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**SERVICES LIBERALIZATION
IN SWITZERLAND**

STUDIES ON BEHALF OF
THE STATE SECRETARIAT FOR
ECONOMIC AFFAIRS

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The Economic Effects of Services Liberalisation in Switzerland

Final Report

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Preface

The State Secretariat for Economic Affairs in Switzerland (seco) has contracted Copenhagen Economics to calculate the economy wide effects for Switzerland of a services liberalisation in Switzerland and EU. This final report documents the findings of the study.

The report has been prepared by Mr. Christian Jervelund, Mr. Patrik Svensson, Mr. Eske Stig Hansen, Miss Jonna Olsson and Dr. Claus Kastberg Nielsen. The report is based on the specifications of the contract covering the study, the inception meeting with seco on April 2nd, the interim meeting with seco on July 11th, the draft final report presentation at the seco headquarters on September 2nd as well as on the close contact between Copenhagen Economics and seco during the study.

October, 2005
Claus Kastberg Nielsen
CEO, Copenhagen Economics

Executive summary

This study assesses the effects of liberalising services provisions in Switzerland and the EU. The objective of the study is twofold. The *first* objective is to measure the current level of regulation of services provision in Switzerland and the EU. The *second* objective is to calculate the economy wide effects in Switzerland of a services liberalisation in Switzerland and the EU.

We find that the level of regulation in Switzerland is of the same magnitude as in the EU in business services, distributive (retail and wholesale) trade and air transport. For regulated professions, regulation is lower in Switzerland compared to the EU and the same goes for rail freight transportation. The rest of the infrastructure sectors, i.e. telecommunications, electricity, postal services and rail passenger transport are much more regulated in Switzerland than in the EU. This could indicate a large potential for Switzerland to liberalise its infrastructure sectors.

The economy wide effects are calculated for a number of scenarios representing different degrees of liberalisation in Switzerland and the EU. Hence, the scenarios provide insight into what drives a successful liberalisation yielding economic gains for Switzerland, but they do not serve as suggestions as to how Switzerland should design an actual services liberalisation.

In the scenario providing the upper bound for the economy wide effect in Switzerland, Switzerland is assumed to liberalise while the EU is assumed not to liberalise. We find that this will increase welfare in Switzerland by around 2 percent equivalent to a consumption increase of 5.2 billion CHF. Moreover, employment is expected to increase by 0.6 percent. In the opposite scenario EU is assumed to liberalise while Switzerland is assumed not to liberalise. We find that this leads to a 0.3 percent *lowering* in Swiss welfare equivalent to a consumption decrease of 0.8 billion CHF.

The results in these two scenarios illustrate that the main driver of economic gains for Switzerland is the country's own extent of liberalisation, not higher demand in the EU caused by EU liberalisation. In the former scenario, the Swiss liberalisation increases productivity and lowers prices in Switzerland which has a strong positive effect on the domestic market, and at the same time the relative competitiveness of Swiss firms, i.e. firms operating in Switzerland, is strengthened compared to their EU competitors. Both effects contribute to higher welfare and increasing employment. In the latter scenario, where only the EU liberalises, Swiss firms experience a drop in relative competitiveness compared to EU firms. This in turn reduces Swiss welfare; even though this effect to some extent is mitigated by a general increase in demand in the EU leading to more trade across borders for all countries, including Switzerland. The expected decrease in Swiss welfare of 0.3 percent in this scenario indicates that the negative effect of lower relative competitiveness of Swiss firms dominates the positive effect of increasing cross-border supply due to higher EU demand.

Chapter 1 The economics of services liberalisation

This study assesses the effects of liberalising services provisions in Switzerland and the EU. The objective of the study is twofold. The *first* objective is to measure the current level of regulation of services provision in Switzerland and the EU. The *second* objective is to calculate the economy wide effects in Switzerland of a services liberalisation in Switzerland and the EU.

The first objective of this study is to measure the current level of regulation in the services sectors in Switzerland and the EU. The services sectors covered in this study are regulated professions, business services, distributive (retail and wholesale) trade, telecommunications, electricity, postal services, rail transportation (freight and passenger), air transportation and banking services; a total of 9 sectors. Notice that health and education services are *not* covered in this study. Knowing how the level of regulation differs between Swiss services sectors and EU services sectors is of great importance when considering a services liberalisation. But also, we need comparable measures of the level of regulation since the scenarios for calculating economy wide effects are defined in terms of specific changes in the level of regulation in Switzerland and the EU.

The level of regulation is reflected in non-tariff barriers to services provision. A services liberalisation reduces these barriers equivalent to reducing the level of regulation. The barriers drive up costs, create rents and may reduce competition from existing and new firms. For example in wholesale trade in Switzerland, laws impose restrictions on the distribution of certain products. This drives up the cost of doing business in wholesale trade, leading to more expensive products and less competition. Another example is the electricity sector in Switzerland where the distribution network is not unbundled from the generating network. This could push up rents – the price margin over costs – as potential competitors, foreign and domestic, may choose not to enter the market of electricity distribution fearing they will receive a biased treatment by the system operator.

We find that the level of regulation in Switzerland is of the same magnitude as in the EU in business services, distributive (retail and wholesale) trade and air transport. For regulated professions, regulation is lower in Switzerland compared to the EU and the same applies to rail freight transportation. The rest of the infrastructure sectors, i.e. telecommunications, electricity, postal services and rail passenger transport are much more regulated in Switzerland than in the EU. This could indicate a large potential for Switzerland to liberalise its infrastructure sectors.

The second objective of this study is to calculate economy wide effects of liberalising services in Switzerland and the EU. We calculate economy wide effects for four independent scenarios each representing different degrees of liberalisation in Switzerland and the EU in the five services sectors of regulated professions, business services, distributive (retail and wholesale) trade, telecommunications and electricity. Later, we provide evidence for the remaining five

sectors; they are not included to begin with because of poor data quality possibly contaminating the results from the five sector analyses where data quality is high. The results from the four scenarios provide insight into what drives a successful liberalisation providing economic gains for Switzerland. However, the four scenarios do not serve as suggestions to actual service liberalisations.

Scenarios one and two provide upper and lower bounds, respectively, for the economy wide effect in Switzerland. In scenario one, Switzerland is assumed to liberalise while the EU is assumed not to liberalise. We find that this will increase welfare in Switzerland by around 2 percent equivalent to a consumption increase of 5.2 billion CHF. Moreover, employment is expected to increase by 0.6 percent. Scenario two represents the opposite. Here the EU is assumed to liberalise while Switzerland is assumed not to liberalise. We find that this leads to a 0.3 percent lowering in Swiss welfare equivalent to a consumption decrease of 0.8 billion CHF.

The results in these two scenarios illustrate that the main driver of economic gains for Switzerland is the country's own extent of liberalisation, not higher demand in the EU caused by EU liberalisation. In scenario one, the Swiss liberalisation increases productivity and lowers prices in Switzerland which has a strong positive effect on the domestic market. At the same time, the relative competitiveness of Swiss firms, i.e. firms operating in Switzerland, is strengthened compared to their EU competitors. Both effects contribute to higher welfare and increasing employment. In scenario two, where only the EU liberalises, Swiss firms experience a drop in relative competitiveness compared to EU firms reducing Swiss welfare; even though this effect to some extent is mitigated by a general increase in demand in the EU leading to more trade across borders for all countries, including Switzerland. The expected decline in Swiss welfare of 0.3 percent in scenario 2 indicates that the negative effect of lower relative competitiveness of Swiss firms dominates the positive effect of increasing cross-border supply due to higher EU demand.

We now present the level of regulation in Switzerland and the EU followed by the economy wide results from the four scenarios.

1.1. The level of regulation in services in Switzerland and EU

We measure the level of regulation by translating qualitative legislation giving rise to non-tariff barriers into a quantitative measure of the barriers for a total of 9 services sectors. It allows us to compare the level of regulation between Switzerland and the EU. The nine sectors covered are: regulated professions, business services, distributive (retail and wholesale) trade, telecommunications, electricity, postal services, rail transport (freight and passenger) air transport and banking services.

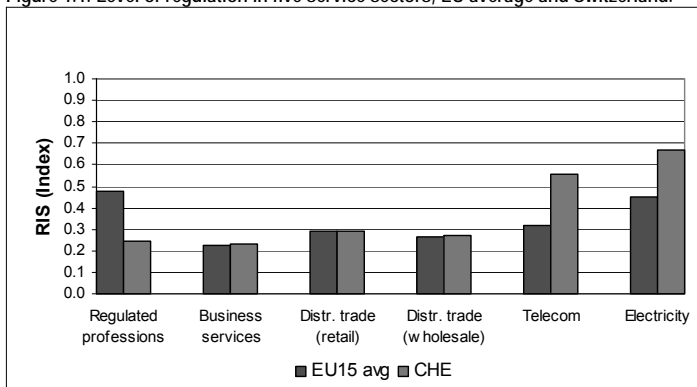
For each sector, we summarise the level of regulation in a single index called Regulation Index in Services (RIS). A high RIS value implies many barriers and consequently a high level of regulation. A low value RIS value implies few barriers.

We find that the level of regulation in business services, distributive (retail and wholesale) trade, air transport and banking service is more or less the same in Switzerland as in the EU. This is indicated by the identical size of the RIS in Figure 1.1 and Figure 1.2. The figures also show that in regulated professions and rail freight transport, Switzerland seems to have much fewer barriers than the EU indicated by a lower value of the RIS for Switzerland than for the EU.

For the remaining sectors: telecommunications, electricity, postal services and rail passenger transport, Switzerland experiences high levels of regulation compared to the EU average.

The chosen split of sectors in Figure 1.1 and Figure 1.2 illustrates which sectors enter the economy wide analysis presented later. Figure 1.1 shows the sectors included in the “main” economy wide 5 sector analysis, while Figure 1.2 shows the sectors additionally included in the extended or 9 sector economy wide analysis.

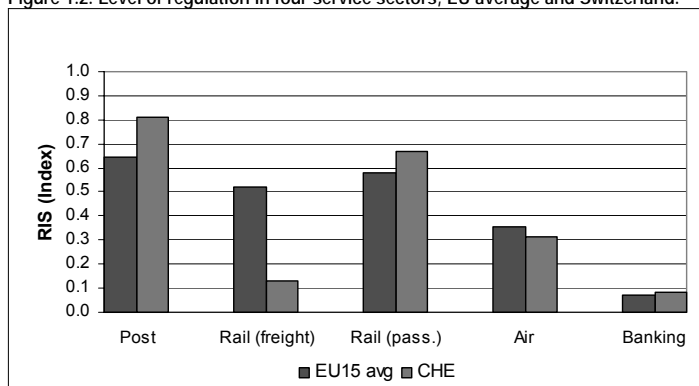
Figure 1.1. Level of regulation in five service sectors, EU average and Switzerland.



Note: The figure shows the “foreign” RIS for the five services sectors included in the simulations of the economy wide effects in four scenarios. The “foreign” RIS reflects the level of regulation for foreign firms operating within the country or region. The domestic index reflects the level of regulation for the country or region’s own firms operating in the country or region, respectively. See chapter 2 for more information. A high value of RIS implies many barriers and consequently a high level of regulation. A low value of the RIS implies few barriers. The RIS is restricted to lie between zero and one. For regulated profession (proxied by the accountancy sector), business services (proxied by IT-services) and distributive (retail and wholesale) trade for Switzerland the RIS reflect the situation in 2002 after the coming into force of the bilateral agreements with the EU. For the same sectors for EU, the barrier indices reflect the situation around 2001-2003. For the telecommunication and electricity sector the year is 2001.

Source: Copenhagen Economics and Copenhagen Economics (2005).

Figure 1.2. Level of regulation in four service sectors, EU average and Switzerland.



Note: The figure shows the level of regulation in postal services, rail transport (freight and passenger), air transport and banking services measured by the RIS. For these sectors there is by construction no difference between the foreign and domestic index, see note for Figure 1.1. The figure shows the RIS for the five sectors with poor data quality not included in the simulations of the four scenarios. However, these sectors are included in an additional simulation covering all eleven sectors. For Switzerland and EU the RIS reflect the level of regulation in 2001.

Source: Copenhagen Economics and Copenhagen Economics (2005).

The RIS value in the figures measure the overall level of regulation in the selected service sectors in Switzerland and the EU. However, our methodology for constructing the RIS allows for more detailed insight into the areas where regulation exists. Being able to compare not only the overall level of regulation between Switzerland and the EU but also specific areas, may prove important in relation to a services liberalisation. For instance, identical RIS indices within a sector in Switzerland and the EU may cover the fact that the regulation in Switzerland lies in areas where the EU is very liberal and vice versa. This could mean that a services liberalisation is also possible within these sectors even though the overall level of regulation is the same.

For example, in retail trade both Switzerland and the EU obtain a RIS value of 0.29, cf. Table 1.1. However, while retail firms in the EU experience more barriers in *Establishment* than Switzerland (0.30 vs. 0.20) the opposite is true in *Uses of input* (0.18 vs. 0.38). The same is true for a number of other sectors which will be covered in chapter 2.

Table 1.1: Decomposing the overall RIS into areas, retail trade.

Retail	RIS	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7
	All	Establishment	Uses of input	Promotion	Distribution	Sales of services	After sales activities	Non-legal barriers
EU15	0.29	0.30	0.18	0.38	0.16	0.32	0.06	0.51
CHE	0.29	0.20	0.38	0.42	0.12	0.22	0.00	0.53

Note: The table shows how regulation is distributed over different areas. Retail is used to illustrate this. The RIS value in retail is similar in EU15 and Switzerland but the composition of the RIS differs.

Source: Copenhagen Economics and Copenhagen Economics (2005). Full table is presented in Chapter 2.

The RIS values convey important information in themselves. But additionally, the four scenarios of services liberalisation are directly based on changes in the RIS, such that a given scenario for liberalisation is reflected in a specific lowering of the RIS for each of the service sectors covered in the study.

1.2. The economy wide effects in Switzerland of liberalisation in 5 sectors

We calculate the economy wide effects for four different scenarios. The scenarios are chosen to supply complementary insight into what makes services liberalisation a success (or a failure) in terms of economic gains in Switzerland; thereby providing the building blocks for a successful services liberalisation. We include the five services sectors; regulated professions, business services, distributive (retail and wholesale) trade, telecommunications and electricity. The remaining four sectors will be included later, but are excluded here because they rest of less reliable data thereby possibly contaminating the results.

Of the four scenarios, scenarios 1 and 2 represent the situations where Switzerland liberalises and the EU does not, and where the EU liberalises and Switzerland does not, respectively. These scenarios give insight into the mechanisms at work when only one region liberalises at a time. Scenarios 3 and 4 will illustrate the mechanisms at work when both regions liberalise at different (scenario 3) and identical (scenario 4) pace, respectively.

The scenarios are presented in Table 1.2. More specifically, the four scenarios are identified as:

- Scenario 1: The EU remains at status quo (the current level of regulation), and Switzerland takes on a “best practice” strategy which implies adopting the level of regulation of the country in the EU with the smallest RIS;

- Scenario 2: Switzerland remains at status quo (the current level of regulation, hence, does not liberalise) while the EU member states continue on their liberalisation path. This implies implementation of the proposed services directive for the services covered by the services directive and the relevant directives in the infrastructure sectors, e.g. the electricity directive in the electricity sector¹;
- Scenario 3: The EU continues along their liberalisation path and Switzerland adopts the level of regulation of the EU country having the lowest level of regulation in each services sector *after* the country itself has adopted the directives governing the continued path of EU liberalisation;
- Scenario 4: The EU and Switzerland both liberalise following the continued liberalisation path of the EU.

Table 1.2. The four scenarios analysed in this study

EU \ Switzerland	Status quo	Minimum EU-compatibility	"Best practice"
Status quo	Benchmark		Scenario 1
Liberalization path continued	Scenario 2	Scenario 4	Scenario 3

Source: Copenhagen Economics

For each of these four scenarios we calculate the economy wide effects for Switzerland using the Copenhagen Economics Trade Model (CETM). The overall implication of the results for Switzerland is that the main driver of economic gains in a service liberalisation is the country's own reduction in barriers. If Switzerland reduces its barriers to service provision, it will experience increases in welfare, wages, employment and cross-border trade, regardless of the action taken by the EU. This is demonstrated by the Swiss gain in welfare of about 2 percent and a 0.6 percent rise in employment in scenario 1 where Switzerland liberalises and the EU does not, cf. Table 1.3.

Table 1.3: Economic effects for Switzerland

Economy-wide effects	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Welfare	2.0 %	-0.3 %	1.7 %	0.8 %
Welfare (CHF billion)	5.2	-0.8	4.6	2.1
Real wages	1.7 %	0.0 %	1.7 %	1.0 %
Employment	0.6 %	0.1 %	0.8 %	0.5 %

Note: All results are reported as changes from the benchmark. Welfare is measured as comprehensive consumption. The table includes liberalisation in the five services sectors regulated professions (proxied by accountancy), business services (proxied by IT-services), retail and wholesale trade, electricity and telecommunications. The results from the remaining sectors rail passenger transport, rail freight transport, air transport, postal services and banking services are presented later in this chapter.

Source: CETM – Copenhagen Economics.

Swiss consumers will benefit from lower prices, higher employment and increased wages if barriers to services provision are reduced. The economic gains are explained by the impacts of increased productivity and reduced prices in the liberalised sectors. This has a positive effect on the domestic market, but it also increases the competitiveness of Swiss firms, compared to

¹ It is less relevant that the proposed EU directives may not be implemented in their original version since they together illustrate the trend path of liberalisation in EU. For instance, just because the proposed services directive may not be implemented in its original version, it is unlikely that no liberalisation of the covered services sectors will take place.

their European competitors. This will increase opportunities for Swiss firms on the European market and subsequently lead to an increase in cross-border supply from Switzerland to the rest of Europe. This is an important effect contributing to the positive results in scenario 1.

If Switzerland on the other hand does not reduce its barriers to service provision while the EU does, the results are reversed. Swiss firms will lose in competitiveness, and hence lose market shares on the European market. This is the explanation behind the decrease in Swiss welfare in scenario 2. When Switzerland falls behind the EU in reducing barriers to services provision, the lost competitiveness for Swiss firms on the European market will lead to shrinking markets, and eventually welfare losses in Switzerland. The effect of less cross-border supply due to lost competitiveness is to some extent mitigated by a general increase in demand in the EU, which leads to more trade across borders for all countries, including Switzerland, but the net result in scenario 2 is a decrease in cross-border supply and consequently welfare, as demonstrated by the 0.3 percent lowering in Table 1.3.

The larger the barrier reduction in Switzerland, the larger the expected total welfare gain. For example, the extent of the barrier reduction is the core difference between scenarios 3 and 4. In scenario 3, Switzerland is assumed to reduce its barriers to services provision in order to match the level of a best practice country; while in scenario 4 Switzerland "only" reduces its barriers in order to meet minimum EU compatibility. The resulting difference in welfare gains is striking. In both scenarios, the EU is assumed to follow the same continued liberalisation path. Hence, the cause of the higher welfare gains in scenario 3 compared to scenario 4 is the extent of Switzerland's own barrier reduction.

The economy wide effect for Switzerland of liberalising services has been calculated in the recent OECD (2004) study. The study finds that Swiss output would rise by 8 percent as a result of liberalising telecommunications, electricity, regulated and business services, distributive trade, gas, health care services and agriculture. This is higher than our finding of a value added gain of 3 percent in scenario one (corresponding to the 2 percent welfare gain, see appendix A). However, including health care and agriculture in the OECD study but not in the present one seems to account for a large share, 3-4 percentage points, of the 8 percent output increase. Moreover, the OECD Interlink model applied in the OECD study seems to put more weight on dynamic capital accumulation than the Copenhagen Economics Trade Model (CETM) used in the present study. This could help explain some of the remaining difference since a liberalisation would tend to increase the aggregate stock of capital increasing output and welfare. In summary, the OECD study may very well imply economic gains from liberalisation of the same general magnitude as those reported in the present study.

1.3. The economy wide effects in Switzerland of a liberalisation in all 9 sectors

We have presented the results of a liberalisation in five services sectors. However, liberalisation in the additional four sectors of banking services, railway transport (freight and passenger), air transport and the postal services sector may affect the potential welfare gains in Switzerland. While the economy wide effect based on nine sectors are less precise than the estimate obtained in the additional four sector analysis because of poor data quality of the additional five sectors, it provides insight into the general *weight* that these additional five sectors would have on total effects of liberalisation.

The simulation focuses on scenario 1: Switzerland is assumed to liberalise according to a best practice strategy, while the EU is assumed to remain in status quo. We find that the potential effects of further liberalisation could be substantial demonstrated by a Swiss welfare gain of 3.1 percent compared to a 2.0 percent gain in the five sector analysis. Furthermore, employment is expected to increase by 0.8 percent compared to the 0.6 percent in the five sector analysis.

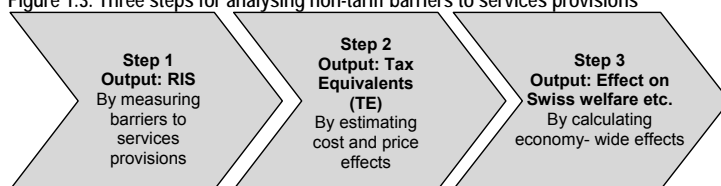
The most important driver of the positive effects is the barrier reduction taking place in the postal services sector. The barrier reduction in this sector is estimated to be extensive, and this has a direct and positive effect on the economy. However, it should be kept in mind that the estimates of effects of barrier reductions in the postal services sector, as well as in the banking services, air transport, and railway transport sectors are burdened with a high level of insecurity due to poor data quality. Rather, the result should be taken to indicate that liberalisation in other sectors may have substantial impacts on the total welfare effect in Switzerland.

1.4. The analytical framework

This section describes the analytical framework which we use to calculate the economy wide effect on the Swiss economy of a services liberalisation.

The framework is specifically designed for modelling non-tariff barriers to services provision. The framework consists of three steps, cf. Figure 1.3.

Figure 1.3. Three steps for analysing non-tariff barriers to services provisions



Source: Copenhagen Economics.

Step 1: Measuring Regulation Index in Services (RIS)

The objective of the first step is to translate qualitative information on barriers found in legislation into a quantitative measure. A quantitative measure allows us to compare more transparently barriers between countries and sectors and to make further calculations eventually resulting in economy wide effects. The quantitative measure is an index labelled the Regulation Index in Services or just RIS bound by zero and one. A high value of RIS indicates a high level of regulation or many barriers while a low value of RIS indicates a low level of regulation or few barriers.

For each services sector and country covered in this study a “foreign” and a “domestic” RIS exists. The “foreign” RIS measures the level of regulation faced by foreign firms operating within that specific country and sector. The “domestic” index measures the level of regulation faced by the country’s own firms. However, for the infrastructure sectors² (and also for banking), the foreign and domestic RIS are identical in construction because the RIS in these sectors focuses more on the legal framework for promoting effective competition irrespective of the country of origin of firms.

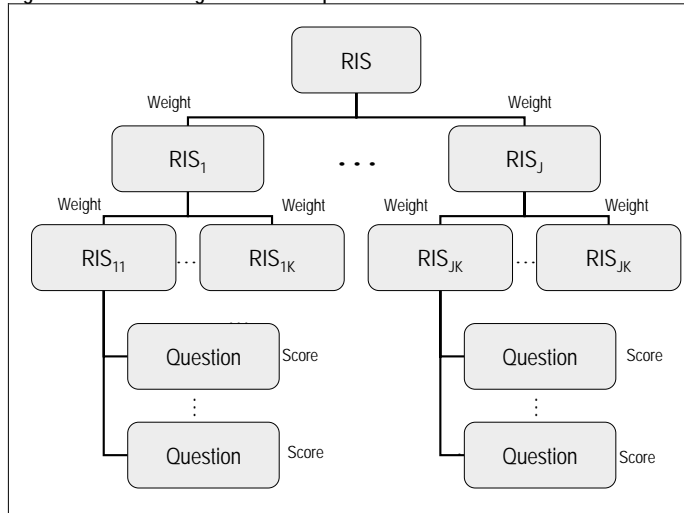
The quantification of barriers into the RIS is based on comprehensive questionnaires. For regulated professions (proxied by accountancy), business services (proxied by IT-services) and distributive (retail and wholesale) trade, the questionnaire is based on the barriers identified by the European Commission in its survey of the state of the Internal Market for services (European Commission, 2002). For the infrastructure sectors (electricity, telecommunications, postal services, rail passenger, rail freight and air transport) the questionnaire is customised to each sector, targeting the specific issues for each. For banking services, the questionnaire and answers are taken straight from Kalirajan et al (2000). The qualitative information on specific restrictions is transformed into the quantitative measure

² Telecommunications, electricity, postal services, rail passenger and freight transport and air transport.

called the RIS (Regulation Index in Services) using index methodology. In each of the four scenarios, the RIS values are recalculated, taking into account which restrictions will be removed in the given scenario.

The computations of the RIS start with the scores of the questions, c.f. Figure 1.4. Each question has a score and if the question is answered by “yes” this score will be added to the subcategory RIS value. Answering all questions successively gives the final subcategory value. Each subcategory is presumed to have a certain relative importance in determining the category barriers. This relative importance is reflected in weights which are used to aggregate the subcategories into the overall RIS.

Figure 1.4: Constructing the RIS from questionnaires on barriers



Source: Copenhagen Economics.

One important advantage of this hierarchical structure is the possibility to identify not only the RIS but also restrictiveness values at more detailed levels of aggregation. This proves important when addressing the question of how a certain value of RIS is composed.

While the RIS measures the level of regulation in each country, it does not directly measure the extent of heterogeneity of regulation between, i.e. the EU member states and Switzerland. If this heterogeneity is large, harmonisation and not just liberalisation in the sense of lowering barriers might yield economic gains. However, in a recent study Kox and Lejour (2005) find that heterogeneity between Swiss and EU member states' services legislation is not larger than the average heterogeneity between the EU member states themselves. This implies that the *level* of regulation is important which is what we measure by the RIS.

Step 2: Estimating cost and price effects of barriers

The objective of the second stage is to transform the RIS values into tax equivalents (TE's). RIS values cannot enter the economic model in step 3, so we have to transform the values into tax equivalents which can then enter the model. Tax equivalents can be thought of as theoretical taxes computed to create economic effects that are equivalent to the economic effects of the actual barriers.

We calculate tax equivalents by econometrically estimating the direct effect of barriers on the costs and prices of services provision. The result is a translation of the information found in the detailed RIS indices into tax equivalents.

We utilise the econometrical results of a number of acknowledged empirical studies and in two cases estimate our own model in order to cover all sectors. Consequently, the specific modelling strategies differ slightly across sectors although the general considerations presented above are fundamental to all the econometric modelling. For electricity and telecommunications we set up econometric models using publicly available data. We estimate two separate equations in order to distinguish cost and rent creating effects, the latter referring to price effects contingent on costs. We find that the coefficient estimates are insignificant at any reasonable level. This is primarily due to the low number of observations; 16, which leaves our estimates insignificant.

To validate the estimates obtained, we compare our results with other empirical evidence. The effects from trade barriers on telecommunication prices were investigated by Doove et al (2000) building on the econometric work of Boylaud and Nicoletti (2000). Doove et al (2000) find price impacts two to four times higher than those used in this study. We believe that much of this large discrepancy can be explained by the different time focus and the fact that Doove's estimates are carried out directly on prices *non-contingent* on costs. The latter means that Doove captures effects from lower costs translating into lower prices in her price estimate while we estimate separately the effects on costs and the effects on prices contingent on costs. With this in mind both estimates seem reasonable.

For regulated professions, business services and distributive (retail and wholesale) trade, we use the results in Copenhagen Economics (2005) drawing on a database of more than 275,000 observations. Their econometric 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 prices and costs are explained by data on firm level as well as on economy-wide information.

Step 3: Calculating economy wide effects in an economic model

Based on the estimated tax equivalents, the economy-wide effects of the scenarios are calculated in the third stage using the Copenhagen Economics Trade Model (CETM). The model represents state-of-the-art developments within general equilibrium models of services trade, and it has been specially designed for the analysis of barriers to trade and foreign direct investment. The model captures all linkages between the different sectors of the economy and it therefore allows for an economy-wide assessment of barriers to services trade.

Since the Swiss economy is the focus of the analysis, the current implementation of the CETM represents Switzerland and its most important trade partners, the EU-15 countries.³ 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. Figure 1.5 provides an overview of the regions and sectors represented in the model. The aggregation of the production sectors has been guided by the focus on service provision in the analysis. Services production takes place within 9 distinct sectors, while all other production, mainly industrial production of goods, is captured by an aggregate production sector. This is to ensure both transparency and tractability of the model.

³ The ten new member states represent a very small share of Swiss imports and exports and are therefore not modelled separately but included in the "rest of the world" group.

Figure 1.5: Regions and sectors in the CETM

Regions	Sectors
1. Switzerland	<i>Service sectors</i>
2. Austria	1. Regulated professions
3. Belgium (incl. Luxembourg)	2. Business services
4. Denmark	3. Distributive trade
5. Finland	4. Telecommunication
6. France	5. Electricity
7. Germany	6. Banking
8. Greece	7. Rail transport
9. Ireland	8. Air transport
10. Italy	9. Postal services
11. Netherlands	10. Other services
12. Portugal	
13. Spain	<i>Goods-producing sector</i>
14. Sweden	11. Rest of the economy
15. United Kingdom	
16. Rest of the World	

Source: CETM – Copenhagen Economics

1.5. Limitations to the analytical framework

Even though we have set up a state-of-the-art methodology it is not perfect.

First of all, the methodology for identifying the barriers and the level of regulation is not perfect. In order to create an RIS that can be compared between countries, some aspects of barriers will inevitably get lost. We use questionnaires to achieve a common ground for comparing regulation; but doing so limits the scope to barriers that can be assessed answering yes or no to a question. No doubt, some barriers have been left out, yet we believe that we have captured the most important barriers by using detailed questionnaires designed to cover important aspects of barriers and regulation.

Furthermore, the barriers identified in regulated professions and business services are actually proxied by barriers in accountancy and IT-services, respectively. While this is deemed a fairly good proxy in many respects, it does also specifically imply that barriers in accountancy are fairly identical to barriers in legal services which may not be the case. Since accountancy is more loosely regulated compared to legal services, using accountancy services to proxy regulated professions will lead to a conservative impact estimate in the scenarios.

Second, not all relevant variables are included in the econometric estimations transforming RIS values into tax equivalents due to data limitations. For example, differences in labour market legislation, the tax system and competition policy between the countries may influence the impact of RIS on prices and costs, yet they are not included in the econometric model. This is due to limited availability of such data for which no obvious solution exists. However, lack of such data is not a specifically Swiss problem and, hence, does not bias the results for Switzerland.

Third, the Copenhagen Economics Trade Model (CETM) does not capture (the likely notion) that liberalisation changes firm behaviour in a way that firms start to innovate more, increase R&D, use new technologies etc. Moreover, the model does not capture the possibility that Swiss firms are being discriminated against in EU countries since the model only allows for a country to treat all foreign firm the same way. For instance, German legislation may levy extra barriers across all foreign firms and not on German firms. But German legislation cannot, in the model, levy more barriers on Swiss firms than on, e.g. Danish firms. However, this model limitation has no major impact on the Swiss results since the main driver of economic gains in Switzerland is higher efficiency of firms operating in Switzerland due to lower Swiss barriers. Discriminatory measures in EU are less important.

Despite the potential drawback of this method, it represents state-of-the-art in modelling services liberalisation. Whenever possible, we have tried to address the drawbacks. The detailed sensitivity analysis in the model analysis in Chapter 4 is an example of that.

Chapter 2 Measuring barriers in services sectors in Switzerland

In this chapter we describe how to translate qualitative information on barriers found in legislation into quantitative measures. A quantitative measure is necessary for this study since it allows us to compare in a more transparent manner, barriers between countries and sectors, and to make further calculations eventually resulting in economy wide effects.

The quantitative measure developed in this chapter is an index labelled the Regulation Index in Services or just RIS. The index is bound by zero and one. A high value of RIS indicates a high level of regulation or many barriers, while a low value of RIS indicates a low level of regulation or few barriers. We create the RIS via detailed questionnaires converting the qualitative information on barriers found in legislative rules and legal practices into the quantitative RIS.

The chapter is organised as follows: Firstly, we describe the basics of the index methodology. Secondly, we describe the questionnaires and how they are used to convert qualitative information on barriers into the quantitative RIS. We conclude the chapter with a short discussion of the pros and cons of this approach.

2.1. The index methodology

Barriers to the free working of market forces are given by a set of complex, qualitative policies in a large number of dimensions. In order to measure these properly, we need to develop a methodology that enables us to transform qualitative information about specific policies into quantitative information in a meaningful, transparent and - as far as possible - unambiguous way. In addition, the methodology should be able to retain the multi-dimensional character of the issues we analyse and at the same time allow us to organise and simplify the multi-dimensionality problem in order to improve analytical tractability. This is of great value in e.g. the econometric modelling where data availability in some cases restricts the scope for multi-dimensionality and in other cases allows more refined estimations.

Furthermore, the methodology should be capable of incorporating hypothesised scenarios that result in new index values being both readily interpretable and realistic forecasts of the qualitative changes implied. The hypothesised scenarios focus directly on changes in legislation and when incorporating these changes the resulting index values should be directly comparable with the starting point, i.e. the benchmark value.

Finally, this study considers a range of sectors differing widely with respect to their technological and economic maturity, with some sectors still possessing many of the classical features known from the theory of natural monopolies and others being ready for full market

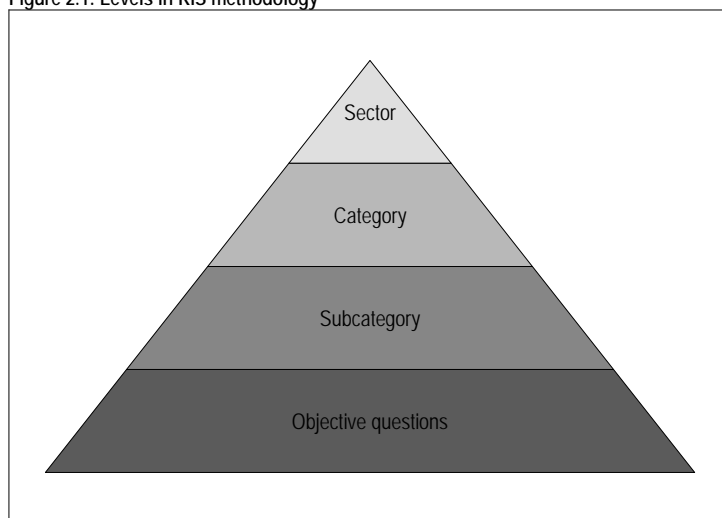
opening.⁴ For instance, in some infrastructure sectors we would perceive the mere decreasing of competitive perplexities to the incumbent as an important barrier reduction, whereas in other sectors the most severe barrier to free competition is nationality requirements in establishment of a business. Thus, the developed methodology should also be flexible enough to aim at very different stages and characteristics in a market opening process, and the index has to incorporate different scope and level of detail according to the sector specifics.

Construction of the Regulation Index in Services (RIS)

The considerations above lead to the construction of a "Regulation Index in Services" which we will simply denote RIS. The index structure is hierarchical, where specific restrictions are evaluated and scored at the lower level. The scores are weighted and summarised in aggregate indices. The advantage of this approach is that it provides a clear linkage between specific and detailed barriers and the overall RIS used in the economic analysis.

The hierarchy of the index consists of four levels c.f. Figure 2.1. For each country, we evaluate several *sectors*. We evaluate the barriers in different stages of the value chains. This is done by breaking down the value chain into more *categories* describing different types of barriers. These categories are further divided into *subcategories* each containing the specific *questions* regarding the restrictions on service provision.

Figure 2.1: Levels in RIS methodology



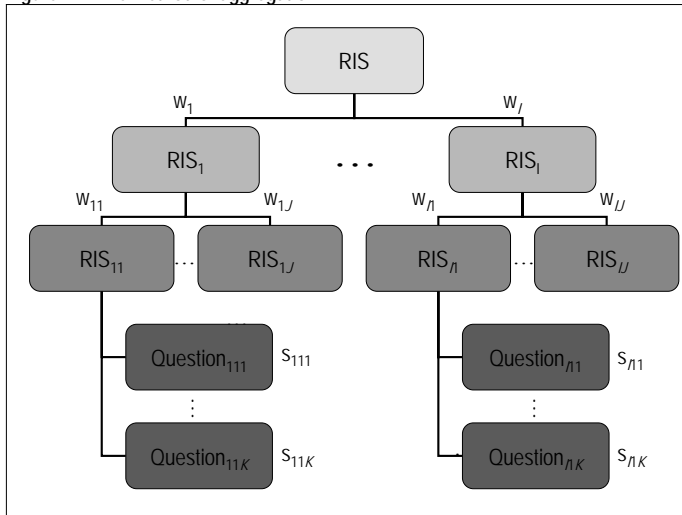
Source: Copenhagen Economics.

Specifically, the computations start with the scores of the objective questions, c.f. Figure 2.2. Each question has a score, and if the question is answered by "yes", this score will be added to the subcategory RIS value. Answering all questions successively gives the final subcategory value. Each subcategory is presumed to have a certain relative importance in determining the category barriers. For instance, "nationality or residence requirements" might play an influential role on the "establishment"-barriers. This relative importance is reflected in weights which are

⁴ The distinctive feature of natural monopolies is the combination of high fixed costs and (extremely) low marginal costs of production, such that the establishment of more than one firm would incur unnecessary high costs.

used in aggregating the subcategories to category values. Similarly, there are corresponding weights for the categories in order to compute the overall RIS.

Figure 2.2: The method of aggregation



Source: Copenhagen Economics

One important advantage of this hierarchical structure is the opportunity to aggregate RIS values at different levels allowing the researcher to attain information with most any desired level of detail. E.g. a full-scale cross-country comparison is likely to be applied to category or even subcategory RIS values, whereas the econometric analysis is better applied to more aggregate RIS indices.

As should be clear, the RIS is simply a function of scores and weights. Consider a certain sector within a certain country, e.g., the Swiss accountancy sector. Let categories be characterised by index i , subcategories by index j and objective questions by index k . Further, refer to s as the score of an objective question and IF as an indicator function being one, if the question is answered by "yes", and zero if answered by "no". These belong to the lowest level of Figure 2.2 and IF is simply a dichotomous variable translating the questions into the numerical values 0 and 1. We can now calculate the subcategory RIS for, say, the "nationality or residence requirements" (j) belonging to the "Establishment" category (i), according to

$$RIS_{ij} = \sum_k s_{ijk} IF_{ijk}$$

The more "yes-answers" at high scoring questions, the higher the RIS. When the answers are mutually exclusive the condition bounding the index upwardly to (exactly) one would be

$$\max_k s_{ijk} = 1,$$

which is always imposed in this study.⁵ When turning to the RIS at category level we need to introduce weights, w , in order to compute

$$RIS_i = \sum_j w_{ij} RIS_{ij} .$$

Analogous to above, the weights should sum to one. In our example this value would give the "Establishment" RIS for accountancy in Switzerland. Equivalently, the sector RIS is given by

$$RIS = \sum_i w_i RIS_i$$

Clearly, all the computations reduce to multiplying and summing, but the presentation above reveals the importance of using valid weights and scores as these alone constitute the RIS.

Practically, the RIS values are calculated using the scores and weights of Copenhagen Economics (2005) and a new set of scores and weights for the infrastructure sectors. In both cases guesstimates have been applied.⁶ Essentially, guesstimates seem to be the favourite choice of most researchers conducting similar analyses, c.f. Findlay and Warren (2000) and Nguyen-Hong (2000).⁷ Moreover, an important strength of the methodologies of Copenhagen Economics (2005), and the additional scores and weights applied here is the large number of objective questions which reduces the importance of assigning "wrong" values to single weights and scores. As far as possible, though, we try to qualify the weights by looking at empirical investigations. For example, Jamasb and Pollitt (2005) state that production costs amount to roughly 40% of total electricity costs, which is used to weigh categories concerning electricity generation altogether by 0.40.

2.2. The questionnaires as the building blocks of the RIS

As already mentioned, the sectors differ widely with respect to economic maturity, technologies, monopolies etc. In particular, the provision of infrastructure services is strongly affected by the underlying technological conditions, e.g. the railway network is a highly capitalised area working with almost no production costs, but a high level of fixed costs. Therefore, it has been – and in many cases is still being – highly regulated. In contrast, most business and distribution services do not require much investment in physical capital and a totally different market structure has emerged. For this reason we prefer to create two sub-frameworks: (i) a sub-framework applying the same criteria to the sectors considered and (ii) a sub-framework applying different criteria according to sector specifics.

Specifically, the sectors accountancy, IT-services, retail and wholesale follow the questionnaires of Copenhagen Economics (2005) where the criteria are identical across sectors; electricity, telecommunication, air, rail and postal services will be evaluated by a new methodology with sector specific criteria, c.f. Table 2.1. This is a sensible way of differentiating, since the former group of services is formed by quite similar industries in contrast to the latter group that consists of industries with distinctive characteristics such as high capital intensity (rail and electricity) and network externalities (e.g. telecommunications). Most importantly, though, the infrastructure sectors have been characterised by strict regulation and/or a

⁵ If all answers belonging to a subcategory are subsidiary, and hence additive, the condition translates to $\sum_k s_{ijk} = 1$.

⁶ The reader is referred to Copenhagen Economics (2005) for a further treatment of the scores and weights.

⁷ Actually, the researcher may apply the techniques of factor analysis at each aggregating step, but this may result in more than one index. In Copenhagen Economics (2005) factor analysis was deployed at the last step of aggregation in both cases resulting in two factors. See also chapter 4.

government monopoly until recently and therefore possess a range of immediate barriers not included in the more advanced questionnaires of Copenhagen Economics (2005).

Table 2.1. Questionnaires by sectors

Identical criteria questionnaires	Sector specific criteria questionnaires
IT-services	Electricity
Accountancy	Telecommunications
Retail	Air transport
Wholesale	Postal services
	Rail transport (freight and passenger)
	Banking services*

*: The questionnaire and answers for EU countries and Switzerland are taken straight from Kalirajan et al (2000).
Source: Copenhagen Economics

Table 2.2 gives an example of how the two setups differ. Notice, that the first sub-framework includes questions general enough to be answered by all industries. However, that might not be very relevant for e.g. the incumbent in telecommunications. On the other hand the second sub-framework aims directly at the telecommunications sector with some of its technological characteristics.

Table 2.2: The two sub frameworks

Sub-framework I		Sub-framework II	
Questions (all sectors)	Answer	Questions (telecommunications)	Answer
1.2. Nationality or residence requirements	CHE	2. Local loop unbundling (LLU)	CHE
Nationality required to practice + Permanent or prior residence (more than 12 months)	N	Availability of full LLU	N
Nationality required to practice + less than 12 months for prior residence	N	Types of LLU available	-
Nationality required to practice + Domicile or representative office only	N	Types of collocation available	-
No nationality requirements + Permanent or prior residence (more than 12 months)	N	Maximum waiting time for collocation space after request	-
No nationality requirements + less than 12 months for prior residence	N	Retail margin on rental rate for full LLU	-
No nationality requirements + Domicile or representative office only	Y		
No restrictions	N		

Source: Copenhagen Economics

The only difference in the output of the two sub-frameworks is that the first allows for a distinction between barriers affecting domestic firms and barriers affecting foreign firms. This difference can be denoted: "discrimination". For example, rules about price setting (maximum and minimum prices, etc.) apply 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. E.g. for accountancy firms there is a number of restrictions to be fulfilled by the employees in order to practice. Where thorough knowledge of national laws is a natural precondition for providing accounting services of high quality, strict nationality requirements simply preclude foreigners from the domestic market and hence serve as a discriminatory barrier.

This level of detail is unattainable in the infrastructure sectors where the mere introduction of competitive pressures is at stake. One could of course apply the same questionnaires, but this would result in much irrelevant information. If telecommunications are still dominated by monopoly, there is not much value to know whether foreigners can or cannot be employed in the sector – the market outcome will most certainly be much more affected by the former

barrier. Thus, the measured barriers should be interpreted as barriers affecting both domestic and foreign firms.

More on the questionnaires and how they are used in scenario design

Having decided on the type of questionnaires to be used for each sector, we now describe the questionnaires in greater detail and how the answers to the questionnaires are closely linked to scenario design.

One of the main challenges is to draw the fine line separating relevant from irrelevant in the barrier space. Some countries might have liberalised formally, but is de facto being highly discriminating by e.g. the use of cumbersome administrative procedures. Lax enforcement of rigorous laws could be an example of the opposite. The picture is further blurred by a range of barriers being more of cultural and demographic nature, e.g. language problems. Since the study aims at the effects of political initiatives the latter seems to be less relevant, but indeed this is not always the case. For instance the Services Directive proposal as of 13.1.2005 foresees to implement "single points of contact" in order to overcome administrative and language problems.

As noted above the sectors have been divided into two groups according to the two sub-frameworks. The first constitutes a group of similar industries and is therefore treated in the same way. The small differences among these industries might nonetheless be captured as the questionnaires contain more than 200 objective questions. If a question is irrelevant to a sector this will typically be mirrored in absence of data and hence answers to the questions. It was the strategy of Copenhagen Economics (2005) to treat missing information on specific questions as evidence of no barriers. The reason for this is, that it is more difficult to obtain the information that a particular restriction does not exist than to obtain information about restrictions that actually exist.

The second group consists of sectors with greater diversities and therefore the questionnaires are adapted to sector specifics. Due to the intensity of purpose, these questionnaires are generally shorter, but all questions are answered without exceptions. Both the first and second set of questionnaires possess a scope and level of detail which is unique compared to other contemporary studies.

As a concrete example we present an excerpt of the telecommunications questionnaire in Table 2.3. We compare Switzerland with Denmark, which is the "best practice" country in the telecommunications sector. Also the weight and scores are presented. Notice, that for simplicity of exposition we have chosen a category with no subcategories, or – if one prefers – with just one subcategory comprising the entire category.

Table 2.3: Excerpt of the telecommunication questionnaire

Questions	Switzerland	Denmark	Weight	Score
5. Ownership			0.20	
Full public ownership (100%)	No	No		1
Mostly public ownership (71-99%)	No	No		0.75
Mixed ownership (30-70%)	Yes	No		0.50
Mostly private ownership (0-29%)	No	No		0.25
Full private ownership (0%)	No	Yes		0

Source: Copenhagen Economics

Table 2.3 demonstrates how the category “Ownership” is divided into a scale ranging from purely public to purely private ownership with descending scores. Obviously, public ownership is a severe impediment to trade in services, i.e. if the (former) monopoly firm providing telecommunications services is publicly owned most of the market will not be subject to normal competitive pressures. Public firms have little or no incentives to maximize profits leading to lax use of resources and lower productivity. Since the incumbent in Swiss telecommunications has mixed ownership, Switzerland obtains a score of 0.50. In comparison Denmark has gone much further in the liberalisation process, transferring all capacities into private hands and thereby obtaining a score of 0.

At this stage it is natural to explain how the RIS is adjusted to take account of the changes implied by the different scenarios. This is done in Box 2.1. The possibility to assess the barrier level of hypothetical scenarios is another distinguishing factor of this study.

Box 2.1: How scenarios imply changes in the barrier levels

The scenarios considered in this study imply changes in a wide set of rules not only for Switzerland, but the full range of European countries. In particular, the high impact scenario considers continued liberalisation in the EU-countries combined with Switzerland introducing “best practice” rules. Thus, every country is thought to change specific regulations thereby altering the scores in both the subcategories and the aggregated barrier index.

Suppose “best practice” in the telecommunications sector implies full private ownership of all capacities as stated by table 2.3, where Switzerland formerly has been characterised by “mixed ownership” implying a score of 0.5. The switch to complete private ownership reduces the category RIS to 0, such that multiplied by the weight of the “ownership-category” (0.20) we would observe a decrease in the aggregated RIS of $(0-0.5) \cdot 0.20 = -0.10$ as a result of this particular liberalisation. An analogous exercise has to be performed for all categories, sectors and countries throughout all scenarios.

Because the exact value of the barrier index is the primary input when calculating the economic effects of the different scenarios a possibly important subtlety should be mentioned at this stage. The question is whether to focus on Switzerland obtaining a certain (minimum) index value by allowing retro gradation of highly liberalised areas or to focus exclusively on the areas where the scenarios imply more liberalisation. As an example, Switzerland could already have liberalised the ownership in the telecommunications industry to an extent not matched by the best practice country, e.g. suppose the answers were reversed between Switzerland and Denmark. When this is left unchanged liberalising other categories will result in pronounced decreases and in this way the barriers of the best practice country puts an upper, not a lower, boundary on the new barrier level.

A practical problem that arises is how to interpret the notions “continued liberalisation” and “minimum EU-compatibility”; i.e. which objective questions are touched and which are not by these concepts? The solution chosen here is to use the Services Directive as proposed by the European Commission wherever applicable and supplement with other existing – if not yet implemented – and proposed EU directives. A complete list is given in appendix E.

Source: Copenhagen Economics.

We stress that implementing the scenarios in this way directs the focus towards liberalisation policies. But when changing regulation to the provision of services, there could be both a liberalisation effect as well as a harmonisation effect. The latter arises, because foreign firms are now operating under circumstances similar to those in their respective “home countries”. The harmonisation effect can naturally also be negative if legislation changes to something unfamiliar for the majority of foreign firms. In particular, we should notice, that policy liberalisation and harmonisation can work in either the opposite or the same direction depending on the situation.

We believe, that the harmonisation effect will in many cases be limited compared to the liberalisation effect, since much of the regulation considered in this study is concerned with protection of domestic firms. A German firm operating in, say a protected German market and a liberalised Swiss environment, would probably not gain much if Swiss regulation was harmonised, i.e. made more protective. The German firm is simply standing on different sides in the German and Swiss markets respectively. In this particular case the liberalisation effect is all that matters. The harmonisation effect would be much more relevant if the study considered other barriers like production standards.

On the other hand, there might be a somewhat stronger case for the presence of harmonisation effects when we consider Switzerland against EU15 member states, simply because the EU has – at least sought to – harmonise regulation across member states.

The argument of harmonisation effects can be extended to regulations not covered by the RIS questionnaires, but again it is questionable whether these have any significant size and whether the heterogeneity is of any relevant magnitude. Kox and Lejour (2005) study the OECD regulation database and find no significant heterogeneity between Switzerland and the EU member states. There are even cases of member states whose services regulation differ more from the EU average than Switzerland does.⁸

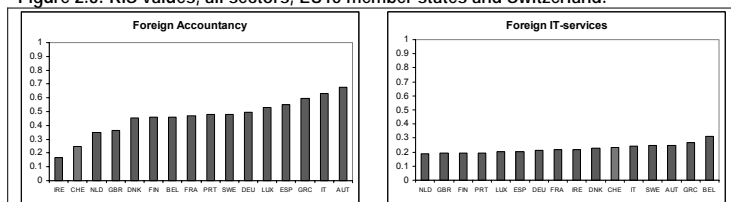
Altogether, our index methodology with its two sub-frameworks provides a reliable and flexible framework incorporating most of our scientific and economic requirements. The obtained index values are directly comparable between countries whether one uses RIS values at the subcategory, category or sector level.

2.3. Comparing the RIS across countries

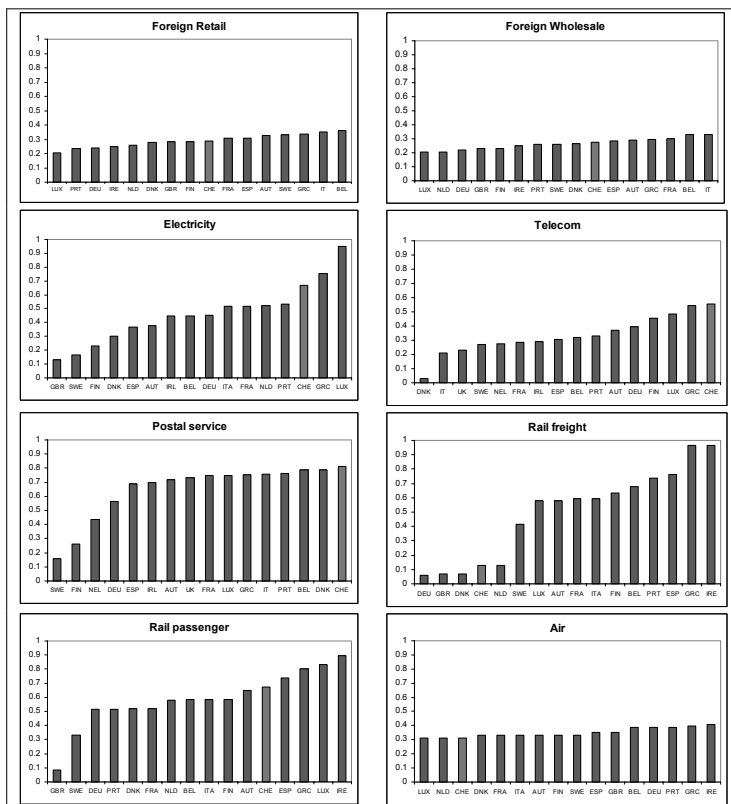
This section compares the Swiss barrier level and barrier composition to the EU15 countries using the RIS. In general, the existence of a marked difference between Switzerland and the EU countries is straightforward to interpret, whereas small differences should give rise to more caution. This is due to the fact that two countries may attain the same RIS value by fulfilling its respective different half of barriers in the questionnaires. The two countries may therefore be quantitatively similar, but qualitatively dissimilar. Thus, while focusing on the aggregated index the richness of information in the total of all the categories and subcategories should not be forgotten. In the following we present results on level and then composition effects.

The results of the aggregated RIS for all sectors are presented in Figure 2.3. The questionnaires are as far as possible answered according to the state of affairs in 2001. This is a natural choice since both the econometric and CGE modelling use economic data from 2001.

Figure 2.3: RIS values, all sectors, EU15 member states and Switzerland.



⁸ Swiss regulations are relatively close to EU average as "euro-compatibility" is usually checked when a new Swiss law or regulation comes into force. Also, many EU regulations are adopted in Switzerland (with some delay) "autonomously". This means, that they are not formally acknowledged, but incorporated in Swiss law.



Note: The fairly high RIS value in retail and wholesale in Switzerland is partly due to barriers on products and other areas that *affect* retail and wholesale, without specifically targeting retail and wholesale.
Source: Copenhagen Economics

The more detailed information of all sub indices are summarised in Table 2.4.

Table 2.4: RIS values decomposed, EU15 average and Switzerland.

Foreign	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5	Cat. 6	Cat. 7	Cat. 8
Account.	Establishment	Uses of input	Promotion	Distribution	Sales of services	After sales activities	Non-legal barriers	
EU15	0.61	0.48	0.28	0.37	0.17	0.04	0.5	
CHE	0.14	0.48	0	0.02	0.22	0	0.53	
IT	Establishment	Uses of input	Promotion	Distribution	Sales of services	After sales activities	Non-legal barriers	
EU15	0.18	0.18	0.38	0.07	0.06	0.04	0.5	
CHE	0.11	0.38	0.29	0.06	0.03	0	0.53	
Retail	Establishment	Uses of input	Promotion	Distribution	Sales of services	After sales activities	Non-legal barriers	
EU15	0.3	0.18	0.38	0.16	0.32	0.06	0.51	
CHE	0.2	0.38	0.42	0.12	0.22	0	0.53	

Foreign	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5	Cat. 6	Cat. 7	Cat. 8
Wholesale	Establishment	Uses of input	Promotion	Distribution	Sales of services	After sales activities	Non-legal barriers	
EU15	0.25	0.18	0.38	0.1	0.31	0.04	0.51	
CHE	0.18	0.38	0.42	0.06	0.19	0	0.55	
Electricity	Free choice of supplier	Unbundling	Network access	Tarification mechanism	Ownership (generation)	Wholesale trading model	Congestion management	
EU15	0.31	0.53	0.07	0.73	0.7	0.53	0.44	
CHE	0.80	0.73	0.75	1	0.75	0	1	
Telecom	Degree of choice	Unbundling	Third Party Access (TPA)	Regulation of TPA	Ownership			
EU15	0.02	0.37	0.32	0.46	0.43			
CHE	0	1	0.28	1	0.50			
Air	Regional airports	Freedom Access	Ownership	Selling Air Fares	Ground handling			
EU15	0	0.17	0.62	0	0.26			
CHE	1	0.17	0.33	0	0.25			
Rail freight	Functional separation I	Functional separation II	Privatisation of rail stock	Network access	Network pricing	Public control of prices	De facto access	
EU15	0.52	0.6	0.73	0.53	0.47	0.27	0.53	
CHE	0.4	0	0	0	0.5	0	0	
Rail pass.	Functional separation I	Functional separation II	Privatisation of rail stock	Network access	Openness to tendering	Network pricing	Liberalisation form	Compensation
EU15	0.4	0.87	0.93	0.67	0.89	0.43	0.1	0.37
CHE	0.5	1	1	0.67	0.95	0.5	0.25	0.5
Postal	Unbundling	Letter post	Third party access	Ownership	Regulation of entry			
EU15	0	0.7	0.8	0.72	0.31			
CHE	0	0.86	1	0.75	0.25			

The table presents the category RIS-values for each sector. It should be noted that the RIS-values only include the barriers to services. In some sectors like retail there will also be barriers to products, but these are not included in the RIS-value.

Source: Copenhagen Economics

The first notable difference is found in *accountancy*, where Switzerland is placed among the most liberal countries only surpassed by Ireland.⁹ The low level of Swiss barriers primarily stem from liberalised establishment, promotion and distribution rules. On the other hand, non-legal barriers seem to be slightly more unfortunate in Switzerland. It is also noteworthy that accountancy is the only one out of the business services and distribution sectors with high and dispersed barriers.

For *IT-services, retail and wholesale* – where the EU-dispersion is much lower – Switzerland obtains a score close to the EU-average. Interestingly, in IT-services the Swiss score is attained by having quite different regulatory setup compared to the EU-countries according to most restrictiveness criteria (objective questions), but this is not always reflected in the category values of Table 2.4, i.e. the qualitative differences disappear when aggregating to the category level. In retail and wholesale, some differences from the EU-pattern can be found in

⁹ It should, though, be noticed that most of the new EU-members such as Hungary, the Czech Republic, Poland, Estonia and Lithuania all seem to fall in the same category as Switzerland and Ireland.

establishment and sales of services respectively. An EU-pattern could not be found in all cases.

In retail it is questionable whether true barriers in Switzerland are actually higher than what the calculated aggregate RIS-values reflect. For example in the category "Use of inputs" one could argue that Switzerland has much higher barriers than we see them in the results. This is because Switzerland does not participate in the tariff union and has not implemented the so called "Cassis-de-Dijon" principle allowing the product standards of one member country to apply in all other member countries. In this way, Switzerland can have many restrictions on specific products complicating the life of retailers. We stress that the study never intended to include regulations on goods, but only on services and this probably accounts for the low RIS-values. Moreover a different weighting scheme could result in higher aggregate barrier values.

Turning to the infrastructure sectors, Switzerland is now placed among the most restrictive countries in Europe.

Starting with *telecommunications*, Switzerland is the most restrictive country, but this is mainly due to the absence of local loop unbundling and restrictive regulation of third-party access. Beyond this, the regulation of the Swiss telecommunication sector displays much affinity with the EU. Local loop unbundling has a prominent position in the questionnaire because it is seen as an important feature in the year 2001, where the barrier information is collected since many competing networks were not a reality at that time.

In the *electricity* sector, Switzerland is much more regulated than its European neighbours, which is reflected in practically all of the different restrictiveness criteria, except the wholesale trading model. Important to remember, though, is the unique combination of nuclear and hydro energy generation not matched by any other European country which hypothetically could enforce stricter regulation of the electricity sector in a hypothetical economic optimum.

Postal services are generally highly restricted throughout Europe with Switzerland being the most regulated country. It is likely that the high degree of regulation reflects particular features such as significant economies of scale and political difficulties. Alternatively, one could state that postal services have not witnessed the same technological improvements supporting liberalisation in other infrastructure sectors.

Compared to the EU-average, the regulation of the Swiss *rail* sector is quite asymmetric according to the object of transportation, i.e. the freight segment is almost fully liberalised whereas the passenger segment has relatively high barriers with the pattern of restrictions diverging somewhat from the EU15. The high degree of openness in freight is mainly due to the relatively high degree of competition and relatively high availability of rail stock.

The *air transport* industry is characterised by high commitment to international liberalisations which is reflected in very similar index values across countries. In this respect, it is quite surprising to observe some departures from the EU-average in the Swiss air industry. We also notice that Doove et al (2000) find significantly higher Swiss barriers, but much of this discrepancy can be explained by measurement at different points in time, i.e. Doove et al (2000) computes barriers for the year 1996.

2.4. Limitations to the RIS methodology

In the contemporary literature, the RIS belongs to the most extensive and refined methods of measuring barriers, c.f. Holmes and Hardin (2000), Warren (2000) and Dee (2003). A comparison across studies would generally just highlight the high quality of the RIS; that it has a unique coverage, several levels and a precise scope for each sector. But despite all

advantages it is still not a *perfect* measure of barriers. Therefore, a critical assessment should rather aim at more general shortcomings of the index-methodology.

The first point to notice is that non-tariff barriers are very complex themselves and are working in an even more complex environment. Moreover, barriers and environment can differ widely across countries. Thus, it is a challenging task to select criteria and sub-criteria covering all *relevant* aspects of non-tariff barriers and still being comparable across countries. The selection is further restricted by availability of information on specific areas. One should therefore not expect the set of criteria to be exclusive. This study excels in its broad coverage and is therefore not severely affected by this criticism.

Further, we seek to measure *actual* barriers, but normally, comparable information only exists on *formal* barriers. Unfortunately, these two can be quite distinct. A country can pass several acts on liberalisation, but choose to have very lax reinforcement, so that actual barriers are much higher than formal ones. A more complicated example; the implementation of the electricity directive 2003/54/EE. According to the directive, Distribution System Operators (DSOs) have to be separated along several lines *if* the DSO serves more than 100,000 households. Some countries have mainly large distributor firms, e.g. Germany, whereas others have much smaller ones, e.g. Switzerland, so even if Switzerland implemented the EU-directive along with Germany to obtain the same formal barriers, *actual* barriers would most certainly diverge. This study primarily focuses on formal barriers, but where credible information is available, it aims at actual barriers. For example, we include call termination charge scores based on true prices in telecommunications.

A practical problem often arising when covering a large number of countries is to get the *right* answers – or to get an answer at all. The questions are formulated so that they can be answered by yes or no, but legislation differs widely across countries and in many cases the correct answer would be “partly”. In other words: When we want to measure barriers in one dimension we must sometimes conclude that several countries can only be judged along another dimension. Even more severe, is the problem of missing information. Normally, when searching for answers to a specific question, nothing will be found if the barrier does not exist. On the other hand, when one does not find an answer one could simply have cut off the search process too early. Therefore, this leaves a certain ambiguity of the unanswered questions. In our case, the problem only appeared in the questionnaire-methodology of Copenhagen Economics (2005). This is because the questionnaires were extremely long. Adding more questions increases the likelihood of missing answers, but at the same time also reduces the severity of any missing answers, because each question becomes less important at the aggregate level. It is therefore not clear how much missing answers could influence our results.

An important issue is the choice of *scores* and *weights*. The actual calculations depend crucially on the scores and weights, but since it is practically impossible to estimate these, the process includes some degree of guessing. Typically, one would use a priori arguments derived from economic theory to qualify these guesses, but essentially the scores and weights will reflect how one weighs different economic theories against each other. This study seeks to minimise the ambiguity of the scores and weights by deploying advanced statistical techniques such as factor analysis. Also, we seek to qualify the weights by empirical evidence. Compared with other studies this is an important step forward, although we only eliminate part of the ambiguities.

A final point concerns what we will denote “horizontal policies”. The barriers included in the RIS aim directly at specific regulation policies, but do not incorporate more general regulative policies like taxes and competition policies. These are horizontal policies affecting firm performance in positive or negative directions – similar to the included regulations and which are often also experienced as barriers by the services providers. It is obvious that changes in

horizontal policies are indeed very important for economic efficiency – not only for services – but lack of comparable and objective data on e.g. competition policies in different countries make it fruitless to pursue this avenue and could distort the results. Additionally, analysing such policies would remove the focus from the scope of the study.

Notice, that when we calculate the economic effects in the following chapters we are likely to implicitly include some of the performance effects induced by horizontal policies to the extent these are correlated with the specific regulation policies included in the RIS. The problem of excluding horizontal policies naturally applies to all countries in this study.

Chapter 3 Estimating the impact of barriers on price and cost

In this chapter we use the RIS values to obtain econometric estimates of the impact on firm performance from trade barriers. The key results of the chapter are the so-called tax equivalents, i.e. hypothetical taxes – implying a similar effect on firms' performance such as the barriers captured by the RIS. In other words, the tax equivalents can be thought of as theoretical taxes computed to create economic effects that are equivalent to the economic effects of the actual barriers. These tax equivalents are the inputs to the economic modelling in the succeeding chapter, because only tax equivalents and not RIS values may enter the applied economic model, the Copenhagen Economics Trade Model (CETM).

In order to calculate the tax equivalents we first set up econometric models attempting to capture all relevant effect but still being consistent with the available data. The main idea of the models is to estimate the link between the RIS and sector prices and costs. This link will be reflected in coefficient estimates; the higher the estimates, the more influential are the barriers.

Secondly, we translate the RIS values to tax equivalents by using the obtained coefficient estimates. The functional form of the translation will depend on the model, but irrespective of this, higher RIS implies higher tax equivalents.

We apply three approaches to obtain tax equivalents. (i) For business services and distribution we take advantage of the econometrical estimates from Copenhagen Economics (2005) and combine these with the RIS values which are similar to the barrier values used in that study. (ii) For electricity and telecommunications, we use publicly available data and our RIS-values to set up econometrical models to find empirical estimates of the link between barriers and sector performance. These are then transformed into tax equivalents. (iii) For the sector rail transport (of freight and passengers), air transport, postal services and banking services we find empirical estimates in the literature, and qualify and transform these allowing us to calculate tax equivalents from our RIS-values.

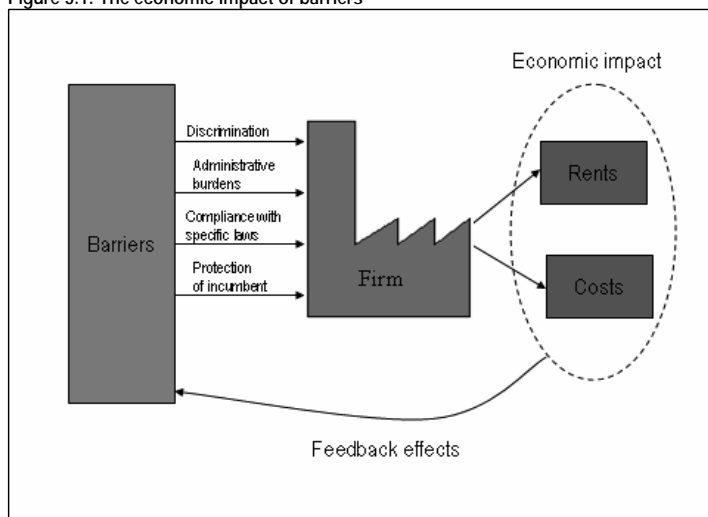
The rest of the chapter is organised as follows: In section 3.1 we set up a framework explaining how barriers to trade in services might influence firm performance, section 3.2 presents the econometric results and section 3.3 explains how the econometric coefficient results are transformed to tax equivalents. Finally, in section 3.4 we present a short critique of the econometrical model.

3.1. The link between barriers and firm performance

Barriers serve to influence the market outcome of a sector; consequently the barriers affect firm performance. Since the barriers are of multidimensional nature, the inter-linkages with firm performance are complex and many-sided.

The first and most intuitive way to think about the effects of barriers to trade in services is that of protecting domestic service providers from competition abroad, thereby allowing for higher prices. In some cases the barriers are of such a nature that even domestic competition is hampered, as e.g. the case of monopolies in the infrastructure sectors. One important effect of trade barriers is higher prices, but many others exist. Figure 3.1 give a stylised picture of a more general model linking barriers and economic effects.

Figure 3.1: The economic impact of barriers



Source: Copenhagen Economics

The multidimensional nature of the barriers are represented by a set of arrows each having its distinctive influence on the firm. The list in Figure 3.1 is non-exhaustive; one could think of many other and more detailed influences on the firm. The main point though, is that different parts of the value chain are touched by different barriers. This is also reflected in the structure of the RIS questionnaires starting with establishment and ending with after-sales services and non-legal barriers. For example, barriers that aim to complicate establishment protect existing firms all over the spectrum, whereas barriers to the use of inputs raises costs of operations directly influencing production.

Further, these influences have economic impacts that can be summarised in two categories: Creation of costs and creation of rents. A barrier can potentially have both cost and rent creating influences, but a rent creating *impact* cannot also be cost creating and vice versa. Thus, the two categories are mutually exclusive. Basically, this is the way the majority of researchers have approached the issue theoretically, see Deardoff and Stern (1985) and Findlay and Warren (2000) for two of the most extensive reviews of non-tariff barrier impacts.

We also notice that both impacts should be reflected in higher prices, but that the relation is not direct and not proportional. If we consider the administrative burdens, these will typically increase overhead costs, but marginal costs are most likely unaffected, and the spill over in prices will not be absolute. Similarly, the protection of a monopolistic incumbent might increase both rents and costs – the latter being due to lax handling of resources. Thus, it is not only difficult to establish a single link to prices, but also to determine what kinds of barriers influence

only costs (or only rents). On the other hand this does not prohibit a formalised division at the aggregate level.

The model also points to potential feedback effects from the economic impacts to barriers of service trade. If firms exploit their market, power policy makers would most likely become aware of the losses incurred by the consumers and therefore move to change legislation – i.e. reduce barriers. This gives a dynamic setup where barriers and economic impacts are simultaneously determined. A somewhat more farfetched linkage can be found if the firms start to appraise the barriers as the sources of their economic rents and attempt to reinforce barriers through lobbying.

Finally, the complex and multidimensional nature of the relationship covers an important point: Where complete regulation has harmful effects on consumers through extreme rent and cost creation, a complete absence of regulations might also result in an unfavourable economic outcome. E.g. in the telecommunications industry we would most likely be witnessing so called “raisin picking” - where only areas exceeding a certain density of population would be served with copper networks – if there are no regulations on this issue.¹⁰ In general the infrastructure networks could hardly be governed by purely competitive markets. Thus, in the model of figure 3.1 there exists a unique mix of trade barriers maximizing economic efficiency. In other words we should think of a nonlinear relationship between barriers and impacts. Too strict regulation precludes the positive gains from competition and too loose might also have adverse effects, so that we can imagine the barriers-efficiency relation as a curve with its maximum somewhere between the two extremes. A further aspect concerns the timing and speed of possible liberalisation policies. For example slow and inconsistent liberalisations may not lead to many advances.

The above discussion revealed three issues deserving attention when modelling barriers and economic performance. The first and main point is that barriers can influence both costs and rents. Second, there are potential feedback effects, and thirdly the overall relation may be nonlinear. Changing the focus to a specific econometric model, some choices and simplifications have to be made concerning these and other issues.

The first choice concerns dividing the impacts in cost and rents. Most similar studies estimating the economic impacts, e.g. Doove et al (2000) and Dee (2003), simplify the mechanism and focus solely on prices, but as inputs to a CGE-model we take up the challenge to separate cost and rent creating barriers. This is done because the two have quite asymmetrical effects on the overall economic outcome.

Second, the issue of feedback effects has been excluded from this analysis. We believe that these effects are of minor importance compared to the direct effects, but acknowledge the potential endogeneity in the econometric models. To our knowledge no other study has incorporated feedback effects.

Thirdly, the mixing and nonlinearity arguments are only treated indirectly. The index methodology can account for mixing and nonlinearity effects when scores and questionnaires are constructed carefully. As an example, the “network pricing” category in the questionnaires to rail freight weight average cost pricing higher than marginal cost pricing. The latter is viewed to be too liberal, as it generally will not cover the high amount of fixed costs. On the other hand, we do not specify any nonlinear econometric model. This is due to the few observations available combined with too little in-sample variation. If there is no data covering the extremes,

¹⁰ Raisin picking could also be economically efficient, but still undesirable from a societal point of view.

a non-linear relation is hardly possible to detect, and a more flexible non-linear model might lead to counter-intuitive results.¹¹

3.2. Econometric modelling

In the econometric modelling we apply three approaches. First, for electricity and telecommunications we use publicly available data and the RIS-values in setting up econometrical models to find empirical estimates of the link between barriers and sector performance. Using the empirical estimates we transform the RIS-values into tax equivalents. Second, in IT-services, accountancy and distributive (retail and wholesale) trade we use the econometrical estimates from Copenhagen Economics (2005) to transform the RIS values into tax equivalents. Copenhagen Economics (2005) focuses exactly on these three sectors. Third, for the sectors railway transport (freight and passenger), air transport, postal services and banking services we utilise the estimates from acknowledged empirical studies, and qualify and transform these allowing us to transform our RIS-values into tax equivalents. In the following, we treat the most important aspects of each econometric specification starting with a thorough examination of the new regressions for telecommunications and electricity.

Electricity and Telecommunications

For electricity and telecommunications we set up econometric models using publicly available data. We estimate two separate equations in order to distinguish cost and rent creating effects. The section proceeds by presenting the model specification and data issues followed by the results and a comparison with other studies.

Standardised cost figures across sectors and countries are only available to a very limited extent, but since costs arise due to the use of inputs we seek to model how efficient a firm operates instead. In particular we take advantage of the fact that using fewer inputs to produce the same amount of services (or goods) must be captured by higher productivity.¹² Thus, the starting point for the cost creating model is a Cobb-Douglas production function which after taking logarithms can be written:

$$\text{Model 3.1} \quad \ln(Y) = \gamma_K^v \ln(K) + \gamma_L^v \ln(L) + \ln(A)$$

where Y is value added, A is exogenous technological changes, K is the value of capital input and L is the value of labour input. "ln" is the natural logarithm and γ_K^v , γ_L^v are the estimated capital and labour shares in the value added model respectively. Now, the measure of productivity is the Solow-residual, $\ln(A)$, and including more variables on the right hand side of model 3.1 simply means that we are trying to explain the variation in productivity. Alternatively, the model can be modified to include a productivity measure directly.

In our context the most important of the control variables is the RIS. We expect the RIS coefficient to be negative implying that production is less efficient, i.e. more costly, when barriers are high. To avoid biases other control variables are included as well. Unfortunately, many relevant control variables are simply not available and when available only through the use of proxies.

Equivalently, the rent creating model is:

$$\text{Model 3.2} \quad \ln(P) = \gamma_K^p \ln\left(P^K \frac{K}{Y}\right) + \gamma_L^p \ln\left(P^L \frac{L}{Y}\right) + \eta$$

¹¹ Also, preliminary analyses with nonlinearities resulted in uncertain estimates that were hard to interpret.

¹² Moreover, it is consistent with the CETM to measure the impact directly on productivity and not on costs.

where P^K is the price, or user cost, of capital and P^L is the price of labour. P is simply the price of electricity/telecommunication services. Notice, how rents emerge as prices (left hand side) minus costs of capital and labour inputs (right hand side). Hence, the residual is simply a measure of rents. If we augment the equation by control variables we therefore obtain their influence on rents, i.e. by including the RIS our regression directly estimates how barriers influence rents.¹³

Because the RIS variable enters the equation without a log-transformation the obtained coefficient can be interpreted as a semi-elasticity, i.e. it gives the percentage change in the left hand side variable due to a unit change in the RIS. Since the RIS is only defined on the interval [0;1], the coefficient can be interpreted as the percentage increase in rents (or decrease in productivity) when a country moves from complete liberalisation to full regulation.

We use publicly available data for all estimations. To be consistent with the CETM we estimate equations based on 2001 data. The sample consists of Switzerland and EU15, so that a maximum of 16 observations are available. The proxy for productivity in the electricity sector is capacity utilisation (yearly basis). The control variables are rain volume and net-exports. We use industry prices for medium-sized firms to present general electricity prices, but all end-user electricity prices have an extremely high correlation. For control variables we use the ratio of nuclear to total capacity and net-exports. All electricity-data were taken from Eurostat and complemented by Swiss figures (various sources). In telecommunications the dependent variable in the cost-creating model is labour productivity and the control variable is number of access lines. The price model uses a price-basket and the equation is augmented by new entrants' share of access lines and volume of public telecommunication investments. All telecommunication-data were taken from OECD-reports.

In Table 3.1 we find coefficient estimates of the four regressions.¹⁴ First, we see that all coefficients have the right sign; barriers tend to lower productivity (increase costs) and increase rents. Moreover, the magnitudes seem plausible and in line with other empirical evidence, e.g. Copenhagen Economics (2005) and Doove et al (2000). Both sign and magnitude were relatively stable over a range of specifications.

Table 3.1: RIS coefficient estimates

	El cost	El rent	Telecom cost	Telecom rent
RIS coefficient	-0.23	0.62	-0.38	0.21
Bootstrap P-values	[0.455]	[0.114]	[0.300]	[0.390]

Source: Copenhagen Economics

Table 3.1 also reveals that all coefficient estimates are insignificant at any reasonable level. Due to the low number of observations we find it more appropriate to apply bootstrap methods to the (asymptotical pivotal) t-statistics, but this does not alter any conclusions.¹⁵ Since the estimates are not remarkably low from an economic point of view, the statistical uncertainty as captured by t-statistics must be attributed to large standard errors.

We believe that the large standard errors can be explained by a number of factors. First, the sample is small. Second, the in-sample variation is also limited, i.e. we estimate on a set of homogenous countries all using similar technologies and having similar barriers. Other studies normally include more Asian and American countries which increases the variation. Third,

¹³ Precisely, the RIS coefficient estimate is the partial derivate on prices conditioned on the relation between barriers and input prices (costs).

¹⁴ Complete summary statistics are given in appendix C. All equations were estimated using OLS.

¹⁵ We applied the pairs bootstrap and the wild bootstrap as both accounting for heteroscedasticity. The pairs bootstrap gave results lying between the t-distribution and the wild bootstrap so here we only present the wild bootstrap results. For a short introduction to bootstrap methods see Davidson and MacKinnon (2004).

focusing on a single year increases the sensitivity of the results to business cycle fluctuations, which give rise to further uncertainty. Fourth, all specifications rely crucially on possessing the right left hand side variables and the right input measures – capital and labour. The former is easily found in official statistics, but the latter is generally not available. Instead we use proxy variables and the quality of these is another source to the uncertainty of the estimates. Fifth, the RIS is a weighted sum of variables having quite different – and potentially even opposing – economic impacts. Though the index is constructed to capture barriers with adverse economic effects the removal of barriers must be seen in a wider economic context. For instance, the privatisation of a monopolistic incumbent is likely to have increased adverse effects on rents if a competitive environment does not emerge. Thus, the RIS could be a sum of different positive and negative influences which simply increase the standard errors of the estimated coefficient. Finally, the low number of observations increases the likelihood of multicollinearity¹⁶ between explanatory variables. In particular, one could suspect capital and labour to correlate and therefore increase standard errors. To assess the importance of multicollinearity we compute the conditioning number and applied Ridge-regression techniques.¹⁷ There are signs of severe multicollinearity in two cases: The rent and the cost equation in telecommunications and the Ridge-regressions suggested a marginally lower cost estimate and a higher rent estimate, which also seems economically plausible.

Despite the fundamental uncertainty of the estimates there seems to be no reason to choose other specifications, regression methods etc.¹⁸. Important to remember, is that our context does not imply testing the *presence* of effects, but measuring the *size* of the effect. Thus, the econometric focus is on obtaining the maximum amount of information on the true impacts from the data, which gives rise to a working methodology very similar to that of an econometric forecaster. If the effect of a variable is uncertain, the forecaster would still appreciate the estimate as the most likely size of the effect given the available data.¹⁹ Only in the case of rent-creating barriers in electricity we are worried that the coefficient estimate might be too high. Consequently, this estimate was adjusted – see below.

To validate the obtained estimates we compare our results with other empirical evidence. Differences to our estimates are incorporated in the sensitivity analysis.

The effects from trade barriers on telecommunication prices were investigated by Doove et al (2000) building on the econometric work of Boylaud and Nicoletti (2000). Doove et al (2000) extend the Boylaud and Nicoletti sample to 47 economies and use 1997 as the base year for the calculations. Since many European reforms were implemented between 1997 and 2001 (notably 1998), we expect the impacts to provide upper bounds for the potential impacts in 2001, which are our main interest. Indeed, Doove et al (2000) find price impacts two to four times higher than those used in this study. We believe that much of this large discrepancy can be explained by the different time foci and the fact that Doove's estimates are price, not rent, impacts. With this in mind, both estimates seem reasonable. Nonetheless, the effects are significantly higher so when setting up the sensitivity analysis more weight is placed on the upper bound.

Price impacts of liberalisation in electricity were also treated in Doove et al (2000). The sample covers 50 economies with the vast majority of observations being based on 1996-figures. Interestingly, in contrast to telecommunication the period 1996-2001 was characterised by very few liberalisation initiatives in all member countries, so that the impacts obtained in Doove et al

¹⁶ Multicollinearity is when explanatory variables are correlated which, among other things, inflate standard errors.

¹⁷ See Theobald (1974) for an introduction to Ridge-regressions.

¹⁸ Of course the estimation procedure included several specifications, testing and sensitivity analysis in order to obtain a favoured model, which is the one presented here.

¹⁹ Notice that the OLS-estimate equals the maximum-likelihood estimate for normal distributed errors. Also the OLS-estimate can be shown to be "best linear unbiased" – the so called Gauss-Markov theorem.

(2000) are directly comparable with those obtained in this study.²⁰ A comparison reveals that the two studies suggest somewhat different impacts from trade barriers, with our figures pointing to more than twice the size of the impacts compared to Doove et al (2000). At the same time, a divergence in the cross-country dimension can be found, i.e. a few countries have high impacts in this study and low impacts in Doove et al (2000) and vice versa, which must be attributed to more general differences in the measurement of barriers.

Our coefficient estimate is admittedly quite high; therefore we incorporate the impacts of Doove et al (2000) to form an average. The studies are weighted equally and the new, qualified estimate amounts to 0.44 instead of 0.62. This seems to be quite a reasonable value. It is practically impossible to present standard errors of this estimate.

Accountancy, IT-services and distributive (retail and wholesale) trade

For accountancy, IT-services, retail and wholesale we use the estimates from Copenhagen Economics (2005). This study belongs to the newest and most extensive one on barriers to service trade using a sample of more than 275 thousand observations to measure the economic impacts. Apart from the impressive number of observations, another advantage of the study is the refined method of aggregating the restrictiveness index using factor analysis. The factor analysis resulted in two, rather than just one, indices with the weights determined by the data.

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 and the econometric model control for these. Most importantly, at the economy-wide level each country's barriers as represented by the two factors are included to measure the direct impact on firms' performance. The regression is repeated for domestic and foreign barriers respectively. Essentially, this is the same setup as presented above for electricity and telecommunications only now directly at firm level.

If the obtained coefficient estimate on either of the factor reduced barriers is positive, i.e. barriers increase price-cost margins, they are interpreted as rent creating. Similarly a negative effect on the price-cost margins from barriers is interpreted as indirect evidence that the barriers are cost creating. The drawback of this estimation strategy is that barriers cannot be rent and cost creating simultaneously because they eliminate each other, in order that the obtained estimates should be thought of as conservative.

The overshadowing advantage of using these econometric estimates is that there is absolutely no ambiguity as to how the barriers are calculated and how to transfer these numbers to tax equivalents.

Banking, air, post, railways (freight and passenger)

Kalirajan et al (2000) investigate the impact from trade restrictions on the net interest margins of *banks*. Applying a two-stage estimation procedure, a significant effect from the trade restrictiveness index is found using a sample of 694 banks from 27 countries with all variables based on late 1997 values. The regression model is essentially the same as Copenhagen Economics (2005) with the interest margin as proxy for the price-cost margin. The major difference is that only one restrictiveness index enters the equation and this results in a rent creating barrier. No cost creating barrier is measured. Since both the trade restrictiveness index and all coefficient estimates are made available, recalculations of the impacts on the

²⁰ To clarify: the barriers have hardly changed over the period, but the performance indicators such as value added and prices – which are used in the econometric modelling – probably have. In particular, if liberalisation influences performance with a lag our estimates would include this effect and point to higher impacts.

basis of different policy scenarios is straightforward. There are two crucial points deserving attention: First, how to convert the policy scenario into changes in the trade restrictiveness index in a trustworthy manner, and second, to be confident that the net interest margins are valid proxies for prices of all banking service.

Regulation in the *air transport* industry was reviewed by Doove et al (2001). As in other studies, the degree of regulations is measured by the restrictiveness of the vast array of bilateral liberalisations conducting international air traffic. The sample covers 35 countries and the variables are taken from the period 1996-1999 with the vast majority of data from 1999. All data are taken at the aggregate level. Doove et al (2001) specify a regression equation based on customer fares and find extremely significant impacts on business and economy class fares, and less, but still significant, pronounced effects on discount fares. We interpret these effects as rent creating. By applying the estimated coefficients in Doove et al (2000) price impacts of different policies can easily be calculated using a reliable transformation of the policies to the index of regulation.

For the postal sector the literature on liberalisation impacts is very sparse. For this reason we apply the estimates obtained for telecommunications as these two sectors have many common characteristics.

Friebel et al (2004) analysed the presence of effects from liberalisation on productivity growth in the *rail freight* sector. The study was based on a panel with 231 observations covering the period 1980-2000, and significant impacts was found in all specifications. The major challenge is to convert the simple indicators of selected areas of regulation to a more general barrier index. Unfortunately, this can only be done in a very proximate manner without invalidating the obtained coefficient estimates. Moreover, all specifications of Friebel et al (2004) concerned productivity *growth*, i.e. the impact of liberalisation is actually "accumulating", which due to a non-dynamic modelling context enforces further approximations. The resulting effects are interpreted as cost creating and also applied to the *passenger* segment. Altogether, the obtained impacts from different policy scenarios should be seen as indicative.

3.3. Transforming RIS values into tax equivalents

The econometrical models above estimate coefficients capturing the relationship between barriers and performance. In order to provide valid input to the Copenhagen Economics Trade Model (CETM) used later to calculate the economy wide impacts, the RIS must be transformed into tax equivalents, that is, hypothetical taxes imposing a similar effect on firms' performance as the barriers captured by the RIS.

Coefficient estimates and RIS values is all the information necessary to transform the RIS into tax equivalents. The exact transformation is closely related to the specific econometrical model as different formulas must be applied when the data is obtained at firm or sector level. However, the general idea is to keep in mind that tax equivalents are percentage price increases (or productivity decreases) arising from barriers, i.e. how much are current prices exceeding efficient prices as a consequence of barriers. Mathematically this amounts to²¹:

$$(\% \text{-change in prices due to unit increase in RIS captured by coefficient estimate}) \cdot \text{RIS}$$

²¹ It should be noted that the following simple calculations depend crucially on the specific model. For instance, when the logarithm of the dependent variable is used the calculations differ accordingly. Therefore the calculations are not applicable to the coefficient estimates of e.g. Doove et al (2000).

The first term is simply the coefficient estimate, a semi-elasticity. However, since the semi-elasticity is applicable only for very small increases due to log-approximation the accurate formula is given by

$$TE = \% \Delta P = 100 \cdot [\exp(c \cdot RIS) - 1].$$

Here c is the coefficient estimate or semi-elasticity. The calculations are identical for both rent- and cost-creating tax equivalents with only a sign reversal – c should be negative in the productivity model. The calculations of tax equivalents for the models of Copenhagen Economics (2005) are more complicated; an outline is presented in box 3.1.

The formulas can be applied to each country and for all hypothetical scenarios. This will give the necessary input to the CETM, i.e. a set of tax equivalents for each sector and country covering both the status quo and several hypothetical scenarios.

Box 3.1. Transforming barriers (RIS) to tax 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 is:

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

This is rewritten as:

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

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

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

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 tax equivalent.

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

Multiplying with the productions yields:

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

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

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

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 $v = v_0$,

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

which gives the price impact as:

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

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

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

Note that the revenues and profits used are the averages in countries. The tax 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.

Note: This formula is applied for accountancy, IT-services and distributive trade.
Source: Copenhagen Economics (2005)

The size of the tax equivalents

To better understand the results in the following CGE-modelling analysis, we present the most important tax equivalents in Table 3.2. We present Switzerland and a simple EU-average of domestic barriers (RIS values) since specific foreign barriers are not available for telecommunications and electricity. In the cases where foreign barriers exist they are often higher than domestic ones.

Table 3.2: Selected tax equivalents

Tax equivalents	Telecom		Electricity		Accountancy		Distribution		IT services	
	Rent	Cost	Rent	Cost	Rent	Cost	Rent	Cost	Rent	Cost
CHE										
Benchmark	0.12	0.19	0.35	0.14	0.03	0.05	0.02	0.01	0.00	0.02
Best practice incl. CL*	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00
Continued liberalisation	0.09	0.14	0.14	0.07	0.00	0.03	0.01	0.01	0.00	0.01
EU15										
Benchmark	0.07	0.12	0.23	0.09	0.05	0.11	0.03	0.01	0.00	0.01
Continued liberalisation	0.06	0.11	0.11	0.05	0.00	0.05	0.01	0.01	0.00	0.01

*: CL means "continued liberalisation" and is a term used when designing scenarios in chapter 4.

Source: Copenhagen Economics

In both Switzerland and the EU we find the highest tax equivalents in the electricity sector followed by telecom. This is primarily due to the higher RIS-values in these infrastructure-sectors, but also the econometric estimates pointed to higher effects from liberalising in these sectors. A step below we find accountancy with moderate tax equivalents and finally distribution and IT-services have very low tax equivalents.

In *telecommunications* the cost-creating exceeds the rent-creating barriers, which seems reasonable given the more intensive use of technologies in more competitive countries. When telecommunication firms are pushed to take new technologies into use there could be a great cost-reducing potential. The table also shows that if Switzerland implements the Danish standards (best practice country) there would be a large decrease in the tax equivalents, whereas the EU-standards (continued liberalisation) only imply moderate reductions.

For *electricity* the rent creating barriers seem to dominate the picture. This is quite reasonable given the local monopolies of many electricity providers. More competition could lead to a reduction in the monopoly mark-ups and thereby reduce the rents. Concerning the changes in barriers under different scenarios we again see that moving to the best practice country standards – in this case the British – implies significant increases in economic efficiency. Also the EU-directives have a remarkable impact on both Swiss and European inefficiencies.

For *accountancy* the cost-creating domestic barriers translates into the highest taxes, while the rent-creating barriers translates to medium level taxes. These high cost-creating barriers are not surprising in a highly regulated sector as *accountancy*, where there are strict rules for opening practices. Though the absolute sizes are much smaller there are still large relative gains for Switzerland to implement Irish standards. Also EU continued liberalisation is quite effective.

Distributive (an average of retail and wholesale) trade has low cost- and rent-creating barriers and for *IT-services* the taxes are even lower; the cost-creating tax equivalents are all marginal. A characteristic for IT-services is that the domestic barrier tax equivalents 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 tax equivalents are expected, since IT-services is an unregulated professional service sector. Table 3.2 also reveals that the services directive is quite progressive for both distribution and IT as the reductions in tax equivalents are larger than those of the best practice countries, Luxembourg and Great Britain.

Comparing with the tax equivalents shown in Doove et al (2000), Kalirajan (2000) and Nguyen-Hong (2000), the magnitudes are similar, although not surprising given that the estimation results are very similar.

3.4. Limitations to the econometric approach

The sections above described (i) how we moved from a theoretical to an econometrical model, (ii) how the econometric estimates were obtained and (iii) how the tax equivalents were obtained. The latter was simple math and as such without any problems, but the former two steps included choices and simplifications that can be criticised and this section seeks to cover the main points.

Concerning the first step we were forced to make simplifications of the theoretical models simply due to limited data availability. Most of the simplifications have already been touched upon in section 3.1. These include absence of feedback effects, non-linearities, timing and speed effects etc. We will not go into more detail with these issues. Moreover, with the exception of a very few, e.g. Friebe et al (2004), similar studies also do not consider such effects.

A more fundamental issue is the static nature of the outlined theoretical and empirical model. Most certainly removal of barriers does not show the entire potential on firm performance the first year they are put into effect. Rather, it must be thought to be a timely process with slow adjustments which altogether calls for a dynamic model.²² This aspect is completely neglected here. The argument that could make the econometrical models robust to this critique, is that the sample is drawn randomly from a large set of countries representing all parts of the dynamic liberalisation process. Unfortunately, this is far from being true; the set of countries and the base year were given by the scope of the study and the requirements of the CETM respectively. Whether this leaves a bias in the estimates or simply increases the uncertainty of the calculated effects is very difficult to determine. Again, the critique does not only concern this study, but (to our knowledge) the entire existing literature.

Turning to the second step of obtaining econometrical estimate, the critique must be divided according to three classes of estimations: the estimates obtained here (electricity and telecommunications), the estimates of Copenhagen Economics (2005) (accountancy, IT-services, retail and wholesale) and the estimates of various sources (rail, post, air and banking).²³

The main problem of the regressions done in this study is the low number of observations since they result in a high degree of statistical uncertainty. Fortunately, the coefficients are surprisingly easy to interpret economically and moreover they seem to be in line with other studies. Another problem is the use of proxies which also could lead to all kinds of biases.²⁴ Altogether, these regressions result in a high uncertainty that will work through the consecutive parts of the analysis. On the other hand, there is no clear indication of the direction of the

²² OECD (2004) also looks at the effects throughout time, but does not set up dynamic econometric models.

²³ Postal services actually use the estimates of telecommunications, c.f. section 3.2.

²⁴ E.g. attenuation bias due to "errors-in-variables" – see Johnston and DiNardo (1997).

potential biases; i.e. the estimates constitute the most likely size of the effects. Thus, we can only proceed and keep the uncertainty in mind.

The regressions of Copenhagen Economics (2005) are characterised by high statistical certainty with respect to the coefficient estimates. Nonetheless, some uncertainty “sneaks through the backdoor” when the factors are calculated, i.e. the factor loadings are functions of the RIS-criteria values and therefore random variables themselves. Additional uncertainty arises when the estimates are transformed into tax equivalents, since the tax equivalents of a specific country are not only a function of the coefficient estimate and the RIS, but also of the firms’ revenue and profit, c.f. box 3.1. Especially for countries with sparse representation in the database, this could lead to much more uncertainty. Thus, one should be careful to judge these tax equivalents as being much more certain than those from the sparse regressions.

Concerning the group of estimates from various sources, the main challenge was to combine the econometrical results with the RIS-values from this study. First, a coefficient estimate is naturally linked to the barrier index used in the regression, implying that the use of another index complicates the interpretability. For example, if the original index does not include establishment rules and the RIS weigh this category heavily, the coefficient estimate will not be directly applicable to the RIS. Second, the studies are generally not made with the purpose of providing precise inputs to a CGE-model, but rather to test for the presence of effects. This sometimes led to functional specifications that could only be translated approximately. We notice again, that the concerned sectors are only included in the extended model analysis.

Finally, there are a few general points to the estimation procedures of all studies. The econometrical models above simply intend to establish a link between barriers and the performance variable of interest conditional on a set of control variables. Possible control variables will be taken from a very long list; and in many cases researchers would strongly disagree on the choice of control variables. We will not go into a discussion of the specific variables chosen in the relevant regression equations, but simply accept that in the search of a parsimonious specification some restrictions has to be made.

It is also questionable how stable the relationship is between performance and barriers when policy changes. We use the models to predict the effects of e.g. liberalisation policies, but if the entire relationship alters due to a policy change, the models are of little value for this purpose. Essentially, this is the contents of the famous Lucas-critique.²⁵ However, it should be noted that the Lucas-critique primarily aims at time-series estimations and here all studies apply the cross-section view. If there is significant cross-country in-sample variation, i.e. high and low barriers, the estimation should average out the structural changes. The coefficients will not be perfect, but to some extent incorporate the changes.

A last point concerns the scope of the regressions. The RIS should include all non-tariff barriers to service trade, but even if a country has a favourable RIS value it might nonetheless have unsatisfying economic performance due to a set of other fundamental policies, e.g. ineffective general competition policies. In specific circumstances it could be unwise to liberalise if fundamental policies are not improved upon at first. In other cases there would simply be much more potential in improving both sets of rules simultaneously. All such considerations are not a part of the econometric analysis in neither this nor other studies.

²⁵ See Lucas (1976).

Chapter 4 The economy-wide effects in Switzerland of services liberalisation

In this chapter, we analyse the economy-wide effects of services liberalisation for Switzerland. For this purpose, we use the Copenhagen Economics Trade Model (CETM), a computable general equilibrium model representing state-of-the-art developments within modelling, especially of provision and trade of services²⁶. Removing barriers to services provision will directly affect the targeted sectors by reducing prices and increasing productivity. 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. A computable general equilibrium model captures all such linkages. Hence, it enables quantitative estimates of total effects in the economy if barriers to services provision were reduced.

Since the focus of the analysis is the Swiss economy, the current implementation of the CETM represents Switzerland and its most important trade partners; the EU-15 countries²⁷. The rest of the world is aggregated into a single region, and we assume that Switzerland and the EU-15 countries trade on the world market at constant prices. Several scenarios are analysed; representing different strategies that Switzerland could adopt when liberalising services. Switzerland could either keep its current barriers to services provision, or it could reduce them. The Swiss action is in turn combined with different actions taken by the EU regarding liberalisation of services provision.

First, we investigate the impact of liberalisation in five services sectors. The sectors where barrier reduction is assumed to take place are regulated professions, business services, distributive trade, electricity and telecommunication. However, barrier reduction in other sectors will also affect the total welfare gains Switzerland might experience. To gain some insight into the general weight these other sectors potentially could have in the total effects of a liberalisation, a more speculative “what-if” scenario is simulated later, in section 4.4. In this “what-if” scenario, we will extend the analysis to include liberalisation in nine sectors, as shown in Table 4.1.

²⁶ A description of the CETM is given in Appendix B.

²⁷ The ten new member states represent a very small share of Swiss imports and exports and are therefore not modelled separately, but included in the “Rest of the World” group.

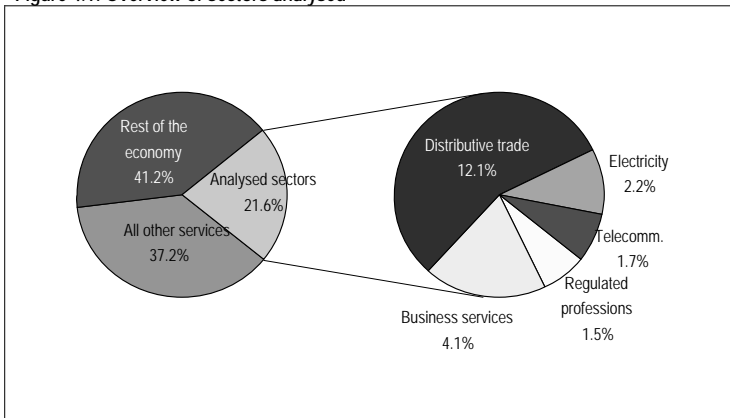
Table 4.1: Sectors in the CETM

Name of aggregate sector	
1. Regulated professions	} The sectors assumed to liberalise in the main analysis
2. Business services	
3. Distributive trade	
4. Electricity	
5. Telecommunication	
6. Banking services	} In section 4.4, we assume liberalisation in these sectors as well
7. Postal services	
8. Rail transport	
9. Air transport	
10. Other services	
11. Rest of the economy	

Source: CETM – Copenhagen Economics.

In the following, we focus on liberalisation only in the first five sectors. As figure 4.1 shows, the five services sectors assumed to be covered by services liberalisation in our main analysis together constitute 22 % of the Swiss economy. Of the five sectors, distributive trade is by far the largest; it constitutes 12 % of total value added in Switzerland.

Figure 4.1: Overview of sectors analysed



Note: The chart shows sectoral shares of total value added in the Swiss economy. The sector "All other services" in this diagram includes e.g. health services, constructions services, banking services, postal services and transport services.

Source: CETM – Copenhagen Economics.

In the CETM, barriers to services provision are modelled as so-called tax equivalents. The tax 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 in place. For a description of the sectors where liberalisation is assumed to take place in our main analysis, and the tax equivalents used in each sector, see Table 4.2.

As Table 4.2 shows, the tax equivalents estimated for accountancy are assumed to be representative for all regulated professions. Accountancy is a professional service that is rather loosely regulated compared to e.g. legal services. Hence, the usage of accountancy services as a proxy for the regulated professions sector is a conservative choice. If a more tightly

regulated service would have been used as a proxy, the effects of liberalisation would be even larger²⁸. Furthermore, it is assumed that the tax equivalents for IT-services are representative for all business services, and that a weighted average of barriers to wholesale and retail trade is representative for the distributive trade sector of the CETM. The latter sector also includes hotels and restaurants, which are covered by the services liberalisation as well. In Switzerland, hotels and restaurants constitute approximately 18 % of total value added in the sector, and if this part of the distributive trade sector was assumed not to gain from any barrier reduction, the resulting economy-wide effects would be slightly smaller²⁹. Finally, in the electricity and telecommunication sectors we use the tax equivalents estimated directly for these sectors.

Table 4.2: Definition of analysed sectors

Sector in the CETM	Tax equivalents used	Examples of covered services	NACE codes
Regulated professions	Accountancy	Legal, accounting, book-keeping and auditing activities, business and management consultancy	741
Business services	IT-services	IT-services, recruitment, cleaning, real estate	70-73, 742-744
Distributive trade	Weighted average of wholesale trade and retail trade	Wholesale trade, retail trade, hotels and restaurants	50-52, 55
Electricity	Electricity	Generation, transmission and distribution of electricity	401
Telecommunication	Telecommunication	Telecommunication	642

Source: Copenhagen Economics.

In the following sections, the modelling approach, results and conclusions are presented. First, the different analysed scenarios are explained in more detail. The scenarios are then simulated in the CETM, and the results from the simulations together with the conclusions that can be drawn are described in section 4.2. In section 4.3, the robustness of the results is tested and discussed. Finally, in section 4.4, the effects of a potential extended coverage of the liberalisation, i.e. the “what-if” scenario with liberalisation in nine sectors, are analysed.

4.1. Scenario definitions

Table 4.3 illustrates the four basic scenarios that are used to analyse barrier reduction in Switzerland. Each scenario represents a strategy Switzerland could adopt, combined with some action taken by the EU. The scenarios are based on status quo or continued liberalisation in the EU on the one hand. On the other hand, Switzerland’s options are status quo, minimum EU compatibility or to implement a strategy called “best practice”. “Status quo” represents the current situation for both EU and Switzerland, respectively. We now describe in more detail what is actually implied by each scenario. For example, how does each scenario affect barriers in Switzerland and the EU, and what is actually meant by “best practice”?

²⁸ There is a discussion going on about new authorisation procedures, both in Switzerland and on a European level, which might lead to tougher regulations in the accountancy services sector in the future. This means that some of the results for this sub-sector might be reversed in the future, if the new regulations lead to more barriers than there is today. However, it does not alter any part of the model analysis.

²⁹ For example, in scenario 1 (see following sections), the resulting over all welfare gain calculated without liberalisation in hotels and restaurants would be approximately 5 % lower (i.e. 95 % of the calculated welfare gain) than if hotels and restaurants were included.

Table 4.3: Analysed scenarios

EU \ Switzerland	Status quo	Minimum EU-compatibility	"Best practice"
Status quo	Benchmark		Scenario 1
Liberalisation path continued	Scenario 2	Scenario 4	Scenario 3

Scenario 1 – Switzerland adopts best practice, EU remains in status quo

In a first scenario, Switzerland is assumed to reduce its barriers to services provision, while the EU remains in status quo. This scenario gives initial insights into the potential economic effects for Switzerland if the country decides to liberalise in the services sector area, even though the EU would not continue on its liberalisation path. In this scenario, all EU countries are therefore assumed to keep their current barriers to both freedom of establishment and free movement of services.

Switzerland is in this scenario assumed to adopt what we call a best practice liberalisation strategy. This means that Swiss barriers to services provision are lowered to correspond to the level of a chosen best practice country for every sector. This best practice country is generally found as the EU-15 member state having the lowest barriers, and the barrier level in the chosen country is then used for the corresponding Swiss sector. The chosen "best practice" countries are presented in Table 4.4.

Table 4.4: Chosen best practice countries

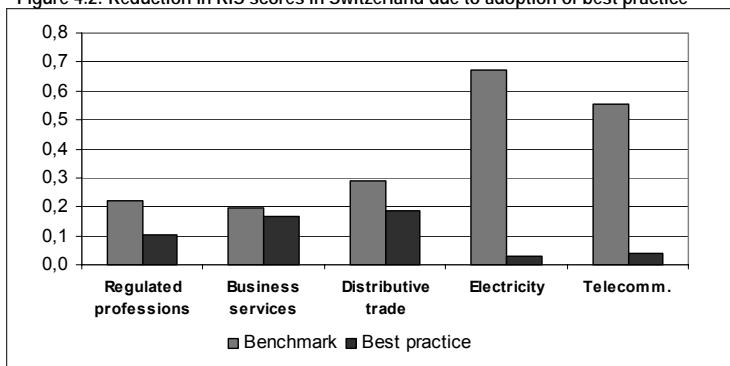
	Regulated professions	Business services	Distributive trade	Electricity	Tele-comm.
Chosen best practice country	Ireland	United Kingdom	Luxembourg	United Kingdom	Denmark

Source: Copenhagen Economics.

For example, best practice liberalisation strategy in the business services sector means to lower the Swiss barriers to business services provision to the level of the United Kingdom, the country chosen to represent "best practice" in this specific sector.

Switzerland's RIS scores in the different sectors, in status quo and after adopting best practice, are shown in figure 4.2. The best practice strategy results in significantly lower barriers, reflected in lower RIS scores. Especially in the electricity and telecommunication sectors, the RIS scores drop considerably, as figure 4.2 shows. The reason is that the United Kingdom and Denmark have much lower barriers than Switzerland in the electricity and telecommunication sectors respectively.

Figure 4.2: Reduction in RIS scores in Switzerland due to adoption of best practice



Note: The graph shows RIS scores for Switzerland in benchmark and after adopting best practice strategy. Benchmark year is 2001 for the electricity and telecommunication sectors, and fall 2002 for the other three sectors. The RIS measured in accountancy is used as a proxy for regulated businesses and the RIS measured in IT-services is used as a proxy for business services. The RIS score for distributive trade is a weighted average of the wholesale and retail trade sectors.

Source: Copenhagen Economics.

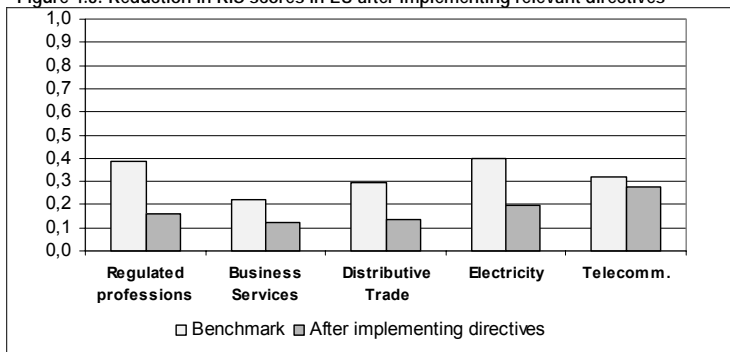
Scenario 2 – Switzerland remains in status quo, EU liberalises

A second scenario analyses the potential economic effects of assuming that the EU continues its liberalisation path, while Switzerland this time remains in status quo, with no reduction in barriers to services provision. This scenario gives insights into the economic consequences for Switzerland if it were to refrain from any reduction in barriers, while at the same time the liberalisation process in the EU will continue.

“Liberalisation path continued” for the EU is modelled as implementation of the different relevant EU directives³⁰. For the services sectors regulated professions, business services and distributive trade, we model “Liberalisation path continued” as implementation of the proposed Services Directive. For the relevant services sectors not covered by the Services Directive, i.e. electricity and telecommunication, we model “Liberalisation path continued” as implementation of the EU directives governing the future market opening in these sectors. The implementation of these directives will reduce barriers to service provision, which in turn means lower RIS scores in the EU countries. The resulting changes in the RIS scores are shown in figure 4.3.

³⁰ See Appendix E for a complete list of the legislative sources used to model the implementation of “liberalisation path continued”.

Figure 4.3: Reduction in RIS scores in EU after implementing relevant directives



Note: The graph shows weighted average RIS scores for the EU-15 countries in benchmark and after implementing the different directives. Benchmark year is 2001 for the electricity and telecommunication sectors, and the benchmark barriers in the other three sectors reflect the situation around 2001-2003. The RIS measured in accountancy is used as a proxy for regulated businesses and the RIS measured in IT-services is used as a proxy for business services. The RIS score for distributive trade is a weighted average of the wholesale and retail trade sectors.

Source: Copenhagen Economics.

Scenario 3 – Switzerland adopts best practice, EU liberalises

In a third scenario, in order to analyse the economic effects that will arise from a parallel liberalisation, both Switzerland and the EU are assumed to reduce barriers to services provision. More specifically, the scenario investigates the economic effects if Switzerland adopts a best practice strategy while the EU continues its liberalisation. As in the previous scenario, the continued liberalisation path for the EU is modelled as implementation of different relevant EU directives.

The best practice strategy for Switzerland is in this scenario modelled by lowering Swiss barriers in the services sectors to correspond to best practice in the EU *after* implementation of the relevant directives. Hence, in this scenario, the best practice level is found as the barriers in the chosen best practice countries after implementation of the proposed Services Directive and the directives governing the electricity and telecommunication sectors.

Scenario 4 – Switzerland adopts “minimum EU compatibility”, EU liberalises

In the last scenario, parallel liberalisation in both Switzerland and the EU is analysed once more. However, this time Switzerland is assumed to adopt what we call “minimum EU compatibility” in the relevant sectors, while there is a continued liberalisation in EU.

“Minimum EU compatibility” means that Switzerland is assumed to conform to the minimum EU requirements outlined in the different EU directives. For the services covered by the proposed Services Directive, this means assuming that Switzerland implements this directive; while the relevant EU directives are used to model “minimum EU compatibility” for the two other sectors, i.e. electricity and telecommunication. Hence, Swiss actions in this scenario are identical to the actions taken by the individual EU countries in the “Liberalisation path continued”-strategy for the EU. In practice, this “minimum EU compatibility” strategy means a reduction of barriers to services provision in Switzerland, but not as drastic as in the “best practice” strategies³¹.

³¹ A complete overview of the tax equivalents used in this scenario is found in Appendix D.

All scenarios are compared with a benchmark scenario that provides a reference point for the analysis. The benchmark scenario represents status quo, i.e. current barriers to both freedom of establishment and free movement of services, in both Switzerland and the EU.

4.2. Results

In the following sections, the main findings of the model analysis are presented. Detailed results are available in appendix A, where effects on a range of variables are reported for each scenario. The reporting in the following sections focuses on changes in welfare, employment, prices and cross-border trade. Aggregate results for Switzerland in the different scenarios are presented in Table 4.5.

In sum, the results show that liberalisation will lead to significant economic gains for Switzerland, and that it is important not to fall behind the EU in reducing barriers to service provision.

Table 4.5: Economic effects for Switzerland

Economy-wide effects	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Welfare	2.0 %	- 0.3 %	1.7 %	0.8 %
Welfare (CHF billion)	5.2	-0.8	4.6	2.1
Real wages	1.7 %	0.0 %	1.7 %	1.0 %
Employment	0.6 %	0.1 %	0.8 %	0.5 %

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

Source: CETM – Copenhagen Economics.

An analysis of the outcomes of the scenario simulations leads to the conclusion that the main driver of economic gains in Switzerland is the country's own reduction in barriers. If Switzerland reduces its barriers to services provision, it will experience increases in welfare, wages, employment and cross-border trade, regardless of the action taken by the EU.

The following general conclusions can be drawn:

Barrier reductions in the services sectors will yield significant economic gains. Swiss consumers will benefit from lower prices, higher employment and increased wages if barriers to services provision were reduced. The total welfare gain (measured as comprehensive consumption) for Switzerland if the country adopts best practice in reducing barriers to services provision, while EU remains in status quo (i.e. scenario 1), is approximately 2.0 %. This corresponds to a yearly gain of approximately CHF 5.2 billion in monetary terms. The economic gains are explained by the impacts of increased productivity and reduced prices in the liberalised sectors. This has a positive effect on the domestic market, but it also increases the competitiveness of Swiss firms, compared to their European competitors.

As Table 4.5 shows, the larger the barrier reduction in Switzerland, the larger the expected total welfare gain. For example, the extent of the barrier reduction is the core difference between scenario 3 and 4. In scenario 3, Switzerland is assumed to reduce its barriers to services provision in order to match the level of a best practice country; while in scenario 4, Switzerland "only" reduces its barriers in order to meet minimum EU compatibility. The resulting difference in welfare gains is striking. In both scenarios, the EU is assumed to follow the same continued liberalisation path. Hence, the cause of the increased welfare gains in scenario 3, compared to scenario 4, is the extent of Switzerland's own barrier reduction.

Swiss cross-border supply to the rest of the EU will increase in the sectors where barriers are reduced. The changes in trade patterns in services depend on both Swiss and EU actions. If Switzerland reduces its barriers to service provision, while the EU keeps its current barriers, Swiss firms will become relatively more competitive. This will increase opportunities for Swiss firms on the European market and subsequently lead to an increase in cross-border supply from Switzerland to the rest of Europe. This is an important effect contributing to the positive results in scenario 1.

If Switzerland, on the other hand, does not reduce its barriers to service provision, while the EU does, the results will be reversed. Swiss firms will lose in competitiveness, and hence lose market shares on the European market. This is the explanation behind the decrease in Swiss welfare in scenario 2. When Switzerland falls behind the EU in reducing barriers to services provision, the lost competitiveness for Swiss firms on the European market will lead to shrinking markets, and eventually welfare losses. This effect is particularly prominent in the electricity sector, where the initial export intensity is high. The effect of less cross-border supply due to lost competitiveness is to some extent mitigated by a general increase in demand in the EU, which leads to more trade across borders for all countries, including Switzerland, but the net result in scenario 2 is a decrease in cross-border supply and consequently welfare, as can be seen in Table 4.5.

This relative competitiveness is also a key reason behind the differences between the results from scenario 1 and scenario 3. In scenario 1, only Switzerland is assumed to liberalise and reduce its barriers to services provision, while the EU is assumed to remain in status quo. The result is a large increase in Swiss cross-border supply to the rest of the EU, especially in the telecommunication and electricity sectors, due to the increased competitiveness of Swiss firms compared to their European counterparts. The resulting increase in cross-border supply means increased production in Switzerland and higher return to production factors. However, in the third scenario, both Switzerland and the EU are assumed to liberalise their services sectors. There is still an increase in Swiss cross-border supply, but not as large as in the first scenario. The drivers for the rise in cross-border supply is now higher demand in the EU region, which means a general increase in trade across borders, and to only a smaller extent an increased competitiveness of Swiss firms.

New jobs will be created. Total employment in Switzerland rises in all scenarios. The rise is most pronounced in the scenarios where Switzerland reduces its own barriers to services provision. It is noteworthy that most jobs are created in scenario 3, where net employment may increase by up to 33 000 jobs in Switzerland, even though the overall welfare effect is largest in scenario 1. The reason is that in scenario 3, the increased productivity in the domestic market, the increase in competitiveness for Swiss firms in the liberalised sectors, and the increase in EU demand for the job-intensive goods-producing sector together drive the positive effects on the labour market.

Total employment will rise also in scenario 2, even though the overall welfare effect is negative in this scenario. The rise in employment is small, only 0.1 %. In this scenario, the job creation takes place in first and foremost the goods-producing sector. The goods-producing sector is not assumed to be liberalised in the EU, and hence, Switzerland does not lose any competitiveness in this sector. Therefore, the generally higher demand in the EU countries the liberalisation will lead to, calls for more output in this sector in Switzerland as well as in the rest of Europe, and this will in turn create jobs.

Barrier reductions in the electricity and telecommunication sectors are important for the overall results. There are two main reasons for the importance of the electricity and telecommunication sectors in the results. First, barrier reductions in these sectors are large, compared to barrier reduction in other sectors. This has a direct and large effect on prices and

performance in these sectors. Second, both electricity and telecommunication serve as important inputs to many other sectors. Therefore, barrier reductions in these sectors result in many positive spill-over effects for the whole economy.

To understand how large the impact of reducing barriers in the electricity and telecommunication sectors is, compared to barrier reduction in the three other sectors, all scenarios are simulated once more, but this time assuming no barrier reductions in the electricity or telecommunication sector, neither in Switzerland, nor in the EU. The difference in overall welfare gains can be seen in Table 4.6.

Table 4.6: Impact of electricity and telecommunication in total welfare gains

Economy-wide effects	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Welfare with barrier reduction in all five sectors	2.0 %	-0.3 %	1.7 %	0.8 %
Welfare with barrier reduction in regulated professions, business services and distributive trade	0.3 %	0.2 %	0.4 %	0.4 %

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

Source: CETM – Copenhagen Economics.

If scenario 2 – i.e. where Switzerland is assumed to remain in status quo while the EU continues on its liberalisation path – is simulated without any reductions of barriers in the electricity and telecommunication sectors in the EU, the net result is even a welfare gain in Switzerland, as shown in Table 4.6. In this case the general increase in EU demand will outweigh the loss in competitiveness for Swiss firms in the three sectors where barriers are assumed to be reduced (regulated professions, business services and distributive trade). The barrier reductions in these sectors are not as drastic as in especially the electricity sector, and therefore we only see small decreases in cross-border supply in the liberalised sectors. All other sectors experience a rise in cross-border supply, due to increased demand in the EU. Hence, in this case, higher demand in the EU completely offsets the negative effects from reduced competitiveness. To sum up, two factors are of crucial importance when determining the total welfare effect for Switzerland if it refrains from any liberalisation: how much competitiveness Swiss firms lose, and to what extent this is mitigated by increased EU demand. The analysis shows that the competitiveness loss is more important in the electricity and telecommunication sectors, while the increased EU demand is more important in the regulated professions, business services and distributive trade sectors.

Scenario simulations

To better understand the outcomes from the simulation of the different scenarios, and the mechanisms behind them, it is helpful to consider the whole chain of economic effects. For example, when Switzerland is assumed to adopt best practice in the business services sector, the result would in reality be lower barriers to provision in this sector. The lower barriers are captured in the updated RIS scores for business services in Switzerland. Changes in barriers are transformed into price and cost effects that are measured in terms of tax equivalents. Barriers are both rent- and cost-creating, and they affect domestic and foreign firms differently. When barriers are reduced, tax equivalents fall. This has both direct and indirect impacts on the economy.

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 efficiency gains. Lower cost-creating barriers,

on the other hand, imply productivity gains because the same output can be produced with fewer resources. Productivity gains enable a surplus for the sectors involved, which is distributed as lower prices to consumers, higher wages and increased returns to capital. Lower prices and higher incomes combine to stimulate demand in all sectors of the economy. Increased demand calls for higher output, which leads to higher demand for production factors.

The economy-wide effects for Switzerland in the different scenarios depend on actions taken by Switzerland, but also on the actions taken by the EU. To get a better understanding of the effects in place, more detailed results from the four scenarios are presented in the following sections.

Scenario 1 – Switzerland adopts best practice, EU remains in status quo

In the first analysed scenario, the EU is assumed to remain in status quo, i.e. keep its present regulations and barriers, while Switzerland is assumed to reduce its barriers for services provision according to a best practice strategy.

As can be seen in Table 4.7, prices fall in all sectors where barrier reductions take place. The lower prices of services depend on reduction in barriers and prices of production inputs, which in turn depend on barrier reduction in other sectors. The largest price decreases can be found in the services sectors where barriers are reduced the most, i.e. in the electricity sector closely followed by the telecommunication sector. However, the results show that in also the other sectors where barriers are reduced, lower rents and increases in productivity outweigh higher prices of labour and capital.

In the remaining sectors of the economy, where no barrier reduction takes place, output prices generally increase slightly, as a result of higher wages and higher costs of capital. This means that for example, prices in the goods-producing sector increases by 0.6 %³².

Table 4.7: Price effects in Switzerland – scenario 1

	Regulated professions	Business services	Distributive trade	Electricity	Telecomm.
Prices	-4.0 %	-0.1 %	-2.2 %	-23.2 %	-21.4 %

Source: CETM – Copenhagen Economics.

Market size, measured as total value of output, grows in all sectors where Switzerland liberalises, as Table 4.8 shows. Job creation is most intense in the telecommunication and electricity sectors. However, less than 3 % of the workforce is employed in these two sectors together. In absolute numbers, most jobs are created in distributive trade.

There is a general increase in Swiss cross-border supply in the liberalised sectors. As earlier mentioned, the EU countries are assumed not to reduce any barriers at all, while Switzerland is assumed to implement best practice in this scenario. This means that Swiss firms become relatively more competitive on the European market than their European counterparts, and consequently, Swiss-produced services become more attractive on the European market. Table 4.8 shows the resulting increases in cross-border supply from Switzerland, which even force out some of the intra-EU cross-border supply. In reality, this means that for example an Italian firm that previously imported management consulting services from France might switch to import the same service from Switzerland instead, due to the increased competitiveness of the Swiss provider.

³² The price effects in all individual sectors are available in Appendix A.

Table 4.8: Market effects in Switzerland in liberalised sectors – scenario 1

	Regulated professions	Business services	Distributive trade	Electricity	Tele-comm.
Market size	5.0 %	4.0 %	2.0 %	17.8 %	19.7 %
Employment	5.6 %	2.0 %	2.9 %	12.7 %	29.0 %
Cross-border supply from Switzerland	13.3 %	2.2 %	6.8 %	86.2 %	100.0 %
Total intra-EU cross-border supply	- 0.2 %	0.0 %	- 0.1 %	-6.6 %	- 2.3 %

Note: "Market size" is measured by the total value of output. "Total intra-EU cross-border supply" is measured as the sum of cross-border supply from all individual EU-15 countries to other EU-15 countries as well as to Switzerland.

Source: CETM – Copenhagen Economics.

The estimated increase in the value of electricity export from Switzerland to the EU is very large, 86.2 %. The reason is the large barrier reductions that take place in this sector, which in turn lead to significantly lower prices. The lower prices will make Swiss electricity more attractive on the European market, and exports will consequently increase. At the same time, the barrier reductions will lead to increased productivity and efficiency in this sector, and consequently allow for a higher value of output and export of electricity. The productivity increase is econometrically estimated and directly based on experience from other countries, as explained in chapter 3.

A substantial share of the increase in the value of exports could be realised by exploiting the price differences between peak and off-peak hours to an even higher extent than today³³. This could be done e.g. by increasing the dimensions of the penstocks in the hydroelectric plants, which in turn would increase the maximum power of the plants, and subsequently the capability to export during peak hours. Increased storage capacity in the hydroelectric power plants would also enable more of this kind of export. Furthermore, there could be some gains from better planning systems, enabling more efficient joint management of hydro power plants contingent on each other. However, a large part of the increase in the value of export can be realised through an increase of contractual exports. New commercial instruments – increased trade through the electricity exchanges, brokering, contracting, swaps, virtual electricity storage or tailor-made security of supply contracts complementary to wind or other renewable energy – could strongly contribute to the rise of export earnings. All in all, these things could enable a substantial increase in the value of electricity export.

In the telecommunication sector, the large increase in Swiss exports is a direct result of the large price fall in this sector. Export in the telecommunication sector mainly consists of incoming international traffic, and in reality, the increase in exports reflects that people and firms would take advantage of the decreased costs, and make more and cheaper phone calls to Switzerland.

There is also a decrease in the total intra-EU cross-border supply, due to the large price fall in Switzerland. The explanation is the standard modelling assumption we employ: that services imported from different countries are substitutes. For example, in Great Britain, telephone calls to Switzerland are substitutes for telephone calls to e.g. Sweden. The large price reduction in the Swiss telecommunication sector therefore results in countries choosing to import telecommunication services from Switzerland instead of from other relatively more expensive countries. Furthermore, there is a decrease in Swiss imports of telecommunication services. The explanation is the model assumption that domestic and imported telecommunication services are substitutes. Lower prices of domestic telecommunication services lead the consumers to shift from imported to domestic services. These model assumptions are part of a standard model setup, but do not correctly reflect the behaviour of telecommunication

³³ I.e. by buying electricity from abroad at low cost, and exporting it on peak hours, for a higher price.

consumers, and thus the resulting decreases in total EU cross-border supply and in Swiss imports are somewhat unrealistic. This should be taken into account when interpreting the results, but it should also be noted that the effect of the export increase in the telecommunication has only small effects on the economy-wide results, since the export intensity in this sector is relatively low.

Scenario 2 – Switzerland remains in status quo, EU liberalises

In the second scenario, Switzerland is assumed to keep all its current barriers, while the EU is assumed to follow its continued liberalisation path. As can be seen in Table 4.9, the price falls we saw in Switzerland in the previous scenario are not present any more. In the EU, prices in liberalised sectors will fall, but only price falls in the electricity sector and the distributive trade sector will be large enough to have any spill-over effects on the Swiss economy. Apart from this, the price level in Switzerland remains the same as in the benchmark.

Table 4.9: Price effects in Switzerland – scenario 2

	Regulated professions	Business services	Distributive trade	Electricity	Telecomm.
Prices	0.0 %	0.0 %	-0.1 %	- 7.1 %	0.0 %

Source: CETM – Copenhagen Economics.

Table 4.10 below shows that market size, measured as total value of output, shrinks in all sectors where the EU liberalises, and labour demand decreases as well in these sectors. The driver of this effect is the reduced competitiveness of Swiss firms, compared to their European counterparts. Because of the barrier reduction taking place within the EU, services production in the EU becomes more competitive relative to Swiss production. Hence, Switzerland will buy more services produced within the EU, i.e. Swiss imports will increase, at the expense of domestic production. For the same reason, cross-border supply from Switzerland decreases in most sectors where the EU liberalises. However, the decrease in cross-border supply is mitigated by higher demand in the EU, which leads to a general increase in cross-border supply for all countries. In the business services sector, the net result is an increase, since the effect of higher demand in the EU entirely compensates the loss in competitiveness.

In the electricity sector, the total value of exports falls in both Switzerland and the EU countries. The price of electricity decreases by 13.5 % in the EU, due to the considerable barrier reductions that are assumed to take place. The resulting increase in demand for electricity does not offset this large price fall, and hence the total market size, measured as total value of output, shrinks on the European level. The reduced market size results in generally smaller trade flows between the EU countries in value terms. However, there is an increase in Swiss electricity import, and a relatively large fall in electricity export from Switzerland to the rest of the European countries. The reason is the relatively lower competitiveness of Swiss electricity producers. When the EU liberalises in the electricity sector, the productivity of the European electricity producers increases, and Swiss electricity producers lose in competitiveness.

Table 4.10: Market effects in Switzerland in liberalised sectors – scenario 2

	Regulated professions	Business services	Distributive trade	Electricity	Tele-comm.
Market size	-1.2 %	-0.3 %	-0.2 %	-17.2 %	-0.7 %
Employment	-1.2 %	-0.3 %	-0.1 %	-4.9 %	-0.6 %
Cross-border supply from Switzerland	-9.6 %	0.5 %	-1.1 %	-34.5 %	-2.2 %
Total intra-EU cross-border supply	11.6 %	1.5 %	3.7 %	-3.1 %	2.0 %

Note: "Market size" is measured by the total value of output. "Total intra-EU cross-border supply" is measured as the sum of cross-border supply from all individual EU-15 countries to other EU-15 countries as well as to Switzerland. Source: CETM – Copenhagen Economics.

Scenario 3 – Switzerland adopts best practice, EU liberalises

In the third scenario, both the EU and Switzerland are assumed to reduce their barriers to services provision. Thus, in this scenario we investigate the effects of a parallel liberalisation in Switzerland and in the EU.

As in scenario 1, prices fall in all sectors where barriers are reduced, and the price falls are largest in the sectors where barriers are reduced the most. The price falls are slightly more pronounced in this scenario than in scenario 1, because of the larger barrier reductions this scenario implies for Switzerland. The other sectors in the economy, where no barrier reduction is assumed to take place, are affected by the change in prices of inputs. Generally, prices in the other sectors increase slightly, as a result of higher wages and higher cost of capital.

Table 4.11: Price effects in Switzerland – scenario 3

	Regulated professions	Business services	Distributive trade	Electricity	Telecomm.
Prices	- 4.4 %	- 0.5 %	- 3.2 %	- 29.7 %	- 21.4 %

Source: CETM – Copenhagen Economics.

Because of the parallel barrier reductions, both Swiss and European firms will increase their productivity. The increase in cross-border supply in this scenario, shown in Table 4.12, is therefore first and foremost a result of the positive effects the barrier reductions have in both Switzerland and the EU. Lower prices and increased productivity leads to higher demand, and subsequently a general increase in cross-border supply. However, the barrier reductions in the electricity and telecommunication sectors in Switzerland are substantially larger than the average reductions made in the EU countries. Therefore, the competitiveness of the Swiss electricity and telecommunication industries increases relative their European counterparts. Due to the high export intensity in the Swiss electricity sector compared to most EU countries, in combination with the large reduction in barriers, Swiss exports of electricity even forces out some of the other European countries' exports in the same way as we saw in scenario 1. Another effect contributing to the decrease in electricity exports in the EU, is the shrinking market size, because of the large price fall in this sector, in the same way as in scenario 2.

Market size, measured as total value of output, grows in most liberalised sectors. However, the opposite is true for the electricity sector, where the market actually shrinks. The production of electricity, measured in volume, increases as well, but due to the relatively increased price fall, the net result is nevertheless a decrease in total market size.

Table 4.12: Market effects in Switzerland in liberalised sectors – scenario 3

	Regulated professions	Business services	Distributive trade	Electricity	Tele-comm.
Market size	3.7 %	3.7 %	1.8 %	- 5.3 %	18.8 %
Employment	3.9 %	1.1 %	3.7 %	9.5 %	28.1 %
Cross-border supply from Switzerland	3.5 %	3.9 %	7.9 %	27.4 %	95.3 %
Total intra-EU cross-border supply	11.5 %	1.5 %	3.6 %	-10.4 %	- 0.3 %

Note: "Market size" is measured by the total value of output. "Total intra-EU cross-border supply" is measured as the sum of cross-border supply from all individual EU-15 countries to other EU-15 countries as well as to Switzerland.

Source: CETM – Copenhagen Economics.

Scenario 4 – Switzerland adopts "minimum EU compatibility", EU liberalises

In the fourth scenario, both Switzerland and the EU are again assumed to reduce their barriers to services provision. However, Switzerland is this time assumed to only adopt "minimum EU compatibility", compared to the best practice strategy that was analysed in the previous scenario. This means that the barrier reduction taking place in Switzerland is not as drastic as in the previous scenario.

As can be seen in Table 4.13, prices fall in all liberalised sectors in this scenario as well. However, the price falls are generally smaller than in scenario 3. The reason is the extent of barrier reduction. When Switzerland was assumed to liberalise according to the best practice strategy, the reductions of barriers to services provision were larger than they are in this scenario. If more barriers are removed, the effect is lower rents and larger increases in productivity, which eventually results in lower prices.

Table 4.13: Price effects in Switzerland – scenario 4

	Regulated professions	Business services	Distributive trade	Electricity	Telecomm.
Prices	-3.7 %	-0.5 %	- 2.4 %	-22.4 %	-6.3 %

Source: CETM – Copenhagen Economics.

The same effects are apparent in the changes in market sizes of different sectors. In most liberalised sectors, the market grows, but not as much as it did in the previous scenario. Cross-border supply from Switzerland to the rest of Europe is notably lower in all sectors than it was in the previous scenario. There is still an increase in Swiss cross-border supply, but not as large as previously. The main driver for the rise in cross-border supply is now higher demand in the EU region, which means a general increase in trade across borders, and not as much an increased competitiveness of Swiss firms. However, the barrier reduction taking place in the electricity sector in Switzerland is still considerable, compared to the EU average reduction in this sector. Hence, we still see the effect of Swiss electricity export crowding out export from other European countries.

Table 4.14: Market effects in Switzerland in liberalised sectors – scenario 4

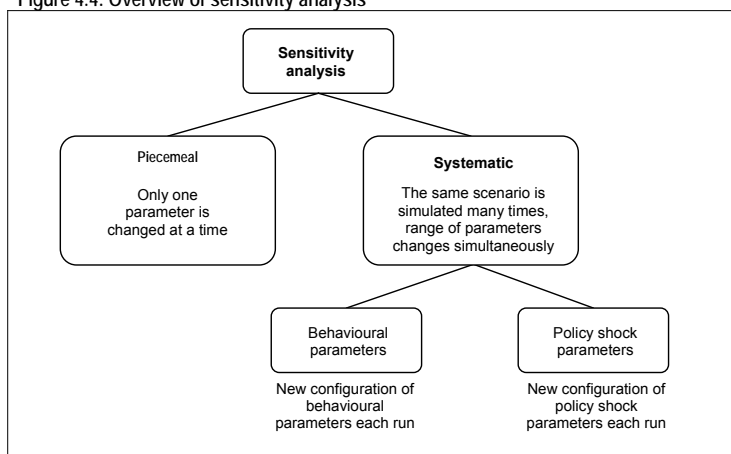
	Regulated professions	Business services	Distributive trade	Electricity	Tele-comm.
Market size	2.0 %	2.2 %	1.0 %	-10.8 %	5.3 %
Employment	4.3 %	0.5 %	2.7 %	4.9 %	7.1 %
Cross-border supply from Switzerland	0.9%	3.2 %	5.3 %	0.7 %	18.4 %
Total intra-EU cross-border supply	11.5 %	1.5 %	3.6 %	- 8.1 %	1.3 %

Note: "Market size" is measured by the total value of output. "Total intra-EU cross-border supply" is measured as the sum of cross-border supply from all individual EU-15 countries to other EU-15 countries as well as to Switzerland. Source: CETM – Copenhagen Economics.

4.3. Sensitivity analysis

The results from the model simulations are dependent on a number of behavioural parameters, the underlying data and the precision of the calculated policy shocks. The purpose of the sensitivity analysis is to determine how changes in strategic parameters and estimations influence the results. The sensitivity of the results to modelling assumptions and policy impacts has been analysed using both piecemeal and systematic sensitivity analysis. An overview of the sensitivity analysis approach is shown in Figure 4.4

Figure 4.4: Overview of sensitivity analysis



The piecemeal sensitivity analysis allows only one parameter to change at a time. This gives insights into how the choice of different individual parameters affects the results. 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. This approach, when the choices of values for many different parameters are able to interact, tells us about the total uncertainty in the model. In the first systematic sensitivity analysis the effect of the choices of behavioural parameters, i.e. parameters determining the behaviour of the economic agents in the model, is analysed. In the second systematic sensitivity analysis, the inherent uncertainty of the calculated policy shocks is investigated. This two-pronged approach gives valuable insights on the robustness of the results from the model simulations.

Piecemeal sensitivity analysis

The piecemeal sensitivity analysis focuses on the three most important elasticities with regard to welfare and employment effects; the elasticity of substitution between individual service varieties, the elasticity of substitution between imported and domestically produced goods and services, and the elasticity of labour supply. To investigate what impact the choice of these parameters has on the results from the model, scenario 1 is simulated again, but with different values of these parameters. As can be seen in Table 4.15, the results show predictable impacts of changing these elasticities. A decrease in the elasticity of substitution between varieties increases the welfare gain. This is because when varieties are bad substitutes, the additional varieties the barrier removal leads to, are worth even more to firms and consumers.

Gains are also slightly higher if imported and domestically produced services and goods are better substitutes for each other than what is assumed in the model. Then we would see even larger increases in Swiss cross-border supply to the rest of the EU, and hence welfare would increase in Switzerland. The elasticity of labour supply has a noticeable effect on employment, but little influence on the welfare effects.

The piecemeal sensitivity analysis also includes the importance of the size of the policy shocks. First, a scenario is simulated where the initial barriers to services provision are set to a value 10 % higher than estimated, and second, the initial barriers are set to a value 10 % lower than estimated. The resulting welfare gains are, as Table 4.15 shows, directly affected by the size of the barriers. If the actual barriers initially in place in all sectors were 10 % higher than estimated, the barrier reduction we measure in scenario 1 would be even larger, and would consequently mean higher welfare gains. However, it is important to remember that the probability that *all* barriers in *all* sectors are concurrently under- or overestimated is very low. The piecemeal sensitivity analysis should rather be interpreted as a way of understanding and quantifying how sensitive the results are to changes in the size of the policy shock.

Table 4.15: Piecemeal sensitivity analysis

	Value	Economy-wide impacts for Switzerland		
		Welfare	Real wage	Employment
Original result scenario 1		2.0	1.7	0.6
Behavioural parameters				
Elasticity of substitution between individual service varieties	4	2.5	1.9	0.6
	6	1.7	1.6	0.6
Elasticity of substitution between imported and domestically produced services and goods ³⁴	2.5	1.8	1.6	0.6
	3.5	2.1	1.8	0.6
Elasticity of labour supply	0.1	1.9	1.8	0.3
	0.3	2.0	1.6	0.8
Policy shocks				
Initial barriers	+10 %	2.3	2.0	0.7
	-10 %	1.6	1.4	0.5

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

Source: CETM - Copenhagen Economics.

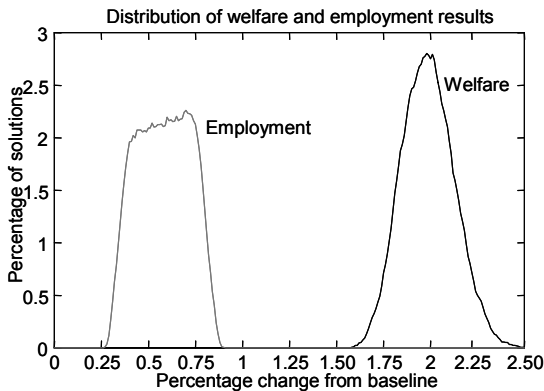
³⁴ In the regulated professions, business services and distributive trade sectors, the elasticity between locally produced and imported services is set to 1, hence these values varies between 0.5 and 1.5 instead.

Systematic sensitivity analysis

The uncertainty in the model analysis arises from two different sources. First, there is an uncertainty stemming from the estimates of the actual policy shock, i.e. the estimates of tax equivalents. Second, there is an uncertainty stemming from the choice of different behavioural parameters in the model. This latter uncertainty is general and, to some extent, part of all CGE analyses. To gain a better understanding how different uncertainties affect the overall result of the analysis, the systematic sensitivity is therefore divided into two parts. As a starting point for both systematic sensitivity analyses, scenario 1, where Switzerland is assumed to liberalise according to a best practice strategy, while the EU is assumed to remain in status quo, is used.

First, the effects of choosing different behavioural parameters are investigated. This means that the model is run 2000 times to simulate scenario 1, but each time with a different configuration of the behavioural parameters listed in Table 4.15. In each simulation, the values of the parameters are drawn from a random distribution. The parameters are all assumed to be uniformly distributed between the upper and lower values investigated in the piecemeal sensitivity analysis. The analysis indicates that the results are satisfyingly robust to changes in behavioural parameters. Figure 4.5 shows that especially the welfare effects, but also the employment effects are distributed across relatively narrow intervals. Furthermore, the curve showing the distribution of employment effects directly reflects the fact that employment is primarily affected by the choice of the labour supply elasticity. The upper and lower limits for employment effects correspond closely to the results from changing the labour supply elasticity in the piecemeal sensitivity analysis.

Figure 4.5: Results from behavioural parameter analysis



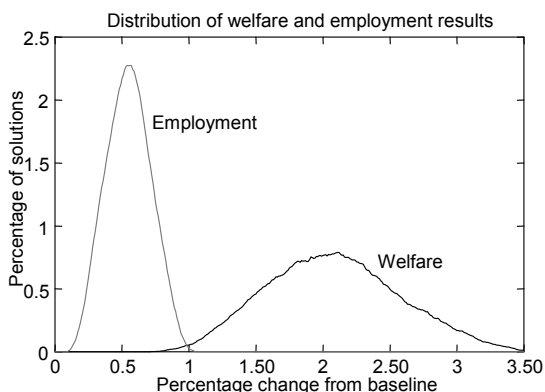
Note: The graph shows the distribution of welfare and employment effects for Switzerland in scenario 1.
Source: CETM - Copenhagen Economics.

Second, effects of uncertainty in the estimations of the policy shocks, i.e. the tax equivalents, are investigated. The systematic sensitivity analysis of the price and productivity impacts draw directly on the probability distributions calculated for tax equivalents in the relevant services sectors in the econometric analysis. For regulated professions, business services and distributive trade we assume that benchmark tax equivalents follow normal distributions, with standard errors taken directly from the econometric estimations of the values. For example, the domestic price tax equivalent in the regulated professions sector varies around its central estimate of 3.2 % according to a normal distribution with a standard error of 0.24 %. In the electricity and telecommunication sectors, corresponding intervals could not be used, due to too few observations. To better reflect the real insecurity in the estimations, we use a uniform

distribution with upper and lower bounds. As upper and lower bounds we use the maximum and minimum estimates obtained from a simulation exercise where single observations were dropped and the coefficients were re-estimated recursively. The benchmark tax equivalents for the electricity and telecommunication sectors are then assumed to be uniformly distributed between these values. For example, the productivity tax equivalent in the electricity sector is assumed to vary uniformly between 7.3 % and 27.6 %. All bounds and distributions used in the systematic sensitivity analysis of tax equivalents are shown in appendix D. In the systematic sensitivity analysis, scenario 1 is simulated 2000 times. In each simulation, new tax equivalents, drawn from the corresponding probability distributions, are used.

As figure 4.6 shows, the results are more vulnerable to uncertainty in the estimates of the policy shocks. The employment outcome is fairly stable, but the welfare effects vary more. The spread of the solutions reflects the uncertainty of estimates in primarily the electricity and telecommunication sectors. However, it should be noted that 95 % of the solutions are distributed between welfare gains from 1.1 % to 3.1 % compared to benchmark. Even though the exact magnitude of the welfare gain is difficult to estimate, we can with certainty say that there is a significant positive effect of barrier reduction in the services sectors.

Figure 4.6: Results from policy shock analysis



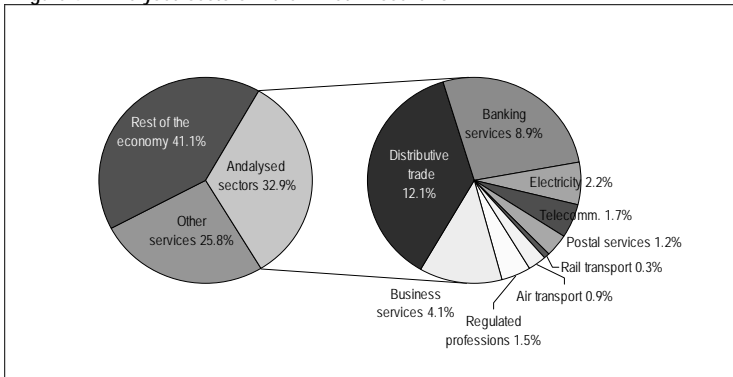
Note: The graph shows welfare and employment effects for Switzerland in scenario 1. Source: CETM - Copenhagen Economics.

4.4. Extended coverage of services liberalisation

The analysis so far has focused on the removal of barriers within five services sectors. These are regulated professions, business services, distributive trade, electricity and telecommunication. However, barrier reduction in other sectors will also affect the total welfare gains Switzerland might experience. To gain some insight into the general weight these other sectors potentially could have in the total effects of a liberalisation strategy, an extended "what-if" scenario is simulated. It has the same basic set up as scenario 1: Switzerland is assumed to liberalise according to a best practice strategy, while the EU is assumed to remain in status quo. However, this time Switzerland is assumed to reduce barriers in not only the five sectors analysed earlier, but also in the banking services, railway transport, air transport and the postal services sectors³⁵. As can be seen in figure 4.7, the analysed sectors in this scenario together constitute 33 % of the Swiss economy.

³⁵ The tax equivalents following the barrier reductions estimated to take place in all nine sectors are reported in Appendix D.

Figure 4.7: Analysed sectors in the “what-if” scenario



Note: The chart shows sectoral shares of total value added in the Swiss economy. The sector “Other services” in this diagram includes e.g. health services and constructions services.
Source: CETM – Copenhagen Economics.

The results from simulating this scenario with extended barrier reduction are shown in Table 4.16. As can be seen, the potential effects of further liberalisation are substantial. The most important driver of the positive effects in this simulation is the barrier reduction taking place in the postal services sector. The barrier reduction in this sector is estimated to be extensive, and this has a direct and positive effect on the economy. However, it should be kept in mind that the estimates of barrier reductions in the postal services sector, as well as in the banking services, air transport, and railway transport sectors are burdened with a high level of insecurity. Rather, the result should be seen as an indication: liberalisation in other sectors might have substantial impact on the total welfare effect in Switzerland.

Table 4.16: Economic effects for Switzerland from extended coverage of liberalisation

Economy-wide effects	Scenario 1 with liberalisation in 5 sectors	Scenario 1 with liberalisation in 9 sectors
Welfare	2.0 %	3.1 %
Welfare (CHF billion)	5.2	8.2
Real wages	1.7 %	2.3 %
Employment	0.6 %	0.8 %

Note: All results are reported as changes from the benchmark. Welfare is measured as comprehensive consumption. The analysed scenario is in both cases scenario 1: Switzerland liberalises according to best practice, while the EU remains in status quo.

Source: CETM – Copenhagen Economics.

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Appendix A: Detailed results from the CETM model

The following sections present detailed results for the analysed scenarios. It should be noted that welfare is measured as comprehensive consumption. Market size is defined as the total value of output by both domestic and foreign firms. Cross-border trade is measured as the total value of intra-EU exports.

First, results from all scenarios with barrier reductions in five sectors (regulated professions, business services, distributive trade, electricity and telecommunication) are presented. Then, the same scenarios are simulated again, but this time without any barrier reductions in the electricity and telecommunication sectors.

Scenario 1 – Switzerland adopts best practice, EU remains in status quo

Summary Results (% change)

	Economy-wide impacts					
	Welfare	Welfare ^a	Value added	Value added ^a	Real wage	Total employment
Switzerland	2,0	5,2	3,0	11,0	1,7	0,6
EU15	0,0	-0,1	0,0	2,1	0,0	0,0

Note: (a) Change in billion CHF (2001)

Source: CETM model - Copenhagen Economics

Costs of services (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
	Switzerland	4,0	-4,0	-2,2	-23,2	-21,4	1,5	-1,5	0,1	1,3	0,4	0,6
EU15	0,0	0,0	0,0	-1,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Note: Costs of services is measured by the weighted average of the prices of output provided by domestic and foreign firms

Source: CETM model - Copenhagen Economics

Market size (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
	Switzerland	5,0	-4,0	2,0	17,6	19,7	1,0	8,0	3,2	-2,0	1,4	0,0
EU15	0,0	0,0	0,0	-2,2	-0,3	0,0	0,0	0,0	0,1	0,0	0,1

Note: Market size is measured by the total value of output by both domestic and foreign firms

Source: CETM model - Copenhagen Economics

Cross border trade (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport
	Switzerland	13,3	2,2	6,8	86,2	100,0	-3,2	8,1	1,5	-4,1
EU15	-0,2	0,0	-0,1	-6,6	-2,3	0,1	-0,1	0,1	0,2

Note: Cross border trade is measured by the value of total exports within the EU

Source: CETM model - Copenhagen Economics

Value added (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
	Switzerland	9,5	4,2	4,7	89,3	42,5	0,8	8,6	4,2	-4,0	1,8	0,0
EU15	0,0	0,0	-0,1	-2,0	-0,3	0,0	0,0	0,1	0,0	0,0	0,1

Note: Value added is measured by the sum of payments to inputs of labour and capital

Source: CETM model - Copenhagen Economics

Employment (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
	Switzerland	5,6	2,0	2,9	12,7	29,0	-0,9	6,7	2,5	-5,6	0,1	-1,7
EU15	0,0	0,0	0,0	-0,7	-0,3	0,0	-0,1	0,0	0,0	0,0	0,1

Note: Employment is measured by labour demand

Source: CETM model - Copenhagen Economics

Scenario 2 – Switzerland remains in status quo, EU liberalises

Summary Results (% change)

	Economy-wide impacts					
	Welfare	Welfare ^a	Value added	Value added ^a	Real wage	Total employment
Switzerland	-0,3	-0,8	0,0	-0,1	0,0	0,1
EU15	0,8	63,9	1,3	150,1	0,7	0,4

Note: (a) Change in billion CHF (2001)

Source: CETM model - Copenhagen Economics

Costs of services (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	0,0	0,0	-0,1	-7,1	0,0	0,1	0,0	-0,2	-0,1	0,0	0,0
EU15	-6,7	0,1	-2,1	-13,5	-1,1	0,1	0,6	0,1	0,6	0,3	0,2

Note: Costs of services is measured by the weighted average of the prices of output provided by domestic and foreign firms

Source: CETM model - Copenhagen Economics

Market size (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-1,2	-0,3	-0,2	-17,2	-0,7	0,0	-0,2	0,2	-1,7	-0,1	0,3
EU15	1,8	1,2	0,7	-10,1	1,5	1,3	1,2	0,9	0,0	0,5	0,5

Note: Market size is measured by the total value of output by both domestic and foreign firms

Source: CETM model - Copenhagen Economics

Cross border trade (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport
Switzerland	-9,6	0,5	-1,1	-34,5	-2,2	1,0	2,1	1,2	2,7
EU15	11,6	1,5	3,7	-3,1	2,0	0,1	1,3	0,7	0,0

Note: Cross border trade is measured by the value of total exports within the EU

Source: CETM model - Copenhagen Economics

Value added (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-1,2	-0,3	-0,1	-16,5	-0,6	0,0	-0,1	0,6	1,9	0,0	0,4
EU15	4,5	0,8	2,2	1,3	2,6	1,5	1,1	1,3	-1,5	0,6	0,8

Note: Value added is measured by the sum of payments to inputs of labour and capital

Source: CETM model - Copenhagen Economics

Employment (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-1,2	-0,3	-0,1	-4,9	-0,6	0,0	-0,1	0,6	1,9	0,0	0,4
EU15	4,5	0,8	2,2	0,1	1,2	0,9	0,3	0,7	-2,1	-0,1	0,1

Note: Employment is measured by labour demand

Source: CETM model - Copenhagen Economics

Scenario 3 – Switzerland adopts best practice, EU liberalises

Summary Results (% change)

	Economy-wide impacts					
	Welfare	Welfare ^a	Value added	Value added ^a	Real wage	Total employment
Switzerland	1,7	4,6	2,9	10,6	1,7	0,8
EU15	0,8	64,2	1,3	151,5	0,7	0,4

Note: (a) Change in billion CHF (2001)

Source: CETM model - Copenhagen Economics

Costs of services (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
	Switzerland	-4,4	-0,5	-3,2	-29,7	-21,4	1,7	-1,4	-0,2	-1,2	0,3	0,6
EU15	-6,7	0,1	-2,0	-14,3	-1,1	0,2	0,6	0,1	0,7	0,3	0,2

Note: Costs of services is measured by the weighted average of the prices of output provided by domestic and foreign firms

Source: CETM model - Copenhagen Economics

Market size (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
	Switzerland	3,7	3,7	1,8	-5,3	16,8	1,0	7,7	3,4	-0,2	1,2	0,4
EU15	1,8	1,2	0,7	-11,8	1,2	1,3	1,1	1,0	0,1	0,5	0,6

Note: Market size is measured by the total value of output by both domestic and foreign firms

Source: CETM model - Copenhagen Economics

Cross border trade (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport
	Switzerland	3,5	3,9	7,9	27,4	95,3	-2,3	10,1	2,8	-1,4
EU15	11,5	1,5	3,6	-10,4	-0,3	0,3	1,2	0,8	0,2

Note: Cross border trade is measured by the value of total exports within the EU

Source: CETM model - Copenhagen Economics

Value added (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
	Switzerland	8,3	4,0	5,6	58,7	41,5	0,7	8,3	4,8	-2,0	1,7	0,4
EU15	4,4	0,8	2,2	-0,6	2,3	1,6	1,0	1,3	-1,5	0,8	0,9

Note: Value added is measured by the sum of payments to inputs of labour and capital

Source: CETM model - Copenhagen Economics

Employment (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
	Switzerland	3,9	1,1	3,7	9,5	28,1	-1,0	6,5	3,0	-3,7	0,0	-1,3
EU15	4,4	0,8	2,2	-0,5	0,9	0,9	0,3	0,7	-2,1	-0,1	0,2

Note: Employment is measured by labour demand

Source: CETM model - Copenhagen Economics

Scenario 4 – Switzerland adopts “minimum EU-compatibility”, EU liberalises

Summary Results (% change)

	Economy-wide impacts					
	Welfare	Welfare ^a	Value added	Value added ^a	Real wage	Total employment
Switzerland	0,8	2,1	1,7	6,0	1,0	0,5
EU15	0,8	64,1	1,3	150,8	0,7	0,4

Note: (a) Change in billion CHF (2001)

Source: CETM model - Copenhagen Economics

Costs of services (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-3,7	-0,5	-2,4	-22,4	-6,3	1,0	0,0	-0,2	0,6	0,1	0,3
EU15	-6,7	0,1	-2,0	-14,0	-1,1	0,1	0,6	0,1	0,6	0,3	0,2

Note: Costs of services is measured by the weighted average of the prices of output provided by domestic and foreign firms

Source: CETM model - Copenhagen Economics

Market size (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	2,0	2,2	1,0	-10,6	5,3	0,6	2,5	1,5	0,6	0,6	0,3
EU15	1,8	1,2	0,7	-11,2	1,4	1,3	1,2	0,9	0,1	0,5	0,5

Note: Market size is measured by the total value of output by both domestic and foreign firms

Source: CETM model - Copenhagen Economics

Cross border trade (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services
Switzerland	0,9	3,2	5,3	0,7	18,4	-0,8	3,5	2,1	0,5	0,1
EU15	11,5	1,5	3,6	-0,1	1,3	0,2	1,4	0,7	0,1	0,1

Note: Cross border trade is measured by the value of total exports within the EU

Source: CETM model - Copenhagen Economics

Value added (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	6,5	2,5	3,8	25,1	10,4	0,5	2,7	2,9	-0,2	1,0	0,6
EU15	9,0	1,5	3,6	0,1	2,5	1,6	1,1	1,3	-1,5	0,8	0,8

Note: Value added is measured by the sum of payments to inputs of labour and capital

Source: CETM model - Copenhagen Economics

Employment (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	4,3	0,5	2,7	4,9	7,1	-0,5	1,6	1,9	-1,2	-0,1	-0,4
EU15	4,4	0,8	2,2	-0,2	1,1	0,9	0,3	0,7	-2,1	-0,1	0,1

Note: Employment is measured by labour demand

Source: CETM model - Copenhagen Economics

Scenario 1 – Liberalisation in three sectors

Barrier reduction is assumed to take place in regulated professions, business services and distributive trade.

Summary Results (% change)

Economy-wide impacts						
	Welfare	Welfare ^a	Value added	Value added ^a	Real wage	Total employment
Switzerland	0,3	0,8	0,5	1,9	0,3	0,3
EU15	0,0	0,3	0,0	0,4	0,0	0,0

Note: (a) Change in billion CHF (2001)

Source: CETM model - Copenhagen Economics

Costs of services (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-4,4	-0,5	-2,2	0,0	0,3	0,4	0,3	0,1	0,2	0,0	0,0
EU15	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Note: Costs of services is measured by the weighted average of the prices of output provided by domestic and foreign firms

Source: CETM model - Copenhagen Economics

Market size (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	2,1	1,2	0,4	0,2	0,4	0,2	0,4	0,5	-0,2	0,1	0,1
EU15	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Note: Market size is measured by the total value of output by both domestic and foreign firms

Source: CETM model - Copenhagen Economics

Cross border trade (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport
Switzerland	13,0	2,0	5,8	0,2	-0,6	-0,8	-0,6	0,1	-0,5
EU15	-0,2	0,0	-0,1	0,0	0,1	0,1	0,1	0,0	0,0

Note: Cross border trade is measured by the value of total exports within the EU

Source: CETM model - Copenhagen Economics

Value added (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	6,5	1,3	2,3	0,2	0,3	0,1	0,3	0,4	-0,5	0,1	-0,1
EU15	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Note: Value added is measured by the sum of payments to inputs of labour and capital

Source: CETM model - Copenhagen Economics

Employment (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	4,1	0,6	2,0	0,0	0,0	-0,2	0,1	0,1	-0,8	-0,2	-0,1
EU15	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Note: Employment is measured by labour demand

Source: CETM model - Copenhagen Economics

Scenario 2 – Liberalisation in three sectors

Barrier reduction is assumed to take place in regulated professions, business services and distributive trade.

Summary Results (% change)

Economy-wide impacts						
	Welfare	Welfare ^a	Value added	Value added ^a	Real wage	Total employment
Switzerland	0,2	0,5	0,1	0,3	0,1	0,0
EU15	0,6	45,6	0,8	92,3	0,3	0,3

Note: (a) Change in billion CHF (2001)

Source: CETM model - Copenhagen Economics

Costs of services (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	0,1	0,1	0,1	0,0	0,1	0,1	0,1	0,1	0,2	0,1	0,1
EU15	-6,9	-0,1	-2,1	0,1	0,4	0,0	0,4	0,1	0,3	0,1	0,2

Note: Costs of services is measured by the weighted average of the prices of output provided by domestic and foreign firms

Source: CETM model - Copenhagen Economics

Market size (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-0,8	0,0	0,2	0,0	0,3	0,3	0,3	0,1	0,2	0,1	0,2
EU15	1,5	0,9	0,4	0,3	0,9	1,1	0,8	0,7	0,3	0,3	0,2

Note: Market size is measured by the total value of output by both domestic and foreign firms

Source: CETM model - Copenhagen Economics

Cross border trade (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport
Switzerland	-9,9	0,2	-1,7	0,0	1,3	0,6	1,3	0,3	0,4
EU15	11,4	1,2	3,4	0,2	0,8	0,4	1,0	0,4	0,4

Note: Cross border trade is measured by the value of total exports within the EU

Source: CETM model - Copenhagen Economics

Value added (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-0,9	0,0	0,2	0,0	0,3	0,2	0,2	0,0	-0,2	0,1	-0,1
EU15	8,6	1,0	2,5	0,3	0,8	1,2	0,7	0,5	-0,4	0,3	0,2

Note: Value added is measured by the sum of payments to inputs of labour and capital

Source: CETM model - Copenhagen Economics

Employment (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-1,0	-0,1	0,0	0,0	0,1	0,1	0,1	-0,2	-0,3	0,0	-0,1
EU15	4,4	0,8	2,0	0,0	0,4	0,9	0,4	0,3	-0,7	0,0	-0,1

Note: Employment is measured by labour demand

Source: CETM model - Copenhagen Economics

Scenario 3 – Liberalisation in three sectors

Barrier reduction is assumed to take place in regulated professions, business services and distributive trade.

Summary Results (% change)

Economy-wide impacts						
	Welfare	Welfare ^a	Value added	Value added ^a	Real wage	Total employment
Switzerland	0,5	1,2	0,8	2,8	0,4	0,4
EU15	0,6	46,4	0,8	92,9	0,3	0,3

Note: (a) Change in billion CHF (2001)

Source: CETM model - Copenhagen Economics

Costs of services (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-4,7	-0,9	-3,0	0,0	0,5	0,6	0,5	0,2	0,4	0,1	0,1
EU15	-6,9	-0,1	-2,1	0,1	0,4	0,0	0,4	0,1	0,3	0,1	0,2

Note: Costs of services is measured by the weighted average of the prices of output provided by domestic and foreign firms

Source: CETM model - Copenhagen Economics

Market size (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	1,6	1,6	0,6	0,3	0,7	0,4	0,7	0,7	0,1	0,2	0,4
EU15	1,5	0,9	0,4	0,3	0,9	1,1	0,8	0,7	0,3	0,3	0,3

Note: Market size is measured by the total value of output by both domestic and foreign firms

Source: CETM model - Copenhagen Economics

Cross border trade (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	3,0	3,5	6,3	0,2	0,5	-0,5	0,5	0,5	0,0	0,0	0,0
EU15	11,2	1,2	3,3	0,2	0,9	0,5	1,1	0,5	0,4	0,4	0,4

Note: Cross border trade is measured by the value of total exports within the EU

Source: CETM model - Copenhagen Economics

Value added (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	6,0	1,8	3,4	0,3	0,6	0,2	0,6	0,6	-0,6	0,2	-0,3
EU15	8,5	0,8	2,5	0,3	0,8	1,2	0,7	0,6	-0,4	0,3	0,2

Note: Value added is measured by the sum of payments to inputs of labour and capital

Source: CETM model - Copenhagen Economics

Employment (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecom-munication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	3,0	0,2	2,9	0,0	0,1	-0,2	0,2	0,1	-1,1	-0,2	-0,2
EU15	4,4	0,8	2,0	0,0	0,4	0,9	0,4	0,3	-0,7	0,0	-0,1

Note: Employment is measured by labour demand

Source: CETM model - Copenhagen Economics

Scenario 4 – Liberalisation in three sectors

Barrier reduction is assumed to take place in regulated professions, business services and distributive trade.

Summary Results (% change)

Economy-wide impacts						
	Welfare	Welfare ^a	Value added	Value added ^a	Real wage	Total employment
Switzerland	0,4	1,0	0,6	2,3	0,4	0,3
EU15	0,6	46,2	0,8	92,8	0,3	0,3

Note: (a) Change in billion CHF (2001)

Source: CETM model - Copenhagen Economics

Costs of services (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	-3,9	-0,7	-2,2	0,0	0,4	0,5	0,4	0,2	0,3	0,1	0,1
EU15	-6,9	-0,1	-2,1	0,1	0,4	0,0	0,4	0,1	0,3	0,1	0,2

Note: Costs of services is measured by the weighted average of the prices of output provided by domestic and foreign firms

Source: CETM model - Copenhagen Economics

Market size (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	1,1	1,3	0,5	0,2	0,6	0,4	0,6	0,5	0,1	0,2	0,3
EU15	1,5	0,8	0,4	0,3	0,9	1,1	0,8	0,7	0,3	0,3	0,3

Note: Market size is measured by the total value of output by both domestic and foreign firms

Source: CETM model - Copenhagen Economics

Cross border trade (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	0,5	2,9	4,3	0,1	0,7	-0,3	0,7	0,5	0,0	0,0	0,0
EU15	11,2	1,2	3,3	0,2	0,9	0,5	1,1	0,5	0,4	0,4	0,4

Note: Cross border trade is measured by the value of total exports within the EU

Source: CETM model - Copenhagen Economics

Value added (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	5,3	1,4	2,7	0,3	0,5	0,2	0,5	0,4	-0,6	0,2	-0,2
EU15	8,5	0,8	2,5	0,3	0,8	1,2	0,7	0,5	-0,4	0,3	0,2

Note: Value added is measured by the sum of payments to inputs of labour and capital

Source: CETM model - Copenhagen Economics

Employment (% change)

	Regulated professions	Business services	Distributive trade	Electricity	Telecommunication	Banking services	Postal services	Rail transport	Air transport	Other services	Rest of the economy
Switzerland	3,9	0,1	2,2	0,0	0,1	-0,2	0,1	0,0	-1,0	-0,2	-0,2
EU15	4,4	0,8	2,0	0,0	0,4	0,9	0,4	0,3	-0,7	0,0	-0,1

Note: Employment is measured by labour demand

Source: CETM model - Copenhagen Economics

Appendix B: Technical documentation of the CETM model

This appendix describes the Copenhagen Economics Trade Model (CETM) as it has been adapted for the analysis of potential services liberalisation in Switzerland and the EU. All details of the model are not included in this description; rather, this appendix aims at giving the reader an understanding of the main features of the model and the intuition behind its assumptions.

The study focuses on the impacts of two types of barriers to trade in services: rent-creating and cost-creating barriers. Rent-creating barriers inflate prices above costs and generate rents to incumbent firms. The model represents 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. It should be noted that the mark-up of prices over costs are modelled as true rents, i.e. the rents are not used for investments or any other productive activities.

Cost-creating barriers increase the use of real resources. The model represents these barriers through an exogenous productivity factor. That is, removal of this type of barrier 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). For most sectors, the removal of the barrier is assumed to lead to an increase in labour productivity, but this depends on the specific characteristics of the barriers in each sector. For example, in the electricity sector, the analysis shows that it first and foremost will be an increase in capital productivity if barriers are removed. To analyse the economy-wide impacts of a potential services agreement between Switzerland and the EU, changes in both types of barriers are considered for each scenario.

The modelling approach begins by defining 11 aggregate and mutually exclusive sectors of production. That is, all production activities belong to one and only one of the sectors listed in Table 1.

Table 17: Sectors in the CETM

Name of aggregate sector	Activities
1. Regulated professions	Legal services, accounting, etc.
2. Business services	IT-services, labour recruitment, cleaning activities, etc.
3. Distributive trade	Wholesale trade, retail trade, hotels and restaurants
4. Electricity	Generation, transmission, distribution
5. Telecommunication	Telecommunication
6. Banking services	Banking services
7. Postal services	Post and courier activities
8. Rail transport	Passenger and freight traffic
9. Air transport	Air transport
10. Other services	Construction services, recreational services, education, healthcare, etc.
11. Rest of the economy	All goods producing activities

Source: CETM model – Copenhagen Economics

Business-related services sectors (1–9) share several characteristics which are important with respect to the modelling of these sectors. Firstly, many business-related services typically require an exchange of knowledge and are customised to some extent. This customisation implies that the service provider solves particular problems of the recipient, and that one provider's service is an imperfect substitute for the services of other firms.

Secondly, many business-related services involve scale economies in production. They are often knowledge intensive, and once the skills have been acquired at a fixed cost, the services can be produced at low marginal costs. Less knowledge-intensive business services are often more standardised and are sometimes labelled routine business services. However, the standardised production process still involves scale economies, especially in the distribution of services. In summary, most business-related services involve scale economies and product differentiation.

Furthermore, customisation often requires the firms to be locally present in order to provide the service, as it might be difficult to provide certain services at a distance. Some services, such as cleaning or equipment maintenance, are virtually impossible to provide via cross-border supply. This implies a potential for multinational service providers, i.e., firms with both domestic and foreign operations³⁶. The modelling of business-related services sectors should therefore account for foreign supply both via commercial presence and via cross-border supply. This approach is also consistent with observed behaviour.

All sectors listed in Table 1 are present in each of the regions, which are shown in Table 2. The focus on Switzerland and the country's potential services agreement with the EU implies that the current version of the model represents Switzerland and the EU-15 countries³⁷. The rest of the world is aggregated into a single region which is labelled "Rest of the World." This version of the model furthermore embodies the assumption that all EU-15 countries and Switzerland trade on the world market at constant prices³⁸.

³⁶ See Markusen (1995) for a discussion of the circumstances that lead firms to supply foreign markets via foreign production.

³⁷ The ten new member states represent a very small share of Swiss imports and exports and are therefore not modelled separately, but included in the "Rest of the World" group.

³⁸ It would probably be more realistic to assume endogenous world market prices and thus allow EU policies to have both direct and indirect impacts on the world market with further with spill-over effects from the world market to the EU economy. A full model of the world market would require realistic assumptions regarding the impact of the ongoing WTO negotiations and require data regarding service supply and production and the associated barriers. On balance, we believe our assumption of constant world market prices provides a simple and transparent representation of a potential services agreement between Switzerland and the EU.

Table 18: Regions in the CETM

Name of region	
1. Switzerland	9. Ireland
2. Austria	10. Italy
3. Belgium ³⁹	11. Netherlands
4. Denmark	12. Portugal
5. Finland	13. Spain
6. France	14. Sweden
7. Germany	15. United Kingdoms
8. Greece	16. Rest of the world

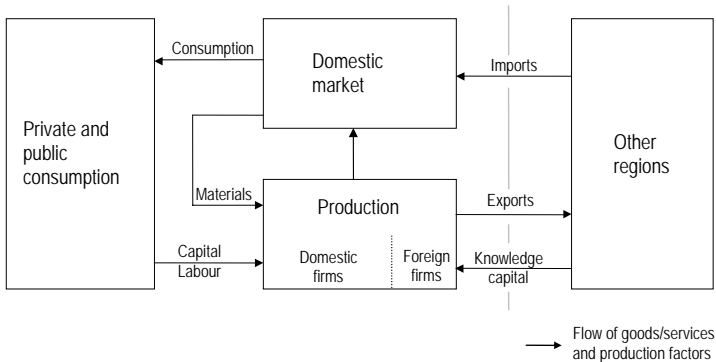
Source: CETM model – Copenhagen Economics

With these preliminaries, the following section lays out the theoretical foundations of the version of the CETM that is used for the analysis of a potential services agreement between Switzerland and the EU. The empirical implementation of the model is then described, including a documentation of the data sources that are used.

The theoretical foundations of the CETM

The current version of the CETM is an extension of the theoretical model by Markusen, Rutherford and Tarr (2000). The CETM represents state-of-the-art developments in modelling, especially of provision and trade of services. Figure 1 gives an overview of the markets, the agents and the flows of goods, services and factors of production in the model.

Figure 8: Overview of the Copenhagen Economics Trade Model (CETM)



Factors of production

There will be three primary factors available in each region: physical capital, labour and a factor called “knowledge capital”. Both physical capital and labour are perfectly mobile across all sectors within a region⁴⁰, but immobile across regions. The supply of physical capital is fixed while the supply of labour is endogenously determined within the model. The production factor called knowledge capital is assumed to be used only by foreign firms. The factor represents for example specialized technical expertise, advanced technology or management expertise. Knowledge capital is internationally mobile and the use of this production factor will

³⁹ Luxemburg is included in the Belgium figures.

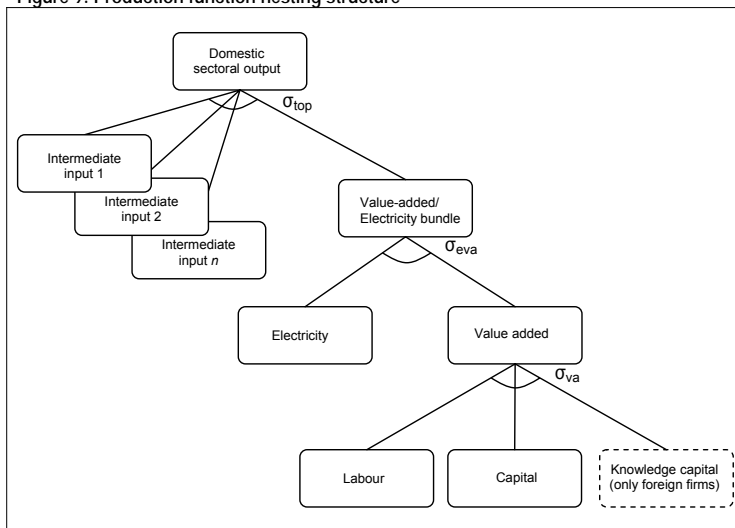
⁴⁰ Except in the electricity sector, where capital is assumed to be sector specific.

thus be a key difference between domestic and foreign firms. All markets for primary factors are perfectly competitive.

Production of services and goods

In the production of all services and goods, non-electricity intermediate inputs are employed in a Cobb-Douglas function together with an aggregate of capital, labour and electricity. At the second level, a constant elasticity of substitution (CES) function describes the substitution possibilities between electricity and the value-added aggregate. Finally, at the third level, capital and labour factor inputs trade off with a constant elasticity of substitution. A schematic overview of the nesting structure is shown in Figure 2.

Figure 9: Production function nesting structure



Source: CETM – Copenhagen Economics

This way of nesting the production structure with respect to electricity or other energy aggregates is common among studies where production and consumption of energy is an important part of the analysis, see for example Böhringer and Loschel (2002), Böhringer and Rutherford (2002) and Babiker et al (2001).

There are two types of sectors. Firstly, there are perfectly competitive sectors in which output is produced under constant returns to scale and where price equals marginal costs. These include the production of what is labelled as “other services”, and all goods production (sectors 10 and 11). Firms in these perfectly competitive sectors maximise profits taking market prices as given. Production is constant returns to scale and characterized by the nested CES production function described in Figure 2. The solution of the profit-maximisation problem yields the standard first-order conditions determining factor demands such that the value of the marginal product of a given input equals its price.

Secondly, there are imperfectly competitive sectors in which output is produced under increasing returns to scale and where price equals average costs. The imperfectly competitive sectors include all business-related services sectors (sectors 1–9). Unlike the perfectly competitive markets, the markets for business-related services are assumed to take the form of

large-group monopolistic competition. Each firm produces its own variety, which is a close, but imperfect substitute for similar services. An individual firm has only limited ability to influence its own output price, and it takes both total output and the composite price of their group as given. Hence, business-related services are produced by imperfectly competitive domestic and foreign firms.

Each firm produces its own variety, which is a close, but imperfect substitute for similar services. ZD denotes services provided by domestic firms, and ZM denotes services provided by foreign firms. ZD and ZM are CES aggregates of zd_i and zm_j respectively, which represent the output per variety produced by the individual domestic and foreign firms:

$$ZD = \left[\sum_i^{n_d} zd_i^\delta \right]^{1/\delta}$$

$$ZM = \left[\sum_j^{n_m} zm_j^\epsilon \right]^{1/\epsilon}$$

where n_d and n_m are the number of domestic and foreign varieties. The constant elasticities of substitution are represented by $\sigma_d=1/(1-\delta)$ and $\sigma_m=1/(1-\epsilon)$.

Total domestic production in the business-related services sectors, D_r , is then a CES aggregate of services provided by domestic firms, ZD_r , and services provided by foreign firms, ZM_r ,

$$D_r = (ZD_r^\gamma + ZM_r^\gamma)^{1/\gamma}$$

The elasticity of substitution between output produced by domestic firms and output produced by foreign firms is $\sigma_r=1/(1-\gamma)$.

All firms of the same type are assumed to be symmetric. That is, all domestic providers within a given sector in a given region have identical cost structures. This assumption applies similarly to foreign providers. The cost functions for domestic providers, CD , and for foreign providers, CM , is given by:

$$CD(\tau^d, r, w, p_a, zd) = vd(\tau^d, r, w, p_a) * zd + fd(\tau^d, r, w, p_a)$$

$$CM(\tau^m, r, w, p_a, p_v, zm) = vm(\tau^m, r, w, p_a, p_v) * zm + fm(\tau^m, r, w, p_a, p_v)$$

where

vd is a cost function representing the unit variable cost of domestic providers,

vm is a cost function representing the unit variable cost of foreign providers,

zd is the output per domestic firm,

zm is the output per foreign firm,

fd is a cost function representing the fixed cost of domestic providers,

fm is a cost function representing the fixed cost of foreign providers,

τ^d represents barriers to domestic providers,

τ^m represents barriers to foreign providers,

r is the costs of capital,

w is the costs of labour,

p_a is the costs of different intermediate inputs (including electricity), and

p_v is the costs of knowledge capital.

As can be seen from above, domestic and foreign services providers use the same types of inputs, with one exception: only foreign firms use the factor representing internationally mobile

knowledge capital. The nesting of different inputs follows the structure laid out in Figure 2 both in the variable cost function and the fixed cost function. Barriers to trade in the business-related services sectors are represented through their impacts on τ^d and τ^m . If the barriers affect productivity, we assume that productivity changes. If the barriers create rents, we assume that the barriers take the form of an exogenous mark-up over total costs.

The assumptions above together with the assumption of profit maximisation yield the standard optimisation condition for firms: marginal revenue equals marginal cost, or

$$\begin{aligned} p_{zd}\delta &= vd(\tau^d, r, w, p_a) \\ p_{zm}\varepsilon &= vm(\tau^m, r, w, p_a, p_v) \end{aligned}$$

where p_{zd} and p_{zm} are the (symmetric) prices received by all providers within their group. Thus, the ratio of price to marginal costs is constant and equal to $(1-1/\sigma_d)$ for domestic providers and $(1-1/\sigma_m)$ for foreign providers, where σ_d and σ_m are the elasticities of substitution between individual service varieties. The differences between output prices and marginal costs provide revenue to cover the fixed costs. The assumption of free entry and exit yields the standard equilibrium condition of zero profits:

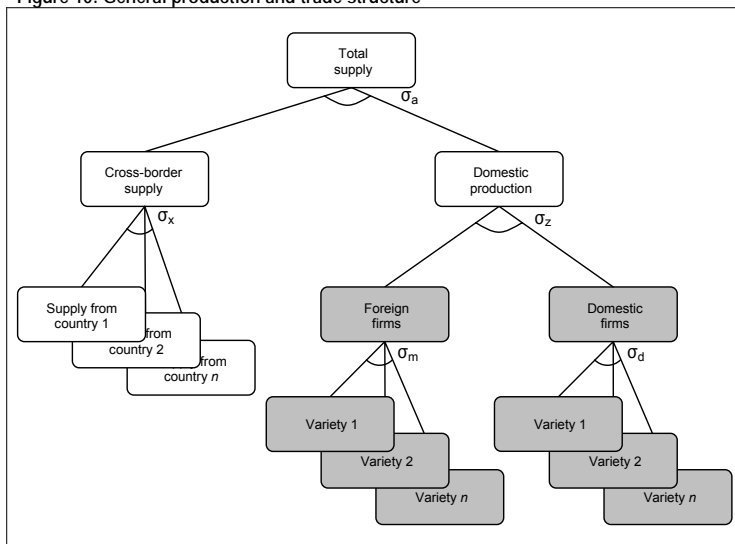
$$\begin{aligned} p_{zd} &= vd(\tau^d, r, w, p_a) + fd(\tau^d, r, w, p_a) / zd \\ p_{zm} &= vm(\tau^m, r, w, p_a, p_v) + fm(\tau^m, r, w, p_a, p_v) / zm \end{aligned}$$

In other words, free entry and exit implies that prices equal average cost in equilibrium and hence the absence of true profits.

Aggregation of total supply

Figure 3 shows the general structure of the aggregation of domestic supply and trade. In all individual sectors, both in the business-related services sectors and in the perfectly competitive sectors, domestic supply consists of an aggregation of domestically produced output and services or goods produced abroad and provided via cross-border supply. The total demand for this aggregate supply arises both from final demand and from intermediate input demands by firms. As Figure 3 shows, the domestically produced goods and the goods provided via cross-border supply are aggregated into total supply through a CES function, with the constant elasticity of substitution σ_a . Thus, the model allows for imperfect substitution between domestically produced services or goods and services or goods produced abroad.

Figure 10: General production and trade structure



Note: The grey squares are only relevant for business-related services sectors (sectors 1–9).
Source: CETM – Copenhagen Economics

The sum of goods provided via cross-border supply, is in turn a CES aggregate of goods imported from different countries with the constant elasticity of substitution σ_x . This means that imported goods or services from different countries are not perfect substitutes for each other.

In the business-related services sectors (sectors 1–9), total domestic production consists of a CES aggregate of services provided by domestic firms and services provided by foreign firms, as indicated by the grey squares in Figure 3. The elasticity of substitution between output produced by domestic firms and output produced by foreign firms is σ_z . The total supply of services provided by domestic firms and services provided by foreign firms are in turn CES aggregates of the output per variety produced by the individual domestic and foreign firms respectively. The constant elasticities of substitution are represented by σ_d and σ_m . This CES aggregation captures the fact that each firm in the business-related services sectors produces its own variety, which is a close, but imperfect substitute for similar services.

Cross-border supply

Domestic firms by definition only produce services or goods within the borders but may provide the service or good abroad via cross-border supply. Foreign firms, on the other hand, are assumed to provide services locally only. That is, foreign firms establish commercial presence if they want to provide services in a given country.

The representative agent

A representative agent represents final demand. The agent's preferences are defined over both consumption of goods and services, A , as well as over leisure time, T . The consumer decides upon consumption of different goods and leisure depending on associated prices⁴¹. The consumption decision is characterised by a CES-utility function:

⁴¹ However, 80 % of the private consumption of electricity is assumed to be exogenously determined.

$$U = (A^\lambda + T^\lambda)^{1/\lambda}$$

where the elasticity of substitution, $\sigma_u = 1/(1-\lambda)$, is calibrated to correspond to an uncompensated labour supply elasticity, ϵ , which is determined exogenously. Aggregate consumption, A , is a Cobb-Douglas aggregate of consumption of different goods and services.

The representative agent maximises his utility subject to his income-constraint, which consists of revenues from sales of his endowment of primary factors, the balance of payments, B , rents from barriers to services, R , expenses on a Cobb-Douglas aggregate of investment demand, I , and public demand, G :

$$INC = r\bar{K} + wL + e\bar{B} + R - p_i \bar{I} - p_g \bar{G}$$

A bar over a factor denotes an exogenous endowment of that factor, and a bar over a good or service denotes an exogenous demand for that good or service. e denotes the real exchange rate, p_i is the price of a unit of the investment good and p_g is the price of a unit of the public good.

The model is closed vis-à-vis the world market by assuming that the real exchange rate clears the market for foreign exchange. The market consists of proceeds from exports of EU production to the world markets and demand for imports to the EU from the world markets, including trade with the factor V . The balance of payments is exogenous in each country.

The empirical implementation of the CETM

The GTAP database, version 6, provides the majority of the data for the empirical implementation of the model (see Dimaranan and McDougall, 2005, for a detailed description of the database). The database provides internally consistent data on production, consumption and international trade by country and sector.

The database uses geography (countries) as its base for accounting and does not provide data on ownership. That is, no distinction is made between production under domestic and foreign control. The database has therefore been extended with data on ownership based on OECD (2001). The data shows multinationals' share of total turnover by sector of production and is based on data on inward investments in firms under majority foreign control. However, the OECD data does not include figures for Switzerland. Therefore, estimates from Seco, based on national employment figures collected from the Swiss National Bank and on information from the OECD study, have been used for Switzerland. The share data has been used to disaggregate both revenue and cost data uniformly. For example, if multinationals' share of total turnover is 15% in a given sector in a given country, then 15% of revenues and costs are allocated to multinationals in the database.

In some sectors, the aggregation of sectors in the GTAP database does not fit the purpose of this study. Therefore, additional sources have been used to adjust the data. Data on regulated (professional) business services is aggregated together with other business services in the GTAP database. Examples of regulated business services include legal, accounting, and auditing services. The database has therefore been extended with data on the share of value added from regulated business services based on Eurostat (2000). For Switzerland, the share of value added from regulated business services is assumed to be equal to the share in Germany. The share data has been used to disaggregate both revenue and cost data proportionally.

Furthermore, data on rail transport is aggregated together with other transport such as urban transport and land transport in the GTAP database. To separate out rail transport from other

transport, data from NERA (2003) on the size of the rail transport sector in the EU-15 countries and in Switzerland is used. The communication sector in GTAP includes both telecommunication and postal services. The communication sector has therefore been disaggregated, for the EU-15 countries by using data from OECD (2003) and for Switzerland, by using data from national sources. Again, both revenue and cost data are disaggregated proportionally.

The additional data sources are all almost complete. Unweighted averages of the data available have been used to complete the data sets. Reliable data on payments to knowledge capital (for example specialized technical expertise, advanced technology and management expertise) in multinationals is not readily available. The database therefore uses the assumption that 25% of the total value added accruing to capital is payments to knowledge capital.

The different elasticities discussed in the previous section are assigned values shown in Table 3 on the following page. Sensitivity analysis is used to examine the how the choice of elasticities affects the results.

Finally, the model is implemented in GAMS/MPSGE and solved with the PATH solver (see Rutherford, 1999, and Ferris and Munson, 2000).

Table 19: Elasticities

Elasticity	Parameter	Value
Uncompensated labour supply elasticity	ε	0.2
Business-related service sectors:		
Elasticity of substitution between individual service varieties	σ_d, σ_m	5
Elasticity of substitution between domestic and foreign services	σ_z	3
Elasticity of substitution between locally produced and imported services	σ_a	3 ⁴²
Elasticity of substitution between imported services	σ_x	3
Elasticity of substitution between capital and labour	σ_{va}	1 ⁴³
Elasticity of substitution between electricity and capital/labour	σ_{eva}	0.2
Elasticity of substitution between electricity/capital/labour and other intermediate inputs	σ_{top}	1
Sectors with perfect competition:		
Elasticity of substitution between locally produced and imported services or goods	σ_a	3
Elasticity of substitution between imported services or goods	σ_x	5
Elasticity of substitution between capital and labour	σ_{va}	1
Elasticity of substitution between electricity and capital/labour	σ_{eva}	0.2
Elasticity of substitution between electricity/capital/labour and other intermediate inputs	σ_{top}	1

Source: CETM – Copenhagen Economics

⁴² Except in the regulated professions, business services and distributive trade sectors, where the elasticity between locally produced and imported services is set to 1.

⁴³ Except in the electricity sector, where the elasticity between capital and labour is 0.1, due to the long-lived type of capital used in this sector.

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Appendix C: Detailed results from the econometric analysis

Table C.1 below presents summary statistics of the regressions made for electricity and telecommunications.

Table C.1: Summary Statistics

	EL PRICE		TELE PROD		TELE PRICE	
Dependent Variable	PCAPUTI	PP1IND	PRODPTELE	PTELE		
Control Variable 1	NET EXPORTS 0.0014191	COSTNUC 0.00450848	SATCL 0.0959354	TELINV 0.0294284		
Control Variable 2	RAIN -0.00252571	NET EXPORTS -0.00675554		NEWACL -0.776533		
Constant	CNST -0.564951	CNST -2.73092	CNST 11.8329	CNST 5.95876		
RIS	RIS -0.230894	RIS 0.616541	RIS -0.382941	RIS 0.206284		
RIS P-Values*	[0.489], [0.482], [0.455]	[0.136], [0.134], [0.114]	[0.559], [0.542], [0.300]	[0.446], [0.446], [0.390]		
R ²	0.169064	0.312334	0.1768	0.321065		
Obs.	15	16	16	14		
Normality	[0.305]	[0.747]	[0.777]	[0.005]		
Heteroscedasticity	[0.780]	[0.999]	[0.862]	[0.942]		
RESET	[0.371]	[0.944]	[0.694]	[0.853]		
F _{esdu} *	[0.491], [0.596], [0.764]	[0.273], [0.284], [0.202]	[0.282], [0.280], [0.098]	[0.256], [0.255], [0.341]		

All numbers in brackets are P-values.

*: We present three P-values: Asymptotic, pair bootstrap and wild bootstrap.

Table C.2: Variable description

Variable name	Explanation	More information	Unit	Source
PCAPUTI	Capacity utilization	Generation of electricity divided by capacity in MWH	Per cent	Eurostat
RAIN	Rainfall in Norway	Only positive for countries belonging to the same international pool (DEN, FIN and SWE)		
PP1IND	Electricity prices for industry incl taxes	For industry (Ie) with annual consumption: 2 000 MWh; maximum demand: 500 kW; annual load: 4 000 hours	PPS Purchasing Power Parities, All taxes included, KWH Kilowatthours	Eurostat, theme 8, Energy, Energy statistics
COSTNUC	Cost of nuclear capacity	Share of nuclear capacity out of total capacity	Per cent	Eurostat, theme 8, Energy, Energy statistics
NET EXPORTS	Total exports of electricity- Total imports of electricity	(Moutexp-Moutimp)/1000		Eurostat
PRODPTELE	Labour productivity	Labour productivity total telecom divided by price index	Million US Dollars per employee	OECD
SATCL	Standard analogue telecommunication access lines		Number of	OECD
PPTELE	Composite basket of telecommunication services		PPP	OECD
TELINV	Public telecommunication investments		Million US Dollars	OECD
NEWACL	New entrants market share of access lines		Per cent	OECD

Appendix D: Tax equivalents used in the CETM

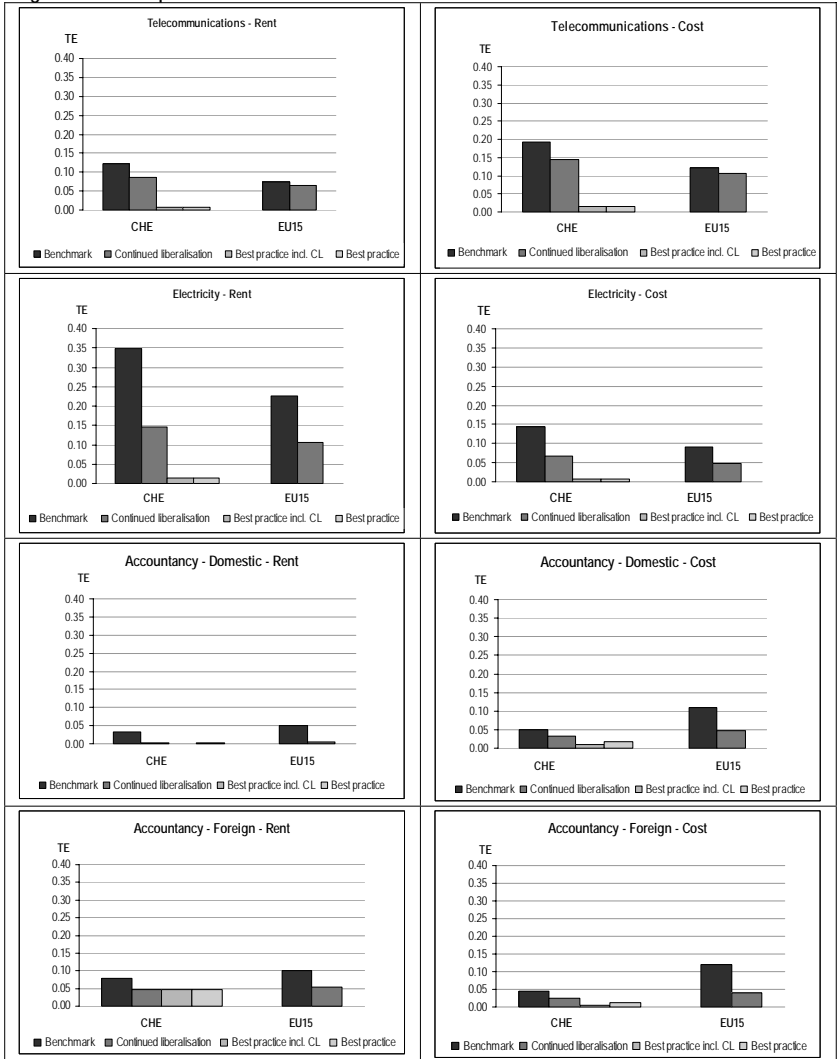
Table D.1 and Figure D.1 summarise the tax equivalents. The EU-figures are simple averages. Table D.2 shows the different values of tax equivalents in benchmark in Switzerland used in the systematic sensitivity analysis.

Table D.1: Tax equivalents across scenarios

Tariff equivalents	Telecom		Electricity		Accountancy		IT services		Distribution				
	Rent	Cost	Rent	Cost	Rent	Cost	Rent	Cost	Rent	Cost	Rent	Cost	
CHE Benchmark Continued liberalisation Best practice incl. CL Best practice	0.12	0.19	0.35	0.14	0.03	0.05	0.08	0.05	0.00	0.02	0.01	0.02	0.01
	0.09	0.14	0.14	0.07	0.00	0.03	0.05	0.02	0.00	0.01	0.00	0.01	0.01
	0.01	0.01	0.01	0.01	0.00	0.01	0.05	0.01	0.00	0.00	0.00	0.01	0.01
	0.01	0.01	0.01	0.01	0.00	0.02	0.05	0.01	0.00	0.02	0.01	0.02	0.00
EU15 Benchmark Continued liberalisation	0.07	0.12	0.23	0.09	0.05	0.11	0.10	0.12	0.00	0.01	0.01	0.01	0.03
	0.06	0.11	0.11	0.05	0.00	0.05	0.05	0.04	0.00	0.01	0.00	0.01	0.01

Tariff equivalents	Air transport		Rail transport		Postal services		Banking	
	Rent	Cost	Rent	Cost	Rent	Cost	Rent	Cost
CHE Benchmark Continued liberalisation Best practice incl. CL Best practice	0.21			0.06	0.18	0.27		0.06
	0.19			0.06	0.16	0.24		0.04
	0.18			0.03	0.03	0.06		0.02
	0.18			0.03	0.03	0.06		0.05
EU15 Benchmark Continued liberalisation	0.22			0.07	0.14	0.21		0.05
	0.21			0.05	0.12	0.19		0.04

Figure D.1: Tax equivalents across scenarios



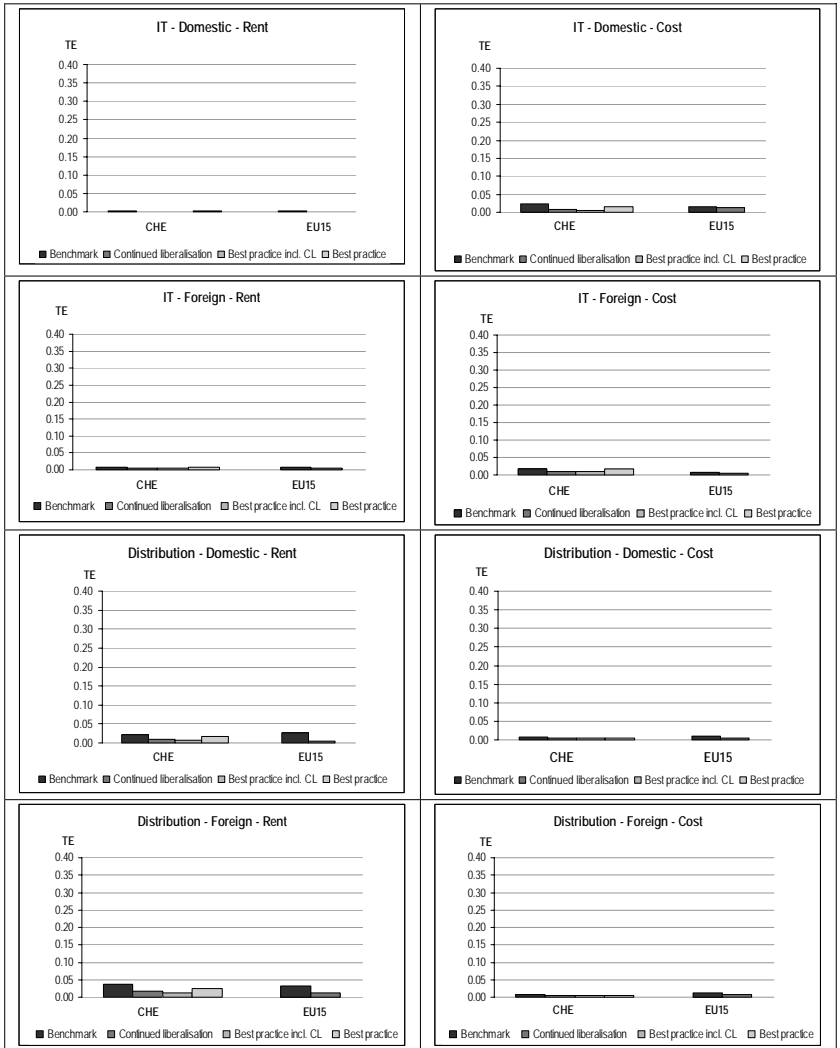


Table D.2: Distributions and bounds used in the systematic sensitivity analysis of policy shocks

	Type	Analysed range			Distribution
		Lower bound ⁴⁴	Central estimate	Upper bound	
Regulated professions					
Domestic	Price	2.7	3.2	3.7	Normal
	Productivity	4.1	5.0	5.8	Normal
Foreign	Price	6.1	7.9	9.8	Normal
	Productivity	3.7	4.5	5.4	Normal
Business services					
Domestic	Price	0	0.2	1.4	Normal
	Productivity	1.0	2.3	3.6	Normal
Foreign	Price	0	0.8	1.8	Normal
	Productivity	0.3	1.8	3.3	Normal
Distributive trade					
Domestic	Price	3.0	3.3	3.6	Normal
	Productivity	0.6	0.7	0.8	Normal
Foreign	Price	3.4	3.8	4.3	Normal
	Productivity	0.8	0.9	1.0	Normal
Electricity					
	Price	17.5	34.9	51.1	Uniform
	Productivity	7.3	14.3	27.6	Uniform
Telecommunication					
	Price	1.3	12.1	18.9	Uniform
	Productivity	7.5	19.1	31.8	Uniform

Note: The table shows the different values of tax equivalents in benchmark in Switzerland used in the systematic sensitivity analysis. In the electricity and telecommunication sectors, there are no specific foreign and domestic barriers.

Source: CETM – Copenhagen Economics.

⁴⁴ For the normal distributions, the upper and lower bounds represent the 95 % confidence intervals.

Appendix E: EU directives used in scenario design

The following legislative sources were used in the scenario design in order to define standards for "continued liberalisation" and "minimum EU-compatibility":

- Directive 2002/21/EC of the European Parliament and of the Council
- Regulation (EC) No 2887/2000 of the European Parliament and of the Council
- Communication from the Commission COM(2004)140 final
- Directive 91/440/EC on the development of the Community's railways
- Directive 97/67/EC of the European Parliament and of the Council and supplements (2000/C 337 E/36)
- Directive 2003/54/EC of the European Parliament and of the Council
- Services of general interest in Europe [Official Journal C 281 of 26.09.1996]
- Communication from the Commission COM(2004)140 final
- Working Paper, Proposal for a Directive amending Directive 91/440/EEC
- Council Directive 91/440/EEC
- Commission White Paper 2001: "European Transport Policy for 2010"
- COM(2002)632; Ctcon (2001)
- EU com 1st/2nd/3rd benchmarking reports
- Council Regulation (EEC) No. 2407/92, Council Regulation (EEC) No. 2408/92
- Council Directive 96/97/EC

Liberalizing Services in Switzerland and with the European Union

**The economic effects on Switzerland using a multi-region
trade model**

On behalf of seco

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Abstract

In Switzerland and in the European Union, the current regulation in services provision imposes restrictions of doing business, which creates barriers to entry and reduces competition leading to more expensive services. Applying SwissSER, a multisectoral, multiregional general equilibrium model including the structure necessary to support the analysis of services liberalization, we evaluate the relative economic impacts on the Swiss economy of liberalizing services in Switzerland and/or in the European Union as compared with the status quo.

The simulation of the bilateral services liberalization results in an economic gain for Switzerland estimated at 2.2% of the value of Swiss consumption. More than half of these gains come from the contribution of efficiency gains associated with an increased number of services varieties. This highlights the key role of the modelling in determining the extent of the welfare gains. In addition, as the application of such models to services liberalization is a relatively new undertaking, results should provide an appraisal of the economic impacts following a successful liberalization rather than being of absolutely accuracy.

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Executive Summary

Services liberalization is determinant for Swiss economic growth as many services, such as financial, telecommunications and transport, are vital intermediate inputs for other sectors of the economy. In Switzerland and in the European Union, the current regulation in services provision imposes restrictions of doing business, which creates barriers to entry and reduces competition leading to more expensive services. In our analysis, we evaluate the relative economic impacts on the Swiss economy of liberalizing services in Switzerland and/or in the European Union as compared with the status quo.

The economic impacts on Switzerland in the case of bilateral services liberalization are largely positive. When firms in Switzerland and in the European Union face new entrants due to a more liberal regulation within their sector, competition increases and lowers the cost of doing business. Efficiency gains derive both from better resource reallocation and from an increased number of services varieties. As a consequence of the reallocation process, movements in workers and capital between industries means positive adjustment costs for the Swiss economy.

The extent of services liberalization positively affects economic benefits of households. When Switzerland liberalizes as in the most liberalized country of the EU, economic benefits are much larger than when Switzerland adjusts its regulation to be compatible with the EU. On the other hand, an accrued liberalization implies larger adjustment costs than a moderate liberalization.

In the case of a unilateral liberalisation in services, the economic effects are negative for the countries that do not liberalize. The non-liberalizing countries suffer from increased competition in the other countries and loose market shares. Relative competitiveness thus clearly matters, and a winning strategy would be to move first at least.

Our analysis relies on the SwissSER model. It is a comparative static, multisectoral, multiregional general equilibrium model. It includes the standard inter-industry relationships within a region and between regions as well as the structure necessary to support the analysis of services liberalization. In particular, SwissSER recognizes the commercial presence of foreign firms in host countries as a mode of supply in services trade. In addition, services are differentiated at the firm level and are produced as unique varieties allowing firms – which face economies of scale through the existence of fixed costs – to be monopolists within their chosen market niche. When more varieties of services are available, consumers are better off as they can obtain varieties that more closely fit their demands and needs.

The application of such models to services liberalization is a relatively new undertaking, which suggests treating quantitative results with caution. They should provide an appraisal of the economic impacts following a successful liberalization in services rather than being of absolute accuracy.

The simulation of the bilateral services liberalization results in an economic gain for Switzerland estimated at 5.3 billion Swiss francs. More than half of these gains come from the contribution of efficiency gains associated with an increased number of services varieties. Out of the five liberalized sectors – electricity, distributive trade, telecommunications, regulated professions and business services – the electricity and telecommunication sectors produce about three-quarter of the economic gains. When Switzerland adjusts its regulation to be compatible with the EU, economic benefits decrease to about 3.2 billion Swiss francs as the extent of liberalization is less ambitious.

When Switzerland stays behind the EU in the services liberalization process, it incurs an economic loss of about 0.8 billion Swiss francs. It shows the importance for Switzerland to liberalize its services sector regardless of the liberalization policy adopted by the EU. In the case of the EU does not liberalize the liberalization in Switzerland leads to economic gains of approximately 6.7 billion Swiss francs. These impacts are significant as they assume that Switzerland adopts the most liberalized regulation in force in the EU and should consequently be interpreted with caution.

Das Wichtigste in Kürze

Die Liberalisierung von Dienstleistungen hat einen wesentlichen Einfluss auf das Wirtschaftswachstum der Schweiz. Dies hängt damit zusammen, dass viele Dienstleistungen (z.B. Finanz-, Telekommunikations- und Transportdienstleistungen) als bedeutende Vorleistungen die Wertschöpfung anderer Wirtschaftssektoren beeinflussen. Die bestehenden Dienstleistungsregulierungen in der Schweiz und in der Europäischen Union erzeugen Eintrittsbarrieren und beschränken so den Wettbewerb. Geringer Wettbewerb führt tendenziell zu hohen Preisen bei den betroffenen Dienstleistungen. In unserer Studie evaluieren wir die wirtschaftlichen Auswirkungen verschiedener Szenarien zur Liberalisierung von Dienstleistungen in der Schweiz und/oder in der EU. Dabei geht es in erster Linie um die Auswirkungen dieser Szenarien auf die Schweiz im Vergleich zum Status quo.

Die wirtschaftlichen Auswirkungen für die Schweiz sind im Fall bilateraler Liberalisierung deutlich positiv. Es wirkt sich kostensenkend aus, wenn Dienstleistungsunternehmen in der Schweiz und in der EU aufgrund der Liberalisierung mit neuen Marktteilnehmern in Wettbewerb treten müssen. Effizienzgewinne entstehen sowohl durch verbesserten Ressourceneinsatz als auch durch den Nutzen eines vielfältigeren Dienstleistungsangebots. Allerdings bringt die Veränderung des Ressourceneinsatzes auch Anpassungskosten für die Schweiz mit sich.

Eine intensivere Liberalisierung der Dienstleistungen erhöht den wirtschaftlichen Nutzen. Die Modellrechnungen ergaben für die Schweiz höhere Effizienzgewinne, wenn sie ihren Liberalisierungsgrad dem am weitesten liberalisierten EU-Land angleicht, als im Fall einer Regulierung, die lediglich die Mindestvoraussetzungen der EU-Vereinbarkeit erfüllt. Andererseits bedeutet verstärkte Liberalisierung auch, dass höhere Anpassungskosten zu tragen sind.

Bei einseitiger Liberalisierung ergeben sich negative wirtschaftliche Auswirkungen auf jene Länder, die nicht liberalisieren. Länder, die die Dienstleistungen nicht weiter liberalisieren, verlieren aufgrund des zunehmenden Wettbewerbs und der eigenen hohen Kosten Anteile an den bereits liberalisierten Märkten. Die relative Wettbewerbsposition ist also von entscheidender Bedeutung, und ein Vorsprung bei der Liberalisierung bringt Vorteile.

Die Analyse basiert auf Simulationen mit dem SwissSER-Modell. Dabei handelt es sich um ein komparativ-statisches, multisektorales und multiregionales allgemeines Gleichgewichtsmodell. Es bildet die Austauschbeziehungen zwischen den Sektoren der Volkswirtschaft ab, und zwar sowohl innerhalb eines Landes als auch zwischen verschiedenen Ländern. Es besitzt darüber hinaus Merkmale, die eine Analyse der Liberalisierung von Dienstleistungen ermöglichen. Insbesondere berücksichtigt SwissSER Niederlassungen ausländischer Unternehmen, wobei Dienstleistungsangebote unterschiedlicher Unternehmen als voneinander verschiedene Güter modelliert sind. Dies erlaubt es den Unternehmen – die aufgrund des Vorhandenseins von Fixkosten mit positiven Skalenerträgen operieren – innerhalb ihrer Marktnische als Monopolisten zu agieren. Da die Konsumenten ein vielfältiges Angebot lieben, wirkt sich eine steigende Zahl von Wettbewerbern (und damit unterschiedlicher Dienstleistungen) positiv auf die Wohlfahrt der Haushalte aus.

Die Anwendung solcher Modelle auf die Liberalisierung von Dienstleistungen steht noch am Anfang. **Die quantitativen Modellergebnisse sollten daher mit Vorsicht interpretiert werden.** Sie dienen der Veranschaulichung und ungefähren Einschätzung der ökonomischen Auswirkungen der Liberalisierung von Dienstleistungen, sind aber nicht als exakte Voraussage zu verstehen.

Die Modellsimulationen weisen für den Fall einer bilateralen Liberalisierung von Dienstleistungen zwischen der Schweiz und der EU einen wirtschaftlichen Vorteil von 5,3 Milliarden Schweizer Franken für die Schweiz aus. Ungefähr die Hälfte dieses Zuwachses besteht aus Wohlfahrtsgewinnen, die mit der erhöhten Vielfalt des Dienstleistungsangebots zusammenhängen. Ungefähr dreiviertel stammen aus der Liberalisierung der Branchen Elektrizität und Telekommunikation. Beschränkt die Schweiz ihre Liberalisierungsanstrengung auf die von der EU gestellten Anforderungen, fallen die wirtschaftlichen Vorteile mit ungefähr 3,2 Milliarden Schweizer Franken geringer aus.

Bleibt die Schweiz bei der Dienstleistungsliberalisierung hinter der EU zurück, nimmt sie wirtschaftliche Nachteile in der Grössenordnung von 800 Millionen Schweizer Franken in Kauf. Dies zeigt die Bedeutung der Dienstleistungsliberalisierung für die Schweiz, unabhängig von der Liberalisierungspolitik der EU. Verzichtet die EU auf eine Liberalisierung, führt die Liberalisierung in der Schweiz zu wirtschaftlichen Vorteilen von ungefähr 6,7 Milliarden Schweizer Franken. Diese erheblichen positiven Auswirkungen beruhen auf der Annahme, dass die Schweiz ihren Liberalisierungsgrad dem am weitesten liberalisierten EU-Land angleicht, und sind somit mit Vorsicht zu interpretieren.

1 Introduction

Barriers in services and in services trade in Switzerland as well as in the European Union are typically non-price regulatory measures. Liberalization in services intends to reduce both types of barriers either in Switzerland or in the EU. As these barriers are significant, what are the welfare implications of liberalizing services in Switzerland and/or in the European Union?

Many services, such as financial, telecommunications and transport, are vital intermediate inputs for other sectors of the economy. According to the World Bank (2001), services represent 60 per cent of the world's GDP and generate approximately a third of world trade (Karsenty, 2000). The analysis of reducing barriers in services has thus to allow for inter-industry relationships within a region as well as between regions. Applying SwissSER, a multisectoral, multiregional general equilibrium model including the structure necessary to support the analysis of services liberalization, the objective is to analyse the economic effects on Switzerland of liberalizing services.

In order to be able to assess the economic impact of reducing barriers in services, three specific stages are required:

- Identification and quantification of the barriers in services;
- Estimation of the direct effects on costs and/or prices; and
- Simulation of the economy-wide impact.

The first two stages are not in the scope of this study. They were conducted by Copenhagen Economics (2005b) by order of seco. This study takes the inputs of the first two steps in the Copenhagen Economic study as given and performs only the third step, i.e. simulates the economy-wide impact of liberalization in services.

2 The Economics of Services Liberalization

Trade in services, like trade in goods, can have strong positive effects on income and growth for both participants of the trade. Not only do economies derive the bulk of their employment and income from the services sector, but many services - financial, telecommunications and transport - are also vital intermediate inputs for other sectors. Services liberalization can make services as a whole more efficient and stable. Liberalization can also improve service quality and leads to greater transfer of knowledge and technology.

This chapter first reviews the underpinnings of trade in services which allows us to intuitively understand the economic impacts from liberalizing services in the second section. We move then to a non-algebraic description of the SwissSER model and subsequently to its empirical implementation.

2.1 Conceptual background

Under the GATS framework are identified four modes of supply in services trade. Traditional trade includes cross-border supply (mode 1, e.g. commercial services) and consumption abroad (mode 2, e.g. tourism services). In addition the definition of trade in services recognizes the commercial presence (mode 3, e.g. foreign direct investment) and the presence of natural persons (mode 4, e.g. movement of labour).

Services transactions are intangible and make tariff protection not amenable. This is the reason why services trade barriers are typically non-price regulatory measures occurring behind the border.

Another characteristic of services is market failure. Examples are potential natural monopoly for network services such as telecommunications and air transport and asymmetric information in professional services, health and education. Domestic regulatory regimes implemented to correct the market failure may also affect services trade. However, they may create more burden on the economy relative to their initial objectives.

A very important characteristic of services is that they are highly differentiated products. Services are commonly differentiated by country or region. A domestic telephone call in the European Union is not the same as a domestic telephone call in Switzerland, because the former is between Brussels and

London, whereas the latter is between Bern and Zurich. Services are also commonly differentiated by firm. This happens because the production of services often involves firm-specific knowledge capital such as specialized technical expertise or management expertise.

Characteristics of services mentioned above show that trade in services is special and that it differs from trade in agriculture and manufactures. Analysis on services trade liberalization needs therefore to treat services appropriately. There are two main issues. The first is related to trade barriers and the second issue is related to the modelling of services *per se*.

Trade barriers in services

Trade barriers in services are typically non-tariff measures and can not be estimated by domestic-foreign price comparison techniques such as the producer or consumer subsidy equivalent measures developed by the OECD for agriculture. They have to be estimated using econometric models of domestic price determination in order to be able to construct the counterfactual (domestic price in the absence of the distortion) within the model itself. Econometric results are converted into ad valorem tax equivalent measures, which can be interpreted either as rent-creating barriers or cost-escalating barriers¹. The former occurs when restrictions create pure rents for incumbent firms and is therefore modelled as an exogenous tax over total costs². The latter applies when restrictions increase the real resource cost of service production.

A key issue in the modelling of tax equivalents as rent-creating barriers is to determine the recipient of the associated rents. They can either be retained by incumbent firms, or appropriated by government via taxation, or transferred from one region to another. In this study, rents are assumed to accrue to incumbent firms, i.e. to the selling region.

¹ The same logic applies to barriers in services within a given country.

² One could argue that restrictions raise fixed costs, sunk costs, or ongoing operating costs. However, as little information is likely to be provided in practice, we assume that trade barriers affect fixed costs and marginal costs in the same proportion.

Modelling of services

Regarding the modelling of services³, the formal recognition of commercial presence in the GATS means that, at a theoretical level, models need to distinguish the ownership of services activity from the location of that activity. The introduction of new economic geography into the model amounts first to characterize different types of firms according to ownership in each region. Second, it specifies transportation costs incurring in shipped commodities, which means simply that a fraction of any good shipped melts away in transit between regions.

A key difference between domestic and foreign firms in each region is the need for the latter of headquarters services which have to be imported (through foreign direct investments) in order to establish commercial presence in the host region. Examples of these imported inputs for services include specialized technical expertise, advanced technology, management techniques and marketing expertise. By definition, foreign direct investment (FDI) is owned by asset holders in the home region. Bilateral ownership of FDI is however not represented in the model.

A very important issue in modelling services is related to three main aspects of the new trade theory. These are increasing returns to scale, imperfect competition, and product differentiation.

Evidence on economies of scale in services is surveyed by Faini (1984). An example would be in professional services where information as an input in production is intensive and exhibits the non-rival property (e.g. knowledge a lawyer requires to practice).

Recognition of services as highly differentiated products means that individual firms (either domestic or foreign) are able to produce unique varieties of a given commodity. Hence they are monopolists within their chosen market niche.

³ A brief overview of the literature on the modelling of services is provided in Appendix A.

Finally, as consumers can choose between different varieties, they tend to be better off when there is an increase in the number of varieties (Dixit and Stiglitz, 1977). This is also true for firms using services as intermediate inputs.

2.2 Intuitive impacts of services liberalization

Barriers in services are either rent-creating or cost-escalating. Depending on the nature of barriers in services, liberalization is modelled either as the reduction of tax equivalents or as a productivity improvement of primary factors. The former liberalization leads to improvement in efficiency as the associated deadweight loss is reduced. However, there are very little redistribution effects as rents to incumbents of a given region are transferred to households in the same region. The latter liberalization results in more real resources being available in the economy as they are not used for rent-seeking anymore. In a partial equilibrium setting, the latter liberalization is likely to yield larger gains to the region than the former liberalization as rectangle gains are supposed to exceed triangle gains⁴.

As the SwissSER model is a general equilibrium model, services liberalization leads also to important indirect effects. First of all, reduction of barriers lowers the costs of services which increase productivity of firms using these services as intermediate inputs. As the cost of doing business is lower, firms in the economy are able to produce more output with the same costs. A higher production of final goods demands in turn more business services. Secondly, as labour and capital are supplied resources in a limited amount, an increase in services provision is followed by higher wages and increased returns to capital. This results in a shift of employment from other sectors of the economy to the services sectors, which then leads to the adjustment of wage across industries. Depending on the assumption on capital mobility, uniform or differential rental rates may occur across sectors.

⁴ Graphically the elimination of tax equivalents suppresses the deadweight loss represented as a triangle while a productivity improvement leads to a shift to the right of the supply curve thus describing a rectangle.

Welfare gains of services liberalization depend a lot on the modelling of services and on the value of second-order behavioural parameters such as elasticities of substitution. While it is now commonplace to introduce monopolistic competition and Dixit-Stiglitz preferences in the treatment of services, appropriate values for substitution elasticities between domestic and imported services and for elasticities of substitution among individual varieties are of first importance. The reason is the key role that they play in this type of models. In the case of elasticities of substitution among varieties, their primary role is to determine the price-sensitivity of demand for particular varieties. In addition, they perform a much more important task in the sense that they determine the extent of the endogenous productivity effect on households and producers as they have more varieties available (Dee, 2003a).

As an example, Markusen, Rutherford and Tarr (2005) argue that low values for elasticities of substitution among individual varieties lead to violations of the Stolper-Samuelson theorem⁵. They show that, due to productivity effects, the price in real terms of all factors can rise as a result of trade liberalisation in a given industry.

⁵ The proposition of the Heckscher-Ohlin Model that a rise in the relative price of a good raises the real price of the factor used intensively in that industry and lowers the real price of the other factor.

2.3 Description of the SwissSER Model

The structure of the SwissSER model is along the lines of the theoretical model by Markusen, Rutherford and Tarr (2005) which provides foundations for the treatment of foreign direct investments in producer services. As in the single-country model by Jensen, Rutherford and Tarr (2005), the SwissSER model includes a detailed treatment of services sectors with their corresponding barriers.

SwissSER is a multi-region computable general equilibrium model. The trading regions are Switzerland, the European Union (EU) and the rest of the world (ROW). Labour and capital are the two primary factors of production used in all types of sectors. There are three types of sectors: competitive sectors, infrastructure services sectors with imperfect competition and business services sectors with imperfect competition.

Characterizing production sectors

Industries considered within each type of sectors are given in the following table.

Table 1: Industries considered within each type of sectors

<i>Competitive sectors</i>	Primary sector
	Manufacturing sector
	Construction
	Government services
	Services n.e.c. ^a
<i>Infrastructure services sectors</i>	Electricity
	Distributive trade
	Railway transportation
	Air transport
	Post
	Telecommunications
<i>Business services sectors</i>	Financial intermediation
	Regulated professions
	Business services n.e.c. ^a

^a n.e.c. is the acronym for not elsewhere classified.

In all sectors, domestic firms face competition from foreign producers where we assume that the quality of goods produced domestically and by foreign firms are differentiated in the demand functions of Swiss consumers and firms (Armington, 1969). All Swiss goods producing firms can sell on the domestic market or export, but there are quality differences between the domestic and export goods.

Competitive sectors

Industries under perfect competition are assumed to exhibit constant returns to scale. Since we require that price equals marginal cost, pure profits are impossible to earn for any activity.

Infrastructure services sectors

Infrastructure services are produced under increasing returns to scale and are differentiated at the firm level. More specifically, we assume the existence of setup costs of production and constant returns variable costs⁶. Individual firms, maximizing their profits, equate marginal cost to marginal revenues and the free entry-exit condition assures that their economic profits are driven to zero. The zero-profit condition allows determining the number of firms operating in the sector.

The number of firms within each sector is assumed to be large in equilibrium such that individual firms take the number of firms and prices of other firms as given⁷. Since varieties are produced by a large number of symmetric firms, the elasticity of demand for an individual variety is equal to the elasticity of substitution among the differentiated services and thus is identical for all firms. As a result, markup over marginal cost is constant and equal to the inverse of the elasticity of substitution among individual varieties. Moreover, changes in the size of an industry involve entry and exit of identically sized firms.

Furthermore firms are assumed to produce at a fixed scale since variable and fixed costs use factors in the same proportion. The industry production function may thus be viewed as producing at constant scale where changes in output are in the form of entry or exit of symmetric varieties instead of more or less quantity of existing varieties. The constant-markup formulation indicates thus no firm-scale effects assuring that output per firm remains constant⁸.

⁶ Graphically the average cost curve represents a rectangular hyperbole with average cost approaching asymptotic to marginal cost for high levels of output.

⁷ This is referred to the Chamberlinian large-group monopolistic competition assumption.

⁸ This specification prevents the model to produce rationalization gains. This means that the same industry output may not be produced with fewer firms excluding then the possibility

Finally we assume that consumers as well as firms using services as intermediate inputs are characterized by love of variety preferences. This means for both types of agents an endogenous productivity effect as they have more varieties of services available (Dixit-Stiglitz, 1977). The love of variety nature of the Dixit-Stiglitz aggregator does indicate industry-level scale effects.

Business services sectors

Business services are also characterized by increasing returns to scale and the free entry-exit condition. We assume also Dixit-Stiglitz preferences and firm-level product differentiation together with the Chamberlinian large-group monopolistic competition assumption. However, business services are potential substitute for primary factors, which implies larger backward and forward externalities⁹.

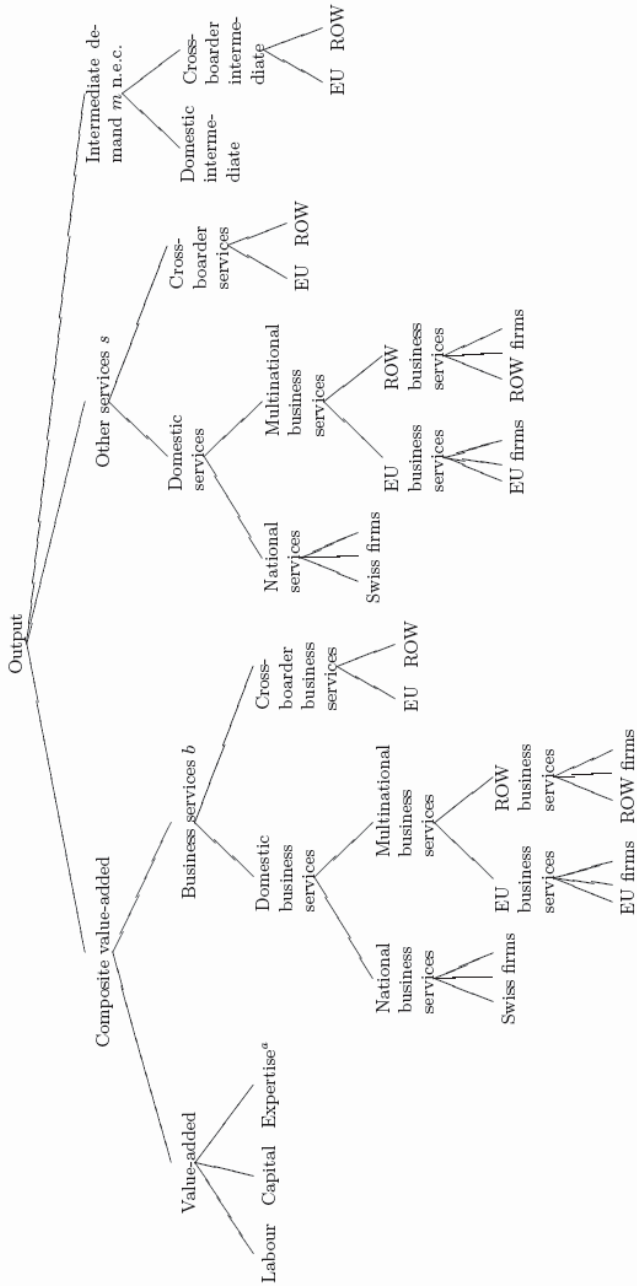
Structure of production and preferences

The structure of production for Switzerland is depicted in the following figure and is similar for the European Union and the rest of the world. Production has to some extent a standard structure with fixed coefficients for intermediate inputs and a CES aggregate of individual primary factors comprising value-added. It differs however in the modelling of services produced under increasing returns and in the nesting of business services.

for firms to slide down their average cost curve in order to produce more output with the same fixed costs.

⁹ Lower prices in business services enhance the productivity of final goods production – for sectors using these services as intermediate inputs – which expand and in turn demand more business services.

Figure 1: Structure of production for Switzerland



^aThis imported-specialized input is required only by foreign firms.

Services produced under increasing returns to scale in Switzerland may be supplied by both national and multinational firms which are differentiated between EU and ROW firms. Multinational service firm providers are assumed to establish a commercial presence in Switzerland. The production of services by foreign firms requires an imported-specialized input (e.g. advanced technology or management expertise representing foreign direct investment) in addition to labour and capital in value-added. Services provided with a domestic presence are imperfect substitutes for traditional cross-boarder services, which can be imported either from the European Union or from the rest of the world.

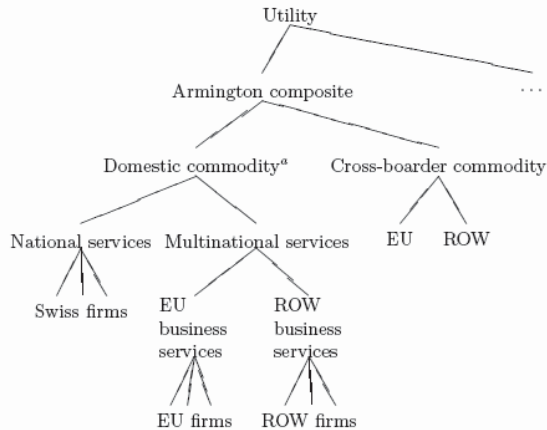
Business services include financial intermediation, regulated professions and business services n.e.c. As they are intermediation services, intermediate demand for business services enters the production function as substitute for value-added.

Intermediate demand for infrastructure services is represented as usual in the production structure. This is also the case for intermediate demand for goods and services n.e.c.

Labour is taken to be freely mobile between sectors but not across borders. Therefore, there is an equilibrium wage for each country. Capital, however, is assumed to be imperfectly mobile between sectors within each region. More specifically, capital is sluggish to adjust between the electricity market and all other sectors, and also sluggish in its adjustment within all other sectors. Capital therefore sustains differential rental rates across sectors in equilibrium. Imported-specialized input is sector specific but mobile internationally. This is consistent with the idea that knowledge capital moves less readily between industries in a given region, but more readily across regions in a given industry.

The structure of consumer preferences is represented in figure 2. Final demand in each region arises from a single representative agent maximizing a Cobb-Douglas utility function subject to a budget constraint. It is expressed for the same Armington composite of domestic and imported commodities as intermediate demand. As a consequence only services produced under monopolistic competition are split between national and multinational services.

Figure 2: Structure of consumer preferences



^aOnly services produced under monopolistic competition are distinguished between national and multinational services.

Representing barriers to services

Barriers to services provision take many forms and may not affect domestic and foreign services providers in the same way. Advertising restrictions and fee typically apply to both domestic and foreign firms while nationality requirements restrict foreign firms only. The difference between restrictions on domestic and foreign firms is a measure of the discriminatory part of barriers.

Barriers to services on either domestic or foreign firms are traditionally distinguished between barriers to establishment and barriers to ongoing operations. The European Commission however distinguished barriers active in seven stages of the economic value chain of service providers¹⁰. Barriers on both domestic and foreign firms represent then a weighted average of the different categories of barriers to services. As a consequence, they are applied on both fixed and marginal costs.

¹⁰ Stages in the value chain are establishment, use of inputs, promotion, distribution, sales of services, after sales aspects and non-legal barriers.

Following Nguyen-Hong (2000) barriers to services are interpreted as rent-creating if they raise prices above costs (variable costs are assumed to be constant). If they have a negative relationship with price-cost margins (prices are assumed to be constant), they are interpreted as cost-creating. Rent creating barriers are represented as an exogenous markup over total costs with rents accruing to incumbent firms. Cost-creating barriers are represented by an exogenous productivity factor on labour inputs only.

2.4 Data requirements for SwissSER

Empirical Implementation of the SwissSER model requires three main types of data. The first type is an input-output table for each region. The second type are estimates concerning barriers to services. Finally, SwissSER needs also appropriate values of second-order behavioural parameters, such as elasticities of substitution.

Input-output tables

The core input-output tables are provided by the GTAP 6 database¹¹, which is based on the year 2001. The GTAP database combines detailed bilateral trade, transport and protection data characterizing economic linkages among regions, together with individual country input-output databases which account for inter-sectoral linkages within regions. The currency unit is the US dollar (USD) which is around 1.6 Swiss francs in 2001. The nomenclature is identical to the Swiss nomenclature (NOGA 2002) at the second level since both are defined by reference to the ISIC Rev. 3¹². However this is not sufficient for the following services sectors:

- Trade is disaggregated into distributive trade and hotels and restaurants;
- Land transport distinguishes between road and railway transportation;
- Postal services are separated from telecommunications; and

¹¹ GTAP is the acronym for Global Trade Analysis Project based at Purdue university (Dimaranan and McDougall, 2005).

¹² ISIC is the acronym for International Standard Industrial Classification of All Economic Activities, Third Revision.

- Business services are split between regulated professions and business services n.e.c.

Both revenue and cost data of these four sectors are split proportionally to share of value-added in each sub-sectors. These share data are provided by Copenhagen Economics (2005b).

Another issue regarding the GTAP 6 database is that it does not differentiate between domestic and foreign firms. The database therefore needs to be extended to allow the presence of foreign services providers. Estimates of firms' ownership in Switzerland and in the European Union are given in Table 2 and are used to disaggregate both cost and revenue uniformly.

Table 2:
Share of production according to ownership of firms

	Switzerland			European Union		
	Swiss firms	EU firms	ROW firms	Swiss firms	EU firms	ROW firms
Electricity	0.95	0.03	0.02	0.02	0.94	0.04
Distributive trade	0.95	0.03	0.02	0.02	0.94	0.04
Railway transportation	0.95	0.03	0.02	0.01	0.98	0.01
Air transport	0.95	0.03	0.02	0.01	0.98	0.01
Post	0.90	0.07	0.03	0.01	0.98	0.01
Telecommunications	0.90	0.07	0.03	0.01	0.98	0.01
Financial intermediation	0.85	0.10	0.05	0.01	0.98	0.01
Regulated professions	0.95	0.03	0.02	0.02	0.94	0.04
Business services n.e.c.	0.95	0.03	0.02	0.02	0.94	0.04

For Switzerland, data from the Swiss National Bank are used to estimate the share of EU and ROW firms in Swiss services sectors. Out of these foreign shares, it is assumed that two thirds are EU firms and the remaining third are ROW firms.

For the European Union, data on turnover by sector of production (OECD, 2001) are taken to estimate the share of Swiss and ROW firms in EU countries. Out of these multinational shares in EU countries, 70% are assumed to be firms from another EU country, 10% are Swiss firms and 20% are ROW firms.

A final issue regarding data to be introduced into the input-output table is the lack of information on payments to knowledge capital such as specialized technical expertise or management expertise for multinationals. In each region, we assume that one quarter of payments to domestic capital by multinational service providers accrue to the imported-specialized input.

Barriers to services

As said earlier, services liberalization can not be analysed without a set of estimates of barriers to services. It is now commonplace to measure these restrictions using the methodology explained in the volume by Findlay and Warren (2000). It proceeds in two steps. The first step consists in converting qualitative information about restrictions to services into a quantitative index. The second step is to enter the restrictive index into an econometric model of economic performance and use it to quantify the direct effects of services barriers. Resulting estimates are then converted into ad valorem tax equivalents in order to be introduced into the CGE model.

Ad valorem equivalents of barriers to services are provided by Copenhagen Economics (2005b). Values for the reference year and for the different scenarios are reported in table 4. Barriers are distinguished between domestic, EU and ROW firms.

Elasticity

Values for elasticities of substitution can not be observed from calibration to underlying data flows. They often result from econometric studies. The GTAP database provides trade and demand elasticity estimates for standard models. However it does not give any information on specific elasticities used in monopolistic competition models with different types of firms, i.e. domestic vs foreign firms. To fill the gap, we derive our own guesstimates based on the literature (Copenhagen Economics, 2005b; Jensen, Rutherford and Tarr, 2004). Table 3 reports the values employed in the model for these specific elasticities.

Table 3: Elasticity values

	Switzerland	EU / ROW
Elasticity of transformation between production for domestic and export markets	5.0	5.0
Elasticity of transformation between the electricity sector and all other sectors	0.25	0.25
Elasticity of transformation for sluggish capital across sectors	1.0	1.0
Elasticity of substitution between primary factors of production in value-added	n.a.	n.a.
Elasticity of substitution between value-added and business services	1.0	1.0
Elasticity of substitution between regional imports	n.a.	n.a.
Elasticity of substitution between imports and domestic supply	n.a.	n.a.
Elasticity of substitution between national and multinational firms	1.0	2.0
Elasticity of substitution between multinational firms	2.0	3.0
Elasticity of substitution among individual varieties	5.0	7.0

Note: n.a. is the acronym for not available.

A value assigned to a given elasticity of substitution in Table 3 means that it is our own guesstimate based on the literature. When the information is not available at the aggregated level, it means that elasticity values are specified at the sectoral level. Consequently, values of elasticities of substitution differ from one sector to another and are drawn from the GTAP database. There is however one exception. In both infrastructure services and business services sectors, values for the elasticity of substitution between imports and domestic supply are half of the original values. The rationale is to stay away as much as possible from mixing firm-level product differentiation effects with Armington effects.

3 Scenario Definition

This chapter presents policy scenarios¹³ and decomposition scenarios in terms of the model specification. Policy scenarios represent a possible strategy governments could adopt while decomposition scenarios define a set of sub-scenarios that allows us to decompose the impacts into their components.

3.1 Policy scenarios

Services liberalization occurs within Switzerland itself but also with the EU in case of a services agreement. Depending on the services agreement between Switzerland and the EU, services liberalization may be unilateral or bilateral. An overview of the policy scenarios analysed in this study is given in Table 4.

Table 4: Overview of the policy scenarios

	Switzerland	Status quo	Best practice	Best practice for CH/EU firms only	Minimum EU compatibility for CH/EU firms only
EU			Scenario 1		
Status quo		Scenario 2			
Liberalization for EU/CH firms				Scenario 1a	Scenario 1b
Liberalization for EU firms only		Scenario 2a			

Following the GATS definition, services liberalization with the EU is considered as liberalizing only the establishment of domestic presence (mode 3) in the EU by Swiss firms or in Switzerland by EU firms. We do not consider liberalization in cross-border services (mode 1).

Table 5 gives an overview of the ad valorem tax equivalents of barriers to services aggregated across sectors¹⁴ in the benchmark and in each scenario for the different types of firms in Switzerland.

¹³ The policy scenarios have been defined by the seco.

¹⁴ Infrastructure services and business services sectors.

Table 5:
Rent and cost creating (RC and CC) barriers to trade in Switzerland (level in % or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
RC barriers for all firms	7.4	-70.9	-70.9	-44.2		
CC barriers for all firms	5.0	-78.0	-76.1	-33.2		
RC barriers for Swiss firms	7.3	-73.4	-73.4	-46.1		
CC barriers for Swiss firms	4.9	-77.9	-77.9	-34.3		
RC barriers for EU firms	7.5	-48.1	-74.1	-37.2		
CC barriers for EU firms	6.6	-79.1	-80.3	-28.3		
RC barriers for ROW firms	7.5	-48.1				
CC barriers for ROW firms	6.6	-79.1				

Services liberalization in Switzerland is simulated with reductions in ad valorem equivalents of barriers on Swiss and EU firms. For rent-creating barriers, it means a decrease in the exogenous markups over costs, whereas for cost-creating barriers, it amounts to an increase in the exogenous productivity of labour.

Similarly, services liberalization in the EU is also simulated with reductions of barriers in services. Aggregated tax equivalents in the benchmark and for the different scenarios are reported in Table 6.

Table 6:
Rent and cost creating (RC and CC) barriers to trade in EU (level in % or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
RC barriers for all firms	4.5		-49.5	-49.5	-48.4	-48.1
CC barriers for all firms	3.6	0.0	-33.8	-33.8	-36.5	-33.1
RC barriers for Swiss firms	4.6		-71.7	-71.7	-50.2	
CC barriers for Swiss firms	3.1	0.0	-43.7	-43.7	-52.5	0.0
RC barriers for EU firms	4.5		-51.1	-51.1	-48.2	-51.1
CC barriers for EU firms	3.6		-34.7	-34.7	-35.7	-34.7
RC barriers for ROW firms	4.6				-50.2	
CC barriers for ROW firms	3.1	0.0	0.0	0.0	-52.5	0.0

Sectoral tax equivalents in Switzerland are given in Appendix B. The five scenarios considered in this analysis are presented in turn.

Scenario 1

The first scenario assumes adoption of best-practice by Switzerland and status quo by the EU. This means that the EU keeps the current regulations and does not further liberalize, while Switzerland adopts the liberalization strategy of the most liberal EU country in each sector. There is no distinction between multinationals, which implies that EU firms are similar to ROW firms in Switzerland. Differences in the level of liberalization between Swiss firms and multinationals appearing in the second column of Table 5 show that foreign firms face discrimination in the liberalization process.

Scenario 1a

A joint liberalization in Switzerland and the EU is analysed in scenario 1a. Switzerland adopts best-practice liberalization as in Scenario 1 and the EU continues its current liberalization plans. There is thus no discrimination between Swiss firms and EU firms in Switzerland or in the EU. However, both Switzerland and the EU discriminate ROW firms as it is shown in the third column of Table 5 and Table 6.

Scenario 1b

Scenario 1b studies a reduced joint liberalization in the sense that Switzerland applies the minimum EU compatibility in the relevant sectors. It means that Switzerland adjusts its regulation to the minimum EU requirements described in the different EU directives. Hence, as it is shown in the fourth column in Table 5, the liberalization is not as strong as in scenarios 1 and 1a.

Scenario 2

Scenario 2 assumes status quo for Switzerland while the EU continues with its known liberalization plans (fifth column of Table 6). As in scenario 1, multinationals are not distinguished according to origin which means that Swiss firms are treated in the same way as ROW firms in the EU.

Scenario 2a

Scenario 2b is identical to Scenario 2, except that Swiss firms in the EU are in this scenario discriminated. As reported in the last column of Table 6, Swiss firms in the EU do not benefit from liberalization in the EU.

3.2 Decomposition scenarios

Decomposition scenarios allow us to decompose the impacts of the different policy scenarios into several components in terms of model specification, extent of liberalization and time horizon.

Central case

The central case defines a scenario corresponding to assumptions under the model description. In particular, labour is perfectly mobile between industries

while capital is sluggish in its adjustment between sectors. In the central case, only 5 sectors are liberalized. These are reported in Table 7.

Table 7: Services sectors liberalized under the central case

<i>Infrastructure services sectors</i>	Electricity Distributive trade Telecommunications
<i>Business services sectors</i>	Regulated professions Business services n.e.c.

This specification yields medium run results.

Perfect competition

In order to assess the impacts of services liberalization in a traditional competitive model, we define a scenario in a version of our model without the possibility of endogenous productivity gains. This means that all services sectors produce under constant return to scale.

Leontief services in intermediate demand

The central case assumes that business services enter the production function as substitute for value-added. In this scenario, we examine the impact of this specification since we do not allow substitution between business services and value-added. Intermediate demand for business services enter the production function as complements to value-added (Leontief specification).

Reduced liberalization

Under the liberalization in the central case, barriers in the electricity and telecommunication sectors are relatively high in the benchmark. Furthermore these sectors experience a massive liberalization in the different first policy scenarios. This sensitivity scenario intends to assess the impacts on the economy without liberalizing these two important sectors. Therefore only the remaining sectors shown in Table 8 are liberalized.

Table 8: Services sectors liberalized under the reduced liberalization case

<i>Infrastructure services sectors</i>	Distributive trade
<i>Business services sectors</i>	Regulated professions Business services n.e.c.

Extended liberalization

The objective of this scenario is to gain some insight into liberalization when all services sectors under imperfect competition experience a reduction in barriers. The extended liberalization concerns both infrastructure services and business services sectors.

Table 9: Services sectors liberalized under the extended liberalization case

<i>Infrastructure services sectors</i>	Electricity Distributive trade Railway transportation Air transport Post Telecommunications
<i>Business services sectors</i>	Financial intermediation Regulated professions Business services n.e.c.

Short run

In the short run specification, capital is assumed to be sector specific. However, it is not the very short run because there is still time for the economy to adjust to the new equilibrium wage.

Long run

The long run specification assumes that capital is perfectly mobile across all sectors but the electricity sector. However the time frame is not the very long run since we assume that the capital stock is fixed.

4 The economic effects on Switzerland

Reductions in barriers to services are simulated using SwissSER¹⁵. Economy-wide results of policy scenarios are first discussed along with decomposition scenarios. The latter allow us to decompose the impacts into different components and give us a better understanding of the economic effects on Switzerland. The subsequent section presents disaggregated results for the relevant sectors of the economy. The sectoral analysis is however restricted to the central case. Nevertheless, sectoral results for the main decomposition scenarios are reported in Appendix C¹⁶.

4.1 Macroeconomic results

In this section, we discuss first the results of the central case for all policy scenarios. Then we present the relative contribution of some key effects underlying the results.

Central case results

The impacts of services liberalization on key macro variables are presented in Table 10¹⁷. Appendix C reports results of other aggregate estimates, such as exports, imports, cost of production and value-added.

¹⁵ The model is written in GAMS/MPSTGE (Rutherford, 1999) and solved using PATH (Ferris and Munson, 2000).

¹⁶ Reporting sectoral results is tedious since there are 14 sectors in each of the three regions. Sectoral results as well as aggregated results reported in this study therefore regard only Switzerland. All results for the EU and the ROW are available from the authors on request.

¹⁷ In interpreting the results, it should be made clear that, in the benchmark, variables value is expressed in million of US dollars, while variables price is normalized to one US dollar. In 2001, the US dollar is around 1.6 Swiss francs. Regarding welfare results, they represent equivalent variation as percentage of consumption. The equivalent variation is the amount of money that, if given to the country's consumers at initial prices, would be equivalent in terms of their level of welfare to the effects of the assumed liberalization.

Table 10:
Macro results : Central case (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	2.8	2.2	1.3	-0.3	-0.3
Real wage	1.0	3.8	3.6	2.3	-0.1	-0.1
Real GDP	246'208.2	2.3	1.9	1.1	-0.2	-0.2
Terms of trade	1.0	-0.2	-0.3	-0.3	-0.1	-0.1

We start by looking at the impact on welfare of the different policy scenarios. We focus then on the economic mechanism at work behind the key macro results.

Scenario analysis

Reduction of services barriers in Switzerland is determinant for Swiss economic growth. Scenarios 1 show positive welfare gains whereas they are negative in scenarios 2. The extent of welfare gains depends on the size of the decrease in barriers and on the policy adopted in the EU. In the case of conforming the Swiss regulation to the EU standard (scenario 1b), welfare gains are equal to USD 2.0 billion whereas they amount to USD 3.3 when Switzerland follows the EU country with the highest degree of liberalization (scenario 1a). On the other hand, when the EU remains at the status quo (scenario 1), welfare gains increase to USD 4.2 billion.

An extended liberalization in services sectors lead to large welfare gains. The reason follows from an increased competition in Switzerland resulting in large efficiency gains. This means also that firms in Switzerland become more competitive compared to firms in the EU, which drives exports up. However, the downside of this effect is large adjustment costs for the Swiss economy. As liberalization is extended, large movements in labour and capital between industries are needed to adjust wages and rates of return.

Liberalization policy adopted in the EU is relevant for Switzerland. In the case of bilateral services liberalization, firms in the EU also face an increase in competition, which reduces the attractiveness of Swiss services for EU consumers. This translates into a reduction of exports from Switzerland to the EU and explains thus smaller welfare gains. On the other hand, adjustment costs are not as large as in the case of a unilateral liberalization (scenario 1).

Switzerland should not stay behind the EU. Supposing that Switzerland keeps its current level of regulation, it incurs a welfare loss of USD 524 million when Swiss firms in the EU benefit from liberalization in the EU (scenario 2)

and nearly the same, with a welfare loss of USD 496 million, when Swiss firms in the EU are excluded from any reduction in services barriers in the EU (scenario 2a). The reasoning is similar to scenarios 1 but has to be applied to the EU which experiences a welfare increase of USD 27.4 billion. In this case, increasing competition in the EU prevents Switzerland to export and reduces welfare in Switzerland. When Swiss firms within the EU are discriminated, welfare losses are slightly reduced since the EU is now slightly less competitive relative to Switzerland.

Macroeconomic analysis

Welfare results can mainly be explained by the contribution of standard efficiency effects, the contribution of procompetitive effects¹⁸, and the contribution of induced changes in the terms of trade¹⁹.

Liberalization in services creates efficiency gains. Services liberalization is achieved by reducing rent-creating and cost-escalating barriers. When rent-creating barriers are reduced, market price of services decreases while production cost increases. The former leads to an increase in consumer surplus and the latter to an increase in producer surplus. These surpluses are distributed to households as lower market price of services and as higher returns to both labour and capital (as discussed below), respectively. Since rents are transferred from incumbents to households, not a single rent is lost from reducing barriers in services. On the contrary lower price of services and higher income stimulate demand and induce higher production, which leads to efficiency gains.

¹⁸ When we depart from the perfect competition paradigm, variations in industry structure and market structure greatly complicate formal analysis of the gains from trade. These complications relate to potential shifts in the cost of production, rising and falling profit margins, new product introduction, increased competitive pressure on domestic producers, and changes in the parameters underlying strategic decisions. The interaction of these effects with trade and trade policy can be quite complex, though the minimum conditions for welfare gains are generally linked to changes in industry output (Markusen et al, 1995). While the specifics vary with model type, the gains from trade that are directly linked to conditions of scale economies and/or imperfect competition are grouped under the common label *procompetitive effects* (Francois and Roland-Holst, 1997).

¹⁹ The terms of trade is the world price of a country's exports relative to its imports.

In the case of a reduction in cost-escalating barriers, market price of services decreases as well as wage due to the decrease in employment following the improvement in the productivity of labour. However, low price in services sectors make consumers and firms expand their demand for services, which increases wage as production goes up. Productivity shocks in labour explain the smaller increase in wage relative to the increase in rental rate of capital.

Procompetitive effects increase return of both labour and capital. In perfectly competitive trade models such as the Heckscher-Ohlin Model, one expects countries as a whole to gain from trade, but the owners of one factor - the scarce factor - to lose through the mechanism first explored by Stolper and Samuelson (see footnote 5). The additional sources of gain from trade due to increasing returns to scale, competition, and product variety, however, are shared across factors, and it is routinely found in CGE modelling that both labour and capital gain from trade liberalization. The reason is that additional foreign firms lower the cost of the intermediate service product in final goods production and thereby increase the relative importance of the final good sector, which uses services relatively intensively. Thus, in a general equilibrium sense, labour and capital are complements to the specialized foreign input. Furthermore, as Switzerland acquires more of the imported input, there is an increase in this input per worker at the level of the country. The consequent rise in the marginal value product of workers²⁰ raises then the wage by more than the overall welfare increase. This means that, in most cases in which national welfare rises, wages rise also and by a greater percentage (Brown and Stern, 2001).

Deterioration of terms of trade is outweighed by procompetitive effects. Liberalization of the barriers on services providers increases competition between firms and decreases market price. As Switzerland is able to produce services at a lower cost, domestic provision of services expands in these sectors, which allows exports to increase as well. Consequently, with increased exports of these services to world markets, their prices fall which leads to the deterioration of the terms of trade (aggregate import price remains approximately constant). In general, a worsening in a country's terms of trade has an

²⁰ The increase in the value of the firms output when one more worker is employed.

adverse effect on its consumers' welfare. But as it happens here, this is outweighed by the other gains from trade due to increased economic efficiency and the procompetitive effects.

Changes in real GDP tend to follow changes in welfare. However, the increase in real GDP is smaller than the increase in welfare. The reason is that the latter is a measure of the change in consumption whereas the former is a measure of all changes in the economy. As investment and public expenditure are fixed, changes in real GDP come either from changes in consumption or changes in the trade balance. In our case, changes in imports in real value are larger than changes in exports in real value²¹, which explains the difference between the percentage change in real GDP and the percentage change in welfare.

Key economic effects

Decomposition scenarios allow us to better understand the impacts on the economy of key components of the SwissSER model. We decompose results into three different types of effects. The first type is related to model specification. The second type of effects is concerned with the extent of liberalization in services sectors. The last type of effects looks at results with respect to the time horizon. Comments refer only to the first scenarios.

Model specification

The first key economic effect is the procompetitive effect. We execute all policy scenarios without the possibility of productivity gains. This means that we assume constant returns to scale in all sectors. Results in Table 11 are self-explanatory. More than half of the welfare gains come from the contribution of endogenous productivity gains.

²¹ In terms of quantity, changes in exports are larger than changes in imports as Switzerland is more competitive due to services trade liberalization.

Table 11:
Macro results : Perfect competition (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	1.2	0.9	0.5	-0.2	-0.2
Real wage	1.0	2.8	2.7	1.9	0.0	0.0
Real GDP	246'208.2	1.1	1.0	0.6	-0.1	-0.1
Terms of trade	1.0	-0.2	-0.3	-0.3	-0.1	-0.1

In order to assess the modelling of business services as substitutes to value-added, we simulate services liberalization assuming that business services are complements to value-added. Results in Table 12 show that approximately 13% of welfare gains are related to increased backward and forward externalities.

Table 12:
Macro results : Leontief services in ID (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	2.5	1.9	1.1	-0.4	-0.3
Real wage	1.0	3.5	3.3	2.1	-0.1	-0.1
Real GDP	246'208.2	2.1	1.7	1.0	-0.2	-0.2
Terms of trade	1.0	-0.2	-0.3	-0.3	-0.1	-0.1

Extent of liberalization

The electricity and telecommunication sectors experience the largest reduction in barriers. Regarding the key role of these two sectors in the liberalization process, we run scenarios without liberalizing the electricity and telecommunication sectors. Results in Table 13 show clearly that most welfare gains come from the liberalization of these two sectors (a thorough analysis of these two sectors is provided below).

Table 13:
Macro results : Reduced liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	0.4	0.4	0.4	0.0	0.0
Real wage	1.0	0.9	0.9	0.9	0.0	0.0
Real GDP	246'208.2	0.4	0.4	0.4	0.0	0.0
Terms of trade	1.0	-0.1	-0.1	-0.1	0.0	0.0

Regarding the extent of the liberalization, we simulate a scenario with an extended liberalization. This means that all services sectors have experienced a reduction in barriers. Results in Table 14 show that further potential welfare gains are not excluded. This comes mainly from postal services. The post sector faces large tax equivalents in the benchmark which are drastically reduced in the liberalization process.

Table 14:
Macro results : Extended liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	3.4	2.8	1.6	-0.4	-0.3
Real wage	1.0	4.7	4.5	2.7	-0.1	-0.1
Real GDP	246'208.2	2.8	2.5	1.4	-0.2	-0.2
Terms of trade	1.0	-0.3	-0.5	-0.4	-0.1	-0.1

Time horizon

The time horizon in the central case is the medium term. When we assume that there is less time for the economy to adjust to the new equilibrium, we observe a slight decrease in welfare gains. This results from the fact that capital is not allowed to adjust between sectors and therefore its allocation across sectors is less efficient (Table 15).

Table 15:
Macro results : Short run (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	2.6	2.0	1.2	-0.3	-0.3
Real wage	1.0	3.7	3.5	2.3	-0.1	-0.1
Real GDP	246'208.2	2.1	1.8	1.1	-0.2	-0.2
Terms of trade	1.0	-0.2	-0.3	-0.3	-0.1	-0.1

On the other hand, when we assume that capital may fully adjust between all sectors but the electricity sector, its allocation is more efficient, which implies additional welfare gains (Table 16).

Table 16:
Macro results : Long run (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	2.9	2.2	1.3	-0.4	-0.3
Real wage	1.0	3.8	3.6	2.3	-0.1	-0.1
Real GDP	246'208.2	2.3	1.9	1.1	-0.2	-0.2
Terms of trade	1.0	-0.2	-0.4	-0.3	-0.1	-0.1

Interestingly results from different time horizon specifications are not that much different from the central case.

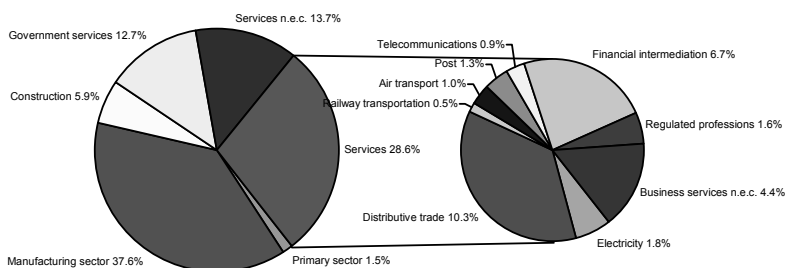
4.2 Sectoral results

As a result of the defined pattern of services liberalization, applied general equilibrium models are able to identify expanding and contracting sectors as well as the magnitudes of these changes. Under the assumption that total employment and aggregated capital is constant within each region, a mixture

of expansions and contractions at the industry level in employment and capital occurs in each region. It is likely to be the case for industry production as well. Sectoral results for key variables in Switzerland are reported in Appendix C.3 to Appendix C.5 according to the main decomposition scenarios. We focus in this section only on the central case of the first scenarios. Differences between the first scenarios (1, 1a and 1b) are likely to occur as the result of the degree of the implemented liberalization. Sectoral results are more or less reversed when the EU liberalizes but not Switzerland.

Figure 3 shows sectoral shares of production in Switzerland. Infrastructure services and business services sectors represent 29% of the economy. The central case scenario is concerned with only five sectors (electricity, distributive trade, telecommunications, regulated professions and business services n.e.c.) corresponding to 19% of the economy.

Figure 3: Output share in total output



Services liberalization reduces prices in sectors affected by the reduction in barriers, which expands the demand for, and hence the output of final goods in sectors that use these services relatively intensely. For other sectors, this means an increase in prices and a contraction of the production.

Primary and manufacturing sectors

Liberalization in services contracts production of primary and secondary sectors. Services liberalization increases efficiency in services sectors, which expand and demand for more labour and capital. Wages and returns to capital increase as the aggregated supply of fixed factors is inelastic. The mobility of primary factors between industries implies an increase in production costs (Appendix C.3, Market price Table), which translates for primary and manufacturing sectors through a shift of the supply curve to the left, reducing thus production (Appendix C.3, Production Table). As these sectors produce less, demand for labour and capital declines. Imports on the other hand increase to satisfy domestic consumption.

Services sectors

Services liberalization expands market share of the tertiary sector. Reducing barriers to services increases competition between firms and allows new firms to enter the market as long as profits are positive. As a result, the price of services falls and both final and intermediate demand for services increase. Increasing demand drives production up, which calls for more labour and capital, as well as more specialized imported input for multinationals. As a consequence, wages and returns to capital increase.

Impacts on a given services sector depend mainly on the size of the reduction in barriers in that sector. We concentrate now on the electricity and telecommunication sectors which experience the largest liberalization in scenarios 1 or 1a (Appendix C.1).

Electricity sector

The electricity sector experiences the largest increase in market share. Liberalization in the electricity sector amounts to approximately remove all barriers. As the tax equivalent is equal to 35% in 2001, it is not surprising that the market price of electricity declines by approximately the same percentage. The attractiveness of the sector expands the number of national and multinational firms, which nearly doubles relative to the benchmark. This suggests a wide prevalence of the realization of economies of scale. Due to the economy's increased domestic efficiency in the electricity sector, imports decrease and exports more than double. As capital is relatively specific to this sector, it

increases only by 18%, while its rental rate doubles. On the other hand, employment in this sector grows massively in the model, contributing largely to the increase in real wage. There is also a huge increase in the import of the specialized input (175%) employed by multinational firms.

Two clarifications are necessary in order not to misunderstand these results. The key message is to stress that increase in production and exports in the model does not necessarily mean that Switzerland is going to build new power plants.

First, one should bear in mind that the electricity sector in the model includes generation, collection, transmission and distribution of electric energy. As an indication, Jamasb and Pollitt (2005) found that production costs amount only to roughly 40% of total electricity costs. Hence, an increase in production also refers importantly to an increase in value-added services in the electricity sector. As an example, a substantial share of the increase in the value of exports could be realised by exploiting the price differences between peak and off-peak hours to an even higher extent than today. When buying electricity from abroad at low cost during off-peak periods to increase storage of water in dams, and exporting it at a higher price during peak periods, exports increase without creating new physical production capacity.

Second, it is important to know that data in electricity trade does not refer to physical flows of electricity, but to contractual values. This means that new commercial instruments such as brokering, contracting, swaps or virtual electricity storage could strongly contribute to the rise of export earnings.

Telecommunication sector

The telecommunication sector sees a large decrease in its market price. Liberalizing the telecommunication sector is nearly equivalent to eliminating all distortions as it is the case in the electricity sector. Rent-creating and cost-escalating barriers in the benchmark are however lower than in the electricity sector. This implies only a 20% reduction in the market price compared to a 37% decrease for the price of electricity. As a consequence, the quantity of telecommunication services increases but not sufficiently to have a positive change in production in real value terms (-1%). The reason comes from the demand for telecommunication exports in other regions that is price-responsive. As foreign demands for exports are downward-sloping, an in-

crease in volume lowers the world price for telecommunication services, which reduces the initial increase in exports and production. Employment in this sector increases only by 11%. Smaller increases are also found for capital (3%) and for the specialized foreign input (10%).

4.3 Sensitivity analysis

Results depend on the choice of a given value specified for each parameter in the model. Elasticities of substitution are important parameters since they can not be obtained from calibration to underlying data flows. In this section, the impact on the results of different values for the key elasticities of substitution in the model is evaluated. In particular, the changing the value of the elasticities listed in Table 17 is analysed.

Table 17: Elasticities of substitution considered in the sensitivity analysis

Elasticity of substitution among varieties	esubv
Elasticity of transformation between the electricity sector and all other sectors	etrae_ele
Elasticity of transformation between production for domestic and export markets	etrao
Elasticity of substitution between imports and domestic supply	esubd
Elasticity of substitution between national and multinational firms, and within multinational firms	esubnm and esubmn

The second column in Table 18 reports the value for key elasticities of substitution employed in the model. Assigning most of these values to the elasticity parameters represents an informal procedure because of unsatisfactory data or even a lack of data. The empirical evidence relevant to appraising the realism of these values is sparse. The first and last column show low and high values for elasticities to be analysed.

Table 18:
Elasticity value

	Low	Central	High
esubv (CH - EU/ROW)	4 - 6	5 - 7	6 - 8
etrae_ele	0	0.25	0.5
etrao	3	5	7
esubd	-50%	n.a.	+50%
esubnm and esubmn	1 - 2	2-3	3 - 4

Note: n.a. is the acronym for not available.

When the information is not available at the aggregated level, it means that elasticity values are specified at the sectoral level. Table 19 presents the im-

impact on welfare of varying the value of these five key parameters while appendix D shows the impact on the main macro variables.

Table 19:
Welfare : Central case in Scen. 1 (change in %)

	Low	Central	High
esubv	3.6	2.8	2.4
etrae_ele	2.8	2.8	2.9
etrao	2.5	2.8	3.0
esubd	2.5	2.8	3.2
esubnm and esubmn	2.8	2.8	2.8

There are two parameters in the table that have a strong impact on the results: the elasticity of substitution among varieties of services, and the elasticity of substitution between imports and domestic supply. The strong impact of the former is explained by its role in determining the extent of the endogenous productivity effect on households and producers as they have more varieties available. Regarding the latter, the impact on welfare is due to its effect on the terms of trade which affects real consumption²².

Therefore quantitative results are to be interpreted with caution. They should provide an appraisal of the economic impacts following liberalization in services rather than being of absolute accuracy.

²² The terms of trade effect depends on the value of the Armington elasticities. With a high Armington elasticity, consumers from the EU and from the rest of the world readily substitute to cheaper imports from Switzerland. This means that the price of Swiss exports would not have to fall as much in order to encourage foreign uptake and the terms of trade would not deteriorate to the same extent leading to higher welfare gains.

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A Brief Overview of the Literature on the Modelling of Services

Earlier research²³ on the modelling of the impacts of liberalizing investment in a general equilibrium framework focuses only on cross-border supply (mode 1). A first approach has been not to model FDI explicitly but to combine barriers to FDI with barriers to services traded cross-border (Robinson, Wang, and Martin, 1999). A second approach has been to model explicitly neither FDI nor the reduction of investment barriers, but to assume FDI responds to investment liberalization that generates international capital flows following changes in differential sectoral rates of return to capital (McKibbin and Wilcoxon, 1996).

Recent general equilibrium analyses however do explicitly model FDI and capture thus important economic characteristics of FDI (mode 3), such as the links between parents and foreign affiliates and the distinctions between foreign and domestic firms within a given region. Two of them set a standard for other work that has followed. Petri (1997) introduces a model of FDI distinguished between activities of domestic and foreign-owned firms into a 6-region, 3-sector CGE model using 1992 GTAP dataset. Products differentiate by both country of ownership and place of production. Capital allocation between sectors and between domestic and foreign investments responds to changes in rates of return and to investor preferences. Barriers to FDI are modelled as a tax on FDI profits. Markusen, Rutherford, and Tarr (2000) develop a conceptual static and dynamic CGE model to analyse how inward FDI in producer services may complement domestic skilled labour, affect the pattern of trade in goods, and determine the characteristics of the dynamic adjustment path.

More recently, Dee and Hanslow (2001) introduce in the GTAP model (Hertel, 1997) the treatment of FDI following closely the work of Petri (1997). The modified version, named FTAP, is a 19-region, 3-sector, recursive dynamic CGE model. It incorporates increasing returns to scale and large-group monopolistic competition in all sectors. It makes provision for capital accumulation and international borrowing and lending. Estimates of barriers to trade in

²³ See also Dee (2003b) as well as Brown and Stern (2001).

banking services are taken from Kalirajan, McGuire, Nguyen-Hong, and Schuele (2000), and estimates of barriers to trade in telecommunications services are taken from Warren (2000).

Brown and Stern (2001) model is drawn from the structure developed by Petri (1997) and Markusen, Rutherford, and Tarr (2000). There are 18 countries with the remaining countries of the world aggregated into a single rest of the world trading 3 goods from which one represents services. Estimated tariff equivalents in traded services are taken from Francois (1999) who uses a regression method based on a gravity model.

The models in these last two studies contain three sectors, agriculture, manufacturing and services, and are thus rather stylized. Results in their model depend crucially on capital flows between nations as opposed to microeconomic endogenous productivity effects.

Finally, Jensen, Rutherford, and Tarr (2004) have been able to combine in a single-country, comparative steady state CGE model a much more disaggregated treatment of the services sector with much more detailed and country-specific measures of barriers to services trade. They judge FDI from new multinational service providers to be possible in 11 of their services sectors. Estimates of barriers to services trade in their study are based on the methodology explained in the volume by Findlay and Warren (2000).

B Sectoral Tax Equivalents in Switzerland

B.1 Tax equivalents for all firm

Rent-creating barriers to trade for all firms (level in % or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	34.9	-96.1	-94.5	-57.4		
Distributive trade	3.3	-52.9	-53.0	-57.8		
Railway transportation						
Air transport	20.9	-13.7	-13.4	-13.4		
Post	18.2	-82.0	-79.2	-13.8		
Telecommunications	12.1	-93.4	-90.3	-27.6		
Financial intermediation	0.9	-12.8	-66.7	-66.7		
Regulated professions	3.4	-88.6	-91.4	-87.8		
Business services n.e.c.	0.2	-28.5	-36.4	-65.1		

Cost-creating barriers to trade for all firms (level in % or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	14.3	-95.1	-93.5	-51.9		
Distributive trade	0.7	-51.7	-51.4	-35.3		
Railway transportation	5.6	-51.8	-50.9			
Air transport						
Post	26.7	-78.2	-75.6	-11.2		
Telecommunications	19.1	-92.3	-89.2	-24.4		
Financial intermediation						
Regulated professions	4.9	-66.9	-65.6	-33.8		
Business services n.e.c.	2.3	-32.4	-32.7	-65.4		

B.2 Tax equivalents for Swiss firms

Rent-creating barriers to trade for Swiss firms (level in % or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	34.9	-96.1	-96.1	-58.4		
Distributive trade	3.3	-53.8	-53.8	-58.7		
Railway transportation						
Air transport	20.9	-13.7	-13.7	-13.7		
Post	18.2	-82.0	-82.0	-14.3		
Telecommunications	12.1	-93.4	-93.4	-28.5		
Financial intermediation						
Regulated professions	3.2	-94.8	-94.8	-90.9		
Business services n.e.c.	0.2	-33.1	-33.1	-66.0		

Cost-creating barriers to trade for Swiss firms (level in % or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	14.3	-95.1	-95.1	-52.8		
Distributive trade	0.7	-52.2	-52.2	-35.6		
Railway transportation	5.6	-51.8	-51.8			
Air transport						
Post	26.7	-78.2	-78.2	-11.6		
Telecommunications	19.1	-92.3	-92.3	-25.3		
Financial intermediation						
Regulated professions	5.0	-66.7	-66.7	-34.5		
Business services n.e.c.	2.3	-33.6	-33.6	-66.5		

B.3 Tax equivalents for EU firms

Rent-creating barriers to trade for EU firms (level in % or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	34.9	-96.1	-96.1	-58.4		
Distributive trade	3.8	-38.4	-60.3	-64.5		
Railway transportation						
Air transport	20.9	-13.7	-13.7	-13.7		
Post	18.2	-82.0	-82.0	-14.3		
Telecommunications	12.1	-93.4	-93.4	-28.5		
Financial intermediation	6.0	-12.8				
Regulated professions	7.9	-40.8	-97.9	-96.3		
Business services n.e.c.	0.8	-3.4	-80.9	-90.3		

Cost-creating barriers to trade for EU firms (level in % or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	14.3	-95.1	-95.1	-52.8		
Distributive trade	0.9	-44.3	-59.3	-45.3		
Railway transportation	5.6	-51.8	-51.8			
Air transport						
Post	26.7	-78.2	-78.2	-11.6		
Telecommunications	19.1	-92.3	-92.3	-25.3		
Financial intermediation						
Regulated professions	4.5	-70.6	-63.6	-28.3		
Business services n.e.c.	1.8	-3.5	-15.8	-57.6		

B.4 Tax equivalents for ROW firms

Rent-creating barriers to trade for ROW firms (level in % or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	34.9	-96.1				
Distributive trade	3.8	-38.4				
Railway transportation						
Air transport	20.9	-13.7				
Post	18.2	-82.0				
Telecommunications	12.1	-93.4				
Financial intermediation	6.0	-12.8				
Regulated professions	7.9	-40.8				
Business services n.e.c.	0.8	-3.4				

Cost-creating barriers to trade for ROW firms (level in % or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	14.3	-95.1				
Distributive trade	0.9	-44.3				
Railway transportation	5.6	-51.8				
Air transport						
Post	26.7	-78.2				
Telecommunications	19.1	-92.3				
Financial intermediation						
Regulated professions	4.5	-70.6				
Business services n.e.c.	1.8	-3.5				

C Detailed Results from the SwissSER Model

We present in the first section an overview of the welfare results. In the second section we report key macro results for all policy scenarios and all decomposition scenarios. Sectoral results are given in the subsequent sections but only for the central case, the reduced liberalization case and the extended liberalization case.

Variables value in the benchmark is expressed in million of US dollars, while variables price is normalized to one US dollar²⁴. For the scenarios, results are given in percentage changes. Percentage changes in production, exports, imports and value-added are computed on the basis of real values and not volumes. The deflator used is the true cost-of-living index. Labour, capital and knowledge capital (specialized foreign input) are given in quantity terms.

C.1 Welfare results overview

Results summary for welfare (level or change in %)							
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a	
Central case	150'777.2	2.8	2.2	1.3	-0.3	-0.3	
Perfect competition	150'777.2	1.2	0.9	0.5	-0.2	-0.2	
Leontief services in ID	150'777.2	2.5	1.9	1.1	-0.4	-0.3	
Reduced liberalization	150'777.2	0.4	0.4	0.4	0.0	0.0	
Extended liberalization	150'777.2	3.4	2.8	1.6	-0.4	-0.3	
Short run	150'777.2	2.6	2.0	1.2	-0.3	-0.3	
Long run	150'777.2	2.9	2.2	1.3	-0.4	-0.3	

C.2 Macroeconomic results

Macro results : Central case (level or change in %)							
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a	
Welfare	150'777.2	2.8	2.2	1.3	-0.3	-0.3	
Real wage	1.0	3.8	3.6	2.3	-0.1	-0.1	
Real return to capital	1.0	4.3	3.8	2.4	-0.1	-0.1	
Real GDP	246'208.2	2.3	1.9	1.1	-0.2	-0.2	
Production	480'741.8	1.6	1.4	0.9	-0.1	-0.1	
Terms of trade	1.0	-0.2	-0.3	-0.3	-0.1	-0.1	
Market price	1.0	-0.6	-0.5	-0.2	0.0	0.0	
Exports	109'709.1	2.2	1.9	1.1	-0.1	-0.1	
Imports	98'643.2	2.4	2.0	1.2	-0.1	-0.1	
Value-added	180'518.0	4.0	3.7	2.3	-0.1	-0.1	

²⁴ The reason is that the US dollar is the currency unit in the GTAP database. In 2001, it is around 1.6 Swiss francs.

Macro results : Perfect competition (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	1.2	0.9	0.5	-0.2	-0.2
Real wage	1.0	2.8	2.7	1.9	0.0	0.0
Real return to capital	1.0	3.1	2.9	1.9	0.0	0.0
Real GDP	246'208.2	1.1	1.0	0.6	-0.1	-0.1
Production	480'741.8	1.0	0.9	0.6	-0.1	0.0
Terms of trade	1.0	-0.2	-0.3	-0.3	-0.1	-0.1
Market price	1.0	-0.2	-0.2	-0.1	0.0	0.0
Exports	109'709.1	1.4	1.2	0.8	-0.1	-0.1
Imports	98'643.2	1.5	1.3	0.8	-0.1	-0.1
Value-added	180'518.0	3.0	2.8	1.9	0.0	0.0

Macro results : Leontief services in ID (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	2.5	1.9	1.1	-0.4	-0.3
Real wage	1.0	3.5	3.3	2.1	-0.1	-0.1
Real return to capital	1.0	4.3	3.8	2.4	-0.1	-0.1
Real GDP	246'208.2	2.1	1.7	1.0	-0.2	-0.2
Production	480'741.8	1.2	1.0	0.6	-0.1	-0.1
Terms of trade	1.0	-0.2	-0.3	-0.3	-0.1	-0.1
Market price	1.0	-0.5	-0.3	-0.1	0.0	0.0
Exports	109'709.1	1.8	1.5	0.9	-0.1	-0.1
Imports	98'643.2	2.0	1.6	0.9	-0.1	-0.1
Value-added	180'518.0	3.8	3.5	2.2	-0.1	-0.1

Macro results : Reduced liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	0.4	0.4	0.4	0.0	0.0
Real wage	1.0	0.9	0.9	0.9	0.0	0.0
Real return to capital	1.0	0.7	0.7	0.7	0.0	0.0
Real GDP	246'208.2	0.4	0.4	0.4	0.0	0.0
Production	480'741.8	0.4	0.4	0.4	0.0	0.0
Terms of trade	1.0	-0.1	-0.1	-0.1	0.0	0.0
Market price	1.0	0.0	0.0	0.0	0.0	0.0
Exports	109'709.1	0.5	0.4	0.5	0.0	0.0
Imports	98'643.2	0.5	0.5	0.5	0.0	0.0
Value-added	180'518.0	0.8	0.8	0.8	0.0	0.0

Macro results : Extended liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	3.4	2.8	1.6	-0.4	-0.3
Real wage	1.0	4.7	4.5	2.7	-0.1	-0.1
Real return to capital	1.0	5.0	4.8	2.8	-0.1	-0.1
Real GDP	246'208.2	2.8	2.5	1.4	-0.2	-0.2
Production	480'741.8	2.1	1.9	1.1	-0.1	-0.1
Terms of trade	1.0	-0.3	-0.5	-0.4	-0.1	-0.1
Market price	1.0	-0.6	-0.4	-0.1	0.0	0.0
Exports	109'709.1	2.8	2.5	1.4	-0.1	-0.1
Imports	98'643.2	3.0	2.7	1.5	-0.2	-0.1
Value-added	180'518.0	4.8	4.6	2.7	-0.1	-0.1

Macro results : Short run (level or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	2.6	2.0	1.2	-0.3	-0.3
Real wage	1.0	3.7	3.5	2.3	-0.1	-0.1
Real return to capital	1.0	4.0	3.7	2.3	-0.1	-0.1
Real GDP	246'208.2	2.1	1.8	1.1	-0.2	-0.2
Production	480'741.8	1.5	1.3	0.8	-0.1	-0.1
Terms of trade	1.0	-0.2	-0.3	-0.3	-0.1	-0.1
Market price	1.0	-0.5	-0.4	-0.1	0.0	0.0
Exports	109'709.1	1.9	1.7	1.0	-0.1	-0.1
Imports	98'643.2	2.0	1.8	1.1	-0.1	-0.1
Value-added	180'518.0	3.9	3.6	2.3	-0.1	-0.1

Macro results : Long run (level or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Welfare	150'777.2	2.9	2.2	1.3	-0.4	-0.3
Real wage	1.0	3.8	3.6	2.3	-0.1	-0.1
Real return to capital	1.0	4.4	3.9	2.4	-0.1	-0.1
Real GDP	246'208.2	2.3	1.9	1.1	-0.2	-0.2
Production	480'741.8	1.7	1.5	0.9	-0.1	-0.1
Terms of trade	1.0	-0.2	-0.4	-0.3	-0.1	-0.1
Market price	1.0	-0.6	-0.5	-0.2	0.0	0.0
Exports	109'709.1	2.4	2.0	1.2	-0.1	-0.1
Imports	98'643.2	2.6	2.1	1.2	-0.2	-0.2
Value-added	180'518.0	4.1	3.7	2.4	-0.1	-0.1

C.3 Sectoral results – Central case

Production : Central case (level or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	6'264.9	-1.7	-0.8	0.0	0.5	0.4
Manufacturing sector	162'667.8	-1.6	-0.8	-0.1	0.3	0.3
Construction	25'616.9	3.1	2.8	1.6	-0.1	-0.1
Government services	55'082.3	2.2	2.0	1.3	-0.1	-0.1
Services n.e.c.	59'248.8	2.4	2.1	1.3	-0.1	-0.1
Electricity	7'956.5	45.6	26.3	8.0	-8.3	-7.8
Distributive trade	44'573.6	1.6	1.2	0.4	-0.3	-0.3
Railway transportation	2'119.6	2.2	2.1	1.3	0.0	0.0
Air transport	4'486.8	1.1	1.4	1.1	0.1	0.1
Post	3'912.4	3.5	3.1	1.8	-0.1	-0.1
Telecommunications	5'703.3	-0.9	-1.3	-0.2	-0.3	-0.3
Financial intermediation	29'009.3	2.3	2.1	1.4	0.0	0.0
Regulated professions	6'942.6	7.0	5.3	3.0	-1.0	-1.0
Business services n.e.c.	19'233.7	5.3	4.6	3.0	-0.1	-0.1

Market price : Central case (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	1.0	0.7	0.9	0.6	0.1	0.1
Manufacturing sector	1.0	0.9	1.0	0.6	0.0	0.0
Construction	1.0	2.0	1.9	1.2	0.0	0.0
Government services	1.0	2.3	2.1	1.4	0.0	0.0
Services n.e.c.	1.0	2.1	1.9	1.2	0.0	0.0
Electricity	1.0	-37.4	-37.1	-26.0	0.0	0.0
Distributive trade	1.0	-0.7	-0.8	-1.5	0.0	0.0
Railway transportation	1.0	1.4	1.3	0.8	0.0	0.0
Air transport	1.0	0.2	0.2	0.1	0.0	0.0
Post	1.0	0.2	0.2	0.9	0.0	0.0
Telecommunications	1.0	-20.5	-20.0	-5.4	0.0	0.0
Financial intermediation	1.0	2.7	2.5	1.6	0.0	0.0
Regulated professions	1.0	-4.9	-4.8	-4.1	0.2	0.2
Business services n.e.c.	1.0	0.7	0.6	-0.5	0.0	0.0

Exports : Central case (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	623.8	-3.2	-1.7	-0.5	0.8	0.7
Manufacturing sector	82'250.8	-3.2	-2.0	-0.6	0.5	0.5
Construction	44.4	-2.5	-1.3	-0.4	0.7	0.7
Government services	3'186.3	-3.3	-2.0	-0.9	0.7	0.7
Services n.e.c.	6'388.4	-2.7	-1.5	-0.5	0.7	0.7
Electricity	2'676.0	185.8	128.5	59.2	-23.6	-22.2
Distributive trade	1'949.2	2.1	1.1	2.1	-1.5	-1.5
Railway transportation	284.9	-1.6	-0.6	0.0	0.5	0.5
Air transport	2'610.9	0.1	0.9	1.0	0.3	0.3
Post	249.1	0.8	2.2	0.5	1.0	1.0
Telecommunications	706.7	52.5	49.8	10.5	-0.9	-0.9
Financial intermediation	4'747.2	-3.7	-2.2	-1.0	1.0	0.9
Regulated professions	910.2	12.5	5.9	3.7	-5.7	-5.9
Business services n.e.c.	3'081.2	0.5	1.5	3.2	0.7	0.7

Imports : Central case (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	3'419.8	1.5	1.5	1.0	-0.1	-0.1
Manufacturing sector	80'687.9	2.6	2.2	1.3	-0.2	-0.2
Construction	33.1	4.8	4.0	2.2	-0.4	-0.4
Government services	1'073.7	5.0	3.9	2.2	-0.6	-0.6
Services n.e.c.	5'041.0	4.4	3.7	2.1	-0.4	-0.3
Electricity	771.7	-32.2	-29.7	-20.0	3.4	3.2
Distributive trade	1'162.9	1.2	0.9	0.1	-0.2	-0.2
Railway transportation	651.1	2.4	2.2	1.4	-0.1	-0.1
Air transport	1'963.5	2.6	2.2	1.3	-0.2	-0.2
Post	379.6	3.6	3.1	1.8	-0.2	-0.2
Telecommunications	517.8	-6.6	-6.8	-1.2	-0.3	-0.2
Financial intermediation	754.3	3.0	2.6	1.6	-0.1	-0.1
Regulated professions	594.6	5.5	4.7	2.8	-0.3	-0.3
Business services n.e.c.	1'592.2	5.2	4.6	2.8	-0.2	-0.2

Value-added : Central case (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	4'443.8	-1.0	0.1	0.7	0.6	0.5
Manufacturing sector	52'451.9	0.1	0.8	1.0	0.3	0.3
Construction	9'571.1	4.6	4.1	2.4	-0.2	-0.1
Government services	28'570.9	3.6	3.2	2.1	-0.1	-0.1
Services n.e.c.	29'798.1	3.6	3.2	2.1	-0.2	-0.2
Electricity	1'272.4	157.3	117.4	53.2	-10.0	-9.4
Distributive trade	19'496.2	5.1	4.5	3.4	-0.3	-0.3
Railway transportation	1'064.6	4.4	4.1	2.6	-0.1	-0.1
Air transport	260.8	3.8	3.8	2.5	0.0	-0.1
Post	1'648.7	6.9	6.3	3.1	-0.2	-0.2
Telecommunications	2'526.8	11.8	10.9	4.1	-0.4	-0.4
Financial intermediation	18'301.6	2.7	2.4	1.5	0.0	0.0
Regulated professions	2'859.9	10.5	8.8	6.2	-1.0	-1.0
Business services n.e.c.	8'251.2	6.0	5.2	3.2	-0.1	-0.1

Labour : Central case (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	1'093.1	-3.0	-2.1	-1.0	0.4	0.4
Manufacturing sector	28'847.5	-3.8	-2.8	-1.4	0.4	0.4
Construction	8'393.9	0.7	0.5	0.1	-0.1	-0.1
Government services	19'434.7	-0.3	-0.3	-0.3	0.0	0.0
Services n.e.c.	14'349.7	-0.3	-0.4	-0.3	-0.1	-0.1
Electricity	296.2	190.6	140.4	61.3	-11.4	-10.7
Distributive trade	14'611.6	1.3	1.0	1.1	-0.2	-0.2
Railway transportation	870.2	0.5	0.5	0.3	0.0	0.0
Air transport	205.4	-0.1	0.2	0.2	0.0	0.0
Post	782.1	3.1	2.8	0.8	-0.1	-0.1
Telecommunications	1'198.6	10.8	10.1	2.5	-0.3	-0.3
Financial intermediation	4'153.1	-1.3	-1.3	-0.9	0.0	0.0
Regulated professions	2'551.7	6.6	5.2	3.9	-0.9	-0.9
Business services n.e.c.	7'362.0	2.1	1.6	0.9	0.0	0.0

Capital : Central case (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	3'350.7	-2.3	-1.6	-0.7	0.3	0.3
Manufacturing sector	23'604.5	-1.4	-1.0	-0.4	0.1	0.1
Construction	1'177.2	0.7	0.5	0.2	-0.1	-0.1
Government services	9'136.2	0.2	0.1	0.1	0.0	0.0
Services n.e.c.	15'448.4	0.3	0.1	0.1	-0.1	-0.1
Electricity	964.0	18.5	14.9	7.9	-2.0	-1.9
Distributive trade	4'824.2	0.8	0.6	0.5	-0.1	-0.1
Railway transportation	192.0	0.6	0.5	0.3	0.0	0.0
Air transport	54.7	0.4	0.4	0.3	0.0	0.0
Post	844.9	1.7	1.5	0.5	-0.1	-0.1
Telecommunications	1'295.0	2.7	2.4	0.7	-0.2	-0.2
Financial intermediation	13'661.1	-0.2	-0.3	-0.2	0.0	0.0
Regulated professions	304.8	2.8	2.1	1.7	-0.4	-0.4
Business services n.e.c.	878.2	1.2	0.9	0.4	-0.1	0.0

Knowledge capital : Central case (level or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	12.2	173.9	114.2	48.8	-10.9	-10.2
Distributive trade	60.3	7.0	5.9	3.9	-0.5	-0.5
Railway transportation	2.4	6.8	5.9	3.6	-0.3	-0.3
Air transport	0.7	6.2	5.5	3.5	-0.3	-0.3
Post	21.7	7.7	6.7	3.2	-0.3	-0.3
Telecommunications	33.2	10.0	7.1	2.9	-0.5	-0.5
Financial intermediation	487.5	3.3	2.7	1.5	-0.2	-0.2
Regulated professions	3.4	11.1	11.7	9.0	-1.2	-1.2
Business services n.e.c.	11.0	6.9	6.1	3.7	-0.3	-0.3

C.4 Sectoral results – Reduced liberalization

Production : Reduced liberalization (level or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	6'264.9	0.3	0.4	0.4	0.1	0.1
Manufacturing sector	162'667.8	0.3	0.4	0.4	0.1	0.1
Construction	25'616.9	0.4	0.4	0.5	0.0	0.0
Government services	55'082.3	0.5	0.5	0.5	0.0	0.0
Services n.e.c.	59'248.8	0.5	0.5	0.5	0.0	0.0
Electricity	7'956.5	0.6	0.7	0.7	0.1	0.1
Distributive trade	44'573.6	-0.2	-0.3	-0.3	-0.1	-0.1
Railway transportation	2'119.6	0.6	0.6	0.6	0.0	0.0
Air transport	4'486.8	0.5	0.4	0.4	-0.1	-0.1
Post	3'912.4	0.7	0.7	0.7	0.0	0.0
Telecommunications	5'703.3	0.6	0.7	0.7	0.0	0.0
Financial intermediation	29'009.3	0.5	0.5	0.5	0.0	0.0
Regulated professions	6'942.6	2.3	1.3	1.0	-0.9	-0.9
Business services n.e.c.	19'233.7	0.8	0.8	1.0	0.0	0.0

Market price : Reduced liberalization (level or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	1.0	0.4	0.4	0.4	0.0	0.0
Manufacturing sector	1.0	0.3	0.3	0.3	0.0	0.0
Construction	1.0	0.4	0.4	0.4	0.0	0.0
Government services	1.0	0.6	0.6	0.6	0.0	0.0
Services n.e.c.	1.0	0.5	0.5	0.5	0.0	0.0
Electricity	1.0	0.0	0.0	0.0	0.0	0.0
Distributive trade	1.0	-1.9	-1.9	-2.0	0.0	0.0
Railway transportation	1.0	0.5	0.5	0.6	0.0	0.0
Air transport	1.0	0.2	0.2	0.3	0.0	0.0
Post	1.0	0.7	0.7	0.7	0.0	0.0
Telecommunications	1.0	0.7	0.7	0.7	0.0	0.0
Financial intermediation	1.0	0.6	0.6	0.6	0.0	0.0
Regulated professions	1.0	-5.9	-5.9	-4.7	0.2	0.2
Business services n.e.c.	1.0	-0.5	-0.5	-1.1	0.0	0.0

Exports : Reduced liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	623.8	0.0	0.1	0.1	0.1	0.1
Manufacturing sector	82'250.8	0.3	0.3	0.3	0.1	0.1
Construction	44.4	0.2	0.3	0.3	0.1	0.1
Government services	3'186.3	-0.2	0.0	0.0	0.2	0.2
Services n.e.c.	6'388.4	0.0	0.2	0.2	0.2	0.2
Electricity	2'676.0	1.0	1.3	1.3	0.2	0.2
Distributive trade	1'949.2	4.4	2.3	2.5	-1.9	-1.9
Railway transportation	284.9	-0.1	0.0	0.0	0.1	0.1
Air transport	2'610.9	0.4	0.3	0.3	-0.1	-0.1
Post	249.1	-0.3	0.1	0.0	0.3	0.3
Telecommunications	706.7	-0.3	0.1	0.0	0.4	0.4
Financial intermediation	4'747.2	-0.2	0.0	0.0	0.2	0.2
Regulated professions	910.2	13.9	6.2	3.7	-6.4	-6.6
Business services n.e.c.	3'081.2	1.9	2.0	3.3	0.0	0.0

Imports : Reduced liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	3'419.8	0.5	0.5	0.5	0.0	0.0
Manufacturing sector	80'687.9	0.5	0.4	0.5	0.0	0.0
Construction	33.1	0.5	0.5	0.5	0.0	0.0
Government services	1'073.7	0.7	0.6	0.6	-0.1	-0.1
Services n.e.c.	5'041.0	0.7	0.7	0.7	0.0	-0.1
Electricity	771.7	0.2	0.2	0.2	0.0	0.0
Distributive trade	1'162.9	-0.5	-0.6	-0.6	-0.1	-0.1
Railway transportation	651.1	0.7	0.6	0.7	0.0	0.0
Air transport	1'963.5	0.5	0.5	0.5	0.0	0.0
Post	379.6	0.7	0.7	0.7	0.0	0.0
Telecommunications	517.8	0.7	0.7	0.7	0.0	0.0
Financial intermediation	754.3	0.5	0.5	0.6	0.0	0.0
Regulated professions	594.6	1.2	1.0	0.9	-0.2	-0.2
Business services n.e.c.	1'592.2	0.9	0.9	0.9	-0.1	-0.1

Value-added : Reduced liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	4'443.8	0.3	0.4	0.4	0.1	0.1
Manufacturing sector	52'451.9	0.5	0.6	0.6	0.0	0.0
Construction	9'571.1	0.7	0.7	0.7	0.0	0.0
Government services	28'570.9	0.7	0.7	0.8	0.0	0.0
Services n.e.c.	29'798.1	0.7	0.7	0.7	0.0	0.0
Electricity	1'272.4	0.5	0.6	0.6	0.1	0.1
Distributive trade	19'496.2	1.7	1.6	1.8	-0.1	-0.1
Railway transportation	1'064.6	0.9	0.9	0.9	0.0	0.0
Air transport	260.8	0.7	0.6	0.6	-0.1	-0.1
Post	1'648.7	0.8	0.9	0.9	0.0	0.0
Telecommunications	2'526.8	0.8	0.8	0.8	0.0	0.0
Financial intermediation	18'301.6	0.5	0.5	0.5	0.0	0.0
Regulated professions	2'859.9	5.0	4.0	3.8	-0.9	-0.9
Business services n.e.c.	8'251.2	0.8	0.8	1.0	0.0	0.0

Labour : Reduced liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	1'093.1	-0.3	-0.2	-0.3	0.1	0.1
Manufacturing sector	28'847.5	-0.4	-0.3	-0.3	0.1	0.1
Construction	8'393.9	-0.2	-0.2	-0.2	0.0	0.0
Government services	19'434.7	-0.2	-0.2	-0.2	0.0	0.0
Services n.e.c.	14'349.7	-0.3	-0.3	-0.3	0.0	0.0
Electricity	296.2	-0.5	-0.3	-0.4	0.1	0.1
Distributive trade	14'611.6	0.9	0.8	1.0	-0.1	-0.1
Railway transportation	870.2	0.0	0.0	0.0	0.0	0.0
Air transport	205.4	-0.2	-0.3	-0.4	-0.1	-0.1
Post	782.1	-0.1	0.0	-0.1	0.0	0.0
Telecommunications	1'198.6	-0.2	-0.1	-0.1	0.1	0.1
Financial intermediation	4'153.1	-0.5	-0.4	-0.5	0.1	0.1
Regulated professions	2'551.7	4.2	3.2	3.0	-0.9	-0.9
Business services n.e.c.	7'362.0	-0.1	-0.1	0.1	0.0	0.0

Capital : Reduced liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	3'350.7	-0.2	-0.2	-0.2	0.1	0.1
Manufacturing sector	23'604.5	0.0	0.0	0.0	0.0	0.0
Construction	1'177.2	0.0	0.0	0.0	0.0	0.0
Government services	9'136.2	0.0	0.0	0.0	0.0	0.0
Services n.e.c.	15'448.4	0.0	0.0	0.0	0.0	0.0
Electricity	964.0	0.0	0.0	0.0	0.0	0.0
Distributive trade	4'824.2	0.4	0.3	0.4	-0.1	-0.1
Railway transportation	192.0	0.1	0.1	0.1	0.0	0.0
Air transport	54.7	0.1	0.0	0.0	-0.1	-0.1
Post	844.9	0.1	0.1	0.1	0.0	0.0
Telecommunications	1'295.0	0.1	0.1	0.1	0.0	0.0
Financial intermediation	13'661.1	-0.1	-0.1	-0.1	0.0	0.0
Regulated professions	304.8	1.5	1.1	1.2	-0.4	-0.4
Business services n.e.c.	878.2	0.0	0.0	0.0	0.0	0.0

Knowledge capital : Reduced liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	12.2	0.3	0.4	0.4	0.1	0.1
Distributive trade	60.3	1.4	1.4	1.6	-0.1	-0.1
Railway transportation	2.4	1.0	1.0	1.0	0.0	0.0
Air transport	0.7	0.8	0.7	0.7	-0.1	-0.1
Post	21.7	0.7	0.7	0.7	0.0	0.0
Telecommunications	33.2	0.6	0.6	0.7	0.0	0.1
Financial intermediation	487.5	0.3	0.3	0.3	0.0	0.0
Regulated professions	3.4	4.4	6.1	6.2	-0.9	-0.9
Business services n.e.c.	11.0	0.7	1.0	1.1	0.0	0.0

C.5 Sectoral results – Extended liberalization

Production : Extended liberalization (level or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	6'264.9	-1.7	-0.7	-0.1	0.5	0.5
Manufacturing sector	162'667.8	-1.5	-0.6	-0.1	0.4	0.3
Construction	25'616.9	3.8	3.5	1.9	-0.1	-0.1
Government services	55'082.3	2.7	2.6	1.5	-0.1	-0.1
Services n.e.c.	59'248.8	3.0	2.8	1.6	-0.1	-0.1
Electricity	7'956.5	46.1	26.8	8.2	-8.3	-7.8
Distributive trade	44'573.6	2.2	1.8	0.7	-0.3	-0.3
Railway transportation	2'119.6	2.7	2.6	1.8	-0.1	-0.1
Air transport	4'486.8	10.5	10.3	9.4	-0.3	-0.3
Post	3'912.4	-4.8	-5.1	0.1	-0.4	-0.3
Telecommunications	5'703.3	0.4	0.0	0.2	-0.3	-0.3
Financial intermediation	29'009.3	3.0	3.2	2.0	0.0	0.0
Regulated professions	6'942.6	7.7	6.0	3.3	-1.0	-1.0
Business services n.e.c.	19'233.7	6.0	5.3	3.2	-0.1	-0.1

Market price : Extended liberalization (level or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	1.0	1.2	1.4	0.8	0.1	0.1
Manufacturing sector	1.0	1.3	1.4	0.8	0.0	0.0
Construction	1.0	2.5	2.4	1.4	0.0	0.0
Government services	1.0	2.8	2.7	1.6	0.0	0.0
Services n.e.c.	1.0	2.6	2.5	1.4	0.0	0.0
Electricity	1.0	-37.2	-36.8	-25.9	0.0	0.0
Distributive trade	1.0	-0.4	-0.4	-1.3	0.0	0.0
Railway transportation	1.0	0.0	0.0	1.0	0.0	0.0
Air transport	1.0	-6.2	-6.0	-6.2	0.1	0.1
Post	1.0	-25.9	-25.2	-3.7	0.0	0.0
Telecommunications	1.0	-21.5	-20.9	-5.5	0.0	0.0
Financial intermediation	1.0	3.1	2.3	1.1	0.0	0.0
Regulated professions	1.0	-4.4	-4.3	-3.9	0.2	0.2
Business services n.e.c.	1.0	1.2	1.2	-0.3	0.0	0.0

Exports : Extended liberalization (level or change in %)						
	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	623.8	-3.5	-2.0	-0.7	0.8	0.8
Manufacturing sector	82'250.8	-3.3	-2.0	-0.8	0.5	0.5
Construction	44.4	-2.4	-1.2	-0.4	0.8	0.7
Government services	3'186.3	-3.3	-2.0	-0.9	0.8	0.7
Services n.e.c.	6'388.4	-2.6	-1.3	-0.5	0.7	0.7
Electricity	2'676.0	186.5	129.3	59.3	-23.6	-22.2
Distributive trade	1'949.2	2.4	1.4	2.2	-1.5	-1.4
Railway transportation	284.9	1.8	2.4	-0.2	0.1	0.1
Air transport	2'610.9	16.8	16.7	16.1	-0.4	-0.4
Post	249.1	72.7	67.6	6.4	-1.8	-1.7
Telecommunications	706.7	58.1	55.3	11.2	-0.9	-0.9
Financial intermediation	4'747.2	-3.4	-0.7	0.4	1.0	1.0
Regulated professions	910.2	12.7	6.2	3.7	-5.7	-5.9
Business services n.e.c.	3'081.2	0.6	1.7	3.1	0.8	0.7

Imports : Extended liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	3'419.8	2.0	2.0	1.2	-0.1	-0.1
Manufacturing sector	80'687.9	3.1	2.8	1.6	-0.2	-0.2
Construction	33.1	5.7	4.9	2.6	-0.4	-0.4
Government services	1'073.7	5.9	4.7	2.6	-0.6	-0.6
Services n.e.c.	5'041.0	6.8	6.0	3.9	-0.4	-0.4
Electricity	771.7	-31.8	-29.2	-19.8	3.4	3.2
Distributive trade	1'162.9	1.9	1.6	0.5	-0.2	-0.2
Railway transportation	651.1	4.6	4.3	3.8	-0.2	-0.2
Air transport	1'963.5	2.0	1.7	0.3	-0.2	-0.2
Post	379.6	-7.8	-7.9	-0.1	-0.3	-0.3
Telecommunications	517.8	-5.8	-6.0	-1.0	-0.3	-0.3
Financial intermediation	754.3	3.8	4.0	2.6	-0.1	-0.1
Regulated professions	594.6	6.6	5.8	3.4	-0.3	-0.3
Business services n.e.c.	1'592.2	6.3	5.7	3.4	-0.2	-0.2

Value-added : Extended liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	4'443.8	-0.9	0.2	0.6	0.6	0.5
Manufacturing sector	52'451.9	0.5	1.2	1.0	0.3	0.3
Construction	9'571.1	5.6	5.1	2.8	-0.2	-0.2
Government services	28'570.9	4.4	4.1	2.4	-0.1	-0.1
Services n.e.c.	29'798.1	4.5	4.1	2.4	-0.2	-0.2
Electricity	1'272.4	159.0	119.0	53.6	-10.0	-9.4
Distributive trade	19'496.2	6.0	5.5	3.7	-0.3	-0.3
Railway transportation	1'064.6	4.1	3.8	3.2	-0.2	-0.2
Air transport	260.8	18.6	17.8	15.4	-0.5	-0.5
Post	1'648.7	12.5	11.5	4.2	-0.4	-0.4
Telecommunications	2'526.8	15.6	14.6	4.9	-0.4	-0.4
Financial intermediation	18'301.6	3.6	4.3	2.9	-0.1	0.0
Regulated professions	2'859.9	11.4	9.7	6.5	-1.0	-1.0
Business services n.e.c.	8'251.2	6.8	6.1	3.5	-0.1	-0.1

Labour : Extended liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	1'093.1	-3.4	-2.6	-1.3	0.4	0.4
Manufacturing sector	28'847.5	-4.3	-3.3	-1.7	0.4	0.4
Construction	8'393.9	0.9	0.6	0.2	-0.1	-0.1
Government services	19'434.7	-0.4	-0.4	-0.3	0.0	0.0
Services n.e.c.	14'349.7	-0.3	-0.4	-0.3	-0.1	-0.1
Electricity	296.2	190.0	140.0	61.1	-11.4	-10.7
Distributive trade	14'611.6	1.3	1.0	1.1	-0.2	-0.2
Railway transportation	870.2	-0.4	-0.4	0.6	-0.1	-0.1
Air transport	205.4	14.0	13.5	13.1	-0.4	-0.4
Post	782.1	11.1	10.3	1.9	-0.3	-0.3
Telecommunications	1'198.6	13.8	13.0	2.9	-0.3	-0.3
Financial intermediation	4'153.1	-1.3	-0.3	0.2	0.0	0.0
Regulated professions	2'551.7	6.6	5.2	3.9	-0.9	-0.9
Business services n.e.c.	7'362.0	2.1	1.6	0.8	0.0	0.0

Capital : Extended liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Primary sector	3'350.7	-2.7	-2.1	-1.0	0.3	0.3
Manufacturing sector	23'604.5	-1.5	-1.2	-0.6	0.2	0.1
Construction	1'177.2	0.8	0.6	0.2	-0.1	-0.1
Government services	9'136.2	0.2	0.1	0.0	0.0	0.0
Services n.e.c.	15'448.4	0.3	0.1	0.0	-0.1	-0.1
Electricity	964.0	18.5	14.8	7.9	-2.0	-1.9
Distributive trade	4'824.2	0.9	0.6	0.5	-0.1	-0.1
Railway transportation	192.0	-0.4	-0.6	0.4	-0.1	-0.1
Air transport	54.7	5.5	5.2	4.9	-0.2	-0.2
Post	844.9	2.4	2.0	0.7	-0.2	-0.2
Telecommunications	1'295.0	4.0	3.6	0.9	-0.2	-0.2
Financial intermediation	13'661.1	-0.2	0.1	0.2	0.0	0.0
Regulated professions	304.8	2.9	2.1	1.6	-0.4	-0.4
Business services n.e.c.	878.2	1.2	0.9	0.4	0.0	0.0

Knowledge capital : Extended liberalization (level or change in %)

	Benchmark	Scen. 1	Scen. 1a	Scen. 1b	Scen. 2	Scen. 2a
Electricity	12.2	175.0	115.1	49.1	-10.9	-10.2
Distributive trade	60.3	7.9	6.8	4.3	-0.5	-0.5
Railway transportation	2.4	4.7	4.6	4.3	-0.4	-0.4
Air transport	0.7	21.9	19.1	15.9	-0.7	-0.7
Post	21.7	9.8	6.5	3.2	-0.6	-0.5
Telecommunications	33.2	13.6	10.5	3.6	-0.5	-0.5
Financial intermediation	487.5	4.7	8.4	7.0	-0.2	-0.2
Regulated professions	3.4	11.8	12.4	9.3	-1.2	-1.2
Business services n.e.c.	11.0	7.6	6.8	3.9	-0.3	-0.3

D Sensitivity Analysis

In the following sub-sections, we report the impact on the main macro variables of varying the value of key parameters in the central case of the first scenarios. We retain the central value of all parameters except the parameter in question.

D.1 Elasticity of substitution among varieties

Scen. 1 (change in %)			
	Low	Central	High
Welfare	3.6	2.8	2.4
Real wage	4.3	3.8	3.6
Real GDP	2.8	2.3	2.0
Terms of trade	-0.2	-0.2	-0.2

Scen. 1a (change in %)			
	Low	Central	High
Welfare	2.8	2.2	1.9
Real wage	3.9	3.6	3.4
Real GDP	2.3	1.9	1.7
Terms of trade	-0.4	-0.3	-0.3

Scen. 1b (change in %)			
	Low	Central	High
Welfare	1.6	1.3	1.1
Real wage	2.5	2.3	2.2
Real GDP	1.3	1.1	1.0
Terms of trade	-0.3	-0.3	-0.3

D.2 Elasticity of transformation between the electricity sector and all other sectors

Scen. 1 (change in %)			
	Low	Central	High
Welfare	2.8	2.8	2.9
Real wage	3.8	3.8	3.9
Real GDP	2.3	2.3	2.4
Terms of trade	-0.2	-0.2	-0.2

Scen. 1a (change in %)			
	Low	Central	High
Welfare	2.2	2.2	2.3
Real wage	3.6	3.6	3.6
Real GDP	1.9	1.9	1.9
Terms of trade	-0.3	-0.3	-0.3

Scen. 1b (change in %)			
	Low	Central	High
Welfare	1.3	1.3	1.3
Real wage	2.3	2.3	2.4
Real GDP	1.1	1.1	1.2
Terms of trade	-0.3	-0.3	-0.3

D.3 Elasticity of transformation between production for domestic and export markets

Scen. 1 (change in %)			
	Low	Central	High
Welfare	2.5	2.8	3.0
Real wage	3.8	3.8	3.9
Real GDP	2.1	2.3	2.4
Terms of trade	-0.3	-0.2	-0.2

Scen. 1a (change in %)			
	Low	Central	High
Welfare	2.0	2.2	2.3
Real wage	3.5	3.6	3.6
Real GDP	1.8	1.9	1.9
Terms of trade	-0.4	-0.3	-0.3

Scen. 1b (change in %)			
	Low	Central	High
Welfare	1.2	1.3	1.4
Real wage	2.3	2.3	2.3
Real GDP	1.1	1.1	1.2
Terms of trade	-0.3	-0.3	-0.3

D.4 Elasticity of substitution between imports and domestic supply

Scen. 1 (change in %)			
	Low	Central	High
Welfare	2.5	2.8	3.2
Real wage	3.7	3.8	4.0
Real GDP	2.0	2.3	2.5
Terms of trade	-0.2	-0.2	-0.2

Scen. 1a (change in %)			
	Low	Central	High
Welfare	2.0	2.2	2.4
Real wage	3.5	3.6	3.6
Real GDP	1.7	1.9	2.0
Terms of trade	-0.3	-0.3	-0.3

Scen. 1b (change in %)			
	Low	Central	High
Welfare	1.2	1.3	1.4
Real wage	2.3	2.3	2.4
Real GDP	1.1	1.1	1.2
Terms of trade	-0.3	-0.3	-0.3

D.5 Elasticity of substitution between national and multinational firms, and within multinational firms

Scen. 1 (change in %)			
	Low	Central	High
Welfare	2.8	2.8	2.8
Real wage	3.8	3.8	3.8
Real GDP	2.3	2.3	2.3
Terms of trade	-0.2	-0.2	-0.2

Scen. 1a (change in %)			
	Low	Central	High
Welfare	2.2	2.2	2.2
Real wage	3.6	3.6	3.6
Real GDP	1.9	1.9	1.9
Terms of trade	-0.3	-0.3	-0.3

Scen. 1b (change in %)			
	Low	Central	High
Welfare	1.3	1.3	1.3
Real wage	2.3	2.3	2.3
Real GDP	1.1	1.1	1.1
Terms of trade	-0.3	-0.3	-0.3

CPB

CPB Netherlands Bureau for Economic Policy Analysis

The Hague, Netherlands



Liberalisation of the European services market and its impact on Switzerland

Assessing the potential impacts of following the EU's 2004 Services Directive

Report to Swiss State Secretariat for Economic Affairs (SECO),
Economic Policy Directorate, Division Growth and Competition Policy

Final report
(October 2005)

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Executive summary

This report estimates the quantitative economic implications of a possible decision by the Swiss government to fully adopt the European Commission proposals for a services directive.

The European Commission's 2004 proposals for a Services Directive consists of measures to reduce or eliminate the obstacles of cross-border trade of services by introducing the 'country of origin' principle. It implies that regulation of the country of origin is relevant, and that the country of destination has no right to impose new regulation. The European Commission has also proposed measures to reduce the obstacles for the establishment of an affiliate abroad by introducing a single point of contact for the service providers to deal with all rules and procedures. Moreover, the EC also introduces mechanisms to build up trust of the member states in each other national regulatory regimes. The EU proposal is only partially aimed at reducing the level of service market regulation in Member States, although local producers might benefit as well from some proposed measures that focus on the elimination of unnecessary and EU-incompatible national regulations.

Our results indicate that the introduction of the 2004 EU services directive in Switzerland would very much intensify the economic relations between the service industries of Switzerland and the European Union. We have investigated the direct effects of mutual liberalisation of services markets. These are strictly positive, both for Switzerland and the EU.

Our estimates are presented as a range of likely outcomes, given statistical uncertainties and uncertainties related to the eventual implementation form of the services directive. The results must therefore be interpreted as a likely order of magnitude of the long-term effects rather than as point forecasts. Keeping this in mind, Swiss exports of commercial services to the EU could increase by 40 to 84 per cent, while Swiss foreign direct investment stocks in EU services industries could increase by 20 to 41 per cent. EU services exports to Switzerland may rise by 41 to 85 per cent, while EU direct investment stocks in Swiss service markets could rise by 29 to 55 per cent.

1 Introduction

This report is prepared on request of the Swiss State Secretariat for Economic Affairs (SECO), Division Growth and Competition Policy.¹ SECO asked CPB Netherlands Bureau for Economic Policy Analysis to estimate the quantitative economic implications of a possible decision by the Swiss government to fully adopt the European Commission proposals for a services directive.

A cornerstone of the European Union (EU) is the principle that goods, services, capital and labour can move freely between the member states. The internal market for goods functions rather well, after the implementation of the Single Market programme in 1988. This is however not the case for the internal market in services. In most service sectors, still less than 5 per cent of production is exported to other EU member states.² The European Commission in March 2004 launched its proposals for removing national regulatory obstacles for the growth of the intra-EU service market (European Commission 2004). A cornerstone of the present EU proposals is the introduction of the 'country of origin' principle. For bilateral service trade it implies that only the product-market regulation of the service provider's origin country applies. This restricts the right of the importing country to impose discriminatory or additional regulations for foreign service providers. The commission has also proposed measures to reduce the obstacles for the establishment of an affiliate abroad by introducing a single point of contact for the service providers to deal with all rules and procedures. Moreover, the EC also introduces mechanisms to build up trust of the member states in each other national regulatory regimes.

In recent months, the proposed EU Services Directive has been the object of much public discussion in EU countries. The European Commission has already announced some clarifications and changes in the proposals. The coming debate in the European Parliament (summer 2005) will probably result in further amendments.³ The revised proposal will probably be available by the end of 2005 or early in 2006. If the EU Member States and the European Parliament agree with the revised proposal, the measures might still become effective in 2010.

In this study we have taken the 2004 European Commission proposals as point of departure for the economic impact analysis. We focus on the role of inter-country regulation differences as a barrier to international trade and direct investment in services. The prime goal of the 2004 EU services directive is to reduce the role of these policy differences. CPB has quantified the possible impacts of these proposals on intra-EU service trade and direct investment in services.

¹ Contract between the Swiss Confederation represented by the Secretary of State for Economic Affairs (SECO) and CPB Netherlands Bureau for Economic Policy Analysis, January 21st, 2005.

² Cf. Kox, Lejour and Montizaan (2004a).

³ E.g. draft proposals by the European Parliament Committee on the Internal Market and Consumer Protection (EP, 2005).

The results of that quantitative assessment are published in three publications.⁴ We found that the proposed EU directive may lead to a substantial increase in bilateral trade and investment among EU member states. Commercial services trade could increase by about 30% to 60%. Foreign direct investment stocks in services could increase by about 20% to 35%. Both the trade effect and the FDI effect will take some years to fully materialise.

The present report quantifies the possible effects on the bilateral services trade and FDI between Switzerland and EU member states for a scenario in which Switzerland voluntarily adopts the EU services directive. We assume that this adoption goes along with a formal agreement between Switzerland and the EU on mutual recognition of services regulations. This would mean full integration of Switzerland in the European services market. The trade and direct investment effects that we have estimated for this scenario are well in the range that was already found for the trade and FDI effects between EU member states. The only exception in this regard is that foreign direct investment in the Swiss services economy would increase by 29 to 55 per cent, which is more than in most EU states.⁵

Structure of the report

The present report has the following structure. Chapter 2 outlines the basic facts about the current Swiss-EU trade and direct investment in services. Chapter 3 summarises the method and main results of CPB's earlier quantitative economic assessment of the proposals for EU member states. Chapter 4 extends this analysis to Switzerland: what would be the impacts for Swiss-EU trade and direct investment in services if Switzerland applied the same liberalisation proposals? Chapter 5 discusses the quantitative results, and analyses in which areas of product-market regulation in Switzerland the 2004 Services Directive could have most impacts. Finally, chapter 6 summarises the results.

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Supplementary research at CPB's initiative resulted in removing some inaccuracies and shortcomings in the bilateral trade and policy heterogeneity data that formed the basis of our econometric estimates. We have subsequently re-done our estimates of the impact of policy heterogeneity on bilateral services trade, using a full-information maximum likelihood method that is better suited for exploiting the full data variance than the SUR method that we used in the initial report. The new parameters from this have been used for an updated simulation of the effects of the 2004 EU Services Directive for Switzerland.

⁴ Kox, Lejour and Montizaan (2004a; 2004b); Kox and Lejour (2004c).

⁵ The main reason for this strong inward FDI effect is that the present Swiss regulations for FDI are more restrictive than holds on average for EU member states. Lowering the investment restrictions for EU services firms thus results in a relatively strong improvement of Swiss attractiveness as an investment destination.

2 Switzerland and the European services market

Switzerland is surrounded by EU countries, and has many economic relations with the European Union. This chapter presents background statistics on the services trade between Switzerland and the EU, and on foreign direct investment relations between Switzerland and the EU. For consistency reasons with the following chapters, the emphasis is on data for the reference years 2001 for trade data, and 1999 for direct investment data.

Trade in services

Table 2.1 shows the composition of Swiss services exports and imports in 2001. The data include total Swiss services trade, including trade between Switzerland and non-EU countries. Switzerland has a remarkably large surplus in its services trade: the services exports are twice the amount of services imports. Most of this net position stems from financial services. If we

Table 2.1 Composition of Switzerland services trade in 2001

	Exports		Imports	
	Value in millions of US dollars	Share (%) in services exports	Value in millions of US dollars	Share (%) in services imports
TOTAL SERVICES	27,726	100.0	13,386	100.0
Transportation	4,439	16.0	3,246	24.2
Travel	7,509	27.1	6,345	47.4
Communications services	761	2.7	917	6.9
Insurance services	1,064	3.8	74	0.6
Financial services	7,628	27.5	651	4.9
Other business services	4,692	16.9	1,973	14.7
Personal, cultural and recreational services	6	0.0	65	0.5
Government services, n.i.e.	1,626	5.9	110	0.8
GOODS	86,457		89,211	
TOTAL GOODS AND SERVICES	114,183		102,597	

Source: OECD (2003) and own calculations.

compare this to other EU countries (cf. Table 2.2), the 27.5% contribution of financial services to total services exports is very high. In contrast, the Swiss imports of financial services are quite small. Travel services (mainly tourism) form nearly half of the services imports. The share of 'other business services' –the sector that may be most affected by the EU services directive– is now relatively low in Swiss services trade.

Table 2.2 EU services exports, 2001

	Value in billion US dollar	% share in total exports
Transportation	144.5	22.8
Travel	176.2	27.8
Communication services	14.6	2.3
Construction	15.9	2.5
Insurance	15.1	2.4
Financial services	44.3	7.0
Other business services ^{a)}	183.8	29.0
Royalties and licence fees	20.5	3.2
Personal services	6.9	1.1
Government services	11.4	1.8
Total services	633.1	100.0

a) Including Computer and information services.

Source: Kox, Lejour and Montizaan (2004b), based on data from OECD (2003a) and own calculations.

Table 2.3 focuses on the most important trading partners of Switzerland in other commercial services trade. This sector includes other business services, information services, finance and insurance and personal, cultural and recreational services. The limited statistical information available on Swiss services exports does not allow us to split off the data on *Finance and insurance* from the rest of services trade. Even at the aggregation level of *other commercial services*, not all trade data are available for bilateral trade with the EU15 countries.

What table 2.3 does show is the strong geographical concentration in Swiss services trade. Germany is the most important export destination. Together with Belgium-Luxembourg it accounts for half the Swiss services exports to the EU. Four other countries (Italy, France, UK and The Netherlands) together account for another 40 per cent of commercial services exports, each country receiving about 10 per cent.

On the import side, the country concentration is hardly less. Germany and the United Kingdom supply about half of Switzerland's imports of commercial services. Other relevant trading partners are France, Italy, and The Netherlands. The Swiss total services trade balance with the EU is about in equilibrium: the value of EU import and export is approximately the same. In combination with Table 2.1 this suggests that the large trade surplus in financial services is mostly accounted for by the non-EU countries. However, the low quality and disclosure of services trade data may also play a role.

Table 2.3 Trade relations between Switzerland and the EU in 'other commercial services' b), 2001

	Exports		Imports	
	Value in millions of US dollars	Share (%) in services exports	Value in millions of US dollars	Share (%) in services imports
Germany	5,104	34	3,970	24
Belgium-Luxembourg	2,517	17	2,517	15
Italy	1,824	12	1,579	9
France	1,579	10	1,778	11
Netherlands	1,534	10	1,295	8
United Kingdom	1,366	9	3,921	23
Austria	653	4	787	5
Sweden	371	2	662	4
Spain	..	..	..	..
Denmark	..	..	..	..
Portugal	107	1	109	1
Greece	88	1	131	1
Finland	76	0	46	0
Ireland	..	..	..	..
Subtotal disclosed EU15 a)	15,217	100	16,794	100

Source : OECD (2004)) and own calculations

a) Most figures are based on the registered observations of the partner trading countries of Switzerland. Denmark, Ireland, and Spain do not report bilateral services trade flows with Switzerland.

b) The aggregate "Other commercial services" includes: Trade and Distribution, Business Services, Hotels and Restaurants, Personal Services, Construction, and Financial Services. Transport and travel services are excluded.

Foreign direct investment

In 1999, the value of Swiss FDI stock in the EU15 amounts to about 100 billion US dollars. A quarter of it is invested in the United Kingdom, and 18 per cent in Germany. Other important EU destinations for Swiss investors are France, Belgium-Luxembourg, and the Netherlands. Further details are shown in Table 2.4.

The inward FDI stock in Switzerland coming from the EU15 countries amounts only to 50 billion US dollar in 1999. This amount may be an underestimation, because data on some bilateral FDI stocks are missing. Table 2.4 displays that France, Germany and the Netherlands are the most important investors in Switzerland. Note that these numbers refer to foreign direct investment in all sectors. There are no data on bilateral data FDI positions at a sectoral level.

Table 2.4 Foreign direct investment relations between Switzerland and the EU: FDI stocks, 1999

	Swiss FDI stocks in the EU		EU FDI stocks in Switzerland	
	value in millions of US dollars	Share (%) in total	value in millions of US dollars	Share (%) in total
United Kingdom	23,858	24	5,054	10
Germany	17,820	18	11,618	23
Netherlands	12,554	13	14,013	28
France	11,041	11	10,221	21
Belgium-Luxembourg	8,498	9	3,749	8
Ireland	6,841	7	..	..
Italy	6,498	7	3,679	7
Spain	3,708	4	326	1
Austria	2,950	3	366	1
Greece	1,542	2	..	..
Denmark	790	1	549	1
Sweden	1,334	1	283	1
Finland	1,193	1	..	..
Portugal	1,162	1	..	..
Total EU15	99,789	100	49,858	100

Source : OECD (2004) and data reported by SECO, own calculations.

Although there is no public information available on the sectoral classification of bilateral FDI stocks, we have some information for the total outward and inward FDI stock for Switzerland. Table 2.5 shows that the Swiss total outward FDI stock in 1999 amounts to 200 billion US dollars. According to table 2.4 about half of the stock is destined to the EU15. Two-thirds of the total stock is invested in services sectors, which is higher than in the EU. Moreover, 85 per cent of all Swiss services FDI is concentrated in the finance and insurance sector. The remaining Swiss FDI stock in the services sector mainly originates from the business services sector. The

Table 2.5 Sectoral classification of Swiss FDI stocks (outward and inward), 1999

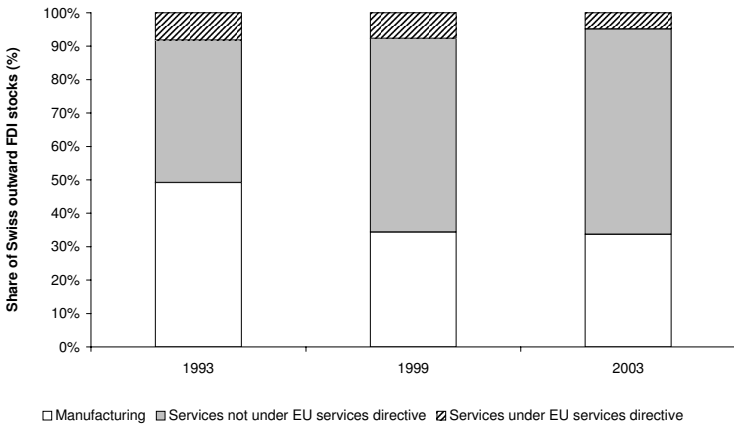
	Outward FDI stock		Inward FDI stock	
	Millions US\$	share (%)	Millions US\$	share (%)
Manufacturing	71,176		11.719	
Total services	135,915	100.0	69.161	100.0
Trade services	8,483	6.2	10.020	14.5
Finance and insurance	115,352	84.9	55.155	79.7
Transport	4,663	3.4	1.772	2.6
Other services	7,417	5.5	2.213	3.2
Total goods and services	207,091		80.879	

Source: Schweizerische Nationalbank

foreign FDI stocks in Switzerland (from all origins) is also mainly invested in financial services. Only a small part invested in the other services and trade sector, much less than in the EU on average (cf. Kox, Lejour and Montizaan 2004a).

The sectoral structure of FDI implies that most of the Swiss outward direct investment stock is in sectors that will be unaffected by the EU services directive: banking, insurance, financial holding companies and transport (see Figure 2.1).

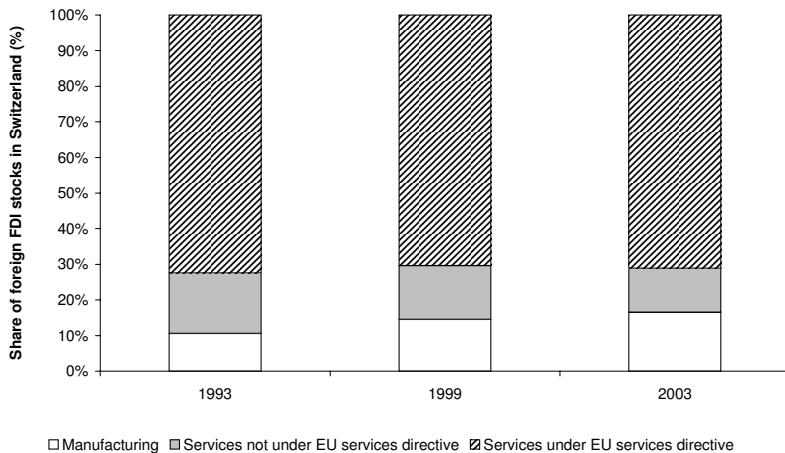
Figure 2.1 Sectoral structure of Swiss outward foreign direct stocks and the EU services directive



Data source: Schweizerische Nationalbank / CPB

Figure 2.2 shows that for foreign direct investment stocks in Switzerland a completely different picture holds: more than 70 per cent of these investments is in sectors that will be affected by the EU services directive: trade, distribution and 'other services'. The share of these sectors in inward foreign direct investment stocks has hardly changed during last decade.

Figure 2.2 Sectoral structure of foreign direct investment stocks in Switzerland and the EU services directive



Data source: Schweizerische Nationalbank / CPB

3 Method of analysis and application to intra-EU trade and FDI

Services trade is hardly subject to import tariffs. Most trade barriers in services are of a non-tariff nature. National regulations play an important role in this respect. This chapter analyses the nature of non-tariff barriers to international services trade, and especially the negative impact of international regulation differences on international trade and investment in services. We describe a new method to quantify the impact of policy heterogeneity on trade and direct investment. This methodology is used for estimating the impact of policy heterogeneity on intra-EU trade and FDI in services. The results of that analysis are applied for assessing the impacts of the EU services directive.

3.1 Regulation in service markets

Most services cannot be stored and shipped abroad (in a box or as computer file), but require the proximity of producers and consumers. Either the consumer has to move abroad as is often the case with tourism services. Or the producer has to go to the country of the consumer for delivering the service. The latter is the dominant form of delivering services in another country. The service provider himself, his staff, his equipment and material therefore cross national borders. Foreign service delivery may mean that some or all stages of the business process take place in the country where the service is delivered. It is here that the non-tariff barriers generally start, because the service provider becomes subject to local regulations in the foreign market. Many national service markets are still regulated in some way or another. The text box briefly deals with the reasons for this.

Regulation of service markets

Service markets have a long history of regulation. Partly, this is due to the externalities that the production of some services may cause for third parties, such as environmental effects of transport, the impact of bank reliability on the overall financial system, or the safety aspects of building design. But there is also a more innate cause for government intervention that may have to do with the very nature of the service product. The production and consumption of the service often cannot be separated in place and time, making it difficult to standardise a service product. The quality of the product is *a priori* uncertain for the consumer – more than in the case for commodities. For a simple service product such as a haircut, this uncertainty problem is generally manageable. The information problem for the individual service buyer is however more serious in the case of complex professional and medical services that require the input of specialist knowledge. The buyer of such service products is confronted with a structural information asymmetry as to the quality of the service product, sometimes even after the transaction took place. To counter such structural asymmetries (and their imminent fraud possibilities) government authorities sometimes apply strict regulations for certain professional services.

The OECD has developed aggregate indexes which makes it possible to compare the relative regulation intensity of countries. These indexes have been developed for product-market regulation and for restrictions on foreign direct investment.⁶ Table 3.1 presents the levels of product market regulation and FDI restrictions for Switzerland and the EU countries. According to these OECD indicators, Switzerland has a relatively high degree of regulation. The level of

Table 3.1 Aggregate OECD indicators for the relative intensity of product-market regulation and FDI restrictions, EU countries, 1998

Country	Product-market regulation	FDI restrictions	Country	Product-market regulation	FDI restrictions
United Kingdom	0.5	0.064	Portugal	1.7	0.157
Ireland	0.8	0.074	Finland	1.7	0.177
Netherlands	1.4	0.083	Switzerland	1.8	0.169
Germany	1.4	0.084	Belgium	1.9	0.091
Denmark	1.4	0.087	France	2.1	0.111
Sweden	1.4	0.140	Greece	2.2	0.130
Austria	1.4	0.268	Italy	2.3	0.097
Spain	1.6	0.165	Czech Republic	2.9	0.196
Hungary	1.6	0.173	Poland	3.3	0.249

Sources: Product-market regulation indices are from Nicoletti et al. (2000), and FDI restriction indices are from Golub (2003).

product market regulation is slightly above the average. The Swiss regulation intensity is comparable to that of Portugal and Finland; it exceeds the EU average. Switzerland is also relatively restrictive towards FDI, although the restrictiveness indicator is not as high as it is for Austria.

3.2 Impact of regulation on trade and direct investment in services

The fact that a national service market *is* regulated is not in itself an important barrier to international services trade. This can be shown by a little thought experiment. Suppose that all countries have the same type of regulation, for instance, a qualification requirement for providers producing a particular service product. Since qualification costs are mainly fixed costs, it would cost an exporting firm a one-off effort to comply with the qualification criteria. Once having incurred these fixed qualification costs, the firm would even have an incentive to export more. The reason is that by enlarging its production through exports into other countries, the firm could reap economies of scale (cost economies).

⁶ Nicoletti et al. (2000); Golub (2003).

Impact of heterogeneous regulation for services markets

However, such a uniform system of regulation for service markets does not exist. Countries often have little confidence in the quality of each other's legal regimes and are reluctant to adapt their own regimes where necessary to facilitate cross-border activities. Each authority uses its own system of quality safeguards for domestic consumers and service buyers, also within the European Union. This system of national regulations is a nuisance for international service trade. Service exporters are confronted with different regulations and requirements in each destination country. The system leads to additional costs for exporters, and thus weakens international competition in services markets.⁷ As Table 3.2 indicates, such compliance costs typically are one-off fixed costs.

Table 3.2 National product-market regulations for service markets

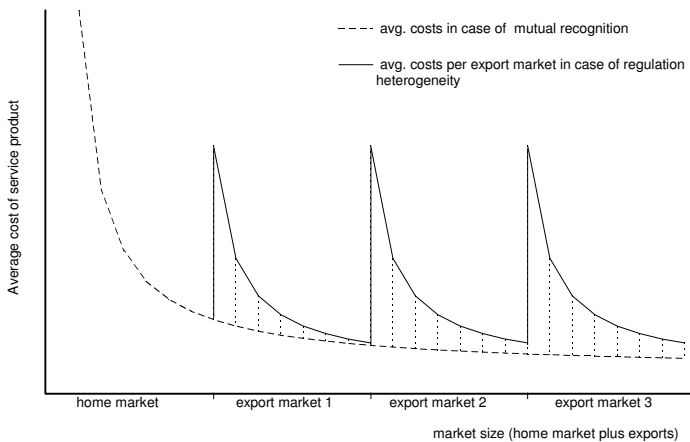
Examples of national product-market regulations	Primary impact on:			
	Fixed costs	Variable costs	Import price	Import volume
Restrictions on import quantity (entry prohibition, local content requirements, restricted network access)				X
Controlled import prices (reference, minimum or maximum price)			X	
Market access costs related to import volume (entry or exit taxes, visa costs, differentiated tariffs by firm origin, postal tariffs)		X		
Firm start-up licenses and associated authorisation requirements	X			
Service-providing personnel must have locally recognised professional qualifications (may necessitate re-qualification)	X			
Obligatory membership of local professional association	X			
Juridical requirements (owners or managers of service-providing firm must have local residence or nationality, firms must have a specific legal form)	X			
Requirement that service providers have nationally recognised liability insurance or professional indemnity insurance.	X			
All service activities in export destination country fully subject to regular administrative and tax procedures	X			
Limitations on inter-professional co-operation or on the variety of services provided by one firm (may require unbundling)	X			
Temporary service personnel from origin country fully subject to rules of the social security system of the destination country	X			
Impediments for material inputs, suppliers and personnel from origin country (may require a search for new local suppliers)	X			

⁷ O'Mahony and Van Ark (2003) find that the widening gap between the EU and the US in economic growth per capita is to an important extent caused by the fact that the USA succeeds better than the EU in raising the productivity of service industries. It might be very difficult to strengthen the competitiveness and efficiency of service industries without alleviating the effects of national regulatory barriers to the cross-border provision of services.

National regulations and requirements for service providers are not in themselves a trade barrier. Often these requirements are not explicitly discriminatory for foreign providers, because both domestic and foreign providers have to comply with the same regulation. Such national regulations can therefore be fully compatible with WTO principles of non-discrimination.

The national regulations become trade barriers because they mostly do not acknowledge that the foreign firm may already have qualified itself. Hence, the problem is the additivity: each national requirement comes *on top of* (similar or slightly different) regulations that the firm has already complied with in its home market or in other countries where it operates. Meeting the national requirements often creates additional costs that are not related to the trade volume. The foreign service firm must re-qualify itself before being allowed to sell one single product.⁸

Figure 3.1 Cost effect of regulation heterogeneity (perspective of exporting firm)



Policy heterogeneity results in a wasteful duplication of fixed policy compliance costs, with two economic consequences for the individual services firm. First, it causes additional fixed costs for entering a particular foreign market. Secondly, it leads to a loss of potential scale economies. Due to the fact that the fixed qualification costs are *specific* for a national market, the costs cannot be spread out over production that is destined for other foreign markets. Regulation heterogeneity restricts the realisation of economies of scale in complying with

⁸ Such costs often are independent of firm size. The result is that in relative terms the strongest effect of policy heterogeneity falls upon small- and medium-size service firms.

regulations, and it increases costs for internationally operating services firms. Figure 3.1 pictures both effects for a services firm that subsequently enters three export markets, and each time incurs the same level of additional fixed qualification costs.⁹ Foreign market entry each time goes along with increased average costs.

Implicitly, Figure 3.1 shows the cost and efficiency gains that can be attained by a system that allows firms to achieve more economies of scale in dealing with regulation requirements. The dotted line reflects the situation that would arise if countries mutually recognise home-country qualifications of the firm. It shows that cost and efficiency gains can be attained by an internationally co-ordinated qualification system for service firms.

Summing up, regulation-caused fixed qualification costs are not in themselves an impediment to international trade in services. The regulatory requirements do become a trade barrier if they differ strongly between countries.¹⁰ Stated differently, we may derive the hypothesis that bilateral service trade between countries is negatively affected by the degree of policy heterogeneity for service markets. Kox, Lejour and Montizaan (2004a) found strong econometric evidence in support of this hypothesis. In the remainder of this chapter we briefly describe our earlier empirical work and how this formed the basis for assessing the quantitative impacts of the proposed EU services directive.

3.3 Quantifying policy heterogeneity

Policy heterogeneity has many dimensions, and does not easily lend itself for a quantitative analysis, let alone in an internationally comparative context. In order to test the predictions from our theoretical framework empirically, we have developed a new index for bilateral policy heterogeneity.

For this we could build on the path-breaking data work by a team of OECD researchers (cf. Nicoletti *et al.* 2000). They developed an international database on national product-market regulations, mainly fed by official inputs from governments of OECD member states. The OECD International Regulation database is by far the most detailed and structured dataset on national differences in product-market regulation. It gives per country information on more than

⁹ The underlying model assumes that the exporter sequentially enters other EU markets, after exploiting the local demand potential of each market. The impact on the establishment of foreign firms (FDI, commercial presence) is more or less similar.

¹⁰ The cost for complying with regulation then turn into country-specific sunk costs for market entry. In case of failure in the foreign market, they become exit costs. The lump-sum costs create a market-entry hurdle, with a negative impact on exports. In relative terms, this hurdle is largest for small- and medium-sized firms. Firms only enter the market if the expected sales are large enough to cover the sunk market-entry costs.

1000 aspects of product-market regulation.¹¹ From this we made a selection of almost 200 most relevant indicators of national product-market regulation that may affect the services markets in which we are interested. These comparison items are of a more or less general nature, or at least they can be considered as a *pars pro toto* for a country's overall approach in product market regulation.

Our index for bilateral regulatory heterogeneity builds upon detailed pair-wise comparisons between individual countries for specific aspects of product market regulation, both regarding the form and the contents of the regulation. For each policy comparison item we assess whether two countries are identical or not. It yields information of a binary nature: when the two countries differ in that particular regulation item we assign a value of 1, and when there is no difference we assign the value of 0 to the regulation heterogeneity index. In this way we may derive an average policy heterogeneity index for each specific country pair. Its value ranges between 1 in case of complete dissimilarity and 0 in case of identical product-market regulations. The overall index of bilateral heterogeneity in product-market regulation can also be decomposed for policy sub-domains. For the decomposition we use the OECD's own classification (Table 3.3).

Table 3.3 Product-market regulation: OECD classification of domains and sub-domains		
	Main policy domains	Policy sub-domains
Inward-oriented policies	State control (SC)	* Size and scope of public enterprise sectors (PO) * Existence and extent of special right over business enterprises (IBO) * Use of price controls, legislative control and other command and control regulations in the economy (IBO)
	Barriers to entrepreneurship (BE)	* Barriers to competition (BC): legal entry conditions, anti-trust exemptions, registering, competition restrictions, regulation of public procurement * Regulatory and administrative opacity (RAO): licensing and permit systems, communication and implementation of rules and procedures * Administrative burdens on start-ups (ABS): start-up procedures, entry capital, start-up delays
Outward-oriented policies	Explicit barriers to trade and investment (EBT)	* Barriers for foreign share ownership * Discriminating procedures in trade and investment * Trade tariffs
	Other barriers (TOB)	* Regulatory trade barriers

¹¹ The base year is 1998. In the mean time, an updated version has been published for the year 2003 (cf. Conway *et al.* 2005), but the 1998 version is still perfect in combination with trade and FDI data for 1999-2001 and 1999, respectively.

The structure of regulatory heterogeneity by policy sub-domain in a nutshell yields much information about policy differences between countries. As an illustration Table 3.4 presents data on the average policy heterogeneity between EU member states, and between Switzerland and EU member states. Swiss product-market regulation –except for the sub-domain *State control*– on average differs a bit more from the EU14 average than EU14 countries differ among themselves.

Table 3.4 Bilateral policy heterogeneity between EU14 member states,^{a)} and between Switzerland and EU member states, 1998	Average between EU member states, EU14	Between Switzerland and EU14 member states
Regulatory and administrative opacity	0.38	0.39
Explicit barriers to trade and investment	0.21	0.28
Administrative burdens on start-ups	0.55	0.63
Barriers to competition	0.32	0.34
State control	0.42	0.41
<u>Overall PMR heterogeneity indicator</u>	0.39	0.41

Note: a) Excluding Luxembourg due to insufficient data.

3.4 Impact of regulation on bilateral trade in services

A next step is to assess econometrically which areas of policy heterogeneity have most impact on bilateral trade and on FDI in services.

In the empirical analysis we focus on bilateral trade in commercial services, hence disregarding government services. Moreover, we exclude *transport* and *tourism* because both services trade categories are quite special. *Transport* because it is strongly related to the total volume of goods trade, and is subject to particular regulatory regimes quite different from overall product-market regulation (e.g. because of environmental externalities). *Tourism* trade is excluded because in most of this trade consumers rather than producers move to the foreign country, and because it to a large extent is determined by factors like climate, weather conditions and cultural heritage. Tourism is also subject to relatively few product-market regulations.

For explaining bilateral commercial service trade between EU member states we use a gravity model as is widely applied for the analysis of bilateral trade patterns. The model explains the bilateral trade from the following variables: the distance and differences in languages between countries (as measure for trade costs), GDP in the countries of origin and destination (as a measure for market size and scale effects), and regulatory barriers. For the latter we investigate

both the impact of the level and the heterogeneity of national product market regulations. We correct for unobserved variables in both origin and destination country.

The full regression results with regard to bilateral trade are specified in the first two data columns in Annex 1. The empirical analysis shows that the level and the heterogeneity of regulation between countries has a significant negative effect on bilateral trade in commercial services.¹² Various specifications and estimation methods lead to similar results: the intensity of regulation and its heterogeneity are variables that significantly affect the volume of trade in commercial services. The most important conclusions for the EU14 are:

- Heterogeneity in two areas of product market regulation (*Barriers to competition* and *Explicit barriers to trade and investment*) has a markedly negative impact on trade in commercial services. Heterogeneity in *Barriers to competition* has the largest effect of both.
- A high level of domestic regulation has a negative impact on the origin country's services exports and a negative impact on service imports from other EU Member States.
- Variables for the other components of regulatory heterogeneity have no statistically significant impact on commercial service trade.

3.5 Impact of regulation on bilateral direct investment

A similar econometric exercise was done for testing the hypothesis that policy heterogeneity and regulation intensity have a negative impact on foreign direct investment in services. For explaining bilateral direct investment stocks we adapted the gravity model with elements of the knowledge-capital model developed by Markusen (2002). The latter model is becoming the standard explanation for direct investment decisions by multinational enterprises. It allows for an integrated treatment of trade and direct investment decisions in international service markets.

For explaining bilateral direct investment stocks we use the following variables: the distance and differences in languages between countries (as measure for trade costs), GDP in the country of origin and destination (as a measure for market size and scale effects), the labour productivity level in the service sector of the origin country (as a measure for technological advantage), and regulatory barriers. For the latter we investigate both the level and the heterogeneity of national product market regulations and FDI restrictions. We correct for

¹² The OECD data for trade in commercial services includes Trade and Distribution, Business Services, Hotels and Restaurants, Personal Services, Construction, and Financial Services. We do not consider Transport services and Travel services, since they are not covered by the EU directive, and because they differ with regard to non-tariff barriers (cf. Kox, Lejour and Montizaan, 2004a: Ch.4).

unobserved variables in origin and destination country. The regression equation for explaining bilateral direct investment stocks is specified in the Annex 1 (last two data columns).

The augmented gravity model explains a considerable part of the variation in bilateral FDI stocks in the EU. A strong tendency is that countries with a higher domestic productivity in services tend to invest more in other countries. With regard to the policy variables, we find that:

- Direct investment between EU countries is strongly (and in a negative sense) affected by the regulation level and by inter-country heterogeneity of product-market regulation.
- Countries with the lowest level of *product market regulation* export and invest more abroad than others.¹³
- FDI restrictions in the destination country have a strong negative impact on foreign direct investment.
- Heterogeneity in *Barriers to competition* and *State control* have a significant and negative effect on the level of bilateral FDI. Heterogeneity in the other indicators for regulatory heterogeneity have no statistically significant impact on FDI stocks.

3.6 The impact of the EU services directive on regulation heterogeneity

The results so far were used for quantifying the possible impacts of the European Commission's 2004 proposals for a Services Directive.

The EC undertook a comprehensive stocktaking of the obstacles hampering the functioning of the internal EU market for services. It resulted in a nightmarish picture of the state of the EU's Internal Market for Services (EU 2002). All stages of the business process are affected by a proliferation of national regulations: the establishment of firms, the use of inputs, promotional activities, distribution forms of a service, the sales process itself, and the after-sales organisation. Foreign service providers often are confronted by national regulations such as requirements for additional professional qualification, local residence of management, additional professional insurance, and constraints on the use of inputs from their origin country. Sometimes regulation procedures and their application are not transparent, thus creating uncertainty for foreign service providers.

It is in response to this situation that the European Commission launched its *Proposal for a Directive of the European Parliament and of the Council on Services in the Internal Market* (EC 2004). It is aimed at boosting the EU's Internal Market in Services by reducing regulation-based impediments to trade and investment in the service market. The European Commission

¹³ This is in line with the Porter hypothesis that countries with open markets become more competitive, and will easier operate in foreign markets (Porter 1990).

regards these measures as a cornerstone for raising the productivity and competitiveness of the European economy, since more than half the latter consists of market services. The proposals consist of measures to reduce or eliminate the obstacles of cross-border trade of services by introducing the 'country of origin' principle. It implies that regulation of the country of origin is relevant, and that the country of destination has no right to impose new regulation. The commission has also proposed measures to reduce the obstacles for the establishment of an affiliate abroad by introducing a single point of contact for the service providers to deal with all rules and procedures. Moreover, the EC also introduces mechanisms to build up trust of the member states in each other national regulatory regimes. The EU proposal is only partially aimed at reducing the level of service market regulation in Member States, although local producers might benefit as well from some proposed measures that focus on the elimination of unnecessary and EU-incompatible national regulations.

The EU directive does not cover all service sectors and not all elements of product-market regulation. Some policy sub-domains are more affected than others. At a detailed level we assessed the concordance between the OECD regulation item and the aspects covered by the proposed EU directive. Based on close reading we assess for each of 187 policy items whether the policy item will be unaffected, moderately affected or heavily affected by the EU directive. If a policy area is not affected, heterogeneity with regard to that regulation item persists after full implementation of the EU proposals.

This item-wise assessment has been aggregated for five sub-domains of product-market regulation. If all items in a policy sub-domain would be fully affected by the EU directive, the expected impact is a 100% reduction of heterogeneity among EU member states. If no items are affected, the expected impact is 0%. Because of the uncertain impact of the EU directive on regulatory items that are partially affected, we use a bandwidth indicating a minimum and a maximum effect. Table 3.5 gives the results.

Table 3.5 Expected impacts of proposed EU measures on intra-EU policy heterogeneity, by sub-domain

Components of heterogeneity indicator and covered policy domains	Reduction of the components of indicator due to implementation EU directive ^{a)}
Regulatory and administrative opacity	66 – 77 %
Explicit barriers to trade and investment	73 – 78 %
Administrative burdens on start-ups	34 – 46 %
Barriers to competition	29 – 37 %
State control	3 – 6 %
Overall PMR heterogeneity indicator	reduction 31 – 38 %

^{a)} Based on detailed item-wise consideration of the match between the EU directive and all 187 specific regulation items selected from the OECD database.

The table shows that the heterogeneity components *Regulatory and administrative opacity* and *Explicit barriers to trade and investment* are heavily affected by the EU directive. The heterogeneity components *Administrative barriers for start-ups* and *Barriers to competition* are moderately affected by the EU directive and the component *State control* is hardly affected. The *State control* regulation items mainly relate to network sectors, and the latter are not included in the proposed EU directive. The numbers in table 3.5 are used later on to assess the impact of less regulation heterogeneity on trade and direct investment.

Impact of the EU proposals: scenario analysis

The estimated coefficients from the preferred regressions for bilateral service trade and for bilateral direct investment stocks (cf. Annex 1) have been used as the basis for quantifying the potential impact of the EU proposal in the internal market for services. For direct investment, our scenario includes the effect of a lower *level* of national FDI restrictions in the destination countries.¹⁴ We did not account for different implementation stages, but instead we quantified the effects of full implementation of the EU directive, indicating the bandwidth of the resulting maximal effects on service trade and direct investment.

This procedure yielded the following results. The full implementation of the proposed directive could increase commercial service trade by 30 per cent to 62 per cent, while the percentage increase of foreign direct investment in services in the EU is between 18 per cent and 36 per cent. The bandwidth in outcomes represents the uncertainty in the effect of the EU directive on the reduction in regulatory heterogeneity (cf. Table 3.5), and the statistical uncertainty with regard to parameter estimates.¹⁵ The increase in trade and FDI is mainly caused by a reduction in the heterogeneity of the *Barriers to competition*. This policy sub-domain appears to be of crucial importance for services trade and investment.

¹⁴ For the level effect we assume a 30% reduction for investors from other EU member states. This is a conservative estimate, since the many existing FDI restrictions are explicitly discriminatory with regard to foreign firms.

¹⁵ We used an interval of the estimated coefficient plus and minus one standard error.

Table 3.6 Policy factors underlying the increase in trade and direct investment in commercial services

	Minimum effects	Maximum effects
<u>Total intra EU trade increase</u>	30	62
of which:		
* Increase due to reduced heterogeneity in <i>Barriers to competition</i>	25	51
* Increase due to reduced heterogeneity in <i>Explicit barriers for trade and investment</i>	5	11
<u>Total intra EU FDI increase</u>	18	36
of which:		
* Increase due to reduced heterogeneity in <i>Barriers to competition</i>	7	18
* Increase due to less FDI restrictions (level effect) ^{a)}	11	16
* Increase due to less heterogeneity in <i>State control</i>	0	2

^{a)} In the scenarios we assume that investors from other EU countries will experience a 30% reduction in the level of FDI restriction of the destination country.

For FDI, also the reduced intensity of FDI restriction is of importance, as shown in Table 3.6. Our analysis concentrated on cumulative direct investment *stocks*, and since the adaptation of FDI stocks occurs mainly through annual FDI flows, the effect on annual direct investment flows will be much higher. To what extent this is the case depends on the length of the adaptation period.

3.7 Impacts of the 2004 Services Directive in the EU: conclusions

We derive firm indications that the EU service sector might benefit from the proposed EU directive through a substantial increase in international trade and investment. Assuming full implementation of the 2004 proposals, we estimate that bilateral commercial service trade could increase by about 30 to 62 per cent. Commercial service trade forms about one-tenth of total trade within the EU. This suggests that total intra-EU trade could increase by 2 to 5 per cent. FDI stocks in services could increase by about 18% to 36%.

These results indicate an order of magnitude. The impact analysis focused on trade flows and investment stocks; it does not provide a full welfare analysis. Possible welfare effects may result from price and income effects of the measures, but like the possible effects on innovation and productivity these have not been part of our analysis.

4 Switzerland lines up with EU liberalisation of services markets: quantitative effects

This chapter quantifies what happens if the Swiss government decides to voluntarily apply the 2004 EU Services Directive, and reaches an agreement with the EU on mutual recognition of national service regulations. We focus on the impacts for Swiss-EU trade and direct investment between Switzerland and the EU.

4.1 Data and methodology

The basic methodology for Switzerland is the same as applied for the EU. We comment first on the data basis for this analysis and subsequently on the trade elasticities for policy heterogeneity.

A first step was to complete the dataset of bilateral trade in commercial services between Switzerland and all individual EU member states. The reference period here again is 1999-2001. The bilateral data on services trade are drawn from OECD (2004) and supplementary data supplied by SECO. We use the OECD trade aggregate "*Other commercial services*" that includes trade in *Trade and Distribution, Business Services, Hotels and Restaurants, Personal Services, Construction, and Financial Services*. Transport and travel services are excluded. Missing trade data have been completed by using data from partner countries. In some cases the reporting country and the partner country reported different bilateral trade. For these cases we applied the Lejour-Verheijden (2004) regression method for identifying the countries whose reported bilateral trade coincided best with the mirror report by their partner countries. This was used for a statistical reliability ranking of countries. By using – in case of conflicting data – the data of the most reliable reporter of the two reporters we have completed our bilateral trade dataset. Data for 2000 and 2001 are deflated to correct for nominal differences caused by US dollar inflation.

The same data procedure has been applied for bilateral data on inward foreign direct investment stocks of Switzerland and the EU member states. The data represent the total stock of foreign direct investment in a particular reporting country, with the stock detailed per country of origin, i.e. per country from where the multinational company invested in the reporting country.¹⁶ We used OECD data on bilateral FDI stocks and supplementary data for Switzerland, supplied by

¹⁶ Bilateral FDI stocks are used rather than annual FDI flows, for three reasons. The first reason is a very practical one: to our knowledge there is no authorised international dataset available for bilateral FDI flows. The second reason is that stock data are closer to the level of actual production by foreign affiliates than annual flow data. Thirdly, bilateral FDI flows are very volatile from one year to another; a few large transactions like mergers may cause large swings in the annual data, sometimes causing negative flows.

SECO. Missing data were completed by using data from the partner country. In those cases that the reporting country and the partner country published substantially different figures on bilateral FDI stocks, we applied a similar procedure for selecting the most reliable reporting country as we applied for bilateral trade data. All bilateral FDI data are for the year 1999. A serious handicap for our research is that –as of yet– no authorised international data set is available for bilateral FDI stocks in the services sector. Sectoral data of FDI stock and flow data are available on a country basis, but not on a bilateral basis with countries of origin and destination specified. We therefore use bilateral total FDI stock data, covering all sectors.¹⁷ In order to prevent that these non-services effects create a bias in estimating the impact of the EU directive on investment, we apply a weighting procedure to exclude effects on sectors that are not affected by the proposed EU directive. Chapter 5 discusses the sensitivity of our FDI results for this weighting procedure.

For Swiss-EU services trade we have applied the same elasticities as we have estimated for the impact of regulatory heterogeneity on intra-EU trade in other commercial services. The reason for doing so is that in our opinion Swiss data fit very well within the sample of the EU data. The sample homogeneity holds for all relevant data areas:

- Policy variables: Swiss - EU data with regard to the relevant policy variables do not display systematic or very large differences. The bilateral heterogeneity in product market regulation between Switzerland and the EU countries is in a range comparable to bilateral heterogeneity among EU countries (cf. Table 3.4). The same holds for the level of regulation intensity (Table 3.1).
- Services trade: Swiss services trade (other commercial services) is relatively large compared to other small countries like Ireland or Austria. It is, however, comparable to that of Belgium-Luxembourg and the Netherlands, and smaller than German and UK services trade. So, the Swiss trade data fit in our EU sample.
- Bilateral FDI stock: The Swiss outward and inward FDI positions are comparable to those of Belgium-Luxembourg and Italy. The positions of the UK, Germany and the Netherlands are larger, while those of most other EU countries are smaller.
- Trade to GDP relation: Swiss exports of 'other commercial services' to the European Union represent some 6 per cent of Swiss GDP. This is a bit higher than for the EU average, which is due to the fact that the EU is dominated by some large countries where trade openness is generally a bit lower than in small countries. It is therefore more appropriate to compare Switzerland with a country like Belgium; other commercial services trade and GDP of Belgium

¹⁷ FDI stocks in non-service sectors are also affected by the heterogeneity and a country's relative intensity of product-market regulation.

are almost identical with the Swiss figures. Hence, with respect to the relation between GDP and services trade, Switzerland is completely in line with comparable EU countries.

- Relative size of Switzerland in independent variables: both for total services and for 'other commercial services' it holds that the size of Swiss services trade is approximately 4 per cent of trade by EU15 countries. Swiss FDI stocks (all sectors) in the EU represent about 8 per cent of total intra-EU FDI stocks.

We have tested whether the Swiss data are outliers in the EU sample using Grubb's test for outliers.¹⁸ This test was done for each additional Switzerland-related observation. Grubb's test is applied for the following regression variables: bilateral other commercial services trade, bilateral FDI stocks, GDP, distance, language distance, level of product market regulation, level of FDI restriction, barriers for entrepreneurship, and the heterogeneity variables on administrative barriers to start-ups, Barriers to competition, Regulatory and administrative opacity, State control, and Explicit barriers to trade and investment. The hypothesis that an observation is no outlier was never rejected for the Switzerland-related observations. The results of these tests also indicate that the Swiss data points fit well in the EU sample.

Given the data analysis so far it is highly unlikely that the inclusion of Swiss data points would substantially alter the EU parameter estimates and the results of the scenario analysis. The estimation results will not change significantly if the data for Switzerland are included in the sample. This allows us to use our earlier elasticity estimates (cf. Annex 1) to analyse the impact of the EU Services directive on bilateral trade between Switzerland and the EU. Moreover, it should be noted that the scenario outcomes are expressed as an order of magnitude, and must also be interpreted as such rather than as single-point forecasts. Effects of small changes in parameters due to the inclusion of the Swiss data points most likely fall within the presented uncertainty range.

4.2 Results of the scenario analysis for Switzerland-EU services trade

The scenario analysis uses the estimated elasticities of bilateral services trade with respect to the policy variables in origin and destination country, especially those that reflect the response of bilateral trade to a higher or lower level of policy heterogeneity.¹⁹ Using these elasticities and

¹⁸ This test takes the absolute value of an observation minus the mean. This absolute value divided by the standard deviation. The mean and standard deviation are calculated using the EU sample excluding the Swiss data. The test results are available upon request.

¹⁹ The estimated coefficients (and their standard errors) are reported in the second data column of Annex I. Note that exports are estimated in logs. So the new export level equals the old export level (2001) times the exponent of the product of the change in heterogeneity and the estimated coefficient.

the expected impact of the Services Directive on policy heterogeneity (reported in Table 3.5), we calculate the expected change in bilateral services exports. The change percentage is different for every bilateral relation between Switzerland and individual EU countries, because the heterogeneity in regulation and the change induced by the EU directive varies for each country pair.

Our estimates are presented as a range of likely outcomes. The reason for presenting a range rather than a single figure is that the estimates are subject to two types of uncertainty, one statistical and one on the eventual impact of the directive on bilateral policy heterogeneity. With respect to the latter we use the bandwidth on the expected impact of the EU directive on the heterogeneity indicators as presented in table 3.5. The statistical uncertainty reflects the confidence interval of our elasticity estimates: we use an interval of the estimated parameter plus and minus one standard error. We combine the two kinds of uncertainties for presenting the effects for Switzerland in three variants: a minimum-effect variant, a central variant and a maximum-effect variant.

Table 4.1 Impact on Swiss-EU bilateral trade in commercial services^{b)} (% change based on 2001 data)						
Effects	Minimum variant ^{a)}		Central variant ^{a)}		Maximum variant ^{a)}	
	Swiss exports	Swiss imports	Swiss exports	Swiss imports	Swiss exports	Swiss imports
Total effect on Swiss– EU trade in 'other commercial services'	40	41	60	60	84	85
of which:						
* due to less heterogeneity in <i>Barriers to competition</i>	30	30	44	45	63	63
* due to less heterogeneity in <i>Explicit barriers to trade and investment</i>	10	10	16	16	22	22

^{a)} The central effect is calculated by using the parameter estimates and the middle of the bandwidth on the expected impact of the directive on regulatory heterogeneity. The minimum-effect variant uses the values of the parameter estimates minus one standard error and taking the minimum value of the bandwidth in table 3.5. The maximum-effect variant uses the values of the parameter estimates plus one standard error, and takes the maximum value of the bandwidth in table 3.5.

^{b)} Data for 'Other Commercial Services'. This aggregate includes trade, distribution, business services, hotels and restaurants, personal services, construction and financial services. See main text for a note on the impact of financial services.

Table 4.1 presents the results for Switzerland, and decomposes it with respect to the underlying policy factors. The effects on Swiss commercial services exports to the EU vary, according to the scenario involved, between +40 and +85 per cent, whereas the effects on imports vary between +41 and +85 per cent. This is a fairly broad range. About three-quarters of the effect stems from reduced heterogeneity in the policy sub-domain *Barriers to competition*, the rest from reduced heterogeneity in *Explicit barriers to trade and investment*. The reduced heterogeneity in the latter category is more important for Switzerland than for the EU15. This

explains to a large extent the bigger trade effects of the proposed directive for Switzerland than these are for the EU15.

4.3 Impacts on bilateral Switzerland-EU direct investment stocks

Our econometric results indicate that the size of bilateral FDI stocks is significantly affected by the heterogeneity and intensity in regulation. Using these quantitative results we now investigate the effects on Swiss-EU bilateral FDI stocks when Switzerland would also apply the 2004 EU proposal for a services directive.

As a starting point we take the preferred parameter estimates (reported in the last data column of Annex 1). Note that the bilateral FDI stocks are also affected by a lower *level* of national FDI restrictions in the destination countries.²⁰ To account for the effects of the proposed directive on bilateral regulation heterogeneity we again use the expected impact of the EU directive on the regulation heterogeneity (Table 3.5). For every country pair we estimated the expected change in FDI stocks that results from the implementation of the EU directive; it differs for each bilateral relation, because the heterogeneity in regulation varies for per country pair. Because the estimated coefficients apply to *total* FDI stocks, we correct the total result for the share in FDI stock of those services that are covered by the proposed EU directive. Here we apply a correction factor based on EU data. Chapter 5 shows the impact of alternative assumptions. The resulting changes in FDI stocks are presented as a bandwidth between a maximum and a minimum effect, in the same way as was done for bilateral exports. The central variant is calculated by using the parameter estimates and the middle of the bandwidth on the expected impact of the directive on regulatory heterogeneity. Table 4.2 presents the effects on bilateral FDI stocks between Switzerland and the EU, together with a decomposition showing the impacts of the underlying policy factors.

Swiss FDI stocks in the EU services sector could increase by 20 to 41 per cent as a consequence of applying the services directive, while EU foreign direct investment stocks in the Swiss services sector could increase by 29 to 55 per cent. The largest effects are caused by the fact that the directive will reduce the heterogeneity in *Barriers to competition*, and the level of *FDI restrictions*. A much smaller positive effect results because the services directive may also

²⁰ For the level effect we assume a 30% reduction for investors from EU member states. This is a conservative estimate, because the directive does not aim at abandoning national regulation or lowering national regulation levels. However, some elements of the directive (single point of contact, electronic handling of administrative requirement for firm start-ups, a ban on discriminative requirements for foreign firms) will effectively lower the level of regulation as experienced by investors from Switzerland and the EU member states.

4.2 Impact on Swiss-EU bilateral FDI stocks in services (% change based on 1999 data)

	Minimum variant ^{a)}		Central variant ^{a)}		Maximum variant ^{a)}	
	Swiss outstock	Swiss instock	Swiss outstock	Swiss instock	Swiss outstock	Swiss instock
Total effect on Swiss– EU direct investment	20	29	29	41	41	55
of which:						
* due to less heterogeneity in <i>Barriers to competition</i>	9	9	15	15	23	23
* due to less heterogeneity in <i>State control</i>	0	0	1	1	2	2
* due to lower level of FDI restrictions ^{c)}	10	20	13	25	16	31

^{a)} The central effect is calculated by using the parameter estimates and the middle of the bandwidth on the expected impact of the directive on regulatory heterogeneity. The minimum-effect variant uses the values of the parameter estimates minus one standard error and taking the minimum value of the bandwidth in table 3.5. The maximum-effect variant uses the values of the parameter estimates plus one standard error, and takes the maximum value of the bandwidth in table 3.5.

^{b)} This refers to possible negative effects from reduced heterogeneity in other policy areas (*Regulatory and administrative opacity; administrative barriers to start-ups*) and a reduced level of regulation with respect to *Barriers to entrepreneurship*. These effects are based on the non-significant elasticities for the policy variables reported in Annex I (last data column: destination countries). We apply the estimated parameters, uncorrected for the standard error. The negative impact of reduced heterogeneity in *Administrative barriers to start-ups* dominates.

^{c)} Each country's FDI restrictions for the base year are derived from the OECD (Golub et al. 2003).

reduce some heterogeneity in *State control*. The effects on inward stocks are larger than for the outward FDI stocks, because Switzerland has more restrictive inward-FDI barriers compared with the EU. The reduction in these (higher) barriers causes larger effects.

4.4 Impacts of the Services Directive on Swiss-EU trade and investment: conclusions

Our results indicate that the introduction of the 2004 EU services directive in Switzerland would very much intensify the economic relations between the service industries of Switzerland and the European Union. We have only investigated the direct effects of mutual liberalisation of services markets. These are strictly positive, both for Switzerland and the EU. Swiss exports of commercial services to the EU could increase by 40 to 84 per cent, while Swiss foreign direct investment stocks in EU services industries could increase by 20 to 41 per cent. EU services exports to Switzerland may rise by 41 to 85 per cent, while EU direct investment stocks in Swiss service markets could rise by 29 to 55 per cent.

5 Discussion of the main results

This chapter discusses the quantitative results in the light of the underlying assumptions and data limitations.

Structure of bilateral effects: decomposition of bilateral trade effects

In Table 5.1 the expected increase in Swiss trade in ('other') commercial services is decomposed by EU partner country. Even more than for the aggregate trade effects, the decomposed results should be interpreted as an order of magnitude rather than as point estimates. Keeping this in mind, Switzerland's largest bilateral trade increase will arise -in absolute terms- with partner countries United Kingdom, and Germany. The trade increase with other large trade partners (France, Italy, Netherlands and Belgium) will be much smaller. In relative terms, trade increases most substantially with France and Italy.

Table 5.1 Decomposition of expected increase in bilateral trade of Switzerland with EU14 members due to the Services Directive, Central variant, reference year 2001

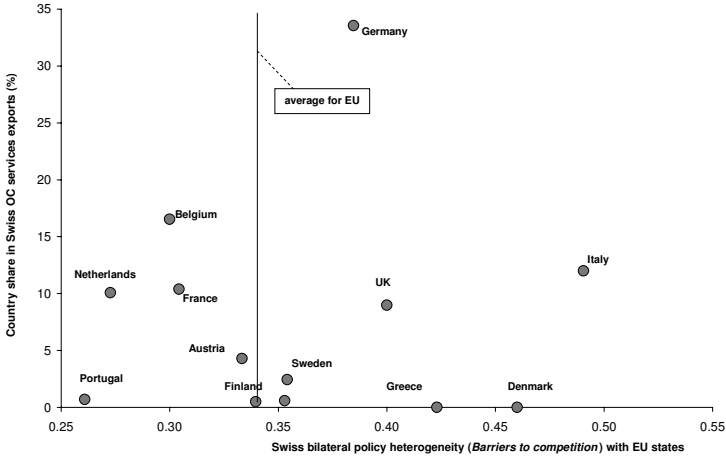
Partner country	Increase % of Swiss services exports to partner country ^{a)}	Increase % of Swiss services imports from partner country ^{a)}	Value of actual Swiss imports in 2001 (mln. USD)
Denmark	..	..	..
Greece	64	64	84
Sweden	65	65	427
United Kingdom	64	64	2493
Austria	58	58	454
Belgium-Luxembourg	42	42	1058
Finland	55	55	25
France	70	70	1236
Germany	57	57	2267
Ireland	..	..	..
Italy	80	80	1255
Netherlands	62	62	796
Portugal	48	48	52
Spain	..	..	..
Total trade Switzerland	60	60	3384

^{a)} Trade in other commercial services. Note that for the central scenario it holds that the percentage point increase of Swiss service exports is about the same as the increase in imports with a particular partner country.

The differences in the bilateral trade effects per EU country are explained by the fact that the policy heterogeneity differs for each specific country pair. Two policy sub-domains are most decisive for bilateral services trade: *Barriers to competition* and *Administrative barriers to*

start-ups. Three-quarters of the effect is caused because the EU services directive effectively lowers heterogeneity with regard to *Barriers to competition*. Figure 5.1 plots the country structure of Swiss services exports against bilateral policy heterogeneity in the policy sub-domain *Barriers to competition*.

Figure 5.1 Structure of Swiss exports of commercial services to EU countries and bilateral policy heterogeneity with regard to policy sub-domain 'Barriers to competition'



Note: Refers to trade in 'other commercial services' in 2001. Source: own calculations.

The largest effects occur in trade with those partner countries that (before introduction of the EU directive) have product-market regulations that are very different from Switzerland. Figure 5.1 shows that this is the case with its important trading partners like Germany, Italy, and the UK. Adoption of the EU services directive by Switzerland is expected to have the largest impact in the bilateral trade with these partner countries.

A similar country decomposition can be made for bilateral FDI relations with EU member states. Table 5.2 indicates that there is a clear difference between absolute and relative gains in bilateral FDI traffic per country.

In relative terms, Swiss FDI stock is expected to grow most in Austria, Finland and the Mediterranean countries (Italy, Spain, Portugal), whereas the increase in Ireland, the

Netherlands, and Belgium-Luxembourg will be small. The Italian, Danish, Spanish and British FDI position in Switzerland are expected to register the largest relative growth. In absolute terms, however, the value of Swiss FDI in UK, Germany, and France will grow most. Conversely, the absolute value growth of German, French and Dutch FDI stocks will account for most of the increased EU FDI position in the Swiss services sector.

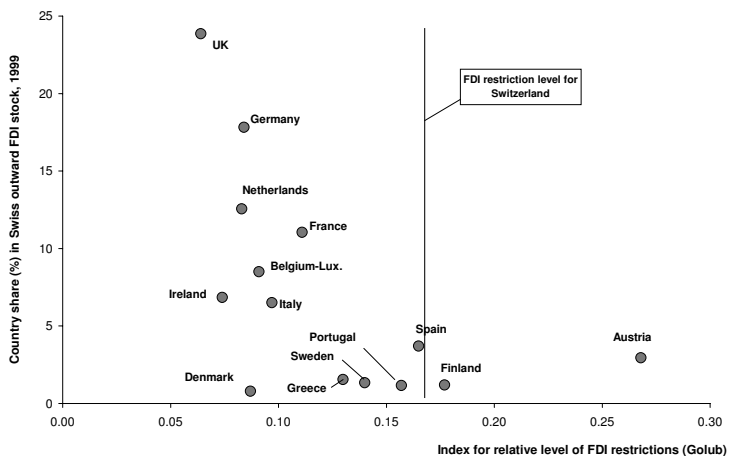
Table 5.2 Decomposition of expected change in Swiss - EU service FDI relations due to Services Directive, Central variant, reference year 1999

Partner country	Absolute increase in Swiss outward FDI stock (mln USD) ^{a)}	Increase % of Swiss outward FDI stock in services ^{b)}	Absolute increase in Swiss inward FDI stock (mln USD) ^{a)}	Increase % of Swiss inward FDI stock in services ^{b)}
Austria	1849	63	147	40
Spain	1655	45	148	45
Finland	504	42	..	..
Italy	2379	37	1802	49
Sweden	476	36	116	41
Portugal	400	34	..	..
Greece	522	34	..	..
Denmark	262	33	258	47
Germany	5120	29	4998	43
France	3182	29	3986	39
United Kingdom	6404	27	2221	44
Belgium-Luxembourg	2167	25	1453	39
Netherlands	2808	22	5157	37
Ireland	1255	18	..	..
Total for Switzerland	28982	29	20286	41

^{a)} See section 4.3 for calculation method. ^{b)} Compared to initial (1999) bilateral FDI stock.

The differences in bilateral FDI stocks are mostly due to the effect of the services directive on bilateral policy heterogeneity with respect to 'Barriers to competition' (already shown in Figure 5.1), and to the diminished level of regulatory restrictions for investing foreign services firms. Figure 5.2 displays the initial level of FDI restrictions per country against the country share in Switzerland's outward FDI stocks. The picture clarifies why FDI in Austria is likely to grow.

Figure 5.2 Structure of Swiss outward stocks (1999) and the level of FDI restrictions per countries



Note: A country's relative intensity of FDI restrictions is measured by the OECD index described in Golub (2003).

Impact on total FDI stock and on services FDI stock

Due to lacking data on bilateral FDI in specific services sectors we use data for total FDI stock (all sectors). Hence, we must account for the fact that the services directive will affect only part of the total bilateral FDI stocks. In the period 1998-2000, one-third of average FDI inflows in the EU went to sectors that are covered by the proposed EU directive (Kox, Lejour and Montizaan 2004a). Note that the current share is partly the endogenous result of the present-day policy heterogeneity and sectoral FDI restrictions in the EU countries. We therefore kept on the conservative side when we used a 0.33 correction factor for the expected FDI stock increase for services.

This 0.33 correction factor has also been used for Switzerland in Table 4.2. However, in chapter 2 it was shown that the sectoral structure of Swiss inward and outward FDI stocks is quite different (see Figures 2.1 and 2.2). This suggests that for Switzerland we should apply a differentiated correction factor for inward and outward FDI stocks. Otherwise we might over-estimate the effect of the services directive on Swiss outward FDI stocks, while at the same we under-estimate its impacts on Swiss inward FDI stocks.

By way of sensitivity analysis, Table 5.3 shows the results of different weighting assumptions. For Swiss outward FDI stocks we use a 0.10 correction factor and for foreign FDI stocks in

Switzerland we use a 0.70 correction factor. This correction would imply a larger difference between expected changes in incoming and outgoing FDI stocks due to the services directive.

Table 5.3 Impact on Swiss-EU bilateral FDI stocks in services: alternative weighting assumptions^{a)} for the services share in total FDI stock (% change based on 1999 data)

	Minimum variant ^{a)}		Central variant ^{a)}		Maximum variant ^{a)}	
	Swiss outstock	Swiss instock	Swiss outstock	Swiss instock	Swiss outstock	Swiss instock
Total effect on Swiss– EU direct investment	6	64	9	90	12	122

a) For the results in this table it is assumed that the services directive affects 0.10 of Swiss FDI outstock and 0.70 of the total foreign FDI stocks in Switzerland. (In Table 4.2 an identical weighting factor of 0.33 was assumed for both cases).

A note on the role of financial services in Swiss services trade

As shown in chapter 2, Switzerland has a relatively high component (27%) of financial services in its services trade: 27 per cent of its total services trade to all countries, and 50 per cent of 'other commercial services' exports to all countries. The data in chapter 2 suggest that the share of financial services in trade with EU countries might be somewhat lower. Nevertheless, some caution is required as to translating the predicted rise in EU-Swiss services trade into growth figures at a lower aggregation level than 'other commercial services' (for which the parameter estimates were done). Financial services as such will be hardly affected by the EU services directive.²¹ Further sectoral specification would require additional research and more sector-specific bilateral trade details.

Missing country observations

The trade effects of the services directive in Table 4.1 are calculated on the basis of an incomplete set of data on bilateral services trade between Switzerland and the EU. Data are lacking on commercial services trade between Switzerland and Spain, Denmark and Ireland. Although these countries probably are no large trading partners, we have reason to expect that completion of the data set with these countries would increase rather than diminish the relative trade growth due to the services directive. This is due to the structure of bilateral policy heterogeneity of Switzerland with these countries.²² Annex 2 shows the value of the relevant policy variables.

²¹ There could be some effects in the area of auxiliary financial services.

²² The structure of Swiss policy heterogeneity in the policy sub-domain Barriers to competition with the missing countries is larger than with the EU average, while the opposite holds for policy heterogeneity in the sub-domain Administrative barriers to start-ups (a countervailing force, cf. Table 4.1).

Indirect welfare effects of a common adoption of the EU services directive

The assessment in this report did not quantify other economic effects outside the trade and FDI effects. More openness and less policy heterogeneity in the European market for services may however cause several – often positive– indirect welfare effects. We mention the most important indirect welfare effects.

The overall economic growth potential of both Switzerland and the EU countries may improve due to a rise in the productivity of the service industries. There are three main channels along which the productivity jump may take shape: (a) the service sector will be better capable of exploiting scale economies through production for other European markets; (b) the competitive selection process will become stronger, causing under-performing firms to exit sooner; and (c) the influx of more productive foreign subsidiaries raises overall productivity of domestic service industries.²³ With regard to the last-mentioned productivity effect, several authors provide evidence for the existence of positive spillovers in the USA and the UK (Haskel *et al.* 2002; Keller and Yeaple 2003). It is plausible that in services, and in particular intermediate services, positive spillovers will occur through forward linkages.²⁴

Another welfare effect runs through changes in the domestic producer surplus. In some cases, the profits of domestic service producers will be affected positively due to more export possibilities. Less competitive domestic producers will see their profits affected in a negative way. The balance between these two groups of producers may differ by economic sector. It would require much more detailed research to quantify this effect.

More competition lowers service prices, brings more variety and innovative service products. This will enlarge the consumer surplus, and thus benefit domestic consumers in Switzerland and EU countries. Also producers can benefit. Since the most internationally traded services are intermediate inputs, more European competition will lower intermediate unit input prices and thus make the client industries more competitive in both Switzerland and the EU.

²³ Cf. Görg and Strobl (2001).

²⁴ Smarzynska Javorcik (2004) argues that such spillovers mainly arise through vertically oriented FDI (backward linkages, joint ventures) and not so much through horizontal direct investments and forward linkages. This analysis is only based on evidence for manufacturing, however.

6 Conclusions

The present report quantifies the possible effects on the bilateral services trade and FDI between Switzerland and EU member states for a scenario in which Switzerland voluntarily adopts the EU services directive. We assume that this adoption goes along with a formal agreement between Switzerland and the EU on mutual recognition of services regulations. This would mean full integration of Switzerland in the European internal services market.

The European Commission's 2004 proposals for a Services Directive consists of measures to reduce or eliminate the obstacles of cross-border trade of services by introducing the 'country of origin' principle. It implies that regulation of the country of origin is relevant, and that the country of destination has no right to impose new regulation. The European Commission has also proposed measures to reduce the obstacles for the establishment of an affiliate abroad by introducing a single point of contact for the service providers to deal with all rules and procedures. Moreover, the EC also introduces mechanisms to build up trust of the member states in each other national regulatory regimes. The EU proposal is only partially aimed at reducing the level of service market regulation in Member States, although local producers might benefit as well from some proposed measures that focus on the elimination of unnecessary and EU-incompatible national regulations.

Our results indicate that the introduction of the 2004 EU services directive in Switzerland would very much intensify the economic relations between the service industries of Switzerland and the European Union. We have investigated the direct effects of mutual liberalisation of services markets. These are strictly positive, both for Switzerland and the EU.

Our estimates are presented as a range of likely outcomes, given statistical uncertainties and uncertainties related to the eventual implementation form of the services directive. The results must therefore be interpreted as a likely order of magnitude of the long-term effects rather than as point forecasts. Keeping this in mind, Swiss exports of commercial services to the EU could increase by 40 to 84 per cent, while Swiss foreign direct investment stocks in EU services industries could increase by 20 to 41 per cent. EU services exports to Switzerland may rise by 41 to 85 per cent, while EU direct investment stocks in Swiss service markets could rise by 29 to 55 per cent. The expected impacts on bilateral Swiss-EU FDI stocks would change if we account for the different composition of the Swiss inward and outward FDI stocks. Correcting for this, the Swiss outward FDI stocks would increase by only 6 to 12 per cent, while the inward FDI stock might increase by 64 to 122 per cent.

Our analysis does not take into account more indirect welfare effects of the EU services directive such as those related with more competition, lower services prices, positive effects for labour productivity growth in services, and the supply of innovative services from abroad.

Annex I Estimation Results

Explaining bilateral trade in commercial services and bilateral direct investment

Transformed variables, DM method ^{b)}	FIML ^a estimation method		SUR ^a estimation method	
Dependent variable:	Bilateral service exports		Bilateral direct investment	
Country perspective	Origin country ^{c)}	Destination country ^{d)}	Origin country ^{c)}	Destination country ^{d)}
<u>Gravity variables</u>				
In GDP Origin	0.83*** (0.04)		0.95*** (0.09)	
In GDP Destination		0.88*** (0.04)		0.74*** (0.06)
In Distance	-0.85*** (0.09)	-0.85*** (0.09)	-1.08*** (0.13)	-1.08*** (0.13)
Language distance	-0.71*** (0.22)	-0.71*** (0.22)	-0.15 (0.14)	-0.15 (0.14)
In(productivity service sector origin country)			0.05*** (0.01)	
<u>Policy level variables</u>				
Product market regulation. origin country	-0.34*** (0.09)		-0.87*** (0.18)	
Barriers to entrepreneurship, destination country		-0.03 (0.07)		-0.21 (0.13)
FDI regulation indicator, destination country				-8.27*** (1.42)
<u>Policy heterogeneity variables</u>				
Heterogeneity, Barriers for start ups	0.35 (0.36)	0.35 (0.36)	0.48 (0.44)	0.48 (0.44)
Heterogeneity Barriers for competition	-3.10*** (0.55)	-3.10*** (0.55)	-3.28*** (0.84)	-3.28*** (0.84)
Heterogeneity Regulatory and admin. opacity	-0.23 (0.33)	-0.23 (0.33)	-0.89 (0.56)	-0.89 (0.56)
Heterogeneity State control	0.74 (0.58)	0.74 (0.58)	-1.43*** (0.77)	-1.43*** (0.77)
Heterogeneity Barriers to trade and investment	-0.86*** (0.30)	-0.86*** (0.30)	0.30 (0.54)	0.30 (0.54)
Year dummy 2000	0.01 (0.10)	0.01 (0.10)		
Year dummy 2001	-0.01 (0.10)	-0.01 (0.10)		
Constant	dummies for destination significant	dummies for origin significant	dummies for destination significant	dummies for origin significant
Number of observations	481	481	195	260
Adjusted R-squared	0.70	0.61	0.66	0.47

Notes on Annex I:

a) Estimation method: Full Information Maximum Likelihood (FIML) for trade and Seemingly Unrelated Regression (SUR) for FDI stocks. In both cases, applying simultaneous estimation of equations for origin and destination countries. All bilateral variables expressed as deviation from the mean. This is done separately from the origin (exporting) country perspective, and from the destination (host) country perspective. Erkel-Rousse and Mirza (2002) impose identical coefficients for distance and language in the equations for origin and destination country. We do the same and also impose identical coefficients for policy heterogeneity for origin and destination country. Absolute value of standard error in brackets. Codes: *** = significant at 1% level; ** = significant at 5% level; * = significant at 10% level.

b) DM method (described in Kox and Lejour 2005).

c) In case of origin country perspective, we use data expressed as deviations from the mean host (destination) country, thus allowing for estimation of exporter-specific variables.

d) With the destination country perspective, we use data expressed as deviations from the mean exporter (origin) country, thus allowing for estimation of destination-specific variables.

Data sources: for country regulation data: Nicoletti, Scarpetta and Boylaud (2000); Golub (2003); for bilateral trade data: OECD (2003); FDI data: OECD.

Annex 2

Table A2 Structure of Swiss policy heterogeneity with the EU countries for which no bilateral service trade data are available

	Switzerland vs. EU average	Switzerland vs. Spain	Switzerland vs. Ireland	Switzerland vs. Denmark
Bilateral policy heterogeneity with respect to <i>Barriers to competition</i>	0.35	0.42	0.21	0.43
Bilateral policy heterogeneity with respect to <i>Explicit barriers to trade and investment</i>	0.22	0.30	0.33	0.40

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