



# Comments on « Simulating equilibrium in multi-product postal markets following deregulation and liberalization »

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# Summary of the work

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- Numerical simulation of Nash equilibrium in a liberalized postal market
- Duopoly between an incumbent (PO or I) and an entrant (EC or E)
- “Constrained” Nash equilibrium
  - PO (i) must offer all products/services, hence strategy is a vector  $P_I$  of prices, (ii) multiple choices of objective function (profit, revenues, etc.)
  - EC (i) chooses which product/services to offer (among a legally feasible set), hence strategy is a set of products/services and a vector of prices for each of the selected product/service  $P_E$
  - EC can play a mixed strategy equilibrium, i.e., randomize among which markets to enter
- Cost and demand functions are assumed affine and calibrated on actual US data
- Equilibrium is solved using an iterative procedure implemented in Excel

# General comments

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- A very useful example of applied research
  - Market opening is a happening (or will happen soon)
  - It is essential to provide policy makers with some informed perspective on the resulting outcome
- The reality of incumbent Postal Operator(s) is very well captured: multiple objective functions, regulatory limitations
- However, a single EC (hence a duopoly) is less convincing. In some markets, we observe one incumbent and multiple entrants. How would the result change if you allowed for multiple ECs?

# Detailed comments

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- Why is an iterative procedure required to find the fixed point? With affine demand and cost functions, is a closed form solution (i.e., invert a matrix in Matlab/Mathematica) not available?
- In the iterative procedure, why does the incumbent use previous probabilities but reaction functions to current prices?

$$\max_{P_I} \left\{ \sum_{t \in T} \mu_t^{i-1} f_I^t(P_I, P_E^t(P_I)) \mid P_I \in S \right\}$$

- Why is the PO referred to as a price leader? This is a simultaneous game, even if is solved by sequential method
- All strategies yield the same (expected) profit in a mixed strategy equilibrium. Could that result facilitate the analysis?
- Why is the EC recording negative profit in the numerical simulation?