

On the International Stability of Health Care Expenditure Function: Are Public and Private Functions Similar?

Dr. Jesús Clemente

Dra. Carmen Marcuello

Dr. Antonio Montañés

Dr. Fernando Pueyo

Faculty of Economics, University of Zaragoza (Spain)

<http://dae.unizar.es/amontane/wpapers.html>

Why a Macroeconomic Perspective?

- It is a very important economic sector (7.8% OECD).
- The influence of supra-national economies in health policies.
- The stability of HCE/GDP relationship:
 - Intertemporal and time series perspective: economic policy, preferences, tastes,...
 - Inter countries: different health system, tastes, preferences,...
 - Inter expenditures: government versus private expenditure

What do we know about the relationship between GDP and HCE ?

- GDP and HCE are non stationary variables: we have to use the cointegration approach
- There is not an unanimous conclusion about the existence of a cointegration relationship between GDP and HCE.
- “Health care is an individual necessity and an national luxury” (Getzen, 2000).
- The graphics show that the evolution of the GHCE and the PHCE is different by country.

OBJECTIVES OF THIS PAPER

- To analyse the stability of the HCE/GDP relationship:
 - Time stability
 - Country stability
 - Government versus Private expenditure stability
- Are both Government and Private Health Services a luxury good?
- We look for some economic explanation for the empirical results.

STRUCTURE

- 2.- Econometric benchmark: cointegration and structural breaks
- 3.- The international stability of the Health Care function.
 - 3.1.- Are GDP and HCE, GHCE and PHCE cointegrated when some structural break is included?
 - 3.2.- Is the income elasticity higher than one
 - 3.3.- When does the function change?
- 4.- A theoretical model
- 5.- Conclusion

2. Unit root test, cointegration and structural breaks

- Background: GDP, HCE, PHCE and GHCE are integrated variables, that is, non stationary variables.
- Some previous papers used cointegration test. They accept the non-cointegration hypothesis (Gerdtham and Hansen, 2000)
 - The reason is the low power of cointegration tests
 - The reason is a misspecification
 - The panel data unit root test approach solve the power problem, but there another problem: the homogeneity assumption.
- In order to solve this problems we used the Gregory and Hansen (1996) proposal that allow us that parameters of the cointegrating vector are not constant.

2. Why could the cointegration vector change?

- Changes in the Health Policy.
- Changes in preferences: a new demand function.
- Changes in technology: a new production function.
- Creation of supraeconomies: the EU process and the convergence criteria.
- The different finance systems of the health system: insurance-based system versus tax-based system.
- Asymmetric behaviour within the business cycle.

2. Econometric specification

- $\ln HS_t^i = b_0 + b_1 \ln GDP_t^i + e_t^i$

Gregory and Hansen (1996)

- $\ln HS_t^i = b_0 + b_1 \ln GDP_t^i + b_2 DU_t + e_t^i$
- $\ln HS_t^i = b_0 + b_1 \ln GDP_t^i + b_2 DU_t + b_3 (DU_t \ln GDP_t^i) + v_t^i$
- DU_t is a variable which takes the value 1 whenever $t > TB$ and 0 otherwise
- Elasticity:

» b_1 if $t < TB$	Constant:
» $b_1 + b_3$ if $t > TB$	b_0 if $t < TB$
	$b_0 + b_2$ if $t > TB$
- The break point is endogenously chosen

3. Database description

- We use the 1998 OECD Health Data Base
- We use the GDP, the total Health Expenditure, the Government Expenditure and the Private Medical Consumption in per capita 1990 constant prices.
- Sample period: 1960-1997.
- 22 OECD countries:
 - Five UE countries with insurance-based system.
 - Nine UE countries with tax-based system.
 - Eight non-UE countries.

3.1. Structural Breaks and cointegration

- No breaks: we can not accept the no-cointegration hypothesis for the total HCE, GHCE and PHCE respectively.
- With one breaks: we can not accept the no-cointegration hypothesis for the 73%, 77% and 74% of the countries for the total HCE, GHCE and PHCE respectively.
- No-cointegration:
 - Total: Austria, Greece, Japan, New Zealand and Norway.
 - Public: Greece, Italy, Japan and Norway
 - Private: Denmark, Greece, Sweden, Iceland and Switzerland.

3.2. The long-term relationship and the income elasticity with structural breaks

- We estimate the HCE-GDP relation with structural breaks.
- There is not a common Health Care Function.
- The Total, Government, and Private Health Care services are luxury goods.
- The inclusion of breaks:
 - The elasticity of EU GHCE has decreased, but in the non-EU countries has not changed.
 - The elasticity in PHCE has decreased in the EU countries with insurance-based finance system and in the non-EU countries, but it has not changed in the EU countries with tax-based finance system.

3.3. Period of breaks

- Total HCE:
 - Most of the EU countries show a break in the second part of the 1970's.
- Government HCE
 - The EU insurance-based countries and 9 countries from the other groups show a break in the period 1970-76.
 - Ireland, Sweden, Denmark, UK and USA show a break in the period 1981-1986.
- Private HCE
 - The EU insurance-based countries show the break in the period 1976-81.
 - The EU tax-based countries show the break in the period 1981-88.

4. A simple model of health demand

- Total, Government, and Private, Health Expenditure grow faster than GDP, that is show a luxury good behaviour. We can find different reasons in the literature:
 - Supply side explanation: health care is an relatively labour intensive commodity.
 - Demand point of view:
 - The consumers wants to expand the variety of goods consumed. When income grows the consumption extend to goods less necessary and more expensive.
 - Individuals focus to increase the quality of life, instead the quantity of consumption.
 - Government consideration: Progressiveness of tax schedule and coverage

4. A simple model of health demand

- We adopt the two last perspectives and the objective is to explain:
 - Elasticity is higher than one for Total, Government and Private HCE.
 - The elasticity has decreased.
 - The constant in the Health Care Expenditures function has increased.
 - To present some political decision that can reply the observed changes in the elasticity's of Total, Government and Private care expenditure.

4. Theoretical Model

- Utility function:

$$U(c,s) = (c-a)^\alpha s^{1-\alpha}, 0 < \alpha < 1$$

- a is the level of consumption required to meet basic needs
- s is the total health care expenditure, both government (g) and private (x), $s=g+x$.

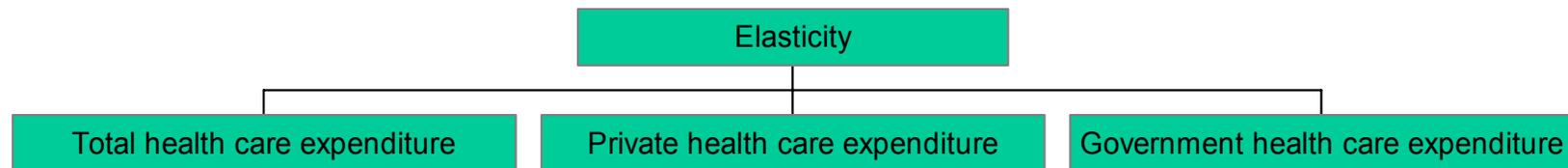
- Consumer budget constraint per capita GHCE

$$y - T = c + P_x x = c + X \quad G = P_x g = \sigma T = \sigma t(y - y_0)$$

- Problem of the representative consumer

$$\max_{c,x} U(c,x) = (c-a)^\alpha (x+g)^{1-\alpha}$$

$$s. t. y - t(y - y_0) = c + P_x x.$$



$$E_{S,y} = \frac{1}{1 - \frac{a/y - (1-\sigma)t y_0/y}{1 - (1-\sigma)t}}$$

$$E_{X,y} = \frac{1}{1 - \frac{(1-\alpha)a/y - [1 - \alpha(1-\sigma)]t y/y}{1 - \alpha - [1 - \alpha(1-\sigma)]t}}$$

$$E_{G,y} = \frac{1}{1 - y_0/y}$$

4. Political decisions

- A reduction in the progressiveness of the tax schedule lead to a reduction of the elasticity of GHCE but the Private HCE elasticity increases.
- A reduction of subsistence consumption, that it is to say, the expenditure in basic goods grows slowly than income, reduce the elasticity of the PHCE and does not modify the Government one.
- We can explain the different behaviour of Government and Private HCE.

5. Conclusions

- GDP and HCE are cointegrated.
- The relationship between GDP and HCE is not stable across the sample.
- The effect of break in the HCE/GDP relationship is not homogeneous: the effects are different for both the countries and the different desegregation of health expenditures (Government or Private).
- The elasticity of HCE, GHCE and PHCE is higher than one and it has been reduced.

5. Conclusions

- We present a theoretical model in which a reduction in the progressiveness of the tax schedule and a reduction of subsistence consumption as percentage of income let to explain empirical results.

5. Conclusions

- The Health Care Expenditure is heterogeneous both by country and by components.
- A decreasing Government HCE does not imply a decreasing Total HCE because the Private HCE in health could increase.
- An evident extension of the theoretical model: the health influence to the quality of the consumption of the rest of goods.