

IFC Working Papers

No 4

Firm level analysis of international trade in services

by Patricia Walter and Rene Dell'mour

March 2010

Irving Fisher Committee on Central Bank Statistics

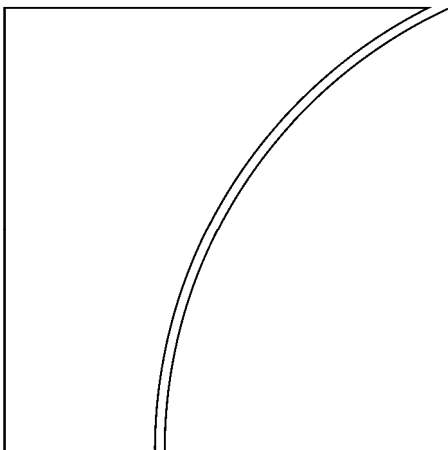
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Firm level analysis of international trade in services

The case of Austria

Patricia Walter, Rene Dell'mour

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Introduction

Balance of payments statistics serve as the common basis for analyzing cross-border trade in services, providing information about exports and imports by individual countries or by economic or monetary areas, specified by service categories and partner countries. However, balance of payments statistics do not deliver insight into the facts that determine trade flows as the decisions related to trading services are taken by companies rather than countries. Consequently, analysis has to turn to the firm level to highlight trading, especially exporting patterns, taking company structures into account. The results may serve interest groups, politicians, business and industry as important sources of information for economic decisions and policy making.

In Austria, the central bank is in charge of compiling balance of payments statistics. In 2006, a major change in data collection was introduced; since then, micro data on exports and imports of services (except travel) have been collected in close cooperation with Statistics Austria, replacing the former banks' records on payment transactions. The structural change in data collection has very positively affected the available detail as well as the methodological quality of statistics on international trade in services. Besides, data on exports and imports per service category and partner country are available on a per-enterprise basis and may be linked with structural or company register information, e.g. about company headquarters, sales revenues, the number of employees and about outward and inward FDI or with foreign trade statistics data.

Starting 2006, the central bank linked survey data about trade in services with business statistics. Micro data analysis indicates that nearly 5,000 nonfinancial enterprises were engaged in international trade in services in Austria. Their economic activities involved some 774,000 employees, sales revenues of about EUR 250 billion, of which service export revenues of about EUR 20 billion, and service import expenditures of roughly EUR 15 billion. The central bank comes to the conclusion that Austria does not feature "typical" service exporters. Much rather, it is possible to distinguish between various types of service traders: (1) network industries, where exports are intrinsic to the system (the postal, telecommunications and transport services); (2) technology-intensive parts of the manufacturing industry, including e.g. the automotive industry, chemicals and TV and radio broadcasting; (3) transnational enterprises that organize their production on a world-wide basis and maintain research centres in Austria; (4) group management providing a broad range of services, e.g. advertising, legal consultancy and financial services; and (5) local, specialized companies in areas such as technology and management consultancy.¹

This working paper introduces the reader to the survey design in Austria (chapter 1) and gives an overview of the trading patterns which time series analysis of the balance of payments reveals (chapter 2). It then describes the data available for analyzing international trade in services on the firm level (chapter 3.1) to explain the structures observed in the balance of payments (chapter 3.2 to 3.8) with regard to possible determinants such as the place of location, trading partners, company size, group activities and linkages between trade in services and trade in goods. The paper also summarizes regression results of export revenues and import expenditures against the 13 variables available on the firm level (chapter 4) before the analytical findings are summarized (chapter 5) and the data set is presented in detail (Statistical Annex).

¹ For related Austrian empirical literature see e.g. Egger and Pfaffermayr (2005), Francois and Wörz (2007), Lamel, Mesch and Skolka (1990), Wolfmayr (2008), Nowotny and Palme (2008).

1. The Framework for Compiling External Statistics in Austria

Until 2006, balance of payments statistics have been compiled largely on grounds of secondary information from banks' records on payment transactions in Austria (settlement system). Progressive economic globalization though made it increasingly difficult to run the indirect reporting system effectively. Among the contributing factors was the rise in intra-company liquidity management, which distorted the volume of trade and financial flows reported by banks upwards. Furthermore, cross-border payment transactions have been gradually standardized within the euro area accompanied by a discontinuation of banks' reporting obligations for the balance of payments.

The Oesterreichische Nationalbank (OeNB), who is in charge of compiling balance of payments statistics in Austria, decided to switch from settlement data to direct surveys of economic agents in January 2006. The sampling design differs according to the type of transaction as well as the economic sector of respondents surveyed. To benefit from synergies in the new reporting system, the OeNB works in close cooperation with Austria's other key producer of statistics, Statistics Austria. Since 2006, the OeNB has thus concentrated on capturing financial transactions and the financial sector, whereas Statistics Austria has focused on real economy data. The OeNB remains responsible for consolidating the different reports and for the quality and publication of the balance of payments statistics.

On behalf of the OeNB, Statistics Austria compiles data on service exports and imports by nonfinancial corporations classified under sections C to I, K, M and O as well as division 67 of the Austrian Statistical Classification of Economic Activities (ÖNACE) 2003.² The OeNB, in turn, conducts the survey of trade in services among the financial sector (mainly banks and insurance companies); this relates to the divisions 65 and 66 of ÖNACE 2003.

The surveys of trade in services cover business activities according to the Extended Balance of Payments Services Classification (EBOPS), taking hold of some 50 different service items. The survey design for the nonfinancial sector is a stratified corporate sample within the scope of the structural business survey (SBS). For setting up the new direct reporting system the survey for the reporting year 2003 was extended to capture service trade flows. The so identified reporting population was grouped by industry classified at the ÖNACE two-digit level. A reporting obligation applies to those corporations whose service exports or imports surpass a specified threshold, either EUR 50,000 or EUR 200,000, with the threshold chosen to capture at least 90% of all service imports and exports in every industry (tables 1 and 2).

Unreported data are imputed using an estimation method. For this purpose, service exports and imports of reporting enterprises are stratified by industries and turnover size classes, median values are calculated, and these are then applied to nonreporting enterprises. Robust regression is used to estimate service exports and imports at values below the threshold. Thereby, exports and imports are calculated as a function of sales.

² This does not include travel data, which are captured separately according to the different mode of supply, combining primary and secondary data sources.

Table 1

Survey design

Basic Population 2003

	Number of business with services exports	Services exports in €1,000	Number of business with services imports	Services imports in €1,000	Balance
Survey data	5,214	17,334,917	4,973	13,718,530	3,616,387
Totals after estimates	47,137	20,132,846	43,641	15,739,222	4,393,624

Source: OeNB, Statistics Austria.

Table 2

Survey design

Coverage 2003

Number of businesses	Coverage in % of corporate sample – services exports	Coverage in % of corporate sample – services imports	Coverage in % of total – service exports	Coverage in % of total – service imports
4,800	99	99	89	91

Source: OeNB, Statistics Austria.

2. Development of Trade in Services according to the Balance of Payments

OeNB and Statistics Austria back casted service exports and imports for the period from 1995 to 2005, using the methodology in place since 2006. The introduction of the new survey system had caused trade flows to slump as the statistical artefact “unclassified transactions” ceased.³ The new time series shows that Austria realises growing surpluses on the trade balance of services (excluding travel) and that these are contributing substantially to the positive long-term trend of the current account balance: Between 1998 and 2008, net service trade augmented from EUR 1 billion to EUR 6 billion, a rise from 0.7% of GDP to 1.5%. The underlying service flows have grown considerably, exports by an average of +10% a year, imports by some +8%.

In comparison, travel revenues expanded only moderately between 1998 and 2008 (+4% a year; expenditures +2%), causing a pronounced shift in the structure of Austria’s external trade. The country cannot be considered first and foremost a tourist destination any longer,

³ For a detailed description of the new data set see Walter (2008).

much rather Austria has become a provider of varied services. Still, the service-to-goods export ratio remained fairly low from 1998 to 2008, about 20%. Although the annual growth of service exports was higher on average than of goods (+8% a year), it did not suffice to make up for the head start of goods trade.⁴

The revealed comparative advantage (RCA) indicates on which products or services a country has a comparative advantage in exports. In particular, the RCA shows to what extent the export-to-import ratio of a particular service deviates from the export-to-import ratio of all services (excluding travel). Typically, the index for country “i” is defined as

$$RCA_i = 100 \ln [(ex_j/im_j)/(Gex/Gim)]$$

With

ex exports
im imports
j type of service
G total services

The RCA index displays a positive value if the ratio is above average for a particular service, indicating a strong international competitive position. In relative terms, foreign suppliers of that service cannot gain as strong a foothold on the country’s market as domestic suppliers succeed in gaining a foothold abroad.⁵

With regard to the volume of trade flows, transportation is traditionally the most important service category in Austria. The RCA index displays though that Austria does not have a comparative advantages in providing transport services to other countries. In other words, the market access in Austria by foreign suppliers outpaces that of Austrian suppliers abroad. Also on services that can be categorized as knowledge-based, like legal services, accounting, auditing and bookkeeping services, business and management consulting, advertising and market research, Austria has a predominantly negative competitive position, with no trend reversal observable so far. In contrast, Austria exhibits comparative advantages on services that can be classified as technologically innovative, research and development services and architectural, engineering, and other technical services (graph 1).⁶

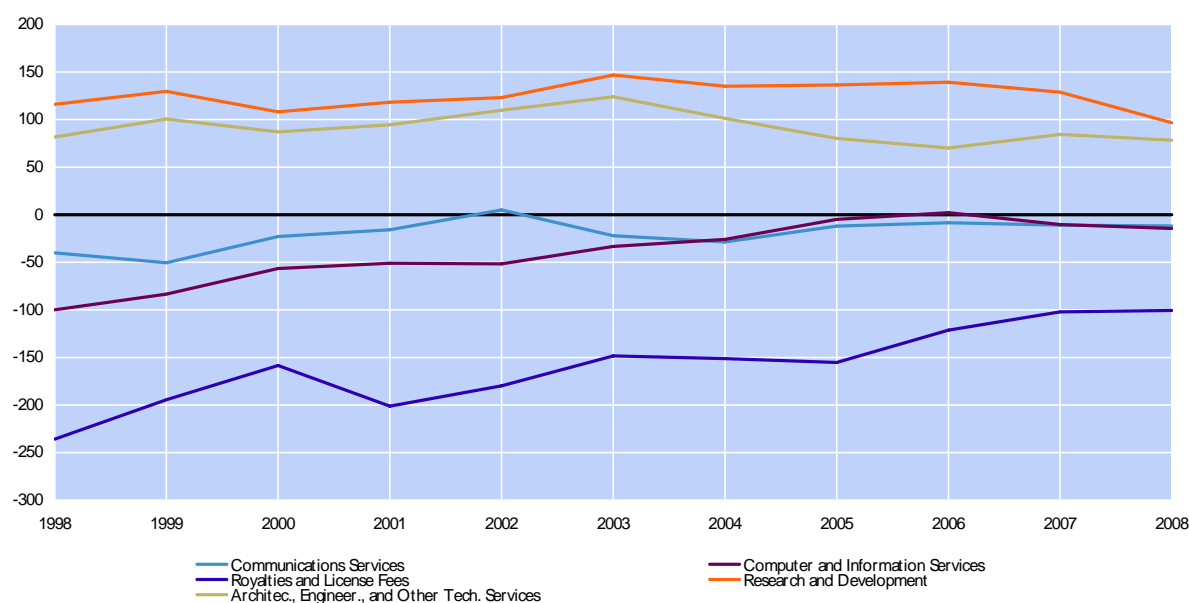
The following analysis of firm level data aims at explaining Austria’s competitive advantages and disadvantages in trade in services, which balance of payments statistics indicate, by taking business structures into account.

⁴ The literature cites two main factors in the lag of trade in services on trade in goods: first, the limited tradability of services resulting from their immateriality and their intrinsic link to the persons performing the relevant service, and second, the continued existence of nontariff trade barriers, above all in the form of regulations on business startups and establishing a commercial presence as well as restrictions on labor mobility. For a detailed presentation see Kox and Kyvik Nordas (2007).

⁵ See Utkulu and Seymen (2004).

⁶ The major comparative disadvantage is with royalties and licence fees, whereby revenues and expenditures on franchises and similar rights included are of minor importance. For the specific development in Japan, owing to payments of licence fees for computer software see Koori (2009).

Austria's RCA in trading technologically innovative services



Sources: OeNB, Statistics Austria.

3. Firm level Analysis and the Determinants of Trade in Services

3.1 Description of the Data Set

The SBS has been drawn up annually in Austria since the reporting year 1997, in compliance with the requirements of the relevant EU regulation.⁷ The SBS are compiled by a survey of those companies whose employment figures and sales revenues are above legally defined thresholds. In 2006, the SBS comprised 289,635 reporting units including an estimate for companies below the reporting threshold.⁸

For analyzing trade in services by Austrian companies, an extract that included only active enterprises registered in the central Austrian company register was drawn from the 2006 SBS. Thus, companies that are covered by the SBS but do not have a registration number were not included. Conversely, registered companies that are part of the trade in services survey but that are not covered by the SBS were included in the analysis. The total data sample thus covers 138,306 enterprises and is applied to below as “basic population”.

A sample was drawn from this population; it comprises 4,963 enterprises that either exported or imported services, or did both, in 2006. Using the company register number as the identification criterion, 14 variables were defined for each enterprise, including the industry in which the company operates (ÖNACE 2003), annual average employment⁹, sales revenues, exports and imports of goods totals, company headquarters (Austrian province), date of establishment, outward FDI (yes or no) and inward FDI (yes or no) as well as the type of

⁷ Regulation (EC) No. 295/2008 of the European Parliament and of the Council of 11 March 2008 concerning structural business statistics.

⁸ See Statistics Austria (2008).

⁹ Employment corresponds to year-end figures if the information was taken from the company register.

service, the country of incorporation of the trade partner, and export revenues and import expenditures.

The data on service exports and imports were taken from the survey of nonfinancial corporations' trade in services. They do not cover travel, nor do they account for trade by financial corporations. Consequently, insurance and financial services exports are recorded only rudimentarily. Also figures comprise only reported service exports and imports and leaves imputed and estimated values out of account.

Most structural information about the reporting enterprises was taken from the 2006 SBS. Master data of companies covered by the trade in services survey in 2006 but not by the SBS were taken from the central Austrian company register. These data were complemented by information derived from the OeNB's company database, mainly about FDI. Finally, exports and imports of goods date from foreign trade statistics.

Two-thirds of the enterprises in the sample are small companies in terms of staff size (graph 2), but the large companies account for more than 60% of total sales revenues. This is a first indication of the importance of large companies for generating revenues from cross-border trade in services.

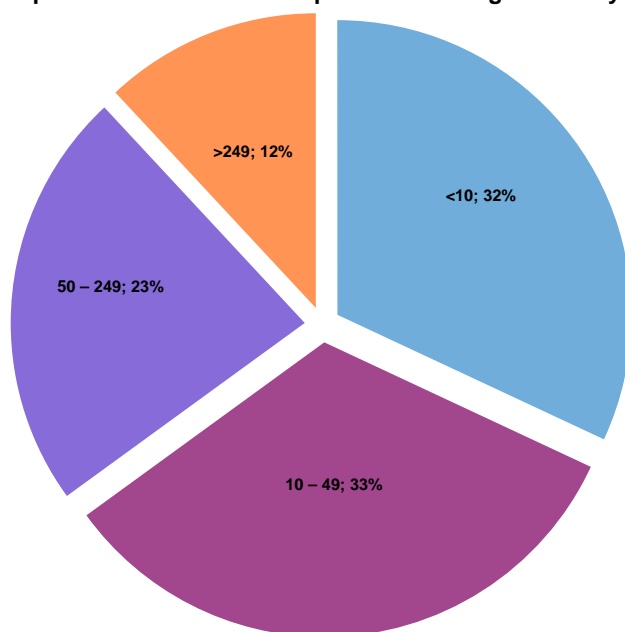
The breakdown of enterprises in the sample by industry displays a heterogeneous structure. The size of the sampling fraction differs from industry to industry, which is attributable to the statistical coverage concept that applies to international trade in services, minimizing costs to the reporting industries while ensuring that the degree of coverage was sufficient in every service category.

- The sample comprises 940 manufacturing companies, accounting for 19% of the sample. The sampling fraction comes to about 6% of the companies in the so defined "basic population". Most of the companies manufacture machinery, equipment and metals, or are in the publishing or food industry.
- 222 enterprises or 4% of the sample – less than 2% of the basic population – are construction companies.
- Service providers represent the bulk of the companies in the sample, i.e. 3,560 companies or almost 72% of the sample. However, these service companies represent only 3% of the basic population, which is indicative of the very fragmented corporate structure in Austria. Most of the service companies belong to the following industries: wholesale trade and commission trade, supporting and auxiliary transport activities (shipping companies and travel agencies), land transport (including transport via pipelines), data processing, management consulting, management of holding companies, architectural and engineering services, and advertising.

Nearly EUR 20 billion of service exports were gathered by the sample. In terms of the 2006 balance of payments, this corresponds to a degree of coverage of 95%; the service imports of the sample account for a volume of EUR 15 billion or 85% of the balance of payments. The degree of coverage is highest for exports of communications services and for merchanting and other trade-related services; it is lowest for personal, cultural, and recreational services and for agricultural, mining, and on-site processing services. The reason for this low degree of coverage is that data from the national accounts complete survey data for the compilation of personal services; moreover in 2006, the survey system for agricultural services was still in the project stage.¹⁰

¹⁰ Legal services exhibit a comparatively low degree of export and import coverage (63%) because in Austria, a large proportion of such services are provided within banking groups (the sample does not include financial intermediaries).

Sample Description: Distribution of Corporations among Classes by Numbers of Employees



Sources: OeNB Statistics Austria.

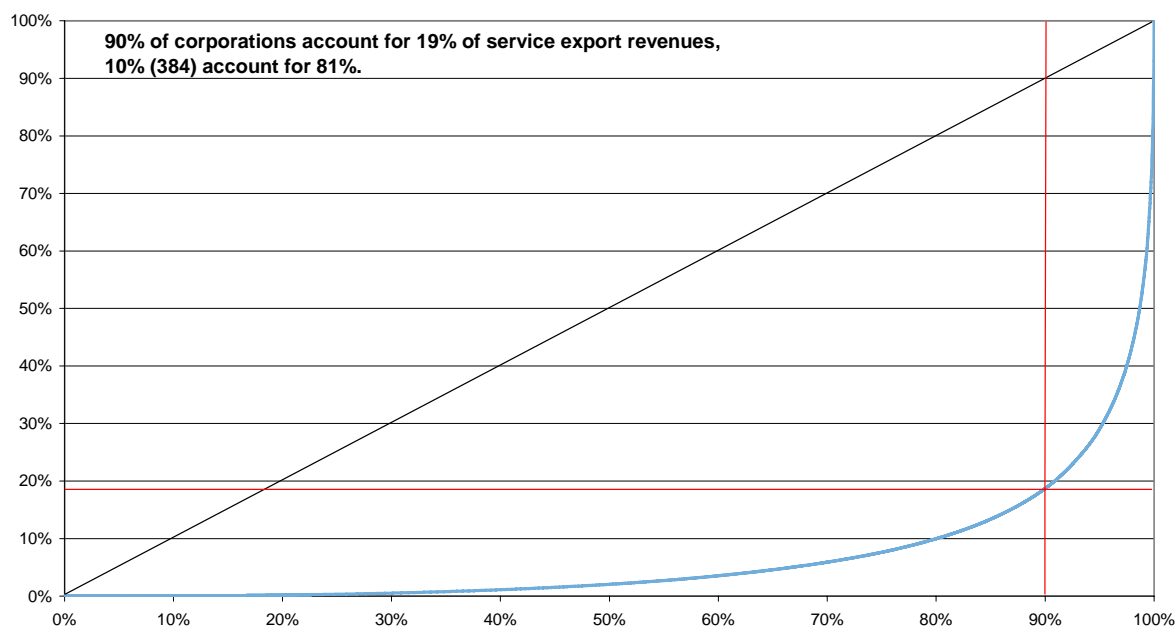
3.2 Concentration of Enterprises in Trade in Services

According to the sample, 4,013 Austrian enterprises exported services in 2006. 10% (384) of these companies generated more than 80% of total service export revenues, indicating that only a small number of Austrian companies which do business abroad account for Austria's service exports (graph 3). Most of these firms belong to the service sectors (1) supporting and auxiliary transport activities, activities of travel agencies, (2) management activities of holding companies, (3) business and management consultancy activities, (4) wholesale trade and commission trade, except of motor vehicles and motorcycles, (5) land transport, transport via pipelines and (6) computer and related activities.

4,057 enterprises imported services in 2006, of which, similar as for exports, 10% (388) account for 80% of import expenditures. In other words, although in principle, every company can purchase services abroad, a small group of enterprises accounts for the bulk of total expenditure on service imports. Most of the companies are in the same sectors as those in which exports are concentrated; other companies are in advertising and air transport. Most of these service sectors can be classified as network industries whose external business orientation is inherent to the system. Other industries with considerable service imports are in the machinery and the chemical manufacturing industries.

Concentration of Corporations in Service Exports

Graph 3



Sources: OeNB, Statistics Austria.

3.3 The Significance of Service Exports for Total Sales

The common indicator to measure the importance of external trade is the export ratio, i.e. exports as a percentage of sales revenues. The service sector accounts for 77% of export revenues according to the sample. The export ratio comes to 12%, which means that export revenues account for only one-eighth of Austrian service companies' total sales revenues.

External trade in services is most important for air transport as well as providers of architectural and engineering services, with both categories selling about one-half of their services abroad (table 3). With an export ratio of up to 5%, service exports are least important for retailers and motor vehicle traders. Among enterprises not classified under the service sector, service exports are relevant above all for manufacturers of radio, television and communication equipment and apparatus, measuring roughly 4% of total sales revenues.

Looking at the type of services exported, service industries with over 90% industry-related exports include various transportation services; postal and telecommunications services; legal services; accounting, auditing, bookkeeping, and tax consulting services; market research and public opinion polling; and architectural, engineering, and other technical services. In contrast, business and management consultancy activities offer a wide range of services, including computer and information services, technical services and advertising services. Retail trade and motor vehicle sales have the second-highest share of revenues from royalties and license fees after the research and development industry.

Table 3
Export Ratios by Service Industry

			Export Ratio in % of sales revenues
Service Industries according to ÖNACE 2003	50	Sale, maint. a. repair of motor veh.; retail sale of auto. fuel	1.8
	51	Wholesale trade and commission trade	5.4
	52	Retail trade; repair of personal and household goods	0.7
	55	Hotels and restaurants (except for travel)	1.5
	60	Land transport and pipeline transport	23.5
	61	Water transport	27.4
	62	Air transport	53.9
	63	Supporting transport activities; travel agency services	28.5
	64	Postal and telecommunications services	8.3
	67	Financial services and insurance activities	22.1
	70	Real estate activities	3.5
	71	Renting of machinery and equipment without operators	9.3
	72	Computer-related activities	19.5
	73	Research and development	x
	74.11	Legal activities	32.4
	74.12	Accounting/auditing activities, tax consultancy	12.5
	74.13	Market research and public opinion polling	31.9
	74.14	Business a. management consult., incl. public rel. consult.	47.4
	74.15	Management activities of holding companies	28.0
	74.20	Architectural and engineering activities	51.0
	74.30	Technical testing and analysis	38.2
	74.40	Advertising	11.1
	74.50	Labor recruitment and provision of personnel	7.8
	74.60	Investigation and security activities	2.0
	74.70	Building and industrial cleaning activities	2.8
	74.80	Miscellaneous business activities	30.9

X Results are implausible as some companies were recorded with different reference date in the primary surveys.

Sources: OeNB, Statistics Austria.

3.4 Service Exports Broken down by Austrian Provinces

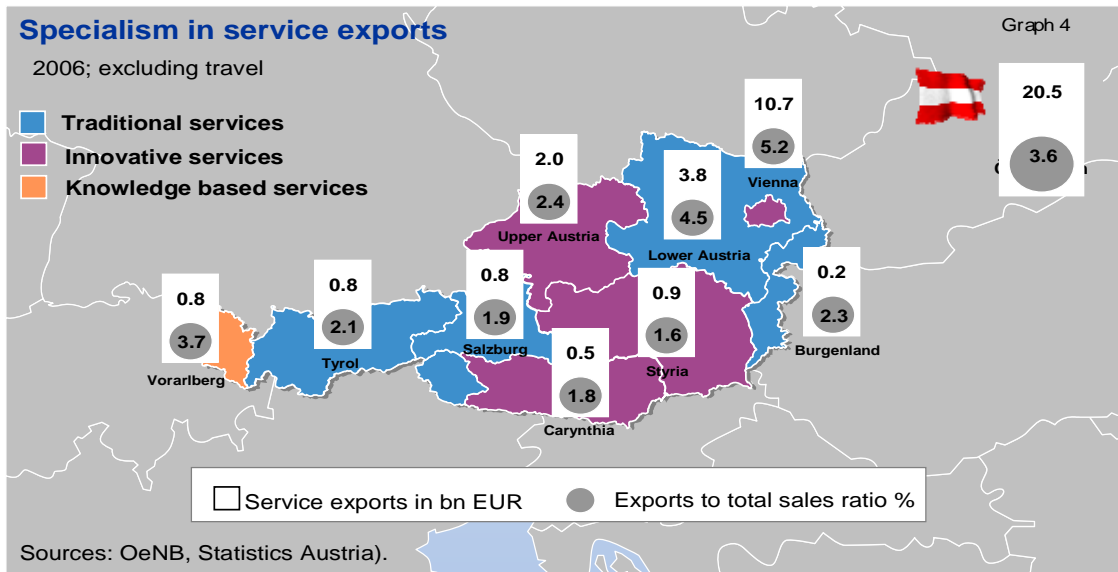
Cross-border trade in services by companies at several sites are collected and reported as a total by headquarters. Many headquarters are located in Vienna, which therefore accounts for 36% of service export revenues. Besides, all Austrian regions export chiefly transport services as this is Austria's most important service category following travel (table 4). But a closer look at the regional distribution of exports broken down by service categories reveals that there are several regional specializations in Austria. For example Upper Austria has a technology park from which it exports a comparatively high degree of architectural, engineering and other technical services. For Austria's southern provinces, Carinthia and Styria, not only a comparatively high share of construction service exports but also innovation centres can be observed which receive revenues from exports of computer and information services as well as research and development services. The western province Vorarlberg features a modern, knowledge-based export structure; in an Austrian comparison, the province has a high share of revenue from legal and business services, including business and management consulting, advertising and market research as well as technical services (graph 4).

Table 4

Distribution of Service Export Revenues among Service Categories and Provinces

Service Category	Provinces								
	Burgen-land	Carinthia	Lower Austria	Upper Austria	Salzburg	Styria	Tyrol	Vorarl-berg	Vienna
Transportation	53	81	3010	603	423	168	48	352	2823
communications s.	16	0	162	3	5	0	6	3	927
construction s.	38	70	7	171	58	130	1	43	196
computer a.info. s.	6	78	43	69	33	95	15	19	660
royalties a.lic. fees	0	4	42	10	3	2	34	5	289
trade related s.	47	43	104	219	80	64	25	41	2155
op. leasing	0	29	17	68	27	44	22	21	70
legal services	0	0	4	2	0	1	38	0	96
accounting services	0	0	0	4	0	0	1	0	36
business services	0	1	18	5	9	5	0	67	307
advertising	0	1	23	21	28	17	2	49	353
r & d	5	71	47	39	0	229	35	14	930
architectural s.	20	26	102	645	56	94	2	104	615
agricultural services	3	0	10	3	0	3	49	0	0
other business s.	2	6	47	61	27	17	0	28	240
s. b.related enterpr.	7	60	201	103	49	77	13	25	831
personal services	0	3	0	1	10	0	33	11	75
							7		

Sources: OeNB, Statistics Austria.

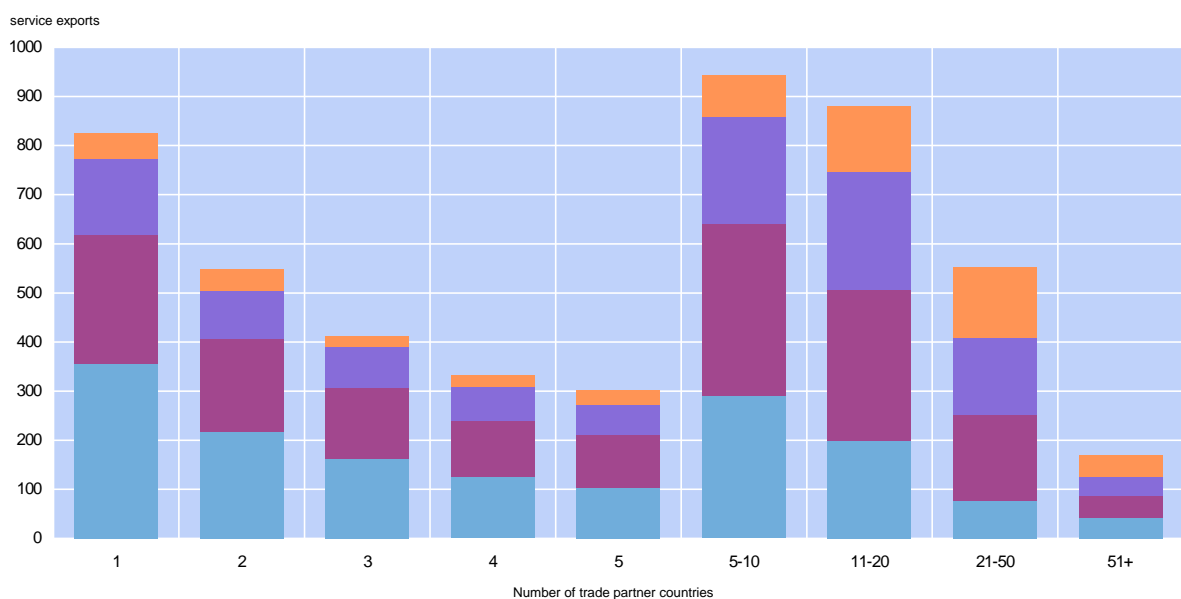


3.5 Range of Trade in Service

The number of countries with which a service importer or exporter has economic relations may serve as a simple approximation of the reach of trade in services at the firm level. It reveals that roughly every fifth respondent is in a service provider or user relationship with one single partner country, mostly a neighbouring country or a country located close by. Some two-thirds of service corporations that trade with a single partner country list Germany. Conversely, there are also atypical cases in which the single trade partner is located in a far-off country like the U.S.A., Canada, Indonesia or Uruguay. 29 companies are in touch with over 100 countries through trade in services. Typically network industries, communications service providers (telecommunications, postal and courier services), airlines, shipping companies and travel agencies, have such an extensive reach. A highly significant positive correlation exists with employment as the reach of trade in services is a function of company size (graph 5).

Graph 5

Range of Trade in Services by Number of Employees



Sources: OeNB, Statistics Austria.

■ < 10 employees
 ■ 10 - 49 employees
 ■ 50 - 249 employees
 ■ 250+ employees

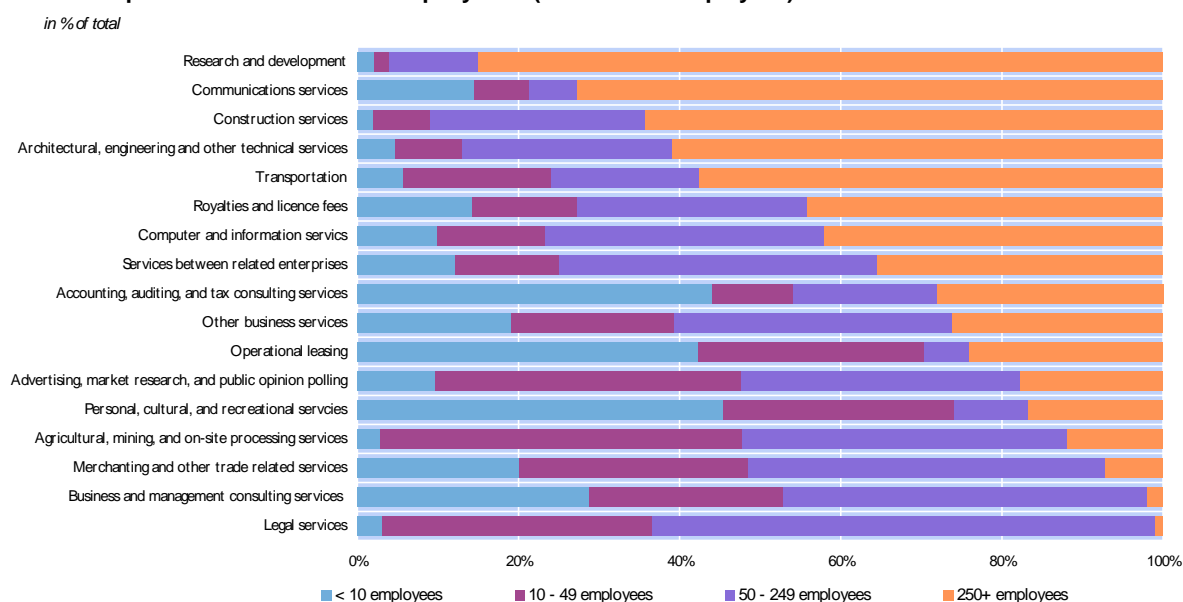
3.6 The Influence of Company Size on Service Exports

Data reveal that companies that export services are roughly ten times the size of the respective industry average. This fact is influenced by technical reasons as the survey of cross-border trade in services is organized as a sample using thresholds. But also for economic reasons, a company must apparently exceed a particular size to be able to engage systematically in service exports.

The distribution of exports of a particular service by company size shows that sophistication and innovation content of service exports correlate positively with company size (graph 6). This result corresponds to the average number of employees in the respective related industries. Exports of network services (communication, transport) are also provided mainly by large companies. Trade in knowledge-based services, though, is predominantly transacted by small and medium-sized enterprises. Trade-related services – above all merchanting – are exported primarily by small and very small enterprises.^{11 12}

Graph 6

Service Exports as a Function of Company Size (Number of Employees)



Sources: OeNB, Statistics Austria.

¹¹ Merchanting is defined as the purchase of a good by a resident trader from a non-resident with the subsequent resale of the good to another non-resident, whereby the good does not enter the country of the trader. These transactions may be considered as intermediate services, not involving any production activities, and can be carried out by only a few employees, often only the entrepreneur and his assistant.

¹² In addition to the question of how service exports correlate with company size, the question of how they correlate with company age is of interest. Typically, companies are expected to have been established domestically for a certain time to be able to develop internationalization resources, i.e. experience and know-how, for their move into markets abroad. For an explanation of internationalization theories, see Nowotny and Palme (2008). This analysis reveals a positive correlation between the export ratio and enterprise age.

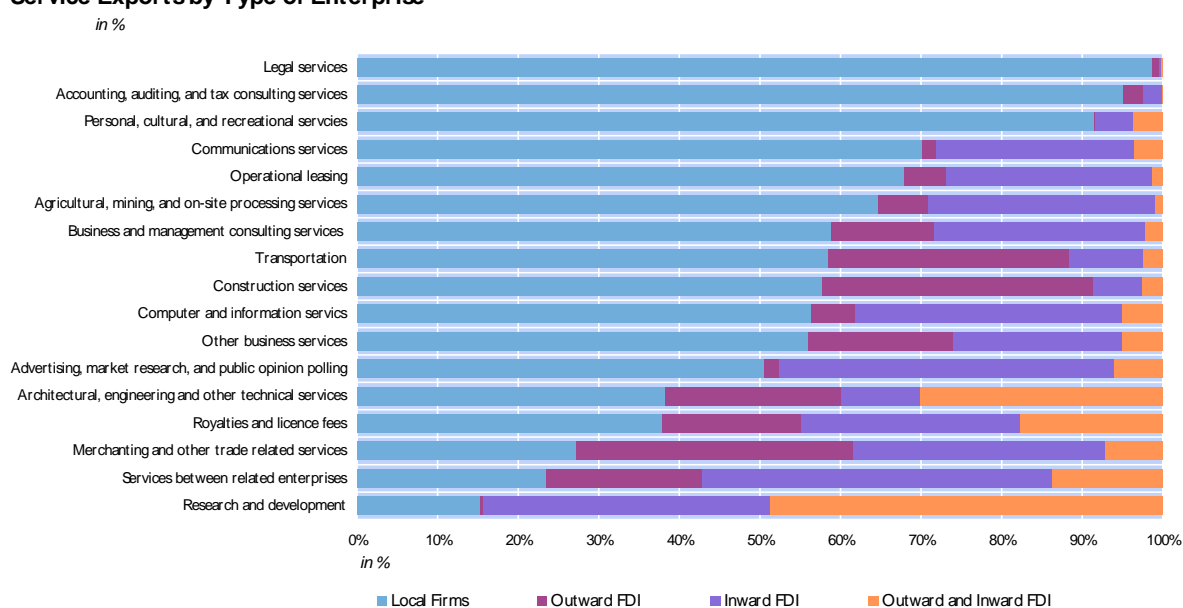
3.7 Links between Trade in Services and Group Activities

Beside goods and service trade and the granting of patents and licenses, companies can resort to a third important form of internationalization of production: cross-border FDI. Not until Austria joined the EU and Eastern Europe opened up did internationalization gather momentum. By the end of 2007, Austrian outward and inward FDI had grown to an estimated EUR 100 billion each.¹³ Bridgeheads – foreign-controlled resident investors that are part of a multinational group and that have subsidiaries abroad themselves – play a special role. Some 900 of 3,300 Austrian direct investments abroad are such regional headquarters.

The sample was divided into local companies and companies that are part of an international group. More than half of all Austrian service exports are attributable to companies with investment ties to a foreign group. These companies with inward or outward FDI generate over half the export revenue from research and development; architectural, engineering and other technical services; and merchanting and other trade-related services (graph 7). The share of royalty and license fee revenue is correspondingly high (34%). Particularly high, some 85%, is the share of foreign-controlled companies in export revenues of research and development services. Also over 50% of service import expenditures in Austria are attributable to companies with foreign group investments. Conversely, local firms predominate in exports of knowledge-based services, such as legal services; accounting, auditing and bookkeeping, and tax consulting services; and personal, cultural, and recreational services.¹⁴

Graph 7

Service Exports by Type of Enterprise



Sources: OeNB, Statistics Austria.

¹³ See Dell'mour (2008).

¹⁴ In this context, the criterion for an inward direct investment is direct foreign control of at least 50% of a company's capital. Therefore, the influence of activities of international groups on trade in services must be assumed to be even larger than the analysis showed, as it did not cover inward FDI from 10% to 50% or indirect FDI. Future analyses will be able to capture inward FDI more broadly.

3.8 Links between Exports of Services and Goods

Four-fifths of this analysis' basic population have no imports or exports. This corroborates the results of international research about the low participation of companies in external trade and is attributed to the prohibitively high transactions costs involved in external trade.¹⁵ This group is followed by the 6.8% segment of Austrian companies that perform goods exports and imports and by the 5.9% segment that has imports only, and finally by the segment of companies that exclusively exports goods (2.7%). Only then follows the group of firms that are engaged in both, trade in goods and services.

Overall, manufacturing enterprises that export goods and services account for approximately 40% of goods exports and 15% of service exports. Companies belonging to the ÖNACE division manufacture of radio, television and communication equipment and apparatus garner the highest share of service export revenues (about 4%), followed by manufacturers of chemicals, engineering companies, companies engaged in manufacturing metal products, companies that manufacture electrical machinery and apparatus, and enterprises in the motor vehicle manufacturing industry. The two industries with the largest shares of goods exports – engineering and motor vehicle manufacturing – have service export revenues that are far lower than their goods export revenues. Nevertheless, their service revenues are in the triple-digit millions. In line with the internationalization stages theory, we might assume that the most innovative manufacturing industries provide innovative services and logistics services along with goods exports at the outset, only to outsource these services to subsidiaries at a later stage (table 5).

Table 5

Export of Service Packages by Manufacturing Enterprises

Activity according to ÖNACE2003		leading service category
15–16	manufacture of food products, beverages and tobacco prod.	royalties and licence fees
17	manufacture of textiles	research and development
18	manufacture of wearing apparel	merchanting and other trade related services
19	manufacture of leather and related products	transportation
20	manufacture of wood and wood products	royalties and licence fees
21	manufacture of pulp and paper	merchanting and other trade related services
22	publishing, printing and reproduction of recorded media	advertising, market research, and public opinion polling
23–24	manufacture of coke, petroleum prod., nuclear fuel, chemicals et.al.	research and development
25	manufacture of rubber and plastic products	architectural, engineering, and other technical services
26	manufacture of other non-metall. min. prod.	advertising, market research, and public opinion polling

¹⁵ See Nordas (2008).

Table 5 (cont)

Export of Service Packages by Manufacturing Enterprises

		leading service category
Activity according to ÖNACE2003		
27	manufacture of basic metals	merchanting and other trade related services
28	manufacture of metal products	construction services
29	Manufacture of machinery and equipment n.e.c.	architectural, engineering, and other technical services
30	manufacture of office machinery a. computer	research and development
31	manufacture of elec. equipment	architectural, engineering, and other technical services
32	manufacture of radio, television, comm. equip.	research and development
33	manufacture of medical, precision. a. opt. instr.	architectural, engineering, and other technical services
34	manufacture of motor vehicles and trailers	research and development
35	manufacture of other transport equipment	architectural, engineering, and other technical services
36–37	Manufacturing n.e.c.	research and development

Sources: OeNB, Statistics Austria.

4. Regression Analysis

Based upon the sample of service exporters and importers in Austria, we performed an explorative step-by-step regression analysis to determine the influence of existing and potentially explanatory variables on the volume of service exports and imports, excluding merchanting. Industry affiliation was modelled by means of dummies and outward and inward direct investment relationships by means of dichotomous variables, too. Additionally, we tested the potential advantage of company headquarters in Vienna. Because the distribution is extremely skewed, the logarithm of the cardinally scaled variables was taken. The result of the analysis on the size of exports may explain one-third of the observed variance ($r^2_{\text{corr}}=0.3256$; $N=1516$):

- Both sales and employment have a significant positive impact on the service export volume with an elasticity of 0.24 and 0.34, respectively, which means that a 10% increase in employment raises service exports by 2.4% and a 10% boost in sales raises exports by 3.4%.
- If the company holds direct investments abroad, *ceteris paribus* this increases service exports by a factor of 1.8 (= $\exp(0.59)$). At least for services, direct investment abroad is a complement and not a substitute for exports.
- Being headquartered in Vienna has an effect of the same size. This could be interpreted as the specific advantage of a location with excellent traffic relations to

other economic centres as the supply of a broad range of services, especially consulting and technical services, requires exporters to cross borders.

- The strongest effect in terms of *industry affiliation* is displayed by the network industries transport and telecommunications, which is not surprising, since the provision of cross-border services is the proper function of many such enterprises. Other typical service exporters are enterprises classified under section K of ÖNACE 2003, for example research and development, advertising, management consulting, engineering services and holding companies. Enterprises in manufacturing with a comparatively low degree of technical sophistication, such as the food, the textiles and non-metallic mineral products industry have a negative correlation with service exports. Belonging to one of these branches reduces the size of service exports.

For service imports it was possible to explain a larger variance share ($r^2_{\text{corr}}=0.4271$; $N=1607$), but the coefficients cannot be interpreted as clearly: This may be caused by a certain degree of multicollinearity, but even between employment and turnover, which showed the maximum bivariate correlation, it amounts to only .787.¹⁶

- Employment has a lower explanatory power than sales, which dominate service imports with an elasticity of 0.668.
- Like a mirror image of service exports, foreign control, i.e. majority ownership by a non-resident in the reporting company, has a significantly positive effect on service imports and enlarges the volume 1.7-fold ($\exp(0.51)$); in this case, payment of management costs, royalties, license fees or purchases of intermediate inputs from affiliated enterprises may play a role. At the same time, outward FDI increases the expected amount of service imports; this may be explained by the bridgehead function of Austria for the activities of multinational groups, where local management holdings provide a number of services for their affiliates.
- The impact of being headquartered in Vienna is somewhat weaker, but again significantly positive. The coefficient of .332 implies that ceteris paribus being a resident of Austria's capital raises service imports by a factor of 1.39.
- The three significant industry dummies, which are influential for the volume of service imports, are the same as for service exports, namely, the network industries and other business services, which both have far larger than average import volumes (as they have export volumes) and the food industry, which has hardly any service imports.
- Finally, the regression model for service imports suggests a weak, but significant positive correlation with goods exports and a negative one with goods imports. At first sight, both relations lack a plausible theoretical foundation and therefore need further analysis. Overall, in order to check the robustness of the results of this explanatory analysis, the authors intend to repeat the regression exercise as soon as a new data-set becomes available.
- The three significant industry dummies, which seem to play a role for the volume of service imports, are the same as for service exports, namely, the network industries and other business services, which both have far larger than average import volumes (as they have export volumes) and the food industry, which has hardly any service imports.

¹⁶ Outliers seem to play a minor role; Standardised residuals range from -5 to +5; The biggest residuals come from reporters, who – contrary to expectations – do not import services at all.

Table 6

Regression Model for Service Exports

		Coefficient B	Standard error	T	Significance Level
Model	(constant)	1,673	0,326	5,131	0,000
	LNEMP	0,241	0,052	4,622	0,000
	LNUMS	0,336	0,046	7,230	0,000
Direct investor	Outward FDI	0,590	0,144	4,089	0,000
Headquartered in Vienna	DVienna	0,592	0,108	5,470	0,000
I – Transportation, storage and communication	DUMBR18	1,875	0,170	11,005	0,000
K – Real estate, renting and business activities	DUMBR20	1,323	0,155	8,538	0,000
DA – Manufacture of food products, beverages and tobacco	DUMBR3	-2,122	0,318	-6,681	0,000
F – construction	DUMBR15	0,548	0,221	2,483	0,013
DB – manufacture of textiles and textile products	DUMBR4	-1,651	0,384	-4,301	0,000
DI – manufacture of other nonmetallic mineral products	DUMBR8	-1,074	0,329	-3,262	0,001
G – wholesale and retail trade; repair of motor vehicles, motorcycles a. personal a. household goods	DUMBR16	-0,445	0,147	-3,016	0,003
DJ – manufacture of basic metals and fabricated metal products	DUMBR9	-0,527	0,237	-2,224	0,026

The variables goods exports, foreign control and other industry dummies have been left out of account because of their insignificance.

Source: OeNB.

Table 7
Regression Model for Service Imports

		Coefficient B	Standard error	T	Significance Level
Model	(constant)	-1,113	0,296	-3,760	0,000
	LNEMP	0,067	0,040	1,665	0,096
	LNUMS	0,668	0,044	15,289	0,000
Located in Vienna	DVienna	0,332	0,094	3,548	0,000
Foreign control	FC	0,510	0,092	5,531	0,000
I – Transportation, storage and communication	DUMBR18	2,018	0,178	11,365	0,000
K – Real estate, renting and business activities	DUMBR20	0,529	0,139	3,806	0,000
DA – Manufacture of food products, beverages and tobacco	DUMBR3	-0,586	0,201	-2,909	0,004
Direct investor	Outward FDI	0,295	0,123	2,402	0,016
Goods exports	LNKG	0,053	0,018	2,963	0,003
Goods imports	LNMG	-0,047	0,023	-2,030	0,043

Source: OeNB.

All remaining industry dummies have been left out of account because of their insignificance.

5. Conclusions

Results of this analysis were highly welcomed in Austria, by both, politicians as well as researchers. As it were, it was a contribution for closing down a gap which had persisted so far within the country's statistical landscape regarding the determinants of trade in services. It would now be of high interest to analyze other, comparable small and open economies for the purpose of comparing countries and come to common conclusions. Combining balance of payments with business and register data is a practicable way for doing so.

In Austria, direct reporting of trade in services was introduced in 2006. Since then, data have allowed for a company analysis to identify the determinants of the developments observable in the balance of payments. The analysis takes account of the structural business survey (SBS), which is limited to registered companies, complemented by information from the OeNB's company database. These data combined provided information about some 138,300 firms in 2006, including information about the location of the company headquarters, the year of establishment, the industry in which the company operates as classified in ÖNACE 2003, employment and sales, goods exports and imports, and inward and outward FDI. A sample using thresholds of just under 5,000 companies was then taken from this "basic population". The sample covers nonfinancial enterprises that export services, import services, or do both. The trade in services data are from the 2006 survey on cross-border trade in services.

The analysis suggests that only a small group of Austrian companies exclusively exports or exclusively imports services. There is a strong correlation between trade in goods and services, which matches the corresponding content of goods and services, e.g. providing transport, assembly, repair and maintenance, planning and training services.

The analysis also provides evidence that the supply of services to Austria and the demand for services from abroad is very unevenly distributed and is concentrated on a small number of enterprises, above all service providers such as shipping companies and travel agencies, transport and trade companies, holding companies, management consultancies and advertising companies as well as computer and related companies.

Manufacturing companies – manufacturers of machinery and equipment and of radio, television and communication equipment and apparatus – also export and import services. Thus, outside of the inherent external trade orientation that applies to network industries, trade in services is dependent on a high degree of technical and knowledge content.

The strong concentration of trade in services on a small number of enterprises also relates to company size. Foremost export of construction, transport, communications, research and development and architectural and engineering services is a function of the number of employees. Conversely, external trade in knowledge-based services is focused on SMEs. Consequently, company structure appears to be a key criterion for the degree of technical sophistication of service exports and for the country's positive or negative competitive position.

Companies with inward or outward FDI account for more than half of Austria's cross-border trade in services. In particular research and development services and cross-border payments of royalties and license fees are linked to group activities.

The analysis was also able to identify various regional specializations in Austria's service trade and indicates that service trade relations are still influenced by proximity.

Statistical Annex

Annex Table 1

Employees, Turnover, Exports and Imports of Goods and Services according to ÖNACE 2003

activity according to ÖNACE 2003	Employees	Turnover	Export of goods	Import of goods	Export of services	Import of services
	2006					
	EUR million					
A–C	1.947	1.344	265	137	21	77
D 15–16	20.439	6.348	1.715	1.265	31	106
17	7.098	1.203	819	458	15	25
18	3.837	532	519	380	2	24
19	2.116	511	397	383	2	22
20	10.627	3.263	2.008	732	68	99
21	10.178	3.977	2.514	794	73	108
22	7.768	2.264	872	330	77	527
23–24	19.522	14.077	5.290	6.221	438	454
25	11.291	2.945	1.895	1.196	122	52
26	17.249	3.253	1.673	607	88	75
27	23.367	9.605	5.689	3.155	20	174
28	21.209	4.973	2.666	1.250	317	205
29	42.888	10.886	7.044	2.941	389	396
30	457	124	73	37	7	9
31	16.918	4.073	2.857	1.529	283	196
32	22.467	6.172	2.940	2.398	879	562
33	4.846	763	590	168	38	26
34	22.976	10.741	6.186	5.440	221	205
35	9.941	2.454	1.499	603	55	60
36–37	12.993	2.766	1.460	770	58	68
E	18.578	10.847	698	2.437	655	104
F	43.407	8.191	188	194	669	281
G 50	11.738	8.941	870	5.151	159	50
51	41.371	54.335	6.280	10.966	2.902	1.962
52	98.499	17.394	496	2.812	120	258

Annex Table 1 (cont)

**Employees, Turnover, Exports and Imports of Goods and Services according to
ÖNACE 2003**

activity according to ÖNACE 2003		Employees	Turnover	Export of goods	Import of goods	Export of services	Import of services
		2006					
		EUR million					
H	hotels and restaurants	8.901	769	1	36	11	45
I	60 land transport and pipeline transport	42.744	7.355	194	350	1.724	968
	61 water transport	173	92	11	2	25	6
	62 air transport	9.057	3.245	832	891	1.750	1.261
	63 supporting transport activities; travel agency services	45.888	14.963	21	60	4.261	3.525
	64 postal and telecommunications services	47.722	10.699	6	170	893	892
J	67 financial services and insurance activities	1.584	671	0	1	149	84
K	70 real estate activities	3.951	1.747	7	5	62	59
	71 renting of machinery and equipment without operators	2.472	2.434	156	158	227	59
	72 computer-related activities	16.186	3.265	67	66	637	300
	73 research and development	2.274	207	5	11	228	91
	7411 legal activities	1.936	305	0	0	98	19
	7412 accounting/auditing activities, tax consultancy	1.772	272	0	0	34	12
	7413 market research and public opinion polling	545	78	0	1	25	12
	7414 business and management consulting, incl. public relations consultancy	3.726	792	15	9	375	185
	7415 management activities of holding companies	5.729	2.539	400	277	712	493
	7420 architectural and engineering activities	7.397	1.482	434	82	756	243
	7430 technical testing and analysis	880	109	1	2	42	10
	7440 advertising	4.044	1.987	2	6	220	171
	7450 labor recruitment and provision of personnel	14.803	637	0	4	46	25
	7460 investigation and security activities	3.476	105	0	0	2	2
	7470 building and industrial cleaning activities	10.117	274	1	1	8	4
	7480 miscellaneous business activities	4.426	1.215	81	52	375	250
M–O	education; health and social work activities; other community, social and personal services	30.585	3.059	34	51	175	280
Total		774.115	250.283	59.771	54.589	20.544	15.121

Note: only enterprises with entry at the record office.

Source: OeNB, Statistics Austria.

Annex Table 2

Exports and Imports of Services by Type of Direct Investment Enterprise

Services according to balance of payments	Firms with							
	Local enterprises		Outward FDI		Inward FDI		Outward and inward FDI	
	export	import	export	import	export	import	export	import
	2006							
EUR million								
Transportation services								
sea transport, passenger	11	9	0	0	0	0	0	0
sea transport, freight	124	318	20	22	239	398	45	52
other sea transport	7	9	0	0	11	36	0	0
air transport, passenger	344	368	1.318	409	25	125	2	55
air transport, freight	65	100	140	166	72	44	25	25
other air transport	191	108	134	365	0	21	0	0
rail transport, passenger	101	96	0	0	0	0	0	0
rail transport, freight	393	495	420	530	25	30	0	15
other rail transport	18	16	1	11	5	6	0	0
road transport, passenger	27	8	0	0	1	1	0	0
road transport, freight	2.739	2.027	339	276	98	206	121	205
other road transport	421	44	4	5	4	4	0	0
inland waterway transport, passenger	34	14	0	0	0	0	0	0
inland waterway transport, freight	32	61	0	23	3	2	0	0
other inland waterway transport	5	1	0	0	0	0	0	0
pipeline transport and electricity transmission	148	35	7	2	231	0	0	0
other services of transport	11	7	0	44	23	1	0	1
Communications services								
telecommunication services	526	500	19	14	176	154	39	1
postal services	197	97	0	0	3	10	0	0
courier services	59	50	0	0	96	51	0	0
Construction services								
construction services abroad	419	132	245	7	43	44	19	24
construction services in Austria	2	142	0	162	0	50	0	11
Computer and information services								
computer services	459	220	56	30	319	299	52	29
information agency services	2	7	0	0	11	37	0	0
other information provision services	120	73	0	2	11	5	0	1
Royalties and license fees								
franchises and similar rights	2	7	9	0	1	2	0	3
other royalties and license fees	138	314	55	22	99	603	65	58

Annex Table 2 (cont)

Exports and Imports of Services by Type of Direct Investment Enterprise

Services according to balance of payments			Firms with					
	Local enterprises		Outward FDI		Inward FDI		Outward and inward FDI	
	export	import	export	import	export	import	export	import
	2006							
EUR million								
Other business services								
merchandising	593	0	759	0	733	0	192	0
other trade-related services	159	205	194	83	133	89	4	38
operational leasing	212	73	16	16	80	27	4	10
legal services	101	45	1	28	0	14	0	8
accounting, auditing, bookkeeping and tax consulting services	39	20	1	7	1	7	0	3
business and manage- ment consulting and public relations services	242	159	53	38	107	118	9	22
advertising, market research and public opinion polling	264	216	10	270	218	169	31	60
research and development services	203	37	4	16	477	114	649	81
architectural, engineering and other technical services	654	298	372	131	169	60	513	123
waste treatment and depollution; agricultural, mining and other on-site processing services	13	44	1	1	6	14	0	2
other business services	241	274	77	74	90	83	22	335
services between affiliated enterprises	322	286	263	68	594	525	188	432
Personal, cultural and recreational services								
audio-visual and related services	59	80	0	0	2	14	4	1
education services	6	16	0	3	1	8	0	3
health services	14	1	0	0	2	0	0	0
other personal, cultural and recreational services	18	18	0	0	0	0	0	0
Services, total	9.735	7.030	4.518	2.825	4.109	3.371	1.984	1.598

Source: OeNB, Statistics Austria.

Annex Table 3

Exports and Imports of Services in Connection with Trade in Goods

Services according to balance of payments	Enterprises			
	Exporting goods		Importing goods	
	Export of services	Import of services	Export of services	Import of services
	2006			
	EUR million			
Transportation services				
sea transport, passenger	3	0	3	3
sea transport, freight	257	383	291	429
other sea transport	1	5	7	12
air transport, passenger	1.372	422	1.530	608
air transport, freight	241	244	275	304
other air transport	296	413	322	473
rail transport, passengers	101	96	101	96
rail transport, freight	505	681	555	850
other rail transport	6	20	6	22
road transport, passengers	5	3	4	3
road transport, freight	2.511	2.152	2.657	2.314
other road transport	11	18	415	38
inland waterway transport, passengers	0	0	24	12
inland waterway transport, freight	21	68	11	60
other inland waterway transport	0	1	1	0
pipeline transport and electricity transmission	43	4	343	37
other services of transport	1	45	3	46
Communications services				
telecommunication services	658	566	730	628
postal services	200	107	200	107
courier services	121	86	154	100
Construction services				
construction services abroad	641	151	671	159
construction services in Austria	1	293	2	343
Computer and information services				
computer services	593	420	614	471
information agency services	0	2	13	43
other information provision services	2	7	121	76
Royalties and license fees				
franchises and similar rights	11	9	11	10
other royalties and license fees	250	824	268	918
Other business services				
merchanted	1.561	0	1.740	0
other trade-related services	355	358	408	372
operational leasing	267	104	248	109
legal services	29	58	38	60
accounting, auditing, bookkeeping and tax consulting services	3	17	14	30
business and management consulting and public relations services	108	159	236	231
advertising, market research and public opinion polling	266	570	362	623
research and development services	1.278	237	1.311	241
architectural, engineering and other technical services	1.491	545	1.561	572
waste treatment and depollution; agricultural, mining and other on-site processing services	20	57	13	57
other business services	254	641	300	667
services between affiliated enterprises	1.025	1.120	1.120	1.213

Annex Table 3 (cont)

Exports and Imports of Services in Connection with Trade in Goods

Services according to balance of payments	Enterprises			
	Exporting goods		Importing goods	
	Export of services	Import of services	Export of services	Import of services
	2006			
	EUR million			
Personal, cultural and recreational services				
audio-visual and related services	7	35	13	62
education services	1	23	4	26
health services	14	1	13	2
other personal, cultural and recreational services	2	1	12	8
Services, total	14.532	10.946	16.725	12.435

Source: OeNB, Statistics Austria.

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