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## Is there increasing regional specialisation within the general process of deindustrialisation?

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# Discussion Papers

# 801

Kurt Geppert • Martin Gornig • Anna Lejpras

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Specialisation within the General  
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Opinions expressed in this paper are those of the author and do not necessarily reflect views of the institute.

## IMPRESSUM

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# **Is there increasing regional specialisation within the general process of deindustrialisation?**

Kurt Geppert, Martin Gornig, Anna Lejpras

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## **Abstract**

Trade theory and economic geography suggest that the removal of trade barriers is likely to bring about more economic specialisation and potentially more diverse development paths between countries and regions. Thus, the deepening and extending European integration should be accompanied by an increasing regional specialisation. In contrast, our results for the period from 1995 to 2004 show considerably declining differences in the share of manufacturing in total value added across nations and regions of the EU. The decrease in sectoral specialisation is accompanied by a strong and almost uniform process of deindustrialisation. However, this trend is slowing down and manufacturing shares appear to be gradually approaching lower limits. These bounds are specific according to national affiliation and settlement types of regions.

JEL: R11, O14, O18

Keywords: Regional specialisation, deindustrialisation, EU, nonlinear modelling

# **1 Introduction**

Trade theory and economic geography suggest that the removal of trade barriers is likely to bring about more economic specialisation and potentially more diverse development paths between countries and regions (Krugman 1993). Thus, the process of deepening and extending European integration should be accompanied by an increasing regional specialisation. This in turn would tend to make the regional economies of the EU more susceptible to asymmetric sectoral shocks and to increase the pressure on economic and political adjustment mechanisms of member states and the EU as a whole.

Empirical research on sectoral specialisation of regions and regional concentration of sectors has flourished in the wake of the huge advances of European integration in the 1990s. For a critical review of studies see Combes and Overman (2004). Due to data problems most studies use national data and focus on manufacturing. The evidence is ambiguous, but overall some basic features emerge. From the beginning of the 1980s up to the middle of the 1990s EU countries have become more specialised within the broad sector of manufacturing (WIFO 1999; Midelfart-Knarvik et al. 2000; Brühlhart 2001). This is, however, a slow and rather mixed process with many industries spreading out in Europe. Thus, the EU appears not to be “Americanizing” its manufacturing landscape (Storper et al. 2002; Brühlhart 2001).

Studies that go beyond the national level and, in addition, incorporate the service sector are confronted with the lack of disaggregated data. Therefore, results have to be interpreted with caution. In contrast to the national level, the overall picture here is a tendency of decreasing regional specialisation and sectoral concentration and a process of convergence in regional productive structures (Molle 1996; OECD 1999; Hallet 2000; Brühlhart and Traeger 2005; Ezcurra et al. 2006). The general shift from manufacturing into services appears to make regions more similar in their specialisation, even though this might in part be a statistical artefact due to poor disaggregation of data on services (Hallet 2000).

In the present paper we combine two aspects of regional development, specialisation and deindustrialisation. We use a very simple indicator to measure both of these processes simultaneously: the share of manufacturing in total value added. This share has been on the decrease for many years. In our period of observation, 1995 to 2004, it went down from 20.3 % to 17.7 % for the EU15 and from 24.0 % to 22.4 for the EU25. Nonetheless, manufacturing still makes the largest contribution to the production of traded goods and services in the vast

majority of EU regions. At the same time manufacturing is among the sectors with the highest degrees of footlooseness. Hence, if there were strong forces towards specialisation the general process of deindustrialisation should be accompanied by a tendency of diverging shares of manufacturing in regional economies. This, however, is not the case. Controlling for differences between nations and types of regions – large agglomerations, smaller agglomerations, and other areas – we observe a tendency towards a uniform share of manufacturing in total value added of EU regions.

In what follows, we explain our data, regional definitions and methods (section 2), present our empirical results (section 3) and discuss a few conclusions (section 4).

## **2 Data and methods**

Our analysis is based on regional data on value added for 23 EU member countries provided by EUROSTAT. In order to allow for national and agglomeration effects on the share of manufacturing in total value added, we group NUTS 2 areas into nations and types of settlement: large agglomerations (areas with urban cores of more than 500,000 inhabitants), small agglomerations (areas with urban cores between 300,000 and 500,000 inhabitants) and non-agglomerations (areas with no urban cores of at least 300,000 inhabitants). The assignment of the particular NUTS 2 regions to the settlement types is shown in the map in the appendix A. Furthermore, we distinguish between two groups of EU member countries, the EU-14 (Austria, Belgium, Germany, Denmark, Spain, Finland, France, Ireland, Italy<sup>1</sup>, Luxemburg, Netherlands, Portugal, Sweden and United Kingdom; see appendix B) and 9 new EU member countries (Bulgaria<sup>2</sup>, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia and Slovak Republic; see appendix C).

In our empirical analysis we examine the development of specialisation and industrialisation – both measured by the share of manufacturing in total value added - over the period from 1995 to 2004. In the first step, we use dispersion measures, the range and the standard deviation, to analyse specialisation among nations and regions of the EU in terms of the share of manufacturing. In the second step, we investigate whether the process of deindustrialization is

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<sup>1</sup> The Autonomous Province of Trento and the Autonomous Province of Bolzano are not considered separately but regarded as one region, Trentino/Alto Adige.

<sup>2</sup> For 1995 the manufacturing shares in total value added are not available for the Bulgarian NUTS 2 regions. In order to construct a balanced panel we replicated the respective values for 1996.

approaching a lower limit and to what extent this limit is common across regions – controlling for national and settlement type differences.

In the analysis of deindustrialisation we apply a nonlinear model based on a logistic function. The generalized logistic models (sometimes termed asymmetric S-functions)<sup>3</sup> have been employed in a range of fields, including biology (e.g., Nelder 1961, Morgan 1976), economics (e.g., Harvey 1984, Herman and Montroll 1972, Marchetti and Nakicenovic 1980), marketing (e.g., Easingwood 1987, Fisher and Fry 1971) or physics (such as Yoon et al. 2006). A typical application of the logistic equation is a population growth model that shows a saturation level characteristic (i.e., carrying capacity) reflected by an upper bound of the function (see Tsoularis and Wallace 2002 for overview of the variants of the logistic growth models).

In our analysis, we assume that the development of the regional manufacturing shares follows an inverted (symmetric) S-curve, i.e., the shares' decrease is subject to a saturation level. Accordingly, we use the following mathematical formula:

$$VA_{it} = a_0 + \frac{a_1}{\{1 + \exp[-a_2(t - a_3)]\}}, \quad 0 \leq a_0 < a_1 < a_0 + a_1 \leq 1, a_2 < 0, a_3 > 0, \quad (1)$$

where  $VA_{it}$  and  $t$  are the dependent and independent variables, respectively. The endogenous variable  $VA_{it}$  is the manufacturing share in total value added in a region  $i$ , where  $t$  represents time. The parameters  $a_x$ ,  $x = 0, 1, 2, 3$ , determine the shape of the logistic function (see Figure 1). In our model the function comes from the initial level (upper bound; a sum of  $a_0$  and  $a_1$ ) and asymptotically tends to the target level (lower bound;  $a_0$ ). The parameter  $a_2$  determines the function slope (in our model this parameter should take a negative value) and  $a_3$  represents the location shift of the curve.

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<sup>3</sup> See Jukić and Scitovski (1996)

### An example of logistic function form

(inverted S-curve)

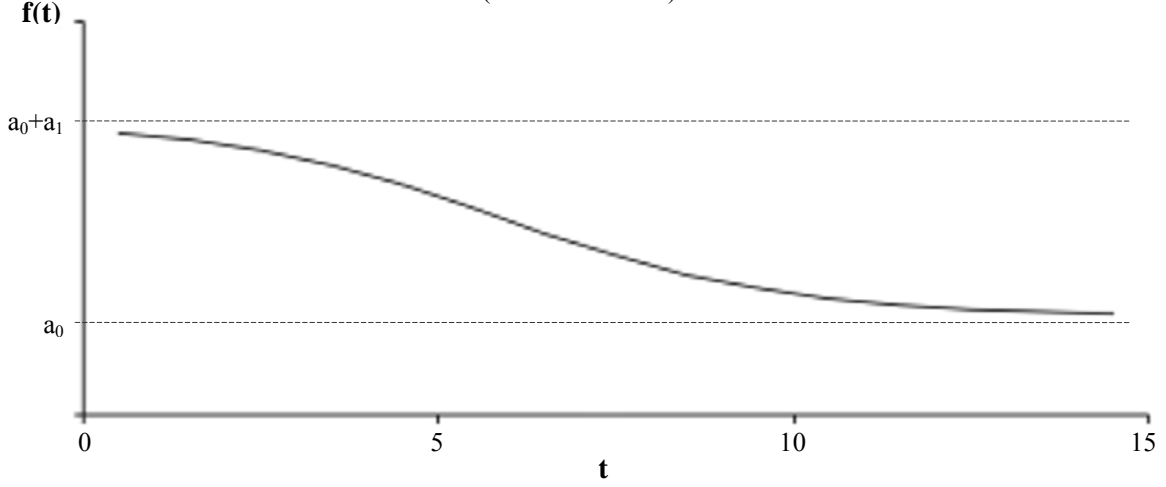


Figure 1: Logistic function form (inverted S-curve) for the following parameter values:  $a_0=0.05$ ,  $a_1=0.1$ ,  $a_2=-0.5$ ,  $a_3=6$ .

In addition, in order to control for the influence of the settlement types and national effects on the development of the manufacturing shares (in particular on the limit of deindustrialization) in regions, we extend the model (1) by introducing the respective the dummy variables:<sup>4</sup>

$$VA_{it} = a_0 + \frac{a_1}{\{1 + \exp[-a_2(t - a_3)]\}} + \sum_{j=1}^{J-1} b_j D_{ij}^{ST} + \sum_{k=1}^{K-1} c_k D_{ik}^C + \varepsilon_{it}, \quad (2)$$

where  $\varepsilon_{it}$  is a disturbance term; the variables  $D_{ij}^{ST}$  refer to the impact of a settlement type  $j$  of a region  $i$  and  $D_{ik}^C$  denote the dummy variables capturing the national effects, i.e., the influence specific to a country  $k$ . Model (2) is employed separately for the two groups of the old (EU-14) and new (EU-9) EU member countries.

<sup>4</sup> Thus, the effects specific to a settlement type or country should influence the intercept (i.e., the upper and lower bounds) of the function, but its slope and location shift remain unchanged. Furthermore, in order to avoid perfect multicollinearity, we have to drop one of the dummy variables per dummy variables set that form the references. t values indicate whether the dummy variables differ significantly from the respective reference category.



For model estimation, we apply nonlinear GMM (General Method of Moments) that is robust to deviations of underlying data to violations of heteroskedasticity and normality as well as provides a unified approach to estimate nonlinear models (Cameron and Trivedi 2005). Due to the nonlinear model specification, the significance tests on the parameters are approximate values based on estimates of standard errors and associated test statistics and p-values determined in iterations using the Gauss method.<sup>5</sup> Furthermore, the model fit evaluation in nonlinear models may be a minor problem because the value of the determination coefficient  $R^2$  can be out of the range of 0 and 1. Nevertheless, it provides a useful descriptive measure (Greene 2003, Hensen 1982, Ratkowsky 1989).

### **3 Results**

Traditionally, there have been considerable differences in the degree of industrialisation across the EU in western Europe. In 1995, the share of manufacturing in total value added was almost 30 % in Ireland but only slightly over 12 % in Portugal (Figure 2). The standard deviation across the 15 member states was 4.2 (Figure 3). These differences became even more significant in the first years of our period of observation (1995-2004). In countries such as Ireland and Germany, manufacturing's share in value added increased until 1999, while in some other countries it went down dramatically. The difference between the highest and the lowest share of manufacturing in total value added rose from 17 to over 20 percentage points. The standard deviation reached the value of 5.

Since 1999, however, we observe a trend of convergence. Since that year, differences in the degree of industrialisation across the old EU have been decreasing consistently. Standard deviations at the national level fell from 5.1 to 4.1 in 2004, i.e., it went back to almost the initial value of 1995. The divergence between the highest share of manufacturing (Ireland, 24 %) and the lowest value (Luxembourg, just under 10 %) is, however, noticeably smaller than at the start of the period under investigation.

We see much bigger regional disparities in degree of industrialisation if we look at regions rather than nations. In 1995, the difference between the highest the lowest share of manufacturing was 33 percentage points. This is almost twice the difference observed when comparing the member states. The standard deviation across our 193 regions was 7.2.

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<sup>5</sup> The chosen starting parameter values for the iterations are shown in the respective tables that present the results of the model estimation. The convergence criterion was set to 0.000001.

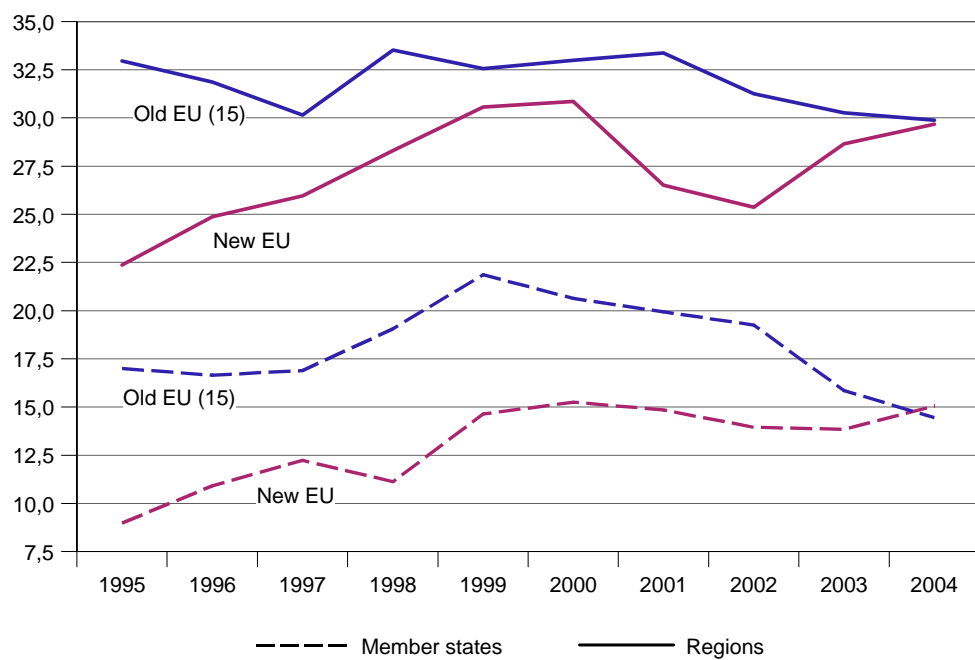


Figure 2: Range of the share of manufacturing in total value added

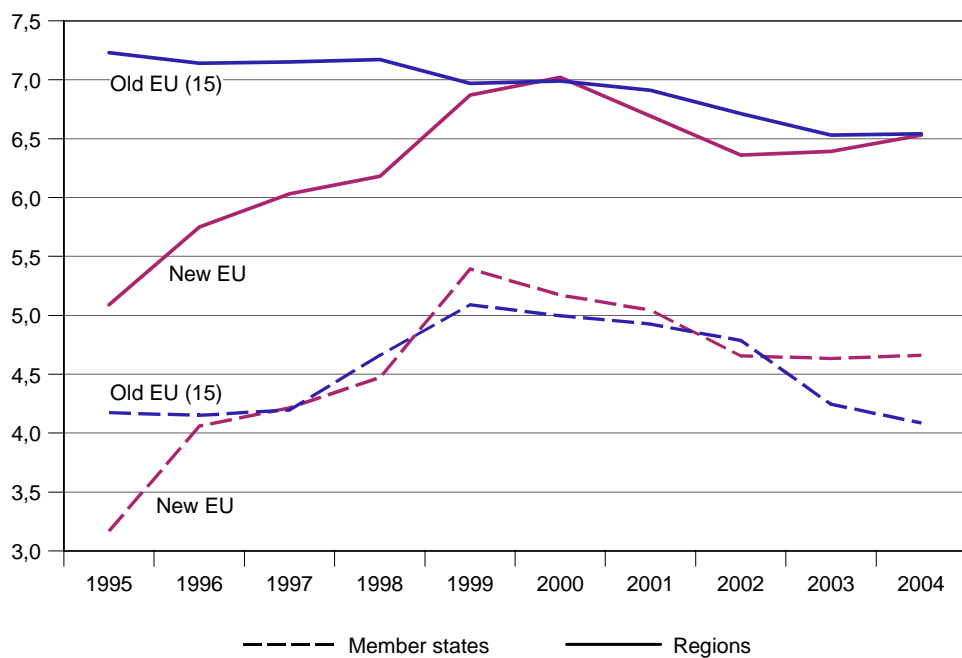


Figure 3: Standard deviation of the share of manufacturing in total value added across nations and regions

At the regional level disparities in the share of manufacturing in total value added have also diminished. But this process differs from that at national level in that it did not take place as a reaction to a period of increased specialisation. Rather, after a few years of stability the standard deviation fell continuously from 1998 onwards. In 2004, it was over 10 % below than in 1995. The range of manufacturing shares across regions does not exhibit any clear trend. Here, the values fluctuate considerably from one year to the next.

For the new central and eastern European member states, the differences in the degree of industrialisation in 1995 were considerably less marked than those between the incumbent members. This is particularly evident when comparing the standard deviations (Figure 3). In 1995, the value at the country level was about 3, i.e., 25 %, below that for the old member states. The contribution of manufacturing to total value added was highest in Slovakia (27 %), this is only 9 percentage points more than the manufacturing share in the country with the lowest degree of industrialisation, Estonia (Figure 2).

At the level of regions the disparities in terms of the share of manufacturing were initially much less pronounced in the central and eastern European countries than in the EU 15. The standard deviation between the 45 regions in 1995 was only 70 % the value for the EU 15. The value for the range was about two-thirds the figure for the regions of the old member states. During the years that followed the disparities in degree of industrialisation between the new member states and their regions increased sharply. By 2000, regional differentiation within the eastern European states had increased to such an extent that it barely differed from the value for the old member states. In 2000, the standard deviations had reached 5 for country level and 7 for the level of regions. These values are identical to those for the EU 15 nations, and the ranges have at least become more similar.

However, after this period of regional adjustment of the transition countries, the process of convergence in terms of the share of manufacturing also established in that area. Since 2001, the standard deviations have been decreasing almost in line with those for the old member states. In 2004, the value for the level of regions was 6.5 points in both eastern and western Europe. In the same year, the range of values for the share of manufacturing was almost the same for the old and new members.

This decline in regional specialisation goes hand-in-hand with the long-term trend of a decreasing role for manufacturing in the European Union as a whole. Here, we investigate two issues in particular:

- In the course of this decreasing regional specialisation, are the regions of the EU moving towards a uniform degree of industrialisation?
- Can the trend towards deindustrialisation be described as a consistent process that is shaping the development of the regions of the EU?

In order to answer these questions, we evaluate the results of the nonlinear model described in the section 2 using a logistic saturation function. The presentation of the results is then broken down for the 193 regions of the EU 15 states on the one hand and the 45 regions of the new member states in central and eastern Europe on the other hand.

The estimation results for the old member states are presented in Table 1. It should be pointed out that the estimated parameters that determine the shape of the logistic function are scientifically plausible, i.e., their calculated values are in accordance with our assumptions. The value of the determinations coefficient  $R^2$  is under 20 %.

The results show that, in the course of the reduction of regional specialisations, regions are moving towards a uniform degree of industrialisation. The lower bound for the share of manufacturing in total value added set in the saturation function assumed here ( $a_0$ ) is highly significant. According to this data, the limiting value for the contribution of manufacturing to total value added for the reference category (non-agglomerations and Germany) was 21% in 2004.

At least, this is the conclusion we come to if we take simple differences in spatial structure and national specifics into account. The proportion contributed by industry in large urban agglomerations differs very significantly from the reference value for the region type "non-agglomeration". For the large agglomerations, it is approximately 3 % lower. By contrast, the difference in the degree of industrialisation for the settlement type "small agglomerations" is not significant.

**Table 1** Model estimation results for the NUTS 2 regions of Western Europe

Parameter		Estimate	Approximate standard error	t value
$a_0$	lower bound	0.211	0.011	19.1
$a_1$	upper bound – lower bound	0.026	0.012	2.2
$a_2$	velocity fall	-1.018	0.929	-1.1
$a_3$	turning point	7.594	1.091	6.96
<i>Dummies for the types of settlement:</i>				
	large agglomerations	-0.031	0.004	-8.44
	small agglomerations	0.001	0.005	0.18
<i>Dummies for national effects:</i>				
	Austria	-0.016	0.006	-2.59
	Belgium	-0.037	0.008	-4.87
	Denmark	-0.036	0.005	-7.25
	Spain	-0.039	0.008	-4.59
	Finland	-0.004	0.011	-0.34
	France	-0.054	0.006	-8.38
	Italy	-0.043	0.007	-6.03
	Ireland	0.081	0.009	8.86
	Luxembourg	-0.115	0.005	-22.43
	Portugal	-0.102	0.009	-10.88
	Sweden	-0.005	0.006	-0.79
	United Kingdom	-0.014	0.006	-2.36
	Netherlands	-0.053	0.008	-6.47

Notes: 1. Adjusted  $R^2 = 0.175$ ; Number of regions  $N = 193$ ; Starting values for the parameters:  $a_0=0.2$ ,  $a_1=0.4$ ,  $a_2=-0.2$ ,  $a_3=0$ .

2. Reference categories are non-agglomerations and Germany.

In general, the country dummies for the 193 regions in the old EU member states are highly significant. The only exceptions are Sweden and Finland, where deviations in the degree of industrialisation from the German reference value are not significant. According to this data, the regions of Ireland show the highest shares of manufacturing. Here, the country dummy variable is eight percentage points higher than that for Germany. In all other countries, it is below the German reference value. The deviation is lowest, at less than two percentage points, for the United Kingdom and Austria. It is highest, in comparison to Germany, with over 10 percentage points difference, in Luxembourg and Portugal.

This indicates that while the different regions are moving towards a uniform degree of industrialisation, their initial situations and processes of change are highly varied. The average deviation from the initial value in 1995 ( $a_0+a_1$ ) is significant only at the 5 level. In addition, we cannot show statistical evidence for a uniform rate of change ( $a_2$ ) in the average decrease in the contribution of manufacturing.

By contrast, the turning point in the logistic saturation function ( $a_3$ ) is highly significant. This indicates that the change towards a stabilisation of the contribution of manufacturing to total value added took place in 2002. This was thus at a time for which the descriptive statistics indicate a reduction in regional specialisation.

The model estimation for the regions of the Eastern European member states also provides plausible results (Table 2). The  $R^2$  value amounts to 36 % and, hence, it indicates that the model can be better fitted for the new member countries than for the old ones. This could, on the one hand, be the result of more similar initial situations in 1995, as the evaluations of the standard deviation have shown. However, on the other hand it might also be an indication of more uniform conditions for development in eastern Europe, which have resulted from the economic transformation process affecting every region there.

But the individual parameters of the logistic saturation function do not directly confirm such an explanation. Even for the new member states, the average deviation from the initial value in 1995 ( $a_0+a_1$ ) is only significant at the 5 % level. Moreover, there is no statistically reliable evidence for a uniform rate of change ( $a_2$ ) in the average reduction of the share of value added contributed by manufacturing industry. However, the estimated value of deindustrialization limit ( $a_0$ ) is highly significant.

According to the results of the model, the limit for the share of manufacturing in total value added in 2004 was about 20 % for the reference category Poland and non-agglomerations. Simple differences in spatial structure and specific national features have been taken into account. The share of industry in the large agglomerations differs highly significantly from the reference value for the region type "non-agglomerations". On average, it is approximately 3 % lower for the large agglomerations. Because of the statistical redundancy with the country dummies of Estonia and Slovenia, it is not possible to usefully identify a difference in the degree of industrialisation in regions of type "small agglomerations".

**Table 2** Model estimation results for the NUTS 2 regions of Eastern Europe

Parameter	Estimate	Approximate standard error	t value
$a_0$ lower bound	0.203	0.005	38.32
$a_1$ upper bound – lower bound	0.022	0.011	2.11
$a_2$ velocity fall (slope)	-0.928	1.016	-0.91
$a_3$ turning point (location shift)	4.485	1.231	3.64
<i>Dummies for the types of settlement:</i>			
large agglomerations	-0.031	0.006	-5.42
small agglomerations	-	-	-
<i>Dummies for national effects:</i>			
Bulgaria	-0.0070	0.0057	-1.22
Czech Republic	0.0748	0.0066	11.28
Estonia	-0.0401	0.0057	-7.04
Hungary	0.0505	0.0081	6.23
Lithuania	0.0114	0.0056	2.05
Latvia	-0.0199	0.0092	-2.16
Slovenia	0.0515	0.0041	12.56
Slovakia	0.0385	0.0040	9.55

Notes: 1. Adjusted  $R^2 = 0.361$ ; Number of regions  $N = 45$ ; Starting values for the parameters:  $a_0=0.2$ ,  $a_1=0.2$ ,  $a_2=-0.2$ ,  $a_3=0$ .

2. Reference categories are non-agglomerations and small agglomerations (due to redundancy with the country dummies of Estonia and Slovenia, the dummy variable for small agglomerations is excluded) and Poland.

The country dummies for the 45 NUTS 2 regions of the new EU are, in generally, highly significant. The only exception is Bulgaria, for which the deviation in degree of industrialisation from the reference value, for Poland, is not significant. The lowest share of value added is provided by manufacturing in the regions in Lithuania and Estonia. Their country dummies are 2 and 4 percentage points lower than for Poland. For the other countries, the value is above the Polish reference value. The largest difference is for the Czech Republic, with a deviation of more than 7 percentage points. For Hungary and Slovenia, the difference is five percentage points.

The expressions of the individual parameters of the logistic function are very similar for the estimators within the already existing EU and the new member states (see Tables 1 and 2). The lower bound of the manufacturing share in total value added is comparable for the two regions, 21% and 20% for the reference categories of the existing and new member states, respectively. The scale of the lower level of industrialisation in the large agglomerations is almost identical. The influence of the country dummies is highly significant almost everywhere in both western and eastern Europe. In both cases, the turning point can be statistically identified with the logistic saturation function ( $a_3$ ). However, the transition to a

stabilisation of the share of value added created by manufacturing industry began considerably earlier in the eastern European member states, in 2000, than in western Europe, where it can be identified for 2002.

#### **4 Conclusion**

In conclusion, our analyses provide evidence that the progression of European integration has – in contrast to theoretical expectations - not resulted in an increase of regional economic specialisation. On the contrary: since 2000 we observe a strong convergence of manufacturing shares in regional economies. Controlling for the influence of settlement structure (agglomeration) and national effects – this process appears to be heading for a single manufacturing share in Europe and, somewhat surprisingly, the new central and eastern European member countries do not diverge from this trend.

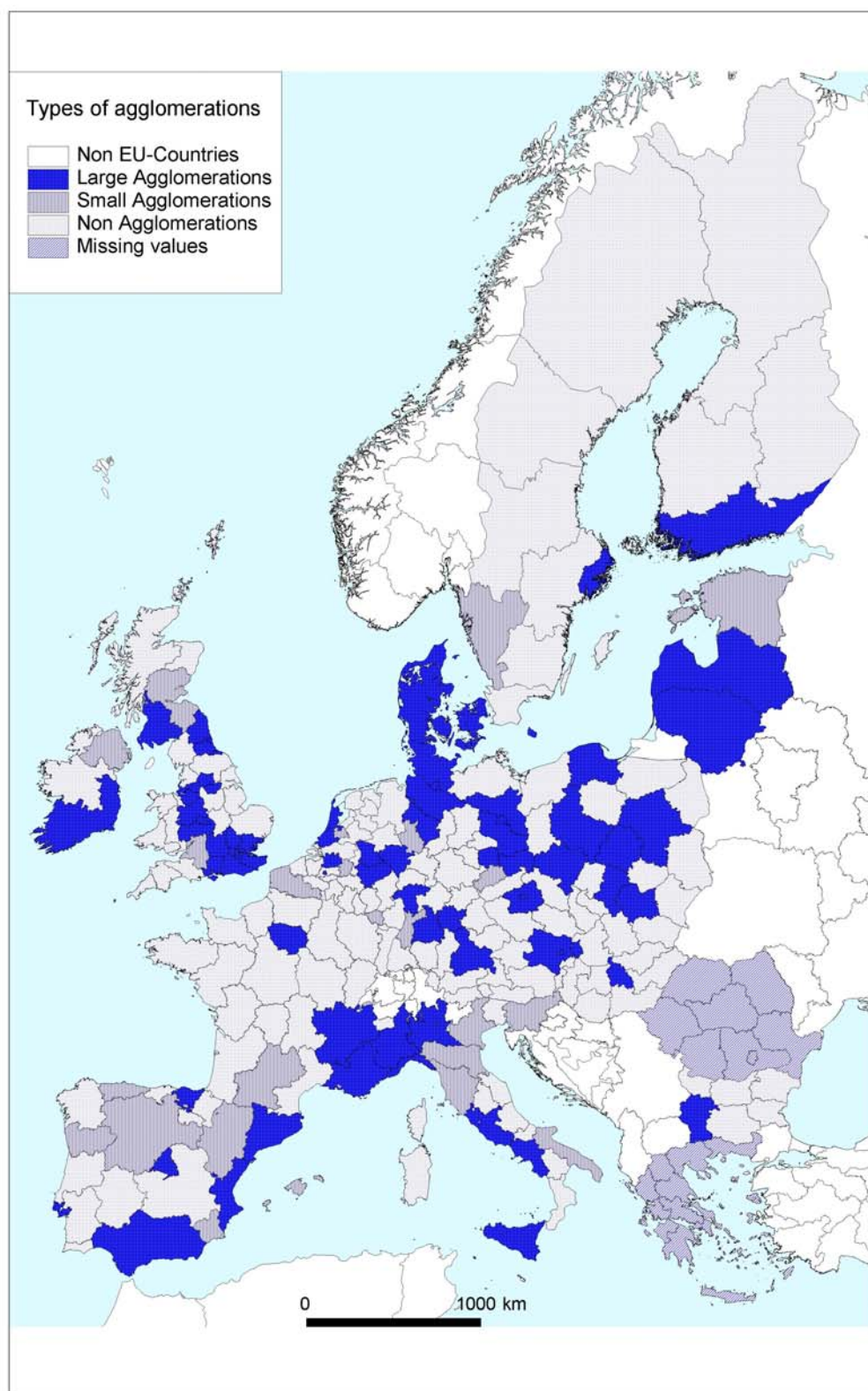


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## Appendix A



## Appendix B

Type of settlement	NUTS 2 code	NUTS 2 region	Country	Manufacturing share in total value added in 1995 (in %)	Manufacturing share in total value added in 2004 (in %)
1 = large agglomerations					
	at12	Niederösterreich	Austria	22.1	23.5
	at13	Wien	Austria	10.1	8.4
	be10	Région de Bruxelles-Capitale	Belgium	8.3	6.5
	be24	Prov. Vlaams Brabant	Belgium	17.0	12.8
	de11	Stuttgart	Germany	31.7	33.2
	de21	Oberbayern	Germany	20.4	21.2
	de25	Mittelfranken	Germany	25.9	25.4
	de30	Berlin	Germany	12.6	11.6
	de41	Brandenburg - Nordost	Germany	10.8	15.1
	de42	Brandenburg - Südwest	Germany	8.3	13.4
	de50	Bremen	Germany	20.9	22.0
	de60	Hamburg	Germany	13.7	14.4
	de71	Darmstadt	Germany	19.1	17.0
	de92	Hannover	Germany	18.5	18.4
	de93	Lüneburg	Germany	16.1	15.5
	dea1	Düsseldorf	Germany	22.0	19.7
	dea2	Köln	Germany	20.5	20.0
	dea5	Arnsberg	Germany	28.3	27.3
	ded2	Dresden	Germany	11.6	20.5
	ded3	Leipzig	Germany	10.1	11.9
	def0	Schleswig-Holstein	Germany	16.9	16.1
	dk00	Dänemark	Denmark	17.3	14.0
	es21	Pais Vasco	Spain	29.6	26.9
	es30	Comunidad de Madrid	Spain	15.5	11.6
	es51	Cataluña	Spain	27.8	22.0
	es52	Comunidad Valenciana	Spain	23.5	18.2
	es61	Andalucía	Spain	12.5	10.3
	fi18	Etelä-Suomi	Finland	23.7	21.7
	fr10	Île de France	France	12.6	9.7
	fr71	Rhône-Alpes	France	21.4	17.8
	fr82	Provence-Alpes-Côte d'Azur	France	10.4	9.4
	ie02	Southern and Eastern	Ireland	30.8	28.2
	itc1	Piemonte	Italy	29.3	22.9
	itc3	Liguria	Italy	12.7	9.4
	itc4	Lombardia	Italy	30.6	26.9
	ite4	Lazio	Italy	11.3	7.8
	itf3	Campania	Italy	14.3	10.7
	itg1	Sicilia	Italy	9.2	8.7
	nl32	Noord-Holland	Netherlands	13.6	9.7
	nl33	Zuid-Holland	Netherlands	15.0	12.6
	pt17	Lisboa	Portugal	13.1	11.0
	se01	Stockholm	Sweden	13.5	12.9
	ukc1	Tees Valley and Durham	United Kingdom	33.4	21.8
	ukc2	Northumberland, Tyne and Wear	United Kingdom	23.7	16.2
	ukd2	Cheshire	United Kingdom	31.0	21.1
	ukd3	Greater Manchester	United Kingdom	23.5	14.1

ukd5	Merseyside	United Kingdom	22.4	13.3
uke3	South Yorkshire	United Kingdom	24.8	16.5
uke4	West Yorkshire	United Kingdom	27.1	16.2
ukg1	Herefordshire, Worcestershire and Warks	United Kingdom	26.2	17.1
ukg2	Shropshire and Staffordshire	United Kingdom	29.4	19.6
ukg3	West Midlands	United Kingdom	30.4	17.6
ukh2	Bedfordshire, Hertfordshire	United Kingdom	23.1	11.6
ukh3	Essex	United Kingdom	20.6	14.7
uki1	Inner London	United Kingdom	7.5	4.8
uki2	Outer London	United Kingdom	15.8	8.2
ukj1	Berkshire, Bucks and Oxfordshire	United Kingdom	17.9	11.8
ukj2	Surrey, East and West Sussex	United Kingdom	13.2	8.2
ukj3	Hampshire and Isle of Wight	United Kingdom	21.3	14.5
ukj4	Kent	United Kingdom	20.7	14.9
ukm3	South Western Scotland	United Kingdom	23.3	15.7
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2 = small agglomerations				
be21	Prov. Antwerpen	Belgium	27.2	24.8
de12	Karlsruhe	Germany	26.8	27.8
dea4	Detmold	Germany	31.5	28.4
dec0	Saarland	Germany	23.7	26.9
ded1	Chemnitz	Germany	13.4	19.9
es12	Principado de Asturias	Spain	18.0	17.1
es24	Aragón	Spain	22.6	21.1
es41	Castilla y León	Spain	17.9	16.5
es53	Illes Balears	Spain	6.8	5.2
es62	Región de Murcia	Spain	18.4	15.3
es70	Canarias (ES)	Spain	7.2	5.2
fr30	Nord - Pas-de-Calais	France	22.4	17.6
fr62	Midi-Pyrénées	France	14.0	10.7
itd3	Veneto	Italy	29.6	26.1
itd5	Emilia-Romagna	Italy	28.2	25.8
ite1	Toscana	Italy	24.0	19.7
itf4	Puglia	Italy	15.0	12.5
nl31	Utrecht	Netherlands	11.1	8.2
pt11	Norte	Portugal	25.8	22.9
se0a	Västsverige	Sweden	24.3	23.1
ukk1	Gloucestershire, Wiltshire and North Somerset	United Kingdom	20.0	14.6
ukm2	Eastern Scotland	United Kingdom	20.9	13.3
ukn0	Northern Ireland	United Kingdom	19.8	15.7
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3 = non-agglomerations				
at11	Burgenland	Austria	16.4	17.0
at21	Kärnten	Austria	18.2	19.3
at22	Steiermark	Austria	23.8	25.4
at31	Oberösterreich	Austria	30.0	29.5
at32	Salzburg	Austria	15.4	16.5
at33	Tirol	Austria	19.0	18.3
at34	Vorarlberg	Austria	27.0	27.7
be22	Prov. Limburg (B)	Belgium	30.2	24.1
be23	Prov. Oost-Vlaanderen	Belgium	24.8	20.7
be25	Prov. West-Vlaanderen	Belgium	25.0	22.7
be31	Prov. Brabant Wallon	Belgium	18.0	19.7
be32	Prov. Hainaut	Belgium	20.7	17.4
be33	Prov. Liège	Belgium	20.1	17.5

be34	Prov. Luxembourg (B)	Belgium	15.6	14.4
be35	Prov. Namur	Belgium	10.4	10.1
de13	Freiburg	Germany	28.8	31.1
de14	Tübingen	Germany	31.0	33.1
de22	Niederbayern	Germany	26.9	27.3
de23	Oberpfalz	Germany	25.0	26.4
de24	Oberfranken	Germany	27.4	27.7
de26	Unterfranken	Germany	25.1	25.9
de27	Schwaben	Germany	27.2	28.2
de72	Gießen	Germany	25.7	25.0
de73	Kassel	Germany	22.0	22.2
de80	Mecklenburg-Vorpommern	Germany	7.7	10.1
de91	Braunschweig	Germany	29.0	33.4
de94	Weser-Ems	Germany	19.6	22.0
dea3	Münster	Germany	23.5	22.4
deb1	Koblenz	Germany	21.7	21.8
deb2	Trier	Germany	21.8	22.3
deb3	Rheinhessen-Pfalz	Germany	29.1	28.4
dee1	Dessau	Germany	14.7	21.8
dee2	Halle	Germany	11.4	17.4
dee3	Magdeburg	Germany	9.4	15.4
deg0	Thüringen	Germany	12.6	21.2
es11	Galicja	Spain	16.7	16.1
es13	Cantabria	Spain	20.9	18.6
es22	Comunidad Foral de Navarra	Spain	32.9	27.0
es23	La Rioja	Spain	28.4	25.1
es42	Castilla-la Mancha	Spain	19.0	17.3
es43	Extremadura	Spain	7.1	6.9
fi13	Itä-Suomi	Finland	21.8	19.3
fi19	Länsi-Suomi	Finland	30.4	28.7
fi1a	Pohjois-Suomi	Finland	27.2	27.3
fi20	Åland	Finland	9.2	6.4
fr21	Champagne-Ardenne	France	20.4	18.5
fr22	Picardie	France	24.8	19.8
fr23	Haute-Normandie	France	24.5	21.5
fr24	Centre	France	20.3	17.4
fr25	Basse-Normandie	France	19.8	16.3
fr26	Bourgogne	France	20.0	17.2
fr41	Lorraine	France	21.1	18.1
fr42	Alsace	France	24.5	21.2
fr43	Franche-Comté	France	29.4	24.8
fr51	Pays de la Loire	France	19.5	17.6
fr52	Bretagne	France	15.0	14.0
fr53	Poitou-Charentes	France	16.5	14.0
fr61	Aquitaine	France	13.1	11.9
fr63	Limousin	France	16.1	13.5
fr72	Auvergne	France	20.7	17.8
fr81	Languedoc-Roussillon	France	9.2	8.2
fr83	Corse	France	3.3	3.5
ie01	Border, Midlands and Western	Ireland	27.7	19.5
itc2	Valle d'Aosta/Vallée d'Aoste	Italy	10.3	10.2
itd1	Provincia Autonoma Bolzano-Bozen	Italy	15.6	14.6
itd4	Friuli-Venezia Giulia	Italy	23.1	20.0

ite2	Umbria	Italy	22.2	17.6
ite3	Marche	Italy	26.8	26.0
itf1	Abruzzo	Italy	22.0	22.4
itf2	Molise	Italy	15.7	16.2
itf5	Basilicata	Italy	15.9	15.9
itf6	Calabria	Italy	6.7	6.4
itg2	Sardegna	Italy	11.8	9.3
lu00	Luxemburg (Grand-Duché)	Luxemburg	13.7	9.4
nl11	Groningen	Netherlands	14.5	10.6
nl12	Friesland	Netherlands	17.6	14.2
nl13	Drenthe	Netherlands	19.5	17.1
nl21	Overijssel	Netherlands	23.4	19.4
nl22	Gelderland	Netherlands	19.7	15.5
nl23	Flevoland	Netherlands	11.2	10.0
nl34	Zeeland	Netherlands	30.6	25.6
nl41	Noord-Brabant	Netherlands	27.6	21.0
nl42	Limburg (NL)	Netherlands	29.3	21.0
pt15	Algarve	Portugal	3.9	4.1
pt16	Centro (PT)	Portugal	24.5	20.3
pt18	Alentejo	Portugal	9.1	11.6
pt20	Região Autónoma dos Açores (PT)	Portugal	5.3	6.1
pt30	Região Autónoma da Madeira (PT)	Portugal	4.2	4.2
se02	Östra Mellansverige	Sweden	27.1	23.4
se04	Sydsverige	Sweden	23.1	20.2
se06	Norra Mellansverige	Sweden	29.6	25.3
se07	Mellersta Norrland	Sweden	21.6	17.1
se08	Övre Norrland	Sweden	17.5	15.1
se09	Småland med öarna	Sweden	30.7	27.5
ukd1	Cumbria	United Kingdom	36.3	25.4
ukd4	Lancashire	United Kingdom	31.3	24.1
uke1	East Riding and North Lincolnshire	United Kingdom	32.2	26.6
uke2	North Yorkshire	United Kingdom	17.7	13.4
ukf1	Derbyshire and Nottinghamshire	United Kingdom	32.4	21.6
ukf2	Leicestershire, Rutland and Northants	United Kingdom	28.5	20.2
ukf3	Lincolnshire	United Kingdom	21.4	17.3
ukh1	East Anglia	United Kingdom	20.4	14.9
ukk2	Dorset and Somerset	United Kingdom	19.8	15.8
ukk3	Cornwall and Isles of Scilly	United Kingdom	11.1	11.5
ukk4	Devon	United Kingdom	22.0	12.4
ukl1	West Wales and The Valleys	United Kingdom	29.2	19.4
ukl2	East Wales	United Kingdom	26.9	16.5
ukm1	North Eastern Scotland	United Kingdom	16.2	11.3
ukm4	Highlands and Islands	United Kingdom	14.1	13.2

## Appendix C

Type of settlement	NUTS 2 code	NUTS 2 region	Country	Manufacturing share in total value added in 1995 (in %)	Manufacturing share in total value added in 2004 (in %)
<b>1 = large agglomerations</b>					
	bg41	Yugozapaden	Bulgaria	16.8	17.1
	cz01	Praha	Czech Republic	11.5	9.2
	cz02	Střední Čechy	Czech Republic	33.7	33.9
	hu10	Közép-Magyarország	Hungary	18.6	17.0
	lv00	Lettland	Latvia	23.5	13.2
	lt00	Litauen	Lithuania	19.9	20.9
	pl11	Łódzkie	Poland	21.3	20.9
	pl12	Mazowieckie	Poland	19.0	13.8
	pl21	Małopolskie	Poland	22.7	20.0
	pl22	Śląskie	Poland	20.0	22.0
	pl41	Wielkopolskie	Poland	23.6	23.6
	pl51	Dolnośląskie	Poland	20.6	21.9
	pl63	Pomorskie	Poland	23.3	21.3
	sk01	Bratislavský kraj	Slovak Republic	22.4	18.7
<b>2 = small agglomerations</b>					
	ee00	Estland	Estonia	17.9	17.1
	si00	Slovenien	Slovenia	26.4	25.7
<b>3 = non-agglomerations</b>					
	bg31	Severozapaden	Bulgaria	29.2	15.9
	bg32	Severen tsentralen	Bulgaria	30.0	23.9
	bg33	Severoiztochen	Bulgaria	26.7	15.3
	bg34	Yugoiztochen	Bulgaria	19.8	20.1
	bg42	Yuzhen tsentralen	Bulgaria	30.3	22.1
	cz03	Jihozápad	Czech Republic	23.2	29.5
	cz04	Severozápad	Czech Republic	21.9	27.4
	cz05	Severovýchod	Czech Republic	29.3	33.2
	cz06	Jihovýchod	Czech Republic	25.1	26.9
	cz07	Střední Morava	Czech Republic	29.5	34.7
	cz08	Moravskoslezsko	Czech Republic	30.8	30.9
	hu21	Közép-Dunántúl	Hungary	32.1	38.8
	hu22	Nyugat-Dunántúl	Hungary	33.9	35.3
	hu23	Dél-Dunántúl	Hungary	16.8	14.1
	hu31	Észak-Magyarország	Hungary	29.7	26.1
	hu32	Észak-Alföld	Hungary	23.2	22.6
	hu33	Dél-Alföld	Hungary	25.2	18.8
	pl31	Lubelskie	Poland	19.0	15.6
	pl32	Podkarpackie	Poland	26.0	25.3
	pl33	Świętokrzyskie	Poland	21.8	18.9
	pl34	Podlaskie	Poland	17.3	15.7
	pl42	Zachodniopomorskie	Poland	19.2	14.8
	pl43	Lubuskie	Poland	19.5	22.0
	pl52	Opolskie	Poland	26.0	26.9
	pl61	Kujawsko-Pomorskie	Poland	25.5	22.0
	pl62	Warmińsko-Mazurskie	Poland	20.8	20.2
	sk02	Západné Slovensko	Slovak Republic	27.7	25.7
	sk03	Stredné Slovensko	Slovak Republic	29.0	25.8
	sk04	Východné Slovensko	Slovak Republic	28.3	24.0