

# Sectoral Specialization in Austria and in the EU-15

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*This study examines sectoral specialization patterns in the EU-15 and in the euro area as well as in Austria. These patterns have policy relevance in so far as a high degree of sectoral specialization may trigger asymmetric shocks, foster the emergence of inflation differentials and impact on long-term growth. The developments seen since 1980 have created a favorable climate for conducting the single monetary policy; the degree of sectoral specialization is low in Austria and the EU, it has changed only moderately and has caused neither cyclical nor inflation differentials. At the same time, the individual sectors' shares in value added have changed, in some cases even dramatically. However, there are signs both in the euro area and in Austria that the current sectoral specialization patterns provide suboptimal conditions for long-term growth.*

## I The Economic and Monetary Policy Implications of Sectoral Specialization

The sectoral specialization pattern of an economy – defined as the contribution of the individual economic sectors to value added and employment in a given country – is of relevance to monetary and economic policies for several reasons:

### Asymmetric Shocks and Economic Cycles

One of the most widely discussed issues prior to the start of Economic and Monetary Union (EMU) was the possibility of asymmetric shocks, that is, the possibility of economic shocks occurring in limited areas within the euro area, which would cause differences in business cycles. The degree of specialization of a country's or a region's economy, and, consequently, the level of dissimilarity to another economy in the monetary union, is proportionate to the probability of asymmetric shocks the single monetary policy is unable to respond to (for an overview of possible sources of shocks and their occurrence, see Bayoumi and Prasad, 1996).

### Inflation Differentials

If the price dynamics in different sectors diverge, an increasing degree

of sectoral specialization may cause inflation differentials between countries to widen, which will in turn make it more difficult to pursue a common monetary policy. Inflation differentials can be traced to a large variety of reasons, including cyclical, but also external factors like exchange rate fluctuations and oil price shocks. Egert et al. (2004) show that in Europe inflation differentials have narrowed markedly over the past ten years.

### Long-Term Growth

Some endogenous growth models<sup>1</sup> (e.g. Lucas, 1988) suggest that the growth rate is contingent on the size of the “innovative” sector; more recent empirical studies (e.g. Peneder et al., 2001) indicate an interrelationship between sectoral specialization and economic growth (e.g. through the positive externalities of research activities). Hence, countries with a high degree of specialization in technology-intensive sectors would enjoy growth advantages in the long run. This estimation of potential is essential for assessing the level of inflation-free growth, i.e. the rate at which an economy can grow without building up inflationary pressures.

On the basis of selected indicators, chapter 2 illustrates how sectoral specialization patterns have evolved in

<sup>1</sup> Models which do not take technological progress for granted but give an explicit explanation.

Austria and in the EU-15<sup>2</sup> and describes a number of important determinants of and factors influencing sectoral specialization. Chapter 3 is dedicated to sectoral specialization and long-term growth in Austria and in the EU-15. Chapter 4 concludes on the basis of the developments described in the earlier chapters.

## 2 Development and Determinants of Sectoral Specialization

In contrast to the U.S.A., production structures in the EU-15 countries are relatively homogeneous in terms of the individual sectors' contribution to value added (ECB, 2004). Moreover, specialization indicators show that specialization patterns change very slowly and consistently (table 1). What is most striking is the shift

towards the service sector, in particular towards business services. Only a few countries see increased specialization in technology-intensive industries (e.g. Finland).

### 2.1 Changes in Sectoral Specialization Patterns

#### 2.1.1 Growing Service Sector

A direct comparison between the EU-15 and Austria (chart 1) reveals that the Austrian economic structure largely matches the EU-15's. At 20.5% in 2002 (2001: 21.2%), the contribution of manufacturing to total value added is higher in Austria than in many other EU countries, but like in most EU Member States it is trending downwards. The construction industry's share in value added in Austria is closer to the ratios recorded in the cohesion countries Spain, Portugal

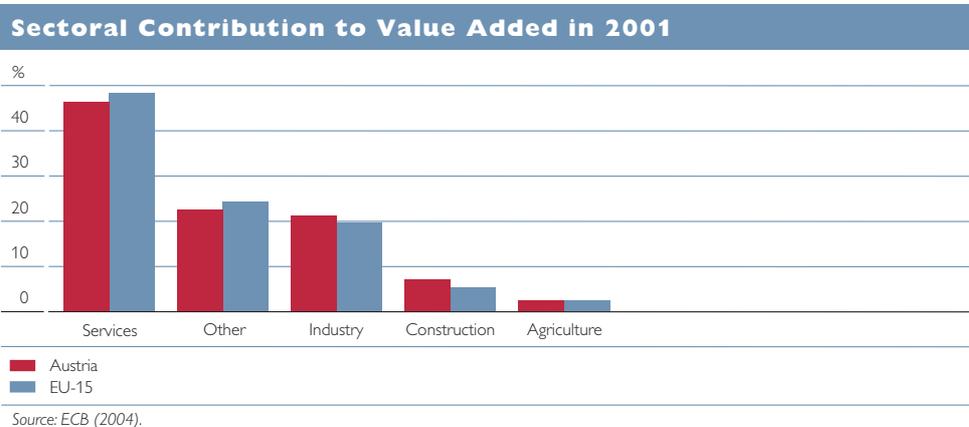
Table 1

	1980					1990					2001				
	Agriculture and forestry	Manufacturing	Business services	Construction	Other	Agriculture and forestry	Manufacturing	Business services	Construction	Other	Agriculture and forestry	Manufacturing	Business services	Construction	Other
	Share in %														
Belgium	1.4	19.9	43.0	6.9	28.8	1.4	21.5	44.4	5.3	27.4	1.5	20.6	46.3	4.9	26.6
Germany	1.5	28.0	36.6	8.6	25.4	1.4	26.1	41.5	6.8	24.1	1.2	20.1	48.0	4.8	25.8
Greece	x	x	x	x	x	8.5	14.7	49.4	7.9	19.5	8.1	12.4	54.8	7.6	17.1
Spain	7.4	19.9	44.9	6.9	20.8	5.9	18.5	44.8	8.0	22.8	4.0	18.7	45.7	8.1	23.5
France	3.6	21.5	43.7	7.0	24.2	3.2	18.3	48.3	6.7	23.4	3.1	19.2	48.7	4.3	24.6
Ireland	x	x	x	x	x	9.6	24.1	x	5.2	x	4.9	37.0	x	5.2	x
Italy	4.2	23.4	42.4	6.6	23.4	3.1	21.9	47.0	5.8	22.2	3.1	21.2	50.3	5.0	20.5
Luxembourg	x	x	x	x	x	1.0	14.5	49.1	6.7	28.7	0.6	11.5	56.3	5.6	26.1
Netherlands	2.7	17.5	41.3	7.9	30.6	3.3	17.9	43.2	6.3	29.2	3.0	16.9	49.6	5.2	25.3
Austria	2.5	20.9	39.9	8.7	28.0	2.3	20.7	44.2	7.0	25.9	2.4	21.2	46.7	7.1	22.6
Portugal	6.3	24.5	37.6	7.9	23.7	5.9	21.8	39.9	6.7	25.7	4.6	20.4	43.4	6.9	24.7
Finland	6.6	22.1	37.3	7.2	26.8	4.7	21.7	41.0	6.7	25.8	3.7	28.8	41.2	4.0	22.3
Euro area weighted average	3.2	23.7	40.6	7.6	25.0	2.9	21.8	44.6	6.5	24.2	2.5	19.8	48.2	5.3	24.1
Denmark	2.8	18.3	43.9	6.4	28.5	3.4	16.9	45.9	5.1	28.7	3.7	16.6	48.4	4.3	27.0
Sweden	2.8	20.5	x	5.8	x	2.8	19.7	40.7	5.5	31.3	2.1	24.4	44.7	4.0	24.8
United Kingdom	2.1	24.6	42.2	5.2	25.9	2.0	22.6	45.0	6.0	24.4	1.3	18.3	50.9	4.8	24.7
EU weighted average	3.0	23.7	40.9	7.3	25.1	2.8	21.8	44.6	6.4	24.5	2.4	19.7	48.5	5.2	24.3

Source: OECD, European Commission, ECB.

<sup>2</sup> The results for the EU-15 are based on a project of the European System of Central Banks (ESCB) and are published in ECB (2004).

Chart 1

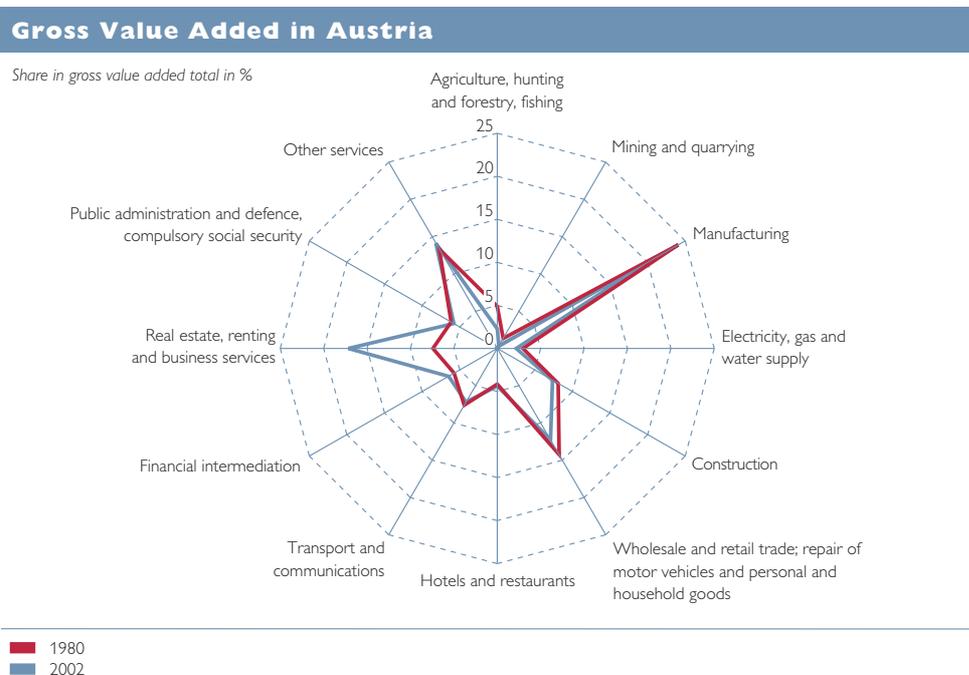


and Greece rather than to those measured in the EU countries with above-average per-capita GDP.

The changes over time (1980 to 2002) clearly reflect the Austrian economy's – albeit slow – shift towards the service sector. Agriculture, hunting and forestry contracted from 4.2% to 2.3%, mining and quarrying

from 1.4% to 0.4%, manufacturing from 22.8% to 20.5%. By contrast, the biggest growth industries were real estate, renting and business services (including IT services), gaining 7.4% to reach 17.2%, as well as financial intermediation, growing by 5.7% to 6.4%.

Chart 2



The individual sectors' growth rates mirror this development: while the tertiary sectors posted above-average rates, the secondary and, in particu-

lar, the primary sectors expanded at below-average rates. The dynamic growth of business services (consulting, software, research services, etc.)

is attributable to the general trend towards outsourcing, new information and communication technologies as well as the increasing knowledge intensity of business activities. Further-

more, tourism is one of the most important components of the Austrian service sector. Given its above-average expansion, Austria's specialization in this sector has increased further.

Table 2

Gross Value Added in Austria			
Sector/industry	1980–2002	1980–1994	1995–2002
	Average growth rate in %		
Real estate, renting and business services	9.1	10.3	6.5
Financial intermediation	5.6	7.4	2.6
Other services	5.3	6.9	2.2
Hotels and restaurants	5.3	5.5	5.0
Total	5.0	5.9	3.3
Transport and communications	4.8	6.3	3.0
Public administration and defence, compulsory social security	4.7	6.8	1.1
Construction	4.6	5.8	2.5
Trade and repairs	4.3	5.1	2.7
Manufacturing	4.3	4.3	3.9
Electricity, gas and water supply	3.6	5.6	–0.4
Agriculture, hunting and forestry	1.4	1.6	1.9
Mining and quarrying	–1.0	–3.0	3.3

Source: OeNB, Statistics Austria.

### 2.1.2 Low Degree of Sectoral Specialization in the EU-15 Changing Only Gradually

Concentration and specialization measures reflect a country's degree of sectoral specialization through an indicator. Krugman's specialization index assumes a value of 0 for a country which has the same economic structure in relation to a benchmark (e.g. Austria in relation to the EU-15) and a value of 2 for a country whose sectoral pattern does in no way match

that of the benchmark. The calculation for the EU-15 (chart 3) shows comparatively small differences in sectoral specialization. The Austrian economy as a whole matches the average economic structure of the EU-15 even to a large extent. At the sectoral level, the degree of congruence is notably higher in manufacturing than in services. Furthermore, the moderate change in the specialization index over time indicates that specialization proceeds slowly.

Table 3

Concentration Indices of Manufacturing Output in Austria							
	1980	1985	1990	1995	2000	2001	2002
	%						
Herfindahl	0.0976	0.0994	0.0974	0.0959	0.093	0.0929	0.095
CR3	40.70	42.70	41.00	40.80	38.70	38.20	39.00
CR5	57.70	59.40	60.80	60.80	60.80	59.20	60.50

Source: OeNB.

Measured by CR3, CR5 and Herfindahl indicators,<sup>3</sup> the absolute sectoral specialization of the Austrian

economy (or the Austrian manufacturing industry) has in fact not changed significantly since 1980. This

<sup>3</sup> The CR3 and CR5 indicators refer to the share of the three and five, respectively, largest sectors in gross value added. The Herfindahl indicator calculates the sum of the individual sectors' squared shares in gross value added. The closer the indicator is to 1, the higher the degree of specialization.

Chart 3



presentation, however, masks the – in some cases considerable – shifts in individual sectors’ shares in value added.

### 2.1.3 Specialization by Employment Reflects Divergent Sectoral Productivity Growth Rates

In terms of employment, the Austrian economy is characterized by a large services sector and the predominance of small and medium-sized enterprises (SMEs). In 2002, 83.7% of businesses employed 1 to 9 people, 13.2% employed 10 to 49 people. In other words, some 97% of enterprises employ a staff of less than 50, and only 0.4% of Austrian businesses have more than 300 employees. All in all, the primary sector accounted for 0.8% of payroll employment and contributed 2.25% to GDP in 2002. By comparison, 28.7% of all employees worked in the secondary sec-

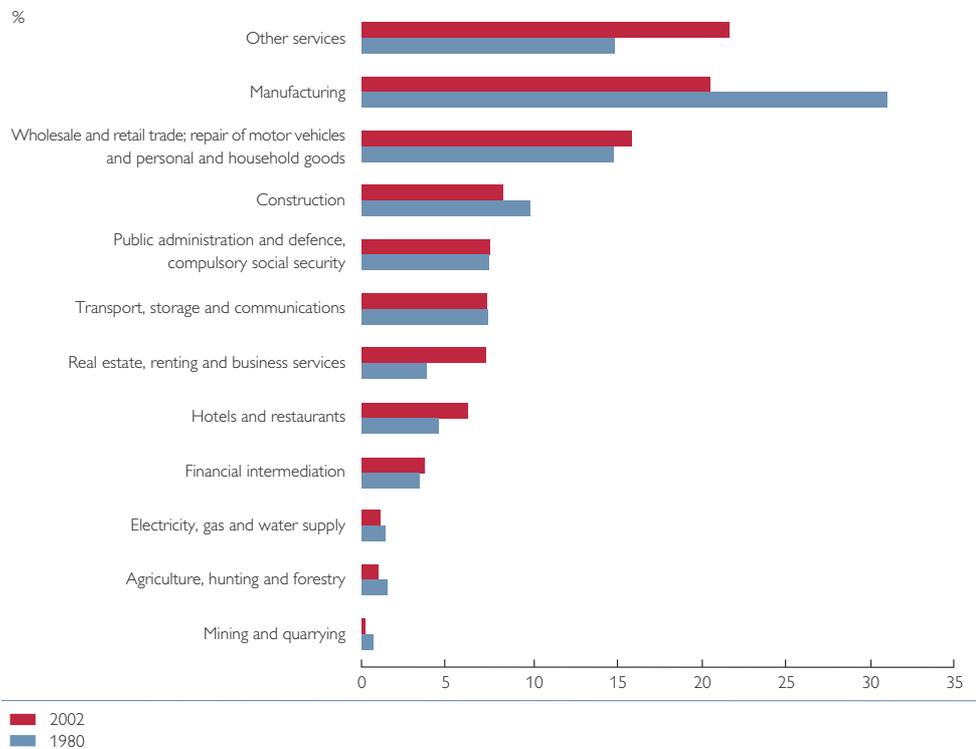
tor (contribution to GDP: 30.45%), and 70.4% in the tertiary sector (contribution to GDP: 62.4%). Between 1995 and 2002 a marked shift took place from the secondary sector (–6.8%) toward the tertiary sector (+7.8%). The biggest growth industries were real estate, renting and business services (+50.4%), health (+22.6%) and other community, social and personal service activities (+20.6%).

The change in absolute shares in employment also mirrors the divergent productivity growth across sectors. While the manufacturing sector’s share in value added contracted only slightly, its share in employment dropped by a significant 10 percentage points.

Labor productivity in manufacturing increased twice as rapidly, on average, as productivity in services

Chart 4

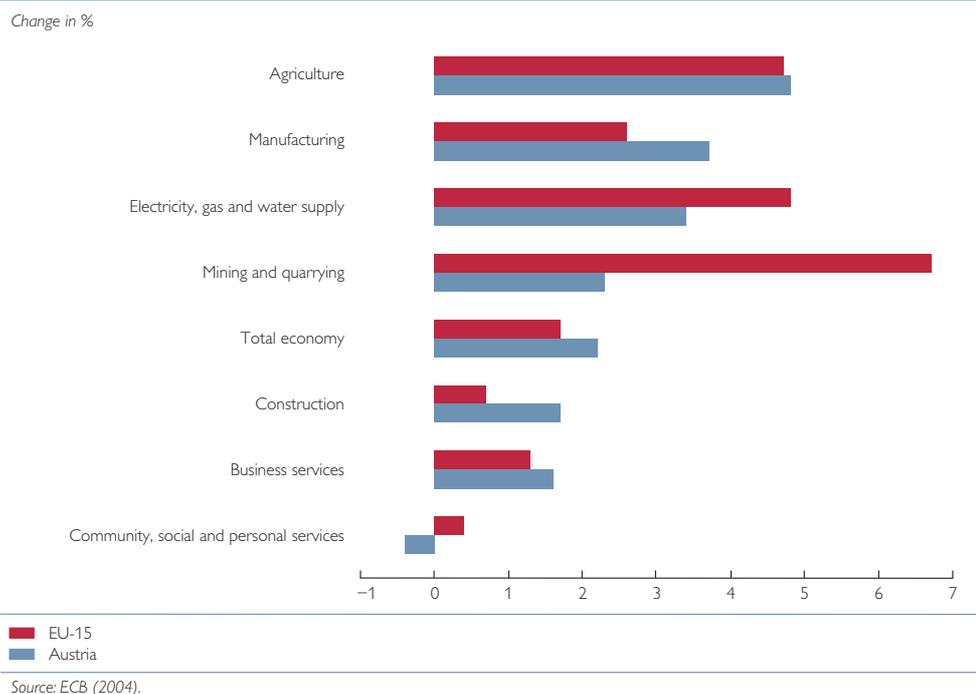
**Change in Sectoral Shares in Total Employment from 1980 to 2002**



Source: OeNB, Statistics Austria.

Chart 5

**Labor Productivity Growth from 1985 to 2001**



Source: ECB (2004).

(leaving aside mining and quarrying, electricity, gas and water supply accounted for the sharpest rise across Europe over the past two decades). These figures seem to confirm, at least for the EU-15, Baumol's hypothesis (1967) of a structurally lower productivity growth potential in the service sector.<sup>4</sup>

#### 2.1.4 Start-up Boom since Mid-1990s

The sectoral distribution of business start-ups is a leading indicator of specialization. What is most striking about the shifts in start-up activities over the past decades is the decline in manufacturing, the stagnation in the service sectors wholesale and retail trade, tourism, transport and communications as well as the increase recorded in financial intermediation and business services (table 4), which has been particularly strong since 2000.

Since 1980 a total of 148,956 new firms were established in Austria; a genuine start-up boom has been observed since the mid-1990s. While prior to 1996 some 15,000 firms were set up every year, the annual average totaled approximately 23,300 between 1996 and 2003. In 2003 business start-ups reached a new record high at more than 28,200 (+9.3% compared with 2002) – a remarkable increase given the prevailing weak economic conditions. However, this figure should be seen against the backdrop that it also includes the group of self-employed termed “new self-employed” (neue Selbstständige), a type of self-employment introduced in January 1998. The sharp rise in start-ups<sup>5</sup> (from 5.8% in 1993 to 8.9% in 2003) has been largely carried by unincorporated sole proprietors.

Table 4

#### Start-Up Activities in Austria in the 20<sup>th</sup> Century

	A+B Agriculture, hunting and forestry, fishing	C+D+E Industry, including energy	F Construction	G+H+I Wholesale and retail trade, repair of motor vehicles and household goods, hotels and restaurants; transport and communications	J+K Financial inter- mediation, real estate, renting and business services	L-P Other service activities	Q Services provided by extra-territorial organizations and bodies	Start-ups	
	Share in % of start-ups in the respective sector							Total	as a percentage of total number of enterprises
NACE code	1–5	10–41	45	50–64	65–74	75–95	99		
until 1900	0.6	13.0	1.3	33.7	50.8	0.5	0.0	970	0.5
1961–1969	0.3	21.0	10.3	49.4	16.4	2.6	0.0	3,958	2.2
1970–1979	0.3	16.8	11.6	42.3	26.8	2.2	0.0	15,827	9.0
1980–1989	0.3	13.9	9.6	45.4	27.6	3.2	0.0	30,270	17.2
1990–1999	0.5	10.0	9.6	43.9	30.7	5.3	0.0	87,565	49.6
2000–2002	0.7	7.5	9.5	33.2	44.5	4.6	0.0	31,121	17.6
Total number	948	20,535	16,916	74,905	55,518	7,625	5	176,452	
Total percentage	0.5	11.6	9.6	42.5	31.5	4.3	0.0		

Source: OeNB.

<sup>4</sup> By comparison, the high productivity growth the U.S.A. has seen over the past few years is to some extent attributable to increasing productivity growth in some service sectors (van Ark et al., 2003).

<sup>5</sup> Start-up ratio = number of start-ups as a percentage of active members of the Economic Chamber.

## 2.2 Determinants of Sectoral Specialization

Theory is ambiguous about the determinants of sectoral specialization. There is no clear evidence that the growing integration of product and factor markets triggered by the EU has unleashed an obvious trend towards increasing or decreasing specialization. While traditional trade theory holds that stepped-up trade fosters specialization, new trade theory (incomplete competition due to returns to scale) sees a convergence of production structures. New economic geography stipulates that the agglomeration or dispersion of economic activity hinges on the level of trading costs: economic integration reduces transport costs, barriers to labor mobility and transaction costs.<sup>6</sup>

In an econometric investigation, Midelfart et al. (2000) find that, in general, growing economic integration in tandem with declining economic policy intervention at the national level cause sectoral specialization or the choice of production sites to be increasingly driven by market forces (e.g. competition in the product markets). Furthermore, industries that depend on tight supplier and customer relations (e.g. because of high transport costs) tend to settle close to economic hubs. In high-technology sectors, specialization clearly depends on the availability of adequately qualified labor. Taking into account these findings, in the following we will investigate to what extent competition, EU accession and EU enlargement promote agglomeration and look at the role of Austria's human resources in the process of specialization. In addition, we will illustrate develop-

ments in national sectoral aid policies, sectoral regulation, foreign direct investment (FDI) and sectoral capital ratios.

### 2.2.1 EU Accession Has Enhanced Competition

Competition, promoted under the frameworks of the World Trade Organization (WTO) and the EU, has fueled structural change, i.e. a shift towards more technology-intensive industries, also in Austria, albeit – as mentioned above – at a comparatively slower pace. As expected, Austria's accession to the EU in 1995 increased competition in certain sectors, which also impacted considerably on price developments. After the Austrian economy's competitiveness had declined due to exchange rate developments in the early 1990s, it started to improve in mid-1995 (Hahn et al., 2001). In other sectors, however, there is no clear evidence of a structural break, with the exception of motor vehicle and parts manufacturing, whose positive development can be traced to an ambitious regional policy and to major corporate relocations. Although the shift away from the clothing and food industries started already before EU accession, it may have been accelerated by the latter.

Another aspect of economic integration is financial integration among the EU Member States, which entails the possibility of cross-border risk diversification and thus may also foster sectoral specialization. This facilitates the full utilization of comparative advantages (Kalemi-Ozcan et al., 2003). Yet, empirical studies show that despite increased economic inte-

<sup>6</sup> For a comprehensive outline of determinants of sectoral specialization in theory, see Wolfmayr-Schnitzer (1999).

gration, risk diversification in the euro area has not improved significantly so far.<sup>7</sup>

### 2.2.2 Austrian Industry Feels Demand Effects Caused by Transition and EU Enlargement

The opening up of Eastern Europe has triggered long-term demand effects in Austria's industrial sector; Austria's moving to the center of the EU may bring about positive agglomeration effects (i.e. an increase in business relocations). In terms of external trade and foreign direct investment (FDI), Austria has the closest ties with the new EU Member States in Central and Eastern Europe. In 2003, the Central and Eastern European countries absorbed 45% of Austria's outward FDI, with banks remaining a key force in the internationalization of Austrian business. Austria's neighbors Hungary, Slovenia, the Czech Republic, the Slovak Republic and Poland account for some 12% of Austria's exports.

A number of studies (e.g. Aiginger et al., 1993) point out that the effects of transition vary considerably across economic sectors in Austria and provide estimations of indirect effects (Luptáčík and Wagner, 1998). These effects, however, are mostly of a long-term nature. An examination by Wolfmayr-Schnitzer (2004) identifies positive effects for the manufacturers of machinery, medical, precision and optical instruments as well as leather, and fairly positive effects for the chemicals sector, communications equipment as well as publishing and printing. By contrast, the textiles and textile products, construction material, wood and wood products as well as metal industries face a more difficult competitive situation. Given its

overall positive foreign trade balance, the wood and wood products sector may benefit from intermediate input from the neighboring countries.

### 2.2.3 Austrian State Aid Focused on Horizontal Measures

For Austria, there are no comprehensive analyses of measures specifically designed to support certain industries. State aid policies have mostly been analyzed from a horizontal perspective (R&D measures, etc.). Still, according to the European Commission's State Aid Monitor, sectoral subsidies account for just about 11% of total state subsidies in Austria, whereas the lion's share is used to finance horizontal measures (R&D, environmental measures, SME promotion, education). At 1.1% of GDP, Austria's state aid ratio was below the EU average in 2002 and has also been going down in absolute figures.

What these figures conceal, however, is the effect regional subsidies, which up to a point are geared to specific industries. For instance, the success of Austrian car component suppliers has been made possible, among other things, by the proactive cluster policy pursued by two regional governments: the automobile clusters of Styria and Upper Austria have developed into large networks of businesses. Likewise, Vienna's biotechnology cluster (pharmaceutical industry) has grown strongly in recent years, not only in terms of research activities but also in terms of turnover. The regional governments support these initiatives not only financially, but also in organizational matters (e.g. in initiating or organizing networks).

An analysis of federal government subsidies granted between 1989 and

<sup>7</sup> See, e.g., Moser, Pointner and Scharler (2003).

2002 shows that throughout the reporting period, hotels and restaurants, the chemicals sector as well as manufacturers of machinery and transport equipment received the highest subsidies. Again, these figures mask a shift in the focus of subsidies that occurred after Austria's accession to the EU: After 1996 manufacturers of radio, television and communication equipment as well as manufacturers of metal products and research

institutions received a comparatively larger share of subsidiaries. Consequently, the above-average growth recorded by tourism is not only traceable to higher demand (fostered by rising incomes) and Austria's attractiveness as a holiday destination, but also to large-scale state subsidies. It would be desirable that in the future, a larger share of subsidies be spent on knowledge-intensive services.

Table 5

Branche	Sector-Specific State Aid from 1989 to 2002			
	Present value 1989–2002 EUR million	1989–2002 Share in %	1989–1995	1996–2002
55 Hotels and restaurants	383	8.0	10.3	5.8
24 Chemicals and chemical products	377	7.8	9.4	6.4
29 Machinery and equipment n.e.c.	340	7.1	7.9	6.3
34 Motor vehicles, trailers and semi-trailers	317	6.6	8.4	4.9
32 Radio, television and communication equipment and apparatus	295	6.1	5.5	6.7
28 Fabricated metal products, except machinery and equipment	282	5.9	5.2	6.6
20 Wood and products of wood and cork	247	5.1	4.1	6.2
26 Other nonmetallic mineral products	212	4.4	4.9	3.9
27 Basic metals	201	4.2	4.7	3.7
73 Research and development services	201	4.2	2.1	6.2
33 Medical, precision and optical instruments, watches and clocks	174	3.6	3.4	3.7
15 Food products and beverages	161	3.3	2.5	4.0
40 Electricity, gas, steam and hot water supply	158	3.3	3.6	3.1
25 Rubber and plastic products	154	3.2	2.6	3.8
21 Pulp, paper and paper products	135	2.8	3.1	2.5
31 Electrical machinery and apparatus n.e.c.	114	2.4	2.4	2.4
72 Computer and related services	108	2.2	1.4	3.1
45 Construction	103	2.1	2.0	2.3
22 Publishing, printing and reproduction of recorded media	90	1.9	2.3	1.5
51 52 Wholesale trade and commission trade services	88	1.8	2.0	1.6
17 Textiles	80	1.7	1.8	1.5
74 Other business services	72	1.5	1.0	1.9
60 Land transport and transport via pipeline services	68	1.4	1.6	1.2
90 Sewage and refuse disposal services	56	1.2	1.4	1.0
36 Furniture; manufacturing n.e.c.	53	1.1	1.3	0.9
70 Real estate services	50	1.0	0.0	2.0
35 Other transport equipment	37	0.8	0.6	0.9
50 Sale, maintenance, repair of motor vehicles and motorcycles	34	0.7	0.7	0.7
93 Other services	23	0.5	0.6	0.4
37 Recycling	17	0.4	0.2	0.4
Total	4,810	x	x	x

Source: Finkard data base, Federal Chancellery.

#### 2.2.4 Is a Lack of University Graduates an Obstacle to Specialization in Knowledge-Based Sectors?

Compared with other EU countries, the share of university graduates in Austria is relatively small, even if graduates of secondary technical colleges (“HTL”) are factored in. In Aus-

tria, only 0.7% of 20- to 29-year-olds hold a tertiary degree in science or engineering, against 2.3% in Ireland, 2% in France and 1.6% each in the United Kingdom and Finland (Walterskirchen, 2004). The use of new technologies and, as a consequence, the growth of certain economic sec-

tors, entail a rising demand for adequately qualified workers, as we have seen from the diffusion of the new information and communication technologies (Falk, 2004). A lack of highly qualified workers in these areas implies that in Austria sectoral specialization will remain limited to medium technology industries (chapter 3).

### 2.2.5 Sectoral Regulation: Significant Progress in Recent Years

Triggered by the liberalization of the telecommunications industry and, subsequently, other network industries, sector regulation has changed significantly over the past few years.

According to calculations by the Austrian Institute of Economic Research (WIFO), deregulation significantly dampened electricity prices for corporate customers (by 35%) and for households (by 13%). By international standards, this decline was more pronounced than in comparable EU countries. The liberalization of the natural gas market in October 2002 also led to substantial falls in prices. In addition, liberalization in the telecommunications sector increased the market share of alternative providers at the expense of (formerly) state-owned providers.

This process of liberalization took place in all EU countries, however; thus, it may not have impacted severely on sectoral specialization, except in cases where it prompted large-scale concentration. In some northern European countries like Ireland, Finland and – to a lesser degree – in Sweden, the information and communication technology industry expanded at an above-average rate (e.g. Nokia, Ericsson).

The crisis that hit the Austrian nationalized industries in the 1980s caused government influence in these industries to become even bigger and prompted a host of labor market policy measures for the workers concerned (e.g. the introduction of a re-employment scheme for steel workers, the so-called “steel foundation”). More recently, new forms of employment (contract self-employment, marginal employment, contract employment, “new self-employed”) have emerged that have provided some positive employment impetus in certain sectors (e.g. in the retail trade). Finally, the admission of seasonal workers in agriculture and tourism has driven up temporary employment of foreigners from 1997 on; since 2002, businesses in all sectors are permitted to employ seasonal workers.

Hall and Soskice (2001) describe the possible interaction between sectoral specialization and regulation in labor, product and financial markets. The regulation of uncoordinated market economies (e.g. the U.S.A. or the United Kingdom) facilitates radical innovation, whereas regulation in coordinated market economies (e.g. Germany or Austria) supports incremental innovation. Put differently, the Austrian type of coordinated market economy promotes specialization in sectors that feature incremental innovation, e.g. manufacturing of motor vehicle parts.

### 2.2.6 Companies Improve Capital Adequacy Ratios

The growth potential of all sectors, not only high-tech sectors, hinges, inter alia, on national and international<sup>8</sup> financing options. In addition,

<sup>8</sup> Over recent years, the role of external funding has increased considerably. Between 1999 and 2003, the share of foreign loans in total loans rose from 4.8% to 10.5% (OeNB, Financial Stability Report 7).

companies' financing structures determine to what extent potential changes in the framework conditions induced by cyclical or financial market developments impact on corporate finance. Sectors featuring radical innovation (e.g. consumer software such as operating systems) have to rely on external, capital market-based fund-

ing sources, since they are forced to redevelop their products within short periods of time, which involves substantial risk without any guarantees of financial return. By contrast, sectors featuring incremental innovation (e.g. custom-made machinery) benefit from stable funding sources such as bank loans (Hall and Soskice, 2001).

Table 6

Indicators of Austrian Companies' Financing Structure							
	1999	2000	2001	2001			
	Capital ratio			Bank debt ratio	Cash flow in % of sales	Cash flow in % of debt	Cash flow in % of investment
	%						
Agriculture, hunting and forestry	3.36	5.74	1.43	68.6	9.4	12.8	146.2
Mining and quarrying	14.89	16.84	11.07	44.9	11.5	14.2	106.9
Manufacturing	10.23	13.6	11.14	47.6	7.1	13.0	166.7
Electricity, gas and water supply	22.28	25.15	33.62	12.6	16.1	15.3	143.2
Construction	4.8	7.06	6.86	42.5	5.8	10.5	178.3
Wholesale and retail trade; repair of motor vehicles and personal and household goods	4.14	6.56	5.88	47.7	4.2	10.9	235.4
Hotels and restaurants	-24.09	-21.03	-20.85	90.7	12.8	10.8	230.1
Transport and communications	2.37	3.78	3.81	53.2	8.9	15.1	122.8
Real estate, renting and business activities	8.15	10.22	10.56	33.3	10.5	17.1	201.3

Source: OeNB.

Austria's sectoral financing pattern tends to encourage incremental innovation. The share of bank lending (62.9% in 2003) in corporate finance continues to be high compared with other European countries. Austrian companies have, however, considerably improved their capital adequacy ratios in recent years, reflecting a rising degree of internationalization and integration but also a shift in business promotion schemes from subsidizing loans<sup>9</sup> to making equity financing more attractive. Foreign portfolio and direct investment contributed significantly to this development.

A breakdown by industrial sector reveals that the capital ratio has grown sharply in all industries, but differs considerably across industries – be-

tween 3.8% of total assets (transport, storage and communications) and 33.6% (electricity, gas and water supply) in 2001. Hotels and restaurants continued to report a negative capital ratio (-20.9%).

More detailed information can be provided at the NACE two-digit level: At 33.3% and 27.4% of total assets, energy suppliers and the radio, television and communications equipment sector posted the highest capital ratios, whereas the retail trade reported a mere 0.01%.

Debt capital has typically been raised through bank loans. Bank financing is of particular relevance for small and medium-sized companies, which dominate Austria's business structure. The bank liabilities of small

<sup>9</sup> For a long time, subsidizing debt financing, for instance through subsidized loans, was the top priority. Over time, the volume of subsidized loans has, however, contracted strongly. In 2002, a mere 4.8% of all loans (excluding housing loans) were subsidized.

businesses (with a turnover of up to EUR 1 million) in manufacturing came to 69.4% of total assets, those of large businesses to no more than 23.3% to 30.2%. At 90.7% of total assets, hotels and restaurants accounted for the largest share of bank liabilities. By contrast, electricity, gas and water supply recorded the smallest share of bank liabilities, while having the highest capital ratio. At the NACE two-digit level, the food industry (65.8%) and the manufacture of furniture (68.2%) posted the highest levels of bank liabilities, whereas the bank liabilities of the car industry, chemicals manufacturers and mining and quarrying were lowest at some 30% of total assets.

Throughout all sectors, cash flow is smaller the larger a company. Real estate (17.1%), electricity, gas and water supply (15.3%) as well as transport and communications (15.1%) recorded the best cash flow-to-debt ratios. As to company size, an interesting trend has been observed in construction: the cash flow-to-debt ratio declines in proportion to increasing company turnover. Companies posting a turnover of EUR 1 million recorded a cash flow-to-debt ratio of 12.4%, while companies whose turnover exceeded EUR 100 million posted 5.5%. Similarly, the cash flow-to-debt ratio decreases – albeit at a slower pace – in proportion to increasing turnover also in the retail sector (from 12.4% to 10%).

### 2.2.7 Austrian Businesses Stepped Up Foreign Direct Investment

Inward and outward foreign direct investment (FDI) plays a crucial role in sectoral specialization in Austria. While the former enhances, e.g., pro-

duction capacity or efficiency through material investment and, in particular, through management and technology transfer, the latter may stimulate growth and boost investors' competitiveness in Austria (as, for instance, cheaper input goods reduce production costs in Austria).<sup>10</sup>

Austria's overall FDI position improved in the 1990s compared with the 1980s. Austria increased its share in outward FDI flows from industrialized countries, from 0.3% on average in the 1980s to 0.6% in the 1990s. At the same time its share of *inward* FDI augmented from 0.4% to about 1%. Austria evidently benefited from EU accession (with regard to inward FDI) and from the opening up of Eastern Europe (with regard to outward FDI). However, Austria's FDI-to-GDP ratio continues to be far below the European average.

In 2003, *outward FDI* reached an all-time high of EUR 6.3 billion. At the same time, *inward FDI* to the tune of EUR 6.1 billion confirmed that the slump of 2002 was only of a temporary nature. On balance, 2003 saw the continuation of the trend of 2002, when outward FDI surpassed inward FDI for the first time since the early 1990s and, consequently, the direct investment gap narrowed significantly.

The sectoral distribution of outward and inward FDI in Austria results in the following specialization pattern: The financial sector – in particular real estate activities and business services (especially increased investment in real estate and business consulting services) as well as financial intermediation – accounts for the lion's share in outward FDI. More than a quarter of total outward FDI

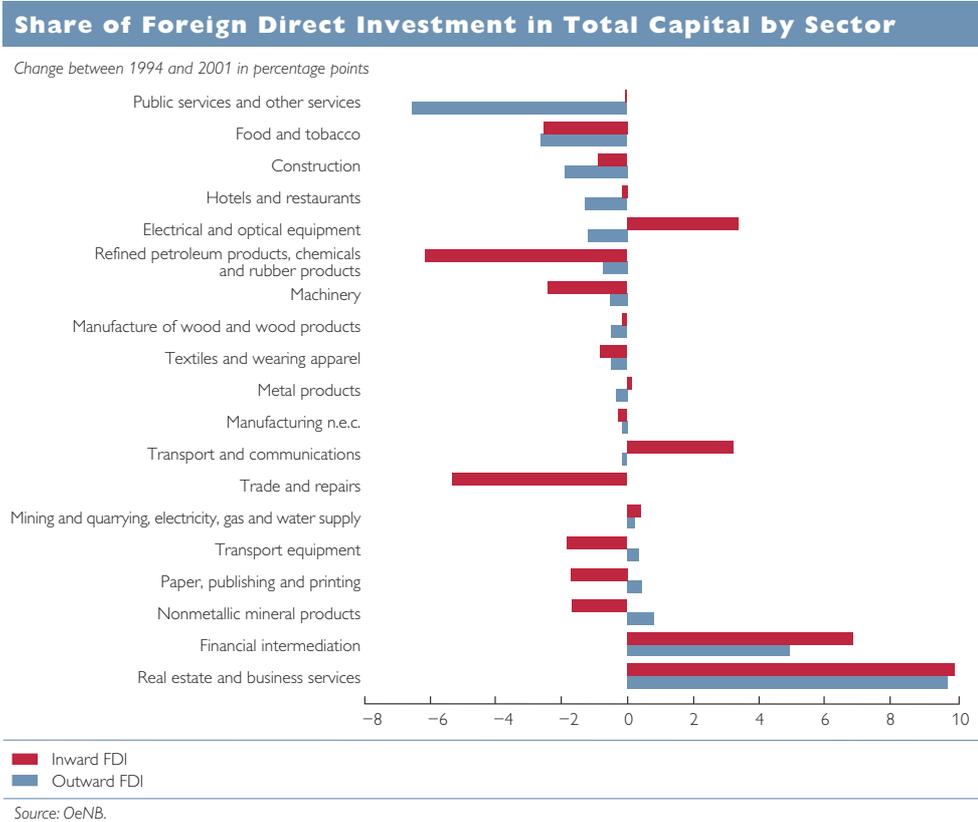
<sup>10</sup> Wolfmayr-Schnitzer (1999) provides an overview of possible interrelations.

Table 7

	Sectoral Breakdown of Foreign Direct Investment					
	Outward FDI			Inward FDI		
	1994	2000	2001	1994	2000	2001
	Share in total capital in %					
Mining and quarrying, electricity, gas and water supply	2.8	1.2	3.0	0.5	1.0	0.9
Food, beverages and tobacco	3.9	1.8	1.4	4.3	2.0	1.8
Textiles and wearing apparel	0.7	0.3	0.3	1.5	0.8	0.7
Manufacture of wood and wood products	1.1	0.9	0.6	0.3	0.2	0.1
Paper, publishing and printing	1.8	2.0	2.2	4.0	2.5	2.3
Refined petroleum products, chemicals and rubber products	6.6	4.5	5.8	12.2	7.3	6.1
Nonmetallic mineral products	3.3	4.3	4.1	3.1	1.4	1.4
Metal products	4.7	4.9	4.3	1.4	1.7	1.6
Machinery	2.2	1.8	1.7	4.7	2.8	2.3
Electrical and optical equipment	3.9	2.6	2.7	4.2	7.0	7.6
Transport equipment	0.4	0.4	0.7	3.1	1.3	1.3
Manufacturing n.e.c.	0.4	0.3	0.2	0.5	0.3	0.2
Construction	3.7	1.5	1.8	1.0	0.2	0.1
Trade and repairs	12.5	12.0	12.5	21.5	19.4	16.2
Hotels and restaurants	1.6	0.9	0.3	0.9	0.8	0.7
Transport and communications	0.7	0.3	0.5	1.4	5.4	4.6
Financial intermediation	18.0	20.9	22.9	10.0	17.9	16.7
Real estate, renting and business activities	24.9	38.1	34.5	25.3	27.8	35.1
Public and other services	6.9	1.0	0.4	0.3	0.2	0.3
	EUR billion					
Total	7,671.3	26,674.5	32,350.7	11,801.2	32,704.3	38,952.3

Source: OeNB.

Chart 6



is attributable to Austrian banks' stepped-up activities abroad. In addition, foreign investors have continued to expand their holdings in third countries through their Austrian subsidiaries.

As to inward FDI, the chemicals sector as well as retail and wholesale trade, but also manufacturers of machinery and the food industry recorded a substantial decline in investment between 1994 and 2001, whereas financial services and manufacturers of electrical machinery and apparatus attracted increasing investment from abroad.

On the whole, the impact of rising outward FDI on specialization patterns in Austria can only be assessed on the basis of data covering longer periods of time.

### 3 Sectoral Specialization and Long-Term Growth

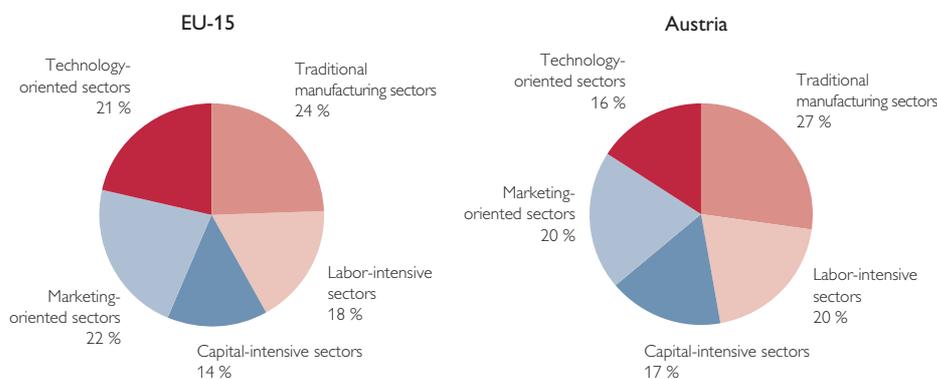
Sectoral specialization patterns have an effect on an economy's long-term growth. From 1960 to 2002, annual per capita income growth averaged 2.75% in Austria, thus climbing at a faster pace than the euro area average of 2.5%. Since the early 1980s, however, the average growth rate has

dropped to 1.95% (Gnan et al., 2004). Despite these above-average growth rates, Austria continues to be specialized in industries at a medium technology level (Peneder, 2001: structure-performance paradox). Although the R&D share of GDP has been revised upwards (2.27%), the most recent data available (from the year 2000) show that compared with the EU, in Austria, labor-intensive industries contribute more to value added (20%, EU: 18%) than technology-oriented industries (16%, EU: 21%).

A comparison of the EU-15 with the U.S.A. shows that in terms of productivity growth, which is key to long-term growth, the EU has been lagging behind the U.S.A. since the mid-1990s. At the sectoral level, this gap is attributable to the U.S.A.'s higher productivity growth in the information and communication technology manufacturing sector and, in particular, in the three service sectors retail and wholesale trade as well as financial services (van Ark et al., 2003). In the EU-15, it is higher productivity in the individual industries that contributes to productivity growth rather than shifts to sectors

Chart 7

#### Specialization in Manufacturing in 2000



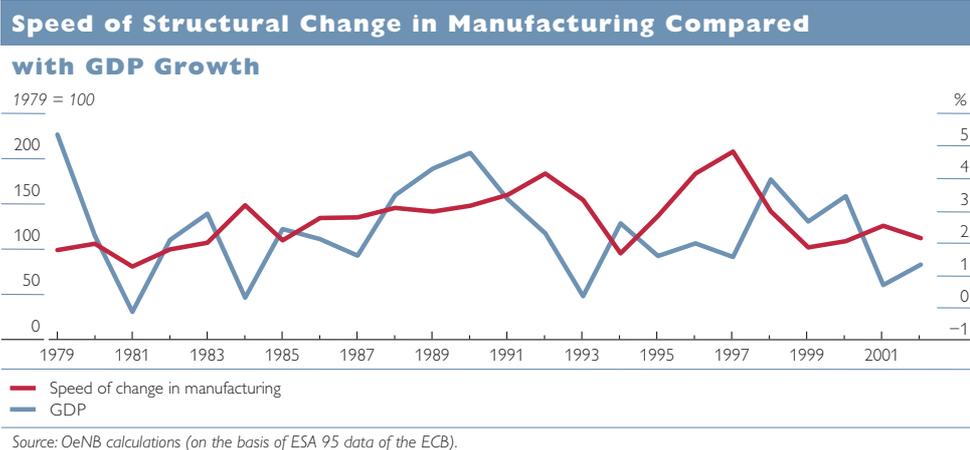
Source: WIFO, WIFO Taxonomie der Sachgütererzeugung, Eurostat SBS.

with above-average productivity rates. Above all in the service sectors of the individual EU countries, however, shifts to more productive sectors account for almost half of total productivity growth. Therefore, the conclusion drawn in ECB (2004) is that Europe still has potential for productivity-enhancing structural change.

How quickly did manufacturing in Austria undergo the structural changes mentioned above? To assess the relationship between aggregate economic development and structural

change in the production system, an indicator of the speed of structural change at the NACE two-digit level can be used.<sup>11</sup> We find the speed-of-change indicator to be out of sync with the business cycle, which implies that individual manufacturing sectors saw developments that differed significantly from the macroeconomic cycle. Moreover, it becomes obvious that prior to 1995 the speed of change lagged behind GDP growth, whereas after 1995 it was a kind of leading indicator of GDP growth.

Chart 8



#### 4 Summary and Conclusions

Sectoral specialization patterns in Austria and the EU-15 have been changing only slowly and more or less homogeneously over the past 20 years. Only a few EU countries saw increasing specialization in high-technology industries. This development proves that owing to the relatively homogeneous production structure, the risk of asymmetric shocks in the euro area is generally low. Neither is there a danger that sectoral specialization would be high enough for Austria to slip into a business cycle that would not be in line with the single mone-

tary policy, since Austria's economic structure is very similar to that of the euro area.

An analysis of developments in the ESCB (ECB, 2004) has shown that cyclical divergences and inflation differentials within the euro area narrowed in the course of the 1990s, to some extent driven by sectors exposed to external trade, which – as described above – are of roughly equal size throughout the euro area. This may indicate that an optimum currency area like Austria and Germany can be the result of, rather than the precondition for, monetary union. In any case, the convergence of business

<sup>11</sup> The indicator calculates the sum of all changes in sector shares in total manufacturing.

cycles, homogeneous production structures and the relatively slow change of sectoral specialization patterns are factors that create a favorable climate for conducting the single monetary policy.

No (or only a gradual) increase in specialization does not imply, however, that an economy is not undergoing structural change. Comparing specialization on an international scale conceals the fact that there have been significant concomitant shifts in the contribution to value added between sectors, in particular gains in services (especially business services). In addition, motor vehicle and parts manufacturers markedly increased their share in value added in Austria. Compared with the EU average and considering Austria's high per capita GDP, the domestic economic structure is still lagging behind in terms of technology and knowledge intensity. Measures to promote structural

change towards knowledge-intensive businesses are still warranted, in particular against the background of EU enlargement and the subsequent increased sectoral heterogeneity in the EU (Peneder et al., 2001; Gnan et al., 2004). One priority should therefore be the promotion of tertiary education.

Growth-enhancing structural change does not necessarily lead to higher levels of specialization and, consequently, to more heterogeneous economic structures in the euro area; if all euro area countries develop along similar lines, as past experience suggests, growth and homogeneous conditions for the single monetary policy are not mutually exclusive. The Lisbon strategy is an economic policy instrument that supports EU-wide structural change, provided that all Member States vigorously pursue its implementation.

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