The effect of reference pricing and competition on pharmaceutical prices

Mauricio Romero (UCSD)

May 23rd 2014

Table of Contents

Motivation

"At a time when money is tight, my advice to countries is this: **before** *looking for places to* **cut spending on health care**, *look first for opportunities to* **improve efficiency**"
Dr. Chan, the Director-General of the World Health Organization.

Research questions

- How can we make pharmaceuticals cheaper without dampening innovation or restricting supply?
- What is the effect of introducing financial incentives in health care?
- Study two policies: reference pricing and induced competition
- Are EPS fulfilling their role as intermediaries?

Table of Contents

Background

- Before 1993 only 24% of the population in Colombia had some form of health insurance.
- 47% of the highest quantile of income had health insurance but less than 5% of the lowest quantile did.
- Law 100 of 1993 set to change this by introducing a universal health insurance scheme.

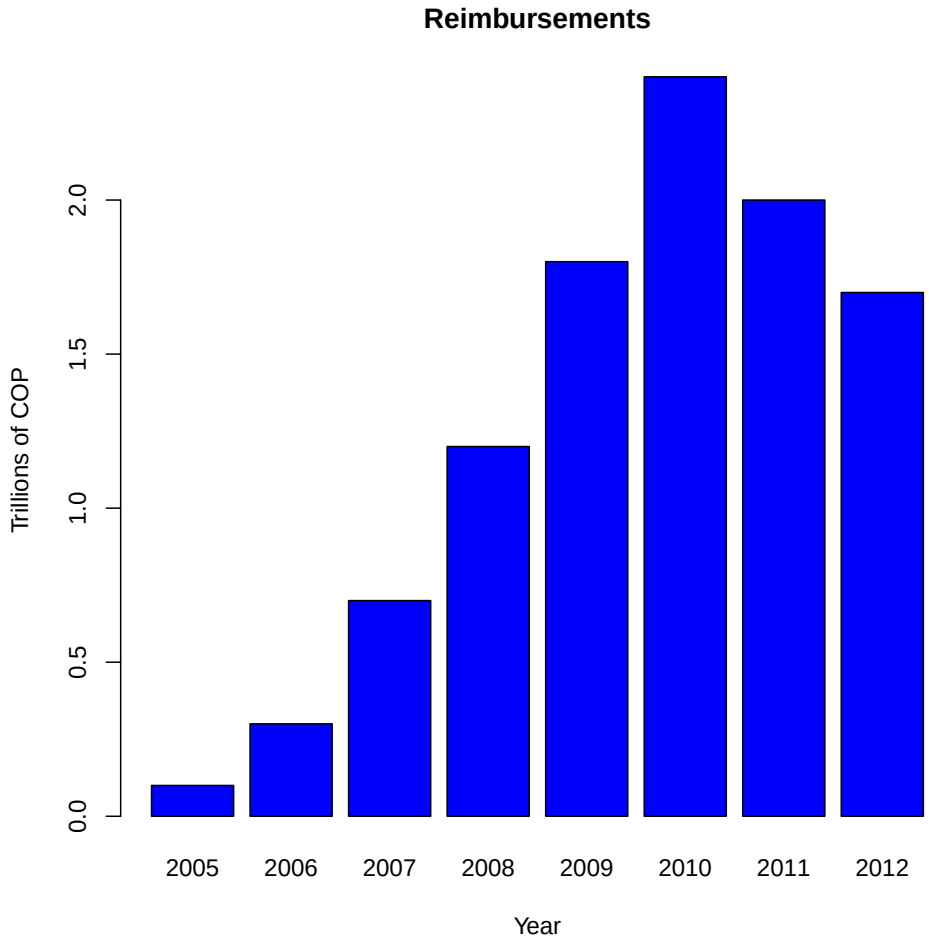
Background

- Colombian health care system is a competitive health insurance market
- Standardized health package (POS) and premium
- Competition through quality

Incentives

- Insurance companies residual claimants of difference between premium and services provided
- Insurance companies often forced to provide services not in the POS (reimbursed by the government)

Reimbursements



Reimbursements$\approx$ 0.5% of GDP in 2010

Public health expenditure $\approx$ 5% of GDP in 2010

Policies

To curb the cost of pharmaceutical, in 2011 the government:

- Adjusted the standardized health plan (POS)
- Introduced reference pricing

Table of Contents

Data

- *Sistema de Informacion de Precios de Medicamentos* (SISMED)
- PDF to Excel (Now available in my webpage for anyone to use!)
- 2006 is unreliable (less than 2% of pharmaceuticals reported)
- From 2007-2013 data covers $\approx$ 80% of pharmaceuticals

▸ Summary Statistics

Data

	2007	2008	2009	2010	2011	2012	2013
No of pharmaceuticals	7,285	5,530	4,913	5,632	4,891	6,645	6,919
Included in the plan	2,797	2,086	1,822	2,051	1,768	2,450	2,612
Proportion	0.38	0.38	0.37	0.36	0.36	0.37	0.38
With RP	0	0	0	0	428	535	551
Proportion RP	0.00	0.00	0.00	0.00	0.09	0.08	0.08

Data

- Information on 10,465 different pharmaceuticals
- Only 2,366 pharmaceuticals have information for all years
- 1,407 different Anatomical Therapeutic Chemical (ATC) codes
- 269 pharmacological subgroups in the sample
- Unit of observation is a pharmaceutical (i.e. company and chemical compound pair)
- Advil®, Motrin®, and Ibuprofeno MK®are all ibuprofen but are different pharmaceuticals.

Data

- The price used in the analysis is the weighted average, by units sold, of the price per unit of product across presentations.

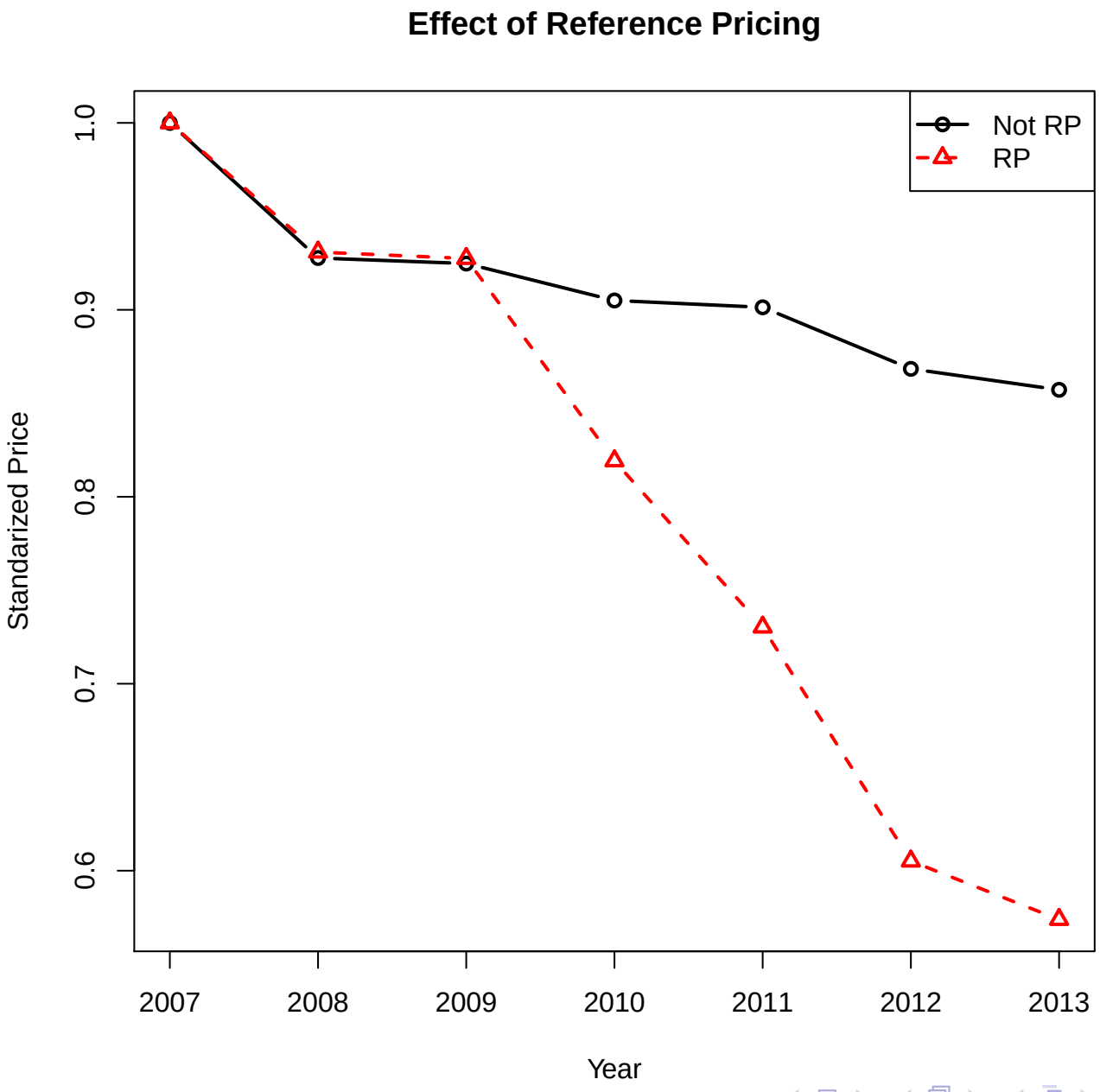
$$SP = \frac{Price}{Units \times (\text{Quantity per unit})}$$

$$AP = \frac{\sum_{p \in P} (\text{SP})_p \times (\text{Quantity Sold})_p}{\sum_p (\text{Quantity Sold})_p},$$

- P is the set of presentations
- SP is the standardized price (price per unit of product)
- AP is the average price across presentations.

Table of Contents

Reference Pricing



Fix Effects Model

$$\log(Price)_{it} = \alpha(RP_i \times Post2011_t) + X_{it}\beta + \gamma_i + \gamma_t + \varepsilon_{it}$$

- $\log(Price)_{it}$: log price (in 2008 COP) for molecule i in time t
- $RP_i = 1$ if molecule i is subject to reference pricing post 2011
- $Post2011_t = 1$ if t is 2011, 2012 or 2013
- X_{it} Measures of competition for molecule i is in the POS in time t
- γ_i molecule fixed effects
- γ_t year fixed effects
- ε_{it} error term

Effect of reference pricing

	(1)	(2)	(3)
RP x Post2011	-0.265***	-0.264***	-0.248***
	(0.0489)	(0.0491)	(0.0464)
Prop. Pharm. in therapeutical group in POS		-0.000836	
		(0.00342)	
Prop. Pharm. in ATC group in POS			-0.00151
			(0.00135)
Pharmaceutical and Year F.E.	Yes	Yes	Yes
Observations	41815	41747	40269

Clustered standard errors, by therapeutic group, in parenthesis

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

Event Study

	(1)
RPx2007	0.0736
	(0.0643)
RPx2008	0.0465
	(0.0762)
RPx2009	0.138***
	(0.0488)
RPx2011	-0.0950
	(0.0598)
RPx2012	-0.213***
	(0.0545)
RPx2013	-0.297***
	(0.0566)
Pharmaceutical and Year F.E.	Yes
Observations	41815

Clustered standard errors, by therapeutic group, in parenthesis
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Fix Effects Model

$$\log(Price)_{it} = \alpha POS_{it} + X_{it}\beta + \gamma_i + \gamma_t + \varepsilon_{it}$$

- $\log(Price)_{it}$: log price (in 2008 COP) for molecule i in time t
- $POS_{it} = 1$ if molecule i is in the POS in time t
- X_{it} Measures of competition for molecule i is in the POS in time t
- γ_i molecule fixed effects
- γ_t year fixed effects
- ε_{it} error term

Effect of competition

	(1)	(2)	(3)
POS	-0.144**	-0.141**	-0.144**
	(0.0603)	(0.0586)	(0.0585)
Prop. Pharm. in therapeutical group in POS		-0.000791	
		(0.00344)	
Prop. Pharm. in ATC group in POS			-0.00159
			(0.00135)
Pharmaceutical and Year F.E.	Yes	Yes	Yes
Observations	41815	41747	40269

Clustered standard errors, by therapeutic group, in parenthesis

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

Pseudo Event Study

	(1) t-2	(2) t-1	(3) t	(4) t+1	(5) t+2
POS	0.0731	-0.0843	-0.144**	-0.136**	-0.127**
	(0.114)	(0.0931)	(0.0603)	(0.0570)	(0.0539)
Molecule and Year F.E.	Yes	Yes	Yes	Yes	Yes
Observations	41815	41815	41815	41815	41815

Clustered standard errors, by therapeutic group, in parenthesis

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

Table of Contents

Pharmacy prices

	(1)
POS	-0.064
	(0.061)
RPx2008	-0.045
	(0.047)
RPx2009	-0.10
	(0.12)
RPx2010	-1.93***
	(0.24)
RPx2011	0.0016
	(0.076)
RPx2012	-0.059
	(0.076)
RPx2013	-0.13
	(0.080)
Pharmaceutical and Year F.E.	Yes
Observations	55898

Clustered standard errors, by therapeutic group, in parenthesis
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table of Contents

Conclusions

- Competition reduces prices by about 14% (Duggan and Scott Morton (2010) find reduction of 20%)
- Reference pricing reduces prices by about 25% (Brekke, Holmas, and Straume (2011) find reduction of 20%).
- What about pharmacy prices? Look at what could have affected both markets in 2010.

Table of Contents

Next Steps

- What happened in 2010 (RP and pharmacy prices)
- Get better data
- Effect on demand
- Effect on expenditure
- Effect on health outcomes (use DHS data?)
- Distributional effects (POS vs RP)
- Effect across geographical areas with different market power

Thank you

- Gracias
- Asante Sana
- Merci
- Obrigado
- Grazie

Bibliography I

Brekke, K. R., Holmas, T. H., & Straume, O. R. (2011). Reference pricing, competition, and pharmaceutical expenditures: Theory and evidence from a natural experiment. *Journal of Public Economics*, *95*, 624 - 638.

Duggan, M., & Scott Morton, F. (2010). The effect of medicare part d on pharmaceutical prices and utilization. *American Economic Review*, *100*(1), 590-607.

Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Panel A: Presentations					
No. of pharmaceutical presentation	20,095	3.013	3.071	1	54
Panel B: Pharmaceutics					
In the POS (=1 yes)	41,815	0.373	0.484	0	1
No. of pharmaceutics in the same pharmacological subgroup	41,815	147.126	113.370	1	556
No. of pharmaceutics in the same pharmacological subgroup in the POS	41,815	55.768	59.511	0	308
No. of pharmaceutics with the same ATC	41,815	34.835	36.631	1	231
No. of pharmaceutics with the same ATC in the POS	41,815	14.765	24.081	0	156
Panel C: ATC Codes					
Number of pharmaceutics per code/year	7,881	5.306	7.418	1	81
Proportion of pharmaceutics in the POS per code/year	7,881	0.236	0.380	0.000	1.000
Panel D: pharmacological subgroup					
Number of pharmaceutics per group/year	1,724	24.255	32.065	1	248
Proportion of pharmaceutics in the POS per group/year	1,724	0.277	0.304	0.000	1.000

◂ Go Back