# Universal service financing in a competitive postal market

# One size does not fit all

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- Next year:
  - Postal market will be fully liberalized

Competition for mail delivery

- High standard for the universal postal service
  - Daily collection and delivery
  - Nationwide coverage
  - Affordable (and uniform?) price
- Competition might be <u>a threat</u> for the financing of the USO

- The universal service is costly
- The cost of providing a 'universal service depends on
  - 1. The definition of the service

Scope of products, quality, price constraints

2. The postal market characteristics

Efficiency of the provider, mailing volume, market contestability

3. The country geographical configuration

Population density, grouping index, hilliness

- The cost of the USO also depends on the extent of competition on the markets
  - 1. The definition of the service

Uniform price constraint modifies price competition and market coverage (Valletti et al., JRE 2002)

2. The postal market characteristics

Access or bypass depends on the relative efficiency of the historical operator (Bloch and Gautier, RNE, 2008)

3. The country geographical configuration

Market coverage by new firms depends on the country configuration (d'Alcantara and Gautier, 2008)

- The USO may place the provider at a *competitive disadvantage*
- In a liberalized market, the USO may be
  - Fair and sustainable
  - Unfair and sustainable
  - Unfair and unsustainable
- Compensation for an unfair financial burden
  - Public funds
  - Cost-sharing between service providers

# **Cost sharing mechanisms**

- Cost sharing mechanisms are not *competitively neutral*
- Possible effects of a USO financing mechanism
  - 1. Change the market behavior

Prices, products offered

- 2. Change the scale of operations Modify the territorial coverage
- 3. Change the entry decision Entry deterring mechanism

# This paper

- Impact of the country configuration on the choice of a costsharing mechanism to finance the USO
- Calibrated model for three country configurations
  - Estimate the impact of the different tax instruments on prices, coverage, profits, welfare
  - Plausible values taking into account their distortionary effect
  - Compare the different tax instruments

# The Model

- Two firms
  - The historical operator (Firm I)
  - The entrant (firm E)
- Universal service obligations imposed on firm I
  - Nationwide coverage
  - Daily collection and delivery
  - Uniform price
- No constraint imposed on firm E
- Products are not homogenous and firms have a different cost structure

## **Demand functions**

- # of mailing items send to an household located in x depends on
  - The prices
  - The products offered at *x*
- Representative sender with net utility  $U(q_i, q_e)$
- Demands for mail to x
  - Duopoly demands  $q_i^D(p_i, p_e)$  and  $q_e^D(p_i, p_e)$
  - Monopoly demand  $q_i^M(p_i)$

# Cost functions, Firm I

• Upstream activities (collection, transport, sorting)

Unit cost c<sub>l</sub>

• Delivery

Unit cost d<sub>I</sub>

Fixed-cost per address F(x)

- The fixed costs results from USO
- The fixed cost at x depends on the characteristics of the receiver's location
  - Grouping index, population density, hilliness

# **Cost functions**, **Firm E**

• Upstream activities (collection, transport, sorting)

Unit cost  $c_E$ 

• Delivery

Unit cost  $d_E(x)$ 

- No fixed cost for the entrant
- The cost of delivery at x depends on the receiver's location
- Assume that the entrant can exhaust the economies of scale by adapting the delivery frequency

# Three hypothetical country configurations

- Countries have an homogenous size of 2m households
- For an identical volume, the total cost is the same in the three countries
- The distribution of the receivers' characteristics vary across countries (d'Alcantara and Gautier, 2008)
- The functions F(x) and  $d_E(x)$  have the same shape

## **I Homogeneous Country**



# **II Monotone Country**



# **III Dual Country**



#### The three configurations



#### **Cross-subsidies in the pre-FMO situation**



#### **Cross-subsidies in the pre-FMO situation**



#### **Cross-subsidies in the pre-FMO situation**



## Timing of the events

- Firms compete in price
- Firms choose prices sequentially
- Timing of the events
  - 1. Firm I sets the price  $p_I$
  - 2. Firm E chooses its coverage  $n_E$  and sets its price  $p_E$
- Both firms apply a unique price (uniform pricing)

#### Financing the universal service

- If the incumbent's profit is negative, the regulator can apply a *universal service tax* on the entrant
- Possible taxes:
  - 1. A lump-sum entry fee
  - 2. An output tax on each mailing item handled by E
  - 3. A revenue tax, proportional to E's turnover
  - 4. A coverage tax on each covered address
  - 5. A pay-or-play on each non-covered address

	Entry fee	Output tax	Revenue tax	Coverage tax	Pay-or- Play
Price	=	+	+	=	=
Coverage	=	-	-	-	+

- 1. The regulator decides on a tax instrument
- 2. Firm I sets the price  $p_1$
- 3. Firm E chooses its coverage  $n_E$  and sets its price  $p_E$
- 4. The tax is set at a level such that the incumbent profit plus the tax revenue is equal to zero

## Calibration hypothesis

- Demands: 200 items per household at p<sub>I</sub>=0.40€
  Standard values for the elasticities
- Monopoly break-even price is 0.40€
- Costs: 70% of the incumbent's cost are fixed

Average delivery cost  $1^{st}$  quintile/ $5^{th}$  quintile = 5

E has a unit cost 30% lower than the unit cost of I in the monopoly break-even situation

# Financing USO

- The calibrated market scenarios are such that
  - 1. П<sub>I</sub> <0
  - 2. П<sub>Е</sub>>0
  - 3.  $\Pi_{I}+\Pi_{E} < 0$  (except in the homogeneous country)
- Distorting the entrant's behavior with a tax is a necessary condition for a sustainable USO
- 'competitively neutral' financing is a myth!

# Financing USO

- Postal sector
  - High displacement ratio
  - Market contraction
  - Incumbent: High average cost, low marginal cost (consequence of the USO)
  - Entrant: lower average cost, higher marginal cost
- Negative aggregate profits  $[\Pi_I + \Pi_E < 0]$  is a concern

#### Unsubsidized market scenario with competition



## **Output tax (1): increase the duopoly profit**



## **Output tax (2): increase the monopoly profit**



#### **Output tax (3): Modified coverage**



#### Calibrated results: the monotone country

	Unsubsidiz ed	Output tax	Revenue tax	Coverage tax	Non- uniform price
Coverage	65%	58%	52%	27%	43%
P	0.40	0.48	0.50	0.45	0.27-0.62
P <sub>E</sub>	0.33	0.42	0.41	0.32	0.25
$\Pi_{I}$	-31.6m	0	0	0	0
$\Pi_{E}$	13.3m	9.23m	9.48m	3.55m	3.6m
Welfare	188m	182m	178m	188m	183m
Tax rate		0.11	29.7%	17.3	
Tax proceeds		10.7m	10.4m	9.44m	

#### Calibrated results: the dual country



# **Calibrated results: the dual country**

	Unsubsidiz ed	Output tax	Revenue tax	Coverage tax	Non- uniform price
Coverage	53%	47%	43%	/	48%
P	0.43	0.50	0.51	/	0.30-0.76
P <sub>E</sub>	0.32	0.44	0.44	/	0.26
$\Pi_{I}$	-30.6m	0	0	/	-1.9
$\Pi_{E}$	21.7m	6.4m	3.2m	/	8.1m
Welfare	182m	184m	183m	/	166m
Tax rate		0.20	56%	/	
Tax proceeds		14.7m	18.4m	/	

	HOMOGENEOUS	MONOTONE	DUAL
Entry fee	1	n.a	n.a
Output tax		3	1
Revenue tax		4	2
Coverage tax		1	n.a
PoP		n.a	n.a
Non-uniform prices		2	3

# **Conclusions (1)**

• 'Preferred' cost –sharing mechanism

Homogeneous country: Entry fee

(No impact on pricing behavior, no impact on coverage)

Monotone country: Coverage tax

(No impact on pricing behavior, impact on coverage)

Dual country: Output tax

(Impact on pricing behavior, impact on coverage)

- When cross-subsidies are more important, the 'optimal' tax instrument induces more distortions.
  - Robustness of this result?



- In this paper, the tax level and the tax proceeds are determined simultaneously.
- The tax rate is not determined with reference to an estimated cost of the USO
- The USO costing exercise and the USO funding exercise cannot be differentiated because the taxes are not competitively neutral