leave school almost a year later than their luckier counterparts** (born earlier in the year)– and thus **face higher unemployment rates at labour market entry**.
- Consider two cohorts : the 1958 and 1959 cohorts.
- Not a before/after comparison. The treatment is to leave school in *worse* conditions than otherwise similar pupils (born the same year).
- Builds on two sources :
  - Within-cohort variation introduced by compulsory schooling laws (both entry and exit rules).
  - Sharp increase in unemployment rates after the 1973 oil crisis.

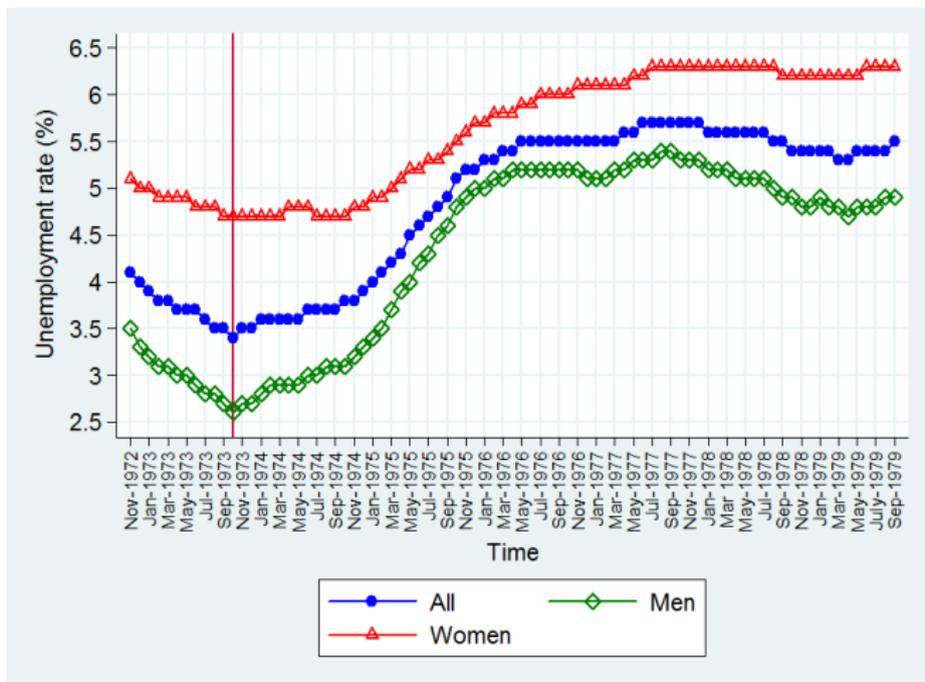
# Compulsory schooling laws in England and Wales

Figure 1: Compulsory schooling rules by month-year of birth.

Birth year (1)	Month of birth (2)	School starting date (3)	Allowed to leave school (4)
1958	January	Sept. 1963	Easter 1974
1958	February	Sept. 1963	May/June 1974
1958	March	Sept. 1963	May/June 1974
1958	April	Sept. 1963	May/June 1974
1958	May	Sept. 1963	May/June 1974
1958	June	Sept. 1963	May/June 1974
1958	July	Sept. 1963	May/June 1974
1958	August	Sept. 1963	May/June 1974
1958	September	Sept. 1964	Easter 1975
1958	October	Sept. 1964	Easter 1975
1958	November	Sept. 1964	Easter 1975
1958	December	Sept. 1964	Easter 1975
1959	January	Sept. 1964	Easter 1975
1959	February to August	Sept. 1964	May/June 1975
1959	September to December	Sept. 1965	Easter 1976

# Unemployment rates over the 1973-1979 period

Figure 2: Unemployment rates for all individuals aged 16 (source: LFS)



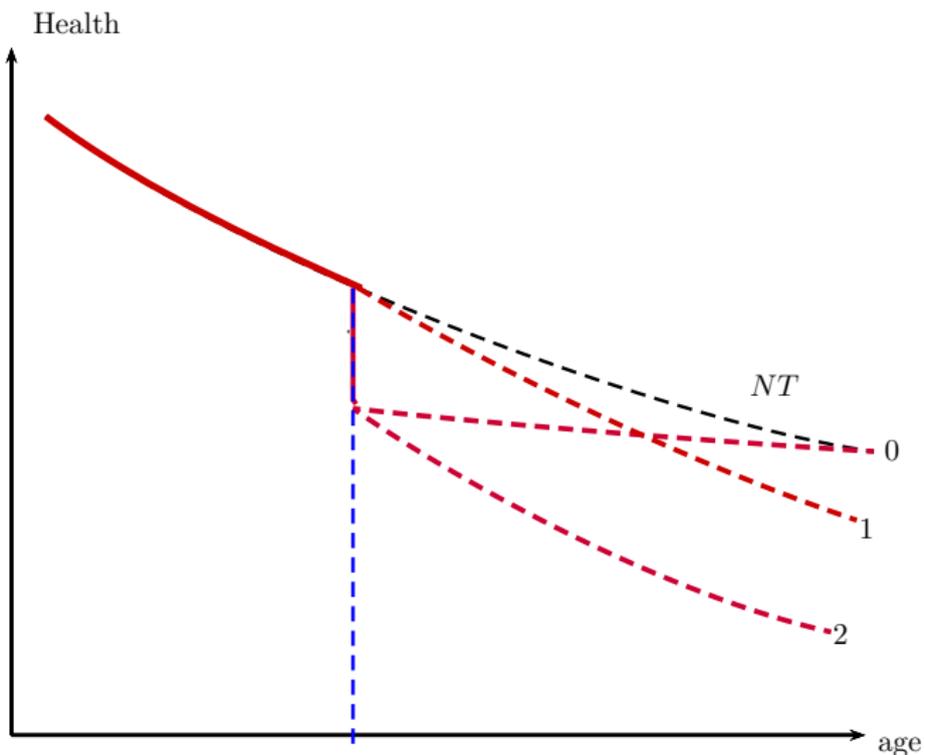
## Model in the literature

- Following Galama et al. (2010), Grossman (1972, 2000) health is modeled as a stock that deteriorates over the lifespan. Time  $t$  is measured from the time an individual has completed her education and joined the labour force (i.e. at 16).
- Health is defined as :

$$H(t) = I_m(t)^\alpha + (1 - d(t))H(t - 1) \quad (1)$$

where health can be improved through investment in curative medical care  $I_m(t)$  and deteriorates at  $d(t)$  which depends on healthy consumption  $C_h(t)$  (e.g. healthy food, healthy neighborhood), unhealthy consumption  $C_u(t)$  (e.g. smoking), job-related stress  $z(t)$  (working environment) and investment in curative care  $I_p(t)$  and on a vector of exogenous functions  $\xi(t)$ .

Figure 3: The evolution of health depending on the scenario.



## Our model

We use a repeated cross-section of individuals over 1983-2001 to estimate the following equation by OLS/probit, for men and women separately:

$$H_i = \alpha + \gamma T_i + \text{BirthYear}_i + \text{InterviewYear}_i + \epsilon_i \quad (2)$$

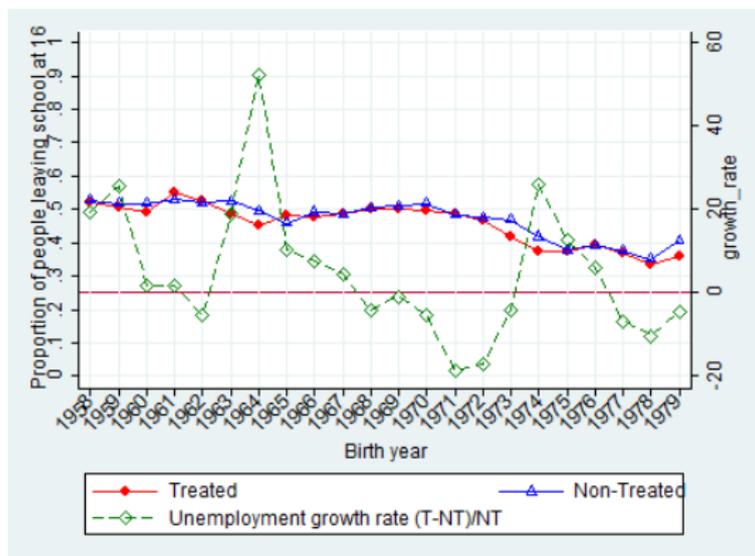
where  $T_i$  is a dummy variable taking value 1 if individual  $i$  is treated, i.e. born between the 1<sup>st</sup> of September and the 31<sup>st</sup> of December and value 0 if non-treated, i.e. born between the 1<sup>st</sup> of January and the 31<sup>st</sup> of August.

$$H_i = \alpha + \gamma T_i + \text{BirthYear}_i + f(\text{BirthMonth}_i) + \text{InterviewYear}_i + \epsilon_i \quad (3)$$

$f(\text{BirthMonth}_i)$  is a quadratic function of age in months within a birth year. It is equal to  $(12 - \text{BirthMonth}_i) + (12 - \text{BirthMonth}_i)^2$ , where  $\text{BirthMonth}_i$  denotes the month of birth of respondent  $i$  and varies from 1 to 12.

## Endogenous timing of school-leaving

Figure 4: Proportion of pupils leaving school at binding age (16); Growth in school-leaving unemployment rate



Reading: Growth in school-leaving unemployment rate faced by pupils belonging to the youngest school cohort (treated) – compared to pupils born the same year belonging to the previous school cohort (non-treated).

# The General Household Survey (GHS)

- GHS: repeated annual cross-sectional survey of over 13,000 households in Great-Britain; ran from 1972-2011.
- Includes information on:
  - demographics – including month-year of birth from 1983 to 2001, the survey waves that we use
  - education – including the age at which the individual left full-time education, the highest qualification obtained.
  - earnings
  - health status, health care and health behaviours.
- A number of the GHS respondents left school immediately after the 1973 oil crisis.

## Our sample

- Consider individuals born in 1958 and 1959 who left full-time education as soon as they reached the minimum school leaving age – i.e at age 16:
  - abstract from the 1972 increase in the school minimum leaving age.
  - these individuals leave school between Easter 1974 and Easter 1976.
- Focus on England and Wales.
- Outcomes of interest not collected consistently over the period – include all possible observations for each outcome to maximize sample size.

# Health outcomes (1)

**Table 1:** The impact of leaving school in a bad economy on health status

Dep. variable	Poor health			Longstanding illness			Restricts activity		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
<b>Men</b>	-0.01 (0.03)	0.08 (0.08)	0.10 (0.09)	-0.01 (0.03)	-0.03 (0.07)	0.06 (0.08)	0.00 (0.02)	0.06 (0.04)	-0.02 (0.05)
age <sup>(a)</sup>	-	x	x	-	x	x	-	x	x
age <sup>2</sup>	-	-	x	-	-	x	-	-	x
<i>N</i>	1044	1043	1043	1096	1095	1095	1095	1094	1094
<i>AIC</i>	1272.5	1272.1	1273.8	1267.2	1266.2	1263.2	615.4	615.6	608.0
<b>Women</b>	0.00 (0.02)	0.11* (0.06)	0.17*** (0.07)	-0.01 (0.02)	0.05 (0.05)	0.06 (0.06)	-0.02 (0.02)	0.04 (0.04)	0.11** (0.05)
age <sup>(a)</sup>	-	x	x	-	x	x	-	x	x
age <sup>2</sup>	-	-	x	-	-	x	-	-	x
<i>N</i>	1909	1907	1907	1917	1915	1915	1920	1918	1918
<i>AIC</i>	2455.8	2450.1	2448.5	2080.2	2077.9	2079.8	1479.4	1474.2	1470.3

Notes: marginal effects are presented, robust standard errors in parentheses, \*\*\* p-value  $\leq 0.01$ , \*\* p-value  $\leq 0.05$ , \* p-value  $\leq 0.1$ . Models (1), (2) and (3) include dummy variables for interview and birth year. <sup>(a)</sup>: age in months.  $AIC = -2\ln L - 2k$  where  $\ln L$  is the maximized log-likelihood of the model and  $k$  is the number of parameters estimated. Given two models, the one with the smaller AIC (Akaike Information Criterion) fits the data better than the one with the larger.

[▶ Marginal effects on poor health](#)
[▶ Marginal effects on restricts activity](#)

## Health outcomes (2)

Table 2: The impact of graduating in a bad economy on health care

Dep. variable	GP consultations			Hospital outpatient consult.			Hospital inpatient consult.		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
<b>Men</b>	0.00 (0.02)	0.00 (0.05)	-0.06 (0.05)	0.00 (0.02)	-0.02 (0.05)	-0.01 (0.06)	-0.01 (0.01)	0.03 (0.04)	0.04 (0.04)
age <sup>(a)</sup>	-	x	x	-	x	x	-	x	x
age <sup>2</sup>	-	-	x	-	-	x	-	-	x
AIC	809.6	811.3	809.6	873.0	874.5	876.4	442.0	442.2	443.9
N	1094	1093	1093	1095	1094	1094	1034	1033	1033
<b>Women</b>	0.04** (0.02)	0.11** (0.05)	0.17*** (0.06)	0.00 (0.01)	-0.02 (0.04)	0.00 (0.04)	0.01 (0.02)	0.02 (0.04)	0.05 (0.05)
age <sup>(a)</sup>	-	x	x	-	x	x	-	x	x
age <sup>2</sup>	-	-	x	-	-	x	-	-	x
N	1920	1918	1918	1918	1916	1916	1920	1918	1918
AIC	1984.1	1979.9	1979.5	1376.0	1374.2	1375.8	1675.9	1669.8	1669.5

Notes: marginal effects are presented, robust standard errors in parentheses, \*\*\* p-value  $\leq 0.01$ , \*\* p-value  $\leq 0.05$ , \* p-value  $\leq 0.1$ . Models (1), (2) and (3) include dummy variables for interview and birth year. <sup>(a)</sup>: age in months.  $AIC = -2\ln L - 2k$  where  $\ln L$  is the maximized log-likelihood of the model and  $k$  is the number of parameters estimated. Given two models, the one with the smaller AIC (Akaike Information Criterion) fits the data better than the one with the larger.

## Health outcomes (3)

Table 3: The impact of graduating in a bad economy on health behaviour

Dep. variable	Currently smokes			Ever smoked			Drinking <sup>(b)</sup>		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
<b>Men</b>	0.04 (0.04)	0.09 (0.11)	0.22* (0.12)	0.06* (0.03)	0.17** (0.08)	0.27*** (0.09)	-0.02 (0.04)	-0.03 (0.11)	0.02 (0.12)
age <sup>(a)</sup>	-	x	x	-	x	x	-	x	x
age <sup>2</sup>	-	-	x	-	-	x	-	-	x
<i>N</i>	619	618	618	619	618	618	597	596	596
<i>AIC</i>	852.7	853.1	851.1	687.7	684.0	682.4	844.8	845.5	846.8
<b>Women</b>	-0.01 (0.03)	0.04 (0.08)	0.02 (0.09)	-0.01 (0.03)	0.09 (0.07)	0.09 (0.08)	0.04 (0.03)	0.01 (0.08)	-0.01 (0.09)
age <sup>(a)</sup>	-	x	x	-	x	x	-	x	x
age <sup>2</sup>	-	-	x	-	-	x	-	-	x
<i>N</i>	1029	1027	1027	1029	1027	1027	945	943	943
<i>AIC</i>	1416.1	1414.6	1416.5	1280.8	1279.5	1281.5	1202.3	1201.3	1203.2

Notes: marginal effects are presented, robust standard errors in parentheses, \*\*\* p-value  $\leq 0.01$ , \*\* p-value  $\leq 0.05$ , \* p-value  $\leq 0.1$ . Models (1), (2) and (3) include dummy variables for interview and birth year. <sup>(a)</sup> : age in months. <sup>(b)</sup> : moderate to heavy drinking.  $AIC = -2\ln L - 2k$  where  $\ln L$  is the maximized log-likelihood of the model and  $k$  is the number of parameters estimated. Given two models, the one with the smaller AIC (Akaike Information Criterion) fits the data better than the one with the larger.

## Health outcomes (4)

**Table 4:** The impact of leaving school in a bad economy on health outcomes (model 3)

	Men			Women		
	m.e.	s.e.	<i>N</i>	m.e.	s.e.	<i>N</i>
<i>Probit estimations</i>						
<b>Health status</b>						
Poor health	0.10	(0.09)	1043	0.17***	(0.07)	1907
Longstanding illness	0.06	(0.08)	1095	0.06	(0.06)	1915
Restricts act	-0.03	(0.05)	1094	0.11**	(0.05)	1918
<b>Health care</b>						
GP consultations	-0.06	(0.05)	1093	0.17***	(0.06)	1918
Hospital outpatient consultation	-0.09	(0.06)	1094	-0.00	(0.04)	1916
Hospital inpatient consultation	0.04	(0.04)	1033	0.05	(0.05)	1918
<b>Health behaviour</b>						
Currently smokes	0.22*	(0.12)	618	0.03	(0.09)	1027
Ever smoked	0.27***	(0.09)	618	0.09	(0.08)	1027
Moderate to heavy drinking	0.02	(0.13)	596	-0.01	(0.09)	943

Notes: marginal effects (m.e.) are presented, robust standard errors in parentheses (s.e.), \*\*\* p-value  $\leq 0.01$ , \*\* p-value  $\leq 0.05$ , \* p-value  $\leq 0.1$ . Our models include age in month, (age in month)<sup>2</sup>, dummy variables for interview and birth year.

## Robustness checks

- Run a placebo test using the 1953 and 1954 cohorts – each school cohort faced same school-leaving unemployment rates at the end of compulsory schooling. [▶ Placebo test](#)
- Differential incentives to take the GCE O-Level/CSE examinations at the end of Year 11.
  - Our results are virtually unchanged when controlling by a dummy indicating whether an individual holds a Year-11 equivalent degree.
- Results virtually unchanged when using school-leaving unemployment rates instead of dummy variable  $T_i$ .

# Labour-market outcomes

**Table 5:** The impact of leaving school in a bad economy on labour-market outcomes (model 3)

	Men			Women		
	m.e.	s.e.	N	m.e.	s.e.	N
<i>Probit regressions</i>						
<i>Economic status</i>						
Keeping house	0.01	(0.03)	495	0.07	(0.07)	1918
Unemployed	0.06	(0.06)	1095	-0.02	(0.03)	1918
<b>For those currently employed</b>						
Less than 1 month	0.04	(0.05)	512	0.05	(0.04)	805
Less than 3 months	-0.02	(0.05)	613	0.06	(0.07)	861
Less than 6 months	-0.04	(0.06)	723	0.03	(0.08)	861
Less than 1 year	0.01	(0.09)	723	-0.05	(0.09)	861
Less than 5 years	-0.00	(0.11)	723	-0.06	(0.10)	861
More than 5 years	0.00	(0.11)	723	0.06	(0.10)	861
<i>Linear regressions</i>						
Earnings (log)	-0.03	(0.11)	799	-0.17	(0.17)	957

Notes: marginal effects (m.e.) are presented, robust standard errors in parentheses (s.e.), \*\*\* p-value  $\leq 0.01$ , \*\* p-value  $\leq 0.05$ , \* p-value  $\leq 0.1$ . Our models include age in month, (age in month)<sup>2</sup>, dummy variables for interview and birth year.

# Summary results

- Leaving school in a bad economy :
  - seems to increase poor health, GP consultations, restricts activity among women.
  - may affect smoking behaviour among men.
  - has no effect – for both men and women – on unemployment, inactivity patterns and earnings.

## Conclusion

- Leaving school in a bad economy :
  - seems to increase GP consultations, poor health and probability to declare restricts activity among low-educated women in the UK.
  - may affect smoking behaviour among men.
- Additional piece of evidence in a new and increasing literature.
- Cumulative effect versus initial shock?

## Limitations

- External validity :
  - similarity between the 1958-1959 cohorts and current cohorts of school-leavers ?
  - similarity between the 1973 oil crisis and current Great recession ?

## References

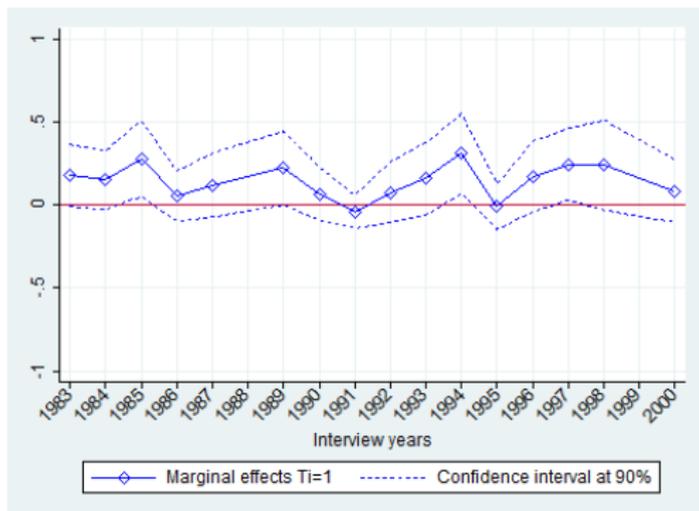
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# Middle to long-term effect on women's restricts activity illness

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Figure 6: Marginal effects on women's restricts activity (GHS 1983-2000)







# Placebo test

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**Table 6:** The impact of leaving school in a bad economy on health outcomes for the 1953-54 cohorts (model 3)

	Men			Women		
	m.e.	s.e.	<i>N</i>	m.e.	s.e.	<i>N</i>
<i>Probit estimations</i>						
<b>Health status</b>						
Poor health	-0.05	(0.11)	631	-0.13	(0.08)	1204
Longstanding ill	0.06	(0.11)	664	-0.02	(0.08)	1210
Restricts act	0.00	(0.07)	663	-0.02	(0.06)	1213
<b>Health care</b>						
GP consultations	-0.04	(0.06)	664	0.04	(0.07)	1211
Hospital outpatient consultation	-0.10	(0.06)	664	-0.08	(0.05)	1212
Hospital inpatient consultation	-0.02	(0.04)	619	-0.07	(0.05)	1212
<b>Health behaviour</b>						
Currently smokes	-0.09	(0.15)	390	0.18	(0.11)	653
Ever smoked	0.03	(0.11)	362	0.10	(0.09)	653
Moderate to heavy drinking	-0.24	(0.15)	372	-0.04	(0.11)	617

Notes: marginal effects (m.e.) are presented, robust standard errors in parentheses (s.e.), \*\*\* p-value  $\leq 0.01$ , \*\* p-value  $\leq 0.05$ , \* p-value  $\leq 0.1$ . Our models include age in month, (age in month)<sup>2</sup>, dummy variables for interview and birth year.

# Does health insurance encourage the rise in medical prices? A test on balance billing in France

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16 March 2015



- 1 Introduction
- 2 French regulation of ambulatory care
- 3 Data & Empirical strategy
- 4 Results
- 5 Conclusion

# Motivation

- Social health insurances are designed to favor access to care
- BUT the effectiveness of coverage depends on their ability to control prices

## **Balance billing : physicians are allowed to charge their patients more than the regulated fee**

- Increase in out-of-pocket (OOP) payments
- SHI coverage might favor the demand for expensive physicians who increase their fees in return
- Increase in premiums for SHI policyholders or/and increase in OOP

## Policy Questions

- Should balance billing be restricted or forbidden ?
- Should coverage of balance billing be restricted ?
- Should the government only monitor the supply for care ?
- Should the government allow balance billing to promote various levels of care quality ?

## Purpose of this paper

**Measure the causal impact of a positive shock on supplementary health coverage on the use of physicians who charge balance billing**

Scope: France, 2010-2012  
Ambulatory care, specialists consultations

At stake: Moral hazard induces inflationary effect on medical prices  
BB can increase welfare through higher quality of care

Other questions: What is the influence of supply organization ?  
Does balance billing limit access to care ?

## Literature (1/2)

### What is the effect of Balance billing on social welfare ?

Balance billing is just a transfer from patients with high WTP to physicians

- Paringer (1980), Mitchell & Cromwell (1982), Zuckerman & Holahan (1989)

Balance billing allows physicians to perform higher quality of care

- Glazer & McGuire (1993), Kifmann & Scheuer (2011)

Balance billing might limit access to care

- Jelovac (2013)

### Empirical evidences

- McKnight (2007), US data : limiting BB reduces OOP without any change on health care use → simple rent extraction ?
- Desprès and alii (2011), French data : foregone care is more frequent in regions where BB is higher → health care access issues ?

## Literature (2/2)

### What could be the effect of a generous coverage on BB ?

(1) On the supply side : physicians may increase their fees in response to insurance coverage

- Feldstein (1970, 1973), Sloan (1982), Feldman & Dowd (1991), Chiu (1997), Vaithianathan (2006)

(2) On the demand side :

- Moral hazard : *"the slope of health care spending, with respect to price"* (Einav, Finkelstein and alii, 2013)
- Assuming a negative price elasticity of demand, a better coverage leads to a decrease in net health care price and an increase in health care consumption
  - Pauly (1974), RAND experiments (1987), Chiappori (1998)

## French regulation of ambulatory care

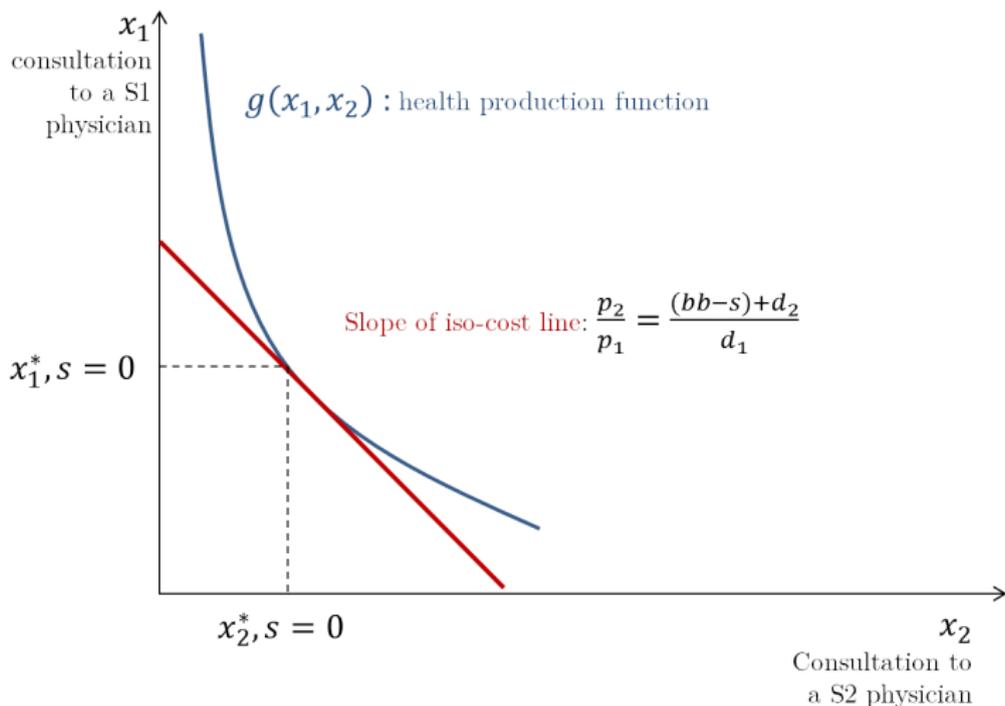
- Physicians are self-employed and paid on a fee-for-service basis
- Sector 1 (S1) physicians are not allowed to charge more than the reference fee
- Sector 2 (S2) physicians are allowed to balance bill their patients
- S1 and S2 physicians are supposed to provide the same quality of care
- BB is not an issue for GPs: 87% are in Sector 1 in 2012 → focus on specialists: 42% are in Sector 2 in 2012

A patient can choose to visit a sector 1 or a sector 2 specialist

Her decision to visit a S2 specialist rather than a S1 will depend on

- her beliefs on S2 quality :  $g(x_1, x_2)$
- the generosity of her SHI coverage for balance billing
- cost of access to S1 or S2 specialists: distance, availability

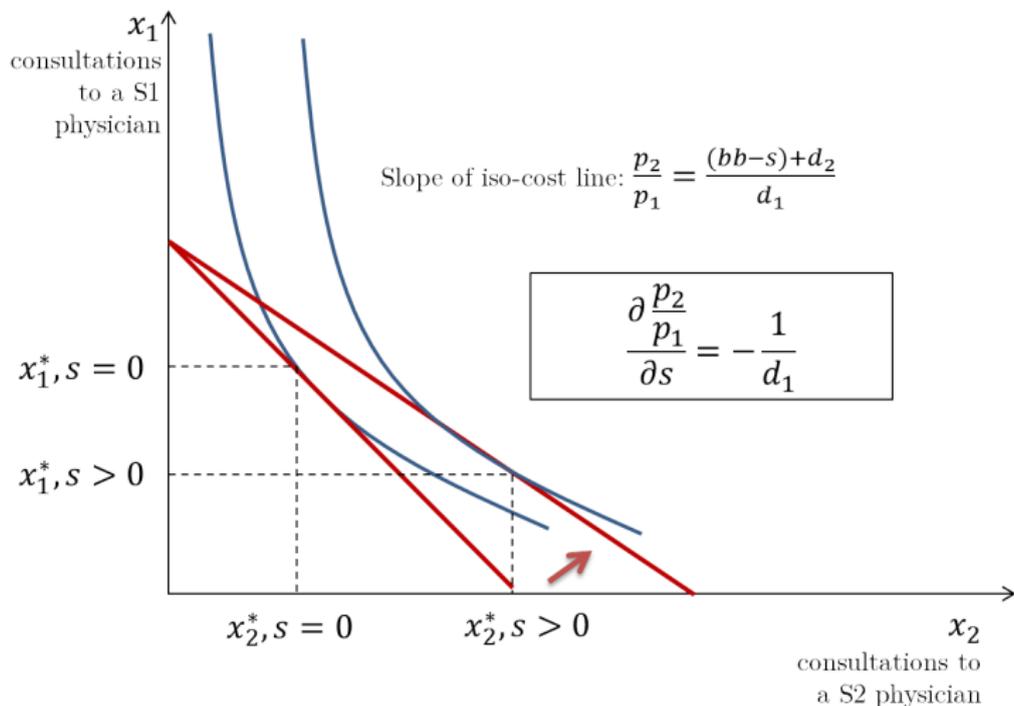
# The decision to consult a S2 specialist



$bb$  : balance billing     $s$  : supplementary insurance coverage

$d_1, d_2$  : costs relative to search, transportation and waiting time for a visit in S1 or S2

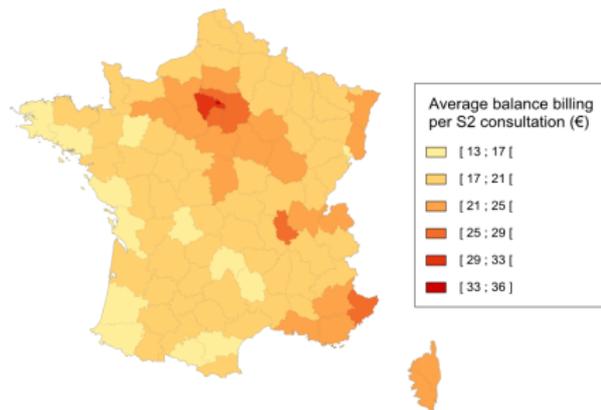
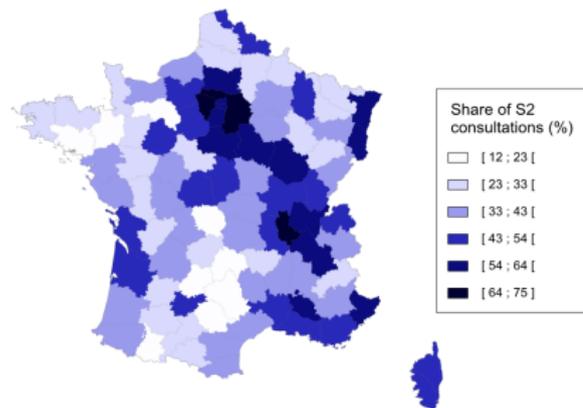
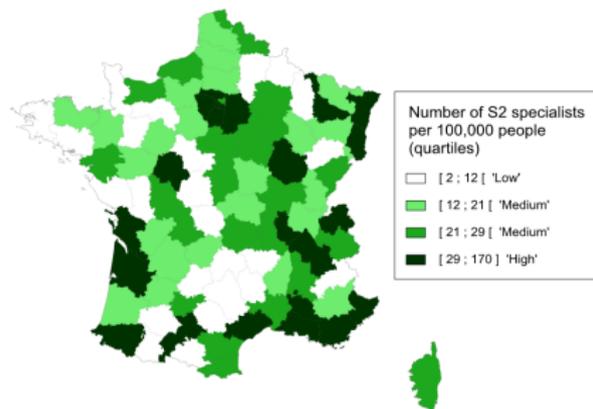
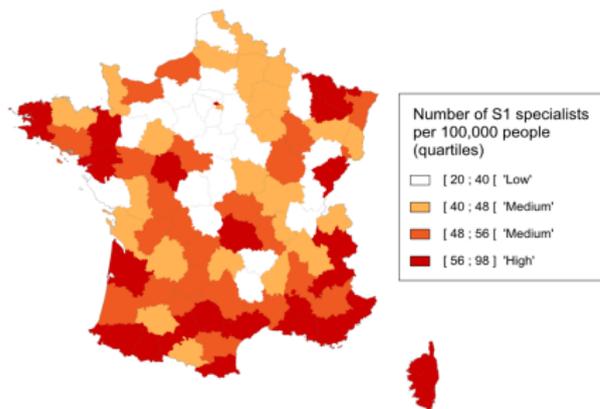
# The effect of a better coverage for BB



$bb$  : balance billing     $s$  : supplementary insurance coverage

$d_1, d_2$  : costs relative to search, transportation and waiting time for a visit in S1 or S2

# Availability of S1 and S2 specialists and BB



- 1 Introduction
- 2 French regulation of ambulatory care
- 3 Data & Empirical strategy**
  - Data
  - Empirical strategy
- 4 Results
- 5 Conclusion

# Data

## **MGEN features :**

- "Mutuelle" : Non Profit insurance cooperative
- MGEN is mandatory for teachers for basic HI
- MGEN Supplemental health insurance is voluntary
- There is only one SHI contract with no BB coverage
- SHI premium are proportional to wage

## **Variables, from 2010 to 2012 :**

- socio-dem characteristics, income, health, specialist:population ratios (SPR)
- health care consumption before and after switching

# Stayers vs Switchers

Table 1 : Control and treatment groups

Control Group : STAYERS (N=87,291)

Basic Insurance (MGEN)		
2010	2011	2012
SHI MGEN		

Treatment Group : SWITCHERS (N=7,940)

Basic Insurance (MGEN)		
2010	2011	2012
SHI MGEN		New SHI



## Variables of interest

- *After they quit MGEN, do switchers visit specialists more often ?*
  - Number of visits to a specialist :  $Q$
- *Do they consume a higher share of sector 2 consultations ?*
  - Share of S2 visits in the total number of visits :  $Q2/Q$
  - Average amount of balance billing per visit :  $BB/Q$
- *Do sector 2 specialists charge them more ?*
  - Average amount of balance billing per sector 2 visit :  $BB/Q2$

## Empirical specification

### (1) Estimation with fixed effects on years 2010 and 2012 (OLS)

$$Y_{it} = \beta_0 + \tau QUIT_{it} + \lambda 2012_t + \beta_1 X_{it} + \beta_2 S_{it} + \alpha_i + \epsilon_{it}, t = 2010, 2012$$

$QUIT = 1$  for Switchers in 2012, 0 else ;  $2012 = 1$  in 2012, 0 else

$X_{it}$  : demand characteristics ;  $S_{it}$  : supply characteristics ;  $\alpha_i$  : individual fixed effect

- This specification allows for possible correlation between individual unobserved heterogeneity and decision to quit

### (2) IV estimation with fixed effects (2SLS)

- The effect of a better coverage is identified and consistent even if  $Cov(QUIT_{it}, \epsilon_{it}) \neq 0$  provided that instruments are exogenous and correlated with  $QUIT$
- We use *retirement in 2011 before 55* and *moving in 2011* as excluded instruments

- 1 Introduction
- 2 French regulation of ambulatory care
- 3 Data & Empirical strategy
- 4 Results**
  - Descriptive statistics
  - Impact of a better coverage on balance billing
- 5 Conclusion

## Sample

- Switchers are **younger and healthier** than Stayers

Table 2 : Individual characteristics of stayers and switchers in 2010

	N	Women %	Age mean (sd)	Income mean (sd)	Chronic Disease %
Stayers	87,291	65	55.4 (15.3)	2434 (774)	17.5
Switchers	7,940	71 ^	42.5 ^ (13)	2399 ^ (770)	6.8 ^

^ Significantly different from Stayers,  $p < 0.001$

We restrict our sample to individuals who had **at least one specialist visit** in 2010 (*if spe=1*)

- Number of Stayers *if spe=1* : **53,202**
- Number of Switchers *if spe=1* : **5,134**

## Balance billing consumption

Table 3 : Total amount of balance billing in 2010, if  $Spe=1$

		Whole sample mean ( <i>sd</i> )	Low SPR in S2 mean ( <i>sd</i> )	High SPR in S2 mean ( <i>sd</i> )
BB	Stayers	30 (58.9)	11.5 (31.2)	42 (74)
<i>if Spe=1</i>	Switchers	41 <sup>^</sup> (72.8)	13 (26.7)	53.6 <sup>^</sup> (85.5)

<sup>^</sup> Significantly different from Stayers,  $p < 0.001$

- Even when they had no BB coverage, Switchers consumed more balance billing than Stayers in 2010
- When controlling for income, chronic disease, and supply side drivers, the average amount of BB per consultation is 19% higher for switchers

# Effect of SHI coverage - Whole sample

- A better SHI coverage increases by 9% the share of S2 consultations, with no impact on the number of visits to a specialist

Table 4 : Effect of a more comprehensive coverage on balance billing

Estimations with individual fixed effects, T=2010,2012

	log(Q)	log(Q2/Q)	log(BB/Q)	log(BB/Q2)
(1) Whole sample				
OLS	0.00	0.01	0.04*	-0.00
2SLS $\ddagger$	0.15	<b>0.09**</b>	<b>0.34*</b>	-0.15

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$  (1)N=58,336

Control: 2012, income, CD, inpatient stays, GP, specialist population ratio, exp. phy.

Instruments :  $\ddagger$  = Retired before 55;  $\ddagger$  = moved out

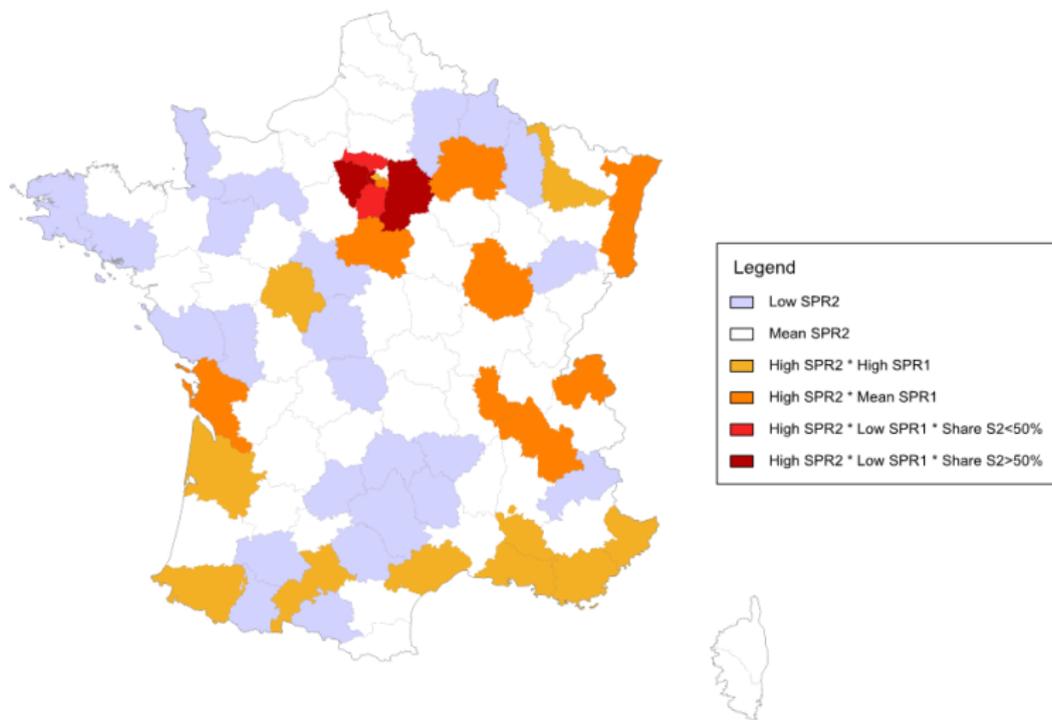
## Tests for 2SLS regression on $\log(Q2/Q)$

\*Instruments are well correlated with QUIT (First stage Fstat = 336)

\*Exogeneity of QUIT rejected (Hausman test stat=4.66 ( $p$ -value=0.03))

\*Sargan test stat=0.048 ( $p$ -value=0.82)

Table 5 : Crossed levels of S1 and S2 specialist:population ratios in 2010



# Effect of SHI coverage and supply side organization (2/3)

- Positive and significant impact of SHI on the share of S2 consultations (+19%) for patients who lived in regions with a high sector 2 specialist:population ratio (50% of our sample)

**Table 6 :** Effect of a more comprehensive coverage on balance billing

Estimation with individual fixed effects, T=2010,2012

		log(Q)	log(Q2/Q)	log(BB/Q)	log(BB/Q2)
<i>(5) Low SPR2</i>					
	OLS	-0.05	0.01	0.06	0.08
	2SLS $\eta$	0.56	0.04	-0.52	-0.91*
<i>(6) High SPR2</i>					
	OLS	0.03	0.01*	0.08**	0.00
	2SLS $\eta$	0.14	0.19***	0.80**	0.01

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$  (5)N=6,248 ; (6)N=28,711

Control: 2012, income, CD, inpatient stays, GP, specialist population ratio, exp. phy.

Instruments :  $\eta$  = Retired before 55

# Effect of SHI coverage and supply side organization (3/3)

- (7) High S1 specialist:population ratio : **No impact of change in BB coverage**
- (8) Low & medium S1 specialist:population ratio : Positive and significant effect of SHI coverage on the **share of S2 visits (+23%)**
- (10) Low S1 specialist:population ratio + proportion of S2 > 50% : increase in the **quantity of consultations (+85%)**

Table 7 : Effect of a more comprehensive coverage on balance billing

Estimation with individual fixed effects, T=2010,2012

		log(Q)	log(Q2/Q)	log(BB/Q)	log(BB/Q2)
<i>(7) High SPR2*High SPR1</i>					
	OLS	0.01	0.01	0.07	0.00
	2SLS $\hat{\beta}$	<b>0.12</b>	<b>0.15</b>	<b>0.61</b>	-0.04
<i>(8) High SPR2*Low &amp; medium SPR1</i>					
	OLS	0.03	0.01	0.07*	0.00
	2SLS $\hat{\beta}$	0.15	<b>0.23**</b>	<b>0.99**</b>	0.06
<i>(10) High SPR2*Low SPR1</i>					
<i>*Proportion of S2&gt;50%</i>					
	OLS	0.01	0.01	0.08	-0.00
	2SLS $\hat{\beta}$	<b>0.85**</b>	0.20	1.19*	-0.14

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01 (7)N=13,974 ; (8)N=14,737 ; (10)N=3,735

# Robustness checks (1/2)

- Only one instrument (retired before 55) can be used for estimation on local sub-samples
- One has to check the robustness of estimates on total sample with this instrument

Table 8 : Estimations on total sample with one or two instruments

	log(Q)	log(Q2/Q)	log(BB/Q)	log(BB/Q2)
<i>(1) Whole sample</i>				
2SLS ‡†	0.15	0.09**	0.34*	-0.15
2SLS ‡	0.15	0.08*	0.29	-0.05

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$  (1)N=58,336

Control: 2012, income, CD, inpatient stays, GP, specialist population ratio, exp. phy.

Instruments : ‡ = Retired before 55; † = moved

# Robustness checks (2/2)

- The instrument retired before 55 concerns mostly women
- One has to check the robustness of results when restricting the sample to women younger than 56

Table 9 : Estimation on women below 56

		log(Q)	log(Q2/Q)	log(BB/Q)	log(BB/Q2)
<i>(5) Low SPR2</i>					
	2SLS $\natural$	0.56	0.04	-0.52	-0.91*
	Women under 56 - 2SLS $\natural$	1.35**	0.00	-0.60	-0.91*
<i>(6) High SPR2</i>					
	2SLS $\natural$	0.14	0.19***	0.80**	0.01
	Women under 56 - 2SLS $\natural$	0.57**	0.21**	0.99**	0.04
<i>(7) High SPR2*High SPR1</i>					
	2SLS $\natural$	0.12	0.15	0.61	-0.04
	Women under 56 - 2SLS $\natural$	0.51	0.11	0.52	-0.08
<i>(8) High SPR2*Low &amp; medium SPR1</i>					
	2SLS $\natural$	0.15	0.23**	0.99**	0.06
	Women under 56 - 2SLS $\natural$	0.64	0.31**	1.44**	0.18

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Control: 2012, income, CD, inpatient stays, GP, specialist population ratio, exp. phy.

Instruments :  $\natural$  = Retired before 55

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## Main findings (1/2)

### Evidence of moral hazard

- A better coverage of balance billing by supplemental health insurance leads patients to increase the share of S2 visits

### Heterogeneity in preferences for sector 2 specialists

- Switchers use more S2 specialists and pay more BB

## Main findings (2/2)

### Heterogeneity in the impact of better SHI coverage

- No significant impact of better coverage in areas where
  - there are few S2 specialists (who balance bill their patients)
  - there are enough S1 specialists (who charge the regulated fee)
- There is a positive impact of better coverage on the share of S2 visits (+23%) and the average BB (+99%) in areas where
  - there are many S2 specialists, and not many S1 specialists (high S2\*low and medium S1)
  - concerns about 25% of the population
- Some evidence of limitation in access to care in areas with more than 50% S2 and few S1
  - concerns about 6% of the population (but teachers are not poor people)

## Policy consequences

Evidence of heterogeneity in preferences for S2 specialists

When there is a sufficient number of S1 specialists there is no limitation in access to care nor inflationist impact of more generous supplemental coverage.

**The issues regarding balance billing could be solved with a better monitoring of supply for care**

**If there were enough Sector 1 specialists, it would be not necessary to introduce limitation in the coverage supplied by SHI**

merci !



Does health insurance encourage the rise in medical prices?  
A test on balance billing in France

Brigitte DORMONT, Mathilde PERON

PSL, Université Paris Dauphine

16 March 2015

# Joint elicitation of health and income expectations: Insights from a representative survey of the French Population.

Stéphane Luchini  
AMSE/GREQAM-CNRS

March 2014 - Journée de la Chaire Santé

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**Part of a larger project:** “Valeur de la santé” (Chaire Santé Dauphine)  
(that links expectations with preferences)

# Introduction

- Expectations, together with preferences, are a key component of economic analysis
- Health and income expectations are certainly of great importance for one's decisions in life (as well as for public policies).

Most often, economists rely on assumptions about expectations (e.g. “rational expectations”): Individual expectations are supposed to coincide with epidemiological and historical data

- Debatable:
  - 1 individuals have private information about their future health and income (Manski, 2004; Hurd, 2009)
  - 2 Average expectations can differ from actual observations.

## Introduction (continued)

- Why **eliciting** health expectations and income expectations **jointly**?

Empirical evidence shows that there exists a positive correlation between health and income, and a significant gradient over the whole range of individual situations, better health being associated with greater income (see, e.g., Deaton, 2002)

- People's expectations may also exhibit such a gradient and eliciting health and income expectations separately would not allow one to investigate this issue.
- **This paper** proposes a method that elicits jointly **health and income expectations** over the life cycle in surveys

# Eliciting Expectations

- Self-reported data on expectations
- Attitudinal research: respondents are asked whether they “think” or “expect” that an event will occur (Curtin, 1982)
- Sometimes the strength of the belief is also measured: “very,” “fairly,” “not too,” or “not at all” (Davis and Smith 1994)
- Difficulties:
  - 1 Interpersonal comparability of responses
  - 2 Information difficult to use in a “structural” analysis (i.e that uses quantitative models)

⇒ **Elicitation of probabilistic expectations** (see Manski 2004 for a review and Pessaran and Weale 2006)

## Eliciting Probabilistic Expectations

- Probabilistic expectations: well-defined numerical scale for responses, possible checks of internal consistency and calibration.
- Example:

SEE Household Income Expectations Questions: *What do you think is the percent chance (or what are the chances out of 100) that your total household income, before taxes, will be less than Y over the next 12 months?*

- Question is asked four times,  $Y$  taking 4 values (e.g. see Dominitz and Manski 1997)
- Practical difficulty for life-long income and health expectations  $\Rightarrow$  A lot of questions that may not be comprehensive enough in a standard face-to-face questionnaire.

# Joint Elicitation of Expectations

- Subjects are given **20 tokens** representing each a 5 percent chance and are asked to place them on a  $5 \times 5$  grid.
- **Health:** Typical of health-related quality of life surveys (see e.g. Ware and Sherbourne, 1992 ) and income: respondents are asked to place tokens on a  $5 \times 5$  grid
- **Monthly income:** Intervals were defined on the basis of the current French equivalized monthly income.
- Expectations are **elicited per decade** 20 to 29, 30 to 49, ... (therefore up to 9 grids per topic for less than 20 years old respondents)
- **Preliminary task:** Each respondent first asked to indicate what cell on the grid best represents his or her health state and income situation during the current decade

# Joint Elicitation of Expectations

Example:

	$\leq 1000 \text{ €}$	$\geq 1000 \text{ €}$ $\leq 1500 \text{ €}$	$\geq 1500 \text{ €}$ $\leq 2000 \text{ €}$	$\geq 2000 \text{ €}$ $\leq 3500 \text{ €}$	$> 3500 \text{ €}$
Very poor health					
Poor health					
Fair health					
Good health					
Excellent health					

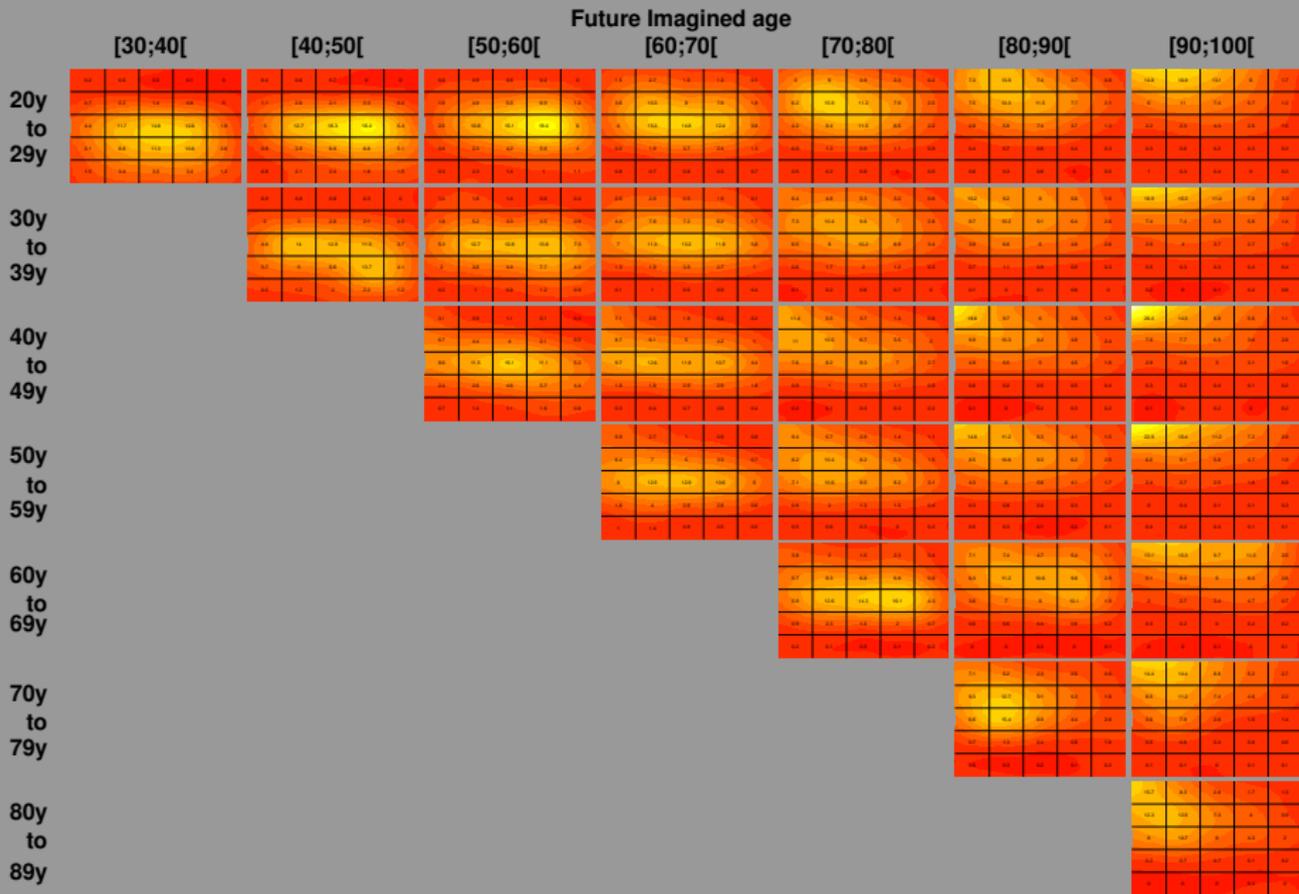
# Survey

- In November and December 2009, health and income expectations of a representative sample of 3,331 respondents from the French population, from 18 to 97 years old, were elicited.
- Survey was conducted by face-to-face interviews.

# Mean probabilistic expectations of 40 to 50 years old respondents for the imagine future age 50 to 59's

	[0; 1000[ €	[1000; 1500[ €	[1500; 2000[ €	[2000; 3500[ €	≥ 3500 €
Very poor health	3.1	0.9	1.1	0.1	0.3
Poor health	6.7	4.4	4	2.1	0.5
Fair health	8.6	11.5	15.1	11.1	5.2
Good health	2.4	2.8	4.6	5.7	4.4
Excellent health	0.7	1.4	1.1	1.6	0.6

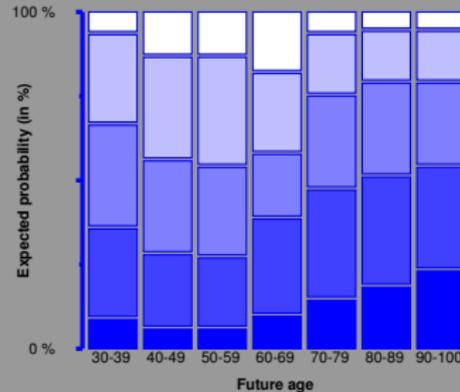
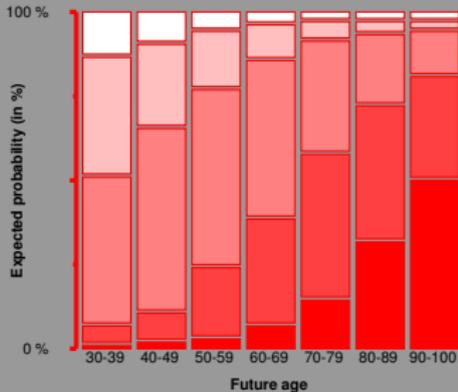
# Empirical results



# Marginal expectations by future age (1)

- ▬ Excellent health
- ▬ More than 3.5 K€
- ▬ Very good health
- ▬ Between 2 K€ and 3.5K€
- ▬ Good health
- ▬ Between 1.5 K€ and 2.0K€
- ▬ Fair health
- ▬ Between 1 K€ and 1.5K€
- ▬ Poor health
- ▬ Less than 1 K€
- ▬ Not relevant

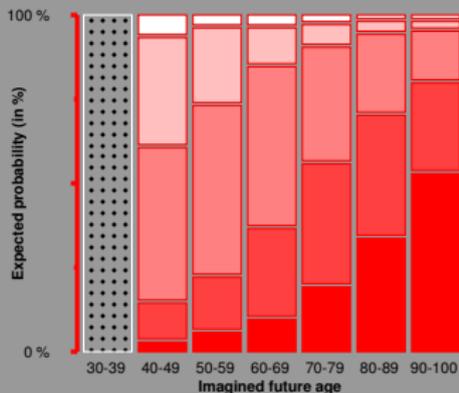
## Respondents less than 30 years old



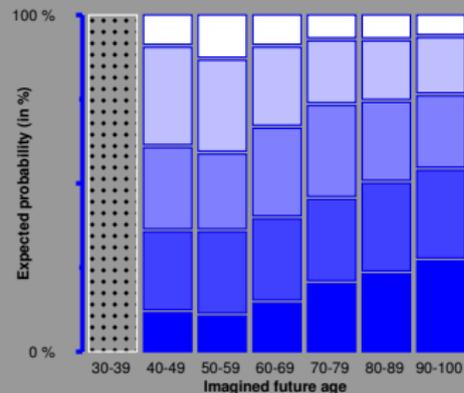
# Marginal expectations by future age (2)

## Respondents between 30 and 39 years old

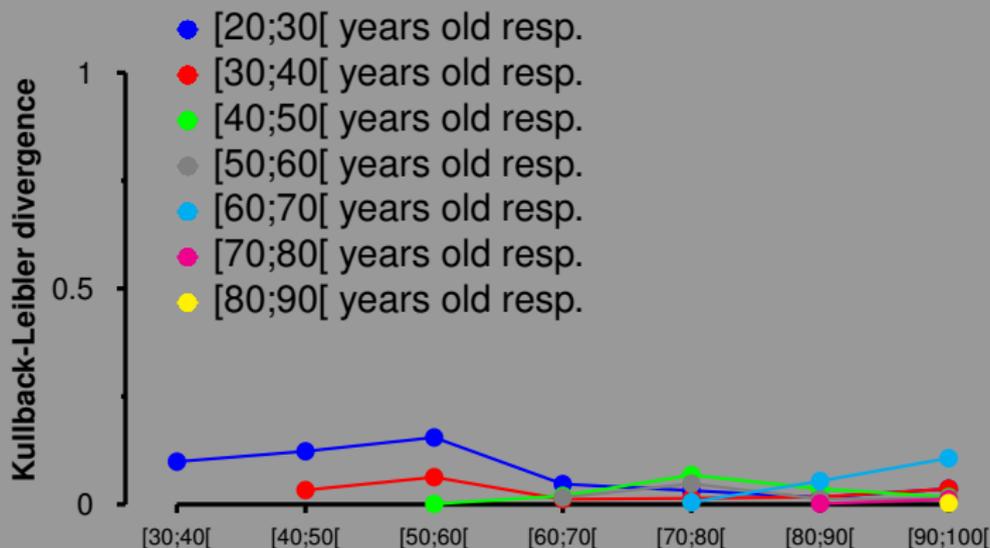
### Future health states



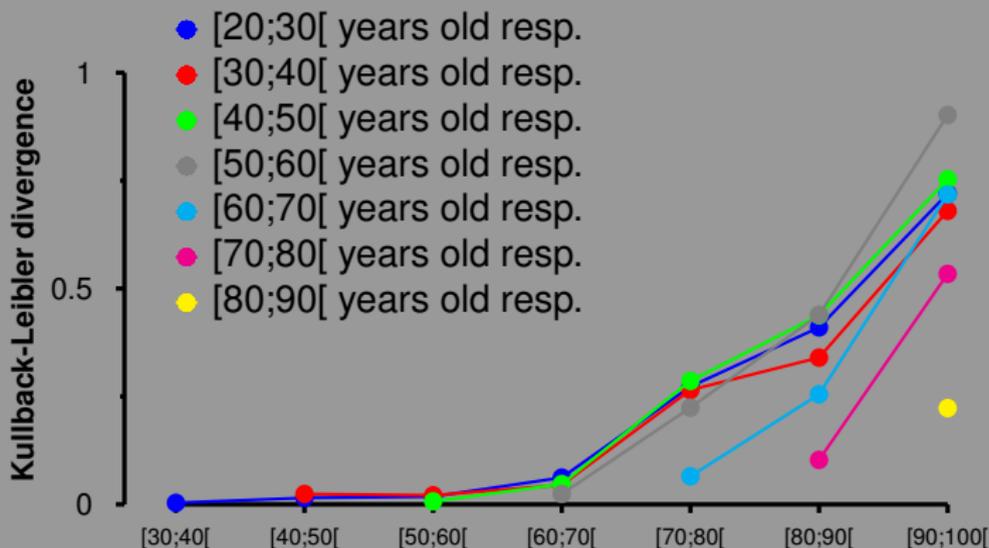
### Future income



# Divergence between income expectations and current income (Kullback-Leibler divergence)



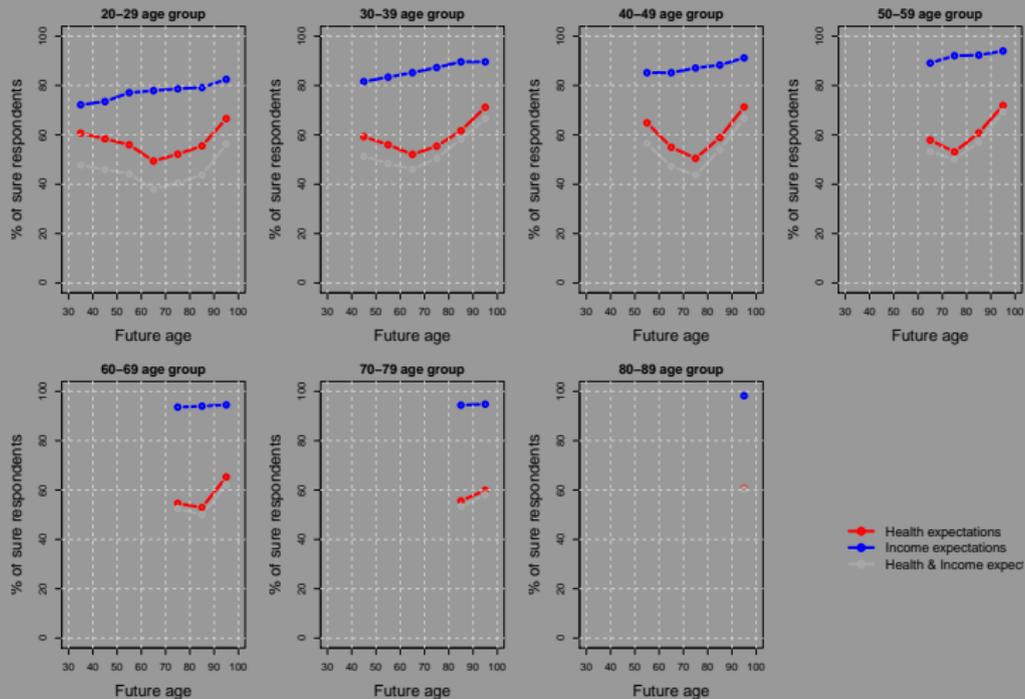
# Divergence between health expectations and current health (Kullback-Leibler divergence)



# Preliminary conclusions

- Income expectations are very close to current income
- Health expectations are close to current health except for future ages greater than 70:
  - Driven by respondents' pessimism regarding future health
- .... one may then wonder: why not **relying on current health and (in particular) current income** only instead of **eliciting expectations**?

# Level certainty of respondents by age group and decade



# Do expectations exhibit a gradient between health and income?

- Kendall's rank **correlation coefficient** between current health and income (bold figures on the diagonal) and expectations on health and income by age group and decade

Age group	Future ages							
	[20; 30[	[30; 40[	[40; 50[	[50; 60[	[60; 70[	[70; 80[	[80; 90[	[90; 100]
[20; 30[	<b>.045</b>	0.087	0.138	0.127	0.116	0.111	0.137	0.123
[30; 40[		<b>.178</b>	0.191	0.159	0.121	0.116	0.110	0.113
[40; 50[			<b>.254</b>	0.264	0.260	0.240	0.225	0.242
[50; 60[				<b>.260</b>	0.163	0.186	0.164	0.136
[60; 70[					<b>.168</b>	0.151	0.134	0.133
[70; 80[						<b>.218</b>	0.126	0.061
[80; 90[							<b>.248</b>	0.209

⇒ **Gradient** between health and income, observed between current subjective health and income, is also present in expectations

## Concluding remarks

- **At the aggregate level**, marginal income expectations very much look like current income distribution in the population: Respondents do not expect changes in permanent income in the future (given that they were asked to not account for changes induced by inflation)
- The same goes for marginal health expectations except for future ages greater than 70 for which respondents are more “pessimistic”.
- At the individual level, however, we find a substantial level of certainty (especially for income).
- Using current health and income distributions as a basis for modeling expectations (instead of eliciting expectations) would therefore **induce too much risk**.

# **Incremental versus standard WTP**

## **An application to out-of-hours and emergency care**

**Karine Lamiraud<sup>1</sup> , Robert Oxoby<sup>2</sup> Cam Donaldson<sup>3</sup>**

<sup>1</sup> ESSEC Business School and THEMA-University of Cergy Pontoise

<sup>2</sup>University of Calgary

<sup>3</sup>Glasgow Caledonian University

# 1. The standard WTP approach

## The standard WTP method

- **involves monetary valuation of benefits**
- **makes it possible to assess the strength of preferences**

## Limitations when multiple programmes are compared

- **Inability of patients' WTP values to discriminate between treatment options (essentially, the result of **embedding**)**
- **Preference reversals (Olsen and Donaldson, 1998; Olsen, 1997)**

→ To aid decision making, a basic prerequisite would be an acceptable degree of convergence between respondents' stated rankings and their rankings inferred from stated WTP values

## 2. The incremental approach

An incremental WTP approach was devised in order to encourage more differentiated answers and a higher degree of consistency among the respondents (Shackley and Donaldson, 2002)

In the incremental approach, the individual is asked

- to give a value for his/her lowest ranked programme
- how much more s/he would be willing to pay for his/her second ranked programme



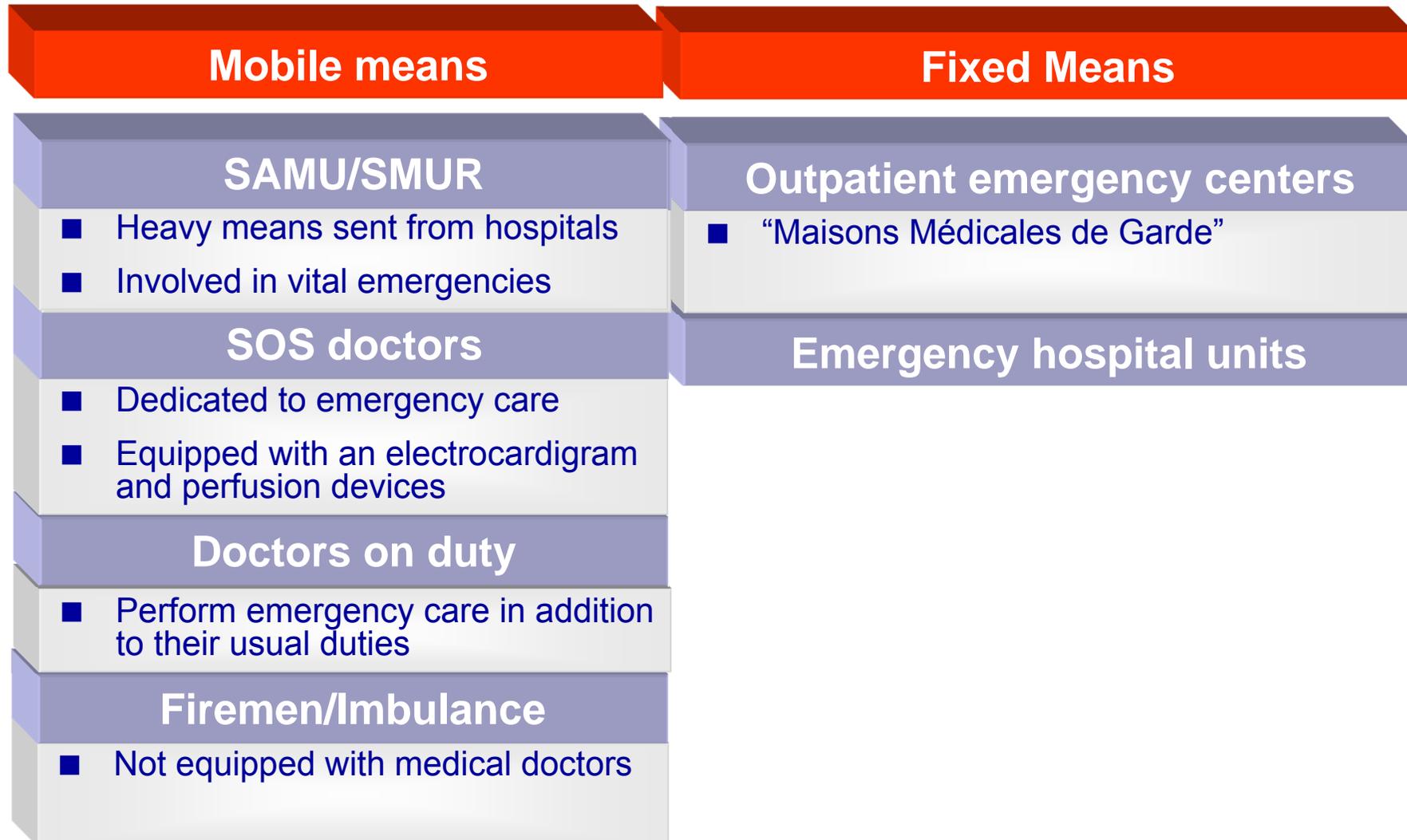
-a theoretical basis for the incremental approach has not been elucidated

- There is little evidence showing that the incremental approach might indeed achieve greater consistency between explicit rankings and implicit rankings inferred from WTP values

### 3. Objectives of this study

- One purpose of this paper is to **provide a theoretical basis** for the **incremental approach**
- This study also aims to **test** the **incremental and standard approaches**
- The context for the application is **aiding decision making about different forms of emergency and out-of-hours service** provision in France

## 4. Emergency and out-of-hours services in France



# Outline

① Theoretical framework

② WTP study

③ Statistical and econometric methods

④ Results and Discussion

# 1. Assumptions

-Based on the theory of reference dependent preferences (Schoemaker, 1982) we assume that the response of any individual to a WTP question is influenced by that person's **reference** point

-When a respondent is asked to value several competing policy alternatives, s/he is likely to compare each of these against **the status quo** (or « do nothing ») option

-**The incremental approach** redefines the reference point from which the response is measured (**the least preferred option**)

## 2. Implications

We show that :

→ in the **standard approach**, **WTP values** for each option, predominantly reflecting improvements over the status quo, **fail to discriminate among the alternatives**

→ the **incremental approach**, which redefines the reference point from which the response is measured, gives a **more discriminating value for the intensity of preferences**

# 1. WTP survey

A WTP method was implemented to assess preferences for different emergency services

## Survey

- **Telephone survey** carried out by TNS Sofres in **July 2009**
- **Representative** sample of the French **adult** population living in **urban areas** (> 100 000)
- **Two questionnaires** (**standard** and **incremental**) randomly assigned

## 2. Questionnaires

### Part A

**The interviewer described** the characteristics of each emergency and out-of-hours actor

### Part B

**Respondents** were asked to **rank these different actors in order of preference**

(from the most preferred to the least preferred option). No equal ranking was possible

### Part C

Respondents were asked to imagine that **financing mechanisms** for emergency services had been changed and that the resources should be provided by households through **insurance premia**

Respondents were then asked their **WTP for such insurance premia**

### 3. WTP questions

#### Standard questionnaire

- Respondents were asked the maximum premium that they would be willing to pay for each actor
- The order of the 6 questions was randomized so as to avoid sequence effects (Payne et al., 2000)
- Respondents had to imagine that they were given back the amount they said they were willing to pay for the previous programme

#### Incremental questionnaire

- Respondents were asked the maximum premium that they would be willing to pay for the actor ranked sixth (in part B)
- Respondents were then asked how much more they would be willing to pay for the second least preferred option
- Etc...
- Respondents were told to imagine they were given back the amount they were willing to pay for the previously valued option

## 4. Method for WTP values elicitation

① The interviewer cites an amount  
(randomly selected)

5 euros	100 euros
10 euros	110 euros
20 euros	120 euros
30 euros	130 euros
40 euros	140 euros
50 euros	150 euros
60 euros	160 euros
70 euros	170 euros
80 euros	180 euros
90 euros	More than 180 euros

② The respondents must say if this amount is an amount that they are sure they would pay

- if the respondents answer yes, then the interviewer cites the next highest amount until the respondents say no or until «more than 180 euros»
- if the respondents answer no, then the interviewer cites the next lowest amount until the respondents say yes or until « 5 euros »

## 5. WTP approach

- An **ex ante approach** (not ex post) was chosen
- An **insurance based** ex ante approach (not tax based) was chosen

# 1. Aims

**The empirical analysis aimed to test the validity of the incremental approach:**

- (i) Whether it improved consistency between respondents' explicit ranking of the providers and the ranking implied by their WTP values
- (ii) Whether it made it possible to differentiate between the various providers

## 2. Regression analyses

We built a panel dataset including 6 observations per respondent (i.e. 1680 observations)

$$RANK_{ij} = Z_j \alpha + X_{ij} \beta + \varepsilon_{ij} \quad WTP_{ij}^* = Z_j \alpha + X_{ij} \beta + \varepsilon_{ij},$$

- $WTP_{ij}^*$  is the maximal WTP of individual  $i$  for option  $j$
- $RANK_{ij}$  is the explicit rank for each actor (1 = most preferred .... 6 = least preferred)
- $X_{ij}$  is a vector of individual characteristics
- $Z_j$  represents a set of option dummies (SOS will be used as the reference)

- we estimated an **ordered probit** model on the explicit ranking
- we estimated a tobit model for WTP with left-censoring and right-censoring
- we used the **cluster option** (because each respondent assesses all six emergency options)
- the regressions were run excluding the individuals with zero answers for all six options

# 1. The study population

280 people were interviewed: 140 received the standard version, 140 received the incremental one

	All n = 280	Standard questionnaire n = 140	Incremental questionnaire n = 140	p*
Age (mean)	50.1	50.9	49.4	0.46
Male (%)	45.7	39.3	52.1	0.03
Secondary school or short professional track (%)	31.4	32.1	30.7	0.60
High school diploma (Baccalaureat)	21.4	24.3	18.6	
Short university studies (2 yrs) or long professional track (%)	15.7	14.3	17.1	
University degree higher than bachelor's (%)	31.4	29.2	33.5	
Individual is married or living in a couple (%)	57.1	57.9	56.4	0.81
Number of children under 15 living in the household (mean)	0.4	0.4	0.4	0.95
Monthly household net Income (1-10)** (mean)	5.7	5.8	5.6	0.64
Excellent self assessed health (%)	30.0	30.0	30.0	0.83
Good self assessed health (%)	47.9	49.3	46.4	
Poor self-assessed health (%)	22.1	20.7	23.6	
Individual has supplementary health insurance coverage (%)	90.7	90.7	90.7	1.00
Used at least one of the 6 emergency services in the previous year	33.3	29.3	37.9	0.13

All statistics are weighted

\* Test of difference between the standard and incremental versions  
(student t-test for continuous variables, chi2 for categorical variables)

\*\* (euros per month) 1 . < 800, 2. [800 - 1000[, 3. [1000 - 1200[, 4. [1200 - 1500[, 5. [1500 - 1800[, 6. [1800 - 2300[, 7. [2300 - 3000[, 8. [3000 - 3800[, 9. [3800 - 5300[, 10. ≥ 5300 euros

→ There were no significant differences between the 2 groups but in terms of gender distribution

## 2. Explicit ranking of actors

SMUR/SAMU was ranked first most frequently. The next most frequently first ranked programme is Imbalance/ Firemen. The least preferred option is emergency outpatient centers.

### Distribution of option ranking in the total sample (n = 280)

	1st	2nd	3rd	4th	5th	6th	
SMUR/SAMU	34.3	32.9	16.1	8.6	5.4	2.9	100.0
SOS doctors	11.8	16.4	22.1	23.9	17.5	8.2	100.0
Physicians on duty	8.2	6.8	14.6	22.9	36.4	11.1	100.0
Imbalance/ Firemen	30.0	25.7	22.9	11.1	6.4	3.9	100.0
Hospital emergency units	12.1	16.1	20.7	25.7	18.9	6.4	100.0
Outpatient emergency centers	3.6	2.1	3.6	7.9	15.4	67.5	100.0

→ The Khi2 test of differences in the distribution of respondents's answers to the ranking question revealed no significant differences between the questionnaires

### 3. Descriptive statistics for WTP (1)

WTP descriptive statistics by actor in the standard and incremental questionnaire

		SMUR/ SAMU	SOS doctors	Doctors on duty	Ambulance/ Firemen	Hospital emergency units	Outpatient emergency centres
Standard version (n = 140)	mean	41.2	36.7	37.6	34.8	32.3	26.0
	std	46.7	41.0	42.7	41.0	38.2	34.5
	median	30.0	25.0	20.0	20.0	20.0	10.0
	% of zeros	27.9	25.0	27.9	28.6	32.1	40.0
Incremental version (n = 140)	mean	103.2	66.1	59.5	97.9	69.2	41.9
	std	130.7	90.0	83.9	127.2	77.3	74.9
	median	57.5	30.0	27.5	47.5	42.5	10.0
	% of zeros	19.3	25.7	26.4	19.3	19.3	35.7

→ The SAMU/SMUR had the highest WTP while the outpatient emergency centers had the lowest

→ WTP values for all types of care were significantly higher in the incremental questionnaires

## 4. Descriptive statistics for WTP (2)

Mean and median WTP by provider, depending on the explicit ranking

	WTP in the standard version		WTP in the incremental version	
	Mean	n	Mean	n
SMUR/SAMU ranked 5-6*	35.8	12	24.1	11
SMUR/SAMU ranked $\leq$ 4th*	41.7	128	109.9	129
SOS doctors ranked 5-6*	40.2	30	32.0	42
SOS doctors ranked $\leq$ 4th*	35.7	110	80.7	98
Doctors on duty ranked 5-6*	36.0	69	30.9	64
Doctors on duty ranked $\leq$ 4th*	39.2	71	83.6	76
Ambulance/ Firemen ranked 5-6*	35.9	11	32.8	18
Ambulance/ Firemen ranked $\leq$ 4th*	34.7	129	107.5	122
Hospital emergency units ranked 5-6*	37.3	41	61.1	30
Hospital emergency units ranked $\leq$ 4th*	30.2	99	72.5	110
Outpatient emergency centres ranked 5-6*	24.5	117	26.7	115
Outpatient emergency centres ranked $\leq$ 4th*	33.7	23	111.8	25

\* based on the explicit ranking question (see Table 3)

→ For the least preferred options (ranked 5-6), mean WTP is similar in the incremental and standard versions. For options ranked 1-4, mean WTP is higher in the incremental questionnaire

## 5. Regression results

	Standard questionnaire		Incremental questionnaire	
	Ranking (1)	WTP (2)	Ranking (1)	WTP (2)
SAMU/SMUR	-0.768***	4.70	-1.086***	49.85***
SOS doctors	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>
Doctors on duty	0.409***	0.51	0.188***	-9.84*
Ambulance/ Firemen	-0.666***	-5.19	-0.82***	42.56***
Hospital emergency units	0.171	-9.30	-0.329	3.99
Outpatient emergency centres	1.741***	-18.69***	1.276***	-50.66***
Male	0.007	-4.74	-0.003	28.48
Age 18 - 30	-0.014	17.63	-0.006	69.9*
Age 31 - 50	-0.010	25.16	-0.013	31.36
Age 51 - 65	0.008	-1.64	-0.009	31.55
Age > 65	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>
Excellent health status	0.001	-0.62	-0.007	47.43***
Good health status	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>
Poor health status	0.014	-0.82	-0.02**	92.68***
Income	-0.035	1.78	0.001	8.33***
Number of children under 15 living in the household	0.008	-12.85	-0.004	-0.93
Individual has supplementary health insurance coverage	0.038	-7.65	-0.020	68.01***
Used at least one emergency service in the previous year	-0.010	-8.88*	-0.007	-43.36***
<i>n</i>	666	666	678	678
Test of normality of residuals (null hypothesis: normal errors)		0.72		0.82
Test of homoscedasticity		0.65		0.68

(1) Ordered probit models clustering for individuals (1 = most preferred option ... 6 = least preferred option)

(2) Tobit models clustering for individuals

\* significant at 0.10 level, \*\* significant at 0.05 level, \*\*\* significant at 0.001 level

All models include geographical areas (department) dummies

→ The declared WTP based on the incremental approach provides the same ranking of providers as the explicit ranking

→ The standard approach is only partially consistent with explicit ranking and proves unable to differentiate between the five most preferred providers

# Robustness checks (1)

Mean WTP by income level in the incremental approach (n = 116)

	SMUR/ SAMU	SOS doctors	Doctors on duty	Ambulance/ Firemen	Hospital emergency units	Outpatient emergency centres
net income < 1500	71.4	45.8	41.9	72.6	50.3	31.0
net income 1500 - 3000	130.5	77.8	67.8	115.0	82.5	45.8
net income > 3000	106.2	75.8	70.8	108.8	76.2	50.9

→ The highest income group did not necessarily drive the results

## Robustness checks (2)

Characteristics of individuals providing very small (<5 euros) WTP values for all 6 providers

	Individual with very small WTP for all six options n = 49	others n = 231	p*
Age (mean)	61.8	47.6	<0.01
Age 18 - 30	0.0	19.5	<0.01
Age 31 - 50	18.4	36.4	
Age 51 - 65	42.9	29.4	
Age > 65	38.8	14.7	
Male (%)	40.8	46.8	0.45
Secondary school or short professional track (%)	34.7	30.7	0.87
High school diploma (Baccalaureat)	22.5	21.2	
Short university studies (2 yrs) or long professional track (%)	12.2	16.5	
University degree higher than Bachelor's degree (%)	30.6	31.6	
Individual is married or living in a couple (%)	61.2	56.3	0.53
Number of children under 15 living in the household (mean)	0.2	0.5	0.13
Income (1-10) (mean)	6.0	5.7	0.48
Excellent self assessed health (%)	20.4	32.0	0.27
Good self assessed health (%)	55.1	46.3	
Poor self assessed health (%)	24.5	21.7	
Individual has supplementary health insurance coverage (%)	98.0	89.2	0.05
Used at least one of the 6 emergency services in the previous year	22.5	35.9	0.07

\* Test of difference between individuals with very small WTP for all six options and other individuals  
(student t-test for continuous variables, chi2 for categorical variables)

→ This suggests that excluded individuals were most probably not expressing valid preferences

## Robustness checks (3)

→ We considered the possibility that, going up the scale, the maximum WTP was an unobserved number between the last value to which the respondents said “yes” and the next one to which they would have said no

→ **An interval data regression model** was estimated in the incremental and standard questionnaires: the results were not qualitatively different

# Conclusions

- The **standard approach** is reasonably consistent with explicit ranking but proves unable to differentiate between the five most preferred actors
- The **incremental approach** provides evaluation results which are fully in line with those of explicit ranking question
- Our **empirical findings** are in line with our theoretical framework
- Our findings suggest that the incremental approach provides results that can be used in **priority setting contexts**

# Improvements on earlier work

→ It was made explicit to respondents that their budget had not been diminished by any WTP values they may have stated for previous programmes

→ Each successive programme is valued over and above that ranked immediately below it

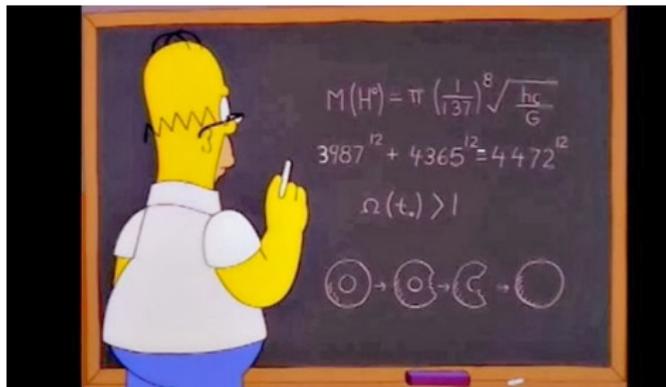
→ Respondents could perceive the ranking exercise and the WTP valuations as different processes: the wording was amended with the intention of conveying the notion of individual value in both contexts:

*“place these programmes in order of how highly you value them starting with the one you like most. When doing this, concentrate on how much you value the proposed expansions and how you value preventing the proposed reductions from going ahead”*

## A discrete choice experiment under oath

Nicolas Jacquemet, Stéphane Luchini, Jason Shogren, Verity Watson

Paris School of Economics  
Université de Lorraine, BETA



## Economic valuation of health and health care policy

- Health care is a large part of government spending
- But it is not possible to fund all treatments or interventions
- Decisions have to be made and should reflect society's (unobservable) value
- Stated preference methods (increasingly choice experiments - CEs) are used to quantify value

Such methods are useful for policy purpose only if they reflect true underlying preferences  
⇔ if they are demand revealing

## Example of choice experiment

**Choice 1: Please compare the pharmacies and tick which pharmacy, if any, you would visit**

	Pharmacy A	Pharmacy B	Do nothing
Pharmacy location	In a shopping centre	In a supermarket	You go nowhere
Find a car park space nearby	Definitely	Unlikely	No wait
Waiting time until you can deal with symptoms	12 hours	1 day	You don't speak to a health professional
You are served by	A <u>trained</u> medicine counter assistant	A pharmacist	No different
Who is	Not friendly & unapproachable	Friendly & approachable	£0
Asks questions about your symptoms and general health	Yes	No	
After speaking with pharmacy staff	You <b>don't understand</b> your symptoms any better and you <b>don't feel</b> like you <b>know the best</b> thing to do to manage them	You <b>understand</b> your symptoms better and you <b>feel</b> like you <b>know the best</b> thing to do to manage them	
Cost	£25.00	£15.00	
	I would visit pharmacy A	I would visit pharmacy B	I would do nothing
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tick one box

## Are CEs demand revealing?

Field experiments comparing hypothetical values from CE with 'real' values

- **Health** - hypothetical and real values differ (Mark & Swait, 2004, *HE*; Ryan et al, 2009, *HE*)
- **Environment** - hypothetical values higher than real, more 'opt-in' (Ready et al, 2010, *Land Econ*; Carlsson & Martinsson, 2003, *JEEM*; Lusk & Schroeder, 2004, *AJAE*)
- **Transportation** - hypothetical values of time are lower than real (Hensher, 2010 *Transport Res.*; Fifer et al, 2014, *Transport Res.*)

but such evidence comes from the comparison between two stated preferences – no reliable benchmark

- To test choices are demand revealing need to know true values
- Induced value experiment (Smith, 1976, AER)
- Monetary rewards are used to induce values for artificial goods – preferences are known to, and controlled by, the experimenter.

In the stated pref. literature, IV studies find no difference between hypothetical and real, but responses are not demand revealing (Collins and Vossler, 2009; Jacquemet, Joule, Luchini, and Shogren, 2009; Mitani and Flores, 2009; Taylor, McKee, Laury, and Cummings, 2001; Vossler and McKee, 2006).

## Target behavior: an IV discrete choice experiment

Luchini and Watson (2014), *Economics Letters*.

Discrete attributes associated with monetary values, and combined to generate alternatives:

**Red = £1**

**Blue = £2**

**Yel = £1.5**

+

**S = £0.5**

**M = £2.50**

**L = £4**

+

**○ = £1.50**

**△ = £3**

**□ = £6**

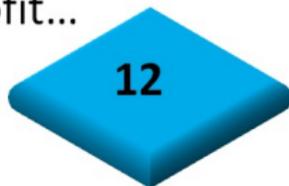
## Design of the baseline experiment: an overview

Students from University of Aberdeen – 5 real sessions (54 subjects), 4 hypothetical sessions (47 subjects).

- Subjects make nine choices
- Same choices – randomised order

	A	B
Colour	Red	Blue
Size	Circle	Square
Shape	Small	Large
Cost	£2	£4

Should pick the one with the highest profit...

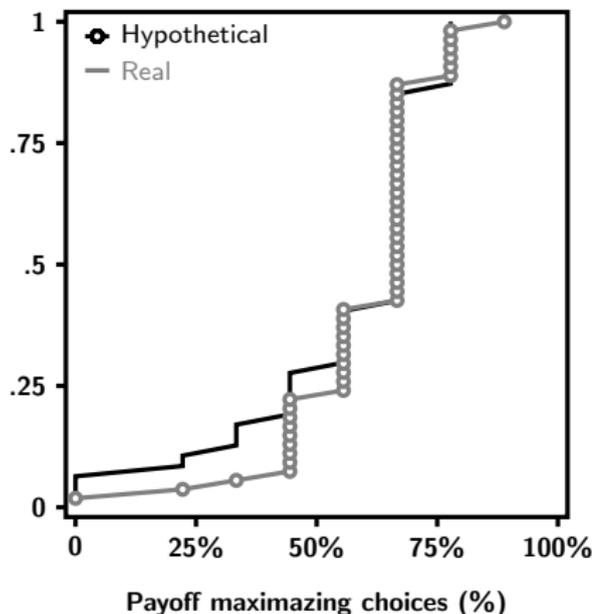


Profit =

1

8

## The open challenge: share of payoff maximizing choices



**Real** treatment: 60% of choice are payoff maximizing ;

**Hyp.** treatment: 56% \_\_\_\_\_;

- No significant difference, but strong evidence that DCE is not preference revealing.

This paper: why this happens, and how to define non-monetary institutions that improve preference revelation ?

## This paper

Why this happens, and how to define non-monetary institutions that improve preference revelation.

### ① Limited cognitive ability of subjects:

Exp. 1 We provide subjects with calculators, and record their use of it.

- 3 sessions (47 subjects) (3 hypothetical sessions with a calculator were also run as a benchmark).

### ② Lack of commitment towards the revelation exercise

Previous evidence show that a truth-telling oath enhance preference revelation in Vickrey auction, Referendum, BDM and (homegrown) DCE revelation mechanisms

- Grounded on the **social psychology of commitment**: decisions made along a sequence of actions induce drastic changes in subsequent decision making.

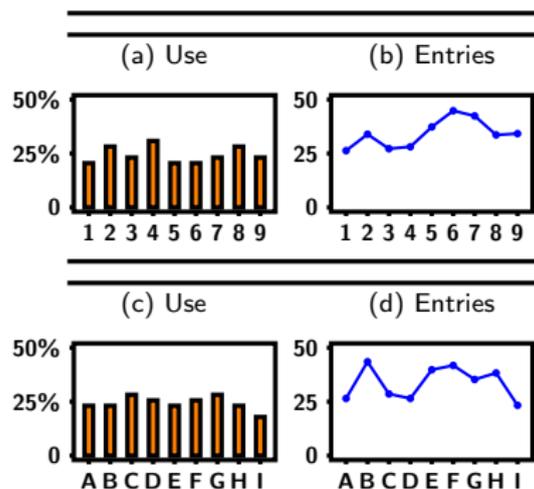
Exp. 2 Truth telling oath added before the DCE experiment takes place:

*“I, the undersigned ... do solemnly swear that, during the whole experiment, I will:  
Tell the truth and always provide honest answers”*

- Subjects told - signing is free, participation and earnings are not conditional on signing;
- 3 sessions, identical in all other aspects (44 subjects) – all but 1 signed the oath.

## Cognitive ability: IV DCE with a calculator help

Observed use of the calculator

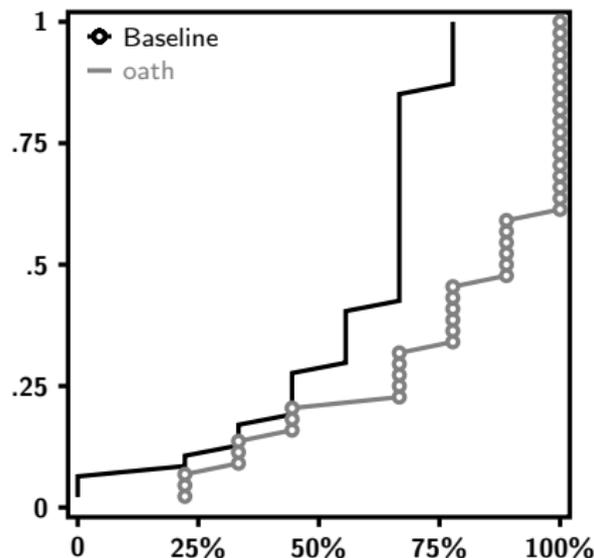


	Value			Hyp.	Real	Calc.
	A	B	≠	N = 47 %	N = 46 %	N = 47 %
A	5.5	6.5	1	14.9	5.0	5.2
B	2.5	9.5	7	38.3	33.3	30.8
C	3.5	8	4.5	14.9	27.7	10.3
D	-0.5	7	7.5	76.5	85.2	87.1
E	8	3	5	72.3	74.1	84.6
F	4.5	3	1.5	72.3	74.1	89.7
G	6	4	2	74.4	81.5	94.9
H	3	0.5	2.5	68.1	79.6	87.2
I	8	1	7	74.4	74.1	94.9
				56.3	59.9	64.9

- Calculator used 25% of the time / choice situations. 50% of subjects never use it. When it is used, intensively so. (all the same without monetary incentives)
- Significant increase in payoff maximizing decisions.
- BUT: driven by 'least' problematic choices D  $\mapsto$  I (89.8% vs 78.1%).
- No difference for choices between subjects who activate the calculator and those who do not.

## Commitment: IV DCE under oath

Truth-Telling oath before the baseline (hypothetical-no calculator) DCE



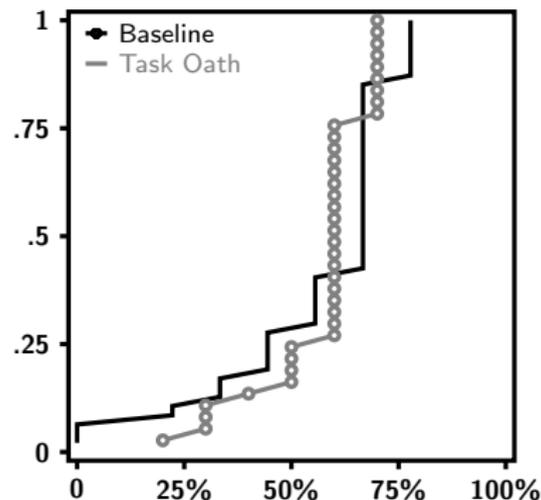
	Value			Hyp.	Real	Oath
	A	B	≠	N =47 %	N = 46 %	N=44 %
A	5.5	6.5	1	14.9	5.0	<b>59.1</b>
B	2.5	9.5	7	38.3	33.3	<b>86.4</b>
C	3.5	8	4.5	14.9	27.7	<b>84.1</b>
D	-0.5	7	7.5	76.5	85.2	90.9
E	8	3	5	72.3	74.1	77.3
F	4.5	3	1.5	72.3	74.1	65.9
G	6	4	2	74.4	81.5	81.8
H	3	0.5	2.5	68.1	79.6	77.3
I	8	1	7	74.4	74.1	79.5
				56.3	59.9	<b>78.3</b>

- Strong and significant improvement in 'problematic' choices A  $\mapsto$  C (only those).
- Higher response times, in particular so as to maximize payoff in problematic choices (21s. vs 12s).
  - Observed as well in Real, but with now behavioral consequences.

## Robustness treatment I – “Task oath”

Does the oath works though fostered cognitive effort ?

- Task oath, same form but reads: “*I, ..., the undersigned do solemnly swear that during the entire experiment, I will faithfully and conscientiously fulfil the tasks that I am asked to complete to the best of my skill and knowledge*”



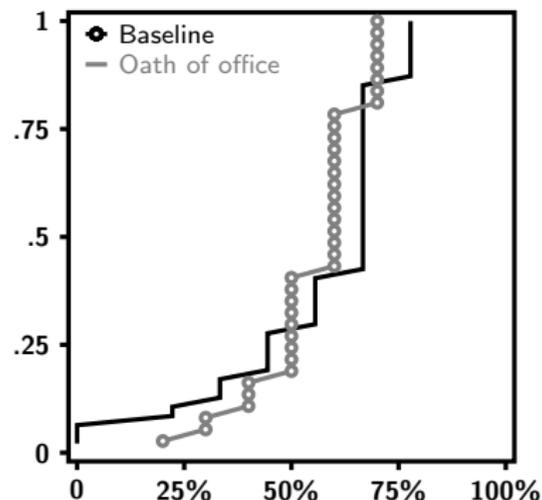
	Value		Hyp.	Real	Task	
	A	B	≠	N = 47	N = 46	Oath
				%	%	N=37
A	5.5	6.5	1	14.9	5.0	10.8
B	2.5	9.5	7	38.3	33.3	35.1
C	3.5	8	4.5	14.9	27.7	18.9
D	-0.5	7	7.5	76.5	85.2	89.2
E	8	3	5	72.3	74.1	83.8
F	4.5	3	1.5	72.3	74.1	75.7
G	6	4	2	74.4	81.5	86.5
H	3	0.5	2.5	68.1	79.6	83.8
I	8	1	7	74.4	74.1	89.2
				56.3	59.9	63.7

- Slight increase, driven only by choice D. Significant increase in response times (237s. vs 157s.).

## Robustness treatment II – “Oath of office”

Task oath not solemn / sound enough ?

- Oath of office, same form but reads: “*I, ..., the undersigned do solemnly swear that during the entire experiment, I will faithfully and conscientiously fulfil my duties to the best of my skill and knowledge*”



	Value		≠	Hyp. N = 47 %	Real N = 46 %	Oath of office N=37
A	5.5	6.5	1	14.9	5.0	0.0
B	2.5	9.5	7	38.3	33.3	24.3
C	3.5	8	4.5	14.9	27.7	8.1
D	-0.5	7	7.5	76.5	85.2	91.9
E	8	3	5	72.3	74.1	94.6
F	4.5	3	1.5	72.3	74.1	75.7
G	6	4	2	74.4	81.5	91.9
H	3	0.5	2.5	68.1	79.6	75.7
I	8	1	7	74.4	74.1	91.9
				56.3	59.9	61.6

- Slight increase, driven only by non problematic choices. Significant increase in response times (213s. vs 157s.).

## Conclusion

We confirm previous evidence that a truth telling oath (drastically) improves preference revelation based on DCE.

As compared to previous evidence:

- We contrast preference revelation according to whether stated preferences have monetary consequences or not;
- We use an IV setting, allowing to contrast revealed and true underlying preferences.

The IV setting reveals a huge discrepancy between true and DCE stated preferences – not related to cognitive limitations.

Perhaps more importantly: commitment to the truth, rather to a higher cognitive effort, is achieved by a truth telling oath.

Main open question: inference to homegrown values.

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# SDU and long-term care insurance

First findings from an empirical analysis based on Canadian data.

Michel Grignon <sup>1</sup>

<sup>1</sup>McMaster University, Economics and HA&S

March 2015

# Outline

- 1 Motivations
- 2 Interpretations of SDU
- 3 What do we know?
- 4 Our empirical analysis

# State Dependent Utility

Outline detailed

- 1 Does Marginal Utility of Consumption change with health?
- 2 How can we approach the question empirically?  
Challenges.
- 3 Implications for pensions and health insurance (mostly public programs)

## A vivid illustration

Cancer Ward, Solzhenitsyn

”Read? Why should I read? We’ll all kick the bucket soon.” Bone-chewer’s scar twitched. ”That’s the point! If you don’t hurry you’ll have kicked the bucket before you’ve read it. Here you are, quick!””

# Implications for policy

- 1 Insurance or pensions as income transfers across states of the world
- 2 If MUC lower in unlucky state, partial insurance is optimal (could explain markets yield partial rather than full insurance, as rational rather than market failures)
- 3 If MUC higher in unlucky state, more than complete insurance (transfer) might be fine (contra moral hazard) and lack of provision is due to market or political failure
- 4 If MUC invariant across states, standard results of expected utility theory apply

# The case of long-term care insurance

- 1 Assumption that dependent do not need anything but care
- 2 No empirical ground
- 3 Sometimes true (severe dementia), but not always.
- 4 Question is: access motive only (catastrophic insurance) or protection of consumption?

## the utility model of SDU

$$U(C, S) = \gamma_0 \cdot S + (1 + \gamma_1 \cdot S) \cdot u(C)$$

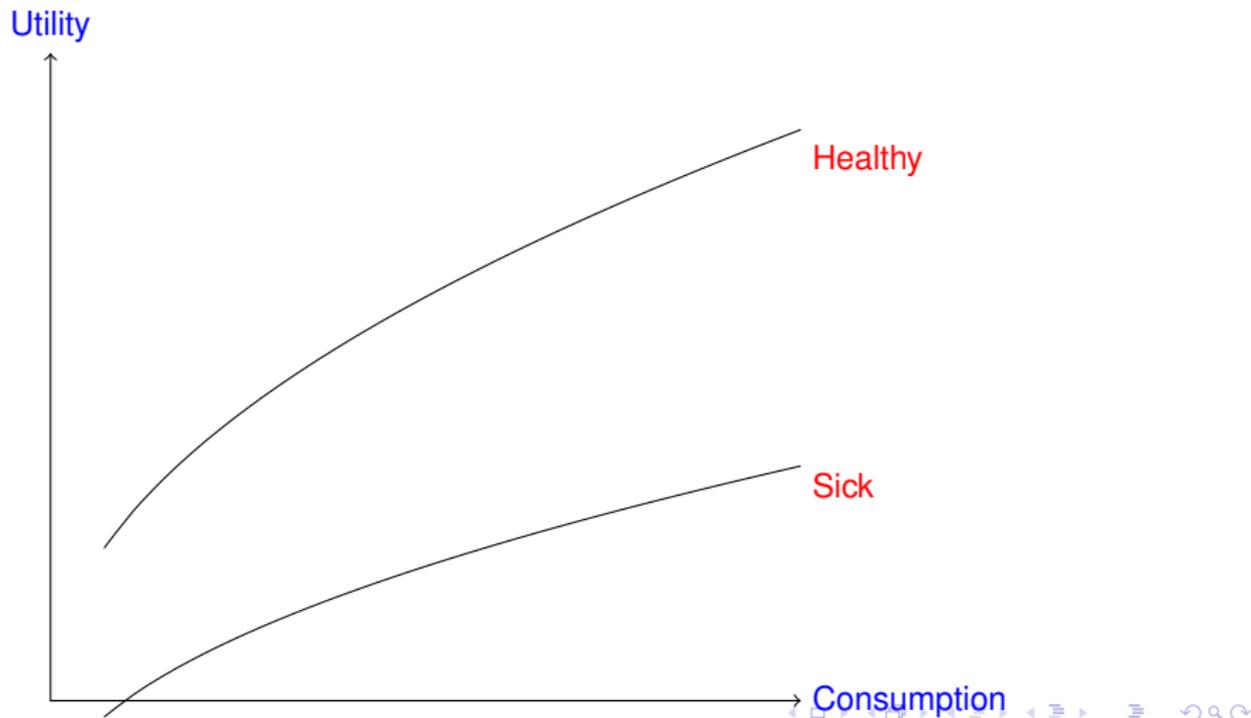
where  $C$  is consumption,  $S$  is sickness (e.g., a binary variable taking the value of 1 if the individual is sick and 0 otherwise).

$\gamma_0$  is the effect of sickness on the level of utility (expected negative)

$\gamma_1$  is the effect of sickness on the slope of the relationship between consumption and utility. The latter is the parameter of interest: a positive  $\gamma_1$  indicates that the marginal utility of consumption is greater when sick.

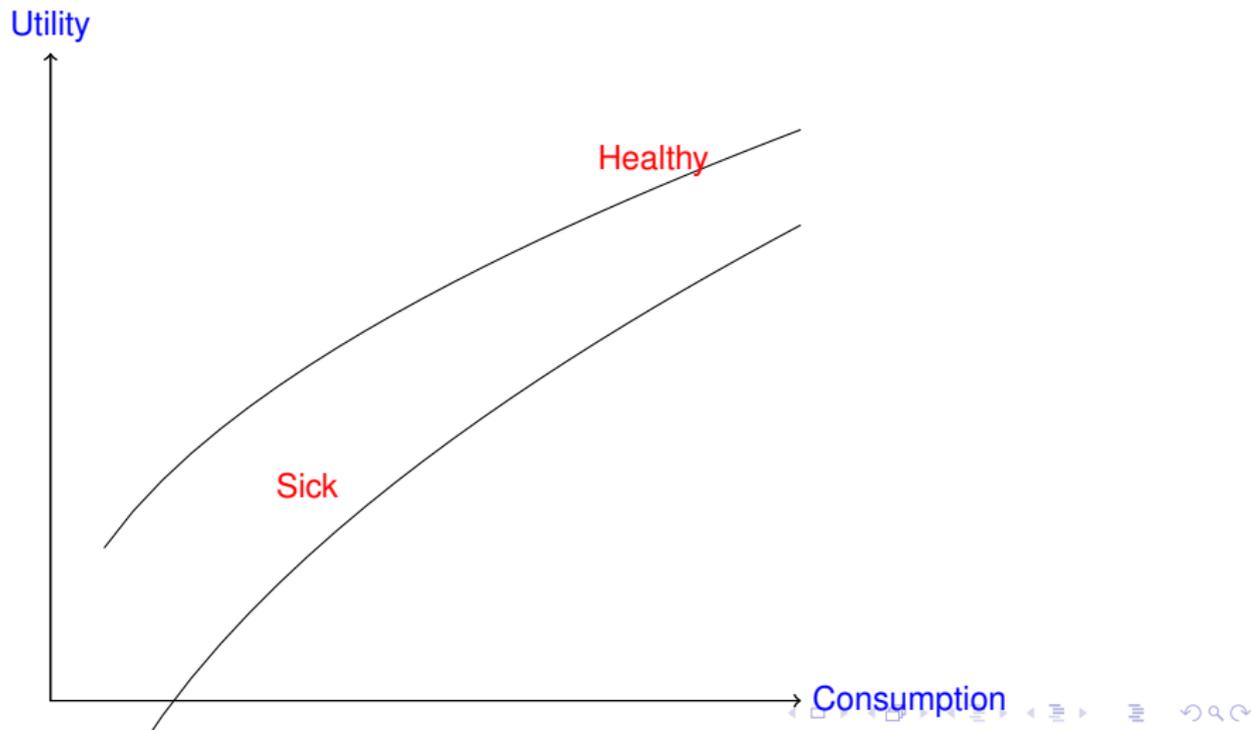
# Negative SDU

Health and Consumption are complement



# Positive SDU

Health and Consumption are substitutes



# Implications for LTC insurance

More formal

If  $u(C) = \frac{C^{\frac{1}{\alpha}}}{\frac{1}{\alpha}}$ ,  $\alpha$  risk aversion, the optimal level of coverage for

an insurance with no moral hazard is:  $b^* = \frac{C_h}{H} \cdot ((1 + \gamma_1)^{\frac{1}{\alpha}} - 1)$ .

If  $\gamma_1 = 0$  the optimal coverage rate will be 100% whatever the value of  $\alpha$  (there is no moral hazard), but if  $\gamma_1 = 0.1$ , the optimal coverage rate will vary from 107% to 115% for values of  $\alpha$  comprised between 4 and 2.

# Literature on health-related SDU

- 1 Introspection: Not conclusive but most think it is negative.
- 2 Empirical: Revealed preferences challenging
  - No control in observational studies
  - Avenue: Critical Illness Insurance (Longo and Grignon).
- 3 Stated preferences (1): Viscusi. Negative for high risks (death), positive in the small.
- 4 Stated preferences (2): Finkelstein et al. (2008)

## Empirical approach

$$U_i = \delta_0 + \delta_1 \cdot (S_i * C_i^{\delta_2}) + \delta_3 \cdot S_i + \delta_4 \cdot C_i^{\delta_2} + \delta_5 \cdot Z_i$$

where  $Z_i$  is a set of controls (taste shifters), would allow us to measure the effect of health on the change in utility brought about by a small change in consumption (marginal utility) through the sign of  $\hat{\delta}_1$ . A positive coefficient would show positive sickness dependent utility (S is sickness, not good health), whereas a negative value would show negative sickness dependent utility and a value non-significantly different from 0 would indicate sickness-independent marginal utility of consumption. We would also be able to infer a value for  $\gamma_1$  as

$$\hat{\gamma}_1 = \frac{\hat{\delta}_1}{\hat{\delta}_4}$$

# Data and variables

- 1 NPHS, 9 waves, older than 50 and not in LF: 6,600 unique individuals, 2.36 waves each.
- 2 Happiness for utility. Two variables (positive and negative)
- 3 Health: number of chronic conditions (2 lists), IADL, sensorial limitations, TTD
- 4 Permanent income as a proxy for consumption (!) (cannot retrieve  $\delta_4$ , auxiliary equation.

# Identification assumptions

- 1 No error in mapping (parametric)
- 2 No systematic differences in expressing happiness across groups of sickness and consumption (out of labour force).

# findings

Table: Main estimates

Utility	Health	$\hat{\beta}_1$	$P >  t $	$\hat{\beta}_3$	$P >  t $	$\frac{\hat{\beta}_1}{\hat{\beta}_4}$
Binary	7 conditions	-0.010	.56	-0.017	.06	-0.114
Binary	19 conditions	-0.000	.97	-0.017	.02	-0.004
Binary	IADL	+0.005	.45	-0.008	.06	+0.062
Binary	Sensorial	+0.019	.49	-0.058	.00	+0.304
Score	7 conditions	+0.005	.82	-0.029	.02	+0.057
Score	19 conditions	+0.008	.54	-0.025	.00	+0.083
Score	IADL	+0.009	.37	-0.014	.04	+0.086
Score	Sensorial	+0.047	.17	-0.080	.00	+0.629
CESD	7 conditions	+0.014	.91	-0.165	.02	+0.019
CESD	19 conditions	+0.103	.13	-0.188	.00	+0.171

# Why is Canada (perhaps) different than the US?

- 1 It is tough to be poor in the US anyway, healthy or not
- 2 It is tougher to be sick when rich in the US than in Canada
- 3 Consumption is affected, for a given level of permanent income, more in the US than in Canada.