

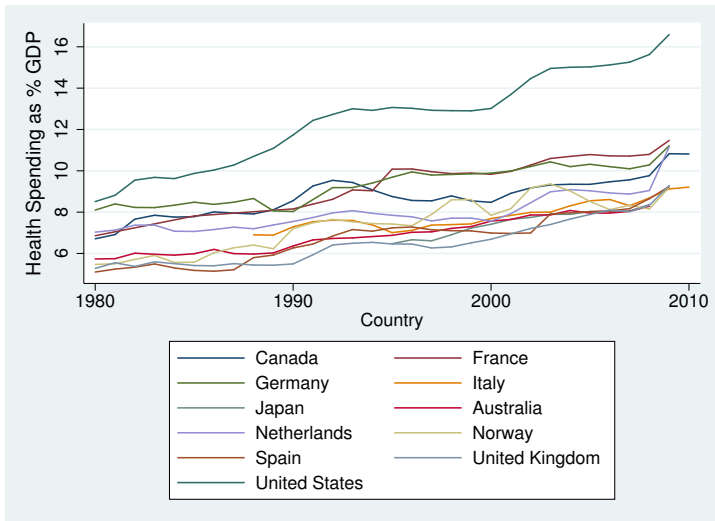
Rising Income and the Share of Health Spending in Canada

Stephenson Strobel

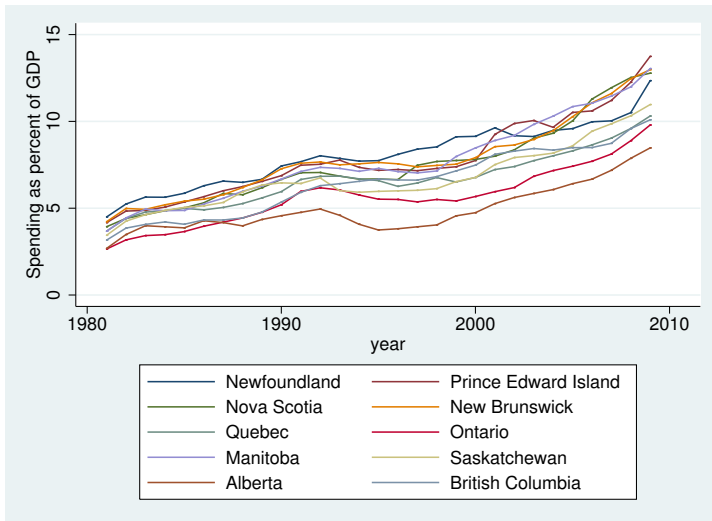
Faculty of Medicine
University of Manitoba

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Rising Health Spending in the OECD



Rising Health Spending in Canada



Income Elasticity of Demand

- What if rising income has driven this increase in health spending?

Income Elasticity of Demand (2)

$$\eta_y = \frac{\% \Delta Q_D}{\% \Delta Y} \quad (1)$$

- Inferior Good: $\eta_Y < 0$
- Necessities : $\eta_y < 1$
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Theoretical Underpinnings

Agent 'i's utility function:

$$\pi(Q_{jt} e_{ijt}) u(c_{ijt}) \quad (2)$$

Agent 'i's Budget Constraint:

$$c_{ijt} + e_{ijt} \leq y_{ijt} \quad (3)$$

Optimization Result:

$$\frac{e_{ijt}}{y_{ijt}} = \frac{\eta_{\pi_{ijt}} / \eta_{u_{ijt}}}{1 + \eta_{\pi_{ijt}} / \eta_{u_{ijt}}} \quad (4)$$

$$\log(e_{ijt}) = \psi \log(Q_{jt}) + \beta \log(y_{ijt}) + u_{ijt} \quad (5)$$

Simultaneity

When we attempt to test this statistically we run into major problems though:

\uparrow Income \rightarrow \uparrow Health Expenditures

but...

\uparrow Health Expenditures \rightarrow \uparrow Income

Which way does causation run?

Instrumental Variables

- We require a variable that only impacts health spending through income.
- The instrument essentially mimics randomization on the variable of interest.
- Allows for a quasi-experiment.

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Natural resources- Oil, Mining, Gas etc.

Two components of the instrument:

- 1 Number of Workers employed in the Natural Resources sectors
- 2 Average annual earnings of natural resources workers

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Data

- Data on health spending comes from the CIHI National Health Expenditures database -the data is at a provincial level and runs from 1987-2006
- Data on basically everything else comes from the StatsCan CANSIM database
 - Income Variable (variable of interest) - GDP data
 - Demand Variables
 - Life expectancy at birth - proxy for health of population
 - Population aged 65 and over
 - Supply Variables
 - Log of total population in province (as the demand variable)
 - Log of total population in country

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Second Stage Results - Total Health Expenditures

Table: IV Estimates of Provincial Data

Variable	Coefficient	(Std. Err.)	P-Value
GDP per Capita	0.639	(0.256)	0.012
Federal Transfers per Capita	0.089	(0.034)	0.010
Percent Population over 65	-0.0315	(2.08)	0.129
Life Expectancy	-0.012	(0.018)	0.512
Manitoba (Relative to NL.)	0.121	(0.066)	0.000
Saskatchewan (Relative to NL.)	0.066	(0.031)	0.038
N	185		
R ²	0.975		
F _(32,.)	183.569		

**all year dummy variables were significant at the 1% level and positive relative to reference year (1987)*

Empirical Conclusions

- **Health Care is NOT a Luxury good**
 - the point estimate for the regression shows that for a 1% increase in GDP, health expenditures should rise by .64%
- from an econometric and statistical perspective we should be looking at using instrumental variables when dealing with income and health spending

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Policy Conclusions

- Consumer expectations are not driving public costs - there is no need for this to be the primary focus of health ministries with regard to cost control
- we need to look to other reasons for escalating costs
 - technology?
 - managerial practices?
 - insurance scheme distortions?

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Other Health Elasticities

Table: Provincial Health Spending Elasticities

Dependent Variable:	Hospital Spending	Physicians	Drugs	Administration
Income Elasticity	2.08	-0.436	-1.303	1.36
Standard Error	(0.462)	(0.463)	(0.606)	(0.691)
P-Value	0.000	0.347	0.031	0.049
R ²	0.8592	0.9336	0.9517	0.9206
F-Test	31.44	67.21	93.59	54.46
Dependent Variable:	Other Personnel	Capital Expenditures	Other Institutions	Public Health
Income Elasticity	0.528	2.219	-4.211	2.151
Standard Error	(0.734)	(2.02)	(.940)	(0.759)
P-Value	0.472	0.274	0.000	0.005
R ²	0.9058	0.555	0.866	0.9455
F-Test	45.74	6.20	32.44	83.61