

# Import Competition, Productivity and Multi-Product Firms

**by**

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Some comments and questions

by Jacques Mairesse

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# Overall comments

- Interesting Issues and Data
- Nice Read
- New Facts and Figures
- A Promising Research Program

# Background and personal explorations in the issues

- **“Hétérogénéité des prix et salaires, pouvoir de marché et emploi : quatre analyses économétriques sur données individuelles d’entreprises**

Thèse présentée et soutenue publiquement par **Rozenn Desplatz** le 21 Décembre 2000

UNIVERSITÉ DE PARIS I PANTHÉON-SORBONNE

CHAPITRE 1: E1 DISTRIBUTIONS DES VARIATIONS DE PRIX INDIVIDUELLES DES ENTREPRISES : UNE ANALYSE STATISTIQUE À PARTIR DES ENQUÊTES DES PRIX DE VENTE INDUSTRIELS ET DES ENQUÊTES DE CONJONCTURE

CHAPITRE 2: ANALYSE ÉCONOMÉTRIQUE DE LA FONCTION DE PRODUCTION : L'APPORT DES INFORMATIONS DE PRIX AU NIVEAU DES ENTREPRISES

- **”Manufacturing and Innovation in Chile”**

PhD *Thesis by Rodolfo Lauterbach* defended on 4<sup>th</sup> December 2012

MAASTRICHT UNIVERSITY

- *.L'industrie française au milieu du XIXème siècle : Les enquêtes de la statistique générale de la France*, Jean-Marie Chanut, Jean Heffer, Gilles Postel-Vinay et Jacques Mairesse eds., Editions de L'Ecole des Hautes Etudes en Sciences Sociales, Paris, 2000.
- Mairesse Jacques and Jordi Jaumandreu “*Panel-data Estimates of the Production Function and the Revenue Function: What Difference Does It Make?*”, in *The Scandinavian Journal of Economics*, 107(4), 2005, p. 651-672.

# Main results

- *“Our MPPF estimation yields sensible results for the various methods that we use. At the firm-level, we find that the coefficients vary very little whether we use an industry-level producer price index or a firm-level price index. However, the standard deviation of our productivity measures is larger with the latter, suggesting more heterogeneity in physical TFP (TFPQ) than in revenue TFP (TFPR). Our productivity measures obtained from the firm product estimation display even more dispersion.”*
- *“We have not succeeded in answering all our problems. The answers we have found only serve to raise a whole set of new questions. In some ways we feel we are as confused as ever, but we believe we are confused on a higher level and about more important things.” [Quoted in Øksendal (1985)—one of Tor Jakob Klette’s favorite quotes] ”. (Foreword to Mairesse-Jaumandreu, 2005 )*
- *Klette, J. and Griliches, Z. (1996), *The Inconsistency of Common Scale Estimators when Output Prices are Unobserved and Endogenous*, Journal of Applied Econometrics 11,343–361.*

# Data

- *PRODCOM Data survey ends in 2007Q4...*
- *Do we have wages in The Social Security Declarations?*
- *The Central Balance Sheet Office Data Base and the perpetual inventory method to build quarterly capital stocks...*
- *"While we could aggregate the data to the annual level and proceed as before, the resulting efficiency loss is equivalent to reducing the sample size to one-fourth of what we observe. ..."*
- *"...For this reason we develop a modified version of Wooldridge OP/LP that permits the use of all of the quarterly data..."*
- ...

# Methodology

- *“The recent literature on productivity has been trying to address two important difficulties: dealing with pricing heterogeneity and the presence of multi-product firms. Our aim is to explore various ways to deal with these issues.”*
- “Option #1: Construct a firm-level price index”
- Option #2: The extended Diewert approach

*Dhyne, Petrin and Warzynski (2014) estimate a MPPF for the bakery industry where most firms produce exactly 2 products (bread and cake). In this simple case, one can write:*

$$Q(ibt) = B0 + B1 L(it) + B2 K(it) + B3 M(it) + C Q(ict) + \omega(ijt) + \eta(ijt)$$

*where  $Q(ibt)$  and  $Q(ict)$  denote the output quantities (in logs) of bread and cakes respectively.*

*The production parameters  $B(1; 2; 3)$  now have the interpretation as the percentage change in bread output due to a percent change in each of the total input levels respectively while holding the production of cake constant.  $C$  is the change in bread output that results from increasing the output of cake by one percent holding overall input use constant. The function is only well-defined when  $B1, B2, B3 > 0$  and  $C < 0$ , and this provides a simple test of specification.*

# Empirical evidence

- Results at the firm level

*“In this section, we first present the results we obtain from the estimation of a classical firm level revenue production function and of our MPPF various levels of analysis. We then use our estimates to compute firm level and firm x product level TFP estimates and we characterize the properties of the distribution of those estimated productivities. Finally, we relate our TFP estimates with our firm specific or product specific import shares and analyze how firms respond to changes in the degree of foreign competition.”*

- *“We also conducted the analysis at the NACE Rev 2. 4-digit level (Table 3 only shows the estimates for the food industry, using the Wooldridge approach and the firm specific price deflator). At that level of analysis, we only considered the NACE Rev 2. 4 digit industries for which we observed at least 500 observations. This illustrates the trade-off that we face: the more disaggregated the level of analysis, the more similar the technology is likely to be, but the less observations we can use. Out of the 115 NACE 4 digit industries we considered, 84 industries are characterized by 3 positive input coefficients and returns to scale between 0.87 (Manufacture of footwear) and 1.32 (Manufacture of ovens, quarterly adjusted Wooldridge method with firm specific price deflator).”*

# Empirical evidence

- Results at firm product level

*“As expected, we observe large differences across categories, as firms differ in their technologies and product scope. In particular, the negative coefficient of  $R_i(-g)_t$  captures how the constraint of producing more other goods limits the physical production of good  $g$ , controlling for the use of inputs. This coefficient varies according to the product category and appears larger in wearing apparel and basic metals, where firms also produce a larger number of products.”*

- TO CONCLUDE:

*“As next steps in our research agenda, we want to analyze the relationship between price, productivity and imports. We also want to follow up on Dhyne, Petrin and Warzynski (2014) and estimate demand functions to obtain measures of product quality and determine whether higher import competition led to quality upgrading. We also plan to estimate costs function for multi-product firms, so that we can look at the link between imports marginal costs and markups.”*