Discussion of

Why do manufacturing firms produce services? Evidence for the servitization paradox in Belgium

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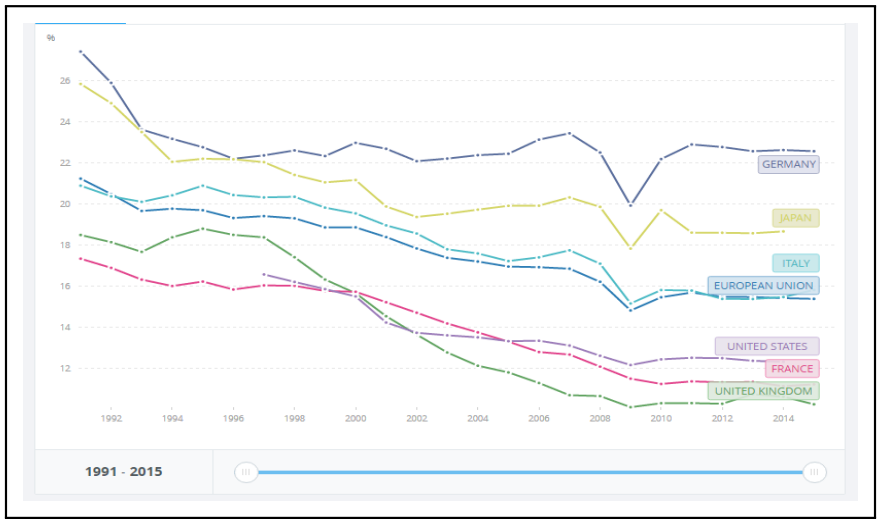
Scene

Decline in manufacturing.



Note: Manufacturing share of value added, 1991-2015

An increasing role of services in GDP:

- from the growing share of service industries;
- from the fact that firms *produce* services along with goods: The focus of this paper.

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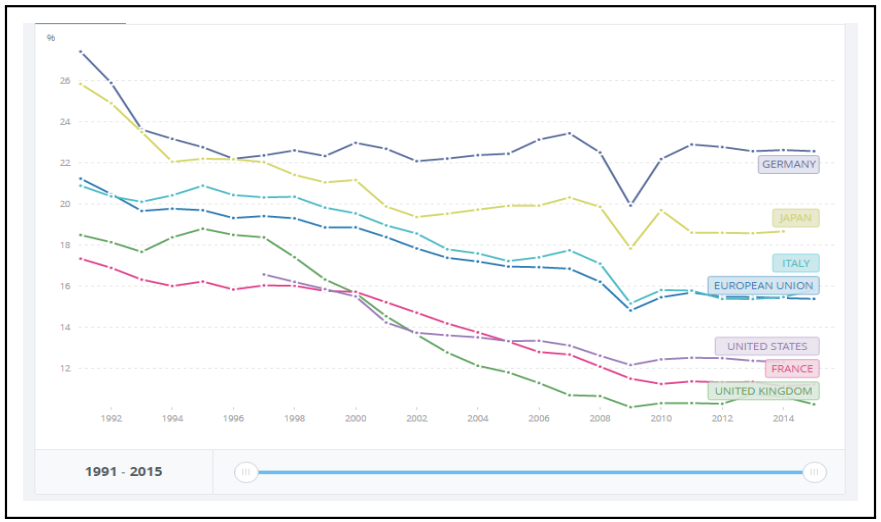

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A non-linear (U-shaped) relationship between servitization and firm productivity: the servitization paradox (like in Suarez et al, 2012 or Kohtamaki et al, 2013).

- Theory. A model of differentiated products with:
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Theory: standard with a twist

- Demand. Quadratic preferences à la Melitz and Ottaviano (2008):

$$U = \alpha \int_0^N q_i^c \, di - \frac{1}{2}\gamma_g \int_0^N (q_i^c)^2 - \frac{1}{2}\left(\int_0^N q_i^c\right)^2 -$$

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- Production. As in Brienlich et al (2014) but with rivarlous knowledge:

$$q_i = T_{ig} L_{ig}; \qquad y_i = T_{is} L_{is};$$

The ratio between the amount of g and s sold depends on their the distribution of knowledge in their production:

$$\frac{T_{is}}{T_{ig}} = \left(\frac{y_i}{q_i}\right)^{\frac{1}{1+t}}$$

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Theory: predictions

A positive productivity shock generally increases service provision.

$$\frac{T_{is}}{T_{ig}} = \left(\frac{y_i}{q_i}\right)^{\frac{1}{1+t}}$$

But, a negative productivity shock can increase it too and it's when non-linearities kick in:

- Knowledge is allocated more to goods provision ($T_{ig} > T_{is}$) and knowledge is not too rivalrous ($t > 1$): less efficient firms find it optimal to reinforce their presence in the service sector because a large part of their knowledge is allocated more to goods provision than to service provision.

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Empirics: descriptive evidence

Firm-product level data for Belgium [1997-2013] used to produce several by-sector regressions:

$$log[Sales_g^f] = d_s^f + \vartheta^k + \vartheta^t$$

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You can do more, also to clarify the variation you are exploiting:

- In the spirit of Ariu et al (2016) build a sort of an *EM* of servitization at the firm level. Not all the products are equally likely to be associated with services, e.g. vegetables and aircrafts parts have very different likelihood of being bundled with services.

$$B_{it} = \frac{1}{\#\text{ of sold products}} \sum_{p \in P} \#\text{ of servitized products}$$

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Empirics: estimation

Use a QMLE fractional models with the Chamberlain-Mundlak correction:

$$Serv_{it} = \Phi[tfp_{it}; age_{it}; wage_{it}; Serv_{kt}; H_{kt}]$$

- a RE model which relaxes the usual assumption that unobserved unit-specific effects be uncorrelated with covariates;
- but it still requires strong assumptions on how effects are distributed.

I would allow for a wider range of techniques:

- OLS. Not necessarily worse than a non linear model if the interest is in MEs (Angrist and Pischke, 2008).
  1. No incidental parameter problem;
  2. Allows to use FE, RE or Chamberlain's approach models;
  3. Unboundedness: how many PPs fall outside the unit interval?

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Empirics: interpretation

A bit more on estimations

- Export status;
- *Industry*×*time* FE;
- The Herfindal index is never significant but in the paper there is quite a bit on the role of sectoral-level competition.

Interpretation

- Is it service provision, production or both?
- What about service outsourcing?
- Really a paradox? Some types of servitization are very simple and many firms do it (Crozet and Milet, 2015; Aquilante and Vendrell-Herrero, forthcoming).

Policy for *Servinomics* (Aquilante et al 2016 - Bruegel Blog Post)

European manufacturing firms are often reluctant to implement service business models, as the results are difficult to predict.

Challenges:

- The management of uncertainty;
- Leadership in the digital economy.

Policies:

- Better policy coordination;
- Straightening digital networks;
- Easing access to capital;
- Encouraging entrepreneurship.

Thank you