

Economic Integration and Structural Change: The Case of Austrian Regions

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Abstract

This paper focuses on employment effects since Austria joined the European Union. The location of economic activity and thus employment has been of interest for the economics profession for a long time. In this respect the question on the employment effects of integration in common markets is of special interest as the hypothesis can be raised that because of increased competition regions will specialize and industries will concentrate. Therefore it is asked how regions have specialized and how industries have concentrated by using various concentration/specialization measures. Moreover, the role of foreign direct investments are observed in explaining concentration/specialization as well as regional employment shifts. It is shown (i) that no general trends in specialization/concentration can be detected, so that on a general level the hypothesis of joining a common market necessarily leads to specialization/concentration must be refused, but for specific industries and regions interesting patterns can be observed and (ii) foreign direct investments have a significant impact on employment in regions.

1. Introduction

For centuries the Austrian economy was dominated by the steel and iron industry. Some regions were and still are specialised in iron and steel. These regions are Linz-Wels-Steyr in Oberösterreich and Obersteiermark in Steiermark due to natural resources in iron. Other industries which dominated a whole region are textiles in Vorarlberg and Niederösterreich. Due to international trends in the textile industry specialisation in this sector is declining.

This paper wants to introduce sectors in which the Austrian economy is specialised. The starting point is an overview of the stylised facts about the whole economy. The Austrian policy, which is dominated by the so-called "Social Partnership", is described. We evaluate the performance and the trade policy, foreign direct investments and research and development. Austria's competition policy changed as a consequence of the accession to the European Union.

2. Stylised Facts

Compared to most of the members of the European Union (EU 15) Austria is a very small country with an area of 83,870.66 km². Austria is divided into nine so-called Länder (provinces). These Länder are: Burgenland, Kärnten, Niederösterreich, Oberösterreich, Salzburg, Steiermark, Tirol, Vorarlberg and Wien. Wien, which is the capital of Austria, is also a province (Land). As can be seen, the overall population is increasing. If the year 1995 is equal to 100, Austria is 100.49 in 2003; Vorarlberg has the highest growth rate with 103.05 in 2003. At the bottom of the scale is Steiermark with 99.19 in 2003.

Table 1 **Population¹**

	1995	2000	2001	2002	2003
Burgenland	274,334	276,707	275,913	275,076	274,191
Kärnten	560,994	564,150	564,035	563,771	563,375
Niederösterreich	1,518,254	1,537,375	1,535,672	1,533,688	1,531,437
Oberösterreich	1,385,769	1,377,694	1,379,059	1,380,083	1,380,813
Salzburg	506,850	516,086	517,353	518,497	519,509
Steiermark	1,206,317	1,201,743	1,200,221	1,198,525	1,196,586
Tirol	658,312	669,245	671,313	673,152	674,804
Vorarlberg	343,109	349,317	350,810	352,249	353,607
Wien	1,592,596	1,598,661	1,596,437	1,594,157	1,591,848
Austria	8,046,535	8,090,978	8,090,813	8,089,198	8,086,170

¹ Source: Statistik Austria

Table 2 **Area²**

	km²	Population/km²
Burgenland	3,965.46	68
Kärnten	9,535.97	57
Niederösterreich	19,177.78	77
Oberösterreich	11,981.74	111
Salzburg	7,154.22	67
Steiermark	16,391.93	72
Tirol	12,647.93	50
Vorarlberg	2,601.48	127
Wien	414.66	3,711
Austria	83,870.66	93

According to the NUTS classification, Austria is divided into three NUTS I units: Ostösterreich (this is a combination out of Niederösterreich, Wien and Burgenland), Südösterreich (Kärnten and Steiermark) and Ostösterreich (Oberösterreich, Salzburg, Tirol and Vorarlberg). On the NUTS II level Austria has nine units, which are the Länder (provinces). On NUTS III level there are 35 units. 26 of these 35 units are a combination of so-called Bezirke (districts) all others are a combination of so-called Gerichtsbezirke (circuits) plus Wien, which is not divided.

3. Economic Policy

A characteristic feature of Austria is that not only political parties influence policy but also lobbies are involved. These lobbies form the so-called "Social Partnership". Groups which are part of the Social Partnership are: the Austrian Trade Union Federation, the Federal Chamber of Labour, the Economic Chamber of Austria and the Standing Committee of Residence of the Chambers of Agriculture.³ A characteristic feature is that membership in the chambers is compulsory.⁴ Each member pays a fee and the chambers produce a kind of a public good. These goods are economic stability and social freedom (NOWOTNY 1997).

² Source: Statistik Austria

³ Österreichischer Gewerkschaftsbund, Kammer für Arbeiter und Angestellte, Wirtschaftskammern Österreich und Präsidentenkonferenz der Österreichischen Landwirtschaftskammern.

⁴ Membership of the Austrian Trade Union Federation is free.

The Social Partnership is a means to coordinate the economic and social policy of the government of Austria and the collective agreements with the wage level. If there is consensus about an issue between the members of the Social Partnership it has great influence on the economic and social policy. Consultations between the government and the members take place on each and every topic which is linked to social and economic issues. All four members are closely linked to political parties. Whereas the Austrian Trade Union Federation and the Federal Chamber of Labour are dominated by representatives of the Social Democratic Party, the Economic Chamber of Austria and Standing Committee of Residence of the Chambers of Agriculture are dominated by the Austrian Peoples Party (GUGER et al. 2001). The core of the Social Partnership is the “Paritätische Kommission für Lohn- und Preisfragen”. This is a forum of the presidents of the members of the partnership and the government. This forum has three committees, one for prices, one for salaries and one for questions about economic and social issues.⁵ Wage increase is oriented around inflation and productivity. The Committee for Economic and Social Affairs is probably the most important think tank in Austrian policy. Since a reform of the Social Partnership there is a fourth committee for international affairs.⁶ (NOWOTNY 1997).

4. The Economic Performance

Austria has established a reputation of having a well-performing economy. Among all OECD members Austria is one of the richest countries in terms of GDP per capita. Between 1990 and 2002 Austria's average growth rate was 2.3 per cent. The average growth rate of the European Union was 2.0 per cent. In the same period productivity increased by 1.9 per cent in Austria and 1.4 per cent in EU. Compared to Germany, which is its main trading partner, Austria also performs better. The figures for Germany are as follows: 1.4 per cent growth rate and 1.3 per cent growth of productivity. Especially in the manufacturing sector, which is traditionally a very important sector in Austria, productivity increased to a higher extent: 4.2 per cent in Austria and 2.8 per cent in Germany.

⁵ Preisunterausschuss, Lohnunterausschuss und Beirat für Wirtschafts- und Sozialfragen.

⁶ Unterausschuss für international Fragen.

Government deficit came under pressure in recent years. Austria managed to reduce its deficit by 3 per cent of GDP. That corresponds with the EU average. This reduction was brought about by increases on the revenue side rather than by reduced spending. Fiscal consolidation is still necessary to meet the challenges of the economy and make room to manoeuvre for tax cuts. There seems to be a very large potential for efficiency gains in public administration. This generates potential for savings in the government budget (OECD 2003). One of the key elements in the adoption of the economic policy of the European Union was privatisation. The first privatisation of a state-owned company was a public offering of 15 per cent of the then ÖMV AG⁷ in 1987. State-owned companies are in the hands of the so-called Österreichische Industrieholding AG (ÖIAG). This is a holding company owned by the Federal Ministry of Finance. Between 1980 and 1992 most of the subsidiaries of ÖIAG made heavy losses. Subsidies of € 4.4 bn were spent and about 55,000 were made redundant.⁸ ÖIAG now owns 39.7 per cent of the Austrian Airlines AG, 31.5 per cent of OMV AG, 31.17 per cent of Telekom Austria AG, 14.4 per cent of VA Tech AG,⁹ 8.77 per cent of voestalpine AG, 100.0 per cent of GKB Bergbau GmbH. and 100.0 per cent of Österreichische Post AG. These companies employ a total of 108,764 workers.¹⁰ All in all 5.5 per cent of GDP have been the total proceeds of privatisation since its beginning. This seems to be quite large by international standards. As a result of this productivity growth can be seen in the manufacturing industry in Austria (OECD 2003).

5. Austria's Competition Policy

Competition is one of the key elements in the policy of the European Union. In a White Paper the EU commission opted for a different approval system for competition restraining arrangements. According to Article 36 of the regulation each member state must identify a competition authority which is responsible for the policy. This authority must be an independent body and corresponds to the guidelines of the

⁷ Now OMV AG, a company dealing with gasoline, chemicals and fertilizers.

⁸ www.oeiag.at

⁹ Offer of Siemens AG, see www.vatech.at

¹⁰ www.oeiag.at

commission. The Austrian law followed these instructions and established the Federal Competition Authority (Bundeswettbewerbsbehörde).

There was criticism that the social partners had too much power. The legal system was inadequate in controlling competition policy in Austria. There are key sectors of the economy which are highly concentrated because only a few competitors share the same market (to mention just a few: political magazines, private health insurance, drugstores, food retailing, furniture retailing) (BÖHEIM 2002). The new cartel law was launched in 2002. The new legislation consists of sanctions concerning fines, a new definition of the variety of information in mass media, measures against dominant strategies and against the abuse of dominant positions in a market and ex post sanctions against mergers. The crucial points of the new legislation are as follows:

- A new Federal Competition Authority (Bundeswettbewerbsbehörde) and a Federal Cartel Prosecutor (Bundeskartellanwalt) were established.
- The establishment of a Competition Commission (Wettbewerbskommission) to give advice to the Federal Competition Authority. Members of this Commission are the social partners and experts.
- Involvement of the regulatory bodies in the telecommunication, electricity and railroads industries (Telekom-Control, E-Control and Schienen-Control) (AK 2003).

6. Austria and the European Union

Since Austria has joined the European Union a characteristic feature is that market forces can be seen and regional policy is an important element of the economic policy. To encourage the development of peripheral regions, for instance Burgenland, southern parts of Steiermark or northern parts of Niederösterreich there are several programs initiated and co-financed by the EU. To mention just a few: RESIDER for old industrial areas or ADAPT to foster regional restructuring (BELLAK et al. 1997).

One of the main benefits of EU membership for Austria is the possibility of more competition because the economy is more open and transparent. Another benefit is the

abolishment of exchange rate risks due to the EURO and reduced transaction costs (PFAFFERMAYR 2003).

Another big step forward is the enlargement of the European Union in 2004. The process itself started in the early 1990s with the opening up of the former communist countries. The fall of the iron curtain triggered foreign direct investments and increased trade. Besides Germany, Austria is the most important country in terms of foreign trade to the former communist countries. In recent years Austrian firms have gained competitiveness vis-à-vis its trading partners due to reduced labour costs, although in absolute terms labour costs are still high. In 2003 labour costs in the manufacturing industry were € 20.62 which is the same amount as the average of the EU 15. Denmark is the member country with the highest labour costs (29.1 per cent above average) whereas Portugal has costs which are 67.2 per cent below the EU average. In Austria labour costs increased on the average at a rate of 1.6 per cent each year between 1995 and 2003 compared to 2.6 per cent in the EU.¹¹ This means that in the late 1990s labour costs increased more moderately compared to the years between 1990 and 2000. In the 1990s labour costs increased at a rate of 4.2 per cent each year in Austria and 4.0 per cent each year in the EU (GUGER 2004).

By looking at competitiveness it can be seen that productivity is an important issue. Austria's industry made some changes in its unit labour costs position in the 1990s. In the first half of the decade we find deterioration by 5.0 per cent, a better currency position and lower wage gains. Since the mid 1990s there has been a high and substantial productivity growth rate (on average 4.4 per cent p. a. until 2002) although this rate was even higher between 1990 and 2000 (5.1 per cent p. a.). This was possible in combination with a cut in relative unit wage costs in manufacturing as well as in the overall economy by 2.25 per cent each year relative to the average of the Austrian trading partners. The Austrian economy has improved its position in terms of price competition by 15 per cent since 1995. Productivity gains were made possible by the European integration. On the one hand, more openness led to more competition. On the other hand early retirements and a higher rate of unemployment were the results because people were made redundant. The workforce in industry was reduced between 1980 and 1990 at an average rate of 1.4 per cent each year. Between 1990 and 1995 this figure increased to 3.1 per cent per annum. In the second half of

¹¹ EU average excluding Austria.

the century the industrial work force was reduced at a rate of 1.0 per cent per year (GUGER 2003). Concerning inflation, it can be seen that in both the accession period and the first five years of membership the Austrian consumer price index was on average 1.5 per cent compared to 2.6 per cent in the EU. The average index was moderate due to a Single Market effect. This effect comes from the elimination of non-tariff trade barriers and the formulation of a common trade policy. Some of these changes took place in 1994 with the formation of the European Economic Area (EEA). In 1995 all bilateral border controls were abolished. This increased competition and facilitated an exploitation of scale economies because firms were in a larger market. A second effect was the lower inflation because it led to lower prices. For consumers a wider range of products were available. Inefficient firms were driven out of the market or had to increase their productivity. This led into a situation in which markets were more concentrated and mergers and acquisitions were more common. As a result of this, competition policy is widely accepted in Austria (PFAFFERMAYR 2003). Increased competition and the adoption of the Common Agricultural Policy were expected to generate a significant reduction of the price level. The food price index decreased from the first half of 1995 onwards. Inflation rates for other products were slower to decline. Inflation rates for consumer durables fell from the third quarter of 1995 and inflation rates for manufacturing goods fell from the first quarter of 1996 onwards (OECD 1997).

Another effect of the Single Market was the increase in productivity. According to BREUSS (2000) a growth of output combined with only a slow employment growth resulted in a productivity growth. Between 1995 and 1999 GDP per worker increased on average by 2.0 per cent every year compared with 1.3 per cent in the EU. BREUSS (2000) argues that the Single Market effect is only 0.75 per cent. EU membership has led to a reorientation of the Austrian trade towards new forms of specialisation and more openness. On average, trade increased by 9.3 per cent per annum. Trade towards the Central and Eastern European Accession Countries in particular increased due to the European Agreements on liberalised trade between east and west. BREUSS (2000) argues that trade creation and liberalisation caused welfare effects of about 1.5 per cent of GDP. KEUSCHNIGG/KOHLER (1996) estimate these effects to be 1.78 per cent.

7. The Role of Foreign Direct Investments

Since 1995, Austria has experienced an exceptional growth in direct investment from abroad. Austrian foreign direct investments (FDI) followed international trends closely until 2000. In 2001 this development became uncoupled from international trends. While Austrian FDI flows were still strong, global FDI flows decreased. Reasons for this are recession and a bursting of bubbles in investments. At the beginning of the new century Austria is at the forefront of the EU although it was a latecomer. Inward as well as outward investment flows remain below the OECD average. Net FDI inflows are as follows: € 1,395 m in 1995, € 3,405 m in 1996, € 2,354 m in 1997, € 4,078 m in 1998, € 2,792 m in 1999, € 9,595 m in 2000 and € 6,603 m in 2001 (AUSSENWIRTSCHAFT 2003). The majority of all investments came from EU members. In 1995 the share was 57.6 per cent. In 2000, 90.0 per cent came from the EU. It is often said that the vast majority of all FDI from a single country comes from Germany. There was an increase of up to 90.3 per cent in 1996, falling only slightly to 79.8 per cent in 2000. In 1996 FDI from Germany was € 3,076 m and in 2000 € 7,661m. In all other years the activities of German firms make up about one third of all FDI inflows. Inward FDI had its peak in 2001 at € 38,952 m. This figure increased constantly from € 14,458 m in 1995. It can be seen that six out of the first eight countries are EU members: Germany, the Netherlands, United Kingdom, France, Italy and Sweden. The two non-EU countries in the top eight are Switzerland, including Liechtenstein, and the US. Sweden is catching up and overtook Japan in 2000. The most important target industry in 1995 was trading including automobile trading at € 3,311m. A boost can be seen in the case of real estate and business services. The figures are € 3,196 m in 1995 and € 13,690 m in 2001. This is the reason why the number of workers in this sector also increases. In 1995 10,518 workers were employed and in 2001 21,603 people worked in real estate and business services. The share increased from 5.06 to 8.80 per cent. The overall number of people who are employed in firms established with foreign capital was 207,684 in 1995 and 245,559 in 2001. The sectors which play an important role are as follows: trading including automobile trading, electricity, information technology and optics, machinery, chemicals, automotive and real estate and business services. The least important sectors are: paper and printing, furniture, timber, mining and energy and

public services. This is a typical pattern for an industrialised country. Foreign direct investments go to more sophisticated branches. Low technology industries are lagging behind.¹²

8. Research and Development

Since the 1980s reports about the structure of the economy show that traditional industries and medium technology segments are more important than high technology branches with high unit values.¹³ Expenditures on R&D as a percentage of GDP are at the bottom of the scale. In 1995 Austria spent 1.59 per cent of GDP on research and development. Austria's venture capital market is underdeveloped. The outcome is that the Austrian economy faces a "technology gap".¹⁴

We have to bear this technology gap in mind because deficits in the overall structure and a lack of specialisation in more dynamic branches are a key element of the economy. However, there is also a kind of paradox here because the level of income, employment and growth rank among the highest of OECD members. Since the mid 1990s growth has increased at a diminishing rate. That is the reason why technology policy became more important in recent years. In 2002 Austria spent 1.95 per cent of GDP on R&D. The figure for 2003 is 2.09 per cent. In 2002 all expenditures amounted to € 4,217 m. This is an increase on 2001 of 4.8 per cent. Expenditures on research and development rose faster than GDP. Looking at the innovation system it is clear that there are two different parts without almost any cooperation. Private companies finance their expenditures themselves or via the contribution of foreign sources. In 1998¹⁵ companies spent € 1,391 m on R&D while foreign partners spent € 649 m. Therefore, only a small amount of money came from the federal budget (€ 119 m). On the other hand, the federal government paid almost all expenditures on R&D in Austria's university system. In 1998 € 961 m out of € 1,010m came from the federal budget, € 18 m from private companies and € 27 m from abroad (FORSCHUNGSBERICHT 2003).

¹² Source: Oesterreichische Nationalbank

¹³ For more details see: FELDERER/FÖLZER/HELMENSTEIN et al. (1998).

¹⁴ In German: Technologielücke.

¹⁵ 1998 is the most recent year with figures for capital flows to and from different sectors.

By looking at sources of money spent on R&D it can be seen that the shares of both public money and money from Austrian firms decrease from 46.9 per cent in 1981 to 40.4 per cent in 2003 and 50.2 per cent to 40.8 per cent, respectively. A completely different trend can be seen in money from abroad. The share was 2.5 per cent in 1981 and 18.5 per cent in 2003. In 1993, two years before joining the EU, this share was 2.6 per cent. Keeping these figures in mind we see that these numbers are among the highest within the EU. The EU average in 2000 was 7.1 per cent. In 1993 € 59.69 m was spent from sources outside Austria. In 2003 this figure was € 801.5 m. One reason for these high shares is capital flows from research programs from the EU. The amount of money spent in Austria from the 4th Framework Program between 1995 and 1998 is € 200 m. About € 225 m came from the 5th Framework Program between 1998 and 2003 (STAT.AT 2003). A second trend can be seen: Private enterprises spent more and more money on research. Two indicators can be read in this way. On the one hand, the companies' share of total expenditures is increasing and on the other hand, the companies share in research itself is increasing. R&D in universities plays a major role in Austria. In 1998 about 30 per cent of the money for R&D went to the university system. This is about 10 per cent above the EU average. On NUTS II level we can see that the provinces spent money on R&D as well. The crucial point is that the share of these provinces is rather small and constant over time. Before joining the EU Austria's provinces financed 5.63 per cent of all R&D in the whole country, which is 0.08 per cent of GDP. In the year of EU accession this figure was 5.69 per cent or 0.09 per cent of GDP. In 2003 the Austrian provinces financed 6.70 per cent of all activities in research and development which equals 0.13 per cent of GDP (FORSCHUNGSBERICHT 2002, own calculations). The overall level¹⁶ of employment in R&D in Austria is 31,307.6.¹⁷ The most important province in terms of research and development is Wien. About 46.0 per cent of all researchers work in the capital of Austria (14,386.6 researchers). The second most important Land is Steiermark with 18.7 per cent of all researchers (5,851.5). This is due to the fact that in both Wien and Steiermark there are clusters of universities, research institutes and multinational enterprises. Out of 2,743 research institutions in Austria 968 are situated in Wien and 483 in Steiermark. Once again the most important province for R&D is Wien. In this province € 1,650 m was spent on R&D, € 599.6 m was spent in

¹⁶ Figures from 1998.

¹⁷ Full time equivalent.

Steiermark. As a consequence of the universities in these provinces the share of R&D which is financed by the state is immense compared to all other provinces. Only 30.3 and 31.6 per cent of all contributions came from enterprises. On the other hand, the share of sources from other countries is relatively large (27.5 per cent in Steiermark and 26.4 per cent in Wien compared to the Austrian average of 20.1 per cent). In 1998 € 44,308 m came from the EU. Most of the money went to Wien and Steiermark (the figures are € 19,990 m and € 10,153 m respectively).

In Austria's business sector there were 1,317 research units in 1998. On a 2 digit level, from this 201 units were in machinery (NACE 29), 120 in business services (NACE 70, 71, 74) and 108 in metal goods (NACE 28). It is not a surprise that these sectors are at the forefront. Austria's industrial structure is characterised by metal and machinery. A closer look at the figures shows that those provinces which are the most industrialised in Austria are the provinces with the highest expenditures on R&D. These provinces are Wien, Steiermark and Oberösterreich. One shortcoming of the Austrian industrial structure can easily be seen. NACE 73 research and development itself is represented by only 52 units. All in all the service sector (NACE 50-99) is underrepresented with only 320 research units (STAT.AT 2002). The outcome is that medium technology and traditional industries are characteristic features of the industry in Austria.

9. Specialization of regions, employment and regional growth

We now turn to examining and discussing how the Austrian employment and labour market structure and dynamics have changed in recent years. The structures of regions in Austria vary by diversity, size and many geographical factors. Regional economies also differ in terms of their employment levels and growth rates, as usually. Potentially one of the most important recent forces driving structural change in Austria since the accession to the EU has been the increasing links between Austrian regions and nearby foreign countries. Here, the considered time span is from 1998 to 2003. Austria has seen a number of fundamental shifts and changes in recent years which have altered the composition and dynamics of the labour market and employment. These include industrial and occupational shifts in employment and the

overall changing structure and configuration of employment. The discussion here seeks to quantify and provide an overview of what has changed. Table 3 shows employment trends in Austria. As can be seen, total employment has increased steadily throughout all Austrian regions.

Table 3 Employment in Austria (1998-2003)

	Region	1998	1999	2000	2001	2002	2003
<i>East</i>	<i>Burgenland</i>	79,829	81,164	82,739	82,822	84,883	86,448
	<i>Niederösterreich</i>	515,938	521,803	526,783	527,453	526,765	530,545
	<i>Wien</i>	770,314	778,574	772,880	770,665	762,826	763,295
<i>South</i>	<i>Kärnten</i>	195,335	197,055	197,978	198,642	198,651	200,543
	<i>Steiermark</i>	422,959	426,956	433,120	436,964	438,573	441,809
<i>West</i>	<i>Oberösterreich</i>	521,438	527,054	534,637	542,922	546,763	558,003
	<i>Salzburg</i>	210,909	211,129	213,207	214,109	218,803	219,427
	<i>Tirol</i>	253,649	259,203	262,242	266,913	270,283	273,634
	<i>Vorarlberg</i>	128,320	130,260	131,609	132,430	134,370	135,638
<i>East</i>	<i>Total</i>	1,366,081	1,381,541	1,382,402	1,380,940	1,374,474	1,380,288
<i>South</i>	<i>Total</i>	618,294	624,011	631,098	635,606	637,224	642,352
<i>West</i>	<i>Total</i>	1,114,316	1,127,646	1,141,695	1,156,374	1,170,219	1,186,702
<i>Austria</i>	<i>Total</i>	3,098,691	3,133,198	3,155,195	3,172,920	3,181,917	3,209,342

Measured by the number of employees the most important industries in Austria (with more than 100,000 employees) are construction (45), wholesale trade and commission trade, excluding motor vehicles and motor cycles (51), retail trade, excluding motor vehicles and motorcycles; repair of personal and household goods (52), hotels and restaurants (55), land transport; transports via pipelines (60), other business activities (74), public administration (75), education (80) and health care and social work (85).¹⁸ This is shown in Table 4. As can be seen, public administration and social insurance is the industry with most employees followed by the building industry and by retail trade. The total number of employees can be seen in columns two and three and the respective share of total employment in columns four and five. This means that public administration amounts to a share of 15 per cent.¹⁹

¹⁸ Numbers in parenthesis indicate the subsections of NACE Rev. 1.1 industries as defined in the Commission Regulation (EC) No 29/2002 of 19 December 2001.

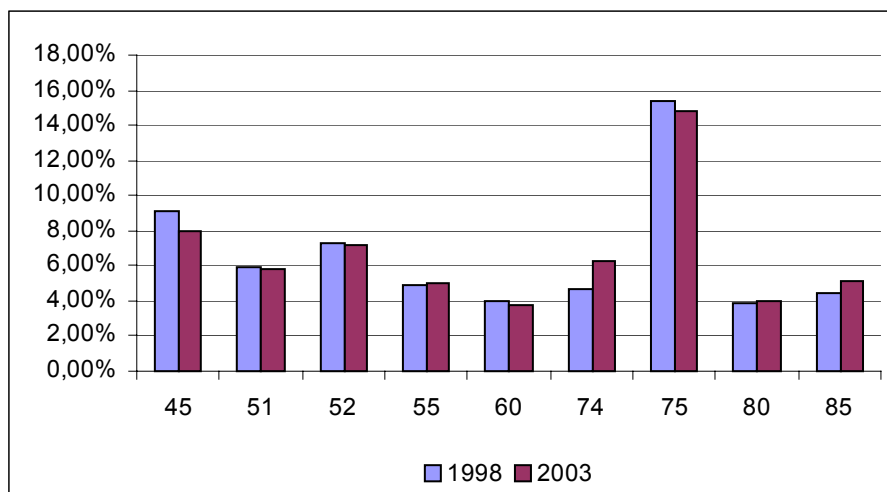
¹⁹ However, as the latter of the biggest industries in Austria (public administration, education, health and social work) are (usually) not exposed to concentration and specialisation forces in some of the analyses (especially for the Herfindahl and Krugman Indices) they are not considered. For a similar approach, see for example BADINGER and BREUSS (2004).

Table 4 **Employment in the largest sectors**

Industry	Number of employees		Share of total Employment		Change	Shift term
	1998	2003	1998	2003	1998-2003	1998-2003
Construction (45)	281,081	254,087	9.07%	7.92%	-9.60%	-13.17%
Wholesale trade (51)	182,078	185,935	5.88%	5.79%	2.12%	-1.45%
Retail trade (52)	226,443	232,078	7.31%	7.23%	2.49%	-1.08%
Hotels and restaurants (55)	150,432	161,526	4.85%	5.03%	7.37%	3.80%
Land transport (60)	123,104	121,924	3.97%	3.80%	-0.96%	-4.53%
Other business activities (74)	144,932	200,972	4.68%	6.26%	38.67%	35.10%
Public administration (75)	475,320	474,094	15.34%	14.77%	-0.26%	-3.83%
Education (80)	118,546	128,601	3.83%	4.01%	8.48%	4.91%
Health and social work (85)	137,485	165,686	4.44%	5.16%	20.51%	16.94%

Table 4 and Figure 1 show industries which have more than 100,000 employees. This means that in sum those industries have a share of approximately 60 per cent of total employment in Austria. This is true throughout the considered time span. No significant changes can be observed. It has to be mentioned that besides public administration, education and health and social work are also dominated by public authorities. Without these industries the total share is about 36 per cent. Within all these industries significant changes over the years can be seen. These shifts are dominated by a rise in employment in the business services industry which amounts to plus 39 per cent. The next “best” performance in rising employment are the hotels and restaurants. However, declining industries are the construction industry (minus 10 per cent) and also land transport and public administration. The reasons for this decline in the construction industry are manifold but the reason for the decline in public administration can be explained by tighter governmental policies towards leaner public administration.

Figure 1 National shares of the largest sectors (employment 1998, 2003)²⁰



As already mentioned, total employment in Austria increased steadily over the considered time span. The last column in Table 4, which shows the so-called "shift term", is the most interesting. However, the national share measures the increase in total employment in a local area due to growth in Austria during the years considered. For example, all else being equal, if employment in the Austrian economy grew by 10 per cent then total employment in the local area would have grown at the same rate. An industry mix identifies fast growing or slow growing industrial sectors in a local area based on the national growth rates for individual industry sectors. Thus, a local area with an above-average share of Austrian high-growth industries would have grown faster than a local area with a high share of low-growth industries. This can be seen in the last column and leads to construction industry, wholesale trade, retail trade and land transport all losing importance. This suggests, of course, that employment in public administration fell even lower (compared to the overall increase).

10. Characteristics and Developments in Regions

Even though, on a national level, some developments can be noticed, a closer look at each region reveals some interesting developments. Such characteristics and developments concern the decline and rise of industries in regions, thus the regional structure. This is done by discussing the regional shift share, which reflects the

²⁰ Source: Hauptverband der österreichischen Sozialversicherungsträger

development of industries in regions. It highlights a local area's leading and lagging industries. Specifically, this effect compares a local area's growth rate in an industry sector with the growth rate for the same sector at the nation wide level. A leading industry is one where that industry's local area growth rate is bigger than its national growth rate. The problem of the shift share technique is that it is only descriptive. Nevertheless, the shift share term is informative, especially when it is combined with other analysis, as in this paper. The shift share does not account for many factors including the impact of business cycles, identification of actual comparative advantages, and differences caused by levels of industrial detail. In this sense the shift share is a snap-shot of the Austrian economy (employment) at specific points of time. In this analysis the snap-shot nature of the analysis is put in perspective as the shift share term is investigated over time. For details see STEVENS and MOORE (1980). Nevertheless, the analysis may not offer a clear picture of Austrian employment shifts since, of course, the results are sensitive to the time period chosen. On the other hand, the shift share term provides a simple, straightforward measure (and approach) to separating out the national and industrial contribution. It is also useful for targeting industries that might offer significant future employment opportunities.

Table 5 Regional employment shifts²¹

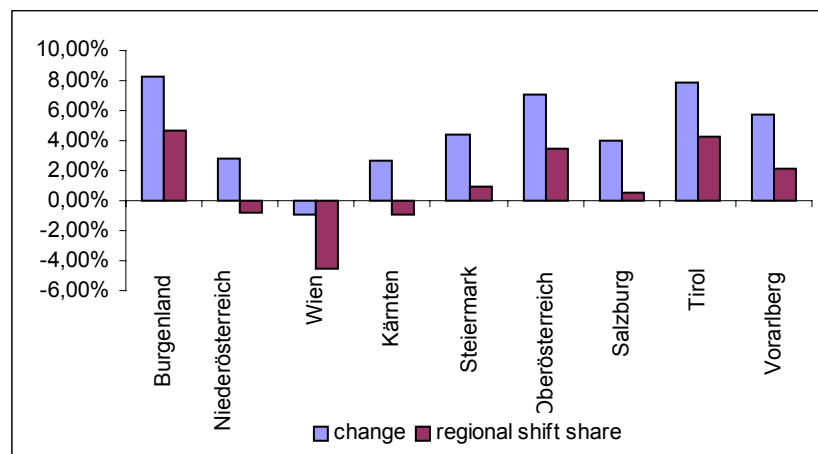
Region	1998	2003	share 1998	share 2003	change	regional shift share
Burgenland	79,829	86,448	2.58%	2.69%	8.29%	4.72%
Niederösterreich	515,938	530,545	16.65%	16.53%	2.83%	-0.74%
Wien	770,314	763,295	24.86%	23.78%	-0.91%	-4.48%
Kärnten	195,335	200,543	6.30%	6.25%	2.67%	-0.90%
Steiermark	422,959	441,809	13.65%	13.77%	4.46%	0.89%
Oberösterreich	521,438	558,003	16.83%	17.39%	7.01%	3.44%
Salzburg	210,909	219,427	6.81%	6.84%	4.04%	0.47%
Tirol	253,649	273,634	8.19%	8.53%	7.88%	4.31%
Vorarlberg	128,320	135,638	4.14%	4.23%	5.70%	2.13%
Austria total	3,098,691	3,209,342	100.00%	100.00%	3.57%	

Table 5 shows how employment changed in industries. In Figure 2 this is illustrated for the regional shift share term and the percentage change from 1998 to 2003. Total employment in Austria rose by 3.57 per cent, but more interesting (and not surprising) is that it is different for the different regions. Burgenland, Tirol and Oberösterreich

²¹ Note that all industries are included.

had an increase in employment and Wien in particular was confronted with a remarkable decline of employment by about 1 per cent. More dramatically, as total employment rose, this is expressed by the regional shift share term of 4.48 per cent. By looking at the regional shift share term the “competitiveness” of regions alters substantially. For example, measured by the regional shift share term not only Wien, but also Niederösterreich and Kärnten are confronted with a lower level of “competitiveness”.

Figure 2 Regional changes in employment (1998 – 2003)



11. Specialisation of Regions

Specialisation of regions is analysed using the Herfindahl and Krugman index. The empirical results are shown in Table 6 and Table 7. As one question (or hypothesis) raised in this work is how the accession to the EU changed the specialisation of regions because of increased forces of competition and the (hypothesised) need for specialisation, some industries are not included in the following analyses as they are not exposed to international or European market forces. The excluded industries are public administration (75), education (80), health and social work (85), sewage and refuse disposal, sanitation and similar activities (90), activities of membership organizations (91), recreational, cultural and sporting activities (92), other service

activities (93), activities of households as employers of domestic staff (95), extra-territorial organizations and bodies (99).²²

As can be seen the regional specialisation in Austria is on a moderate level in all regions. Here (on this low level) specialisation is higher in Wien and Burgenland and lowest in Kärnten and Steiermark. More interesting is that the level of specialisation fell in most regions! For example, in Burgenland specialisation fell most significantly by about 8 per cent. Only Steiermark and Kärnten witnessed a rise in specialisation. It follows that specialisation in Austria fell after the EU accession and regions became more homogeneous. Nevertheless some shifts in regional industries can be noticed and will be discussed in the following section even though the most important industries (measured by the number of employees) faced no substantial changes. In the following all changes are in relation to the regional shift share term (which compares the change to the total share).

Table 6 Herfindahl Index: Specialization of region

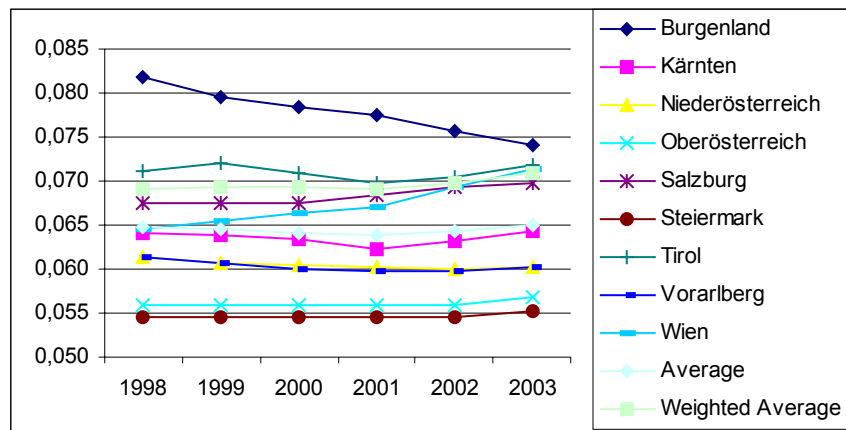
	1998	1999	2000	2001	2002	2003
Burgenland	0.081848018	0.079489538	0.078459251	0.077578356	0.075635258	0.074088337
Kärnten	0.064140721	0.063791768	0.063375987	0.062287697	0.063264525	0.064362900
Niederösterreich	0.061392874	0.060722741	0.060490898	0.060290654	0.059971528	0.060224574
Oberösterreich	0.055935929	0.056018324	0.055957801	0.055908053	0.055870004	0.056830668
Salzburg	0.067524851	0.067566180	0.067401330	0.068316971	0.069372036	0.069846643
Steiermark	0.054646046	0.054565271	0.054467834	0.054479422	0.054520332	0.055311880
Tirol	0.071226122	0.072063781	0.070832477	0.069693001	0.070407479	0.071787455
Vorarlberg	0.061420423	0.060733491	0.060083921	0.059697436	0.059750282	0.060222868
Wien	0.064499862	0.065471717	0.066354135	0.067145740	0.069239441	0.071337586
Average	0.064737205	0.064491424	0.064158182	0.063933037	0.064225654	0.064890324
Weighted Average	0.069183197	0.069307753	0.069225687	0.069193769	0.069859880	0.070961023

The weighted average is the region's average multiplied by the number of employees. Figure 3 shows developments over time graphically. Many changes can be seen in the construction of vehicles (other than motor vehicles). In this industry Burgenland saw a decline of 90 per cent and Vorarlberg a decline of 78 per cent. On the other hand, in Kärnten employment in this industry rose by 454 per cent and in Tirol employment rose by 84 per cent. These shifts have to be put in perspective as the share of this industry (compared to total Austria) was 0.42 per cent in 1998 and rose to 0.50 per

²² Numbers in parenthesis indicate the subsections of NACE Rev. 1.1 industries as defined in the Commission Regulation (EC) No 29/2002 of 19 December 2001. Not included in the NACE Rev. 1.1 are the conscript army and people on maternity leave (data was available, but not included in this analysis).

cent in 2003. The most important regions for this industry are Steiermark (share of 35 per cent in 1998 and 30 per cent in 2003) and Oberösterreich (share of 30 per cent in 1998 and 31 per cent in 2003). A second industry which faced interregional shifts is recycling with a rise in Niederösterreich by 241 per cent, in Steiermark by 171 per cent and in Kärnten by 52 per cent. Vorarlberg was confronted with a decline of 63 per cent. Also in this industry the national share is low and rose from 0.03 per cent in 1998 to 0.04 per cent in 2003 and its most important regions were Oberösterreich with a share of 41 per cent in 1998 (which declined to 35 per cent in 2003) and Wien with a share of 36 per cent in 1998 (which also declined to 32 per cent in 2003). The next sector with changes in the interregional structure, which is also of more “political” interest, is research and development. In this sector Vorarlberg witnessed an increase of 133 per cent, Oberösterreich an increase of 81 per cent and Tirol 55 per cent. No dramatic decreases of the shift share term can be seen. These interregional shifts can be explained by the foundation of several universities of applied sciences. This leads to an increase of the total share of this sector from 0.25 per cent in 1998 to 0.35 per cent in 2003. Nevertheless, most research and development is conducted in Wien which had a share of 55 per cent in 1998 and 53 per cent in 2003 which means that Wien still dominates this industry. Another interesting sector is banking and insurance. This sector is also mainly located in Wien (a share of 45 per cent in 1998 and a share of 31 per cent in 2003). Throughout Austria this sector saw a rise in employment from 0.10 per cent in 1998 to 0.18 per cent in 2003. Tirol's shift share term increased by 411 per cent followed by Salzburg with 300 per cent, both dramatic changes. As Wien is the most important region for this industry (with a decline of the shift share of 61 per cent) the high increases in Tirol and Salzburg resulted only in the rise of total employment mentioned before.

Figure 3 Herfindahl Index: Specialisation of regions

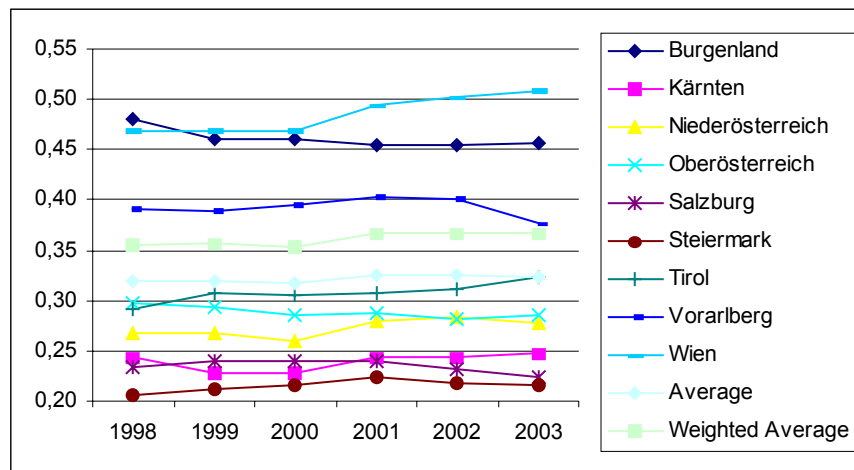


After discussing the Herfindahl index we apply the Krugman index. The empirical results are shown in Table 7 and illustrated in Figure 4. Results are similar to the Herfindahl index as the specialisation of regions is also on a moderate level and no significant changes over time can be detected. Notable is that the specialisation in Burgenland did not fall as dramatically as described by the Herfindahl index. Burgenland and Wien are highly specialised (compared to other regions) and Kärnten, Niederösterreich, Steiermark and Salzburg are specialized on a moderate level. All those levels vary slightly over time but, again, no dramatic changes can be seen even though a slight increase in specialisation can be noted.

Table 7 Krugman Index: Specialisation of regions

	1998	1999	2000	2001	2002	2003
Burgenland	0.480187328	0.460590105	0.460860567	0.454712735	0.454540602	0.457263601
Kärnten	0.244067022	0.227533122	0.228348820	0.243464362	0.243226883	0.246902890
Niederösterreich	0.268138480	0.266931079	0.260323911	0.280495119	0.282542709	0.276897626
Oberösterreich	0.297472354	0.293992165	0.285062255	0.286879715	0.281259371	0.285454551
Salzburg	0.233141723	0.240591664	0.238839410	0.239328431	0.231775423	0.223606139
Steiermark	0.205661507	0.212259623	0.215674915	0.223110055	0.217801600	0.214981816
Tirol	0.291971654	0.306921440	0.306302831	0.307689011	0.311099038	0.323153523
Vorarlberg	0.391101290	0.389321623	0.394251028	0.402320400	0.401609007	0.377143182
Wien	0.468379333	0.468386980	0.467853206	0.493515436	0.501815277	0.507388233
Average	0.320013410	0.318503089	0.317501883	0.325723918	0.325074434	0.323643507
Weighted Average	0.355534128	0.356340629	0.353604789	0.366197145	0.366175768	0.366263396

Figure 4 Krugman Index: Specialisation of regions



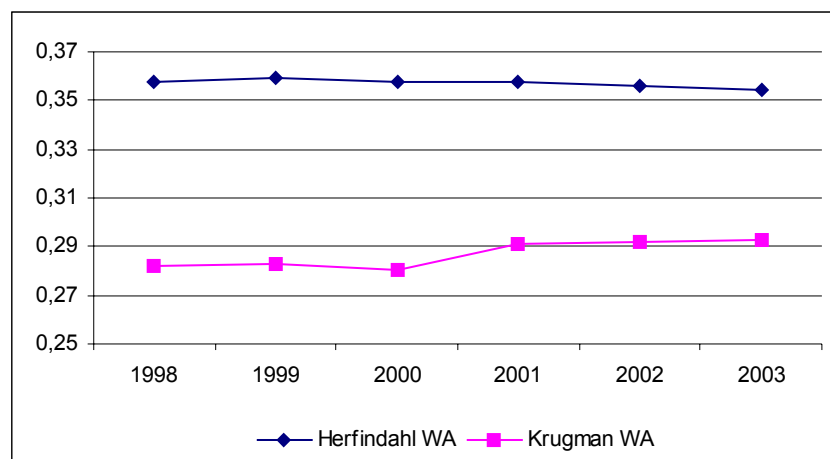
12. Spatial Concentration of Industries

We now discuss the analyses of the spatial concentration of industries. As with the specialisation of regions, the Herfindahl and the Krugman indices are used to measure concentration. Industries which are most concentrated are the mining of coal and lignite (10), mining of crude oil and gas (11), mining of metal ores (13), manufacture of coke, refined petroleum products and nuclear fuel (23), manufacture of radio, television and communication equipment and apparatus (32), water transport (61), air transport (62), real estates activities (70), computer and related activities (72) and research and development (73). The fact that the mining industries are heavily concentrated is no surprise as mining is not widespread over Austria and due to the nature of mining no dramatic reallocation of industries is possible. However, by looking at the absolute number of employees in the “higher” concentrated industries it can be seen that their national share is low.

The spatial concentration of all other regions is on the same level and ranges from about 0.13 to 0.2. This means that sectoral specialisation is weak in Austria. This is also observed by JANGER and WAGNER (2004) by analysing value-added production, whereas this work observes employment. Nevertheless, the results are similar as they conclude that industries are weakly specialised. JANGER and WAGNER (2004) also notice that even though specialisation is weak and no substantial shifts over time can be observed for some sectors interesting shifts can be

detected. Again, their results are similar to the results in this work. Notable industries, as they range on the lowest concentration level are fishing, operation of fish hatcheries and fish farms (05), electricity, gas, steam and hot water supply (40), construction (45), sale, maintenance and repair of motor vehicles and motorcycles (50) and hotels and restaurants. The first of those industries, fishing, can be classified as an outlier as its share of total employment is again on a low level. The fact that electricity, gas, steam and hot water supply as well as maintenance and repair of motor vehicles and motorcycles are not highly concentrated industries can be explained in that Austrian energy is mainly produced by water and rivers and lakes are spread throughout Austria. The Austrian population is also spread throughout the area (with a few exceptions in the Alps) and motor vehicles are needed and sold throughout Austria. However, more interesting is the fact that construction industry and hotels and restaurants are not concentrated as these two industries have already been discussed as they are, measured by the absolute number of employees, two of the most important in Austria. This can be explained by the fact that the Austrian economy is heavily engaged in tourism and nearly all regions stress the importance of tourism, thus the abundance of hotels and restaurants. The fact that the Austrian population is spread all over the country explains the low level of concentration of the construction industry. Figure 5 shows the development of the weighted (by the number of employees) spatial concentration of industries for the Herfindahl index and for the Krugman index. It is interesting to see that the Herfindahl index decreases and the Krugman index increases slightly. As both indices do not change dramatically a more precise discussion is foregone.

Figure 5 Spatial concentration indices (weighted averages) over time



13. Conclusions

The aim of this work was to take a closer look at the industrial structure of the Austrian economy with special focus on the possible concentration of specialisation in regions and spatial concentration of industries. Since Austria joined the European Union in the mid 1990s it could be argued that, because of increased competition, a tendency towards specialisation and concentration can be expected. This question is of special interest as the accession to the European Union is still fairly recent and most of the new accession countries are of the same size as Austria so that conclusions for these countries can be drawn. Due to this role there is literature which has already analysed changes in Austrian industrial structure. In contrast to this literature, in this work the industrial structure and shifts in industrial structure are analysed using employment data on a sectoral as well as a regional level. This means that on a sectoral and regional basis this question was observed in detail by applying relevant measures.

In this respect it is most interesting that no substantial shifts on a general (overall) level can be observed since Austria joined the European Union. Moreover, Austria is found to exhibit a low concentration of industries and no fundamental shifts over time can be seen which means that the spatial concentration of industries remained on the same (low) level which, in some sense, rejects the hypothesis of increased competition since Austria joined the European Union. As regards the regional specialisation, again a moderate level in all regions can be noted. Here (on this low level) specialisation is higher in urban regions (Wien) and low in other regions. What is more interesting is that specialisation fell in most regions. For example, in some rural areas specialisation fell dramatically. As Wien is the only urban region in Austria specialisation fell after the EU accession and Austria became more homogeneous. This, however, also rejects the hypothesis that increased competition would lead to increased specialisation. The reason for the rejection of both hypotheses can be found in the fact that employment data is used and employment is sticky and fundamental changes can only be seen over decades. As regards a differentiation between urban and rural areas it is interesting that absolute employment in Austria

increased in all regions with the exception of Wien. This means that urban areas are confronted with a decrease in employment and rural areas with an increase. Moreover, Wien is in many respects different to other regions as it experienced an increased in specialisation. However, not surprisingly, the Austrian economy is characterised by an increasing tertiary sector. Employment in particular in hotels and restaurants, in education and business activities increased. However, it can be concluded that no substantial shifts in the Austrian economy can be seen. Intra-industrial and intra-regional shifts have to be explained by Austrian characteristics and by general trends because of globalisation.

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