

Liberalizing Services in Switzerland and with the European Union

Laurent Cretegny*

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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.

*Address : Institute for Economic Modelling (Eco'Modelling), Ch. de Clamogne 27,
CH - 1170 Aubonne. E-mail: laurent@cretegny.ch.

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.

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.

Modelling of services

Regarding the modelling of services, 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

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

²One 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.

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. 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 gains.

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.

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, 2003).

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 theorem. 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.

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 (2004), 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 table 1. 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

Table 1: Industries considered within each type of sectors

<i>Perfectly 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

^an.e.c. means not elsewhere classified.

variable costs. 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 given. 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 constant³.

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 and 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

³This 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 for firms to slide down their average cost curve in order to produce more output with the same fixed costs.

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 externalities⁴.

Structure of production and preferences

The structure of production for Switzerland is depicted in the appendix (figure 1) 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.

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 the appendix (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

⁴Lower 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.

under monopolistic competition are split 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 providers⁵. 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.

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

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 database, 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. 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

⁵Stages in the value chain are establishment, use of inputs, promotion, distribution, sales of services, after sales aspects and non-legal barriers.

- 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 (2005).

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. 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 (2005). Values for the reference year and for the different scenarios are reported in tables table 3 and 4. Barriers are distinguished between domestic, EU and ROW firms.

Elasticities of substitution

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, 2005; Jensen, Rutherford, and Tarr, 2004). Table 18

Table 2: Overview of the policy scenarios

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

in the appendix reports the values employed in the model for these specific elasticities.

A value assigned to a given elasticity of substitution in table 18 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 section presents policy scenarios 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 2.

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 3 gives an overview of the ad valorem tax equivalents of barriers to services aggregated across sectors⁶ in the benchmark and in each scenario for the different types of firms in Switzerland.

⁶Infrastructure services and business services sectors.

Table 3: Rent and cost creating (RC and CC) barriers to trade in Switzerland (level in % or change in %)

	Bench.	Sc. 1	Sc. 1a	Sc. 1b	Sc. 2	Sc. 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				

Table 4: Rent and cost creating (RC and CC) barriers to trade in the EU (level in % or change in %)

	Bench.	Sc. 1	Sc. 1a	Sc. 1b	Sc. 2	Sc. 2a
RC barriers for all firms	4.5		-49.5	-49.5	-48.4	-48.1
CC barriers for all firms	3.6		-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		-43.7	-43.7	-52.5	
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				-52.5	

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 4.

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 3 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 discrimina-

tion 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 3 and table 4.

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 3, 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 4). 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 4, 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 5. This specification yields medium run results.

Table 5: 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.

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 6 are liberalized.

Table 6: 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 7).

Table 7: 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 SwissSER⁷. 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.

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.

4.1.1 Central case results

The impacts of services liberalization on key macro variables are presented in table 8. 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.

Table 8: Macro results : Central case (level or change in %)

	Bench.	Sc. 1	Sc. 1a	Sc. 1b	Sc. 2	Sc. 2a
Welfare	150777	2.8	2.2	1.3	-0.3	-0.3
Real wage	1	3.8	3.6	2.3	-0.1	-0.1
Real GDP	246208	2.3	1.9	1.1	-0.2	-0.2
Terms of trade	1	-0.2	-0.3	-0.3	-0.1	-0.1

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

⁷The model is written in GAMS/MPSGE (Rutherford, 1999) and solved using PATH FerrisMunson00.

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 effects, and the contribution of induced changes in the terms of trade.

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.

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.

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 workers⁸ 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 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 value, which explains the difference between the percentage change in real GDP and the percentage change in welfare.

4.1.2 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

⁸The increase in the value of the firms output when one more worker is employed.

assume constant returns to scale in all sectors. Results in table 9 are self-explanatory. More than half of the welfare gains come from the contribution of endogenous productivity gains.

Table 9: Macro results : Perfect competition (level or change in %)

	Bench.	Sc. 1	Sc. 1a	Sc. 1b	Sc. 2	Sc. 2a
Welfare	150777	1.2	0.9	0.5	-0.2	-0.2
Real wage	1	2.8	2.7	1.9	0	0
Real GDP	246208	1.1	1	0.6	-0.1	-0.1
Terms of trade	1	-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 14 show that approximately 13% of welfare gains are related to increased backward and forward externalities.

Table 10: Macro results : Leontief services in ID (level or change in %)

	Bench.	Sc. 1	Sc. 1a	Sc. 1b	Sc. 2	Sc. 2a
Welfare	150777	2.5	1.9	1.1	-0.4	-0.3
Real wage	1	3.5	3.3	2.1	-0.1	-0.1
Real GDP	246208	2.1	1.7	1	-0.2	-0.2
Terms of trade	1	-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 11 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 11: Macro results : Reduced liberalization (level or change in %)

	Bench.	Sc. 1	Sc. 1a	Sc. 1b	Sc. 2	Sc. 2a
Welfare	150777	0.4	0.4	0.4	0.0	0.0
Real wage	1	0.9	0.9	0.9	0.0	0.0
Real GDP	246208	0.4	0.4	0.4	0.0	0.0
Terms of trade	1	-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 12 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 12: Macro results : Extended liberalization (level or change in %)

	Bench.	Sc. 1	Sc. 1a	Sc. 1b	Sc. 2	Sc. 2a
Welfare	150777	3.4	2.8	1.6	-0.4	-0.3
Real wage	1	4.7	4.5	2.7	-0.1	-0.1
Real GDP	246208	2.8	2.5	1.4	-0.2	-0.2
Terms of trade	1	-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 13).

Table 13: Macro results : Short run (level or change in %)

	Bench.	Sc. 1	Sc. 1a	Sc. 1b	Sc. 2	Sc. 2a
Welfare	150777	2.6	2	1.2	-0.3	-0.3
Real wage	1	3.7	3.5	2.3	-0.1	-0.1
Real GDP	246208	2.1	1.8	1.1	-0.2	-0.2
Terms of trade	1	-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 14).

Table 14: Macro results : Long run (level or change in %)

	Bench.	Sc. 1	Sc. 1a	Sc. 1b	Sc. 2	Sc. 2a
Welfare	150777	2.9	2.2	1.3	-0.4	-0.3
Real wage	1	3.8	3.6	2.3	-0.1	-0.1
Real GDP	246208	2.3	1.9	1.1	-0.2	-0.2
Terms of trade	1	-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. 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.

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. 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.

4.2.1 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, which translates for primary and manufacturing sectors through a shift of the supply curve to the left, reducing thus production. As these sectors produce less, demand for labour and capital declines. Imports on the other hand increase to satisfy domestic consumption.

4.2.2 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.

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 increase 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%).

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 15 is analysed.

Table 15: Elasticity values

Elasticity of substitution among individual 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 16 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 16: Welfare : Central case in Scen. 1 (change in %)

	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

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 impact on welfare of varying the value of these five key parameters.

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 consumption. With a high Armington elasticity, consumers from the EU and from the rest of the world readily substitute

Table 17: 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
esubd	2.5	2.8	3.2
esubnm and esubmn	2.8	2.8	2.8

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.

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 absolutely accuracy.

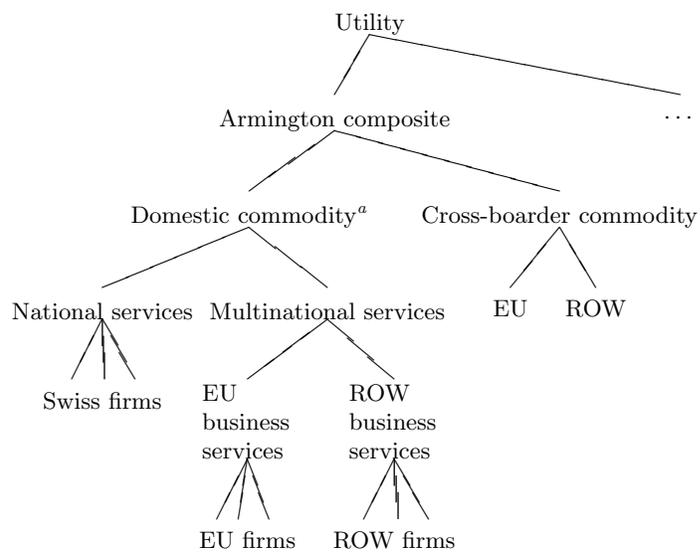
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Table 18: Elasticity values

	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

Figure 2: Structure of consumer preferences



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