BANCO DE ESPAÑA
Eurosistema

Explaining small firms' TFP gap: An analysis with Italian, Spanish and French firm-level data

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Content

The beginning of everything…

Ratio of labour productivity in Spanish micro-firms (less than 10 employees) to European average –source: Eurostat Structural Business Statistics

Labour productivity in Spain to average in EU-13 countries	Spain	Standard deviation
MANUFACTURING AND MARKET SERVICE	0.6	
TOTAL MANUFACTURING	0.7	0.3
Food products, beverages and tobacco	0.9	0.4
Textiles and textile products	0.7	0.4
Leather and leather products	0.7	0.4
Wood and wood products	0.7	0.4
Pulp, paper, publishing and printing	0.7	0.3
Coke and refined petroleum products		0.7
Chemicals, chemical products and fibres	0.4	0.5
Rubber and plastic products	0.7	0.3
Other non-metallic products	0.7	0.4
Basic metals, and fabricated metal products	0.7	0.3
Machinery and equipment	0.7	0.3
Electrical and optical equipment	0.6	0.4
transport equipment	0.7	0.4
Other manufactures	0.6	0.3
MARKET SERVICES	0.7	0.4
Hotels and restaurants	0.9	0.4
Wholesale and retail trade	0.8	0.4
Transport	0.7	0.5
Storage and Communications	0.4	0.5
Real state	0.7	0.5
Renting of machinery and equipment	0.4	0.8
R&D	0.6	0.3
Other market services	0.7	0.3

Questions, questions….

- **Labour productivity in Spanish micro-firms is smaller than that in other European micro-firms across ALL sectors**
  - Why?
  - Is this related to some horizontal (cross-sector) factor? What type of distortions can explain this?
  - Are small Spanish firms systematically different to those in other countries, even if they operate in the same sector?

- **How can this finding be reconcile with previous findings with EFIGE data?**
  - They concluded that there are no differences in competitiveness across countries once you control for their industrial structure (size and sector distribution). *See Navaretti et al 2011*.

Our contribution

In this paper we intend to answer some of these questions (I)

1. **We estimate TFP (TFPR, I am afraid) at firm level using Amadeus data for Italy, France and Spain**
   - In order to avoid the potential simultaneity problem in the production function estimation, we use a "control function approach", à la Petrin & Levinsohn
     - *We use value-added as the output variable*
     - *We assume that unobserved productivity depends on the demand for intermediate inputs and the capital stock*
     - *We allow the technological coefficients of the production function to vary in cells defined for country-sector-size*
       - We distinguish between small firms (10-20 employees) and medium and large firms (more than 20 employees)

Our contribution

In this paper we intend to answer some of these questions (II)

2. **We compare the TFP distribution of firms in the same size segment and sector, but operating in different countries**
   - We test whether those distributions are statistically different

3. **If there are differences…what factors can explain them?**
   - We intend to use for this purpose the rich information contained in the EFIGE dataset
   - We will perform a kind of *"Oaxaca decomposition"*
     - *The estimated TFP gap (between small firms in a given sector in Spain and France, for example) will be a function of:*
       - The difference in the "usual" determinants of competitiveness across firms
       - The difference in the firm-level returns to those determinants…

Content

1. **Motivation and contribution**
2. **Data – EFIGE**
3. **TFP distribution across countries: Are there differences across sectors or/and firm size?**
4. **Explaining the TFP gap – to come**
5. **Conclusions**

Content

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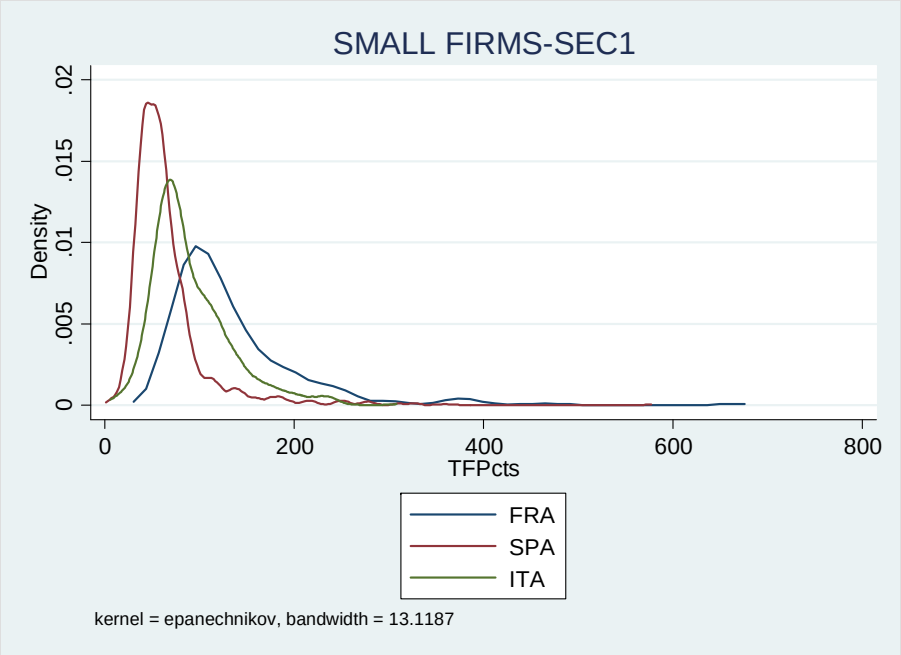
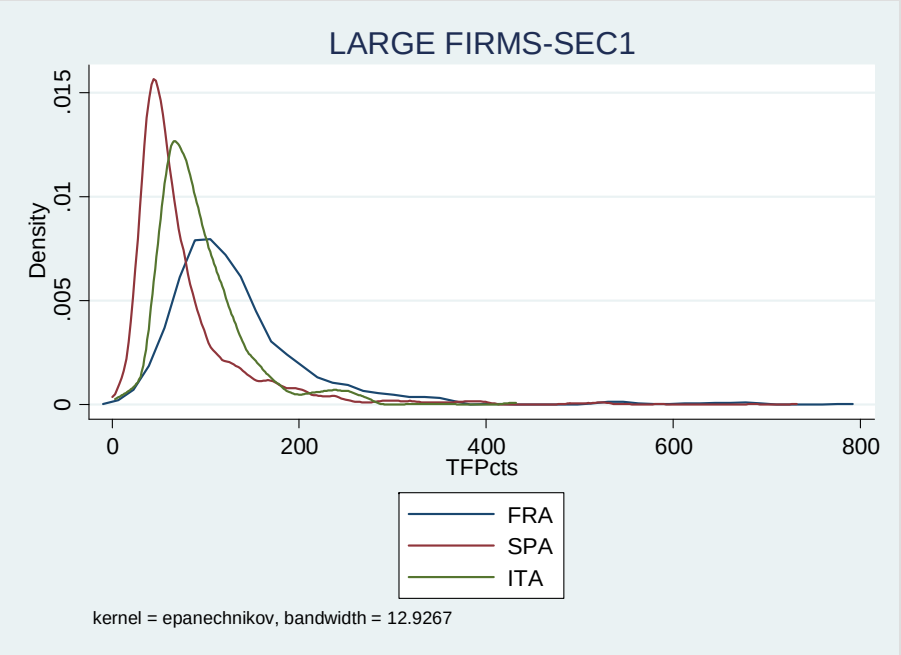
TFP Kernel density functions by size

Food products, beverages and tobacco





FRA>ITA (0.3759) ; FRA>SPA (0.6592) ; ITA>SPA (0.3856)

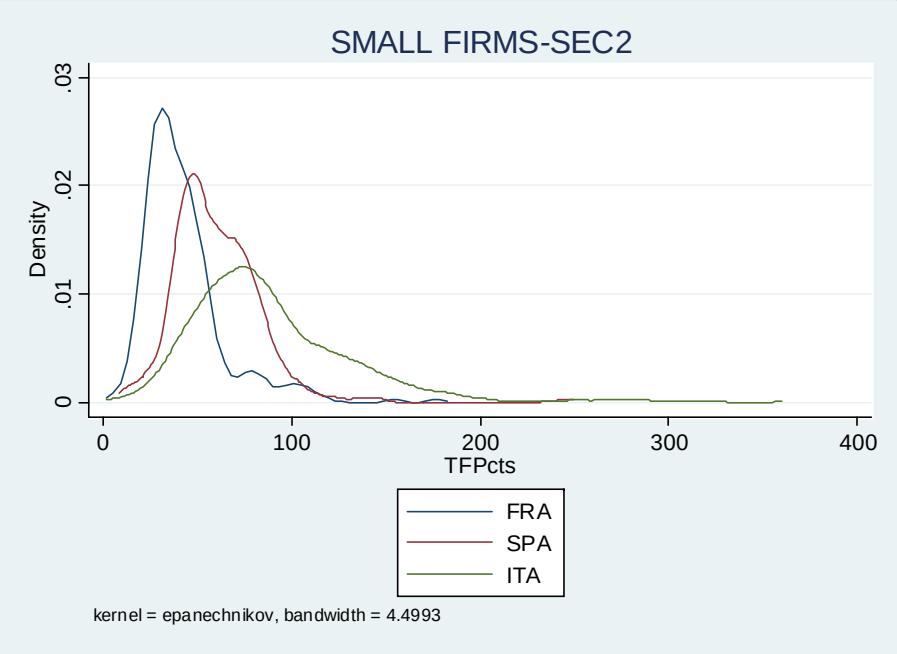
FRA>ITA (0.2998) ; FRA>SPA (0.5148) ; ITA>SPA (0.3322)

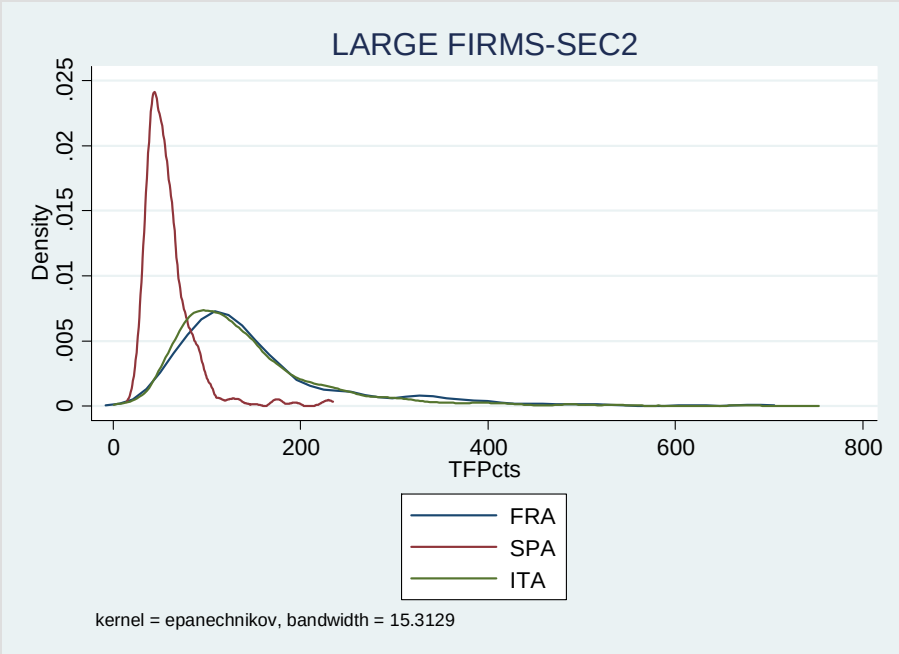
Wilcoxon rank-sum test rejects equality of the density functions

SEC1: Food products, beverages and tobacco (1500-1600)

TFP Kernel density functions by size

Textiles and leather products





FRA<ITA (0.6495) ; FRA<SPA (0.4490) ; ITA>SPA (0.3581)

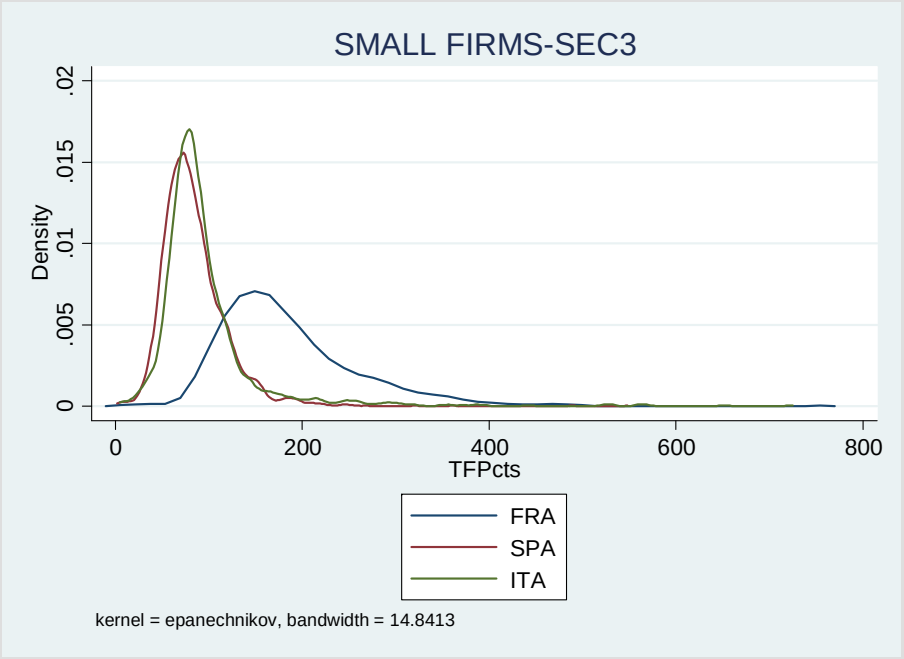
FRA>ITA (0.0651) ; FRA>SPA (0.7208) ; ITA>SPA (0.6838)

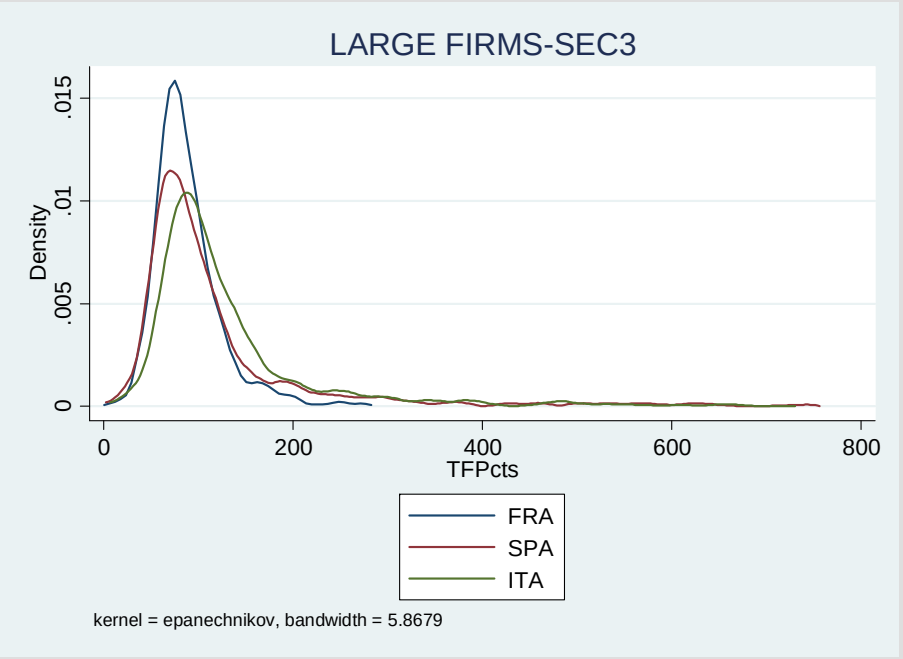
Wilcoxon rank-sum test rejects equality of the density functions

SEC2: textiles and textile products (1700-1830) + Leather and leather products (1900-1930)

TFP Kernel density functions by size

Wood, Pulp, Paper, publishing and printing





FRA>ITA (0.6986) ; FRA>SPA (0.7338) ; ITA>SPA (0.1082)

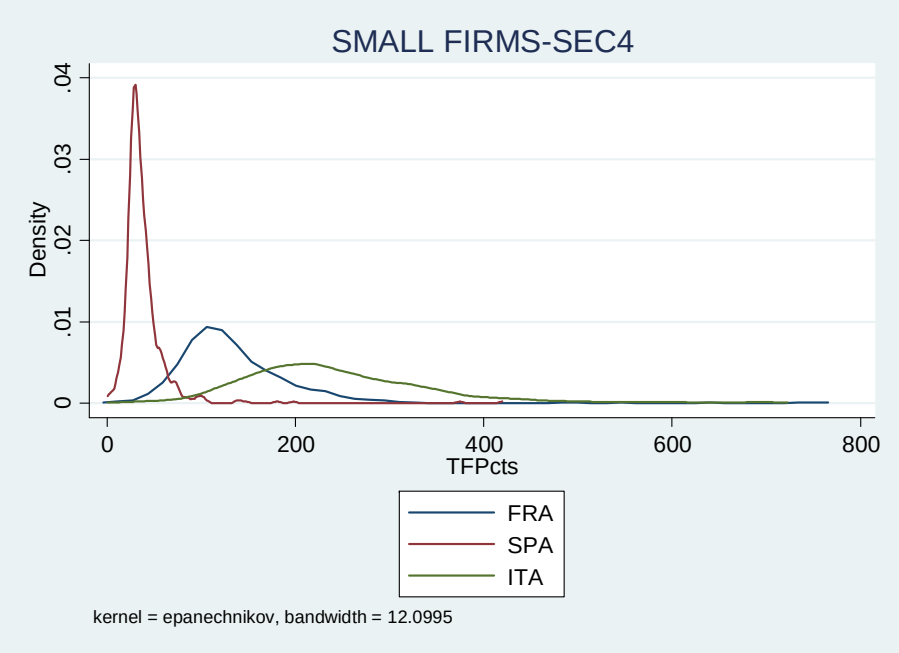
FRA<ITA (0.2669) ; FRA<SPA (0.1418) ; ITA>SPA (0.6838)

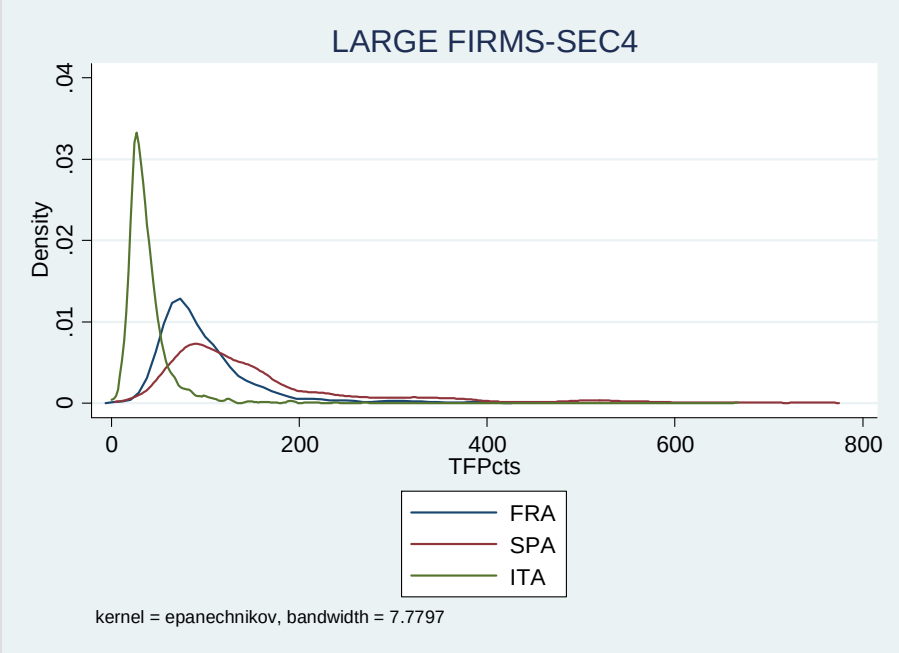
Wilcoxon rank-sum test rejects equality of the density functions

SEC3: Wood and wood products (2000-2052)+Pulp, paper and paper products, publishing and printing (2100-2233)+nec (3600-3720)

TFP Kernel density functions by size

Coke, refined petroleum, chemicals, rubber and plastics





FRA<ITA (0.5778) ; FRA>SPA (0.8846) ; ITA>SPA (0.9584)

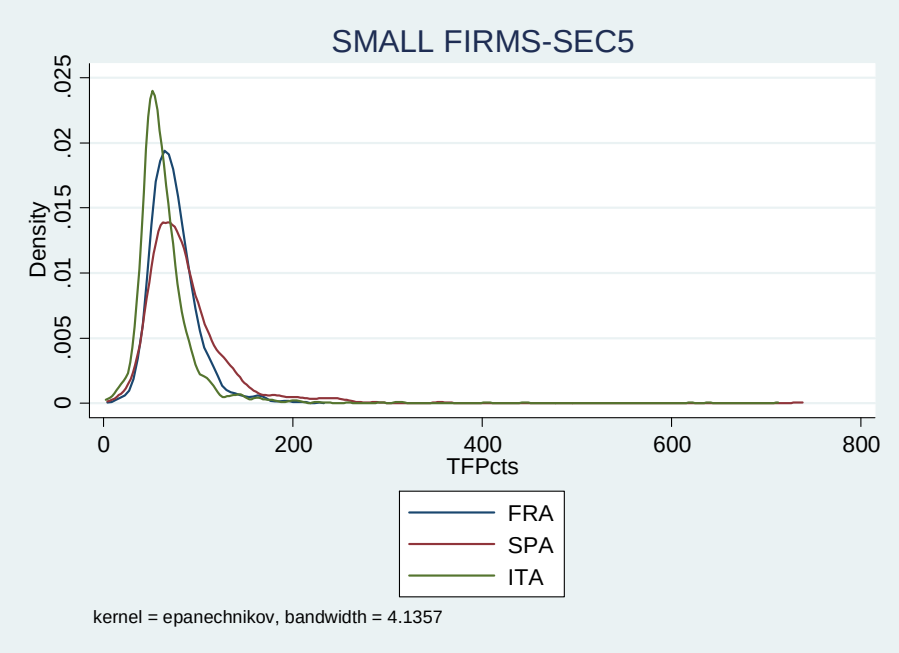
FRA>ITA (0.7567) ; FRA>SPA (0.3012) ; ITA>SPA (0.8276)

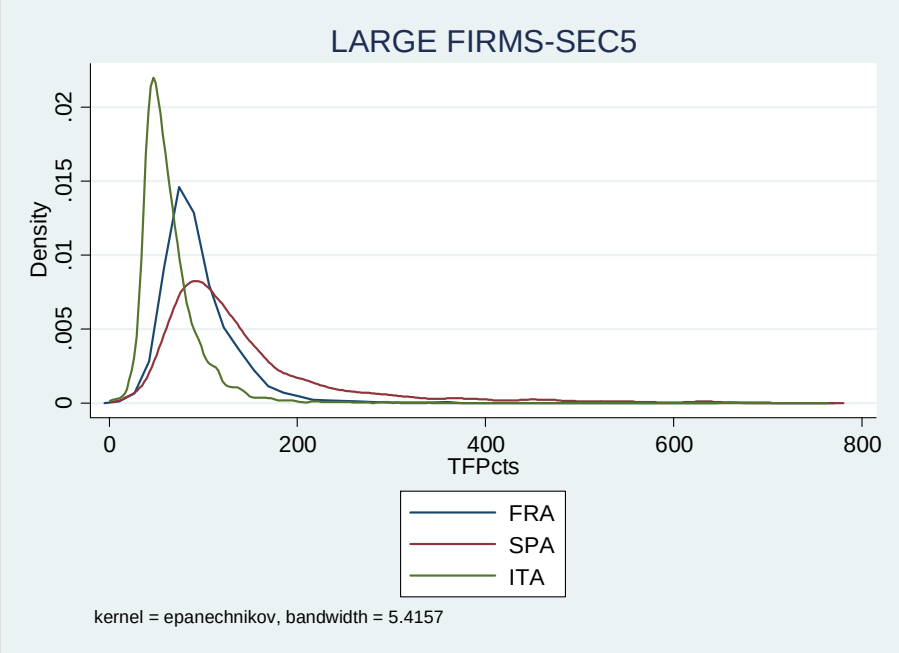
Wilcoxon rank-sum test rejects equality of the density functions

SEC4: Coke, refined petroleum products and nuclear fuel (2300-2330)+chemicals, chemical products and man-made fibres (2400-2470)+rubber and plastic products (2500-2524)

TFP Kernel density functions by size

Metals and other non-metallic products





FRA>ITA (0.2515) ; FRA<SPA (0.1474) ; ITA<SPA (0.3277)

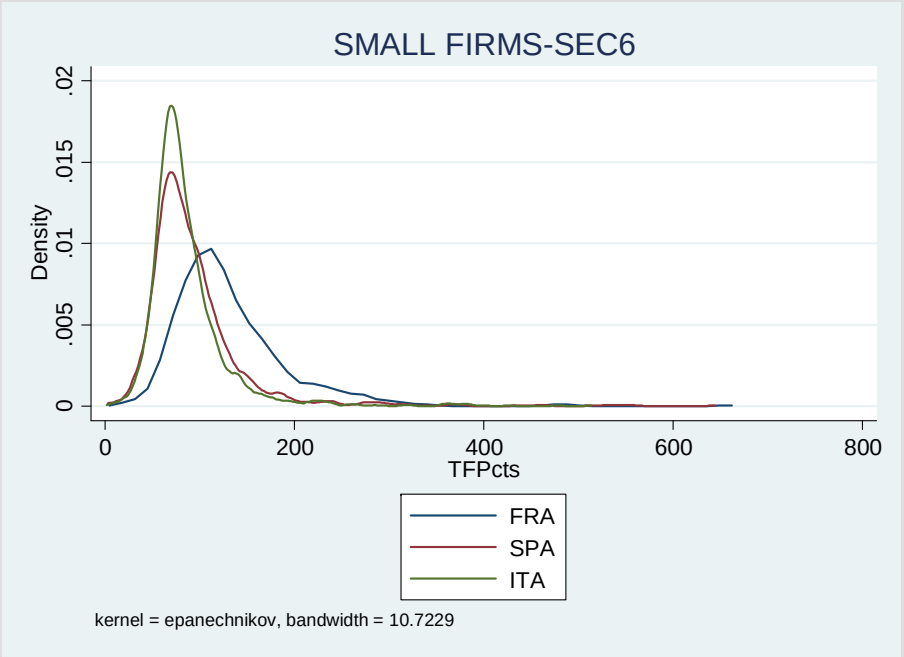
FRA>ITA (0.4504) ; FRA<SPA (0.2871) ; ITA<SPA (0.5863)

Wilcoxon rank-sum test rejects equality of the density functions

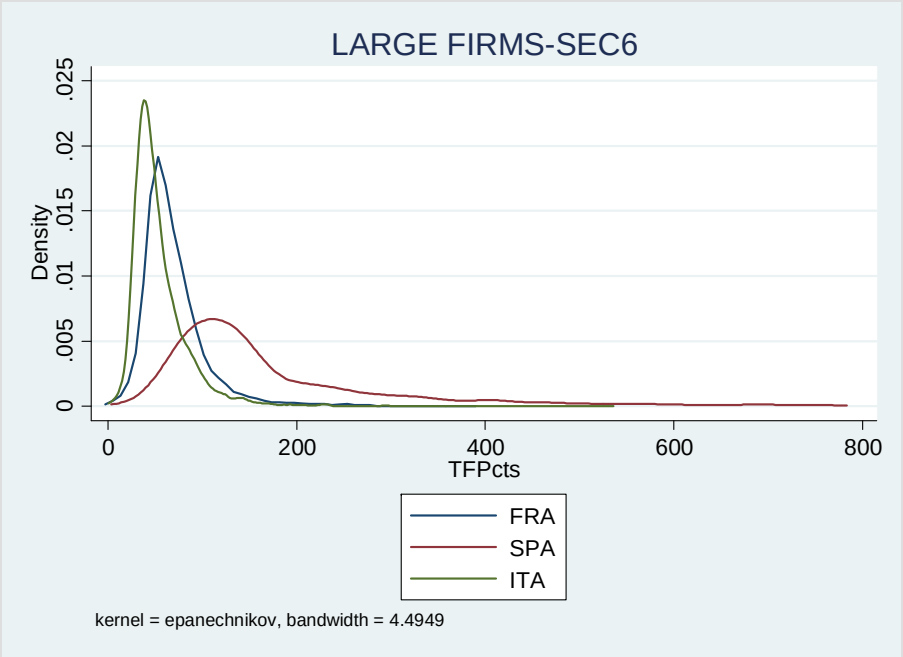
SEC5: Other non metallic mineral products (2600-2682)+basic metals and fabricated metal products (2700-2875)

TFP Kernel density functions by size

Machinery, electrical, optical and transport equipment



FRA>ITA (0.4727) ; FRA>SPA (0.3885) ; ITA<SPA (0.0995)



FRA>ITA (0.2988) ; FRA<SPA (0.6206) ; ITA<SPA (0.7210)

Wilcoxon rank-sum test rejects equality of the density functions

SEC6: Machine an equipment nec (2900-2972)+electrical and optical equipment (3000-3350)+transport equipment (3400-3550)

Sample sizes for TFPcts estimation

	FRANCE		ITALY		SPAIN	
	Smaller than 20	**Greater than 20**	**Smaller than 20**	**Greater than 20**	**Smaller than 20**	**Greater than 20**
Sector 1	331	675	622	970	1258	1873
Sector 2	315	663	938	1477	449	541
Sector 3	685	1126	1352	1583	2007	2245
Sector 4	457	1401	554	1315	618	1270
Sector 5	1983	3375	1922	3178	2232	3638
Sector 6	800	2466	1484	3061	1282	2356