

Should everybody be in services?
The effect of servitization on
manufacturing firms' performances

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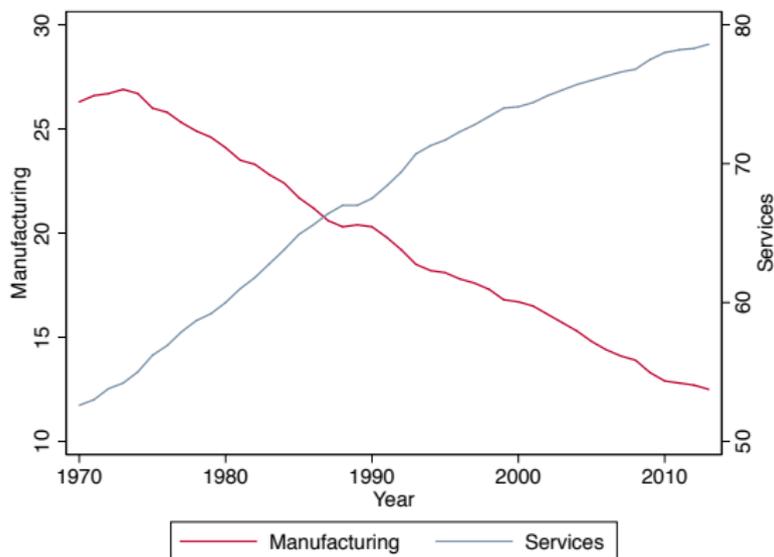
2016

The shift toward services

- Developed economies are deindustrializing
- Between 1970 and 2010 the share of the manufacturing sector in value added dropped by more than 10 percentage points in most OECD countries
- In 2010, this share was about 15% and the share of manufacturing in total employment was less than 10%

The shift toward services

Figure: Share of manuf and services in total French employment



The shift toward services

- This shift toward services
 - had generated a vast academic literature
 - ▶ Baumol and Bowen (1966); Baumol (1967); Acemoglu and Guerrieri (2008); Ngai and Pissarides (2007)...
 - is a major concern for policy makers
 - Because it induces large labor market adjustment costs
 - Because it creates uncertainty about the nature and the strength of possible engines of long-term growth

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 - is a major concern for policy makers
 - Because it induces large labor market adjustment costs
 - Because it creates uncertainty about the nature and the strength of possible engines of long-term growth
- **However, all the debates on the extent, the causes and the consequences of the shift toward services are based on misleading representation of the economy as a collection of distinct sectors**

There are no such things as service industries. There are only industries whose service components are greater or less than those of other industries. Everybody is in service



Theodore Levitt, 1972

There exists no authoritative consensus on either the boundaries or the classification of the service industries.



George Stigler, 1956

Manufacturing vs services: The blurry line

- A vast literature points the high level of interdependence between manufacturing and services and the subsequent difficulty to distinguish one from each other
 - Because manufacturing value added chains include many services tasks (and vice-versa)
 - Because manufacturing firms also produce services
 - ▶ For own account
 - ▶ **For third-parties** = servitization

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 - Because manufacturing value added chains include many services tasks (and vice-versa)
 - Because manufacturing firms also produce services
 - ▶ For own account
 - ▶ **For third-parties** = servitization
- In this paper, we focus on the last bullet point

Why do manuf firms produce services?

- Three main reasons leading manufacturing firms to engage in service activities (Gebauer et al., *Europ. Manag. J.*, 2005)
 1. To add another source of revenue
 2. To increase consumer's loyalty and provide a more appropriate response to the consumer's needs.
 3. To propose a product-service bundle which is harder to imitate, and is less substitutable

Why do manuf firms produce services?

Rolls-Royce earns its keep not just by making world-class engines, but by selling “power by the hour” - a complex of services and manufacturing that keeps its customers’ engines burning. If it did not sell services, Rolls-Royce could not earn enough money from selling engines

The Economist (Jan. 8th, 2009)



Outline

- What we do
 - We exploit French fiscal data which provides detailed balance sheet information for a very large sample of French manufacturing firms. . .
 - . . .incl. information on the sales of services (to third parties) and the sales of goods produced by the firm

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 - we describe the extent of servitization of French manufacturing over a decade (1997-2007)
 - We assess the consequence on firms' performances of adding services to the production of goods

Outline (cont')

- What we find
 - Servitization is not a negligible phenomenon
 - In our sample of manufacturing firms, in 2007:
 - ▶ 75% of firms sold some services
 - ▶ 11.5% of total production sold to 3rd parties are services
 - ▶ 16% of firms sold more services than goods
 - ▶ All these figure increase over time

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- What we find
 - Servitization is not a negligible phenomenon
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 - ▶ 75% of firms sold some services
 - ▶ 11.5% of total production sold to 3rd parties are services
 - ▶ 16% of firms sold more services than goods
 - ▶ All these figure increase over time
 - Servitized firms are bigger and more profitable
 - ▶ A part of this premia is due to self selection. . .
 - ▶ . . .but we also identify a causal relationship between the engagement into the production of services and firms' performances

Existing literature (1)

- On the extent of servitization (Management)
 - Neely et al. (mimeo, 2011): sample of more than 10,000 large manuf. firms - shows that the proportion of servitized firms rose from 29.5% in 2007 to 30.1% in 2011.
 - Dachs et al. (mimeo 2012) input-output matrices.
 - Lodefalk (2013, 2015) Swedish firm-level data, Kelle (2013) German trade data

Existing literature (2)

- On the extent of servitization (cont')
 - Bernard and Fort (2015): Document the importance of *Factory-less manufacturers* in US economy
 - Bernard Smeets and Warzynski (2015): A non-negligible portion of the decrease in the number of Danish manufacturing firms is due to firms switching from manufacturing to services.
- On the causes of shift toward services
 - Breinlich et al. (2014) show that UK manufactured exposed to greater competition from low wage countries are more likely to start exporting (also) services

Existing literature (3)

- On the impact of servitization
 - Correlation between the provision of services and
 - ▶ firms' market value (Fang et al., J. of Marketing, 2008)
 - ▶ firms' markup (Suarez et al., Management Science, 2013)
 - ▶ firms' sales growth (Visnjic et al., Esade WP, 2012)
 - See Baines et al.(J. of Manuf. Technology Manag, 2009) for a survey of previous studies
 - See also Vandermerwe, et al. (Eu. Manag. J., 1988) and Gebauer et al. (Eu. Manag. J., 2005)

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 - See also Vandermerwe, et al. (Eu. Manag. J., 1988) and Gebauer et al. (Eu. Manag. J., 2005)
- *Main finding*: Not much!
 - This management literature hardly finds a robust impact of servitization on firm performances = "*Service Paradox*"

Road map

1. Data
2. Part 1: The extent of servitization
 - Who is servitized?
 - Trends in servitization
3. Part 2: The impact of servitization
 - Graphical overview
 - Econometric artillery
 - Econometric results

The Data

- French firm-level fiscal Data = BRN (Bénéfices Réels Normaux)
 - Provide exhaustive balance-sheet information
 - 1997 to 2007
 - Very large coverage: 67,385 manufacturing firms. The average firm employs 55 workers and generates a turnover of €12 million

The Data

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 - Provide exhaustive balance-sheet information
 - 1997 to 2007
 - Very large coverage: 67,385 manufacturing firms. The average firm employs 55 workers and generates a turnover of €12 million
- The BRN provide:
 - Total sales
 - Total production sold
 - Total production of goods sold
 - Total production of services sold
- We measure the service intensity as:

$$\frac{\textit{Total production of services sold}}{\textit{Total production sold}}$$

The Data

- Original
- Data cleaning
 - We keep firms
 - ▶ registered in manufacturing
 - ▶ with always strictly positive employment
 - ▶ with always strictly positive capital stock
 - ▶ with never a K/L ratio 100 times above or below the nace2 median
 - ▶ with never a va/L ratio 100 times above or below the nace2 median
 - ▶ in nace2 with more than 100 firms
- Large panel = 50,530 firms (average emp. = 60 workers).
- Panel restricted to firms mainly producing goods = 39,814 firms (average emp. = 66 workers).

Who is servitized?

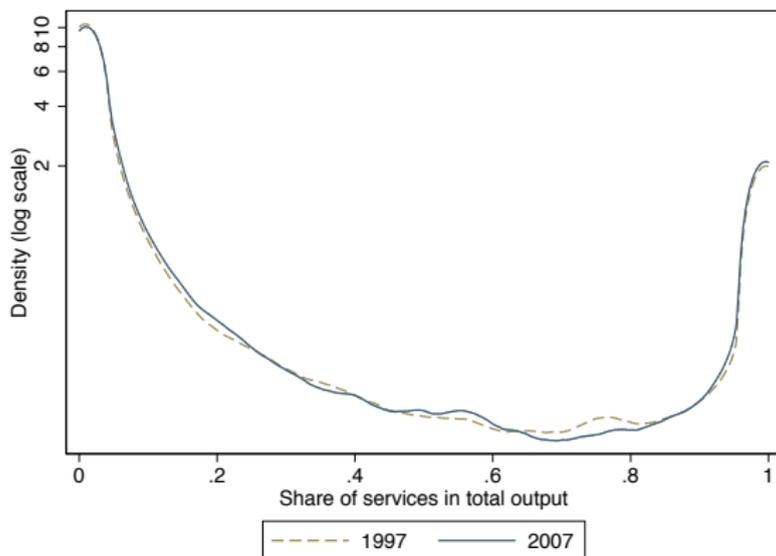
Who is servitized?

		All firms		Servitized firms	
		2007	$\Delta 97-07$	2007	$\Delta 97-07$
(1)	# Firms	28,258	-1.11	21,007	-1.02
	Share (%)			74.6	
(2)	Employment				
	Total (thousand)	1,618	-1.62	1,473	-1.29
	Share (%)			91.0	
	Average	57.27	-0.51	69.7	-0.28
(3)	Turnover				
	Total (€, million)	415.8	+2.24	387.6	+2.64
	Share (%)			93.2	
	Average (€, thousand)	14.7	+3.39	18.4	+3.69
(4)	Profitability				
	Average (%)	48.7	+0.35	49.8	+0.43
(6)	Service intensity				
	Average (%)	18.3	+0.72	24.5	+0.62
	Median (%)	1.3	+2.63	3.2	+2.05

Who is servitized? Density

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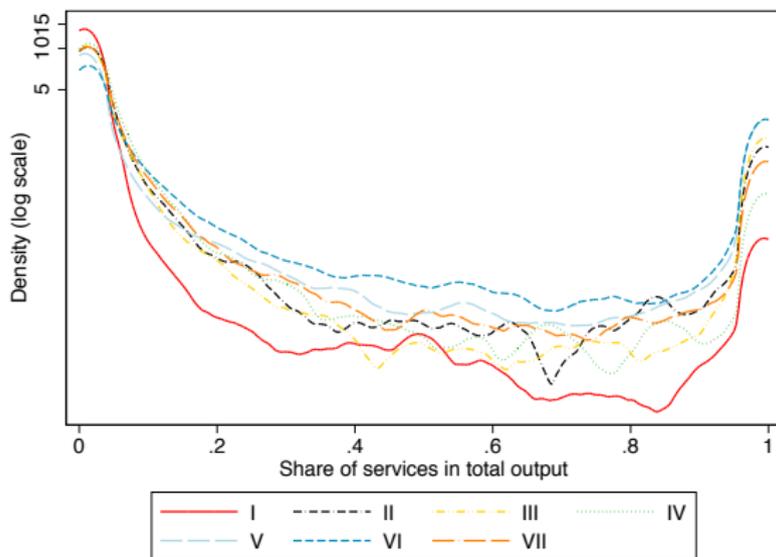
Figure: Distribution of firm-level servitization (2007 - log scale)



50 - 100% 16% of the firms
100% 12% of the firms

Who is servitized? Density (2)

Figure: Distribution of firm-level servitization (2007 - log scale)



Transition matrix 1997-2007

To → From ↓	0%	bin1	bin2	bin3	bin4	bin5	bin6	bin7	bin8	bin9	bin10	100%
0%	11.98	7.42	0.40	0.17	0.11	0.06	0.05	0.05	0.05	0.04	0.25	1.30
bin1	5.89	39.49	2.78	0.82	0.40	0.17	0.15	0.10	0.06	0.08	0.42	1.57
bin2	0.23	1.79	1.17	0.47	0.18	0.12	0.05	0.04	0.01	0.04	0.03	0.24
bin3	0.09	0.63	0.45	0.42	0.20	0.14	0.07	0.03	0.02	0.03	0.05	0.13
bin4	0.04	0.26	0.13	0.21	0.19	0.12	0.11	0.07	0.02	0.01	0.05	0.13
bin5	0.03	0.13	0.07	0.11	0.13	0.18	0.08	0.07	0.07	0.01	0.04	0.09
bin6	0.01	0.11	0.03	0.06	0.05	0.11	0.12	0.08	0.04	0.04	0.07	0.08
bin7	0.01	0.06	0.03	0.04	0.04	0.05	0.08	0.10	0.08	0.08	0.05	0.10
bin8	0.02	0.08	0.01	0.02	0.03	0.03	0.04	0.05	0.12	0.09	0.12	0.16
bin9	0.02	0.07	0.01	0.01	0.01	0.02	0.03	0.04	0.08	0.14	0.23	0.20
bin10	0.08	0.31	0.06	0.02	0.02	0.03	0.03	0.05	0.08	0.13	2.36	1.96
100%	0.83	1.38	0.22	0.18	0.12	0.12	0.14	0.13	0.13	0.15	1.63	3.81

Notes: Constant sample of 29,909 firms. Lines refer to the service intensity in 1997, while columns refer to the service intensity in 2007. Bins are defined as 10% intervals of service intensity. Firms in bin5 have a service intensity between 40% and 50%. The first and last columns (0% and 100%) refer to firms that produced either only goods or only services, respectively, in 2007.

Who is servitized? - Bottom line

- Most firms are mainly manufacturers or mainly producers of services
- Firms do not change drastically their level of servitization
- From now, we focus on firms that are mainly manufacturers, i.e. with a level of servitization $< .5$

Who is servitized? - Manufacturers sample

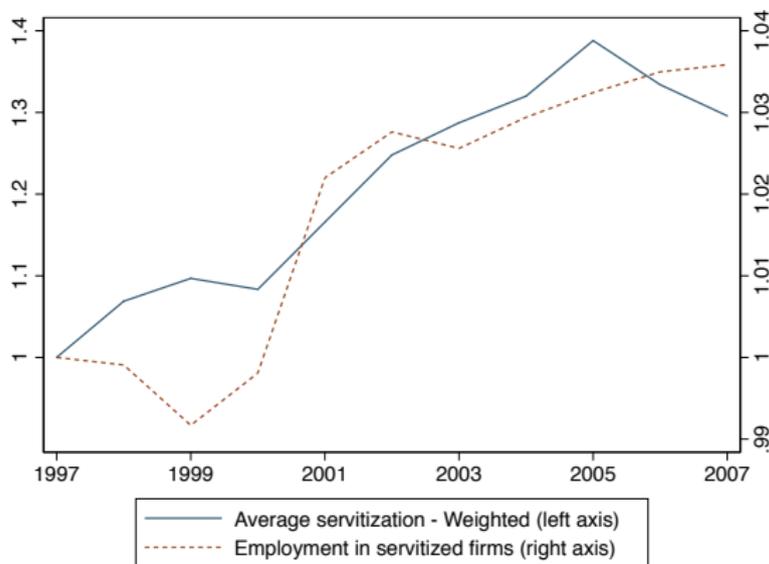
Mainly manuf firms.

		All firms		Servitized firms	
		2007	$\Delta 97-07$	2007	$\Delta 97-07$
(1)	# Firms	22,675	-1.23	15,740	-1.24
	Share (%)			69.4	
(2)	Employment				
	Total (thousand)	1,417	-1.58	1,274	-1.23
	Share (%)			89.9	
	Average	62.5	-0.35	81.0	+0.0
(3)	Turnover				
	Total (€, million)	378.0	+2.53	350.2	+2.99
	Share (%)			92.6	
	Average (€, thousand)	16.7	+3.81	22.3	+4.27
(4)	Profitability				
	Average (%)	49.0	+0.31	50.5	+0.42
(6)	Service intensity				
	Average (%)	3.2	+0.33	4.6	+0.34
	Median (%)	0.6	+2.47	1.6	+1.76

The servitization of French manufacturing

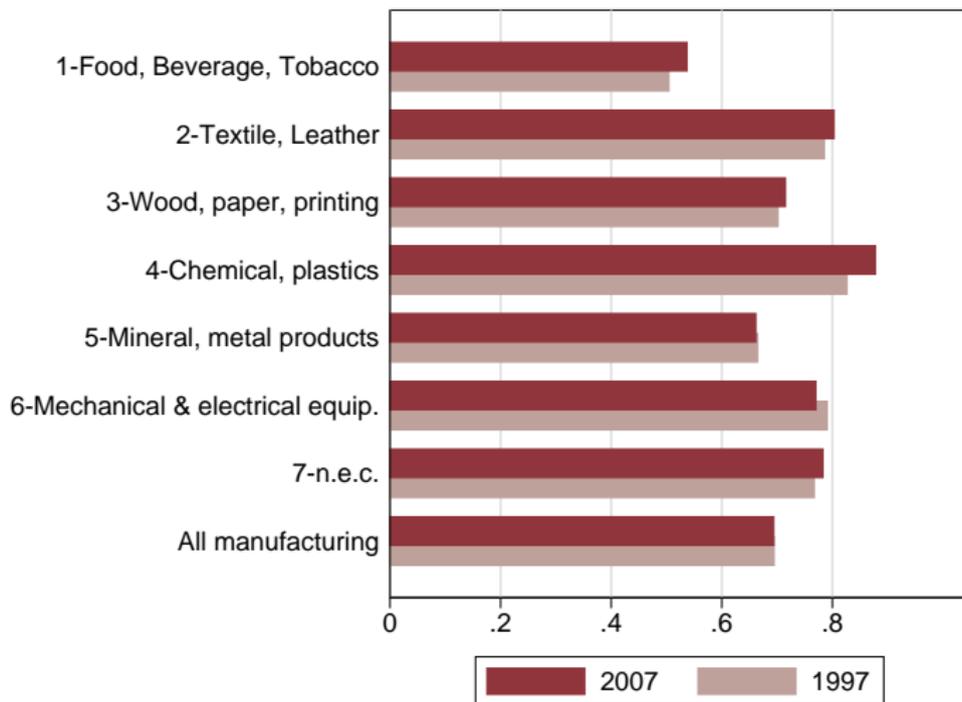
The servitization of French manufacturing

Figure: Trend in servitization: 1997-2007



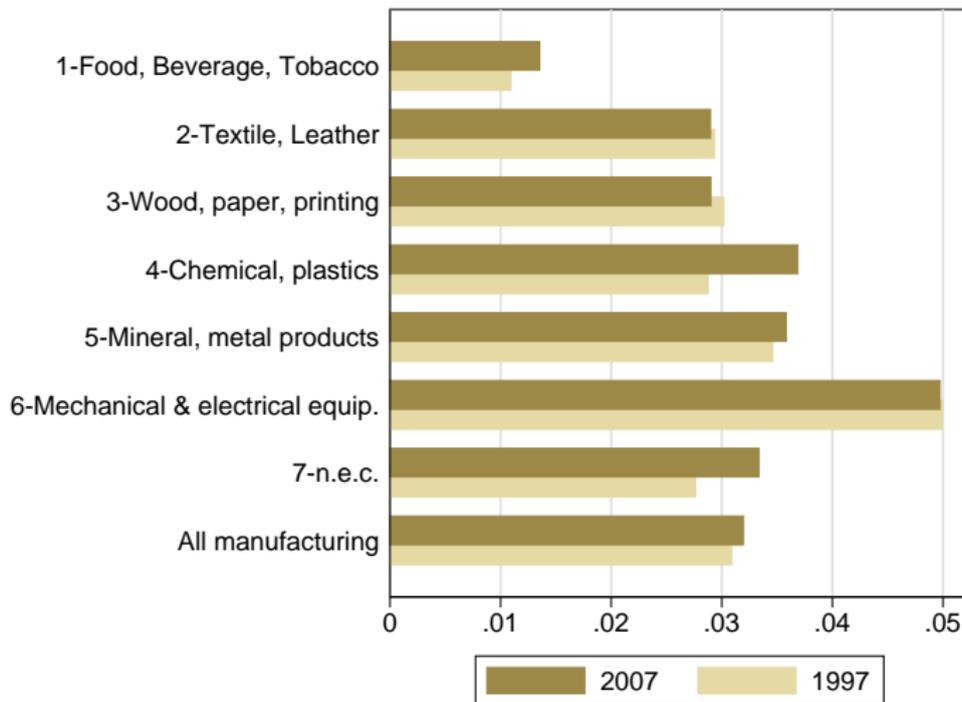
The servitization of French manufacturing

Figure: Share of servitized firms



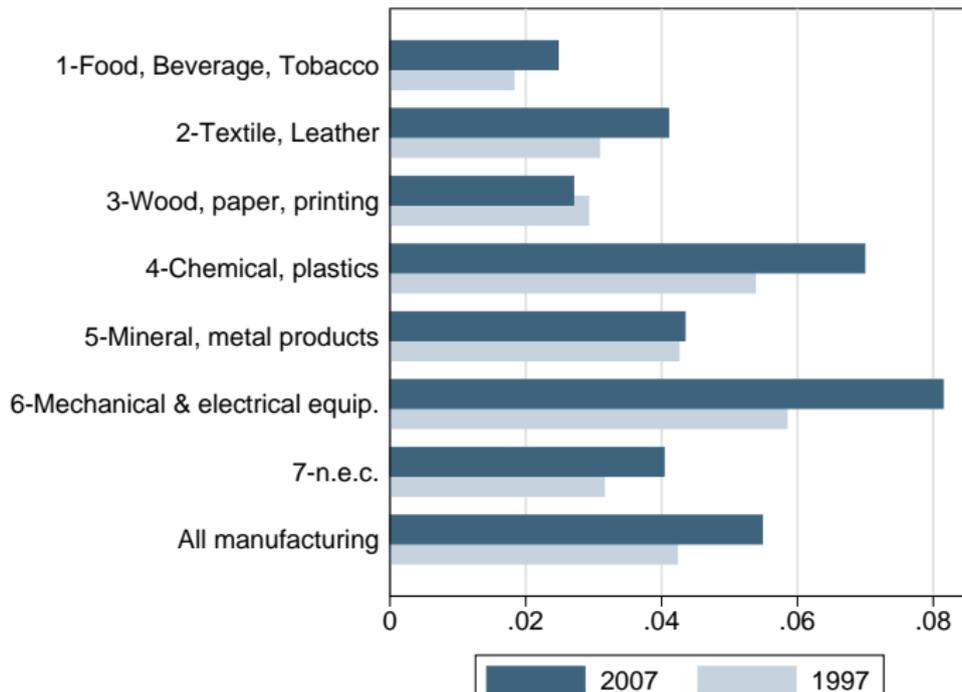
The servitization of French manufacturing

Figure: Average service intensity (unweighted avg.)



The servitization of French manufacturing

Figure: Share of services in total output (weighted avg. service intensity)



The servitization of French manufacturing

- We decompose the aggregate change of the share of services in total manufacturing output into between and within firms is as follows:

$$\Delta S_j = \sum_i \Delta S_{i,j} \bar{Y}_{i,j} + \sum_i \Delta Y_{i,j} \bar{S}_{i,j}$$

- Where $\bar{Y}_{i,j}$ is the average share of firm i in the production of industry j , $\bar{S}_{i,j}$ is the average service intensity of firm i in industry j

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	Within	Between
All manufacturing	94.4	5.56
Food, Beverage, Tobacco	134.4	-34.4
Textile, Leather	119.8	-19.8
Wood, paper, printing	149.8	-49.8
Chemical, plastics	95.5	4.5
Mineral, metal products	78	22
Machinery, electrical & optical equip.	107.5	-7.5
Transport	72.3	27.8
n.e.c.	83.8	16.2

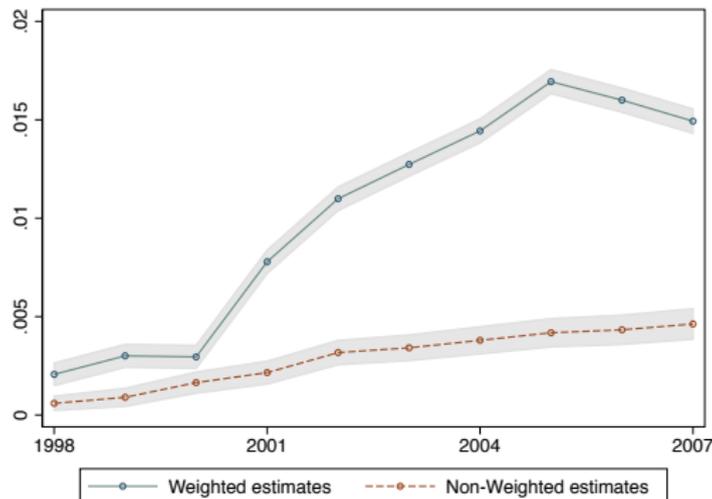
- \Rightarrow The aggregate trend is mainly driven by changes that occur within firms

The servitization of French manufacturing

- To verify that the within firm change is not driven by few firms, we estimate the following equation:

$$ServiceIntensity_{it} = \theta_i + \gamma_t + \epsilon_{it},$$

- And plot the year dummies γ_t :



Performance of servitized firms - Premia

Performance of servitized firms - Premia

- We estimate:

$$Perf_{i,t} = \sum_{k=0}^{k=49} \alpha_{]k;k+1]} d_{]k;k+1],i,t-1} + \delta_{j,t} + \epsilon_{i,t},$$

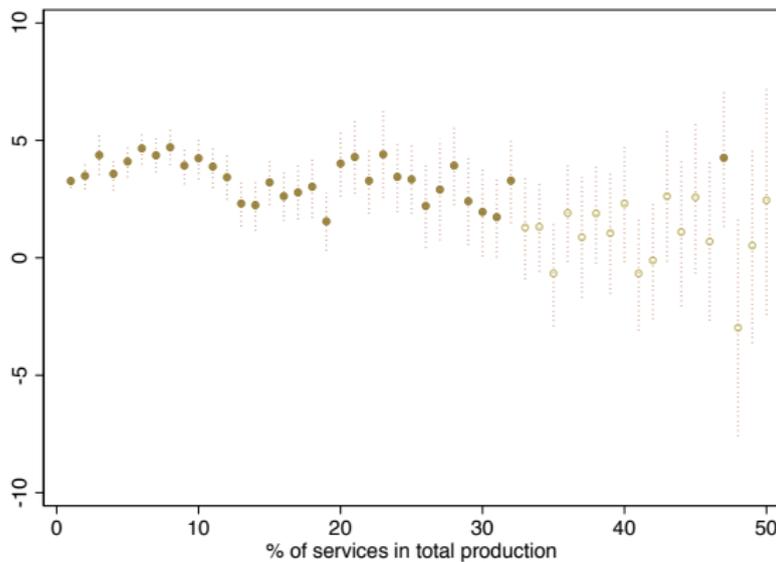
- where

$$d_{]k;k+1],i,t} = \begin{cases} 1 & \text{if } k < \text{Service Intensity}_{i,t-1} \leq k + 1, \quad k \in [0\%; 49\%] \\ 0 & \text{otherwise} \end{cases}$$

- And plot the $\alpha_{]k;k+1]}$

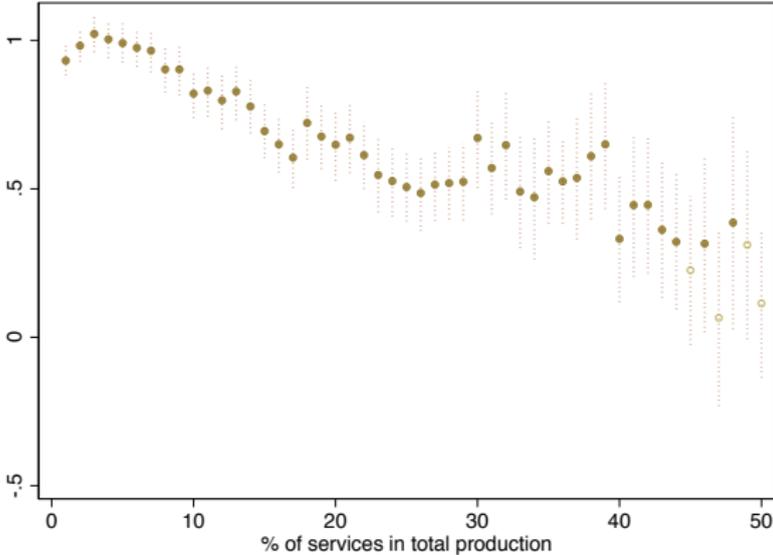
Performance of servitized firms - Premia

Markup



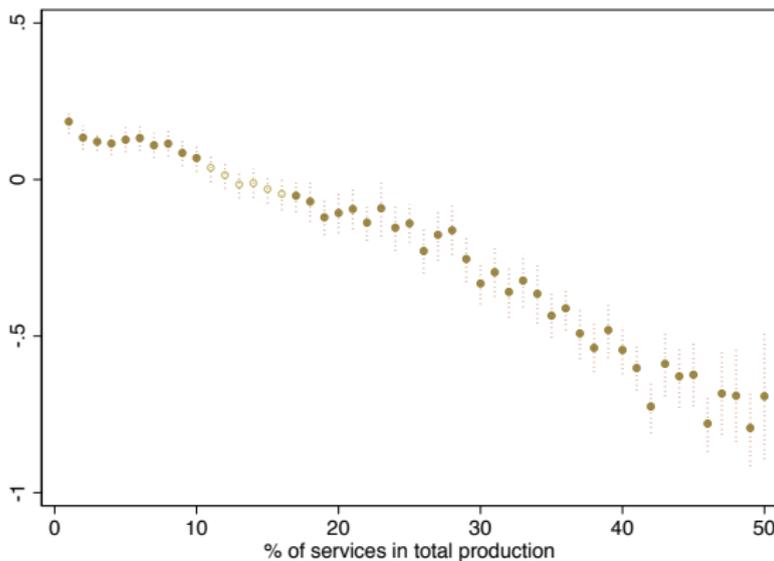
Performance of servitized firms - Premia

Employment



Performance of servitized firms - Premia

Production of goods



Empirical strategy

Empirical strategy

- Servitized firms have better performance than non-servitized ones
- With the exception of the production of goods, service intensity does not influence the premia much
- \Rightarrow We focus on the impact of the decision to start producing services rather than on changes in the service intensity.
- But we only have correlations so far and premia estimates suffer from patent endogeneity problems.

Econometric strategy - OVB

- The decision to start selling services may be motivated or influenced by:
 - Changes in firm environment (e.g., competition pressure, technological changes, evolution of public regulations. . .).
 - Unobserved firm-level characteristics (e.g. manager ability and past experiences)

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 - Changes in firm environment (e.g., competition pressure, technological changes, evolution of public regulations. . .).
 - Unobserved firm-level characteristics (e.g. manager ability and past experiences)
- Lagged dependent variable model (assumes time-variant OV):

$$Performance_{i,t} = \alpha \Gamma(serv_{i,t-1}) + \sum_{k=1}^{\#Lags} \gamma_k Performance_{i,t-k} + \chi_{i,t-1} + \delta_{j,t} + \mu_i$$

where $\chi_{i,j,t}$ is a vector of control variables and $\delta_{j,t}$ an industry-year fixed effect.

Econometric strategy - OVB (2)

- We also estimate a fixed effect model (assumes invariant omitted variables):

$$Performance_{i,t} = \alpha \Gamma(serv_{i,t-1}) + \chi_{i,t-1} + \theta_i + \delta_{j,t} + \mu_{i,t}$$

Empirical strategy - IV

- The LDV model addresses the omitted variables issue and helps alleviate concerns about reverse causality bias.
- A reverse causality bias may persist if firms start selling services because they *anticipate* changes in their performance.

Empirical strategy - IV

- The LDV model addresses the omitted variables issue and helps alleviate concerns about reverse causality bias.
- A reverse causality bias may persist if firms start selling services because they *anticipate* changes in their performance.
- We perform regressions with endogenous binary-treatments
- IV strategy based on the assumption of “good practice” spillovers across firms (Mol and Birkinshaw, 2009; Fu, 2012).
 - For each firm i and year t , we compute the share of servitized firms in
 - ▶ The year $t - 2$
 - ▶ The same industry (nace2)
 - ▶ The same decile of size
 - ▶ Weighted by the geographic distance to i .
 - Varies across year \times ind. \times size class \times cities (there are 36,000 cities in France).

Results - Benchmark - Markup

Profit _{<i>i,t</i>}	(1)	(2)	(3)	(4)	(5)	(6)
Estimator:	OLS	LDV	LDV-IV	OLS	LDV	LDV-IV
$\Gamma(\text{serv}_{i,t-1})$	4.179 ^a (0.284)	0.468 ^a (0.109)	1.669 ^a (0.322)	4.418 ^a (0.374)	0.399 ^a (0.112)	2.427 ^a (0.578)
Profit _{<i>i,t-1</i>}		0.601 ^a (0.011)	0.599 ^a (0.011)		0.601 ^a (0.011)	0.597 ^a (0.010)
Profit _{<i>i,t-2</i>}		0.183 ^a (0.010)	0.182 ^a (0.010)		0.183 ^a (0.010)	0.181 ^a (0.010)
Profit _{<i>i,t-3</i>}		0.127 ^a (0.008)	0.126 ^a (0.008)		0.127 ^a (0.008)	0.125 ^a (0.008)
Ln Emp _{<i>i,t-1</i>}				-0.296 ^c (0.151)	0.084 ^b (0.042)	-0.122 (0.078)
# Obs.	34,243	34,243	34,243	34,243	34,243	34,243
R ²	0.014	0.740		0.014	0.740	
ρ			-0.0951			-0.156
Wald			(0.000)			(0.000)

Notes: Stoppers and continuously servitized firms are excluded. All regression include industry×year fixed effects. Robust standard errors in parentheses are clustered by industry×year. Significance levels: ^c: p<0.1, ^b: p<0.05, ^a: p<0.01. Coefficients on $\Gamma(\text{serv}_{i,t-1})$ are the average treatment effects (ATEs)

Results - Benchmark - Markup

- The profitability of firms that start selling services is 4.2 percentage points higher than that of pure manufacturers (4.4 when controlling for lagged employment).
- In the sample used for the regressions, the average profit rate is 45.7% \Rightarrow the premium on the profit rate is between 9.2% and 9.6%
- When controlling for endogeneity, The ATE is between 1.7 and 2.4 percentage points \Rightarrow a causal increase in the profit rate between 3.7 and 5.3

Results - Robust 1 - Markup

- With controls for lagged employment level, lagged market share and interaction between lagged market share and lagged industry-level Herfindahl index

	ATE	std. err.	# Obs.	ρ (p-value)	Method	Controls
(1)	2.459 ^a	(0.592)	34,243	-0.158 (0.001)	LDV-IV	Θ_3

Results - Robust 2 - Markup

- FE model provides bigger effects (respect the bracketing properties of LDV and FE estimators)

	ATE	std. err.	# Obs.	ρ (p-value)	Method	Controls
(2)	1.693 ^a	(0.165)	34,243	-	FE	Θ_1
(3)	4.585 ^a	(0.669)	34,243	-0.152 (0.000)	FE -IV	Θ_1
(4)	4.597 ^a	(0.665)	34,243	-0.153 (0.000)	FE-IV	Θ_2

Notes: Stoppers and continuously servitized firms are excluded. Column (std. err.) reports the robust standard errors clustered by industry \times year. Column (6) indicates the set of control variables: Θ_1 = lagged employment level; Θ_2 = Θ_1 , lagged market share and interaction between lagged market share and lagged industry-level Herfindahl index; Θ_3 = Θ_2 , Profit $_{i,t-1}$, Profit $_{i,t-2}$ and Profit $_{i,t-3}$. Line (1) reports lagged dependent variable model estimates. Lines (2), (3) and (4) report firm-level fixed effects estimates.

Results - Robust 3 - Samples

	ATE	std. err.	# Obs.	ρ (p-value)	Samples		
					Starts only	With stops	All years
(1)	2.575 ^a	(0.878)	27,415	-0.123 (0.018)	✓		
(2)	2.953 ^c	(1.834)	72,034	-0.207 (0.154)		✓	
(3)	3.168 ^a	(0.899)	22,304	-0.213 (0.003)			✓
(4)	3.457 ^b	(1.375)	17,300	-0.171 (0.045)	✓		✓
(5)	5.803 ^a	(1.499)	51,232	-0.421 (0.000)		✓	✓

Notes: Line (1) uses the sample of firms that were not producing services at $t - 2$. Line (2) includes all firms except those that always produce services. Line (3) replicates the benchmark regression for the panel of firms active from 1997 to 2007. Lines (4) and (5) replicate the regressions shown in lines (1) and (2) for the panel of firms active from 1997 to 2007. Significance levels: ^c: $p < 0.1$, ^b: $p < 0.05$, ^a: $p < 0.01$.

Results - Alternative performance indicators

	Dep. variable	ATE	std. err.	# Obs.	ρ (p-value)
(1)	Employment	0.263 ^a	(0.019)	34,243	-0.593 (0.000)
(2)	Turnover	0.036 ^a	(0.009)	34,243	-0.069 (0.001)
(3)	Prod. goods	0.035 ^a	(0.008)	34,243	-0.072 (0.000)

Notes: IV-Lagged dependent variable models with 3 lags, controlling industry×year fixed effects in all regressions and for lagged employment in (1) and (3). The (std. err.) column reports robust standard errors clustered industry×year. Significance levels: ^c: $p < 0.1$, ^b: $p < 0.05$, ^a: $p < 0.01$.

Results - Alternative performance indicators

- All variables are in logs. Magnitude of the impact is e^{ATE} .
- On average and relative to pure manufacturers, firms that start producing services increase:
 - Their level of employment by approximately 30%
 - Their turnover by 3.7%
 - Their sales of goods by 3.6%.
- The marginal effects are large, but the firms are small: The median firm has 9 employees \Rightarrow Shifting to the production of services creates about two additional jobs for the median firm.

Results - Long run effects

Results - Long run effects

	ATE	std. err.	# Obs.	ρ	Dependent variable
(1)	2.6246 ^a	(0.962)	27,851	-0.183	Profit _{<i>i,t+1</i>}
(2)	3.204 ^a	(1.239)	22,360	-0.232	Profit _{<i>i,t+2</i>}
(3)	4.306 ^a	(1.004)	17,486	-0.314	Profit _{<i>i,t+3</i>}

Impact on profit is spread over time
and grows steadily for at least three years

Results - Long run effects

	ATE	std. err.	# Obs.	ρ	Dependent variable
(4)	0.194 ^a	(0.020)	27,851	-0.458	$\ln(\text{Emp.})_{i,t+1}$
(5)	0.161 ^a	(0.022)	22,360	-0.400	$\ln(\text{Emp.})_{i,t+2}$
(6)	0.138 ^a	(0.024)	17,486	-0.351	$\ln(\text{Emp.})_{i,t+3}$

Impact on employment is also persistent
but the effect decreases slowly over time.

Results - Long run effects

	ATE	std. err.	# Obs.	ρ	Dependent variable
Impacts on turnover and production of goods fade over time					
(7)	0.027 ^a	(0.010)	27,851	-0.056	$\ln(\textit{Turnover})_{i,t+1}$
(8)	0.013	(0.015)	22,360	-0.027	$\ln(\textit{Turnover})_{i,t+2}$
(9)	0.016 ^c	(0.009)	17,486	-0.037	$\ln(\textit{Turnover})_{i,t+3}$
(10)	0.023 ^b	(0.010)	27,851	-0.043	$\ln(\textit{Prod.goods})_{i,t+1}$
(11)	-0.002	(0.040)	22,360	0.013	$\ln(\textit{Prod.goods})_{i,t+2}$
(12)	0.013	(0.009)	17,486	-0.025	$\ln(\textit{Prod.goods})_{i,t+3}$

Results - Long run effects

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Impact on profit is spread over time
and grows steadily for at least three years

Results - By firm size

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	Dep. variable	ATE	std. err.	# Obs.	Firm type (# employees)
(1)	Profitability	2.786 ^a	(0.590)	18,643	micro (1-10)
(2)	Profitability	3.127 ^c	(1.274)	12,519	small (11-50)
(3)	Profitability	2.300	(1.632)	3,081	large (> 50)
(4)	Employment	0.226 ^a	(0.158)	18,643	micro (1-10)
(5)	Employment	0.327 ^a	(0.030)	12,519	small(11-50)
(6)	Employment	-0.038	(0.082)	3,081	large (> 50)
(7)	Turnover	0.030 ^a	(0.011)	18,643	micro (1-10)
(8)	Turnover	0.086 ^a	(0.021)	12,519	small(11-50)
(9)	Turnover	0.022	(0.126)	3,081	large(> 50)
(10)	Prod. goods	0.023 ^b	(0.011)	18,643	micro (1-10)
(11)	Prod. goods	0.083 ^a	(0.017)	12,519	small(11-50)
(12)	Prod. goods	0.168	(0.123)	3,081	large(> 50)

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Results - By industry (1)

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	ATE	std. err.	# Obs.	ρ (p-value)
1- Food, Beverage, Tobacco				
Profitability	5.070 ^a	(0.511)	10479	-0.390 (0.000)
Ln Employment	0.178 ^a	(0.034)	10479	-0.376 (0.000)
Ln Turnover	0.026 ^b	(0.013)	10479	0.214 (0.095)
Ln Prod. goods	0.024 ^c	(0.013)	10479	-0.066 (0.054)
2- Textile, Leather				
Profitability	-1.268	(2.339)	1258	0.065 (0.629)
Ln Employment	0.070	(0.116)	1258	-0.116 (0.662)
Ln Turnover	0.225 ^b	(0.073)	1258	0.357 (0.003)
Ln Prod. goods	0.214 ^a	(0.079)	1258	-0.373 (0.006)
3- Wood, Paper, Printing				
Profitability	6.632 ^a	(2.040)	4776	-0.453 (0.05)
Ln Employment	-0.080	(0.112)	4776	0.265 (0.365)
Ln Turnover	-0.353 ^a	(0.031)	4776	0.745 (0.000)
Ln Prod. goods	-0.357 ^a	(0.031)	4776	0.748 (0.000)

Results - By industry (2)

	ATE	std. err.	# Obs.	ρ (p-value)
4- Chemicals, Plastics				
Profitability	9.690 ^a	(0.987)	1527	-0.630 (0.000)
Ln Employment	-0.185	(0.256)	1527	0.584 (0.381)
Ln Turnover	-0.237 ^b	(0.093)	1527	0.564 (0.025)
Ln Prod. goods	-0.248 ^b	(0.097)	1527	0.566 (0.025)
5- Mineral, Metal Products				
Profitability	2.860	(3.040)	9941	-0.173 (0.443)
Ln Employment	0.096 ^c	(0.050)	9941	-0.217 (0.099)
Ln Turnover	0.044 ^b	(0.019)	9941	-0.076 (0.106)
Ln Prod. goods	0.023 ^b	(0.029)	9941	-0.035 (0.622)

Results - By industry (3)

	ATE	std. err.	# Obs.	ρ (p-value)
6- Machinery, Electrical Equip.				
Profitability	1.220	(0.917)	4309	-0.028 (0.634)
Ln Employment	0.190 ^c	(0.105)	4309	-0.462 (0.096)
Ln Turnover	0.021	(0.019)	4309	-0.035 (0.163)
Ln Prod. goods	0.021	(0.016)	4309	-0.044 (0.023)
7- Manufacturing, n.e.c.				
Profitability	7.997 ^a	(1.942)	1953	9.085 (0.000)
Ln Employment	0.387 ^b	(0.179)	1953	-0.749 (0.050)
Ln Turnover	0.102 ^a	(0.058)	1953	-0.191 (0.134)
Ln Prod. goods	0.093 ^a	(0.057)	1953	-0.178 (0.133)

Results - By industry (Summary)

1. Servitization has a positive impact on all four indicators of performance.
 - Agri-food (1) and Other manufacturing not elsewhere classified (7).
2. Servitization increases the sales of goods (and more generally firm size) but not the profit rate.
 - Mineral and metal products (4) and textile (2)
 - Complementary between services and the provision of goods
 - Service paradox (cost of organizing services activities outweighs the competitive gains)
3. Servitization increases profitability but reduces firm size and production of goods
 - Wood products, Paper and printing (3) and Chemicals and plastics (4)
 - Substitution between services and the provision of goods

Conclusion

Take away:

1. For management people: Combining services and provision of services is a way to foster performances (in most case, but not always)
2. For macro people: Deindustrialization figures hide deeper changes in the nature of manufacturing activity in developed countries
3. For micro people: We need to better understand what manufacturing firms are *really* doing to understand export, R& D, investment, employment (etc) strategies, and keep in mind that a huge majority of manufacturing firms also produce services (and have - at least - two production functions) before, say, estimating TFP

Conclusion

That's it for today

Thank you for your comments