

Economic Assessment of the Barriers to the Internal Market for Services

Final report

January 2005

COPENHAGEN ECONOMICS

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Preface

This is the final report of the study “Economic Assessment of the Barriers to the Internal Market for Services”. Our initial analysis report was presented to the European Commission at a meeting in Brussels in February 2004. The draft final report was subsequently presented to the Commission in October 2004. We gratefully acknowledge the many useful comments we have received throughout the study.

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Executive summary

Services account for almost 70% of GNP and jobs in the EU, but the full economic potential of the service sectors is currently hampered by many Internal Market barriers. Examples of barriers to service provision are abundant. Service providers wishing to establish themselves in other Member States may face restrictive authorisation schemes and other disproportionate, possibly even discriminatory, requirements. Similarly, cross-border provision of services is sometimes hindered by obligations and administrative burdens imposed by national and local regulations.

With the purpose of eliminating such barriers, the Commission recently presented a proposal for a Directive on services in the Internal Market (hereafter the Services Directive). The Services Directive covers a wide range of services provided to both consumers and businesses in all 25 Member States. Examples of the services covered include pure business services (e.g. management consultancy and recruitment services), services provided to both business and consumers (e.g. legal advice and distributive trades), and pure consumer services (e.g. leisure services and some health care services).

This report presents the economy-wide effects of reducing barriers according to the Services Directive. The analysis is based on an analytical framework that explicitly links legal changes to economy-wide effects. The framework relies on detailed barrier data, a dataset containing more than 275 000 firms in the EU, and a sophisticated simulation model. The analysis includes approximately 2/3 of the economic activity covered by the Services Directive, and may therefore underestimate its economic effects.

Reducing barriers to service provision intensifies competition and forces firms to cut prices to the benefit of consumers, governments, and businesses both within and outside the service sectors. Barrier reductions also reduce costs and increase productivity, because barriers waste real resources. The economic effects are thus caused by both stronger competition and reduced costs in the EU services sectors.

The calculations show that the proposed Services Directive will yield significant economic gains to all Member States. European consumers, businesses and governments will benefit from enhanced productivity, higher employment, increased wages and lower prices. Total consumption in the European Union will increase by approximately 0.6 percent, or €37 billion. The economic gains can be traced back to the sectors covered by the Services Directive.

Prices of services will fall in the covered sectors. Stronger competition will reduce artificially inflated prices and less waste of resources will lead to lower costs of services provision. This will benefit both consumers and firms using the covered services as inputs. Productivity gains enable the creation of higher value added and provide a strong stimulus to the EU economy.

Output will rise in all sectors of the EU economy. Output and value added will increase across all sectors, and services and goods markets will expand considerably. In monetary terms, total value added in the service sectors will increase by approximately €33 billion. The increase in economic activity will spur the creation of new jobs.

New jobs will be created in all Member States. Total employment will rise, but productivity improvements and reallocation of labour mean that employment will fall in some sectors. Job creation is most intense in those sectors where barriers are reduced the most. Net employment may increase by up to 600 000 jobs across the European Union. Consumers will also benefit from higher wages, while businesses will experience increased opportunities in the Internal Market as international expansion becomes less costly.

Trade in services will intensify. The Internal Market will become more integrated as a result of increased trade in services. Both cross-border trade and foreign commercial establishments will increase. This will lead to improved availability of different service varieties and promote competition in the Internal Market.

The thorough approach leads to the conclusive result that reductions in barriers consistently yield economic gains. Moreover, larger barrier reductions lead to larger gains. This should be taken into account when drafting regulatory reforms that aim to strengthen the European Union economy.

Chapter 1 Introduction and summary

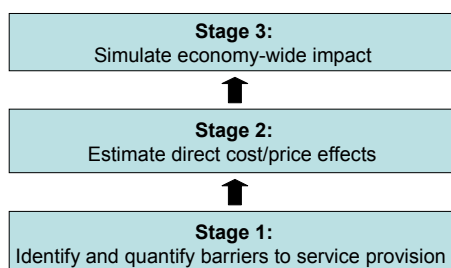
The objective of this report is to evaluate the economic impacts of reducing barriers to service provision in the Internal Market. Services account for almost 70% of GNP and jobs in the EU, but the full economic potential of the service sectors is currently hampered by many Internal Market barriers. Examples of barriers to service provision are abundant. Service providers wishing to establish themselves in other Member States may face restrictive authorisation schemes and other disproportionate, possibly even discriminatory, requirements. Similarly, cross-border provision of services is sometimes hindered by obligations and administrative burdens imposed by national and local regulations.

With the purpose of eliminating such barriers, the Commission recently presented a proposal for a Directive on services in the Internal Market (hereafter the Services Directive). The Services Directive covers a wide range of services provided to both consumers and businesses in all 25 Member States. Examples of the services covered include pure business services (e.g. management consultancy and recruitment services), services provided to both business and consumers (e.g. legal advice and distributive trades), and pure consumer services (e.g. leisure services and some health care services).

We find that reductions in barriers to service provision according to the proposed Services Directive yield significant economic gains to all Member States. European consumers, firms and governments will benefit from enhanced productivity, higher employment, increased wages and lower prices.

The economic gains are caused by reduced costs and stronger competition. Barrier reductions lower the costs of service provision, because barriers to service provision waste real resources. Removing barriers to service provision also intensifies competition and forces firms to reduce prices. The economic analysis of these processes is based on a detailed bottom-up approach that explicitly links legal changes to economy-wide effects. The analytical framework consists of three stages, as illustrated in Figure 1-1.

Figure 1-1: Three stages in the analysis of barriers to service provision



Source: Copenhagen Economics.

The first stage of our analysis is a detailed assessment of current barriers. The assessment is based on a comprehensive set of objective and detailed questions regarding restrictions on service provision in the Internal Market. The questions are organized in more than 40 sub-categories. We use index methodology to transform this qualitative information about specific restrictions into a quantitative measure called the IMRIS (Internal Market Restrictiveness Index in Services). Barriers are different for domestic firms and for foreign firms. Therefore, we calculate a Domestic IMRIS and a Foreign IMRIS that measure barriers for domestic firms and foreign firms, respectively. Our detailed bottom-up construction of indices of barriers to service provision enables us to evaluate how changes in specific restrictions on a very detailed level will affect the overall barriers. All legal changes that have an impact on the IMRIS indices are included in the analysis, since we specifically create a new set of Domestic and Foreign IMRIS indices to capture the legal changes implied by the Directive.

In the second stage, we use a dataset with more than 275 000 firms from 19 Member States to econometrically estimate the impact of barriers to service provision on prices and costs. Barriers affect prices in two ways. First, some barriers serve to protect incumbent service providers. This reduces competition and enables firms to inflate prices above costs. Such barriers are called rent-creating barriers. Second, some barriers cause real costs for service providers (for example by requiring excessive paperwork) and are called cost-creating barriers. We estimate both the rent-creating and the cost-creating impacts of barriers to service provision. We translate these impacts into tariff equivalents. The tariff equivalents can be thought of as hypothetical taxes that are computed to create economic effects that are equivalent to the economic effects of the actual barriers as measured by the IMRIS indices.

In the third stage, we use the estimates of the tariff equivalents to compute the economy-wide impact of the barriers in the CETM model (Copenhagen Economics Trade Model). The CETM model is a global, multi-regional computable general equilibrium model. The model captures all linkages between the different sectors of the economy, allowing for an economy-wide assessment of barriers to service provision. This is important, because reductions in barriers to service provision will reduce the prices of services, which creates many knock-on effects in other sectors.

In the following sections, we provide a summary of the key elements of the analytical framework. We first explain the analysis of the economy-wide impacts and then describe how we have measured and analysed barriers to service provision.

1.1. The economy-wide impact of removing barriers to services trade

This section describes our analysis of the economy-wide impact of barriers to service provision. First, we present the policy scenarios that we have analysed. We then show how a reduction in barriers will affect the European Union economy. Finally, we describe the model used to simulate the economy-wide impacts. A complete documentation of the model analysis is provided in Chapter 2.

Scenarios

The scenario analysis is based on the proposed Services Directive, which establishes the principles of freedom of establishment for service providers and the free movement of services (European Commission, 2004a). The Services Directive covers a wide range of services provided to both consumers and businesses. Examples of the services covered include pure business services (e.g. management consultancy and recruitment services), services provided to both business and consumers (e.g. legal advice and distributive trades), and pure consumer services (e.g. leisure services and some health services).

We formulate two scenarios based on the Services Directive, cf. table 1-1. In the *Direct policy impact scenario*, we analyse the situation that will emerge when all Member States have implemented the Directive. We specifically create a new set of IMRIS indices to capture the legal changes implied by the Directive.

Table 1-1: Analysed scenarios

	Benchmark scenario	Direct policy impact scenario	Extended impact scenario
Barrier estimates	Current	Updated to reflect the Directive	Updated to reflect the Directive
Different <i>de facto</i> barriers for domestic and foreign firms	Yes	Yes	No

Note: Appendix A also reports results from two hypothetical scenarios that include construction services.
Source: Copenhagen Economics.

Regarding establishment, the Directive will simplify the formalities required for establishment of new service providers. Firms will be able to complete all administrative procedures at a “single point of contact” using electronic procedures, and many legal requirements are either prohibited or subject to evaluation in order to eliminate unjustified requirements.

Regarding the free movement of services, firms will be able to provide services in any Member State and only be subject to the regulations of the country in which the firm is established. Furthermore, customers shall have the right to use services from other Member States and not be subject to any discrimination.

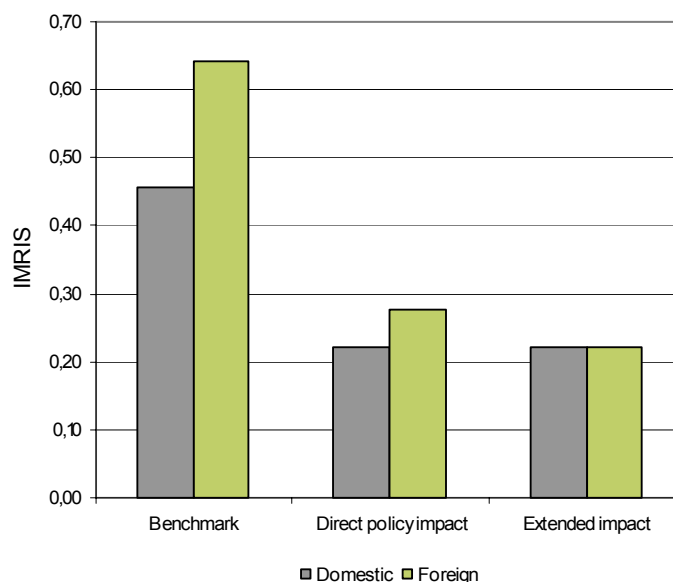
Even though the Services Directive will eliminate all legally discriminating restrictions, foreign firms may still face higher *de facto* barriers to service provision than domestic firms. This is not because foreign firms face outright discrimination, but simply because the rules and regulations in foreign Member States are different from the rules and regulations in their home country. Regulatory disparities and non-legal barriers necessarily give rise to additional *ex ante* costs even in the case when domestic and foreign firms – legally – are on equal terms.

Our barrier measures reflect *de facto* discrimination, as opposed to only legal discrimination, and foreign firms may face higher barriers than domestic firms for a number of reasons. First, there may be outright legal discrimination. Second, some regulations are more restrictive for foreign firms than for domestic firms. Third, regulatory disparities between Member States create barriers to foreign or cross-border operations. Fourth, non-legal barriers like for example language and local business practices affect only foreign firms. Regulatory reforms that only remove legal discrimination, for example the Services Directive, will therefore not equalize all barriers faced by domestic and foreign firms in a country.

In the *Extended impact scenario*, we assume that Internal Market integration is so complete that foreign firms will face the same *de facto* barriers as the barriers faced by domestic firms after the Directive has been implemented. The scenario consequently assumes that regulatory disparities and non-legal barriers no longer restrict foreign service providers. The policy interpretation is quite substantial, because significant harmonisation and adaptation must occur before regulation creates identical *de facto* barriers for both domestic and foreign firms. The extended impacts can therefore be thought of as reflecting some of the more qualitative and long run effects of the Directive on the Internal Market.

To provide an example of the policy impacts of the two scenarios, the effects on barriers to establishment in the regulated professions sector of Belgium are illustrated in Figure 1-2. The figure shows that the biggest policy impact is to be found in the direct policy impact scenario, which reflects the effects of the Directive. The extended impact scenario differs only in that all domestic and foreign firms in a country are assumed to face the same barriers. The policy impact of the scenarios is similar across all sectors, countries and types of barriers. The complete sets of corresponding tariff equivalents are provided in Appendix C.

Figure 1-2: The size of the IMRIS indices in the policy scenarios



Note: The figure shows IMRIS scores for barriers to establishment in the regulated professions sector in Belgium.
Source: Copenhagen Economics.

We estimate that on average, the Directive will reduce current barriers to service provision by more than 50 percent. The reductions are largest for regulated professions (accountancy) and smallest for business services (IT-services).

Both scenarios include three service sectors: regulated professions (modelled with barriers as for accountancy services), distributive trade (with barriers as for retail and wholesale trade), and business services (with barriers as for IT-services). This is the most detailed level of disaggregation possible, considering the rudimentary state of services trade statistics. The three service sectors in the analysis account for roughly 25 percent of total value added in EU or approximately 2/3 of the scope of the Service Directive. It is primarily construction services, leisure services, some health services and some educational services that are omitted from the scenario analysis. The analysis may consequently underestimate the economic impact of the Services Directive.

Results

Reducing barriers to service provision in the Internal Market will result in significant benefits to consumers and firms in all Member States. Our analysis leads to the following conclusions:

The Services Directive will yield significant economic gains. European consumers, firms and governments will benefit from enhanced productivity, higher employment and increased wages. The total welfare gain (measured as comprehensive consumption) for the European Union is approximately 0.6 percent and welfare will increase in all Member States. This corresponds to a money equivalent of €37 billion. The welfare gains increase to approximately

0.7 percent in the extended impact scenario. In both cases, the economic gains are explained by the impacts of stronger competition and reduced costs in the EU service sectors.

Prices of services will fall in the sectors covered by the Directive. Stronger competition will reduce artificially inflated prices and less waste of resources will lead to lower costs of services provision. This will benefit both consumers and firms using the covered services as inputs. Productivity gains enable the creation of higher value added and provide a strong stimulus to the EU economy.

Output will rise in all sectors of the EU economy. Output and value added will increase across all sectors, and services and goods markets will expand considerably. In monetary terms, total value added in the service sectors will increase by approximately €33 billion. The increase in economic activity will spur the creation of new jobs.

New jobs will be created in all Member States. Total employment will rise, but productivity improvements and reallocation of labour mean that employment will fall in some sectors. Job creation is most intense in those sectors where barriers are reduced the most. Net employment may increase by up to 600 000 jobs across the European Union. Consumers will also benefit from higher wages, while businesses will experience increased opportunities in the Internal Market as international expansion becomes less costly.

Trade in services will intensify. The Internal Market will become more integrated as a result of increased trade in services. Service provision through both cross-border trade and foreign commercial establishments will increase. This will lead to improved availability of different service varieties and promote competition in the Internal Market.

Table 1-2 summarizes the aggregate effects of the two scenarios for the European Union as a whole. It should be emphasized that the economic benefits of the Services Directive apply to both consumers and businesses. Consumers will experience lower prices, more service varieties, higher wages and increased employment. Businesses will have the benefits of expanded markets, increased productivity and higher value added.

Table 1-2: Economy-wide effects of the Services Directive for the European Union

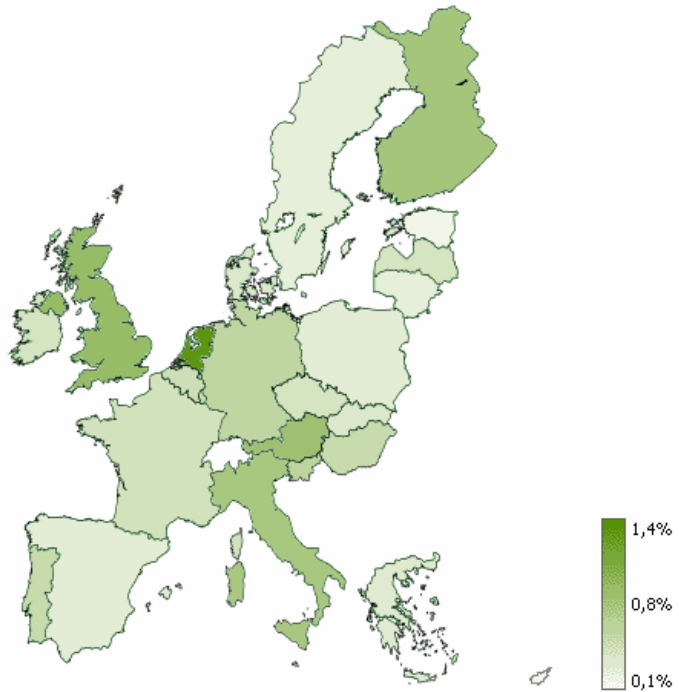
	Direct policy impact scenario	Extended impact scenario
Welfare	0.6 %	0.7 %
Real wages	0.4 %	0.4 %
Employment	0.3 %	0.3 %

Note: All results are reported as percentage changes from the benchmark. Welfare is measured as comprehensive consumption.

Source: CETM model - Copenhagen Economics.

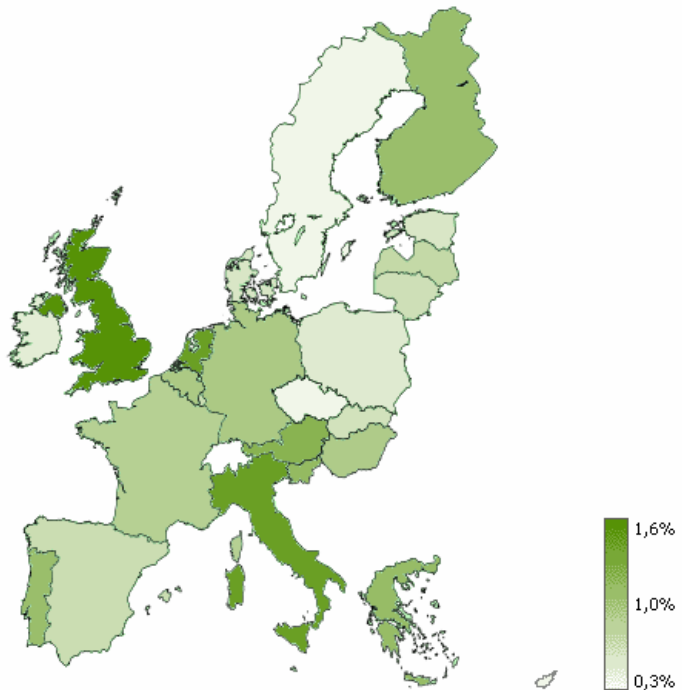
The distribution of the overall welfare gains (measured as comprehensive consumption) across Member States is illustrated in Figure 1-3 on the following page. Member States with a darker green colouring experience larger gains than Member States with a lighter green colouring. For comparison, Figure 1-4 shows the distribution of value added gains in the service sectors. The two figures show that countries with relatively higher value added gains in the service sectors also experience relatively higher overall welfare gains. In short, there is a strong connection between service sector gains and total welfare gains. This illustrates the importance of the economy-wide spill-over effects of reducing barriers to service provision.

Figure 1-3: Distribution of total welfare gains



Note: A darker green colouring reflects larger welfare gains. Welfare is measured as comprehensive consumption.
Source: CETM model – Copenhagen Economics.

Figure 1-4: Distribution of value added gains in the service sectors



Note: A darker green colouring reflects larger value added gains.
Source: CETM model – Copenhagen Economics.

The economic gains from reductions in the barriers to service provision are caused by an interaction between *direct effects* on the prices and costs of service provision and *indirect effects* in other sectors of the economy.

The *direct effect* is caused by reductions in two types of barriers; rent-creating and cost-creating barriers. Both rent- and cost-creating barriers lead to higher prices on services.

First, rent-creating barriers are restrictions that reduce competition between service providers, for example requirements that firms must be owned or controlled by local professionals. This provides protection for incumbent providers. Rent-creating barriers thus inflate prices above costs and generate excessive profits to incumbent firms.

Second, cost-creating barriers increase the use of real resources. For example, it may require extra labour to overcome a given barrier. Removal of this type of barrier improves productivity in the sense that more output can be produced with the same amount of inputs.

A reduction of barriers to service provision will also create important *indirect effects* on other sectors. The indirect effects arise in two ways:

First, services are important inputs to other sectors. Reductions in barriers to service provision will lower the prices of services and thereby stimulate both the demand for services and overall demand in the economy. Stimulation of the overall demand leads to higher production and higher employment in industrial sectors. Production and employment changes in industrial sectors also generate feed-back effects on the service sectors, as increased demand for service inputs lead to additional production and employment effects in the service sectors.

Second, the service sectors and the other sectors of the economy compete for the limited resources labour and capital. Higher productivity in the service sectors leads to higher real wages in these sectors, which will shift employment from other sectors to the service sectors. Some of the indirect effects will therefore emerge through the markets for labour and capital.

Model

We use the Copenhagen Economics Trade Model (CETM) to calculate the economy-wide effects of reducing barriers to service provision. The CETM model is a global, multi-regional general equilibrium model. The model explicitly represents all 25 Member States¹. The model captures all linkages between the different sectors of the economy and it therefore allows for an economy-wide assessment of barriers to service provision. Specifically, the model captures both the *direct* effects on service providers and the *indirect* effects on their suppliers and customers. The model, therefore, captures the important backward and forward linkages both among firms and among firms and final consumers (households and governments).

The simulations of the economy-wide effects are based on tariff equivalents. The tariff equivalents can be thought of as hypothetical taxes that are computed to create economic effects that are equivalent to the economic effects of the actual barriers as measured by the IMRIS indices. The values of the tariff equivalents are determined in Stage 2 as explained below.

1.2. The impact of barriers on firm performance

In Stage 2 of our analysis, we estimate how barriers affect the costs and prices of service provision. The overall objective of this stage of the analysis is to translate the information found in the detailed IMRIS indices into tariff equivalents that can be incorporated in the general

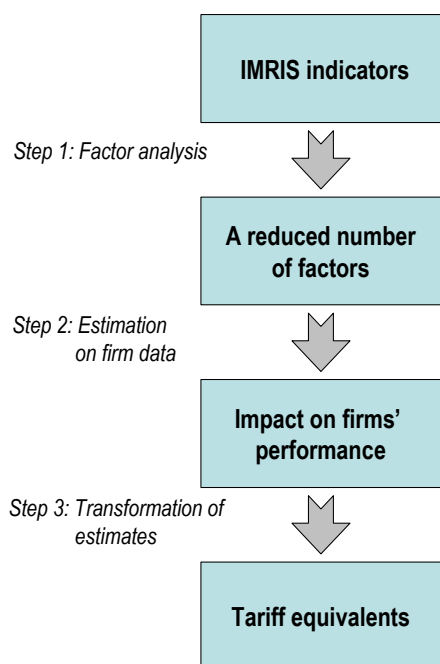
¹ We use an unweighted average of the existing tariff equivalents for the Member States where we do not have separate estimates (primarily for Ireland, Luxembourg and Lithuania).

equilibrium model. The tariff equivalents can be thought of as hypothetical taxes that are computed to create economic effects that are equivalent to the economic effects of the actual barriers as measured by the IMRIS indices. In the following, we explain our estimation strategy and present the main results. The econometric estimates of Stage 2 are described in detail in Chapter 3.

Estimation strategy

We use a thorough econometric analysis to estimate the direct impact of barriers to service provision and based on a comprehensive data set covering more than 275 000 firms. This is by far the most complete study of the impact of barriers to services trade to date. Our estimation strategy consists of three steps, as illustrated in Figure 1-5.

Figure 1-5: Illustration of the estimation strategy



Source: Copenhagen Economics.

Our direct measures of barriers to service provision consist of seven indices per sector, corresponding to seven stages in the value chain of service providers. The indices are derived from qualitative information being fed into a questionnaire with seven categories, and are prone to overlapping questions. Specific answers could be highly interlinked throughout the seven categories, or even be the same for some categories. Links of this type can affect the econometric results significantly, because collinearity among explanatory variables makes it difficult to identify the impact from individual variables. The first step in our estimation strategy is, therefore, to use the statistical method factor analysis, which seeks to explain high-dimensional data (here seven indices) with fewer variables (in this case two indicators). Factor analysis is appealing because it reduces the number of barrier-indicators that enter the estimations and thereby reduces the problem of multicollinearity. The aggregation of the seven indices is data-based and ensures that the two resulting indicators account for the maximum amount of cross-country variance of the detailed indicators.

The second step is to econometrically estimate the relation between the two indicators of barriers to service provision and firms' price-cost margins in a regression model. We use the indicators from the factor analysis as explanatory variables, along with a number of other economy-wide and firm-level explanatory variables. The analysis uses a specification of firm profitability that explicitly takes both the influence of barriers and firm-specific differences into account. At the firm level, each firm's profitability is affected by several factors specific to that firm. The econometric model controls for these factors by including profits earned on other activities, operational efficiency, firm size, capital and labour intensity in production, and solvency of the company.

We interpret barriers as rent-creating if they increase price-cost margins. If barriers reduce price-cost margins, they are interpreted as cost-creating. This approach is in line with similar studies (see Kalirajan, 2000; and Nguyen-Hong, 2000). Our detailed approach (with a calculation of seven indices) is very important for the analysis, because it enables us to capture both cost-creating and rent-creating barriers. If we only had a single index per sector per country, we could only capture either cost-creating or rent-creating barriers in a sector².

The third step is to translate the relationship between trade barriers and the prices and costs of service provision into tariff equivalents, using a simple transformation.

Estimation results

We evaluate the barriers applying to four business-related service sectors; accountancy, retail trade, wholesale trade and IT-services. Lack of data on barriers prevented us from covering a broader range of sectors. The sectors were chosen to represent different types of service provision with diverse characteristics. Accountancy and IT-services are both knowledge intensive services, but accountancy services are generally regulated, and IT-services are unregulated. Retail and wholesale trade are different types of distributive trade and account for a large share of the service sector.

The econometric model is estimated twice for each of the four sectors, first with the indicators for the barriers for domestic firms and then with the indicators for the barriers for foreign firms. The coefficients are, of course, different in the two estimations with respectively domestic and foreign indices. However, the general characteristics of the estimates are identical in both cases. For each sector, we identify one indicator for cost-creating barriers and one indicator for rent-creating barriers, as illustrated in table 1-3.

Table 1-3: Results of estimations of the direct impact of barriers

Sector	Factor	Significant	Sign	Interpretation
Accountancy	1	Yes	Negative	Cost-creating
	2	Yes	Positive	Rent-creating
Retail trade	1	Yes	Negative	Cost-creating
	2	Yes	Positive	Rent-creating
Wholesale trade	1	Yes	Negative	Cost-creating
	2	Yes	Positive	Rent-creating
IT-services	1	Yes	Negative	Cost-creating
	2	No	Positive	Rent-creating

Note: The general results are the same for both domestic and foreign barriers, although the coefficients differ.

Source: Copenhagen Economics.

² Furthermore, the co-existence of both cost-creating and rent-creating barriers would lead to underestimation of the cost or price impact of the barrier.

The combination of factor analysis³ and the estimations give an intuitive interpretation of the results: barriers affecting the up-stream end of the value-chain of service providers (e.g. establishment) tend to be cost-creating, and barriers affecting down-stream activities (e.g. sales and promotion) tend to be rent-creating.

All indicators, except for the indicator for cost-creating barriers in IT-services, are statistically significant. This means that in countries with high barriers, i.e. a high level of protection, service providers can inflate prices and the costs of operation are higher. Conversely, we show that providers in countries with lower barriers operate with lower costs and supply services that are less costly for consumers and users.

In the CETM model, the tariff equivalents estimated for accountancy services are assumed to be representative for all regulated professions. Similarly, it is assumed that the tariff equivalents for IT-services are representative for all business services. Finally, it is assumed that the weighted average of barriers to wholesale and retail trade is representative for the distributive trade sector of the CETM model. Table 1-4 and Table 1-5 report the tariff equivalents as they have been incorporated in the model analysis.

Table 1-4: Average tariff equivalents in the EU, current situation

	Regulated professions (Accountancy)		Business services (IT-services)		Distributive trade (Retail and wholesale trade)	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
Rent-creating barriers	5.5%	11.0%	0.2%	0.9%	2.4%	3.1%
Cost-creating barriers	9.3%	11.8%	1.3%	0.7%	0.9%	1.2%

Note: The table shows the weighted average tariff equivalents for the European Union. The estimates for cost-creating barriers in business services (IT-services) are statistically insignificant for both domestic and foreign firms and tariff equivalents should be interpreted with care.

Source: Copenhagen Economics.

We use the econometric estimates to compute the impact of policy changes (in this case the Services Directive) on prices and costs. This is done by recalculating the IMRIS indices for the barriers to service provisions and translating the new indices into tariff equivalents. The results show that the Services Directive will be effective in reducing barriers to service provision, especially for regulated professions, as illustrated in Table 1-5.

Table 1-5: Average tariff equivalents in the EU, after the Services Directive

	Regulated professions (Accountancy)		Business services (IT-services)		Distributive trade (Retail and wholesale trade)	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
Rent-creating barriers	0.2%	5.6%	0.0%	0.5%	0.5%	1.0%
Cost-creating barriers	3.0%	2.5%	1.2%	0.4%	0.3%	0.5%

Note: The table shows the weighted average tariff equivalents for the European Union. The estimates for cost-creating barriers in business services (IT-services) are statistically insignificant for both domestic and foreign firms and tariff equivalents should be interpreted with care.

Source: Copenhagen Economics.

³ The factor analysis showed that a barrier tends to be included in either factor one in all sectors or in factor two in all sectors.

1.3. Measuring barriers to EU services trade

In Stage 1 of our analysis, we develop an index - The IMRIS (Internal Market Restrictiveness Index in Services) – to measure actual barriers to service provision in the Internal Market. The index methodology transforms qualitative information about restrictions on service provision into quantitative measures using a system of scores and weights. We construct a hierarchical index structure, where specific restrictions are evaluated and scored at the lower level. The scores are weighted and summarized in aggregated indices. The advantage of this approach is that it provides a clear linkage between specific and detailed restrictions and the index used in the economic analysis.

We use a detailed questionnaire with almost 200 objective questions about legal and non-legal barriers to service provision in a given sector in a given Member State. The questions are organized into categories and sub-categories, corresponding to seven stages in the value chain of service providers (see Table 1-6). This follows the classification in the “State of the Internal Market Report” from the European Commission (European Commission, 2002).

Table 1-6: IMRIS categories

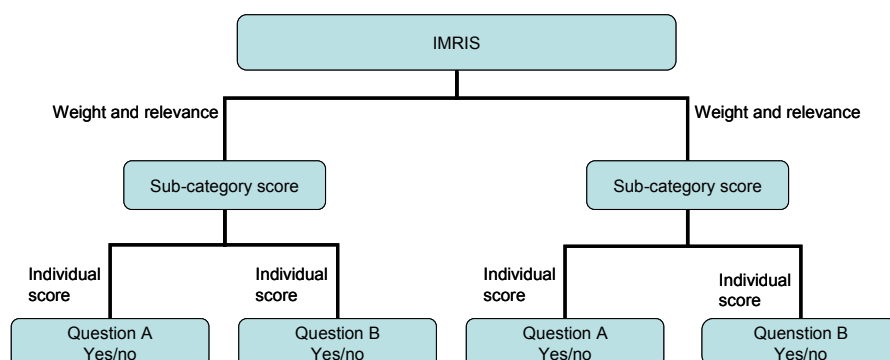
Number	Category	Number of sub-categories
1	Establishment	7
2	Uses of input	5
3	Promotion	8
4	Distribution	5
5	Sales of services	5
6	After sales aspects	4
7	Non-Legal Barriers	4

Source: Copenhagen Economics IMRIS database

Each question is assigned an individual score based on the restrictiveness of the specific barrier, and the sub-categories are assigned weights according to their relative importance. Knowing the answers to the objective questions, we can calculate IMRIS indices for each category in all four sectors, as illustrated in figure 1-6.

The IMRIS index has a value between zero and unity. The larger the index, the more severe are the barriers to service provision in the given sector and Member State. We describe barriers to the Internal Market in the EU15 and five of the new Member States; Estonia, Lithuania, Poland, Hungary and the Czech Republic.

Figure 1-6: Calculating the IMRIS



Source: Copenhagen Economics.

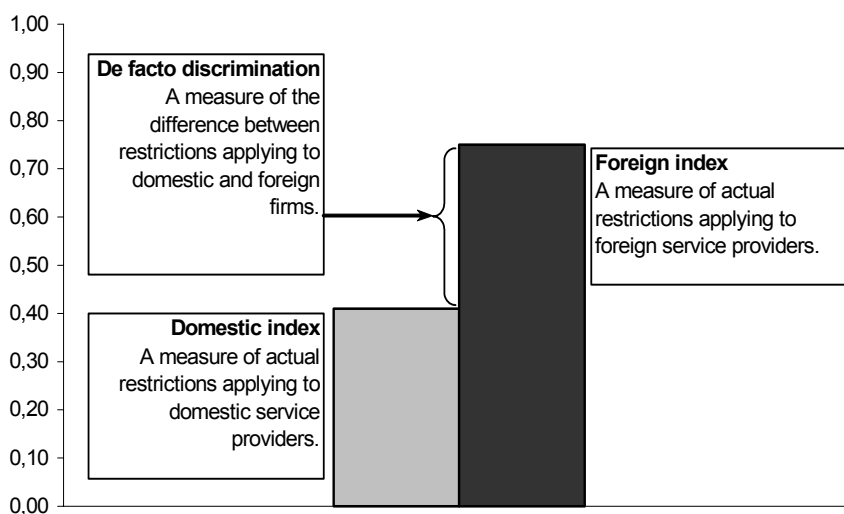
Barriers to service provision affect domestic firms and foreign firms differently. First, some barriers, for example residence requirements, will restrict foreign firms only. Second, several

barriers, for example restrictions on the use of temporary foreign workers, are more restrictive for foreign firms than for domestic firms. Furthermore, foreign firms may face barriers to establishment and ongoing operations in another Member State, simply because the rules and regulations in the foreign Member State are different from the rules and regulations in the home country. To take proper account of the effects of barriers on respectively domestic and foreign firms, we calculate both a Domestic and a Foreign IMRIS.

The Domestic IMRIS measures the extent of restrictions on service provision in a specific Member State for domestic service providers, while the Foreign IMRIS measures the extent of the restrictions for foreign service providers. To reflect that some barriers are more restrictive for foreign firms than for domestic firms, we use the same objective questions and scores, but apply larger weights to calculate the Foreign IMRIS than to calculate the Domestic IMRIS.

The difference between the Foreign IMRIS and the Domestic IMRIS can be interpreted as the discriminatory part of the barriers, as illustrated in figure 1-7. Note that the IMRIS indices reflect de facto discrimination, as opposed to only legal discrimination. As mentioned above, foreign firms face higher barriers than domestic firms for a number of reasons. First, there may be outright legal discrimination. Second, some regulations are more restrictive for foreign firms than for domestic firms. Third, regulatory disparities between Member States create barriers to foreign or cross-border operations. Fourth, non-legal barriers like for example language and local business practices affect only foreign firms. Regulatory reforms that remove legal discrimination, for example the Services Directive, will therefore not equalize all barriers faced by domestic and foreign firms in a country.

Figure 1-7: An illustration of Domestic IMRIS and the Foreign IMRIS



Source: McGuire (2002).

The IMRIS can be used to analyse the effects of different policy scenario. We use the IMRIS to determine the direct policy impact of the Services Directive. The specified regulatory measures are translated to changes in IMRIS indices. This is done according to a detailed bottom-up approach, where each individual IMRIS score is recalculated to take the Directive explicitly into account. This detailed approach means that the economic impacts of the Directive can be traced back to changes in the specific regulatory barriers recorded in the IMRIS indices.

Our analysis of the current barriers to service provision in the different Member States reveals some general tendencies. First, barriers are largest in the accountancy sector, while the barriers are lower in retail distribution, wholesale distribution, and IT-services. Second, the barriers seem to be lower in the new Member States than in the old Member States. Third, barriers tend to be either high or low in all sectors within a Member State.

The remainder of this report consists of four parts that provide a detailed description of our methodology and results. In Chapter 2 we calculate the economy-wide impact of reducing barriers to service provision. We use a general equilibrium model to capture both the direct effects on the service sectors and the indirect effects on the rest of the economy.

In Chapter 3 we determine how barriers to service provision affect firm performance, i.e. we econometrically estimate the relation between barriers and prices and costs of service provision. We translate the impacts on prices and costs into tariff equivalents that distort firm performance in the same way as the actual barriers.

In Chapter 4 we develop an index methodology that enables us to translate detailed qualitative information about barriers to service provisions into a quantitative measure of barriers. We use the index methodology to quantify the current barriers in the European Union as well as the barriers that will emerge after the implementation of the Services Directive.

In Chapter 5 we provide a review of the literature analysing barriers to trade. Compared to other studies of barriers to trade, the strength of our study is that we provide a clear linkage between very detailed assessments of specific restrictions to the economy-wide effects of barriers. We establish this link using a very large data set with more than 275 000 firms.

Chapter 2 The economy-wide impact of removing barriers to services trade

This chapter presents an analysis of the economy-wide effects of removing barriers to service provision in the European Union. Services account for almost 70% of GNP and jobs in the EU (European Commission, 2002). Service sector reforms are therefore a potential source of growth, competitiveness and job creation, but also an area neglected by comprehensive Internal Market policies (European Commission, 2003b). The full economic potential of the services sectors is currently hampered by many obstacles in the Internal Market (European Commission, 2004a).

Examples of obstacles to service provision in the Internal Market are abundant. Service providers wishing to establish themselves in other Member States may face restrictive authorisation schemes and other disproportionate, possibly even discriminatory, requirements. Similarly, cross-border provision of services is sometimes hindered by obligations and administrative burdens imposed by national and local regulations. With the purpose of removing such obstacles, the Commission recently presented a proposal for a Directive on services in the Internal Market (European Commission, 2004a).

The proposal (hereafter “the Directive”) covers a wide range of services provided to both consumers and businesses. Examples of the services covered include pure business services (e.g. management consultancy and recruitment services), services provided to both business and consumers (e.g. legal advice and distributive trades), and pure consumer services (e.g. leisure services and some health care services).

The Directive specifically aims at providing “a legal framework that will eliminate the obstacles to the freedom of establishment for service providers and the free movement of services between the Member States” (European Commission, 2004a, p. 3). In short, the Directive will make it less burdensome to set up a firm in another EU country and to run a firm with intra-EU operations. Both elements will in particular make it easier to carry out international trade in services within the EU, primarily via direct cross-border supply or commercial presence (FDI) in other Member States.

The Directive lays down a number of specific provisions. Regarding the establishment of new firms, Member States must simplify the formalities with which service activities must comply. Firms will be able to complete all administrative procedures at a “single point of contact” and by using electronic procedures. Authorisation schemes must furthermore respect certain objective and non-discriminatory principles, and many legal requirements are either prohibited or subject to evaluation in order to eliminate unjustified requirements.

Regarding the free movement of services, firms will be able to provide services in any Member State and only be subject to the regulations of the country in which the firm is established.

Customers shall have the right to use services from other Member States and not be subject to any discrimination.

The Directive directly affects business services, services provided to both businesses and consumers, and consumer services. In addition, it also has important knock-on effects on other sectors. The knock-on effects arise partly because the affected services are important inputs to the rest of the economy, and partly through the markets for labour and capital. Production and employment changes in industrial sectors also generate feed-back effects on the services sectors. A computable general equilibrium model, the Copenhagen Economics Trade Model (CETM), capturing all such linkages has been specifically adapted to evaluate the economy-wide impacts of the Directive.

The modelling approach, results, and initial conclusions are described in the following sections. First, the interpretation of the policy changes implied by the Directive is described and formulated in two scenarios. A non-technical overview of the CETM model is subsequently provided, which is followed by a presentation of the simulation results. Finally, concluding remarks sum up the analysis, including a discussion of the limitations of the analysis and suggestions for analytical extensions. Two appendices contain detailed results and technical documentation of the CETM model.

2.1. Scenario definitions

This section specifies how the policy changes implied by the Directive are interpreted and included in the model analysis. The Directive addresses barriers to the Internal Market for services using a two-pronged approach, recognizing that barriers to service provision manifest themselves in two distinct ways. First, there are barriers to establishment for service providers. Second, there are barriers to the free movement of services between the Member States. For evaluation and modelling purposes, both types of barriers are quantifiable using the Internal Market Restrictiveness Index in Services (IMRIS) indices presented in Chapter 4.

The first part of the Directive aims to eliminate obstacles to establishment. These include barriers facing both domestic firms and foreign firms trying to establish themselves in a Member State. The Directive bundles a number of specific provisions, including demands for administrative simplification, reform of discriminatory authorisation schemes, and the prohibition of certain restrictive requirements. The provisions primarily fall under the IMRIS category covering legal barriers to establishment.

The second part of the Directive focuses on obstacles for service providers to supply services from their Member State of origin directly into another Member State. The Directive provides for the Country of Origin principle, rights and assistance for recipients to use services and a regulatory environment for the posting of workers. Introducing the Country of Origin principle, according to which a service provider is subject only to the law of the country in which he is established, is clearly the most far reaching policy change and will significantly influence barriers to cross-border supply of services. These provisions relate to the IMRIS categories covering legal barriers to ongoing operations.

The proposed Directive also provides for various derogations, exceptions for specific service activities and measures to establish trust between Member States. However, the main policy proposals relevant to the economic analysis are the two broad approaches to eliminating barriers to respectively the free movement of services, and the freedom of establishment of service providers. The scenario definitions specifically capture the impacts on barriers to the provision of business-related services.

Formulation of policy scenarios

The Directive provides for broad horizontal reforms using a combination of regulatory techniques. To make the analysis transparent, it is important to define the precise impact of the Directive on service providers. This is accomplished by relying on the detailed IMRIS indices presented in Chapter 4.

A first scenario analyses the direct policy impact of the Directive on business-related services by explicitly linking it to specific policy changes. To put the first scenario into perspective, a second scenario analyses the potential effects of assuming that foreign firms face no barriers that are discriminatory in their effect (e.g. disparities between national regulations and non-legal barriers), going beyond the direct policy impacts of the Directive. In essence, the second scenario analyses the economy-wide effects of having an Internal Market for services where foreign and domestic firms face the same *de facto* barriers.

Both scenarios assume barrier reductions in three service sectors: regulated professions (modelled with barriers as for accountancy services), distributive trade (modelled with barriers as for retail and wholesale trade), and business services (modelled with barriers as for IT-services). These three service sectors account for roughly 25 percent of the total value added in EU. In practice, the Services Directive has a broader scope than what is assumed in the scenarios. The analysis may consequently underestimate the impact of the Services Directive.

Finally, Appendix A also reports results from two hypothetical scenarios that extend the analysis of potential effects by focusing on potential effects of removing barriers outside business-related services, namely in the construction sector.

Direct policy impact scenario

Under the broad principles of freedom of establishment for service providers and the free movement of services, the Directive lays down an array of specific regulatory measures. To determine the direct policy impact of the Directive, the specified regulatory measures are translated to changes in IMRIS indices. This is done according to a detailed bottom-up approach, where each individual IMRIS score is recalculated to take the Directive explicitly into account. This detailed approach means that the economic impacts of the Directive can be traced back to changes in the specific regulatory barriers recorded in the IMRIS indices. All legal changes that have an impact on the IMRIS indices are therefore included in the model analysis.

The new IMRIS indices are used to calculate updated price and cost impacts measured as tariff equivalents, based on the econometric estimates presented in Chapter 3. The tariff equivalents can be thought of as hypothetical taxes that are computed to create economic effects that are equivalent to the economic effects of the actual barriers as measured by the IMRIS indices. The updated tariff equivalents will thereby reflect the new, and lower, costs incurred by service providers after the Directive has been implemented. The updated tariff equivalents for all scenarios are provided in Appendix C. Finally, the updated tariff equivalents are used in the CETM model analysis to determine the economy-wide effects of the Directive.

It is important to note that the Directive will not equalize all *de facto* barriers across countries, sectors and firms. At the high level of detail provided by the IMRIS indices, regulatory barriers and intra-EU differences will remain. Still, by imposing the principles of freedom of establishment and the free movement of services, the Directive will go a long way towards harmonising barrier levels across the European Union. In addition, the Directive will not remove barriers caused by regulatory disparities and non-legal barriers.

Extended impact scenario

The Services Directive will remove legally discriminating barriers, but among the barriers to service provision that remain, some barriers will *de facto* affect foreign firms more than domestic firms. This is primarily the case for non-legal barriers, but also results from disparities between national regulations on e.g. public contracts and taxation. A significant part of the remaining barriers would disappear if national regulations were harmonised to an even greater extent. The scenario assumes that Internal Market integration is so complete, that foreign firms experience the same *de facto* barriers as domestic firms.

Following the above assumptions, the individual IMRIS scores of foreign firms are set to be equal to the individual IMRIS scores of domestic firms in their respective countries. As in the direct policy impact scenario, the domestic IMRIS scores are updated to reflect the policy changes implied by the Directive. Compared to the direct policy impact scenario, the extended impact scenario differs only in the effects of barriers on foreign firms. The policy interpretation is, however, more substantial because significant harmonisation and adaptation must occur before regulation creates identical *de facto* barriers for both domestic and foreign firms. The extended impacts can therefore be thought of as reflecting some of the more qualitative and long run effects of the Directive.

Comparison of scenarios

The differences between the policy scenarios are summarized in table 2-1. All scenarios are compared against a benchmark scenario that provides a reference point for the analysis. The benchmark scenario includes current barriers to both the freedom of establishment and the free movement of services.

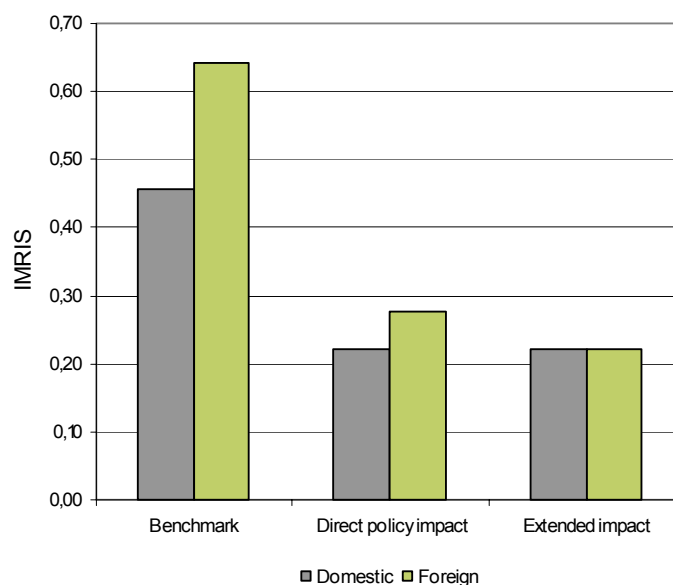
Table 2-1: Analysed scenarios

	Benchmark scenario	Direct policy impact scenario	Extended impact scenario
Barrier estimates	Current	Updated to reflect the Directive	Updated to reflect the Directive
Different <i>de facto</i> barriers for domestic and foreign firms	Yes	Yes	No

Note: Appendix A also reports results from two hypothetical scenarios that include construction services.
Source: Copenhagen Economics.

To illustrate the policy impacts of the two scenarios, the effects on barriers to establishment in the regulated professions sector of Belgium are illustrated in figure 2-1. The biggest policy impact is to be found in the direct policy impact scenario, which reflects the effects of the Directive. As explained above, the extended impact scenario differs only in that domestic and foreign firms are assumed to face the same barriers. The policy impact of the scenarios is similar across all sectors, countries and stages of the business process. The complete sets of IMRIS indices and corresponding tariff equivalents are provided in Appendix C.

Figure 2-1: Policy impacts of the scenarios



Note: The figure shows IMRIS scores for barriers to establishment in the regulated professions sector in Belgium.
Source: Copenhagen Economics IMRIS database and scenario definitions.

2.2. The CETM model

The policy scenarios are implemented and analysed using the Copenhagen Economics Trade Model (CETM). This section provides a summary of the model and describes its main features.

Overview of the CETM model

The CETM model is a global, multi-regional general equilibrium model. The model represents state-of-the-art developments within models of the services trade and it has been specially designed for the analysis of barriers to trade and foreign direct investment, price reforms and market integration. The model captures all linkages between the different sectors of the economy and it therefore allows an economy-wide assessment of barriers to services trade. Specifically, the model captures both the *direct* effects on the service providers and the *indirect* effects on their suppliers and customers. The model therefore, captures the important backward and forward linkages both among firms and among firms and final consumers (households and government organisations).

The current version of the CETM model has been adapted specifically to the analysis of barriers to services trade within the EU. This implies that the model focuses particularly on the individual countries in the EU and on the sectors where barriers have a significant economy-wide impact. The model also incorporates the rest of the world and a goods-producing sector, but does so in a more stylized manner to ensure both transparency and tractability of the model.

The model currently represents 25 regions that are connected via international trade in goods and services. The model represents all of the current EU Member States including the new Member States. The rest of the world is aggregated into a single region, and we assume that all regions trade on the world market at constant prices. Table 2-2 on the following page provides an overview of the regions and sectors represented in the model.

Table 2-2: Regions and sectors in the Copenhagen Economics Trade Model (CETM)

Regions	Sectors
1. Austria	1. Regulated professions
2. Belgium	2. Business services
3. Cyprus	3. Distributive trade
4. Czech Republic	4. Construction services
5. Denmark	5. Other services
6. Estonia	6. Government services
7. Finland	7. Rest of the economy
8. France	
9. Germany	
10. Greece	
11. Hungary	
12. Ireland	
13. Italy	
14. Latvia	
15. Lithuania	
16. Luxembourg	
17. Malta	
18. Netherlands	
19. Poland	
20. Portugal	
21. Slovak Republic	
22. Slovenia	
23. Spain	
24. Sweden	
25. United Kingdom	
26. Rest of the World	

Source: Copenhagen Economics.

The aggregation of the production sectors has been guided by the details of the currently available estimates of barriers to service trades and the availability of data. Specifically, services production takes place within 6 distinct sectors. All other production, mainly industrial production of goods, is captured by an aggregate production sector.

The three service sectors regulated professions, business services and distributive trade are explicitly included in the analysis of the Services Directive. The exact definition of the sectors is provided in Table 2-3.

Table 2-3: Service sector definitions

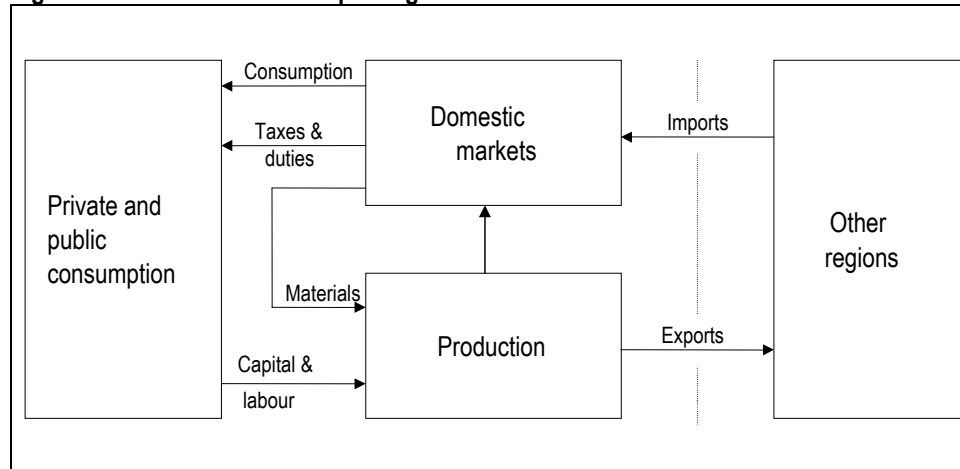
Sector in the CETM model	Examples of covered services	NACE codes	Share of total EU value added in CETM
Regulated professions	Legal, accounting, business and management consultancy	741	2,9%
Business services	IT-services, recruitment, cleaning, real estate.	70-73, 742-744	8,8%
Distributive trade	Wholesale trade, retail trade	50-52	12,9%

Note: Value added data is extracted from the CETM model database.

Source: Copenhagen Economics.

Each of the regions has a representative consumer, a government and a production sector for each of the goods and services. Figure 2-2 gives an overview of the markets, the agents and the flows of goods, services and factors in the model. Firms producing goods and services represent the supply side of the model. All goods and services are being produced with materials and primary factors capital and labour. A representative agent represents final demand and he finances his consumption with income from sales of capital and labour. Finally, a government provides public goods financed through taxes and duties.

Figure 2-2: Overview of the Copenhagen Economics Trade Model



Source: Copenhagen Economics.

Modelling of the supply and demand for services

The modelling of services in the CETM model builds specifically on Markusen, Rutherford and Tarr (2000) and Jensen, Rutherford and Tarr (2003). The model distinguishes between two categories of firms producing services. One category, represented by government services, produces services under constant returns to scale and the firms sell their output in perfectly competitive markets. The other category, including all business services and construction services, produces services under increasing returns to scale and the firms sell their output in markets characterized by imperfect competition.

In the case of imperfectly competitive firms, the model incorporates production of services in a country by both purely national firms and by foreign firms. Foreign firms represent subsidiaries of multinational firms that sell services abroad via foreign direct investment in local production corresponding to “Commercial presence” (mode 3) in the WTO classification. The key difference between national firms and foreign firms is in the use of the primary factors labour and capital. National firms only use domestic labour and capital, whereas the production in foreign firms also uses a specialized intermediate good provided by their parent company. This good can be thought of as knowledge capital embodied in capital provided by foreign direct investment (FDI). The term knowledge capital will hereafter be used when referring to this specialized input.

Users of services include firms, governments and households. They purchase a bundle of services and their benefit from services depends on the number of varieties available. Individual varieties of services are available in the sectors with services production under increasing returns to scale. Recent literature (Broda and Weinstein, 2004) has shown that growth in product varieties is an important source of gains from trade. The more varieties, the lower the costs of a quality adjusted unit of services. That is, an additional variety of a given service not only represents a value in itself, but also makes other services more valuable and productive. The model also captures that firms use services as intermediate inputs and that

lower costs of inputs lower the prices of services. Thus, lower prices of services benefit not only the firms purchasing the services but also firms, government and households purchasing their output. The model therefore captures the economy-wide effects of barriers to service trades.

Users of services not only distinguish between individual varieties of services, they also distinguish services according to nationality. For example, French customers view services provided by French firms as better substitutes for each other than services provided by, say, the French subsidiary of a German multinational. Also, services provided locally, whether by a purely national firm or by a foreign firm, are better substitutes for each other than services provided across borders (“Cross-border supply” (mode 1) in the WTO classification).

Barriers to services trade

The CETM model represents barriers to service trades in several ways depending on the nature of the barrier. The exact representation in the individual sector reflects results from detailed sector studies and other both quantitative and qualitative evidence.

Overall, the model captures two main types of barriers: Rent-creating and cost-creating barriers. Rent-creating barriers reduce competition, inflate prices above costs and generate rents to the incumbent firms. We represent this type of barrier through an exogenous mark-up over costs. The barrier can be thought of as creating a price-wedge between producer prices and producer costs. The more indirect and dynamic effects of rent-creating barriers, by limiting competition and thereby reducing productivity, are not considered in the model.

Cost-creating barriers increase the use of real resources. For example, it may require extra use of labour to overcome a given barrier. This type of barrier is represented through an exogenous productivity factor. That is, removal of this type of barriers improves productivity in the sense that more output can be produced with the same amount of inputs (or the same output can be produced with smaller amounts of inputs).

Barriers to services trade are identified and quantified using the IMRIS indices presented in Chapter 4. The IMRIS indices have been developed to translate qualitative information on regulatory policies to quantitative measures of barriers. For each country in the model, the index is calculated for seven stages in the value chain of service providers. The index distinguishes between barriers to domestic and foreign firms. Chapter 4 presents the detailed approach used to design the IMRIS indices.

Price and cost impacts of barriers are computed using sophisticated econometric estimations based on the IMRIS indices and economic data on more than 275 000 firms. The price and cost impacts are expressed in tariff equivalents, i.e. as percentage impacts on prices. The tariff equivalents can be thought of as hypothetical taxes that are computed to create economic effects that are equivalent to the economic effects of the actual barriers as measured by the IMRIS indices. The econometric estimations also reveal if barriers are rent-creating or cost-creating. Chapter 3 provides a detailed account of the econometric methodology used.

The benchmark scenario contains tariff equivalents corresponding to current regulations as captured in the IMRIS indices. When different scenarios are simulated, the first step is to calculate new IMRIS scores based on regulatory changes. The updated IMRIS indices are subsequently used to calculate new tariff equivalents based on the original econometric estimations. Finally, the policy change is introduced into the model by inserting the new tariff equivalents. There is consequently a direct connection between specific policy changes and the outcomes of the model analysis.

However, the representation of barriers in the model analysis is limited by the sector coverage of the IMRIS indices. The IMRIS indices and econometric estimates measure regulatory barriers to accountancy services, IT-services, wholesale trade and retail trade. In the CETM model, the tariff equivalents estimated for accountancy services are assumed to be representative for all regulated professions. Similarly, it is assumed that the tariff equivalents for IT-services are representative for all business services. Finally, it is assumed that the weighted average of barriers to wholesale and retail trade is representative for the distributive trade sector of the CETM model. These extrapolations should be kept in mind when interpreting the sector-level results of the model analysis. The mapping between sectors in the model analysis and the sectors for which tariff equivalents are available is provided in Table 2-4.

Table 2-4: Mapping of tariff equivalents to sectors in the CETM model

Sector in the CETM model	Tariff equivalents used
Regulated professions	Accountancy
Business services	IT-services
Distributive trade	Retail and wholesale trade

Source: Copenhagen Economics.

2.3. Results

This chapter provides an overview of the main findings of the model analysis. Detailed results are available in Appendix A, where effects on a range of variables are reported for all Member States. The reporting highlights the welfare, employment and market effects of removing barriers to service provision in the Internal Market. The analysis leads to the following conclusions:

The Services Directive will yield significant economic gains. European consumers, firms and governments will benefit from enhanced productivity, higher employment and increased wages. The total welfare gain (measured as comprehensive consumption) for the European Union is approximately 0.6 percent, or €37 billion in monetary terms, and welfare will increase in all Member States. The economic gains are explained by the impacts of stronger competition and reduced costs in the EU service sectors.

Prices of services will fall in the targeted sectors. Stronger competition will reduce artificially inflated prices and less waste of resources will lead to lower costs of services provision. This will benefit both consumers and firms using the covered services as inputs. Productivity gains enable the creation of higher value added and provide a strong stimulus to the EU economy.

Output will rise in all sectors of the EU economy. Output and value added will increase across all sectors, and services and goods markets will expand considerably. In monetary terms, total value added in the service sectors will increase by approximately €33 billion. The increase in economic activity will spur the creation of new jobs.

New jobs will be created in all Member States. Total employment will rise, but productivity improvements and reallocation of labour mean that employment will fall in some sectors. Job creation is most intense in those sectors where barriers are reduced the most. Net employment may increase by up to 600 000 jobs across the European Union. Consumers will also benefit from higher wages, while businesses will experience increased opportunities in the Internal Market as international expansion becomes less costly.

Trade in services will intensify. The Internal Market will become more integrated as a result of increased trade in services. Service provision through both cross-border trade and foreign commercial establishments will increase. This will lead to improved availability of different service varieties and promote competition in the Internal Market.

In short, the analysis suggests that the barrier reductions implied by the proposed Services Directive will result in significant economic gains to consumers and firms in all Member States. Aggregate results for the EU are presented in table 2-5. The results show that the benefits of the Directive are similar in the two scenarios considered.

Table 2-5: Economic effects of the Services Directive

	Direct policy impact scenario	Extended impact scenario
Economy-wide effects		
Welfare	0.6 %	0.7 %
Real wages	0.4 %	0.4 %
Employment	0.3 %	0.3 %
Services sectors		
Employment	0.5 %	0.5 %
Value added	1.1 %	1.1 %

Note: All results are reported as percentage changes from the benchmark. Welfare is measured as comprehensive consumption.

Source: CETM model - Copenhagen Economics.

The Directive has strong and positive effects on the economies of the European Union. To better understand the outcomes, it is helpful to consider the whole chain of economic effects that drive the results. The following section explains the economic effects of reducing barriers to service provision by presenting results from the direct policy impact scenario more in depth.

2.4. The economic effects of reducing barriers to service provision

The effects of the Directive on barriers to service provision are captured in the updated IMRIS scores underlying the scenario definitions. Changes in barriers are transformed into price and costs effects that are measured in terms of tariff equivalents. Barriers can be both rent- and cost-creating, and can affect domestic and foreign firms differently. When barriers are reduced as a result of the Directive, tariff equivalents fall for all firms. The fall in tariff equivalents is an important driver of the economic effects, because prices and costs are directly affected. Average reductions in tariff equivalents are presented as percentage point changes in table 2-6. Tariff equivalents are, as expected, reduced the most in regulated professions and fall more for foreign firms than for domestic firms. Still, the policy impact in terms of changes in tariff equivalents is relatively modest.

Table 2-6: Average reductions in tariff equivalents

	Regulated professions		Business services		Distributive trade	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
Rent-creating barriers	-5.3	-5.4	-0.2	-0.4	-1.9	-2.1
Cost-creating barriers	-6.3	-9.3	-0.1	-0.3	-0.6	-0.7

Note: The table shows percentage point changes in weighted average tariff equivalents.

Source: Copenhagen Economics.

The barrier reductions reduce prices and increase productivity. This is because lower rent-creating barriers imply a smaller price wedge between producer prices and producer costs, resulting in lower prices of services and creating an allocative efficiency gain. Lower cost-creating barriers imply productivity gains because the same output can be produced with fewer resources. Productivity increases, in turn, lead to higher wages and return to capital. Output will therefore increase most in those sectors where barriers are reduced the most. Similarly, welfare gains will be largest in those Member States that reduce their own barriers the most.

As noted, reductions in cost-creating barriers increase productivity. Productivity gains enable creation of higher value added and lower costs, creating a surplus for the sectors involved.

This surplus is distributed as lower prices to consumers, higher wages and increased return to capital. Because the surplus more than outweighs lower profits for incumbents from rent-creating barriers, the net effect is a rise in income. Lower prices and higher spending combine to stimulate demand in all sectors of the economy. Increased demand calls for higher output, which compensates for jobs lost through improvements in labour productivity.

As illustrated in table 2-7, value added and market sizes (measured by the total value of output by both domestic and foreign firms) increase in all sectors of the EU economy. Total employment increases in all Member States, though labour demand falls in some sectors. Job creation is most intense in regulated professions, i.e. where barriers have been reduced the most. The positive employment effects from increased demand consequently outweigh the negative employment effects of increased productivity.

Table 2-7: Market effects of the Services Directive

	Regulated professions	Business services	Distributive trade	Other services	Rest of the economy
Value added	7.4 %	1.0 %	2.5 %	0.6 %	0.3 %
Market size	1.1 %	0.8 %	0.6 %	0.7 %	0.3 %
Employment	2.5 %	0.6 %	1.9 %	0.3 %	-0.1 %

Note: All results are reported as percentage changes from the benchmark. The results reflect the direct policy impact of the Services Directive. Market size is measured by the total value of output by domestic and foreign firms. Source: CETM model - Copenhagen Economics.

Higher demand and growing markets stimulate cross-border supply of services in the Internal Market. Services trade increases significantly in the targeted sectors, as illustrated in table 2-8. Growth in cross-border supply is strongest in those sectors where barriers have been reduced the most, i.e. in regulated professions and distributive trade. Member States that experience large reductions in their own barriers also see large increases in their services exports.

The rise in cross-border supply is primarily explained by changes in the prices of services. Lower prices stimulate overall demand for both domestic and foreign services. Furthermore, prices fall relatively more in Member States that experience above average reductions in their own barriers. When domestic prices fall more than prices in other Member States, domestic firms become relatively more competitive in the Internal Market. This leads to higher exports and explains why Member States that reduce their barriers the most experience the largest increases in services exports.

Table 2-8 also illustrates that services trade through commercial presence will increase in all service sectors. Again, larger reductions in barriers lead to larger increases in commercial presence.

Table 2-8: Changes in cross-border supply and commercial presence

	Regulated professions	Business services	Distributive trade	Other services
Cross-border supply	9.4 %	1.0 %	3.2 %	0.7 %
Commercial presence	2.7 %	2.5 %	1.3 %	1.0 %

Note: All results are reported as percentage changes from the benchmark. The results reflect the direct policy impact of the Services Directive. Commercial presence is measured as the value of output provided by foreign firms. Cross-border supply in distributive trade refers to cross-border activity in wholesale trade. Source: CETM model - Copenhagen Economics.

Prices of services depend on reductions in barriers and the prices of production inputs. Aggregate changes in the prices of services and goods are provided in table 2-9. Prices fall significantly in the service sectors targeted by the Directive, indicating that lower rents and productivity effects outweigh higher prices of labour, capital and some intermediate inputs. Output prices increase slightly in other sectors of the economy, as a result of higher wages and costs of capital. Prices fall slightly more in foreign firms than in domestic firms. This is primarily because foreign firms tend to experience larger reductions in barriers than domestic firms. Prices similarly fall most in Member States that experience above average reductions in barriers.

Table 2-9: Price effects

	Regulated professions	Business services	Distributive trade	Other services	Rest of the economy
Price of total output	-7.2 %	0.0 %	-2.2 %	0.2 %	0.1 %
Price of output supplied by domestic firms	-7.1 %	0.1 %	-2.2 %	0.2 %	-
Price of output supplied by foreign firms	-7.6 %	-0.3 %	-2.4 %	0.1 %	-

Note: All results are reported as percentage changes from the benchmark. The results reflect the direct policy impact of the Services Directive.

Source: CETM model - Copenhagen Economics.

2.5. Extended impact scenario

The Directive will not completely equalize the barriers facing domestic and foreign firms. The extended impact scenario analyses the impact of assuming that foreign firms face the same barriers as domestic firms. Table 2-5 illustrated that the economy-wide effects of extended impact scenario are similar to the direct policy impact scenario. The effects on service provision through commercial establishment are larger, as suggested in table 2-10. Because the discriminatory aspects of barriers are completely removed, total barriers fall more for foreign firms than for domestic firms. As a result, the price of output supplied by foreign firms decreases significantly more than price of domestic services. The effect is particularly strong for regulated professions, where foreign firms experience a sharp drop in rent-creating barriers.

Table 2-10: Price effects in the extended impact scenario

	Regulated professions	Business services	Distributive trade	Other services	Rest of the economy
Price of total output	-8.2 %	-0.1 %	-2.5 %	0.2 %	0.0 %
Price of output supplied by domestic firms	-7.1 %	0.1 %	-2.3 %	0.2 %	
Price of output supplied by foreign firms	-12.4 %	-0.8 %	-3.3 %	0.1 %	

Note: All results are reported as percentage changes from the benchmark. The results reflect the extended impact of the Services Directive.

Source: CETM model - Copenhagen Economics.

Though total output changes little compared to the direct policy impact scenario, output in foreign firms increases significantly as a response to higher demand. Services supply through commercial presence grows, as illustrated in table 2-11. Compared to the direct policy impact scenario, the extended scenario shows that removing all de facto discriminatory barriers would significantly increase service provision through commercial presence in other Member States. The rise in commercial presence is very strong in regulated professions, where foreign firms enjoy a price advantage resulting from significantly reduced rent-creating barriers.

Table 2-11: Changes in commercial presence in the extended impact scenario

	Regulated professions	Business services	Distributive trade	Other services
Commercial presence	25.5 %	4.5 %	4.6 %	1.1 %

Note: All results are reported as percentage changes from the benchmark. The results reflect the extended impact of the Services Directive. Commercial presence is measured as the value of output provided by foreign firms.

Source: CETM model - Copenhagen Economics.

2.6. Sensitivity analysis

The sensitivity of the results to data quality, modelling assumptions and policy impacts has been analysed using both piecemeal and systematic sensitivity analysis. The piecemeal sensitivity analysis allows only one parameter to change at a time. The systematic sensitivity analysis allows a range of parameters to change simultaneously within specified ranges. The model is used to simulate the same scenario many times, and each time the model randomly chooses a new configuration of the selected parameters.

Piecemeal sensitivity analysis

Regarding data, sensitivity analysis is performed on the market share of foreign firms and the use of the knowledge capital that differentiate foreign firms from domestic firms. Because different barriers apply to domestic and foreign firms, it is important to analyse if poor data quality or assumptions on the use of knowledge capital in foreign firms may significantly alter the results and policy conclusions. Table 2-12 on the following page shows that this is not the case, i.e. that the main results are robust to changes in both the initial market share of foreign firms and their use of knowledge capital.

The results show small and predicable impacts of changing elasticities of substitution and labour supply. Gains are slightly higher if individual service varieties are worse substitutes than assumed, because barriers then become more important. Conversely, gains are slightly lower if individual service varieties are better substitutes than assumed. The elasticity of labour supply has little influence on welfare effects, and primarily influences employment.

As expected, the results are more sensitive to the size of tariff equivalents. Using the 95% confidence intervals of the econometric estimates used to calculate tariff equivalents, aggregate welfare gains range from 0.5% to 1.0%. Still, the effects are of a similar order of magnitude.

Table 2-12: Piecemeal sensitivity analysis

	Value	Economy-wide impacts		
		Welfare	Real wages	Employment
Benchmark		0.6	0.4	0.3
Data				
Market share of foreign firms	Half	0.6	0.4	0.3
	Double	0.7	0.4	0.3
Foreign firms' use of knowledge capital	5 %	0.6	0.4	0.3
	50 %	0.7	0.4	0.3
Model assumptions				
Elasticity of substitution between individual service varieties	4	0.8	0.4	0.3
	6	0.5	0.3	0.3
Elasticity of labour supply	0.1	0.6	0.4	0.2
	0.3	0.7	0.3	0.4
Policy parameters				
Tariff equivalents	Low	0.5	0.3	0.2
	High	1.0	0.6	0.4

Note: The benchmark effects reflect the direct policy impact scenario. Welfare is measured as comprehensive consumption.

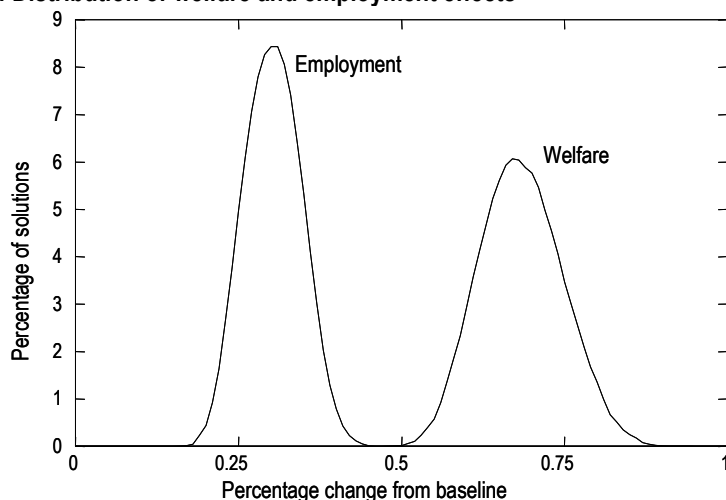
Source: CETM model - Copenhagen Economics.

Systematic sensitivity analysis

In the systematic sensitivity analysis, the direct policy impact has been simulated 2000 times with different configurations of the parameters used in the piecemeal sensitivity analysis. Again, the analysis indicates that the results are robust to changes in strategic parameters. Figure 2-3 shows that both the welfare and employment outcomes are distributed across relatively narrow intervals.

Note that both the initial market share of foreign firms and their use of knowledge capital are included in the systematic sensitivity analysis. By including these two parameters simultaneously, the sensitivity analysis in effect tests the definition and relative importance of foreign firms in the model analysis. Both the piecemeal and the systematic sensitivity analysis show that the model results are robust to changes in such strategic parameters.

Figure 2-3: Distribution of welfare and employment effects



Source: CETM model – Copenhagen Economics.

2.7. Concluding remarks

The full analytical framework provides a direct path from policy changes to economic outcomes. The policy changes implied by the proposed Services Directive have been quantified for the analysed service sectors using detailed IMRIS indices covering barriers to seven stages in the value chain of service providers. The price and cost impacts of the barriers have subsequently been estimated using sophisticated econometric techniques on a dataset containing more than 275 000 firms. Finally, the impact of the Directive has been analysed in the CETM model to assess the economy-wide effects.

The analysis shows that the Services Directive will yield significant economic gains. The benefits of reducing barriers to service provision have positive knock-on effects on the European economy as a whole. European consumers and firms will benefit from enhanced productivity, higher employment and increased wages. Productivity improvements that initially reduce employment are outweighed by the positive employment effects of increased economic activity. Furthermore, all Member States will benefit from the Directive and output will rise in all sectors of the EU economy. The Internal Market will become more integrated as a result of increased trade in services through both cross-border supply and commercial establishments.

Given that the proposed Services Directive has yet to be finalized, it is important to underline that reductions in barriers consistently yield economic welfare gains. Moreover, larger barrier reductions lead to larger gains. This should be taken duly into account when drafting regulatory reforms that reduce barriers to the provision of services.

Chapter 3 The impact of barriers on firm performance

In this chapter, we analyse the link between barriers to the Internal Market for services and the performance of European service firms. Using data for more than 275 000 European service providers, we find significant impacts of the identified barriers on prices and costs of operation in the European service sectors. This is by far the most comprehensive study of the impact of barriers to services trade to date. We show that in countries with high barriers, i.e. a high level of protection, service providers can inflate prices and that the costs of operation are higher. Conversely, firms in countries with lower barriers operate more efficiently. They experience lower costs and the level of competition from abroad has driven prices down towards marginal costs.

The key results of this chapter are the so-called tariff equivalents, i.e. hypothetical tariffs implying a similar effect on firms' performance as the barriers captured by the IMRIS. The tariff equivalents can be thought of as theoretical taxes that are computed to create economic effects that are equivalent to the economic effects of the actual barriers. The tariff equivalents are generally high in accountancy and low in retail trade, wholesale trade and IT-services, cf. table 3.1.

Table 3.1 Tariff equivalents for cost-creating foreign barriers (per cent)

	Accounting	Retail trade	Wholesale	IT-services
Austria	n.a.	1.7 - 2.2	0.6 - 0.7	0.2 - 1.7
Belgium	11.3 - 17.0	2.0 - 2.5	1.1 - 1.4	0.3 - 3.0
Czech Republic	3.5 - 5.1	0.7 - 0.9	0.7 - 0.9	0.2 - 2.0
Germany	9.6 - 14.3	1.0 - 1.3	0.3 - 0.4	0.1 - 1.2
Denmark	8.5 - 12.5	1.2 - 1.5	0.7 - 0.9	0.1 - 1.3
Spain	12.2 - 18.4	1.7 - 2.2	1.0 - 1.3	0.2 - 1.7
Estonia	5.2 - 7.7	0.7 - 0.9	0.4 - 0.6	0.1 - 1.6
Finland	10.5 - 15.7	1.6 - 2.0	0.8 - 1.0	0.2 - 1.7
France	9.1 - 13.6	1.4 - 1.7	0.8 - 1.0	0.1 - 1.2
United Kingdom	5.7 - 8.4	1.5 - 2.0	0.7 - 0.9	0.1 - 1.2
Greece	12.8 - 19.4	1.5 - 1.9	0.8 - 1.0	0.2 - 2.0
Hungary	5.7 - 8.3	0.9 - 1.2	0.6 - 0.8	0.1 - 1.5
Italy	12.9 - 19.5	1.9 - 2.4	0.7 - 0.9	0.2 - 1.7
Lithuania	n.a.	0.6 - 0.8	1.0 - 1.3	0.1 - 1.2
Luxembourg	n.a.	0.6 - 0.8	0.5 - 0.7	n.a.
Netherlands	5.2 - 7.7	1.2 - 1.5	0.2 - 0.3	0.1 - 0.9
Poland	4.8 - 6.9	0.8 - 1.0	0.6 - 0.8	0.1 - 1.3
Portugal	9.8 - 14.6	1.3 - 1.6	0.9 - 1.2	0.2 - 1.8
Sweden	9.1 - 13.5	1.7 - 2.1	0.5 - 0.6	0.2 - 1.6

Source: Copenhagen Economics, own estimates based on the IMRIS database and the Amadeus database.

Note: High and low tariff ranges are derived from 95% confidence intervals of coefficient estimates.

Above we have reported results for cost-creating foreign barriers. The choice is deliberate, since cost-creating barriers matter more in economic terms than rent-creating barriers. We show foreign barriers rather than domestic barriers since the Directive primarily aims at reducing barriers to foreign firms' operations. All tariff equivalents are shown in appendix D. The general picture with high barriers in accountancy and lower barriers in retail trade,

wholesale trade and IT-services is also found in the case of domestic barriers and in the case of rent-creating barriers.

Returning to the key results in table 3.1, the tariff equivalent in e.g. accountancy in Belgium is 14%. This is our central estimate, and the range from 11.3% to 17.0% expresses the uncertainty related to the estimate. With 95% probability, the estimated tariff equivalent is within this range. A tariff equivalent of 14% for cost-creating foreign barriers shall be interpreted as follows: Foreign accountancy firms in Belgium experience non-tariff barriers with an impact similar to having a 14% tax on all their inputs.

The estimations of the tariff equivalents are based on the detailed IMRIS indices of restrictions on service providers (presented in Chapter 4). Using factor analysis we have grouped the barriers affecting each of the seven stages of the economic value chain of service providers into two factors. These factors are used as explanatory variables in our regression analyses. The results show that barriers affecting the up-stream end of the value-chain (e.g. establishment) are mostly included in factor one and barriers affecting down-stream activities (e.g. sales and promotion) tend to belong to factor two⁴.

Furthermore, we find that factor one always is associated with cost-creation and that factor two always shall be interpreted as rent-creating. The result of the factor analysis, therefore, has a very clear interpretation with regards to cost- and rent-creating effects of barriers to the Internal Market for services: barriers affecting the up-stream end of the value chain generally increase costs and barriers affecting down-stream activities mostly increase rents (profits) of incumbent firms. We emphasize that there are deviations from this general pattern in the data.

We strongly underline that the estimations of the tariff equivalents is based on a very comprehensive data set covering all firms in the four service sectors in 19 Member States. The empirical evidence covers in excess of 275 000 firms and its scope vastly surpasses any previous study of this kind. In addition, the collected data on barriers is processed using advanced techniques of factor analysis, which has not been done before. Our econometric results are comparable to the findings of earlier studies, showing the strength of the applied method. Together, these facts greatly substantiate the identified protection of incumbent service suppliers.

In the remainder of this chapter we first explain the adopted methodology (sections 3.1 and 3.2). We then present the results of the factor analysis (section 3.3). We continue by describing the econometric model used for link barriers to firm performance (section 3.4), examining the data (section 3.5), and presenting the econometric results (section 3.6). Finally, we transform the parameter estimates to tariff equivalents (section 3.7).

⁴ However, there are deviations from this pattern, and therefore we chose not to label the factors other than 'factor 1' and 'factor 2'.

3.1. Overview of the econometric method

The overall objective of the econometric stage of the analysis is to translate the information found in the IMRIS into tariff equivalents that are incorporated in the general equilibrium model. In order to estimate how the barriers matter for firm performance we carry out three steps, cf. figure 3-1:

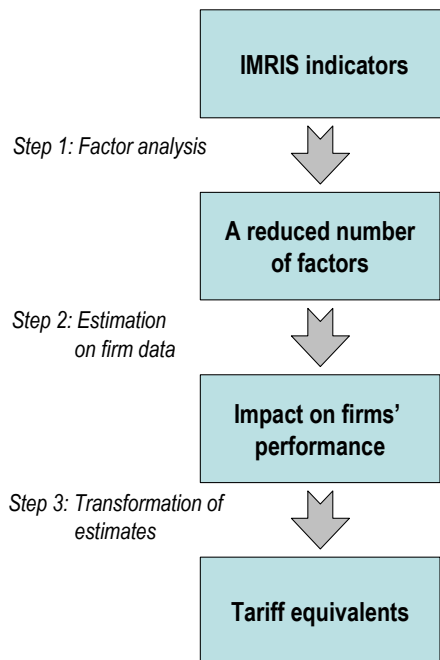
Step 1: Factor analysis to reduce the number of restrictiveness indicators (the IMRIS),

Step 2: Linear regression to assess the effects of restrictions on firms' profits.

Step 3: Transformation of parameter estimates to tariff equivalents

Where the first two steps are statistical techniques, the third step is a more simple transformation of the econometric results into interpretable numbers as those shown in table 3.1 above.

Figure 3-1: Illustration of the estimation methodology



We describe each of the steps in the methodology below. First, the technique of factor analysis is presented with a short discussion of alternative approaches. Second, the method of estimating the impact of barriers is described, especially concerning the choice of a single-step estimation and the specification of the model. Finally, the chapter is concluded with a description of the way to transform barrier coefficients from the regression into tariff equivalents of the barriers to trade in services.

3.2. The econometrics of factor analysis

The IMRIS is by construction derived from qualitative information being fed into a questionnaire, and as such is prone to overlapping questions. Specific answers could be highly interlinked throughout the seven categories, or even be the same for some categories. Links of

this type can affect the econometric results significantly. Furthermore, the many indices reduce the interpretability of barriers in later stages, e.g. when evaluating the economy-wide effects. Factor analysis is appealing because it reduces the number of barrier-indicators that enter the estimations, thereby reducing the problem of multicollinearity due to highly correlated explanatory variables⁵. In addition, the aggregation of the detailed indicators is data-based and ensures that the resulting summary indicators account for a large part of the cross-country variance of the detailed IMRIS indicators, cf. Nicoletti, Scarpetta and Boylaud (1999).

The use of factor analysis has not been used in previous studies within the framework of restrictiveness indicators to trade in services, however, the OECD has used it extensively in evaluation of regulation within industries, c.f. Nicoletti, Scarpetta and Boylaud (1999), Steiner (2000) and Gonenc and Nicoletti (2000).

Factor analysis is a statistical technique aimed at finding the minimum number of *latent* variables, which explain the maximum amount of the overall covariance of the observed variables. The factors, which are linear combinations of the observed variables, can often be interpreted in economic terms. Each factor is characterised by a set of coefficients, called *factor loadings*, expressing its correlation with the observed variables. The variables are then assigned to the factor in which they are most *loaded*.

We use two factor analysis methods, *principal factor* (PF) and *principal component factor* (PCF), depending on the nature of the covariance. When there is a large unique component in the variation of each variable, the PF-method is appropriate. Consequently, when there is no unique component, i.e. much of the variation is common across variables, the PCF-method is appropriate. Thus, the choice of method is based on the uniqueness of the variables, and given the construction of the IMRIS categories, both cases can be relevant. When answers in two categories overlap, there will be a common variance, and when answers differ, there will be a unique component. A more formal explanation of the factor analysis methods used is presented in box 3.1.

After performing factor analysis the IMRIS is summarised into two *latent* indicators, using the factor loadings as described. These *latent* indicators are labelled *factor-reduced* IMRIS and are directly interpreted as separate *types* of barriers to trade in services. The factor analysis is performed for each of the four sectors and for *domestic* and *foreign* IMRIS respectively, resulting in a total of eight sets of factor-reduced IMRIS. Thus, the information carried by the IMRIS consisting of seven different categories are summarised by two unique barriers. These unique barriers are carried forward through the econometric analysis and further into the study of economy-wide effects of barriers.

⁵ In the case of multicollinearity it is difficult to single out the impact from each of the collinear explanatory variables.

Box 3.1. The statistics of factor analysis

There are several approaches to factor analysis, however, here only the ones used in this study are described. These are principal factor (PF) and principal-component factor (PCF).¹ They are rather similar and are often mistaken for one another, however, for both factor analysis approaches the aim is to write the p observed variables x_1, \dots, x_p as a linear function of the (fewer) latent variables, while still describing as much of the variation between the x 's as possible. The covariance matrix Σ can be decomposed into its eigenvalues and eigenvectors in the following way:

$$\Sigma = C\Lambda C',$$

where C is a $p \times p$ matrix of orthogonal eigenvectors and Λ is a $p \times p$ diagonal matrix of the corresponding positive eigenvalues, in decreasing order. For a symmetric matrix the sum of the eigenvalues is equal to the trace of Σ which expresses the total variation in the observed x -variables. That means the largest eigenvalues can be retained and their corresponding eigenvectors describe an arbitrarily large proportion of the correlation in Σ . Eigenvectors belonging to large eigenvalues explain much of the variation in the x -variables. Retaining r eigenvalues and eigenvectors gives:²

$$\tilde{\Sigma}_{p \times p} = C_{p \times r} \Lambda_{r \times r} C'_{r \times p}.$$

Since the eigenvalues are always positive, the correlation matrix can be rewritten as

$$\tilde{\Sigma}_{p \times p} = C_{p \times r} \Lambda_{r \times r}^{1/2} \Lambda_{r \times r}^{1/2} C'_{r \times p} = (C_{p \times r} \Lambda_{r \times r}^{1/2}) (\Lambda_{r \times r}^{1/2} C'_{r \times p}) = P_{p \times r} P'_{r \times p}$$

where P is a $p \times r$ matrix of *factor loadings* in the case of PCF approach.³

The PF-approach differs from the PCF-approach by analysing a reduced version of the covariance matrix Σ due to the following decomposition:

$$\Sigma = \Sigma^{reduced} + \Psi,$$

where $\Sigma^{reduced}$ is the covariance matrix analysed in the PF-approach. Contrary to the PCF the x -variables are allowed to be generated by a set of common latent factors as well as by a unique error term. Therefore, the analysis looks only for the common factors which are isolated in $\Sigma^{reduced}$, while the unique variation is represented by Ψ

$$\Sigma = \Sigma^{reduced} + \Psi = \tilde{P}\tilde{P}' + \Psi$$

The common variance, called the *communality*, is measured for each x -variable by the overall fit (R^2) of the regression of x_i on all the x 's except for x_i and is represented in the diagonal of $\Sigma^{reduced}$. Since the common variance is smaller than the total variance of the x 's, the eigenvalues associated with $\Sigma^{reduced}$ *might* be negative meaning that eigenvectors associated with negative eigenvalues cannot be retained (since the retained eigenvalues enter with a square root in the definition of P).

¹ Other approaches or estimation methods are iterated principal-component factor and maximum-likelihood factor, cf. StataCorp. (2003).

² See Johnston and DiNardo (1997).

³ See Johnston and DiNardo (1997) and Everitt (1984).

Box 3.1 (continued)

The number of retained eigenvalues and eigenvectors should be chosen so they reproduce the covariance matrix Σ well and have an economic interpretation. In the literature there are three rules of thumb guiding the choice:⁴

1. Each eigenvector is associated with an eigenvalue higher than one
2. Each eigenvector explains more than 10 per cent of the overall variance/covariance
3. The number of chosen eigenvectors cumulatively explains more than 60 percent of the overall variance/covariance of the observed variables.

These rules are only indicative and the final choice of retained eigenvectors must also have an economic interpretation and is guided by the grouping of variables, from how strongly correlated with the eigenvectors they are.

The matrix of *factor loadings*, P , from either method can be rotated using matrix operations retaining their original orthogonality while making the economic interpretation easier. Here the *Varimax* rotation scheme is applied. It is designed to have each of the x -variables primarily *load to* (be correlated with) just one of the rotated factor loading vectors P .⁵

Having decided on how many eigenvalues to retain and rotated appropriately, the r factors representing the p x -variables are now determined as the linear combination of the p variables and the r eigenvectors and is referred to as the *factor score*. The OECD⁶ exploits that the elements in P are a measure of the correlation between the x -variables and the factor loading vectors, whereby the squared normalized elements in each factor loading vector measure the proportion of the variance shared by the x -variable. So, for calculating the factors, each x -variable is weighted according to the proportion of its variance that is explained by the factor it is associated to (i.e. the normalised squared loading). Thus, factors are calculated as:

$$f_{(r \times 1)} = \begin{pmatrix} \frac{p_{11}^2}{\sum_{i=1}^p p_{1i}^2} & \frac{p_{12}^2}{\sum_{i=1}^p p_{1i}^2} & \frac{p_{13}^2}{\sum_{i=1}^p p_{1i}^2} & \dots & \frac{p_{1p}^2}{\sum_{i=1}^p p_{1i}^2} \\ \frac{p_{21}^2}{\sum_{i=1}^p p_{2i}^2} & \frac{p_{22}^2}{\sum_{i=1}^p p_{2i}^2} & \frac{p_{23}^2}{\sum_{i=1}^p p_{2i}^2} & \dots & \frac{p_{2p}^2}{\sum_{i=1}^p p_{2i}^2} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ \frac{p_{r1}^2}{\sum_{i=1}^p p_{ri}^2} & \frac{p_{r2}^2}{\sum_{i=1}^p p_{ri}^2} & \frac{p_{r3}^2}{\sum_{i=1}^p p_{ri}^2} & \dots & \frac{p_{rp}^2}{\sum_{i=1}^p p_{ri}^2} \end{pmatrix} x_{(p \times 1)}$$

factor score

There are other ways of calculating the factor scores and thereby the factors,⁷ however, in this study the OECD method is chosen.

⁴ See Boylaud and Nicoletti (2000).

⁵ See Everitt (1984).

⁶ See Nicoletti, Scarpetta and Boylaud (1999)

⁷ Other scoring methods are the exact eigenvectors and eigenvectors weighted by the inverse of the covariance matrix. Cf. Everitt (1984)

3.3. Results of the factor analyses

This section reports the results of the factor analyses we performed for each of the four sectors, for domestic and foreign barriers, and using both principal-component factor (PCF) and principal factor (PF) respectively, thus totalling in 16 factor analyses. For all sectors the IMRIS indicators are reduced to two factors.

In table 3.2 the weights for foreign barriers in accountancy is reported. For this barrier establishment, use of inputs and distribution is grouped together to factor 1 with the weight shown. Promotion, sales and non-legal barriers are grouped into factor 2 with another set of weights. The complete result of all factor analyses is reported in appendix F.

Table 3.2 Example: Factor weights for accountancy, foreign barriers

Categories for accountancy	Factor 1	Factor 2
	Weights	Weights
Establishment	0.30	0.01
Use of inputs	0.28	0.02
Distribution	0.32	0.00
Promotion	0.05	0.25
Sales of services	0.02	0.46
Non-legal barriers	0.03	0.26

Source: Copenhagen Economics

With regards to the individual analyses of domestic and foreign barriers across sectors, they do reveal some regularity in the grouping of barriers into the factors, cf. table 3.3. The general pattern is that barriers regarding establishment and distribution belong to factor 1 (F1) and promotion and non-legal barriers belong to factor 2 (F2).

We furthermore detect a tendency that barriers affecting the up-stream end of the value-chain (e.g. establishment) are mostly included in factor 1 and barriers affecting down-stream activities tend to belong to factor 2. However, there are deviations from this pattern, and therefore we chose not to label the factors other than 'factor 1' and 'factor 2'.

Table 3.3 Factor grouping of barriers, all sectors

		Establishment	Use of inputs	Promotion	Distribution	Sales of services	Non-legal
Accountancy	Domestic	F1	F1	F1	F1	F2	F2
	Foreign	F1	F1	F2	F1	F2	F2
IT-services	Domestic	F1	F2	F2	F1	F2	F2
	Foreign	F1	F1	F2	F1	F2	F2
Retail	Domestic	F1	F2	F2	F1	F1	F2
	Foreign	F1	F2	F2	F1	F1	F1
Wholesale	Domestic	F1	F2	F2	F1	F1	F1
	Foreign	F1	F2	F2	F1	F1	F2

Note: Grey fields indicate the barrier belongs to factor 1 and white fields indicate the barrier belongs to factor 2.

Source: Copenhagen Economics

The rules for selecting the number of factors were given in box 3.1, and are based on the initial PCF analysis. Especially, the results show that an addition of one extra factor only contributes 10%–14% in explaining the correlations between the IMRIS indicators, a result which also can be seen in the eigenvalues being below one for those extra factors. Results for both PCF and PF are reported for comparison, although only one method is chosen for each sector. The overall choices for sectors are presented in table 3.4.

Table 3.4 Overview of factor analyses on sectors

Sector	No. factors	Factor reducing method	Reason for choice of method
Accountancy	2	Principal-component factor	Low uniqueness of indicators suggests that total variance is common.
IT-services	2	Principal factor	High uniqueness for <i>distribution</i> and <i>use of inputs</i> suggests that total variance can be split into a unique and common component.
Retail	2	Principal factor	High uniqueness for (foreign) <i>non-legal barriers</i> and <i>sales of services</i> suggests that total variance can be split into a unique and common component.
Wholesale	2	Principal-component factor	Low uniqueness of indicators suggests that total variance is common.

Source: Copenhagen Economics

The reduced factors are used to calculate new variables for the barriers by converting the original IMRIS into two factors using their factor weights. These common factors are used for estimating the impact of barriers on firm performance.

Factor analysis is proven to be a useful technique to reduce an abundant amount of information to a limited number of new variables capable of explaining some the variance in firm performance. However, it is not without problems to use the factor analysis approach. As with any empirical method it is sensitive to modifications in the basic data. Data revisions and updates, possibly implying additional observations (such as the inclusion of new countries), may change the set of weights that are used to compute the summary indicators. The results are also likely to be sensitive to the presence of outliers, which may introduce an unexplainable variability in the data. Finally, data limitations may imply difficulties in the statistical identification and the economic interpretation of the unobserved factors. As far as possible we have taken care of these issues and we consider factor analysis as the appropriate tool for the present analysis.

As stressed above, the results from the factor analyses do not produce a similar pattern in the grouping of IMRIS categories, especially between domestic and foreign barriers within the same sector. This poses a problem in directly comparing factor-reduced IMRIS values, since the factor analyses assign the categories to different types of barriers and since the estimations reveal that the types of barriers are fundamentally different, i.e. cost- and rent-creating. However, the factor analysis specifically singles out the categories which vary in same way. Thus, if the grouping of categories for domestic and foreign barriers within a sector is different, it reflects the fact that the impact of barriers is fundamentally different for domestic and foreign service providers, respectively. Alternatively, applying factor analyses such that the categories were grouped the same way for domestic and foreign barriers, the issue would have been eliminated. In turn, this would have reduced the explanatory power of the reduced factors and ignored a significant amount of the observed variation in the primary data. We consider this problem of losing information to be crucial and have, therefore, chosen to apply the factor analyses separate for domestic and foreign barriers.

3.4. Estimating the impact of barriers

With the barriers described by summary indicators we can continue to evaluate their impact on firm performance. This section deals with the applied methodology in the estimation of the

performance impact of the barriers. The used estimation techniques are presented followed by exact specifications of the models. Finally, the section is concluded with a derivation of the formulas for calculating tariff equivalents.

Estimating the price and cost impact of barriers

This study measures the impact of barriers on the price-cost margins of firms to assess the impact of barriers, as used specifically by Kalirajan (2000) and Nguyen-Hong (2000). If barriers increase price-cost margins they are interpreted as rent-creating in the above mentioned terminology. Similarly a negative effect on the price-cost margins from barriers is interpreted as indirect evidence that the barriers are cost-creating.

In Kalirajan's (2000) study he applies a two step approach to estimate the effects of the observed barriers. The technique separates the economy-wide effects and firm specific effects on firms' price-cost margins. The first step estimates firm level price-cost margins on a range of other firm level variables, but with an extra component relating to any specific profits coming from firms operating in different countries. It is exactly this country specific component in price-cost margins that are affected by the barriers, since barriers to trade are equal for all firms within a single country. The second step then estimates the country specific profit component on the observed barriers to trade in services. Combining the results from these two steps, the direct effect of barriers on firm profits can be calculated.

The approach has two benefits. One, it does not use a single equation with both country specific and firm specific explanatory variables, which otherwise could create a bias in the model estimates, cf. Moulton (1986) and Kalirajan (2000). Two, it reduces the problem of differences in country coverage of firm level data. I.e. a country with a good coverage of firm data will result in that country's estimate of country specific profit being that much better determined. The second step is *only* using country level data, thus data coverage is the same (one observation per country). On the contrary a severe drawback of the technique is that it actually assumes *two* independently distributed error terms, but the first step completely ignores this.

In comparison, Nguyen-Hong (2000) tests if the economy specific effect is more appropriately left out, and then uses a single-step estimation, with both firm-level and country-level data. The model then directly explains the impact of barriers to each firms' profit margin, and not through a second step estimation. This method also overcomes the problematic structure of the error terms. Furthermore, the single-step approach allows the factor-reduced IMRIS to influence all firms in an economy instead of only affecting the economy-wide effect, e.g. if a country has a many firms the barriers' effects are estimated on the complete variation as opposed to an aggregated fixed effect.

We have analysed the impact of barriers using both the single-step and two-step approach, and as Nguyen-Hong (2000) we find that single-step estimation is the most appropriate with respect to this analysis. The following section outlines the rationale and specification of the models used for estimation.

Specification of the regression models

The analysis uses a specification of firm profitability that takes the barriers' influence into account as well as firm specific differences. Briefly stated, if firms are protected through imposed barriers to competition, the profitability is increased, while barriers that raise cost influence profits negatively. The model is adopted on firm level where firms within the same country are affected equally by the specific country's barriers, i.e. each firm's profit margin is explained both by data on firm level and economy-wide information. At the firm level, each firm's profitability is affected by several factors specific to that firm. The econometric model need to control for these factors, and in the case of firms in the service sectors these factors

are profits earned on other activities, operational efficiency, size of firms, capital and labour intensity in production, and solvency of the company. Finally, at the economy-wide level each country's barriers are included to measure the direct impact on firms' performance. A more detailed explanation and rationale of the individual selected variables are presented in the following.

Kalirajan (2000) and Nguyen-Hong (2000) bases the specification of the econometric model on Betancourt and Gautschi (1993) and Mueller (1986). The general version of the model used here is a micro-level representation of firms' price-cost margin in the service sector and is specified with the above outlined rationale in mind. The exact equation is:

$$PCM_{ij} = \beta_1 NCA_{ij} + \beta_2 IvS_{ij} + \beta_3 IvS_{ij}^2 + \beta_4 Sales_{ij} + \beta_5 Sales_{ij}^2 + \beta_6 dSales_{ij} + \beta_7 CapInt_{ij} + \beta_8 Solv_{ij} + \beta_9 LabPd_{ij} + \beta_{10} frIMRIS_j \quad (1.1)$$

Where the variables are defined as:

- PCM_{ij} : Price-cost margin of firm i in country j .
- NCA_{ij} : Proportion of revenue from non-core activities in firm i in country j .
- IvS_{ij} : Efficiency of supply, measured as the ratio of inventories to sales in firm i in country j .
- $Sales_{ij}$: Total revenue from sales in firm i country j .
- $dSales_{ij}$: Growth in sales for firm i in country j .
- $CapInt_{ij}$: Capital intensity in output, measured as the ratio of capital to sales in firm i in country j .
- $Solv_{ij}$: Solvency ratio in firm i in country j .
- $LabPd_{ij}$: Labour productivity, measured as sales per employee in firm i in country j .
- $frIMRIS_j$: Factor reduced IMRIS indicators of restrictiveness in country j .

The price-cost margin is defined here as the price of output minus cost of input divided by the price. This is the mark-up ratio for firms. Note, that multiplying the price-cost margin by output yields the profit margin, defined as profits over revenue.

Since the sectors analysed in this study are business services, the econometric specification and the variables' expected impact on the price-cost margin are the same across sectors. Although, for *accountancy* and *IT-services* the efficiency of supply is dropped, for reasons described later. The variables are explained in more detail in the following.

The variable *non-core activities (NCA)* captures the effect that firms tend to engage in activities not directly related to their core business and therefore have proceeds from these activities. These proceeds are included in firm revenues. The price-cost margin will then include information of the main business as well as the non-core activities. The proportion of revenue accrued to non-core activities will capture this relationship. Large revenue from non-core activities will tend to increase the price-cost margin, since cost are unaffected by the non-core activities.

The variable *efficiency (IvS)* is a measure of how well a firm is able to deliver to its costumers. Especially *retail* and *wholesale* firms are in the business of reselling goods and should be able to meet demand for goods as it arises. Thus, they should have inventories large enough to supply costumers when demanded. On the other hand, running too large inventories incurs overhead and maintenance costs. The ratio of inventories to sales intends to explain this relationship and is included in non-linearly in the specification for the *retail* and *wholesale* sectors by using the square of the ratio.

The variable *sales* (*Sales*) is used as proxy for firm size. Large firms, will be better equipped to supply its costumers, through for example a larger assortment of products, the ability to communicate information on what they can offer and because they may have reached a critical size to stay in business. Thus, size is expected to increase the profit. However, size can be hindering profits from increased administration and other overhead costs. Therefore, sales are included in a quadratic form.

The variable *growth in sales* (*dSales*) captures effects of above-normal profits. Firms could be earning above-normal profits in the short run when they experience rapid increases in demand, e.g. from the introduction of new products or the opening of a new branch. So, following Nguyen-Hong (2000), growth in sales is included to capture these effects and is expected to have a positive influence.

The variable *capital intensity* (*CapInt*) captures the firms' use of capital in producing services and is measured by the capital intensity, i.e. the ratio of capital to total sales. In the *retail* and *wholesale* sectors it represents ambience for the costumer. E.g. a large store giving the customer a positive shopping experience. For the sectors, *accountancy* and *IT-services* the capital intensity represents support capacity for the knowledge intensive service, e.g. a large IT firm having access to large data processing power increasing productivity. The capital intensity variable captures this expected positive effect.

The variable *solvency ratio* (*Solv*) is used as a proxy for the quality of management. The argument is that management in a firm influences the overall profits of a firm. Overall, if a firm is run poorly, it is not expected to have high profits. The solvency of firms is intended to proxy exactly this influence. Although, poor performance is not necessarily a result of bad management, it could stem from firms being faced with financial distress. Thus, high solvency ratios affect profits positively.

The variable *labour productivity* (*Labpd*) is measured as sales per employee. Firms are expected to have higher price-cost margins if there is high labour productivity. This relationship is very similar to the case with capital intensity. E.g. high performing sales people boost profits. Thus, the labour productivity is expected to have a positive sign in the estimation.

Finally, but not least important, the restrictiveness indicators measure the countries' regulatory barriers on firms operating in the economy. As mentioned previously the barriers can affect firms in two distinct ways. They can be cost-creating pushing up costs for firms faced by the barriers, they can be rent-creating working as protecting the established firms from new entrants, or they can be both cost and rent-creating. If the estimated coefficients to the barriers are positive it is interpreted as a sign of rent-creating barriers, cf. Kalirajan (2000) and Nguyen-Hong (2000), while a negative coefficient reflects cost-creating barriers.

This model is estimated for each of the four sectors, with the explanatory variables taken from the factor analysis and the AMADEUS database. The models are estimated twice with domestic and foreign factor-reduced IMRIS as explanatory variables respectively. This is to separate the effects of foreign and domestic barriers and to avoid problems of correlation *between* domestic and foreign indices, cf. Kalirajan (2000) p. 38.

Finally, adding a stochastic error term, equation (1.1) specifies the econometric model for each sector, although with the exception of the efficiency variable for *accountancy* and *IT-services*. The models are estimated using ordinary least squares (OLS).

This concludes the section on the econometric methodology used. The next section gives a brief description of the data sources and empirical issues regarding the firm-level data and is

followed by the final section presenting the results of the quantifying the direct impact of barriers to trade in services.

3.5. Description of data and data sources

The cross-country dataset used in this part of the study encompasses two strains of data. The first is the micro-dimension consisting of company performance data, while the second contains the economy-specific indices of trade restrictiveness (IMRIS). This section presents the former, while the latter is described thoroughly in the next chapter.

Micro data

The firm-level data used is company accounting data from the full version of Bureau van Dijk's AMADEUS database (Bureau van Dijk, 2004a), which covers approximately 6 million companies in Europe. The main advantage of the dataset is that it covers a wealth of small and medium enterprises, rather than being restricted to large or listed companies only, which appears to be a limitation in previous studies. Here the limitation is in using accounting data, since they cannot be corrected for market value because most companies are not listed on the stock market. A more detailed description of the data source is presented in box 3.2. The estimation adopts 2002 as the year for the analysis, as it is the latest year for which complete information on most of the variables considered, is available. Table 3.5 below summarises the dataset construction process, which involves five major steps.

Table 3.5. Overview of dataset construction

Step in construction phase	Accountancy	No. of observations		
		IT-Services	Retail	Wholesale
1. Initial no. of companies available (incl. incomplete observations)	40500	194800	264500	387400
2. Complete observations	12500	27700	128000	130000
3. Replacing missing sales figures with turnover data	14209	28844	130864	147873
4. No. of eliminated influential observations	-1888	-3843	-13196	-14678
5. Final no. of observations in dataset	12321	25001	117668	133195

Source: Copenhagen Economics

Step 1. Initial extraction of companies and assigning them into sectors according to the NACE number. The observations were preliminarily screened and only those with a valid NACE number and a non-missing figure for total operating revenues were retained.

Step 2. The model's variables were calculated, which was followed by selecting only those observations for which all relevant variables were not null. Unfortunately, as a consequence, a few countries disappeared completely from the datasets (most notably Denmark and United Kingdom) on account of missing sales figures for 2002 and/or 2001. Step 3 provided a solution to this problem.

Step 3. In order not to exclude too many countries from the estimation due to missing observations, the missing sales figures were replaced with operating revenue figures, where available. The sales figure includes all the revenue a company gets from selling its products to its clients. The *operating revenue/turnover* figure includes sales plus all other revenue linked to the normal operations of the company, e.g. subsidies in some countries and variability in stock holdings. In most cases the figure of *sales* is very close to the figure of *operating revenue/turnover* (Bureau van Dijk, 2004a). This replacement is equivalent to assuming that a company with total operating revenue equal to sales does not derive any revenue of either financial or extraordinary nature.

The difference in the number of companies available in step 2 and step 3 is the number of added back companies, for which the sales figures were replaced with operating revenue. Most

notably, however, this number included countries which would otherwise have been entirely left out.

Box 3.2. Issues regarding the quality of data

Data source

Scarcity of comparable data sources makes it difficult to check the accuracy of the Amadeus data used. There are gaps in reports when the data is not made available by companies (e.g. detailed accounts for many German companies, turnover for smaller British companies) either in accordance with the national laws or in violation with the national laws (Bureau van Dijk, 2004a). Based on prior studies (Kalirajan, 2000 and Nguyen-Hong, 2000), however, it appears that the AMADEUS data is sufficiently accurate, despite certain shortcomings. Below, we highlight the most important issues affecting the quality of the dataset.

The major shortcoming is where one or more variables is missing per observation (company), which significantly limits the number of complete observations (companies) we can construct. In extreme cases, this means that no complete observations are available, which renders complete countries unavailable for the analysis. To some degree, the problem of missing or incomplete data can be attributed to variation in country-specific filing requirements, or the enforcement thereof, which determines how much financial information is disclosed by companies. For instance, Bureau van Dijk, acknowledges that are difficulties in accessing data in some East-European countries, which is also reflected in the smaller number of observations that are available to us in those countries. Fortunately, we were able to maintain complete coverage of all industries in Eastern Europe, with the exception of the Lithuanian Accountancy sector. On the other hand, problems appeared for some industries in certain West-European countries listed below:

- In the case of *Lithuania*, only the accounts of public companies are available. This, together with the small number of Lithuanian companies in Amadeus, has made it impossible to include the country in our Accountancy dataset.
- With the exception of the Retail sector, we were unable to cover *Luxembourg*. The format of accounts is not standardised in that country, and small and medium companies are allowed to file abridged accounts, which turn out not detailed enough for this purposes.
- The coverage of *Irish* companies relatively scarce in Amadeus and missing data makes it impossible to include the country in all sectors with the exception of Wholesale, in which case no more than 6 observations have been available.
- Lax enforcement of the filing requirement, or no obligatory filings for certain types of companies, is also present in *Austria*, where only 50.000 large and medium companies make their accounts publicly available. The consequence is incomplete financial information available in Amadeus, which causes Austria to drop out from the dataset on Accountancy companies.
- The number of *German* firms covered in the dataset is low since only 10.000 large or medium companies and 25.000 small companies publish their accounts (Bureau van Dijk, 2004a). This represents only 8.75% of the total number of AG, GmbH, and e.g. companies which are legally obliged to file accounts. Furthermore, there is no standardised format of accounts and the average time of filing takes 9-12 months, except for public companies.

Step 4. Having secured nearly complete country coverage for the sectors, observations were eliminated which either 1) unusually affected parameter estimates or 2) were considered as outliers.

The first group of observations to be excluded was identified by computing the DFBETA statistic. The DFBETA determines if one observation exerts an unusually large influence on one or more parameter estimates and is in fact calculated on the basis on the model in the estimation step 1. The statistic is calculated for each observation as a scaled measure of the difference between the OLS estimate of a parameter and the corresponding estimate of that parameter with the n^{th} observation left out. Observations, for which the two parameter estimates are statistically different are influential and were excluded.

The second group of observations to be excluded was determined by means of examining the *studentized deleted residuals* (SDR). The statistic is computed by dividing the raw residual by its standard error as in standardized residual, but here with the n^{th} observation left out before computing the residual and the standard errors. This prevents the n^{th} observation from influencing these statistics. SDRs greater than 2 in absolute value were eliminated from the sample.

Step 5. A last inspection revealed that observations from Czech Republic were error prone, especially for *inventories* and *sales*. Top 5% and bottom 5% of observations according to the efficiency variables were deleted for Czech Republic to deal with this problem. In addition, firms in the UK in *IT-services* also showed a significant error rate. These data were also deleted. The pruned dataset was then produced and subsequently used for the final estimation. The number of observations for each country varies significantly, with some countries accounting for almost half of the total observations. Inspection of the data reveals large variation in the variables between countries, but also within countries. E.g. the average revenue in the retail sector ranges from 0.6 million Euros in Estonia to 205 million Euros in Germany, while the variation in France given by the standard deviation is 31 million Euros with the average at 2 million Euros. This large variation in the data is not uncommon for cross-sectional data, but the nature of the data gives an indication that data covers a too diverse set of companies. This could pose difficulties in estimation where the models seek to explain common characteristics for all companies in all countries. However, these problems were not considered severe, and the results from the estimations show that using this dataset is justified.

Concerning the IMRIS indicators used, the collected data is based on information on the status of restrictiveness in 2004, while the available firm-level data is from 2002. Ideally the firm data investigated should be from a period after the IMRIS, to capture the causality of restrictiveness influence on performance. However, it has not been possible to combine the goal of present IMRIS indicators with firm level impacts. In the Internal Market the restrictiveness is expected to be falling over time, thus, the results presented here are a conservative guess of the direct impact on firms' performance.

3.6. Result of the regression analyses on firm performance

The main results from the regressions are presented in table 3.6, i.e. only the coefficients to barriers are reported. The estimation was performed on 20 countries from the European Union, i.e. Estonia, Lithuania, Poland, Czech Republic, Hungary and EU15. However, in the case of *accountancy* UK and Hungary were left out because of extreme observations, and for *IT-services* UK was left out.

Table 3.6 Coefficients to barriers, results from regressions

Variable	Domestic barriers				Foreign barriers			
	Account.	IT	Retail	Wholesale	Account.	IT	Retail	Wholesale
P-c margin								
Factor 1*	-0.402 ^a (0.0336)	-0.189 ^a (0.0547)	-0.0772 ^a (0.00478)	-0.0281 ^a (0.00282)	-0.210 ^a (0.0190)	-0.0631 ^a (0.0267)	-0.0628 ^a (0.00379)	-0.0374 ^a (0.00243)
Factor 2*	0.340 ^a (0.0252)	0.0186 (0.0691)	0.243 ^a (0.00643)	0.10308 ^a (0.0114)	0.312 ^a (0.0370)	0.0275 (0.0197)	0.169 ^a (0.00711)	0.0210 ^a (0.00348)
No. obs	12320	21646	117661	133167	12320	21646	117661	133167
F-value	244.25	164.8	972.81	1639.43	236.64	164.13	950.6	1657.19
R ²	0.1515	0.0642	0.0834	0.1193	0.1475	0.0639	0.0816	0.1204

Note: Standard errors in parenthesis. *PCF for accountancy and wholesale, PF for IT and retail. ^a Coefficient estimate is significant at 5% level. Source: Copenhagen Economics

Due to lack of observations in several countries, a number of countries have not had their barriers estimated. The countries in question are:

Accountancy: Austria, Ireland, Luxembourg and Lithuania
IT-services: Ireland and Luxembourg
Retail: Ireland, Finland and Lithuania
Wholesale: Luxembourg and Lithuania

Thus, the estimation does not include these countries. Furthermore, it is not possible to extrapolate the estimated barriers to those countries, because it is exactly those variables needed for the conversion to tariff equivalents that are missing.

Examination of the results reveal that the models fit reasonably well, although compared to other studies have less variation explained. However, since this analysis is based on a vastly larger dataset the R-square values cannot easily be compared. Here the dataset contains more than 1000 times more observations, which means that the variation in the dependent variable cannot be captured to the same degree using similar models. The models here explain some of the variation in profit margins, where the share is 15% for *accountancy* and 6.5% for *IT-service*. This indicates that more explanatory variables could be needed. Attempts were made to include more country specific variables, but this did not improve the models. In comparison, Kalirajan (2000) and Nguyen-Hong (2000) have values of 38% and 37% respectively. Tests of all coefficient being insignificant (F-test), i.e. the hypotheses that the overall models do not explain the variation, are all rejected.

For the individual estimates, the non-core activities have a significant and positive coefficient in all sectors, except in IT-services where the sign is negative. This can be attributed to poor results in IT firms that have engaged in those activities, which can have increased costs and reduced the profit margin. Recall that the profit margin is overall profits over overall revenue.

In the case of *retail* and *wholesale* efficiency of supply shows a surprising result. The coefficients to the quadratic form reveal that there are large gains when firms have very high inventories to sales ratio, and in the case of *wholesale* even negative influence when inventories increase in small amounts. However, the sign on the quadratic form for *retail* is

insignificant. For *wholesale* this effect could be explained by economies of scale, where large warehouses with huge stock, gives rise to higher capability to supply costumers, and thus and increased profit margin. This is similar to the results in Kalirajan (2000) that also has negative sign on efficiency and positive sign on the square.

The same quadratic form also emerges for the revenue for *accountancy*, *IT-services* and *wholesale*. There is a negative sign on the linear term and a positive sign on the squared term. This means that a small increase in sales reduces the profit margin, while large increases boosts the margin. If firms operate efficiently then small fluctuations will have negative effects, while large increases have positive effects. The latter is also revealed in the coefficient to growth in sales being positive.

The significance of the barriers is generally very satisfactory. It is only for *IT-services* that one of the coefficients is insignificant; however, this is both for domestic and foreign barriers.

Investigation of the coefficients to the barriers shows the general pattern that the first factor-reduced barriers are cost-creating, while the other is rent-creating. In comparison Kalirajan (2000) only identified cost-creating barriers to distribution services, while Nguyen-Hong (2000) found foreign barriers to engineering services to be rent-creating and domestic barriers to be cost-creating. The estimated coefficient in the two studies are of the same magnitude as here, Kalirajan (2000) has barrier estimates in the range -0.395 to -0.182 on profit margin, while Nguyen-Hong (2000) has barrier estimates in the range 0.37 to -0.55.

The results also show that the estimated coefficients to foreign barriers are lower than for domestic barriers for the individual sectors. This is a consequence of performing the estimations on the same data for both domestic and foreign barriers. Since the domestic IMRIS indices are by definition lower than foreign IMRIS indices, and the econometric model is formulated in linear terms, the differences between the levels of domestic and foreign indices are reflected in the estimated coefficients. The same issue is also present in both Nguyen-Hong (2000) and Kalirajan (2000).

3.7. Transformation to tariff equivalents

With the estimated coefficients of the direct impact of barriers it only remains to convert them into tariff equivalents. Based on the identification of the barrier being either cost or rent-creating the conversion to tariff equivalents is done by using a simple transformation. The exact equations for the transformations are presented in box 3.3. Again, it should be noted that the tariff equivalents can be thought of as hypothetical taxes creating economic effects that are equivalent to the economic effects of the actual barriers as measured by the IMRIS indices.

Conversion to tariff equivalents

The complete set of tariff equivalents for all sectors across countries are presented in appendix D. Included is also the calculated tariff intervals based on the 95% confidence intervals of the estimated coefficients. Due to the low level of significance for one of the estimates, the confidence intervals span across zero, thus changing signs on the coefficient within the range. In this case, however, the interpretation of the tariffs does not make sense, since the identification of the barrier type is based on the sign. Consequently, the tariffs were cut off at zero when the bounds change signs.

In some cases the calculated tariff equivalents for foreign barriers report a lower percentage than for domestic barriers, which at first glance suggests that domestic firms are faced by higher barriers than foreign firms. However, this interpretation is not valid for several reasons. First, the factor analyses group the IMRIS categories differently for domestic and foreign barriers in a sector, thus making the factor-reduced IMRIS incomparable. Second, the impact of barriers is measured against the variation in price-cost margins, but since these margins are ratios the calculated tariffs are underestimated if the impact affects both the nominator and denominator in the price-cost margins. Third, the econometric analysis, by nature, assumes the estimated coefficients to barriers are equal for all countries while allowing for variation in the observed impacts of barriers. Thus, the conversion to country specific tariff equivalents reintroduces the variation resulting in some tariffs being very low while others are high. Because of these factors, the reported tariff equivalents are, as such, a conservative representation of barriers to trade in services.

For *accountancy* the cost-creating domestic barriers translates into somewhat high tariffs, while the rent-creating barriers translates to medium level tariffs. These high cost-creating barriers are not surprising in a highly regulated sector as *accountancy*, where there are strict rules for opening practices.

For *IT-services* the tariffs are notably lower; the cost-creating tariffs are all below 5%. A characteristic for this sector is that the domestic barrier tariffs are markedly higher than the foreign counterparts. The results show that there are almost no tax effects of foreign barriers, while domestic restrictiveness carries some cost increasing effects. The low tariff equivalents are expected, since IT-services is an unregulated professional service sector.

In the case of the *retail* sector, the foreign cost-creating barriers seem to have generally higher tariff equivalents compared to domestic barriers. The rent-creating barriers are significantly higher and again the discrimination against foreign firms is apparent.

Finally, the results in the *wholesale* sector show that foreign cost-creating barriers have clearly higher tariffs compared to domestic barriers. However, the rent-creating barriers show the opposite picture. The tariffs converted from domestic barriers are all well below 2%.

Comparing with the tariff equivalents shown in Kalirajan (2000) and Nguyen-Hong (2000), the magnitudes are similar, although not surprising given that the estimation results are very similar. The difference found in tariff equivalents comes from the fact that the country average *revenues* and *profits* are used for tariff conversions, and the numbers in this study are based on a completely different data source. The other studies have used a datasets limited by companies being listed, while this study used here contain detailed accounting data from more than 275 000 companies.

Box 3.3. Conversion of barriers to tariff equivalents

Cost-creating barriers

The conversions are based on profit margins, which can be expressed as the price-cost margins:

$$\frac{\text{profit}}{\text{revenue}} = \frac{PQ - vQ}{PQ} \approx \frac{P - v}{P} \quad (1.A)$$

Where P are prices, v are variable cost and Q are output. Using subscript zero for the case of no barriers, the impact on price-cost margins are:

$$\frac{P - v}{P} - \frac{P_0 - v_0}{P_0} = \frac{P - v}{P} - \frac{P_0 - v_0}{P_0} = \alpha \cdot I \quad (1.B)$$

Where I is the indicator for the barrier. This is rewritten as:

$$\left(1 - \frac{v}{P}\right) - \left(1 - \frac{v_0}{P_0}\right) = \frac{v_0 P - v P_0}{P_0 P} = \alpha \cdot I \quad (1.C)$$

Now assuming that prices are unaffected and the barrier only impacts cost, i.e. $P = P_0$ gives

$$\begin{aligned} v_0 - v &= P(\alpha \cdot I) && \Leftrightarrow \\ v - v_0 &= -P(\alpha \cdot I) && \Leftrightarrow \\ v_0 &= v + P(\alpha \cdot I) \end{aligned} \quad (1.F)$$

Which is the variable cost in the absence of barriers. Dividing the last two lines in equation (1.F) gives the relative increase in costs from barriers, thus the tariff equivalent.

$$TE_{\text{cost}} = \left(\frac{v - v_0}{v_0}\right)100 = \left(\frac{-P(\alpha \cdot I)}{v + P(\alpha \cdot I)}\right)100 \quad (1.G)$$

Multiplying with the productions yields:

$$TE_{\text{cost}} = \left(\frac{-PQ(\alpha \cdot I)}{vQ + PQ(\alpha \cdot I)}\right)100 \quad (1.H)$$

And assuming the cost is revenue minus profit gives the formula for the tariff equivalent:

$$TE_{\text{cost}} = \left(\frac{-\text{revenue}(\alpha \cdot I)}{\text{revenue}(1 + \alpha \cdot I) - \text{profit}}\right)100 \quad (1.I)$$

Rent-creating barriers

As for the case with cost-creating barriers the change in price-cost margin is defined by equation (1.C). Assuming the barriers only affect prices not costs, which means $v = v_0$.

$$\left(\frac{P - P_0}{P_0}\right)\frac{v}{P} = \alpha \cdot I \quad (1.J)$$

Which gives the price impact as:

$$TE_{\text{rent}} = \left(\frac{P - P_0}{P_0}\right)100 = \frac{P}{v}(\alpha \cdot I)100 \quad (1.J)$$

And again multiplying with production and assuming cost can be expressed by revenue minus profit gives the formula:

$$TE_{\text{rent}} = \frac{\text{revenue}}{\text{revenue} - \text{profit}}(\alpha \cdot I)100 \quad (1.K)$$

Note that the revenues and profits used are the averages in countries. The tariff equivalents are expressions of the average impact of barriers on costs and rents.

The conversions are based on Kalirajan (2000) pp 49–50 and Nguyen-Hong (2000) pp 60–62.

Chapter 4 Measuring barriers to EU services trade

In this chapter we explain how we have developed a tool to measure barriers to service provision.

The measurement of barriers to service provision posed an important challenge, because information about barriers is *qualitative by nature*, while econometric analysis requires quantitative input. It follows that our methodology must be able to transform qualitative information into quantitative information in a meaningful, transparent and – as far as possible – unambiguous way.

We use index methodology to transform qualitative information about restrictions on service provision into quantitative measures. We develop an index - The IMRIS (Internal Market Restrictiveness Index in Services) – to measure *de facto* barriers to the Internal Market in services. The IMRIS index is between 0 and 1. The larger the index, the more severe are the barriers to service provision in the given sector and Member State. In this chapter we describe the contents of the IMRIS and substantiate the choices we made during the development of the IMRIS.

The IMRIS can be used to analyse how different policy changes affect the barriers to service provision. We have used the IMRIS to measure the impact of the Directive on services in the Internal Market proposed by the Commission, hereafter the Directive (European Commission, 2004a). We compute the IMRIS values that will emerge, when the Member States remove all the restrictions that are incompatible with the Directive.

In Chapter 3 we used the data from the IMRIS to estimate econometrically the direct impact of barriers to service provision, i.e. how barriers affect the performance of companies (price/cost effects).

The data set used to calculate the IMRIS contains information on barriers in four different business-related service sectors: accountancy, retail distribution, wholesale distribution and IT-services. These sectors were chosen to show different types of services. Accountancy and IT-services are both knowledge intensive services, but accountancy is a more regulated service sector, and IT-services are a less regulated service sector. Retail and wholesale trade are different types of distributive trade and account for a large share of the service sector.

Barriers to the Internal Market in services appear in all stages of the value chain. We divide the value chain into seven different categories describing barriers to establishment and different types of barriers to ongoing operations as well as non-legal barriers.

We describe barriers to the Internal Market in the EU15 and five of the new Member States; Estonia, Lithuania, Poland, Hungary and the Czech Republic. We have not covered all the new Member States due to poor accessibility of information on barriers.

Barriers affect both domestic companies and foreign companies. However, barriers often discriminate between foreign companies and domestic companies. Discrimination may occur because of discriminatory legislation, because some non-discriminatory legislation affects foreign firms more than domestic firms and because of non-legal restrictions. The IMRIS distinguishes between barriers for foreign companies and domestic companies by computing both a Foreign IMRIS and a Domestic IMRIS. The difference between the Foreign IMRIS and the Domestic IMRIS can be interpreted as the discriminatory part of the barriers. It should be duly noted that de facto discrimination may remain even if legal discrimination is eliminated.

In this chapter we show aggregated results on Domestic IMRIS, Foreign IMRIS, and de facto discrimination with the current barriers to service provision in the Member States. We show results for all Member States and all sectors. The barriers seem to follow the same pattern in all Member States. Barriers are largest in the accountancy sector, while the barriers are lower in retail distribution, wholesale distribution, and IT-services. Discrimination also seems to follow the same pattern in all Member States. Discrimination is much larger for accountancy, while discrimination in the other sectors is almost at the same level.

4.1. The IMRIS Methodology

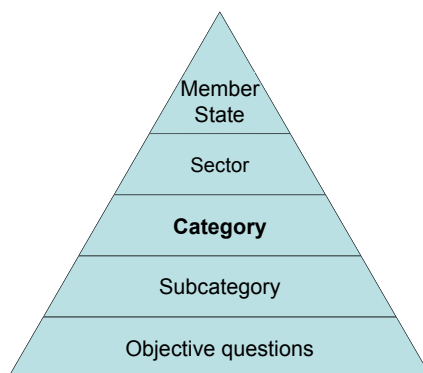
In this part we describe the IMRIS Methodology and substantiate the choices we made during the development of the IMRIS. We also document the choices of indicators used for determining the barriers and which sectors and countries the IMRIS describes.

The IMRIS measures barriers to the Internal Market for services using index methodology. An index methodology is a system of scores and weights converting qualitative information about restrictions into quantitative information based on the number of restrictions and their restrictiveness. The IMRIS index reflects the number of restrictions and the relative importance of the restrictions, thereby providing a measure of the actual barriers facing firms. The IMRIS is based on objective questions regarding legislation and other barriers to provision. This information must be structured in order to create useful quantitative indicators.

We construct a hierarchical index structure, where specific restrictions are evaluated and scored at the lower level. The scores are weighted and summarized in aggregated indices. The advantage of this approach is that it provides a clear linkage between specific and detailed restrictions and the index used in the economic analysis.

Our analysis consists of five levels. For each Member State, we evaluated four sectors. We evaluate the barriers in different stages of the value chains. This is done by breaking down the value chain into seven categories describing different types of barriers. These categories are divided into subcategories containing the specific questions regarding the restrictions on service provision, cf. figure 4-1.

Figure 4-1: Levels in IMRIS methodology



Source: Copenhagen Economics.

The IMRIS values can be aggregated at different levels. The econometric analysis is based on IMRIS indices calculated on category-level, i.e. the dataset contains an index for each category in each sector in each Member State, c.f. chapter 3. In this chapter we report an aggregated IMRIS for each sector in each Member State. We do not report a single IMRIS value for each Member State, where we have aggregated the IMRIS values across sectors.

In the following we describe the different levels in our analysis.

Member states

We describe barriers to the Internal Market in the EU15 and five of the new Member States: Estonia, Lithuania, Poland, Hungary and the Czech Republic. We have not covered all the new Member States due to poor accessibility of information on barriers in the last five Member States.

Restrictions will affect domestic firms and foreign firms differently. A restriction can be:

- **Non-discriminatory:** restricting domestic and foreign service providers equally.
- **Discriminatory:** restricting only foreign service providers, or restricting foreign providers more than domestic providers.

For example rules about price setting (maximum and minimum prices, etc.) applies to both foreign and domestic firms. Hence, these rules are non-discriminatory. On the other hand, nationality requirements restrict foreign firms only and are thus considered to be discriminatory.

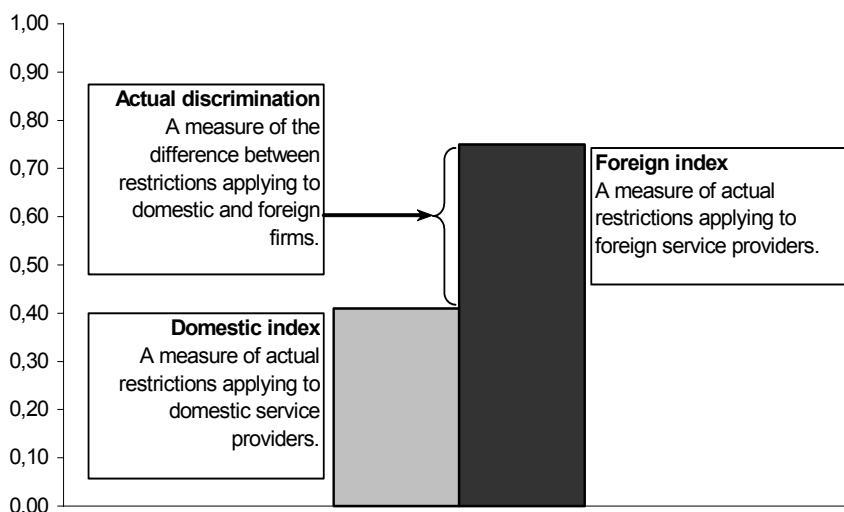
In addition, several restrictions may have more impact on foreign firms than on domestic firms. For example, restrictions on the use of temporary foreign workers will affect foreign firms more than domestic firms. Furthermore, even in the case when all non-discriminatory barriers have been eliminated, foreign firms may still face barriers for establishment in another Member State. Not because they face outright discrimination, but simply because the rules and regulations in the foreign Member State are different from the rules and regulations in the home country. The different sets of rules of regulations necessarily give rise to additional ex ante compliance costs even in the case when domestic and foreign firms – legally – are on equal terms.

We calculate both a Domestic IMRIS and a Foreign IMRIS. The Domestic IMRIS measures the severity of restrictions on service provision in a specific Member State for domestic service providers, while the Foreign IMRIS measures the severity of restrictions on service provision in a specific Member State for foreign service providers.

The Foreign IMRIS is, by definition, larger than the Domestic IMRIS, because the Foreign IMRIS captures several restriction categories involving direct discrimination against foreign services providers and because several restrictions are considered to be more restrictive for foreign firms.

The difference between the Foreign IMRIS and the Domestic IMRIS can be interpreted as the discriminatory part of the barriers. If the Foreign IMRIS and the Domestic IMRIS have the same values, the Member State is interpreted as non-discriminatory and not imposing additional barriers on foreign versus domestic service suppliers. Figure 4-2 shows the foreign and domestic indices as illustrated by McGuire (2002).

Figure 4-2: An illustration of the domestic index and the foreign index



Source: McGuire (2002).

The foreign IMRIS does not distinguish between the countries of origin for foreign service providers. This means that the Foreign IMRIS to some extent is underestimated for foreign service providers originated far from a country and overestimated for foreign service providers originated close to a country, because some barriers are smaller for service providers from neighbouring countries than for service providers from a country far away. For example, it may be easier for a German firm to export services to the Netherlands than for a Portuguese firm.

We would need a measure for the distance between languages, specific legislation, and culture, to be able to distinguish according to the country of origin. We could not find a satisfactory way to measure the distance between languages and cultures. Therefore, we do not include information about the distance between language, culture, and legislation in the calculation of the IMRIS. Furthermore, language and cultural barriers are not relevant for the analysis of different scenarios, because these barriers will not be affected by regulation. Barriers that arise because of disparities between national regulations could be removed by harmonising legislation, but when we examined the literature, we found only few indications of legal barriers depending on the country of origin for foreign service providers. These indications include legislation according to the movement of people from outside the EU and from some new EU Member States, and to some extent disparities in tax systems.

In principle, service providers originating in countries outside the EU (extra-EU) may face higher barriers than intra-EU firms. However, we decided to calculate one Foreign IMRIS only.

Hence, we do not distinguish between intra-EU and extra-EU firms. There are three reasons for this:

Firstly, we could not find sufficient data on the extra-EU barriers. Secondly, most of the barriers will be the same for foreign intra-EU firms and extra-EU firms. Hence, there would only be small differences between the Foreign IMRIS for intra-EU and extra-EU firms. Thirdly, it will often be difficult in practice to distinguish between extra-EU and intra-EU firms⁶. When a firm is established in one Member State, it automatically becomes an intra-EU firm, and it will face exactly the same legal barriers as other EU firms⁷. For example, Coca Cola is in reality an intra-EU firm, because Coca Cola have subsidiaries in EU Member States.

Sectors

We examine four different business related services: accountancy, retail distribution, wholesale distribution, and IT-services. The sectors were chosen among business related services as defined by the European Commission (see Box 4). A number of criteria led us to choose these four sectors. First, the sectors are all included in the proposal for the *directive on services in the Internal Market*, whereas financial services and network services are not (European Commission, 2004a). Second, the four sectors represent different types of business related services, but all four sectors provide services that are used as input in other businesses or services that are important for distribution of goods. Third, based on data available in the Eurostat New Cronos database on Structural Business Statistics, we find that these four sectors represent a reasonable share of value added. Fourth, the sectors include both small and medium-sized enterprises and larger multinational enterprises. One last criterion is that information on barriers should be available.

Box 4: Business related services

Business Services (NACE 70–74). This group consists of two types of services: 1) Knowledge-Intensive Business Services, which are professional services, such as Accountancy, IT-consulting, management consulting, R&D services, advertising and professional training. 2) Operational services consisting of services such as industrial cleaning, security services and secretarial services.

Distributive Trade (NACE 50–52). This group consists of enterprises facilitating the distribution of goods and services to other sectors of the economy and to final consumers.

Network Services (NACE 40–41, 60–64). This composite group consists of electricity, gas and water supply, transport and communication services.

Financial Services (NACE 65–67). This group consists of enterprises offering intermediation of financial services such as banks and insurance companies.

Source: European Commission (2003b).

Accounting (NACE 74.12) is a regulated knowledge-intensive business service and covers accounting, bookkeeping and auditing services, tax consultancy etc. Retail distribution (NACE 52) covers all types of retail trade except of motor vehicles and motorcycles and repair of personal goods and household goods. Wholesale distribution (NACE 51) covers all types of wholesale trade and commission trade except of motor vehicles and motorcycles. IT-services (NACE 72) is an unregulated knowledge intensive service and covers computer and related activities i.e. hardware consultancy, software consultancy and supply, data processing, database activities, maintenance and repair of office, accounting and computing machinery and other computer related activities.

⁶ We have similar practical problems in distinguishing between domestic and foreign firms.

⁷ In practice, it can also be difficult to distinguish between domestic and foreign firms for the same reasons.

Categories

The index methodology is common and also applied by other studies⁸. Studies commonly classify barriers by whether they restrict establishment or restrict ongoing operations:

- **Establishment:** the ability of service providers to establish physical outlets in a country and supply services through those outlets. Restrictions on establishment include those affecting services delivered via foreign direct investment.
- **Ongoing operations:** the operation of a service provider after it has entered the market. Restrictions on ongoing operations can affect services delivered by cross-border supply, consumption abroad or the presence of natural persons.

We improve this two-category classification by classifying barriers into seven different categories according to the “State of the Internal Market Report” from the European Commission (European Commission, 2002). The European Commission distinguishes between barriers that are active in six different stages of the economic value chain and a seventh category for non-legal barriers, cf. table 4-1.

Table 4-1: Categories

Number	Category	Number of sub-categories
1	<i>Establishment</i>	7
2	<i>Uses of input</i>	5
3	<i>Promotion</i>	8
4	<i>Distribution</i>	5
5	<i>Sales of services</i>	5
6	<i>After sales aspects</i>	4
7	<i>Non-Legal Barriers</i>	4

Source: Copenhagen Economics IMRIS database

The first category contains legal barriers to establishment. Categories 2 through 6 are legal barriers to ongoing operations, and Category 7 contains information about non-legal barriers, such as cultural barriers and lack of information for foreign companies.

The econometric analysis is based on indices calculated at the category level. The data set consists of six IMRIS indices per sector per Member State. We did not include the category “after sales aspects” in the data set due to poor data coverage.

Sub-categories

In the “State of the Internal Market Report”, the European Commission identifies a complete listing of sub-categories (European Commission, 2002, cf. table 4-1). For instance, within the ‘Establishment’ category seven different sub-restrictions are reported, namely⁹:

⁸ McGuire and Schuele (1999), McGuire, Schuele and Smith (2000) and Nguyen-Hong (2000) in studies of banking, maritime services and professional services. Kalirajan (2000) in studies of distributive trade.

⁹ See Table 1 in the Annex for a complete listing of barriers at each stage as reported in the most recent report on the state of the Internal Market for Services.

Table 4-2: Example of sub-categories, Establishment

<i>Stage of the value chain</i>	<i>Sub-categories</i>
1. Establishment of service providers	1.1. Monopolies and other quantitative restrictions 1.2. Nationality or residence requirements 1.3. Authorisation and registration procedures 1.4. Restrictions on multi-disciplinary activities 1.5. Legal form 1.6. Professional qualifications 1.7. Conditions concerning the exercise of service activities

Source: Copenhagen Economics IMRIS database

We give each sub-category a weight between 0 and 1 according to the importance of the sub-category in question¹⁰. The weights are qualified, but subjective, assessments of the importance of the sub-categories. We give large weights to sub-categories that we assume have a large economic impact and small weights to sub-categories that we assume have a limited economic impact.

We use the same weights for all sectors, but we use different weights for the domestic index and the foreign index. The weights for the foreign index are larger than (or equal to) the weights for the domestic index. This reflects that some barriers (both legal and non-legal) are more restrictive for foreign firms than for domestic firms. The weights summarize to unity for the Foreign IMRIS, hence the weights for the Domestic IMRIS summarize to less than unity. This means that, the Foreign IMRIS will, by definition, be larger than the Domestic IMRIS, and that the Domestic IMRIS will be below unity, even for the most restrictive Member State.

Objective questions

The basic level of our analysis, and the starting point for the calculation of the IMRIS, is the answering of a number of objective questions regarding the restrictions in each sub-category. For example, we have asked whether establishment requires that the service provider has both nationality and previous residence in the Member State. We compute a score for each sub-category based on the answering of the objective questions.

Each restriction is given a specific score between 0 (least restrictive) and 1 (most restrictive). The specific scores are based on qualified, but subjective, assessments of the severity of specific types of restrictions. If the answer to the question is yes, then the specific score for the restriction is added to the score for the sub-category.

4.2. Assessment of barriers

The IMRIS, and other indices, uses a system of weights and scores to measure restrictions based on a judgement about the relative stringency of restrictions. McGuire (2002) writes:

“This system is sometimes criticised as being arbitrary, but it is an essential component of measuring restrictions. Restrictions on trade in services, by their nature, are qualitative. Estimating the effect of restrictions requires converting qualitative information into quantitative or numerical values. The only way to convert this information is to use an index methodology, as it takes into account the number of restrictions and their restrictive effect. A pure frequency ratio only counts the number of restrictions.”

¹⁰ The use of weights for different restriction categories is discussed in detail in Hardin and Holmes (1997), Claessens and Glaessner (1998), McGuire and Schuele (2000) and OECD (1997).

We have formulated a number of objective questions regarding the restrictions on service provision. The questions are organized in categories and sub-categories, as described above.

After the formulation and structuring of the objective questions, we collected information on the restrictions on service provision in the twenty Member States. We have then assessed the restrictions by answering the objective questions and computed the IMRIS. The assessment is based on actual restrictions rather than stated limits.

Information on barriers was gathered from different sources. The sources fall into four main categories: databases, studies, investment guides and internet sites with translations of specific legislation. A complete list of data sources is listed below. The primary source of information is the OECD International Regulation Database. The data sources were chosen to cover as many indicators and countries as possible. Accountancy, retail and wholesale in EU15 were well covered by the OECD database and other studies. IT-services were covered by investment guides and similar sources. The new Member States were covered by investment guides and internet sites, mostly government sites, with information on legislation.

Information on barriers:

- International Regulation Database, which stores more than 1100 variables for each OECD-country. This has best coverage of the EU15 while the five new Member States are covered more poorly. OECD (1999)
- Studies on sectors and specific barriers. The EU15 Member States are covered by different studies surveying the barriers to specific sectors. The studies we used were all compiled either by or for organizations like the European Commission, OECD and the WTO.
Boylaud & Nicoletti (2001), European Commission (2000), Gallup(2002), Nicoletti (2001), OECD (2000), OECD (2000b), OECD(2001a), OECD (2004), Paterson, Fink and ogus (2003), PricewaterhouseCoopers (2002), OECD/PUMA/HRM (2000), UNPAN (2004), WTO (1996),
- Investment guides
HVRI (2004), European Commission (2003a), European Commission (2004), KPMG (2003), Ernst & Young (2003a; 2003b), PricewaterhouseCoopers (2004),
- Internet sites on legislation
CBA (2004), CZA (2004), EIA (2004), ELLC (2004), Infoplex (2004), ITD (2004), KPMG (2004), Kutsekoda (2004), LDA (2004), Sejm (2004), Seimas (2004), Tring (2004).

We could not find indicators of barriers in all subcategories, either because barriers do not exist, or because it has not been possible to collect information on barriers. We only base the IMRIS on reported restrictions and treat missing values in the same way as non-existing barriers, i.e. missing values give a score of zero. We do so because it is more difficult to obtain the information that a particular restriction does not exist than to obtain information about restrictions that actually exist. Table 4-3 shows for how many subcategories we were able to report data. The numbers under each sector indicates for how many subcategories we found information on barriers. The "Horizontal" column indicates for how many subcategories we found that the barriers applied to all four sectors. More details are shown in Appendix I.

Table 4-3: Number of categories where information was found in each sector

	Sub-categories	Accountancy	Retail	Wholesale	IT-services	Horizontal
Establishment	8	8	8	8	5	1
Uses of input	5	3	2	2	2	1
Promotion	5	1	3	3	1	0
Distribution	8	5	6	5	4	0
Sales of services	5	3	3	3	2	2
After sales aspects services	5	3	3	3	3	3
Non-legal barriers	4	4	4	4	4	4

Source: Copenhagen Economics IMRIS database.

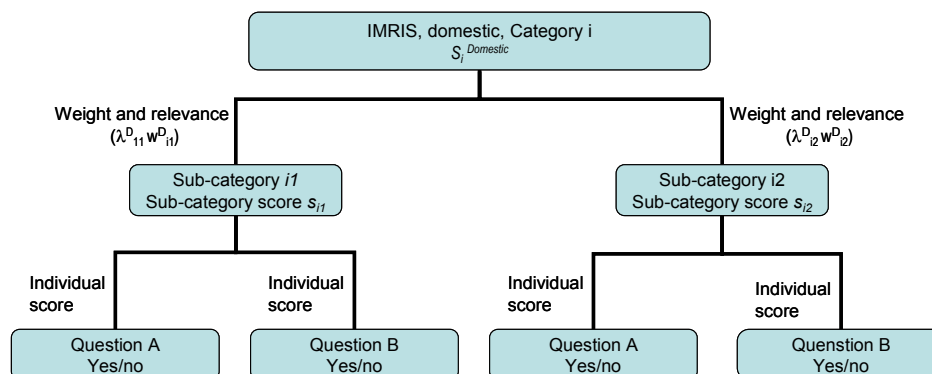
For some sub-categories we have used the same information for several sectors, cf. Appendix I. Some barriers affect several sectors, e.g. all the non-legal barriers (category 7) and some sub-categories regarding after sales aspects of services. Other barriers, for example working permits, affect all sectors except accountancy. We assume that working permits is a barrier for all sectors, but there are stricter barriers for accountancy than for the other sectors. Other barriers affect both retail and wholesale; these barriers are for example restrictions on sale of alcohol and pharmaceuticals. We have used information about barriers in the retail sector to describe barriers in wholesale sector, when we could not find the relevant information about wholesale sector.

4.3. Calculating the IMRIS

The econometric analysis is based on indicators calculated at the category level. Hence, the dataset consists of a Domestic IMRIS index and a Foreign IMRIS index for each of the seven categories for all four sectors in all twenty Member States.

We refer to the Domestic IMRIS for a particular sector (e.g. accounting) in a particular Member State (e.g. Austria) for a specific category (e.g. Establishment) as $S_i^{Domestic}$, where i refers to the category (Establishment, Use of input, Promotion, etc.). The Domestic IMRIS is calculated using a system of scores and weights, cf. figure 4-3. The figure shows how the IMRIS is calculated for a category with two subcategories, when there are two questions for each subcategory.

Figure 4-3: Calculating the IMRIS



Source: Copenhagen Economics

Each category is divided into a number of subcategories. We use subscript j to refer to the subcategories. For example, the category Establishment has ten sub-categories. We assign a weight (w^D_{ij}) to each of the subcategories, cf. table 4-4. We use different weights to calculate the Domestic IMRIS and the Foreign IMRIS, but identical weights for the same type of firm across all sectors.

Table 4-4: Subcategories for Establishment

1. ESTABLISHMENT		Foreign Weight (w^F_{ij})	Domestic Weight (w^D_{ij})	Relevant to foreign firms (λ^F_{ij})	Relevant to domestic firms (λ^D_{ij})
1.1.	Monopolies and other quantitative restrictions	0.125	0.125	1	1
1.2.	Nationality or residence requirements	0.200	na	1	0
1.3.	Authorisation and registration procedures	0.100	0.100	1	1
1.4.a.	Restrictions on multi-disciplinary activities	0.100	0.100	1	1
1.4.b.	Other Restrictions on multi-disciplinary activities	0.050	na	1	0
1.5.	Legal form	0.150	na	1	0
1.6.a.	Professional qualifications (for foreign firms)	0.100	na	1	0
1.6.b.	Professional qualifications (for local firms)	na	0.075	0	1
1.7.	Conditions on the exercise of service activities	0.125	0.125	1	1
1.8.	State Control	0.050	0.025	1	1

Source: Copenhagen Economics IMRIS database

Not all subcategories are relevant for the Domestic IMRIS. For example, nationality or residence requirements are relevant for the Foreign IMRIS, but not for the Domestic IMRIS, cf. table 4-4. We use λ^D_{ij} to indicate whether sub-category ij is relevant for domestic firms in the calculation of the Domestic IMRIS, $S_i^{Domestic}$. If $\lambda^D_{ij} = 1$ the sub-category is relevant to domestic firms, and if $\lambda^D_{ij} = 0$ the sub-category is irrelevant to the domestic firms.

We calculate a score (s_{ij}) of the restrictiveness in each sub-category (e.g. 1.1. Monopolies and other quantitative restrictions). The score is based on objective questions that are answered with “yes” or “no”.

Restrictions are multi-dimensional in nature. We capture this in the calculation of the sub-category scores in two ways.

For some subcategories, the restrictions are mutually exclusive. In these subcategories, we list a number of possible statements about the barriers in the sub-category in question. We have assigned a specific score to the statements and ranked them according to how restrictive the barriers are. We choose the statement that fits the sub-category in question, which gives us the score for the sub-category.

For example, for accounting in Austria, we answered yes to the statement “monopoly and quantitative restrictions on access to activities”. This is the most restrictive type of barriers in this sub-category. Thus, the specific score is 1.000 which then becomes the sub-category score ($s_{11}=1.000$). Had we instead answered yes to the statement “Monopoly on access to activities (no quantitative restrictions)”, the sub-category score would have been 0.750, cf. table 4-5.

Table 4-5: Sub-category score for “Monopolies and other quantitative restrictions” for establishment of accounting in Austria

1.1. Monopolies and other quantitative restrictions	Specific score	Objective answer	Sub-category score s_{ij}
			1.000
Monopoly and quantitative restrictions on access to activities	1.000	Yes	
Monopoly on access to activities (no quantitative restrictions)	0.750	No	
Quantitative restrictions on access to activities (no monopoly)	0.375	No	
No restrictions on access activities	0.000	No	

Source: Copenhagen Economics IMRIS database

For other subcategories the restrictions are additive by nature. In these subcategories, we assign a specific score to each restriction. We then calculate the sub-category score by summarizing the specific scores for all the restrictions that are in place. For example, we investigate three restrictions on multi-disciplinary activities that create barriers to establishment. For accounting in Austria two of these restrictions apply, and the sub-category score is 0.825, cf. table 4-6.

Table 4-6: Sub-category score for “Restrictions on multi-disciplinary activities” for establishment of accounting in Austria

1.4.a. Restrictions on multi-disciplinary activities	Specific score	Objective answer	Sub-category score s_{ij}
			0.825
Restrictions on association with other professions	0.325	Yes	
Restrictions on the exercise of different core activities	0.500	Yes	
Restrictions on the exercise of activities in different locations	0.175	No	
No restrictions	0.000	No	

Source: Copenhagen Economics IMRIS database

We use the weights and scores for each sub-category to compute the Domestic IMRIS. The domestic index for restriction category i , $S_i^{Domestic}$, is computed as the sum of individual scores

(s_{ij}) multiplied by its related weights ($w^{D_{ij}}$) for those barriers that are relevant to local firms ($\lambda^{D_{ij}} = 1$):

$$S_i^{\text{Domestic}} = \sum_j \lambda^{D_{ij}} w^{D_{ij}} s_{ij},$$

where $\lambda^{D_{ij}} = \begin{cases} 1 & \text{if the sub-restriction category } ij \text{ is relevant for the domestic index,} \\ 0 & \text{if the restriction sub-category } ij \text{ is not relevant for domestic index.} \end{cases}$

We go through the same exercise to calculate the IMRIS for foreign firms, S_i^{Foreign} . The legal and non-legal restrictions are the same. However, the barriers may be more important for foreign firms than for domestic firms, for two reasons:

First, some subcategories are relevant for foreign firms, but not for domestic firms – and vice versa. For example, Nationality or residence requirements are relevant for foreign firms only. This means that $\lambda^{F_{ij}}$ used to compute the Foreign IMRIS will be different from $\lambda^{D_{ij}}$ used to compute the Domestic IMRIS.

Second, barriers will influence foreign firms more than domestic firms. To capture this, we use different (larger) sub-category weights to calculate the Foreign IMRIS, i.e. $w^{F_{ij}} \geq w^{D_{ij}}$ cf. table 4-4 above.

The specific scores are the same for foreign and for domestic firms. The specific scores are defined by the severity of the specific restrictions. This means that the sub-category scores (s_{ij}) are the same for domestic and for foreign firms, because the sub-category scores are indicators of the number of restrictions and their restrictiveness.

Appendix J gives a detailed description of all the specific scores and weights we have used to calculate the IMRIS.

4.4. Scenario analysis

The IMRIS model can be used to evaluate the barriers in different policy scenarios. Policy changes will affect the restrictions, some restrictions will be removed and other restrictions may be introduced. This will change the sub-category scores, because different restrictions will apply under different policy scenarios.

The weights for the sub-categories ($w^{F_{ij}}$ and $w^{D_{ij}}$) remain unchanged in different policy scenarios, because the weights indicate the importance of different restrictions – whereas the sub-category scores indicate the severity of the actual restrictions. Similarly, the relevance of different subcategories ($\lambda^{F_{ij}}$ and $\lambda^{D_{ij}}$) for foreign and domestic firms is not affected by policy changes.

We calculate the Domestic IMRIS and the Foreign IMRIS for the current situation in the Member States. We also use the IMRIS methodology to measure the barriers in the situation that will emerge after the implementation of the EU services directive.

Appendix I shows the answering of the objective questions regarding the restrictions in the current situation in the Member States. The appendix also provides the resulting IMRIS indices for all Member States in all four sectors in all categories.

4.5. Results

In this part we point out the most obvious tendencies found by the IMRIS about the current situation in the Member States.

In this chapter we compare the barriers to service provision in different Member States. For each Member State, we calculate a weighted average of the IMRIS for the seven categories. We assign different weights to the categories based on their relative importance for the Internal Market for services¹¹, cf. table 4-7. This sector-level value is used in this chapter only, because the econometric estimation is based on IMRIS indices for six of the seven categories (category-level).

Table 4-7: Category weights

Stage	Weight
1 Establishment	0.333
2 Use of inputs	0.186
3 Promotion	0.050
4 Distribution	0.186
5 Sales of services	0.050
6 After sales	0.010
7 Non-legal	0.186
Total	1.000

Source: Copenhagen Economics IMRIS database.

The charts below show aggregated results from all 4 sectors. Figure 2-1 shows Foreign IMRIS, figure 2-2 shows Domestic IMRIS and figure 2-3 shows discrimination. Appendix H shows the detailed results for the sectors and the categories.

On average the Foreign IMRIS is approximately twice as high as the Domestic IMRIS. As described in part 4.1 this is because some barriers are relevant to foreign service providers only, and because some barriers are more restrictive for foreign than domestic service providers.

There are four obvious tendencies in the IMRIS values across the Member States

- Accountancy has larger IMRIS than the other three sectors.
- The IMRIS values for retail, wholesale, and IT-services are very similar, but the IMRIS value seems to be larger for retail than for wholesale and IT-services.
- Barriers tend to be either high or low in all sectors within a Member State.
- Scores seems to be lower in the new Member States.

The accountancy sector has larger IMRIS scores than the other three sectors. This is not surprising because the accountancy sector is a regulated professional service. The barriers that apply to the accountancy sector only are mainly specific requirements on education. These requirements are often different between Member States, and therefore discriminating for foreign service providers. This means that the Foreign IMRIS is much larger for accountancy than for the other sectors, and that the discrimination (the difference between Foreign and Domestic IMRIS) is very high.

The IMRIS values for retail, wholesale, and IT-services are roughly at the same level. This applies to both the Domestic IMRIS and to the Foreign IMRIS – and thus also to the

¹¹ The weights are based on a qualified but subjective judgement. It is possible to use the results from the factor analysis to create weights based on the econometric analysis. The purpose of this chapter is, however, only to show the most general tendencies. Using econometrically estimated weights will probably not change the general picture very much.

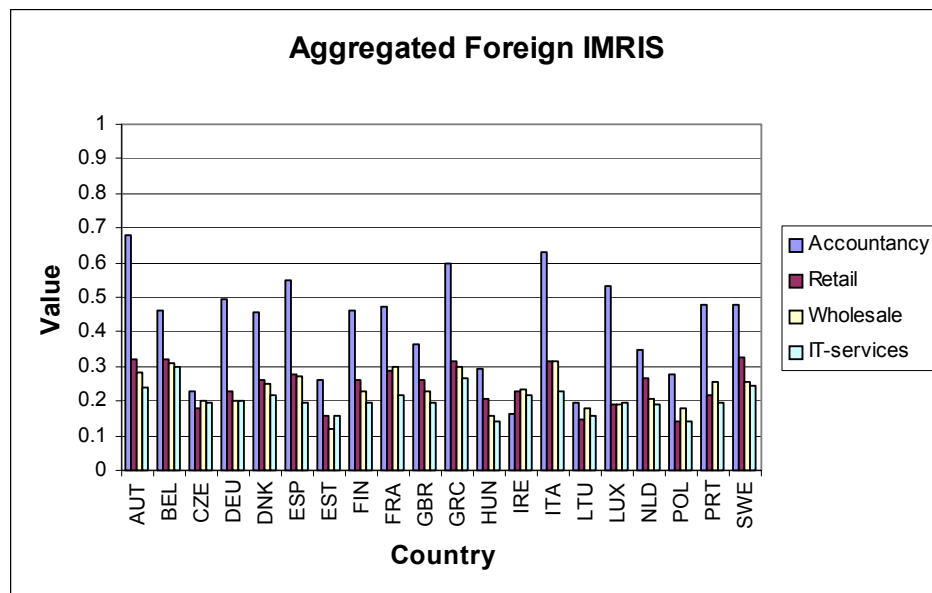
discrimination. The reason is that the restrictions are very similar for these sectors, and that the sectors are exposed to relative few restrictions. Furthermore, many of the restrictions, e.g. regulations on opening hours, are not discriminating. This explains the low discrimination.

Retail seems to face larger IMRIS values than wholesale and IT while wholesale has larger values than IT. This tendency is not consistent across countries. Especially the five new Member States differ from this tendency. Zoning regulation, regulation on the size of stores and regulation on opening hours restricts the retail sector, because this sector is depended on being near its costumers. Opening hours, zoning and chain store regulation are not discriminating between foreign and domestic service providers.

When a Member State has high scores in one sector, there is a tendency that the Member State also has high scores in the other sectors. This is because some important barriers apply to all sectors, e.g. non-legal barriers, and because the legislation is consistent within the Member States, such that some Member States are more restrictive in all sectors than other Member States.

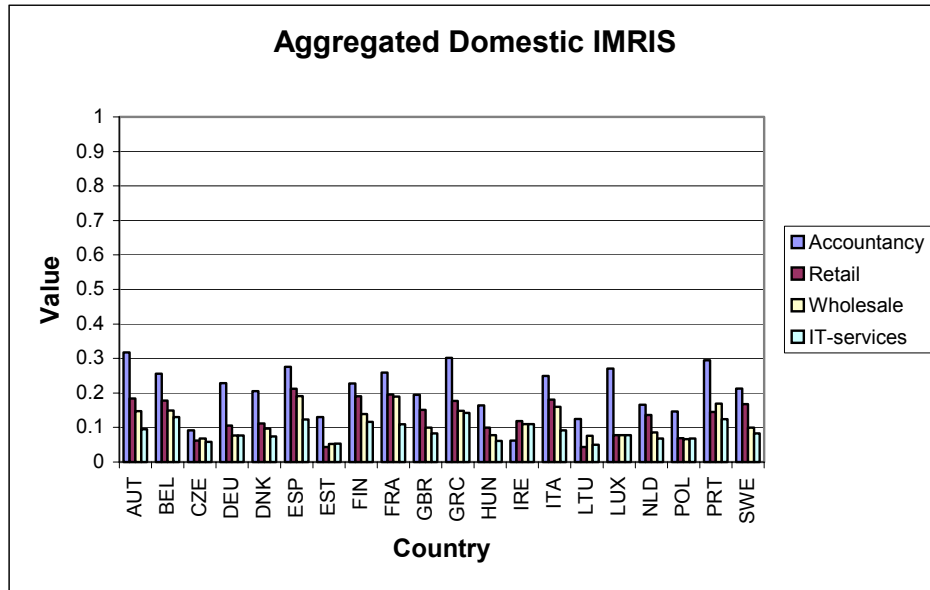
The new Member States have low IMRIS values. The same applies for accountancy in Ireland. A low IMRIS value can be caused by low barriers, but it can also be caused by lack of information, because we only base the IMRIS on reported restrictions, i.e. missing values gives a score of zero. For example there were many missing values on Ireland in the OECD Regulation Database. This might explain why the Domestic IMRIS for accountancy is so low in Ireland. The same might apply to some of the new Member States and should be taken into account when comparing cross-country results.

Figure 4-4: Aggregated Foreign IMRIS, all sectors



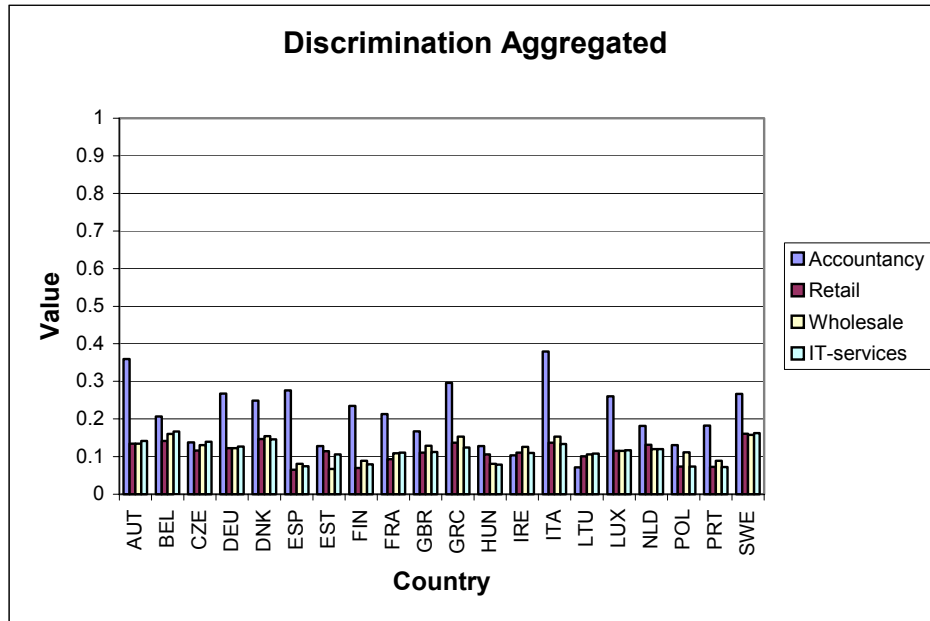
Source: Copenhagen Economics IMRIS database.

Figure 4-5: Aggregated Domestic IMRIS, all sectors



Source: Copenhagen Economics IMRIS database.

Figure 4-6: Aggregated Discrimination, all sectors



Source: Copenhagen Economics IMRIS database.

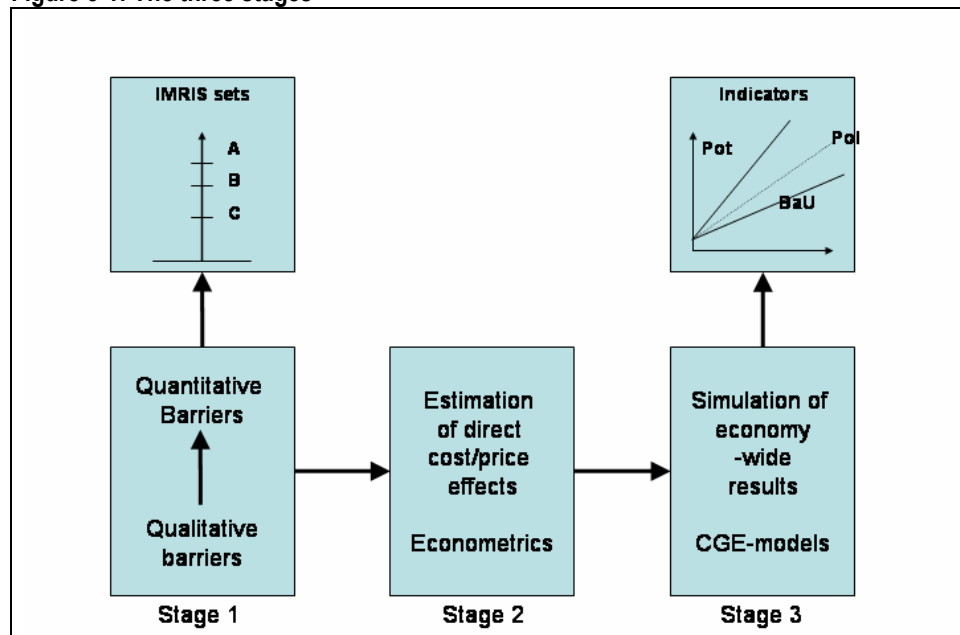
Chapter 5 Literature review

This chapter provides a brief overview of studies that have measured the economic effects of barriers to service trades. The literature has recently been extensively surveyed (OECD, 2001b; Jomini et al, 2002; Chen and Schembi, 2002; Dee, 2001; Dihel, 2002) and we primarily focus on providing a brief and intuitive overview of the methodology applied and the results achieved in the most advanced studies similar in idea and scope to the current project.

5.1. The three stages

The measurement of the economic impact of barriers to trade in services, e.g. the percentage change in GDP or welfare that can be achieved by reducing the current level of barriers requires three **stages of measurement**: 1) Measuring the size of barriers, 2) Measuring the immediate price impact and 3) Measuring the overall economic impact, cf. figure 5-1.

Figure 5-1: The three stages



Source: Copenhagen Economics.

The *first stage* quantifies the barriers to service trades within a sector and country using available information on the actual design of barriers. The output is an index number between zero and unity that summarises the severity of barriers to service trades in a given sector and country. The larger the index, the more severe are the barriers to service trades in the given sector and country.

The *second stage*, estimates econometrically the direct impact on sector output prices¹² of the index of barriers to service trades, cf. stage 1, *and* other explanatory variables using cross-section estimation techniques. The output is for each sector a percentage that indicates how much prices (costs) would decrease (increase) if barriers to service trades, as represented by the index number, were reduced (increased) by one unit within the countries in the sample. The larger the percentage, the more sensitive are prices to changes in the barriers to service trades within the sector.

The *third stage* calculates in a general equilibrium model the overall impact on economic output and welfare of barriers to service trade taking into account the spill-over effects that arise when other sectors use inputs from the service sectors that are more costly than they would be in the absence of barriers. The output is, for each set of changes in barriers, a percentage of GDP that summarizes the change in real output for a given country and sector, or a percentage change in welfare that summarizes the overall change in economic welfare for the country.

5.2. The three approaches

In the literature you can find three different **approaches** to the estimation of the economic impact of barriers to trade in services. The key difference between the three approaches is found in the first stage: How do the three approaches quantify the barriers to service trades?

The *first approach* is associated with Hoekman (1995, 1997), who pioneered this branch of literature in the mid-nineties. He defined simple indices for the size of barriers to service trades on a very aggregate level. In principle, one aggregate index number was defined for each sector and country based on a reading of the GATS commitments¹³. The Hoekman indices were defined in all sectors for a large group of countries. The price impact of the barriers was guesstimated and these numbers were used to construct scenarios that could be analysed in a computable equilibrium model. Typically, estimates of the gain of removing barriers based on this approach are quite large. We call this approach the **shallow direct approach**, cf. figure 5-2a.

The *second approach* is associated with Francois (Francois and Hoekman, 1999; Francois et al, 1995; Francois and Wooten, 2001), who jumped directly to the second stage without having an estimate of the size of barriers. He estimated econometrically the relationship between standard explanatory variables and the output prices in the service sectors and argued that the impact of barriers to service trades – that were not accounted for in the estimation – was hidden in the residuals from the regression equations. He now interpreted the residuals in the econometric estimation as a relative indicator of the size of the barriers to services trade and used these residuals as a proxy for the size of barriers to service trade. The proxies, then, were used to construct scenarios that could be analysed in a computable equilibrium model. We call this approach the **indirect approach**, cf. figure 5-2b.

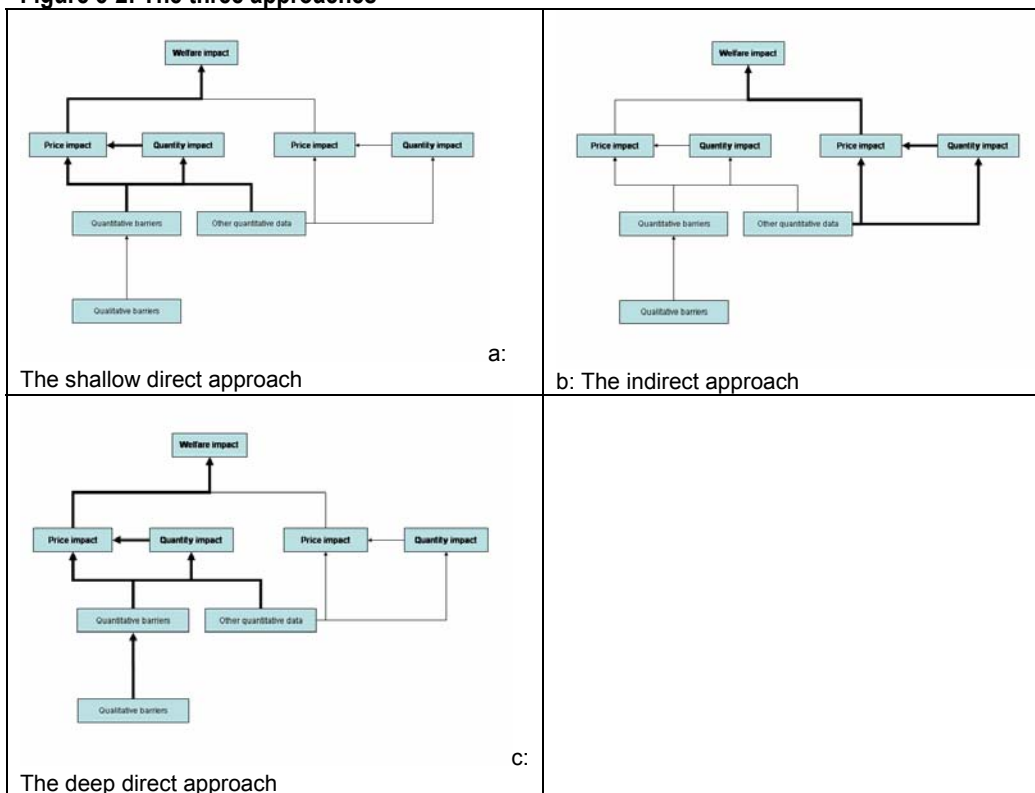
The third approach is associated with the Australian Productivity Commission (Findlay and Warren, 2000; Dee and Hanslow, 2001, Dee et al, 2003), who in the first stage chooses to construct a range of different indices of the size of barriers to service trades constructed on the basis of a sophisticated hierarchy of sub-indicators. These indices were used in the second stage to isolate the direct (if any) impact of barriers to service trades on sector prices. In the end, these price estimates were used to construct scenarios that could be analysed in a

¹² In some cases costs rather than prices

¹³ Commitments, not the real barriers

computable equilibrium model. We call this approach the **deep direct approach**, cf. figure 5-2c¹⁴.

Figure 5-2: The three approaches



Consensus is, today, that the third of these approaches is the most sophisticated and promising approach. This is also the approach that we follow in this report. In the remainder of this chapter we shall primarily refer to studies following the third approach. In the next sections we shall for each stage briefly summarize the results of the most important studies based on the deep, direct approach.

5.3. Stage 1: Measuring the size of barriers

The goal of stage 1 is to construct indicators that measures the severity of barriers to service trade within a given service sector and country.

Studies based on the deep direct approach have been completed for the following eight service sectors: Banking, telecommunications, maritime services, distribution services, engineering, architectural, law and accounting services and education. These sectors cover approximately 60 percent of the service sectors in the EU and 30 percent of the entire economy. These studies have covered between 16 and 136 countries, the telecommunication sector being by far the most comprehensive. In most cases all EU15 Member States are part of the studies.

The methodology employed in these studies has been to construct a detailed hierarchical index structure, where specific barriers are defined, evaluated and scored at the lower level. The scores are weighted and summarized in aggregate indices at the higher levels that measure

¹⁴ See also Boylaud and Nicoletti (2000); Gonenc and Nicoletti (2000) and Steiner (2000) for a related approach developed in a range of OECD studies.

the aggregate impact of the subset of specific barriers included in the aggregate index. The key advantage of this approach is that it provides a very clear link from the very specific and detailed barriers to the index used in the economic analysis. The key problem is how to determine scores and weights.

The value of an aggregate index is determined by the range of barriers included, the scores attributed to each barrier and the weighting scheme.

The *range of barriers* is typically organized in two dimensions: 1) Barriers to establishment *versus* barriers to on-going operations and 2) Barriers to foreign companies *versus* barriers to domestic companies. In all studies, barriers are classified as *either* being a barrier to establishment *or* a barrier to on-going operations. The main reason is that the two types of barriers are believed to be relevant for different modes of service trade. In addition there is a presumption that the two types of barriers may give rise to very different economic impacts, both with respect to size and the distribution.

Barriers to establishment are primarily relevant for service trade that requires the establishment of a physical presence on foreign grounds (Mode 3). In addition, barriers to establishment are believed primarily to impose a fixed cost on companies entering the market. It implies that fewer companies decide to enter the market, but it does not add to the costs of companies operating in the market once they have decided to enter. The key impact is to lower the number of competitors, presumably allowing for a higher mark-up above marginal costs than otherwise possible. Mark-ups give rise to rents that accrue to owners of the companies on the market, some of them foreign, and are paid by the consumers. But it does not necessarily tie up real resources that could have been used for other purposes.

The above studies measure barriers to establishment on the basis of 4-10 discrete sub-indicators.

In contrast, barriers to on-going operations are primarily believed to impose a steady cost to companies operating in the market. The consequence is that it forces companies to tie up resources in order to overcome these barriers pushing up costs and prices. In this case, real resources are tied up that could have been better used in other parts of the economy. However, large barriers to on-going operations may also scare companies from entering the market at all. As a consequence these barriers can have dual effects: Tying up real resources and giving rise to a mark-up.

The above studies measure barriers to on-going operations on the basis of 6-9 discrete sub-indicators.

Most studies also distinguish between barriers to foreign companies and barriers to domestic companies. Barriers to domestic companies are defined as barriers that apply to all companies irrespective of being domestic or foreign. In contrast, barriers to foreign companies are defined as those specific barriers that apply to foreign companies only and not to domestic companies. Barriers to domestic firms can be interpreted as general barriers to growth of the sector in question that may be justified as being necessary to fulfil other political goals, e.g. with respect to the environment or employment. Barriers to foreign firms can be interpreted as specific barriers to trade and foreign direct investment (FDI) in the sector in question that derives from a deliberate discriminatory treatment of companies of different nationality. The latter type of barriers is clearly in focus in debates on WTO, GATS and the Internal Market.

The *scores* of each barrier are between zero and unity and are defined by the analyst on the basis of a reading of often much dispersed information on the regulation of each sector. In many cases the information is collected by international organisations as WTO, OECD, the

World Bank and the EU. The scores are qualified, but subjective, assessments of the severity of the barrier. The subjectivity is limited in the sense that the scale mostly is discrete and not continuous. That is, the analyst assigns the score of a specific barrier choosing among a range of pre-defined states with predefined scores.

The *weights* are fixed for each sector and are assumed to capture the relative economic importance of each barrier, giving large weights to barriers that are assumed to have a large economic impact and small weights to barriers that are assumed to have limited economic impact.

Weights are, as the scores, typically qualified, but subjective, assessments of the importance of each barrier. In some cases attempts have been made to econometrically estimate the weights of groups of barriers using factor and principal component analysis. This approach still uses subjective weights on the lower levels but uses econometric tools to determine the relative contribution of barriers to establishments and barriers to on-going operations to the prices in the given sector. The estimated weights are then used to calculate an overall index of barriers summarising barriers to establishment and barriers to on-going operations.

Once the range of barriers has been defined, scores are assigned and weights determined, it is possible to calculate separate indices for barriers to establishment and barriers to on-going operations separately for domestic and foreign companies.

Results of the studies

We now survey the main results for the EU15 Member States in the following eight sectors: Banking (McGuire and Schuele, 2000), telecommunications (Warren 2000a), maritime services (McGuire, Schuele and Smith 2000), distribution services (Kalirajan 2000), engineering, architectural, law and accounting services (Nguyen-Hong 2000).

In EU15 the average barriers in accountancy, maritime and legal services are largest, both in relationship to domestic and foreign firms; cf. table 5-1. They seem to be lowest in banking. The barriers to foreign forms relative to domestic firms seem to be largest in distribution, maritime and architectural services. However, the comparison between sectors should be treated with caution because indices are not calibrated.

Table 5-1: Un-weighted average size of barriers in eight sectors in EU15, US and AU

Barriers to...	...domestic firms	...foreign firms	Relative barriers
Distribution	0,08	0,23	3,0
Maritime	0,13	0,35	2,6
Architectural	0,07	0,18	2,5
Legal	0,17	0,35	2,1
Accountancy	0,18	0,33	1,8
Engineering	0,08	0,14	1,8
Telecommunications	0,11	0,17	1,6
Banking	-	0,07	Na.

Notes: Relative barriers are defined as barriers to foreign firms divided by barriers to domestic firms and measure in principle the extent of discriminatory treatment of foreign firms. The larger the relative barrier, the more the economic activity of domestic companies is protected by barriers.

Source: Findlay and Warren (2000); Kalirajan (2000) and Nguyen-Hong (2000).

Among the EU15-Member States, Finland, Ireland and the United Kingdom consistently appear as the countries with the lowest level of average barriers; cf. table 5-2. Germany, Spain and Italy seem to be the countries with the highest level of barriers. Greece, Portugal and partly Finland have relatively large barriers for foreign firms relative to domestic firms. The other way round, countries like the Netherlands and the UK seem to have rather low barriers for foreign firms relative to domestic firms.

Table 5-2: Weighted and un-weighted rank of (the absence of) barriers in EU15, US and AU

Barriers to... Rank	...domestic firms		...foreign firms	
	Un-weighted	Weighted	Un-weighted	Weighted
Ireland	3	2	3	1
United Kingdom	2	3	1	2
Luxembourg	4	4	4	3
United States	10	6	8	4
Australia	7	5	11	5
Netherlands	8	12	5	6
Finland	1	1	2	7
Sweden	6	9	10	8
Austria	15	10	16	9
Denmark	5	11	6	10
Portugal	12	8	14	11
Spain	17	13	15	12
Germany	16	17	13	13
Belgium	13	15	7	14
Greece	9	7	12	15
France	11	16	9	16
Italy	14	14	17	17

Notes: A low rank implies few barriers. Un-weighted rank is the rank of the average rank for rankings in eight service sectors with equal weight attributed to each sector. Weighted rank is the rank of the average weighted rank for rankings in eight service sectors with weight proportionate to their share in EU GDP. The main difference between the two columns is due to barriers in the distribution sector, because the distribution sector is similar in size to all other service sectors combined. Countries with a higher (lower) weighted rank than un-weighted rank have rather high (low) barriers in the services sector.

Source: Findlay and Warren (2000); Kalirajan (2000) and Nguyen-Hong (2000).

Studying the barriers to foreign firms in each sector and country reveals a rather complicated structure of barriers. No single country, maybe apart from the United Kingdom, has low or high barriers in all sectors; cf. table 5-3. See also figure 5-3 below. Finland has generally low barriers, but high barriers in distribution. The US has also generally low barriers, but high barriers in all professional and maritime services. Austria has generally high barriers, but low barriers in distribution.

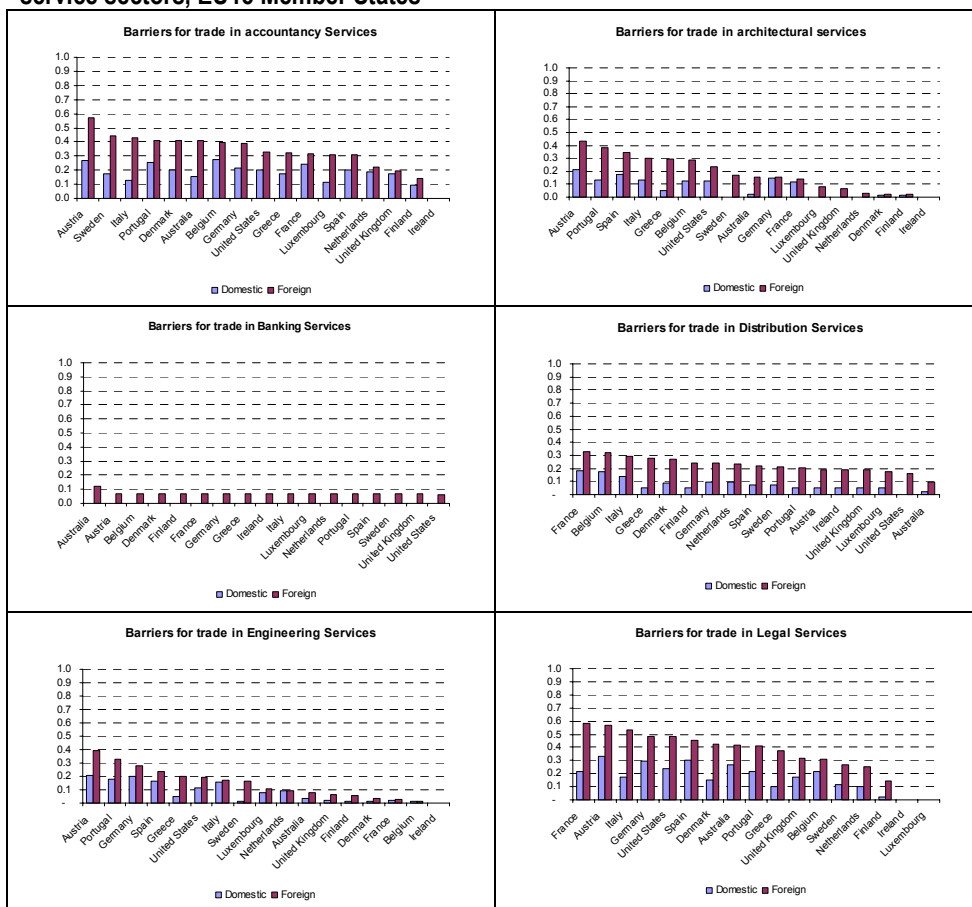
Table 5-3: Rank of (the absence of) barriers to foreign firms in eight service sectors in EU15, US and AU

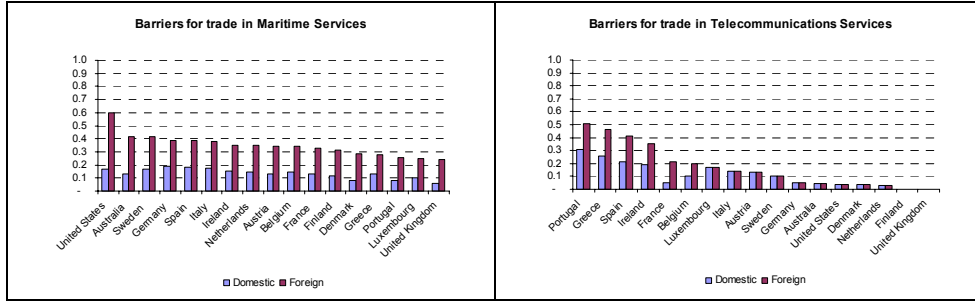
	Accoun	Archi	Bank	Dis	Eng	Leg	Mar	Tele
Australia	12	8	17	1	7	10	16	6
Austria	17	17	2	4	17	16	9	9
Belgium	11	12	2	16	2	6	8	12
Denmark	13	2	2	13	4	11	5	4
Finland	2	2	2	12	5	3	6	1
France	7	7	2	17	3	17	7	13
Germany	10	8	2	11	15	14	14	7
Greece	8	13	2	14	13	8	4	16
Ireland	1	1	2	4	1	1	11	14
Italy	15	14	2	15	11	15	12	10
Luxembourg	6	6	2	3	9	1	2	11
Netherlands	4	4	2	10	8	4	10	3
Portugal	14	16	2	7	16	9	3	17
Spain	5	15	2	9	14	12	13	15
Sweden	16	10	2	8	10	5	15	8
United Kingdom	3	5	2	4	6	7	1	1
United States	9	11	1	2	12	13	17	5

Notes: A low rank implies few barriers.

Source: Findlay and Warren (2000); Kalirajan (2000) and Nguyen-Hong (2000).

Figure 5-3: Indices of barriers for foreign and domestic firms to service trade in eight service sectors, EU15 Member States



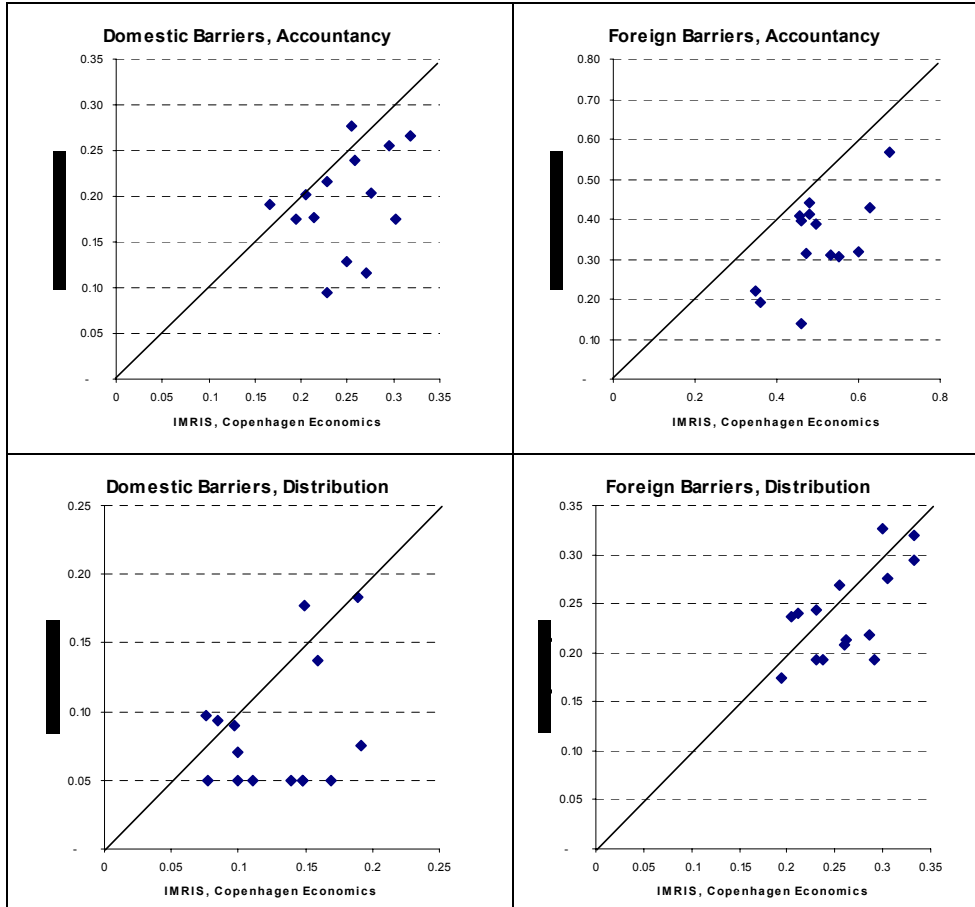


Source: Findlay and Warren (2000); Kalirajan (2000) and Nguyen-Hong (2000).

Comparing IMRIS to other studies

There is a general tendency in all studies, including our study of barriers (the IMRIS): barriers are highest in professional regulated services. The studies seem to reveal the same pattern across Member States. The Member States with high IMRIS values have also high indices for barriers in other studies, c.f.

Figure 5-4: Comparing indices of barriers for foreign and domestic firms to service trade in EU15 Member States in different studies



Note: each point represents one Member State. The value on the horizontal axis is the aggregated IMRIS for the Member State. The value on the vertical axis is the index of trade barriers determined in another study.

Source: Copenhagen Economics; Kalirajan (2000) and Nguyen-Hong (2000).

5.4. Stage 2: Measuring the price impact

The goal of stage 2 is to measure the direct impact from the barriers identified and quantified in stage 1 on sector prices or price-margins in a cross-section of countries.

There are fewer studies calculating the price impact of regulation than measuring indicators of barriers. The published studies cover banking, distribution, engineering, telecommunication, international air transport and electricity supply. The two last studies apply a methodology that seems to be slightly different than the methodology applied in the other studies. The studies cover between 16 and 136 countries, the telecommunication sector being by far the most comprehensive. In most cases all EU15 Member States make part of the studies.

The methodology employed is to regress a measure of sector prices or price margins (the dependent variable) on the indices developed in stage 1 and a number of other explanatory variables (the independent variables). The regression coefficients can then be used to calculate a percentage number indicating how much regulation has caused prices (or costs) in a specific country to increase compared to a benchmark situation. If for example the percentage is 16.5 percent, it means that current prices are 16.5 percent higher than they would have been in the benchmark situation. The benchmark situation differs between the studies. In some cases the benchmark situation is the absence of any regulation (banking, distribution, engineering and telecommunication). In other cases the benchmark situation is a supposedly optimal regulatory situation reflecting that some regulation is required to meet other political objectives than economic growth and trade (international air transport and electricity supply).

Some studies use the sector price as the dependent variable and are able to directly calculate the total impact of barriers on the average sector price (international air transport and electricity supply). Other studies use price margins on company-level as the dependent variable (banking, distribution and engineering). Under some rather strict simplifying assumptions it allows them to separate out those barriers that on a net basis have either a price increasing or a cost-increasing impact on the firm-specific performance. Finally, some other studies have found it difficult to find an appropriate price measure (telecommunications). Instead they calculate an optimal volume of trade that would have taken place in the absence of regulation, e.g. using a gravity model. They interpret the difference between the actual observed trade volume and the hypothetical trade volume as a downturn in trade volume caused by regulation and convert this quantity measure to a price measure using estimated elasticities of demand. That is, they calculate the price increase that would have caused a decrease in trade volume similar to the calculated decrease. The later approach is called the quantity approach as compared to the price approach employed in all other studies.

In the studies of the price impact in engineering and distribution services the authors have been able to measure separate price and cost effects of barriers to service trades. That is, they argue that they can distinguish between situations where the net effect of barriers to trade causes prices to increase holding costs constant, and situations where the net effect of barriers to trade is to increase costs and prices simultaneously. The former situation is referred to as a case of rent creating impact of barriers, while the latter is referred to as a case of cost creating impact of barriers. The distinction between these two states is potentially very important and can have significant impact on the overall result of the analysis. This is so because the elimination of a barrier with cost increasing impact is supposed to have significantly larger economic pay-off than the elimination of a barrier with rent increasing impact of similar size. The reason is that removal of cost increasing barriers will free up real resources that can be used more productively in other parts of the economy, whereas removal of rent creating barriers does not free up real resources. However, all simulation studies until now have assumed that all impacts are rent creating and have ignored the cost creating impact

Results of the studies

We now survey the main results for the EU15 Member States in the following six sectors: Banking (Kalirajan at al, 2000), telecommunications (Trewin, 2000 and Warren, 2000b), distribution services (Kalirajan, 2000), engineering (all Nguyen-Hong, 2000), international air transport and electricity supply (Doove et al, 2001).¹⁵

In EU15 the average price impact of barriers to foreign firms is large in the engineering and banking sector and modest in the telecommunication sector. In the distribution sector the barriers to foreign firms are modestly cost creating rather than rent creating; cf. table 5-4. The average impact of barriers to domestic firms is moderately cost creating in engineering and distribution, but rent creating in the other sectors. The price impact of barriers in international air transport and electricity supply is substantial compared to the other sectors.

Table 5-4: Un-weighted average cost and price impact in six sectors in EU15, US and AU

Barriers to...	...domestic firms	...foreign firms
Distribution	0.9%	1.2%
Engineering	1.6%	3.4%
Telecommunications	1.0%	1.9%
Banking	0.0%	5.3%
Int. air transport	11.0%	
Electricity supply	6.9%	

Notes: Red indicates cost creation, black indicates rent creation.

Information was not available for the maritime, the architectural, the legal, and the accountancy sectors.

Source: Kalirajan at al (2000); Trewin (2000); Kalirajan (2000); Nguyen-Hong (2000) and Doove et al (2001).

There is no simple relationship between the average barrier size of barriers as measured by the index calculated in stage 1 and the direct price (or cost) impact estimated in stage 2, cf. table 5-5. The ratio between the (price) impact and the size of barrier ranges between 5 in distribution and 76 in banking. The former number implying that if barriers were at maximum, the price (cost) impact would be 5 percent. The latter number implying that the same price impact in the banking sector would be 76 percent.

Table 5-5: The relationship between average barrier size and average price impact, EU15

Firms	Sector	Barriers	Impact	Impact/Barriers
Domestic	Distribution	0.08	0.9%	11
	Engineering	0.08	1.6%	20
	Telecommunications	0.11	1.0%	9
	Banking	0	0.0%	-
Foreign	Distribution	0.23	1.2%	5
	Engineering	0.14	3.4%	24
	Telecommunications	0.17	1.9%	11
	Banking	0.07	5.3%	76

Notes: Red indicates cost creation, black indicates rent creation.

Source: Kalirajan at al (2000); Trewin (2000); Kalirajan (2000); Nguyen-Hong (2000) and Doove et al (2001).

No clear picture emerges from a study of the sector price impact in each EU Member State and the US and Australia; cf. table 5-6 and figure 5-5.

¹⁵ Kang (2000) also estimated the price impact of barriers to service trade in maritime services, but all results are for bilateral routes and they are not readily comparable with the other studies and cannot readily be applied as an input in the simulation model.

Table 5-6: Sector price and cost impact of barriers to foreign firms for EU15, US and AU

	Banking	Distribution	Engineering	Tele
Austria	5.3%	0%	14.5%	0.8%
Germany	5.3%	0%	10.2%	0.3%
Spain	5.3%	0%	8.7%	3.9%
United States	4.8%	2.3%	7.4%	0.2%
Sweden	5.3%	0%	6.8%	0.7%
Netherlands	5.3%	2.7%	3.7%	0.2%
Australia	9.3%	0.6%	2.8%	0.3%
United Kingdom	5.3%	2.8%	2.5%	0.0%
Finland	5.3%	0%	2.3%	0.0%
Denmark	5.3%	0%	1.1%	0.2%
France	5.3%	5.2%	0.9%	1.4%
Belgium	5.3%	4.9%	0.5%	1.3%
Greece	5.3%	0.3%	0.0%	4.5%
Ireland	5.3%	2.6%	0.0%	2.7%
Italy	5.3%	0%	0.0%	1.0%
Luxembourg	5.3%	0%	0.0%	1.0%
Portugal	5.3%	0%	0.0%	6.2%

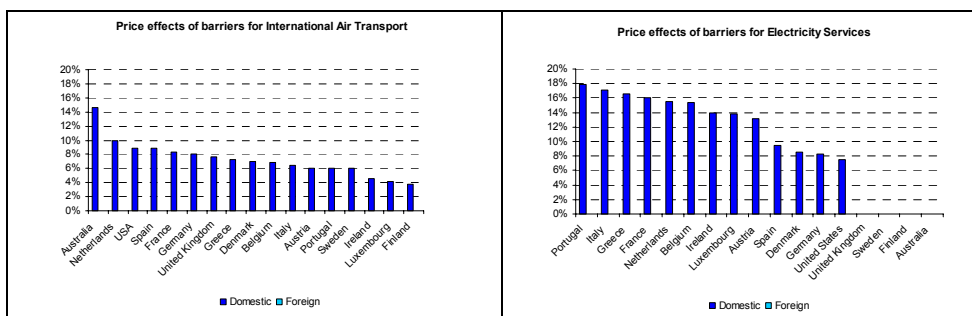
Notes: Red indicates cost creation, black indicates rent creation.

Information was not available for the maritime, the architectural, the legal, and the accountancy sectors.

Source: Kalirajan et al (2000); Trewin (2000); Kalirajan (2000); Nguyen-Hong (2000) and Doove et al (2001).

Figure 5-5: Price and cost impact of barriers to domestic and foreign firms in service sectors, EU15





Notes: Red indicates cost creation, black indicates rent creation.

Information was not available for the maritime, the architectural, the legal, and the accountancy sectors.

Source: Kalirajan et al (2000); Trewin (2000); Kalirajan (2000); Nguyen-Hong (2000) and Doove et al (2001).

5.5. Stage 3: Measuring the overall economic impact

The goal of stage 3 is to calculate the overall economic impact of the barriers identified and quantified in stage 1 using a general equilibrium simulation model. The third and final stage accomplishes two important goals relative to stage 2. Firstly, the simulation model can take into account all the indirect effects caused by the higher prices when service sector output is used as an input in other sectors. Secondly, the model can calculate theoretically consistent and meaningful measures of the total socio-economic gains associated with a partial or complete removal of the barriers imposed on the service sectors, not only the impact on prices.

The methodology employed is to take an existing standard computable general equilibrium model incorporating a theoretically consistent picture of the world economy including a modelling of all important spill-over links between the economic activities and extend the model with a number of features that is required to model the removal of barriers to service trade. First of all, it requires that the model can handle foreign direct investments distinguishing between firms owned by domestic residents and foreign residents. Secondly, it requires that the model can handle imperfect competition allowing consumers to distinguish between output produced by foreign and domestic companies. Thirdly, it requires that the model can handle rent- and cost increasing effects from barriers to service trades. Fourthly, it requires that the model can handle different modes of supply, as a minimum cross-border supply and FDI.

Once the model has been extended, the model is calibrated to replicate the economic situation in a base year including the current level of barriers to services trade. This constitutes the benchmark scenario. Next a number of policy scenarios characterised by a partial or complete removal of barriers to service trades are designed. The model is solved for each of these scenarios and the difference between the results in the policy scenarios and the results in the benchmark scenario is interpreted as the impact of the change in barriers.

Results of the studies

The deep direct approach has given rise to two models capable of simulating the overall economic impact of the removal of barriers to services trade (Dee and Hanslow, 2001 and Verikios and Zhang, 2000). Both models are global general equilibrium model based on the GTAP database version 4.

The model developed by Dee and Hanslow (2001) covers 18 regions, including EU15 as a single region, and three sectors: Primary, secondary and tertiary. The model features quasi-dynamic capital accumulation, partial capital mobility, increasing returns to scale and monopolistic competition.

The model incorporates two modes of supply, cross-border trade and foreign direct investment. The incorporation of foreign direct investment implies that the model in each region distinguishes between economic activity by ownership, that is economic activity owned by domestic capital and economic activity owned by foreign capital differentiated by region.

The model can handle the partial or complete removal of barriers to services trade distinguishing between barriers to domestic companies (that is all types of economic activity) and foreign companies, as well as between barriers to establishment relevant for foreign direct investment (modelled as a tax on capital) and barriers to on-going operations relevant for both cross-border supply and foreign direct investment (modelled as a tax on output).

The barriers to service trade are assumed to generate rents, a mark-up of price over costs, but no real costs. The rents net of taxes associated with the barriers to establishment (the capital tax) accrue to the region of ownership, whereas the net rents associated with the barriers to on-going operations accrue to region of location. The assumption that barriers only generate rents and not real costs implies that the real economic impact is underestimated and that the impact of the distribution of rents is overestimated.

The model is highly aggregated and assumes that a weighted average of the barriers in the banking sector (Kalirajan et al., 2000) and the telecommunications sector (Warren, 2000b) is representative for the barriers to all tertiary sector activities.

Dee and Hanslow (2001) simulated a number of liberalisation scenarios for services where they eliminated all barriers or eliminated a selected subset of barriers to services. As a rough guide the scenario corresponds to a reduction of prices in the domestic part of the tertiary sector by ½ percent and in the foreign part of the tertiary sector by 3½ percent. We judge that the tertiary sector in this context corresponds to approximately 50 percent of the economy. We are not aware of the market shares of the domestic and foreign owned part of the sector.

A complete elimination of all barriers to service trades implies a relatively small gain to the world economy corresponding to an increase in welfare at about 0.45 percent or 133 million US\$; cf. table 5-7.

Table 5-7: Economic gains of the complete elimination of all barriers in the service sector

	Real output		Welfare
	Percent	Percent	US\$ million
European Union (EU15)	0.0	-0.1	- 1,809
United States	-0.1	-0.1	-6,169
World		0.45	+133,386

Source: Dee and Hanslow (2001), table 6 and 7.

The developing countries with high initial barriers stand to gain the most, whereas the EU and the US stand to lose. The EU gains by improvements in allocative efficiency when prices on service goods come down, but loses rents that in the presence of barriers would have accrued to the owners of foreign capital predominantly coming from the EU and the US. However, the results are very sensitive to assumptions in the model about the distribution of rents between regions of which very little is known.

The model developed by Verikios and Zhang (2000) extends the previous model. The extended model still covers 18 regions, but sector coverage has been expanded to eight sectors of which 6 are service sectors. The model has no capital accumulation, but capital is now assumed to be region-specific allowing for a greater degree of within-region capital mobility. The absence of capital accumulation implies that the results of the model

underestimate the long run impact. In addition, some sector specific adaptations have been made.

The model is less aggregated than the previous model and incorporates appropriate sector specific barriers in the banking and telecommunications sector taken from Kalirajan et al. (2000) and Warren (2000b).

Verikios and Zhang (2000) simulated a number of liberalisation scenarios for services where they eliminated all barriers in communication services and financial services, respectively. As a rough guide the scenario corresponds to a reduction of prices in the telecommunication sector by 1-2 percent and in the foreign owned part of the banking sector by approximately 5 percent. We estimate that the telecommunication and banking sectors account for 2-3 percent of the economy each.

A complete elimination of all barriers to the two sectors implies more limited gains to the world economy corresponding to an increase in real output at 0.1 percent for communication services and 0.09 percent for financial services; cf. table 5-7 and table 5-7. However, in these simulations liberalisation only covers about 10 percent of the economic activity covered by the simulations made by Dee and Hanslow (2001).

Table 5-8: Economic gains of the complete elimination of all barriers in the communications sector

	Real output	Welfare	
	Percent	percent	US\$ million
European Union (EU15)	0.01	na	na
United States	0.05	na	na
World	0.10	na	na

Notes: Conflicting welfare results have been reported in the literature. We are checking the results
Source: Verikios and Zhang (2001), table 4.2

Table 5-9: Economic gains of the complete elimination of all barriers in the financial sector

	Real output	Welfare	
	percent	percent	US\$ million
European Union (EU15)	0.05	na	na
United States	-0.02	na	na
World	0.09	na	na

Notes: Conflicting welfare results have been reported in the literature. We are checking the results
Source: Verikios and Zhang (2001), table 5.2

The developing countries with high initial barriers stand to gain the most, whereas the EU and the US stand to loose. The main reason is the loss in rents that in the presence of barriers, particularly in the developing countries, would have accrued to the owners of foreign capital predominantly coming from the developed countries. However, the results are very sensitive to assumptions in the model about the distribution of rents between regions of which very little is known.

Overall the economic gains of removing barriers to service trade seem to be rather limited according to the above analyses. A complete removal of all barriers to service trade in half the economy only increases real output and welfare by fractions of a percentage. A limited removal of barriers to service trade in selected sectors gives rise to proportionate, but equally modest, economic gains.

The key reason for the modest results seems to be the assumption applied in stage 3, that all barriers give rise to rent increasing effects, but not to cost increasing effects. As long as the barriers only impact the distribution of rents in the global economy, the real changes in the global economy will be severely limited. In the end, it seems to be more important to determine whether barriers are cost or rent increasing rather than being able to model the barriers in great detail. This is one of the key features in our own preliminary analysis in chapter 1.

Very recent work by Dee and Sidorenko (2003) also confirms that simulations which treat some barriers as cost escalating provide a much more even pattern of gains all around. Interestingly, this new line of modelling also suggests that countries do not gain greatly when their trading partners liberalise services.

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Appendix A: Detailed results from the CETM model

Appendix B: Technical documentation of the CETM model

Appendix C: Tariff equivalents for scenarios in modelling analysis

Appendix D: Descriptive statistics for variables included in the econometric analysis

Appendix E: Factor analysis results

Appendix F: IMRIS-values for Accountancy, IT-services, Wholesale and Retail Trade in EU20 Member States

Appendix G: Assessment of trade barriers in for Accountancy, IT-services, Wholesale and Retail Trade in EU20 Member States.

Appendix H: Categories, weights and scores

Appendix I: Assessment of Trade Barriers for Accountancy, Retail, Wholesale and IT-services

Appendix J: The Service Directive and IMRIS Categories, Weights and Scores