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THE CONVERGENCE THEORIES AND THE MANUFACTURED INDUSTRY IN PORTUGAL

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ABSTRACT

The aim of this paper is to present a further contribution to the analysis of absolute convergence, associated with the neoclassical theory, of the manufactured industry productivity at regional level and for the periods from 1986 to 1994 and from 1995 to 1999. The main conclusions that should be noted is which the signs of convergence different between the several manufactured industries.

Keywords: convergence theories; panel data; manufactured industry; Portuguese regions

1. EMPIRICAL EVIDENCE OF ABSOLUTE CONVERGENCE, PANEL DATA

The purpose of this part of the work is to analyze the absolute convergence of output per worker (as a "proxy" of labor productivity), with the following equation ((1)Islam, 1995, based on the (2)Solow model, 1956):

$$\Delta \ln P_{it} = c + b \ln P_{i,t-1} + v_{it} \quad (1)$$

Table 1 presents the results for the absolute convergence of output per worker, in the estimations obtained for each of the manufactured industry of NUTS II, from 1986 to 1994 (3)(Martinho, 2011).

The convergence results obtained are statistically satisfactory for all manufacturing industries of NUTS II.

Table 1: Analysis of convergence in productivity for each of the manufacturing industries at the five NUTS II of Portugal, for the period 1986 to 1994

Metals industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	0.190 (0.190)						-0.024 (-0.241)	-0.024	1.646	0.002	30
LSDV		2.171** (1.769)	2.143** (1.753)	2.161** (1.733)	2.752** (1.988)	---	-0.239** (-1.869)	-0.273	1.759	0.198	27
GLS	0.407 (0.394)						-0.046 (-0.445)	-0.047	1.650	0.007	30
Minerals industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	0.738 (0.903)						-0.085 (-0.989)	-0.089	1.935	0.025	38
LSDV		1.884* (2.051)	1.970* (2.112)	2.004* (2.104)	1.926* (2.042)	1.731** (1.930)	-0.208* (-2.129)	-0.233	2.172	0.189	34
GLS	0.967 (1.162)						-0.109 (-1.246)	-0.115	1.966	0.039	38
Chemical industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	2.312** (1.992)						-0.225** (-1.984)	-0.255	2.017	0.104	34
LSDV		6.104* (3.750)	6.348* (3.778)	6.381* (3.774)	6.664* (3.778)	6.254* (3.777)	-0.621* (-3.769)	-0.970	1.959	0.325	30
GLS	2.038** (1.836)						-0.198** (-1.826)	-0.221	2.034	0.089	34
Electric goods industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	0.781 (0.789)						-0.083 (-0.784)	-0.087	1.403	0.016	38
LSDV		3.634* (2.363)	3.552* (2.360)	3.673* (2.362)	3.636* (2.376)	3.429* (2.324)	-0.381* (-2.355)	-0.480	1.259	0.167	34
GLS	0.242 (0.285)						-0.025 (-0.279)	-0.025	1.438	0.002	38
Transport equipments industry											

Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	4.460* (3.110)						-0.464* (-3.136)	-0.624	2.258	0.206	38
LSDV		8.061* (4.948)	8.526* (5.007)	8.614* (4.986)	8.696* (4.998)	8.077* (4.961)	-0.871* (-5.014)	-2.048	2.049	0.429	34
GLS	5.735* (3.780)						-0.596* (-3.807)	-0.906	2.159	0.276	38
Food industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	0.314 (0.515)						-0.027 (-0.443)	-0.027	1.858	0.005	38
LSDV		2.841* (2.555)	2.777* (2.525)	2.899* (2.508)	2.617* (2.471)	2.593* (2.470)	-0.274* (-2.469)	-0.320	1.786	0.198	34
GLS	0.090 (0.166)						-0.005 (-0.085)	-0.005	1.851	0.001	38
Textile industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	4.276* (4.639)						-0.462* (-4.645)	-0.620	1.836	0.388	34
LSDV		5.556* (4.288)	5.487* (4.276)	5.506* (4.272)	5.561* (4.253)	5.350* (4.431)	-0.595* (-4.298)	-0.904	1.816	0.431	30
GLS	3.212* (6.336)						-0.347* (-6.344)	-0.426	1.848	0.542	34
Paper industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	2.625* (2.332)						-0.271* (-2.366)	-0.316	1.534	0.128	38
LSDV		3.703* (2.803)	3.847* (2.840)	3.837* (2.813)	3.684* (2.812)	3.521* (2.782)	-0.382* (-2.852)	-0.481	1.516	0.196	34
GLS	1.939** (1.888)						-0.201** (-1.924)	-0.224	1.556	0.089	38
Severall industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	5.518* (4.004)						-0.605* (-4.004)	-0.929	2.121	0.297	38
LSDV		7.802* (5.036)	7.719* (5.022)	7.876* (5.033)	7.548* (5.023)	7.660* (5.018)	-0.847* (-5.032)	-1.877	2.024	0.428	34
GLS	6.053* (4.308)						-0.664* (-4.309)	-1.091	2.081	0.328	38

Table 2 shows results also for each of the manufacturing industries of the NUTS II of Portugal, but now for the period 1995 to 1999.

Table 2: Analysis of convergence in productivity for each of the manufacturing industries at the five NUTS II of Portugal, for the period 1995 to 1999

Metals industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	1.108* (3.591)						-0.111* (-3.353)	-0.118	2.457	0.384	18
LSDV		1.476 (1.143)	1.496 (1.183)	1.503 (1.129)	1.451 (1.186)	1.459 (1.233)	-0.151 (-1.115)	-0.164	2.424	0.416	14
GLS	1.084* (7.366)						-0.108* (-6.866)	-0.114	2.176	0.724	18
Minerals industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	-0.455 (-1.236)						0.052 (1.409)	0.051	1.601	0.099	18
LSDV		2.158* (2.222)	2.280* (2.265)	2.287* (2.227)	2.194* (2.248)	2.417* (2.306)	-0.221* (-2.192)	-0.250	1.359	0.567	14
GLS	-0.356 (-0.854)						0.042 (1.007)	0.041	1.628	0.053	18
Chemical industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.
Pooling	1.236 (1.026)						-0.115 (-0.966)	-0.122	1.049	0.049	18
LSDV		5.320* (4.493)	5.281* (4.452)	5.447* (4.449)	5.858* (4.711)	5.072* (4.501)	-0.525* (-4.470)	-0.744	2.432	0.702	14
GLS	3.136* (2.532)						-0.302* (-2.477)	-0.360	1.174	0.254	18
Electric goods industry											
Method	Const.	D ₁	D ₂	D ₃	D ₄	D ₅	Coef.	T.C.	DW	R ²	G.L.

Pooling	1.936 (1.289)						-0.196 (-1.271)	-0.218	1.945	0.082	18
LSDV		4.729 (1.504)	4.775 (1.507)	4.818 (1.490)	4.590 (1.463)	4.671 (1.519)	-0.482 (-1.488)	-0.658	2.038	0.342	14
GLS	2.075 (1.299)						-0.211 (-1.283)	-0.237	1.976	0.084	18
Transport equipments industry											
Method	Const.	D₁	D₂	D₃	D₄	D₅	Coef.	T.C.	DW	R²	G.L.
Pooling	2.429* (2.264)						-0.237* (-2.179)	-0.270	1.837	0.209	18
LSDV		8.626* (10.922)	8.647* (10.973)	9.051* (10.924)	8.537* (10.917)	8.356* (10.866)	-0.867* (-10.811)	-2.017	2.000	0.896	14
GLS	3.507* (3.025)						-0.346* (-2.947)	-0.425	1.649	0.326	18
Food industry											
Method	Const.	D₁	D₂	D₃	D₄	D₅	Coef.	T.C.	DW	R²	G.L.
Pooling	0.873 (1.619)						-0.082 (-1.453)	-0.086	2.921	0.105	18
LSDV		-0.516 (-0.300)	-0.521 (-0.308)	-0.532 (-0.304)	-0.425 (-0.259)	-0.435 (-0.268)	0.060 (0.341)	0.058	2.230	0.208	14
GLS	1.027* (4.163)						-0.098* (-3.800)	-0.103	2.251	0.445	18
Textile industry											
Method	Const.	D₁	D₂	D₃	D₄	D₅	Coef.	T.C.	DW	R²	G.L.
Pooling	0.788** (2.048)						-0.080** (-1.882)	-0.083	1.902	0.165	18
LSDV		0.514 (0.261)	0.525 (0.270)	0.515 (0.262)	0.522 (0.272)	0.541 (0.301)	-0.051 (-0.239)	-0.052	1.919	0.167	14
GLS	0.802* (20.052)						-0.081* (-18.461)	-0.085	1.719	0.950	18
Paper industry											
Method	Const.	D₁	D₂	D₃	D₄	D₅	Coef.	T.C.	DW	R²	G.L.
Pooling	0.735 (1.524)						-0.073 (-1.471)	-0.076	2.341	0.107	18
LSDV		5.201 (1.479)	5.454 (1.462)	5.410 (1.467)	5.053 (1.470)	4.970 (1.486)	-0.533 (-1.465)	-0.761	1.939	0.227	14
GLS	0.654* (3.329)						-0.064* (-3.198)	-0.066	2.185	0.362	18
Several industry											
Method	Const.	D₁	D₂	D₃	D₄	D₅	Coef.	T.C.	DW	R²	G.L.
Pooling	-0.338 (-0.463)						0.042 (0.531)	0.041	2.651	0.015	18
LSDV		3.734** (1.949)	3.883** (1.962)	3.940** (1.966)	3.817** (1.967)	3.647** (1.934)	-0.402** (-1.930)	-0.514	2.905	0.303	14
GLS	-0.904* (-3.791)						0.102* (4.003)	0.097	1.922	0.471	18

2. CONCLUSIONS

The signs of absolute convergence are different from one manufactured industries to another, but there is a curious results for the equipment transport industry, because present strong evidence of absolute convergence and we know that this industry is a dynamic sector. In another hand we have the textile industry that we expect find strong signs of absolute convergence, because we know this is a sector with weak dynamics, but we only see some evidence of convergence in the first period.

3. REFERENCES

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