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Impacts of Trade Liberalization, Tax Reform, and FDI Inflow to the Slovak Republic consequential to EU Integration - A World Link CGE Model Analysis

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October 2005

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Abstract

The objective of this paper is to analyze the consequences of Slovak Republic's EU integration by identifying the positive and negative impacts of this process. Specifically, the research is aimed to directly evaluate the impacts of EU accession based on a World Link Standard Computable General Equilibrium Model, in the short-, medium-, and long-term, and to confirm (or reject) a general opinion that integration should bring positive effects to the economy. Common EU market with free movement of commodities, labor and capital, structural reforms of Slovak Republic consequential to EU integration, and FDI flows, are the main policies under consideration. By developing a link CGE model applicable to the conditions and structure of not only the Slovak economy but of EU and the world, this paper identifies problems and based on the outcomes tries to make suggestions for policy measures. The research presented in this paper is new in several aspects. Source of data for each region is GTAP 6 database, with Slovak data supplemented by 2000 Social Accounting Matrix, Input-output and other data. Strong feature of the model is that it extends the concept of single-country CGE model into a world model, with each region having its own economy, and interconnected by international linkages. The model solves for equilibrium in each individual region and for the whole world at the same time. The world in the model is divided into several regions (countries), where the regional models are based on an individual Standard CGE model used by the World Bank. Every region is linked together and international flows are provided via channels of trade, capital, labor, FDI payments, and labor remittances. The link CGE model in this research has been designed to allow sectoral, regional (country), or international impact analyses. The model allows to carry out static and dynamic simulations; range for dynamic simulations is a period of 10 years with year 2001 as benchmark. Model functions are either of CES or CET type.

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1. Introduction

Slovak Republic has successfully joined the European Union (EU) on May 1st, 2004, creating a unique chance to overcome its social and economic lag with developed countries. The integration itself is a multidimensional process including complex political, economic, and social factors, and invites a wide participation of the society, beginning with the government and its integration activities, social institutions, organizations, employee and employer associations, private businesses, down to individuals. In spite this process in its early stage gives only a potential chance for development, it has no comparable alternative in the age of world globalization.

Experience of foreign countries shows that in order to participate efficiently in building a new, enlarged EU, the Slovak Republic urgently needs to create a mechanism allowing to systematically process and analyze policy impacts, programs, plans, and concepts. Unfortunately, such a system is at the moment very disperse or often completely absent.

The objective of this paper is to analyze the consequences of Slovak Republic's EU integration by identifying the positive and negative impacts of this process. Specifically, the research is aimed to directly evaluate the impacts of EU accession based on a World Link Standard Computable General Equilibrium Model, in the short-, medium-, and long-term, and to confirm (or reject) a general opinion that integration should bring positive effects to the economy. Several works have been published about Slovak Republic's integration process and its economic impacts. However, most of the single-country analyses are based on qualitative methods, and there is a lack of quantitative analysis. Other works accomplished mainly by foreign institutions utilizing quantitative and/or CGE approach, do not consider the Slovak Republic as a separate region, but as part or a greater integration (e.g. the Central European region), or neglect it completely because of data shortage. By developing a link CGE model applicable to the conditions and structure of not only the Slovak economy but of EU and the world, this paper identifies problems and based on the outcomes tries to make suggestions for policy measures.

The research presented in this paper is new in several aspects. Source of data for each region is GTAP 6 database, with Slovak data supplemented by 2000 Social Accounting Matrix, Input-output and other data. The model is not a single-country model, but is solved for the entire world. The world in the model is divided into several regions (countries), where the regional models are based on an individual Standard CGE model used by the World Bank.

Every region is linked together and international flows are provided via channels of trade, capital, labor, FDI payments, and labor remittances. The link CGE model in this research has been designed to allow sectoral, regional (country), or international impact analyses. The model allows to carry out static and dynamic simulations; range for dynamic simulations is a period of 10 years with year 2001 as benchmark. Model functions are CES (Constant Elasticity of Substitution), or CET (Constant Elasticity of Transformation) type.

Strong feature of the model is that it extends the concept of single-country CGE model into a world model, with each region having its own economy, and interconnected by international linkages. The model solves for equilibrium in each individual region and for the whole world at the same time.

Depending on availability of data, it is possible further to disaggregate households (e.g. urban and rural) for income distribution analysis, to disaggregate production factors (into e.g. labor by kind, capital by kind, land, etc.), to implement a range of various taxes (value added taxes, excise taxes, taxes on factors, import and export taxes, consumption taxes, etc.).

In order to evaluate the impacts of Slovak Republic's EU integration, following policy simulations are carried out:

1. Access to common market for goods and services - free movement of commodities between EU regions;
2. Access to common labor market - free movement of labor between EU regions, counter flows in form of remittances;
3. Access to common capital market - free movement of capital between EU regions, counter flows in form of FDI;
4. Structural reforms in the Slovak Republic - tax reform (flat value added tax (VAT), reduction of corporate income tax), FDI inflow, fiscal decentralization and reform of government budget, liberalization of business environment followed by investment increase, real appreciation of the Slovak Crown (SKK) due to monetary policy measures, etc.

2. Economic development in the Slovak Republic

Macroeconomic development in the Slovak Republic (SR) is affected by various factors, including development in the world markets, the country's EU accession, and economic reforms started in 1998. Recently, macroeconomic performance has been improving considerably, although some imbalances remain significant (EU 2003b, pp. 5-8). Real GDP growth was high, i.e. 4.6 % in 2002, 4.5 % in 2003, and 5.5 % in 2004. The volume of GDP created during 2004 was 1,325.5 billion SKK (at current prices), which was 10.3 % higher than the previous year (NBS, 2005, pp. 25-76), and 19.4 % more than two years earlier (NBS, 2004, pp. 26-45). Structure of economic growth is improving in a sense of balance between foreign and domestic demand. GDP in terms of use generated by domestic demand is primarily a result of dynamic growth in investment and consumption components. This increase is due to wage development, tax reform, and an increased FDI inflow. Growth in final household consumption was created foremost by increase in real wages and tax reduction for current household income, continuing growth of household propensity to consume, and availability of commercial bank loans and new consumer and mortgage loan products. Development of wages in 2004 was also faster than expected, however not causing inflationary pressure due to higher real labor productivity than real wage increases.

Figures on unemployment vary most depending on the reporting agency. According NBS (2005), unemployment dropped to 13.1 % from a level of almost 20.0 % five years before. EU reports that unemployment is fell from its level of 18.6 % in 2002 to 17.7 % in the first half of 2003. Employment is growing to a rate of roughly 57.0 % in 2002. In 2003, the average monthly nominal wage reached 14,365 SKK, representing a year-on-year increase of 6.3 %. Real wages fell by 2.0 %, after an increase by 5.8 % in 2002. The current account deficit again reached more than 8.0 % of GDP in 2002. However, it was more than fully covered by FDI inflows, which reached almost 17.0 % of GDP in 2002. The current account deficit dropped very significantly, to 1.5 % of GDP in 2003. This was primarily due to a favorable trend in the trade balance, especially growth of export. Increase in Slovak Republic's export performance is closely connected with FDI in previous years, with the most dynamic growth of export recorded in the automobile industry. Price level in 2003 and 1004 was determined mostly by increase in administered prices and higher indirect taxes, what led to an increase of the inflation rate from 3.4 % in December 2002 to 9.3 % in December 2003, and 5.9 % in December 2004. At the same time the core inflation remains low.

Approximating harmonized EU standards, the general government deficit reached 5.7 % of GDP in the election year 2002, but has been gradually lowered to 3.7 % in 2003, and 3.3 % in 2004. Target is set out to 3.0 % by the year 2006. General government debt decreased from 49.8 % of GDP in 2001 to 44.3 % of GDP in 2002 - mainly reflecting the use of part of the very high privatization receipts to retire government debt.

Table 1: Main economic indicators, Slovak Republic

Indicator	Unit	1998	1999	2000	2001	2002	2003	2004
Nominal GDP	bill. SKK	781.4	844.1	934.1	1,009.8	1,098.7	1,201.2	1,325.5
Real GDP (in 1995 prices)	bill. SKK	667.1	676.9	690.7	716.8	749.9	783.4	826.5
Real GDP per capita	SKK	123,751	125,469	127,883	132,675	139,109	145,614	153,566
Real GDP growth rate	%	4.2	1.5	2.0	3.8	4.6	4.5	5.5
Inflation rate - annual	%	6.7	10.6	12.0	7.1	3.3	8.5	7.5
Unemployment rate	%	15.6	19.2	17.9	18.6	17.5	15.6	13.1
State budget balance	bill. SKK	-19.2	-14.8	-27.7	-44.4	-51.6	-56.0	-70.3
General gov't budget balance	% of GDP	-3.8	-7.1	-12.3	-6.0	-5.7	-3.7	-3.3
General government debt	% of GDP	34.0	47.2	49.9	48.7	43.3	42.6	43.6
Gross foreign debt (whole economy)	% of GDP	56.2	52.7	54.8	54.1	48.2	49.8	57.7
Exchage rate (midpoint)	SKK/USD	35.242	41.417	46.200	48.347	45.335	36.773	32.045
Exchage rate (midpoint)	SKK/EUR	-	44.115	42.589	43.309	42.699	41.491	40.045
Structure of production	% of GVA	100.0	100.0	100.0	100.0	100.0	100.0	100.0
- Agriculture	% of GVA	5.0	5.3	5.3	5.3	5.2	5.3	5.0
- Industry	% of GVA	30.6	27.1	26.8	27.8	26.8	26.8	25.3
- Construction	% of GVA	6.6	6.2	5.0	3.5	3.8	3.3	3.4
- Services	% of GVA	48.7	52.6	53.2	53.3	53.7	56.0	57.5
- Other	% of GVA	9.1	8.8	9.6	10.2	10.4	8.6	8.8
Structure of expenditure	% of GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0
- Final consumption expenditure	% of GDP	76.7	76.8	76.3	78.2	77.8	76.1	76.3
- Gross fixed capital formation	% of GDP	34.0	27.6	26.1	30.0	29.3	25.3	26.4
- Export of goods and services	% of GDP	59.7	61.4	70.8	73.4	71.7	77.4	77.0
- Import of goods and services	% of GDP	70.4	65.7	73.3	81.5	78.9	78.9	79.7
Import of goods and services	bill. SKK	466.7	518.1	661.5	741.0	788.2	933.2	1018.0
Export of goods and services	bill. SKK	550.0	554.8	684.4	823.5	866.3	951.1	1053.6
Current account balance	% of GDP	-10.7	-4.4	-2.5	-8.2	-7.1	-1.5	-2.7
Export with EU-15	% of total	55.7	59.4	59.0	59.9	78.7	-	-
Import with EU-15	% of total	50.1	51.7	48.9	46.8	82.5	-	-
FDI inflow	mill. SKK	18,582	16,689	99,561	61,448	185,954	39,036	28,690
FDI inflow	% of GDP	2.4	2.0	10.7	6.1	16.9	3.2	2.2
Population average	thous. pers.	5,391	5,395	5,401	5,380	5,379	5,379	5,382
Natural growth rate	per thous.	0.82	0.70	0.45	-0.16	-0.13	-0.10	-0.35
Infant mortality rate	per thous.	8.79	8.31	8.58	6.24	7.63	7.85	-
Life expectancy - male	at birth	68.6	68.9	69.1	69.5	69.8	69.8	-
Life expectancy - female	at birth	76.7	77	77.2	77.5	77.6	77.6	-

Sources:
1. Eurostat
2. Statistical Office of the Slovak Republic
3. National Bank of Slovakia
4. Ministry of Finance of the Slovak Republic
5. Authors' calculations

Notes:
1. Part of data is preliminary
2. Data are collected from various sources and may be inconsistent.

3. Slovak Republic in the EU

The Slovak Republic along with nine other countries has become member of EU on May 1st, 2004. Within only the first year of our membership, positive development in the economy can be noticed. This however is due to long and tedious path of reforms and convergence process, which has been launched several years before. One of the significant factors is growth of FDI inflow. This, together with investment demand, increasing growth of household consumption resulting from real wage increases, better access to lending sources and partly tax reduction, are the most significant factors contributing to economic growth. On the other side, increase in net export deficit has moderate negative economic effects. This however may be explained by import of production technology connected with FDI.

In recent years, the Slovak economy shows the fastest growth rates between countries of the Visegrad[1] group (V4). The driving force of this growth changed from foreign to domestic demand, while the contribution of the foreign sector is negative. Exports show double-digit growth. Imports, however, driven by high investment and private consumption demand, grow even faster. The fast growth in private consumption is influenced by growth of real wages and lower income taxes. Even though the long term current account deficit has been showing slight improvement in the past few years, it increased again in 2004, as a result of higher imports, but also due to the substantial growth profit repatriation. Labor market in longer spam shows increase in employment, although in 2004 is characteristic by significant slowdown due to cost-saving measures in the public sector. Reforms in the labor market cause steady improvement in unemployment rates. Inflation continues to decrease, although its remaining, relatively high level is connected with price deregulation and indirect tax increase. General government budget is absorbing a large package reform agenda, which is reflected on both income and expenditure side. Reform of the tax system brings a uniform tax rate of 19.0 % for personal income tax, corporate income tax, as well as value added tax (VAT). In parallel, labor market reforms, privatization of strategic sectors, social reforms including pension system, health system, school system, and public institution reforms, are carried out. Even though the majority of measures has been carried out already, measures in price liberalization, exchange market, support and development of entrepreneurial

[1] Poland, Czech Republic, Slovak Republic, and Hungary. Originally, the Visegrad group originates in 1335, when the Czech, the Polish and the Hungarian king held a meeting in the Hungarian city of Visegrad. The modern era V4 group originates on a summit of Czechoslovak, Hungarian and Polish government officials, held in the city of Visegrad on February 15th, 1991, to establish co-operation between these three states (four, after the division of Czechoslovakia on January 1st, 1993) in order to accelerate the process of European integration.

environment, continue. Budget deficit of the general government in 2004 was lower than planned, mostly due to delay expenditures related to co-financing from EU funds. Due to strong pressure on appreciation of SKK, key interest rates have been decreased significantly.

The process of European integration is closely monitored by the EU itself, in its regular strategy papers, and the assessment reports on preparedness for EU membership (see e.g. EU 1999, 2002, 2003a, 2003b). The strategy papers are quite lengthy and give suggestions for strategy of accession on a yearly basis. The assessment reports monitor the implementation of the Acquis[2]. There are works dealing especially with data by Eurostat (2003).

There is a new series of documents that will replace the accession monitoring reports. These are related to the following aim to join the European Economic and Monetary Union (EMU)[3], to which the Slovak Republic has agreed by joining the EU. Title of the document is The Convergence Programme for the Slovak Republic, and is regularly updated. The Slovak side has submitted it for the first time on May 14th, 2004. After being reviewed by the European Commission, a new Assessment document (EU, 2004) is published in return.

The Slovak Republic formally applied in June 1995 for EU[4] membership at the EU summit in Cannes. The main legislative norm, which regulates the activities of the Slovak Republic in the process of European integration, is (was) the European Association Agreement between the European communities (European Community, European Community for Coal and Steel, and European Community for Nuclear Energy) and their member states on one side and the Slovak Republic on the other side. This international legislative norm is the source of primary legislation of the European Community and it states

[2] Acquis Communautaire, or Community Acquis, in full. It is the body of common rights and obligations, which bind all the Member States together within the European Union. The Community Acquis comprises not only Community law in the strict sense, but also all acts adopted under the second and third pillars of the European Union and the common objectives laid down in the Treaties (and also declarations and resolutions made by EU, issues regarding common foreign and security policy, measures relating to justice and home affairs, international agreements made by the Community or EU states between themselves, sectoral policies, economic and fiscal affairs, regional policy, environment, external policies, and financial questions). Applicant countries must accept the Community Acquis before they join the Union. Exceptions from the Acquis are granted only in exceptional circumstances and are limited in scope.

The members of the EU cooperate in three distinct areas, often called pillars. At the heart of this system is the European Community (EC) pillar with its supranational functions and its governing institutions. The EC pillar is supported by two pillars based on intergovernmental cooperation: Common Foreign and Security Policy (CFSP) and Justice and Home Affairs (JHA). These two pillars are a result of the Maastricht agreement to develop closer cooperation in these areas.

[3] also referred to as Eurozone

[4] EU was established on February 7th, 1992 by the signing of the Treaty on European Union in Maastricht, by a group of European countries that have chosen to integrate many of their economic activities, including forming a customs union and harmonizing many of their rules and regulations; it was preceded by European Economic Community (EEC) and European Community (EC).

the framework of strategy for preparation for Slovakia to join the EU as a fully-fledged member. Since this document is very extensive and covers most areas of social, political and economic issues, we will analyze and utilize for the purpose of our research only the part, which deals with foreign relations and foreign trade.

The EU, during the summit in Amsterdam[5] made an agreement to develop a European Union, which will support mutual economic and social development, first of all by creating an area without borders and by implementing an economic and monetary union (Nováčková 2000, p. 137). A common market is defined as market without internal borders, where there is, in harmony with the European Community Treaty (EC Treaty)[6], guaranteed a free movement of goods, persons, services and capital. It creates a customs union, which unifies the system of tariffs between the member states. The goal of a customs union is to introduce a unified customs policy in business relations to third countries, especially to apply a unified tariff system (Nováčková 2000, pp. 142-146). By joining the EU, Slovakia would also belong to the EC Treaty. According to Article 23 of the Treaty, it becomes part of a customs union, which covers all trade with goods and it prohibits export and import tariffs and other fees with similar effect between the member countries and at the same time it unifies the tariff system in relation to third parties.

European integration is a process of political, economic, social, and cultural integration of European states into a tighter bloc (Link 3). The main and most powerful body of European integration is the EU, though other institutions like the Council of Europe[7] also integrate their member states. EU has grown from the six founding member states in 1952, to the 25 current member states. There were four successive enlargements during this period, with the largest occurring on May 1st, 2004, when 10 new member states, including the Slovak Republic, joined. Further enlargement is scheduled for 2007, with the addition of two candidate states, and in time the European Union may grow to 30 member states.

Eligibility of a nation to become member of the EU is based on fulfillment of economic and political conditions generally known as the Copenhagen Criteria[8] (Link 3). The criteria

[5] In 1997, Treaty of Amsterdam was signed, that came into force on May 1st, 1999.
[6] First signed on March 25th, 1957 in Rome, establishing the European Economic Community (EEC Treaty); it was amended by Maastricht Treaty; and amended again by Amsterdam Treaty.
[7] Council of Europe is an international organization of 46 member states in the European region. Membership is open to all European states which accept the principle of the rule of law and guarantee fundamental human rights and freedoms to their citizens (Link 3). One of the main successes of the Council is the European Convention on Human Rights, which serves as the basis for the European Court of Human Rights. The seat of the Council of Europe is in Strasbourg. The Council of Europe is not to be confused with the Council of the European Union or the European Council, as it is a separate organization and not part of the European Union.
[8] accepted by the European council during the Copenhagen summit in June, 1993

require that a state have the institutions to preserve democratic governance and human rights, a functioning market economy, and that the state accept the obligations and intent of the EU. "Membership requires that the candidate country has achieved stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and, protection of minorities, the existence of a functioning market economy as well as the capacity to cope with competitive pressure and market forces within the Union. Membership presupposes the candidate's ability to take on the obligations of membership including adherence to the aims of political, economic and monetary union." The Copenhagen criteria are divided into four groups:

1. Geographic criteria
2. Political criteria
3. Economic criteria
4. Legislative alignment

Slovak Republic has successfully joined the EU on May 1st, 2004, creating a unique chance to overcome its social and economic lag with developed countries. The integration itself is a multidimensional process including complex political, economic, and social factors, and invites a wide participation of the society, beginning with the government and its integration activities, social institutions, organizations, employee and employer associations, private businesses, up to individuals. And even if this process in its early stage gives only a potential chance for development, it has no comparable alternative in the age of world globalization.

Experience of foreign countries shows that in order to participate efficiently in building a new, enlarged EU, the Slovak Republic urgently needs to create a mechanism that would allow processing systematically analyses of policy impacts, programs, plans, and concepts. Unfortunately, such a system is at the moment very disperse or in most areas completely absent.

By joining EU, Slovak Republic also accepted a commitment to fulfill the Maastricht criteria - rules first of all to ensure success and stability of EMU with a new single European currency - the Euro, but it also rules the cooperation of the member states in terms of justice policy, foreign policy and domestic policy, in order to establish the EU. Detailed discussion is in the following section.

4. Slovak economic reforms

In March 2000 in Lisbon, a strategy that intends to deal with low productivity and stagnation of economic growth in the EU, through the formulation of various policy initiatives to be taken by all EU member states has been implemented (Link 1). It is called the Lisbon Strategy, and its broader objectives set out to be attained by 2010. It was adopted for a ten-year period in 2000 in Lisbon, Portugal by the European Council. The former member states undertook a commitment for EU to "become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion by 2010".

Recent development and economic reforms in the Slovak Republic are being carried out in a similar spirit. Their first stage has been launched in 1999, and a similar reform path lasting to present has been confirmed by re-establishing the Dzurinda-cabinet in 2002 for its second term.

4.1 Reasons and consequences of Dzurinda-cabinet reforms

Until the peak of 1989, Slovak Republic along with other Central and Eastern European has been part of block of socialist countries grouped around the Soviet Union, with a centrally planned economy. After the change of political system and economic orientation in November 1989, the major goal set out was to transform the centrally planned economy into a functioning market economy, by achieving real convergence with the rest of EU and long-term competitiveness. During this almost 15-year long period, until entering the EU in May 2004, Slovak Republic was referred to as a "transition" economy. This accession was preceded by major structural reforms during the transition period [9], especially price deregulation, privatization, and introduction of market institutions. Indeed, the reforms continue until present day, since European integration is a dynamic process also from the inside. And although Slovakia has fulfilled the formal requirements of a full EU membership, the launched reform path will have to continue for several more years in order to line up, or at least to approach the former EU members in real terms.

[9] in legislation also referred to as "convergence" period, based on negotiations between EU countries and the Slovak Republic

The Slovak government launched a whole package of system reforms, especially:

1. Introduction of a flat (uniform) 19.0 % tax;
2. Introduction of tax-bonus for families with children;
3. Reform and modernization of the labor law;
4. Reform of the social system to be more motivating and less misused;
5. Pension-system reform;
6. Improve efficiency of public financing, decrease the public deficit, and therefore decrease the amount of total debt;
7. Significantly improve the entrepreneurial environment, growth of employment, and increase of economic performance;
8. Decentralization and efficiency of the public sector;
9. School reform;
10. Fiscal consolidation;
11. Health system reform;
12. Development of an information society based on research and development.

As a result during the early stage, employment has started to increase, illegal work is decreasing, FDI inflow picked up on dynamism, and the economic performance of the Slovak Republic became significantly higher than the EU average.

Tax reform:

A major tax reform preceding the current one was launched in 1993 under the strong influence of political and economic changes, i.e. the shift from centrally planned to a market economy. The necessity to improve its shortcomings, and the process of EU integration caused the legislation to be revised and amended several times since then. Due to frequent revisions, the system has lost its transparency, including several elements giving preference to one group, or causing disadvantages to another. Personal income tax was calculated based on progressive rates and the corporate income tax was set to a standard rate of 40.0 %. Small firms were taxed with a 2.0 % rate. Range of personal income tax was from 15.0 % to 40.0 %. There were two VAT rates of 6.0 % form basic goods and services (food, medicine, books, transportation, etc.), and 25.0 % for the others. Numerous interventions has been done to the system, including change of the personal income tax for the highest income group to 38.0 %, corporate income tax rate reduction to 25.0 %, change lower rate VAT to 10.0 % and later to 14.0 %, change of higher VAT rate to 23.0 % and later to 20.0 %, reclassification of goods and services between the two VAT rates several times, etc.

On January 1st, 2004, a complex tax reform was launched in the Slovak Republic. The main objectives of the changes are to reduce the work disincentives of taxation, increasing the transparency of the tax system, and reduce distortions from tax exemptions and double taxation (OECD 2004, p. 55). The main part of the tax reform is the introduction of a 19.0 % flat marginal tax rate for personal and corporate income taxes, while increasing the deductible allowance for low income earners to 160.0 % of poverty line incomes. All other exceptions, exemptions and special regimes are eliminated. Moreover, VAT rates, too, are unified at 19.0 % for all products. Aim of the government is to shift the tax burden from direct to indirect taxes. The reform aims to clarify tax relations, increase efficiency of tax collection, increase fairness of taxation by reducing its rates, reduce tax evasion, while preserving a strict fiscal policy.

Direct tax revenues of 7.4 % of GDP in 2002[10] slightly decreased after the first year of the new system to 6.0 % in 2004[11]. Indirect tax revenues of 12.0 % of GDP in 2002 increased to 12.4 % in 2004. Contribution of social security taxes in 2002 was 13.6 % of GDP, and 12.5 % in 2004. In spite of several risks of the new tax reform impact to the government budget, based on preliminary estimate data the government expects slightly higher tax revenue than projected for 2004. An overview of tax system after the reform is in Table 2.

Table 2: Tax system in the Slovak Republic

Tax system introduced on January 1st, 2004
Income
Flat (uniform) tax: 19.0 % on every kind of income
Tax on transfer of ownership
Property
Real estate tax
Motor vehicle tax
Consumption
Value added tax: 19.0 % on all commodities
Consumption taxes on:
alcohol
tobacco
mineral oil, petroleum
beer
wine

Source:
Authors' compilation from various sources.

[10] source of data is MF SR
[11] 2004 tax data are preliminary

Public finance reform:

All recent reforms are part of a large reform package. Reform of public finance (fiscal consolidation, public finance consolidation) is directly connected with the rest of reforms, and can not be though of independently. Slovak Republic started its transformation in 1993 with heavy taxes, and had the highest share of primary government expenditures in GDP among the Central and Eastern European Countries (CEECs) in 1994 (OECD 2004, pp. 50-57). Moreover, pro-spending policies in the early years of transition raised the share of government revenues further to 43.5 %, and spending to 44.9 % of GDP[12] in 1996. After the formation of a pro-reform government in 1998, the share of public revenues was brought back to 35.7 %, and expenditures to 41.3 % of GDP[13] in 2001. However, during this period, taxes were cut more rapidly than expenditures, and as a result, deficits grew and the public debt exploded to a projected 38.3 % of GDP according to GDS-86, and 45.0 % of GDP according to ESA-95 method in 2003[14].

The government therefore undertook an ambitious plan of public finance reform. The plan aims to cut the share of public expenditures from 49.0 % in 2002 to 41.2 % on an ESA-95 basis by 2006, and of public revenues from 41.8 % to 38.3 %. Recent development predicts a success of this policy, since the deficit of general government in 2004 has been reduced to 3.3 % of GDP. By further reduction of the deficit to the level under 3.0 %, Slovak Republic would comply with the EMU fiscal benchmark. This ratio insures further increase in total public debt. The government concentrates on increasing efficiency of public expenditures. In order to meet the requirements for EU accession, budget deficit had to be reduced significantly. Cuts in taxes and transfers are being carried out in parallel with reforms in the largest "spending" resorts, i.e. reduction of expenditure spending. The major element of public consolidation is introduction of a strict budgetary restriction in the entire range of public finances. No section is allowed to spend more than the national, or municipal authorities approved. Introduction of strict budgetary restrictions aims to stop the increasing indebtedness of public sector institutions, e.g. railways, schools, healthcare, public television, or the public radio. The government agrees to find ways not to pass bills in the national diet without clear budgetary coverage. The preferred method is medium-term budgeting by the ESA-95 methodology in the entire scope of public financing. The government is responsible

[12] GFS-86 (cash) basis
[13] ESA-95 (accruals) basis
[14] for detail on government budget and development of public debt, see Table 1

for creating legislative, administrative, and control mechanisms for efficient utilization of EU funds, which are included as part of public finances.

Development and promotion of market-based entrepreneurial environment, and competitiveness; promotion of foreign investment:

The Slovak government undertook a commitment to support entrepreneurship and to improve business environment. The goal is to simplify process of starting businesses, especially by simplifying its administrative process. The government is strongly encouraging FDI inflow, and thereby promoting competitiveness of the Slovak economy. Transparency of business environment is being increased by setting clear rules of subsidies and the introduction of licensing through auction system. Promotion of small and medium-size businesses through support programs and institutions is required, with accent to local municipalities and cooperation in areas along the borders. The Lisbon Strategy agreed on by EU members in 2000 launched a series of ambitious reforms at national and European level. By establishing an effective internal market, the aim is to make the EU "the most dynamic and competitive knowledge-based economy in the world" by 2010 (Link 1). For the Slovak Republic to become a fully fledged member, there is an urgent need of boosting applied research, innovation and improve education. The commitment of creating an information society is closely related to development of internet infrastructure, electronic signature, e-commerce, and systems for its efficient operation.

From evaluations of foreign institutions, reforms and effort in creating new business chances of the Slovak Republic seem to be on the right track. The World Bank in its recent report (World Bank, 2004) significantly supports the Slovak efforts, and is evaluating Slovak Republic as a top number 1 reformer from between all of the 148 countries reviewed, with an overall rank 18 on the ease of doing business. On December 13th, 2004, Standard & Poor's Ratings Services raised its long-term foreign currency sovereign credit rating on the Slovak Republic to 'A-' from 'BBB+', and affirmed the 'A-2' short-term foreign and local currency ratings (Link 2).

Besides the direct effects from EU accession, there is a strong influence and pressure of West-European competition. The common market with free movement of capital, goods, services, and labor will have significant influence and will induce easier investment, capital relocation, and simplification of business environment. Pressure of foreign competition will have positive effects on consumers, too, in a form of wider supply of goods and services, and higher quality. A need for increase in factor productivity will arise naturally. Sectors in

agriculture face probably the largest problems, due to especially low productivity. The inefficiency in these sectors is protected by soft financial environment, protected by subvention agricultural policy. This violation of free-market mechanism remains, however, even after EU accession. Cost reduction is supported by abolition of tariffs and duties across borders, and reduction of passport controls.

Because it is impossible to sustain in long-term and at the same time also not desirable, low levels of labor cost were major factor drawing foreign investors to Slovakia. In the business sectors it amounts on average to less than a fifth of those in EU countries such as Austria and Ireland (OECD 2004, p. 25). While wage growth has outpace labor productivity improvements to an extent that unit labor costs increased faster than in other CEECs over time, the labor cost advantage remains. In combination with the accelerating pace of privatization and the more FDI-friendly policy environment since 1998, foreign investment picked up rapidly, and will help to boost labor productivity. Evidence of FDI in Slovak businesses shows significantly better results of relevant indicators than in domestic firms. In 2001, firms of processing and manufacturing sectors with foreign participation were 2.5 times better equipped with fixed assets per employer than domestic ones (SAV 2003, p. 258).

These facts confirm the necessity of FDI in transformation of the Slovak economy, and EU integration. Even though recent development (from 2000) in FDI inflow shows rapid improvement, overall investment per capita still lags far behind other CEECs. FDI inflows into the Slovak economy are in Table 3.

Table 3: FDI inflow into the Slovak Republic, 1993-2004

Period	SKK millions			USD millions		
	on Jan. 1	change	on Dec. 31	on Jan. 1	change	on Dec. 31
1993	8322.00	7020.00	15342.00	287.99	174.10	462.09
1994	15342.00	8990.00	24332.00	462.09	315.88	777.97
1995	24332.00	7770.00	32102.00	777.97	307.71	1085.68
1996	32102.00	12697.00	44799.00	1085.68	318.91	1404.59
1997	44799.00	11415.00	56214.00	1404.59	211.61	1616.20
1998	56214.00	22354.00	78568.00	1616.20	512.26	2128.46
1999	78568.00	17470.00	96038.00	2128.46	143.77	2272.23
2000	96038.00	81103.00	177141.00	2272.23	1465.79	3738.02
2001	177141.00	57255.00	234396.00	3738.02	1098.18	4836.20
2002	234396.00	84850.00	319246.00	4836.20	3137.77	7973.97
2003	319246.00	28975.00	348221.00	7973.97	2603.81	10577.78
2004	348221.00	42081.00	390302.00	10577.78	3118.94	13696.72

Source:
National Bank of Slovakia
Notes:
1. Preliminary data included
2. Over the time period, methodology changes several times

EU accession is a good potential chance to provide further FDI for the Slovak economy. Economic growth, which is expected to continue after EU accession, should induce addition FDI. FDI should also be induced by the increased credibility of the Slovak Republic after EU accession, by improved technical and financial infrastructure, further liberalization of factor movement, but mainly by the mechanism of international production itself.

Restructuralization and industrial policy is one of the key factors of economic transformation and EU integration. In order to cope with market mechanism in the global economy, Slovak firms, majority of which has been established during the socialist period, must be transformed to have structure close to that of western economies. This transformation has started in 1989, and will have to continue even after EU accession.

Pension system reform:

Slovak Republic has gradually introduced the reform of the pension system, in order to create a secure and fair pension system based on three pillars, which should be universal for the whole economically active population. Its aim is to halt increasing of internal debt originating in the pension system due to the negative demographic development, and to increase the involvement of particular persons on their future life after retirement.

In a first step, Slovakia introduced several changes to the parameters of the pay-as-you-go pillar[15] that became effective in 2004. These parametric changes reduced the scope of entitlements, and the implicit debt of the pillar (EU 2005, p. 18). They thereby prepared a ground for the second, system reform, i.e. the introduction of a funded pension pillar[16] at the beginning of 2005. Furthermore and in parallel to these reforms, the possibilities for voluntary old-age provisions[17] have been expanded.

The funded pension pillar introduced at the beginning of 2005 is sizeable and receives contribution of 9.0 % of gross wage for old-age pension from the pay-as-you-go pillar, 6.0 % for disability pensions, and 4.75 % for a reserve fund which is envisaged to cover potential shortfalls in the public pension system. Approximately 75.0 % of the total contribution is paid by employers.

The government has an increased interest in improving optional or voluntary forms of pension savings. Tax benefits should be one of the motivating factors for such behavior. It is necessary to create legislation in order to eliminate risks for potential clients, increase

[15] 1st pillar
[16] 2nd pillar, also referred to as "capitalization pillar"
[17] 3rd pillar

transparency of the system, and to insure independent control of institutions providing these services.

The government guarantees a minimal old-age pension for citizens from those social classes that cannot participate on individual savings.

Health system reform:

In spite of continuous reforms in the health system, started from 1993, health care remains affected by serious problems. The health care system is not financially sustainable, and it has become a sector, in which uncompromising changes have to be made to eliminate debts as the basic condition for a successful transformation. The indebtedness of the health sector has an expressively rising character. The sector has an inappropriate structure and inefficient capacities have caused a significant deterioration of health care services. The health sector is does not work economically, it does not deal with a problem of ignored insurance contributions, and it has developed a corrupt medical ethics. The poorly motivating payment system is also a big problem. The system of financing the health sector by the government has failed. State supervision over insurance companies is also inefficient. As the matter of fact, the existing health infrastructure continues to rely heavily on relatively costly, input-intensive approaches, with too much emphasis on costly in-patient care and specialist physicians.

The government elected in 2002 therefore came with a reform that would promote the economization of the health sector, with main focus to stop the growth of debts and to guarantee health-care services to all people to full extent of the law.

School-system reform:

Schools and education play a strategic role in development and future of a society. Formation of information society and economic globalization predict an absolutely new image of education. Technological development and the rapid changes at the labor market require life-time learning, and education has become a key to success, investment into the future, and plays a preventive role against unemployment, crime and drugs.

Strategy of school transformation from the economic point of view is aimed at creating a multi-resource funding system, and increasing its efficiency via normative financing per student. It is necessary to increase the social status of teachers at all levels, with differentiated remuneration according to the quality of their work, and to make this profession more attractive to young people. The government must create a transparent, normative, and

motivating system of multi-resource funding for all levels of regional schools, spare-time activity and sport institutions, without unnecessary, inefficient segments. Special treatment for talented student, as well as handicapped students or students with disadvantages has to be introduced. The government has already decided to decentralize the ownership of primary and secondary schools to municipal governments, and introduced a normative funding according to the number of students in each region. This will allow the regions to experiment with more effective policies to meet the set standards, including on the basis of increased competition between public, private, and ecclesiastical schools. Strategic target in tertiary schooling is to create an efficiently functioning system compatible with international standards, and to overcome the shortage available capacities in comparison with demand until the year 2008. A strategy is being prepared for encouraging pluralism and new entries by transforming universities into autonomous institutions, and introducing tuition fees and student loans. Long-term under-financing and debt accumulation requires a complex reform package, including multi-funded financing, and increased support from the state budget to a level comparable with OECD countries. The transformation of the Slovak school system must continue with respect to Eurozone, especially the Bologna Declaration[18]. Utilization of credit recognition and transfer system between EU countries will significantly simplify and facilitate student mobility, and thus increase the quality of academic education.

Unemployment and labor market reform:

The attainment of the primary objective at the labor market - increased employment, and reduction of structural unemployment under 10.0 % by 2010 - should be supported by three main factors (MF SR 2004a). First, in July 2003, the government adopted a highly flexible labor code. Second, the available labor supply should be relatively high, especially in connection with the adopted reforms in the social insurance and benefits schemes. Third, improving business environment, exemplified in the recent successes in attracting notable FDI, should continue generating a noticeable increase in labor demand. The Act on Employment Services, which came into effect in 2004, established a legal framework for the provision of such employment services by integrated Labor, Social, and Family Affairs Offices. The offices are designed to provide prompt and effective support in re-entering the labor market to those unemployed citizens who want to work, are able to work, and seek a job. The

[18] Bologna declaration is the main guiding document of the Bologna process, adopted by ministers of education of 29 European countries at their meeting in Bologna in 1999 (Link 3). The purpose of the Bologna process is to create the European higher education area by harmonizing academic degree standards and quality assurance standards throughout Europe for each faculty and its development.

assistance should enable the unemployed to improve their social situation by employment, or income-earning activity, in the shortest possible time. Thanks to other legislative improvements, the work of these public entities should be supplemented by job mediation activities of private temporary employment and supported employment agencies. Furthermore, in order to accelerate the implementation of active labor market measures, the Ministry of Labor, Social Affairs, and Family of the Slovak Republic has prepared national projects that are be co-financed from the European Social Fund (ESF).

Labor market development in the Slovak Republic seems to be on a right path, and is characterized by employment growth helping unemployment reduction, decreasing elasticity of real and partially of nominal wages. Reforms in the social sector, tax reform, and the new Labor Code compatible with EU employment strategy[19], evoke further flexibility of the labor market, especially by increased motivation to work. There is still space for improvement in utilization of flexible employment forms, and in illegal labor regulations. Extension of retirement age will act in the next few years act against unemployment reduction. Even though the persistently high unemployment opposes the necessity of labor market liberalization, measures must be taken because of qualitative and structural equilibrium aspects are gaining ground. Regional mobility of labor is still low, and requires assistance programs.

Decentralization and efficiency of public administration:

In parallel with fiscal decentralization, reform of the public administration and its decentralization are carried out. Role of regional administrative offices and municipalities is being reinforced, to fight the misuse of social services. Local municipalities now play an active role in unemployment matters and other social policies.

The Slovak government considers a slim, highly function, and less demanding public sector necessary to management of public affairs. Quality of public officers and importance of labor costs are key factors, and necessitate to continue the public sector reform. Amendment to the State Service Act should allow employing top quality professionals in central authorities with an adequate remuneration.

[19] based on the Lisbon Strategy - an agreement between heads of EU countries in Lisbon in 2000, which launched a series of ambitious reforms at national and European level. By establishing an effective internal market, by boosting research and innovation and by improving education, its aim is to make the EU "the most dynamic and competitive knowledge-based economy in the world" by 2010.

Economic and social reforms in other areas:

The restructuralization launched by the Dzurinda cabinet is not limited only to the above-mentioned reforms. The strategy is more complex and handles the matters of several other areas, which however, have been successfully fulfilled previously, or are not of direct concern in our research, i.e. financial market reform, reform of agriculture and agro-production sectors, regional development, environment, culture, science and technology, justice, internal security, foreign security and defense, foreign policy, etc.

4.2 Preparation for Euro and EMU

Slovak Republic's EU accession was a significant milestone as well as recognition of important accomplishments. This membership, however, comprises the duty to participate in EMU as a member state with a derogation (NBS, 2005). This means that by joining the EU Slovakia undertook a commitment to become a member of the EMU in the future. At the same time, the National Bank of Slovakia (NBS) became a member of the European System of Central Banks (ESCB)[20].

Maastricht Criteria:

Before entering the Eurozone, Slovak Republic and all other countries must fulfill five main convergence criteria, i.e. Maastricht Criteria (MF SR, 2004b):

1. Fiscal deficit - the public finance deficit may not exceed 3.0 % of GDP;
2. Gross public debt - the overall public debt may not exceed 60.0 % of GDP;
3. Inflation criterion - the average inflation of the last 12 months may not exceed by more than 1.5 % the average of three EU countries with best performance in price stability;
4. Long-term interest rate stability - the average of market interest rates of long-term state bonds and similar may not exceed by more than 2.0 % the average of three EU countries with best performance in price stability;
5. Exchange rate stability - the Slovak Crown (SKK) must two years before evaluation be integrated in the Exchange Rate Mechanism (ERM 2), with a stable exchange rate.

[20] The ESCB is composed of the European Central Bank (ECB) and the national central banks (NCBs) of all 25 EU Member States (Link 3). The "Eurosystem" is the term used to refer to the ECB and the NCBs of the Member States which have adopted the euro (also known as Eurozone). In accordance with the Treaty establishing the European Community and the statute of the ESCB and of the ECB, the primary objective of the Eurosystem is to maintain price stability, i.e. to control inflation.

The first two convergence criteria are designed to ensure stability of the euro, protecting the EU from threats of inflation which may arise from government budget deficits. Monetary stability is reinforced by the last three criteria, supporting a fixed exchange rate regime among member countries.

Level of fulfillment of the Maastricht Criteria by the Slovak Republic - nominal convergence:

The decisive factor of EMU accession is the perspective of Maastricht Criteria fulfillment - inflation, public finance deficit, gross public debt, exchange rate stability, and long-term interest rates (MF SR, 2003b). It is a condition for acceptation of the Slovak Republic's application to join the Eurozone. At the same time, it is a condition for efficient functioning inside the Eurozone.

Not all Maastricht Criteria are fulfilled at present. The Slovak economy however aims to their sustainable fulfillment until 2007 at latest. Development of the economy shows improvement especially of public finance, and domestic entrepreneurial environment. Reforms have been accepted by major international institutions, and foreign investors. Current developments show that the economic growth is accompanied by increasing efficiency and competitiveness, which in turn creates good conditions for fulfillment of nominal Maastricht Criteria.

Summary of Maastricht Criteria and the perspective of their fulfillment by the Slovak Republic is in Table 4.

Table 4: Maastricht Criteria and the perspective of their fulfillment

Criterion	2007	
	Slovak development assumption	Reference value assumption
Inflation (%)	2.5	2.8
Interest rates (%)	5.7	7.6
Public debt (% of GDP)	45.4	60.0
Fiscal deficit (% of GDP)	3.0	3.0

Source:
Ministry of Finance of the Slovak Republic

The successful fulfillment of the above criteria during 2 years following year 2007 should allow Slovak Republic to join the Eurozone by 2009.

Key indicators for EMU accession within the proposed time horizon show positive development. Considering the fact that inflation in the following years will be reduced due to

completion of administrative adjustments, the key parameter for successful introduction of the Euro in 2009 will be ability to fulfill the program of public finance deficit reduction.

Real convergence of the Slovak economy with the EU:

The economy of the Slovak Republic is increasing its orientation at the territory of the present EU (MF SR, 2003a). More than 60.0 % in 2003, and after joining in 2004 along with 9 other countries, as much as 90.0 % of Slovak export is oriented to EU territory. Several analyses show that the Slovak economy is increasing its share in trade with EU countries.

The economic structure is converging to EU economy. There has been a major reduction in agricultural share, as well as manufacturing during the transformation period, while the share service sector increased significantly. Trade with EU shows increase in share of high sophisticated production with less price sensitivity. These sectors require less exchange rate support in order to maintain their competitiveness.

FDI inflow into the Slovak economy is in comparison with the nearest neighbors lower. Green-field investment is a significant factor of economic development, although investment from privatization has also a great importance, because they increase the total factor productivity and contribute to the cultivation of economic environment.

In 2003, in comparison with EU15 the ratio of Slovak Republic's per-capita GDP in PPP was 48.3 %, 55.2 % in labor productivity, and 45.7 % in the price level. Economy of the Slovak Republic has one of the most dynamic growth rates, with an average of 4.5 in 2003, and 5.5 in 2004. Slovak economic growth during the same period (year 2003) thereby significantly exceeds the average GDP growth in former EU15 where growth was 2.3 %, but also the enlarged EU25 with an average of 2.4 %. Rate of productivity increase is constantly increasing, too. Due to these results, the real convergence of the Slovak economy towards the EU average is continuing. Competitiveness is also increasing, reflected especially in an improved performance of the balance of payments in comparison with the past.

High level of convergence is also visible in the institutional and legal sphere. According to various prognoses, the increased growth will continue in the future. Fast economic growth and further convergence towards EU will be supported by the restructured baking and financial sector. Further support to this process will come from a proper combination of monetary and fiscal policy, effective adoption of additional economic policies, and FDI inflows especially into the automobile industry. The effect from the above mentioned factors will be further strengthened by the strategy aimed at Euro adoption.

5. Model description

The link CGE model of presented in this research is constructed for the benchmark year 2001. The world economy is divided between 10 regions/countries[21], which are linked together through trade relations, labor and capital movement, and labor foreign remittance and FDI flows. Country models of each separate region consist of 10 industrial sectors[22], 10 homogenous composite goods[23], 3 production factors[24], 3 institutions[25], a capital account[26], 3 tax accounts[27], and a rest of the world account. Depending on availability of data, it is possible further to disaggregate households (e.g. urban and rural) for income distribution analysis, to disaggregate production factors (into more types of labor and introduce land), and to implement a range of various taxes (value added taxes, excise taxes, taxes on factors, import and export taxes, consumption taxes, etc.).

The data is based on Social Accounting Matrices (SAMs) for each individual region, constructed mainly from GTAP 6 database. The SAM of the Slovak Republic is based on Koronczi (2005a). Structure of the SAM is in Table 5, and is similar for all 10 model regions. The database is supplemented by additional data, such as labor and capital stock, various substitution and transformation elasticities, population data, unemployment data, data on economically active labor, direct taxes, depreciation, etc.

[21] SVK - Slovak Republic, EU09 - remaining 9 new member countries accessing in 2004, EU15 - former EU member countries, RUS - Russia, REUR - rest of Europe, JPN - Japan, CHN - China, RASIA - rest of Asia, USA - United States, ROWD - rest of the World

[22] Crops-A - crop production activities, OtherA-A - other agriculture activities, Mining-A - mining industry activities, FoodP-A - food processing activities, LightM-A - light manufacturing activities, HeavyM-A - heavy manufacturing activities, Machine-A - machinery activities, Utility-A - utility sector (heat, water, trash collection, etc.) activities, Constr-A - construction industry activities, Serv-A - service activities

[23] Crops-C - crop production commodities, OtherA-C - other agriculture commodities, Mining-C - mining industry commodities, FoodP-C - food processing commodities, LightM-C - light manufacturing commodities, HeavyM-C - heavy manufacturing commodities, Machine-C - machinery commodities, Utility-C - utility sector commodities, Constr-C - construction industry commodities, Serv-C - service commodities

[24] UnskLab - unskilled labor, SkLab - skilled labor, Cap - capital

[25] Hhd - households, Corp - corporations, Gov - government

[26] S-I - savings-investment

[27] Ytax - direct income tax, Stax - indirect sales tax including subsidies, Tar - import tariffs on the import side (export duties on the export side)

Table 5: Social Accounting Matrix of the Slovak Republic, 2001

Account	Crops-A	OtherA-A	Mining-A	FoodP-A	LightM-A	HeavyM-A	Machine-A	Utility-A	Constr-A	Serv-A	Crops-C	OtherA-C	Mining-C	FoodP-C	LightM-C	HeavyM-C	Machine-C	Utility-C	Constr-C	Serv-C	UnskLab	SkLab	Cap	Hhd	Corp	Gov	S-I	Ytax	Stax (Gap)	Tar	RoW	Total
Crops-A											653.34																					653.34
OtherA-A												1,097.79																				1,097.79
Mining-A													209.97																			209.97
FoodP-A														4,893.00																		4,893.00
LightM-A															6,187.38																	6,187.38
HeavyM-A																9,655.58																9,655.58
Machine-A																	8,301.39															8,301.39
Utility-A																		1,286.06														1,286.06
Constr-A																			4,824.49													4,824.49
Serv-A																				18,227.09												18,227.09
Crops-C	40.15	176.98	0.00	386.38	10.01	24.39	0.01	0.01	2.52	55.59														190.10		1.00	9.75			0.00	97.66	994.53
OtherA-C	35.20	70.89	3.05	314.01	270.84	29.11	0.03	1.18	5.29	54.12														245.87		0.10	11.66			0.00	110.46	1,151.81
Mining-C	12.94	8.44	28.62	71.24	57.94	1,169.47	37.61	310.29	68.38	109.12														121.78		0.02	0.00			0.00	18.19	2,014.02
FoodP-C	17.51	106.98	7.02	1,550.88	76.83	49.46	15.78	3.13	10.18	349.40														3,048.80		0.93	0.00			0.00	391.88	5,628.80
LightM-C	23.16	26.06	9.22	283.45	2,353.72	256.21	155.05	18.97	216.40	854.95														1,376.67		3.48	65.85			0.00	2,810.21	8,453.42
HeavyM-C	174.82	113.27	32.86	304.87	594.47	4,118.45	1,383.71	90.51	1,176.17	1,101.31														1,232.93		197.19	251.65			0.00	4,319.10	15,091.33
Machine-C	25.25	34.60	11.92	90.05	120.90	402.57	3,823.67	56.86	204.93	881.10														632.63		0.99	2,851.56			0.00	5,370.00	14,507.03
Utility-C	25.18	38.14	9.21	83.03	98.61	326.35	64.25	219.93	12.65	355.24														335.29		0.40	0.00			0.00	136.27	1,704.56
Constr-C	7.61	17.21	3.01	42.13	35.71	76.64	82.93	61.17	939.91	540.17														57.56		0.38	3,012.07			0.00	67.76	4,944.27
Serv-C	84.62	134.59	43.21	585.61	713.10	885.18	815.03	146.38	689.42	5,133.20														3,989.26		3,982.66	210.45			0.00	1,144.94	18,557.64
UnskLab	107.80	191.92	23.50	377.41	872.68	820.19	888.47	75.98	481.73	2,048.87																						5,888.56
SkLab	1.86	3.32	3.02	65.97	130.75	156.49	234.90	31.79	74.54	1,893.40																						2,596.05
Cap	97.25	175.39	35.31	737.96	851.83	1,341.07	799.96	269.85	942.39	4,850.62																						10,101.61
Hhd																					5,888.56	2,596.05	8,888.68		1,098.92	746.10				286.99	19,505.30
Corp																							1,212.93	352.89		932.54				-246.70	2,251.66
Gov																												2,829.85	1,022.29	438.42	-40.29	4,250.27
S-I																								6,186.38	58.02	-1,615.55					1,784.15	6,413.00
Ytax																								1,735.13	1,094.72							2,829.85
Stax (Gap)											-9.39	-31.44	47.09	106.33	282.11	1,491.40	338.01	74.32	21.07	-1,297.21												1,022.29
Tar											16.50	0.34	0.24	35.36	82.80	115.10	188.07	0.00	0.00	0.00												438.42
RoW											334.08	85.11	1,756.73	594.11	1,901.12	3,829.25	5,679.55	344.18	98.71	1,627.77												16,250.62
Total	653.34	1,097.79	209.97	4,893.00	6,187.38	9,655.58	8,301.39	1,286.06	4,824.49	18,227.09	994.53	1,151.81	2,014.02	5,628.80	8,453.42	15,091.33	14,507.03	1,704.56	4,944.27	18,557.64	5,888.56	2,596.05	10,101.61	19,505.30	2,251.66	4,250.27	6,413.00	2,829.85	1,022.29	438.42	16,250.62	199,931.11

Source:
Authors' calculations based on GTAP 6.0 data, and Koronczi (2005a)

GDP1= 20,046.92
GDP2= 20,046.92

Notes:
-A - activities
-C - commodities
OtherA - other agricultural production
FoodP - food processing
LightM - light manufacturing
HeavyM - heavy manufacturing
Machine - machinery
Constr - construction
Serv - services
UnskLab - unskilled labor
SkLab - skilled labor
Cap - capital
Hhd - households
Corp - private corporations
Gov - government
S-I - savings, investment (aggregation of gross fixed capital formation and change in stocks)
Ytax - direct tax, i.e. personal income tax, corporate income tax
Stax (Gap) - sales (indirect) taxes other than import duty (residual), e.g. VAT, consumption tax, subsidies
Tar - import tariffs (row), and export duties (column)
RoW - rest of the world account (imports in row, exports in column)
(exports are calculated from import matrix (in GTAP: Imports=Export+Transport costs))
GDP1 - GDP calculated by Expenditure method
GDP2 - GDP calculated by Income method
Units are mill. USD

The model is quite extensive, consisting of 6 993 equations[28] and endogenous variables, about the same number of parameters, and tens of thousands output variables. Therefore, we mainly refer only to results of only one region - the Slovak Republic, although simulations give a complex solution for each region separately.

The theoretical side of our model is based on the open economy model of Dervis, de Melo, and Robinson (1982) further enhanced by Robinson, Yúnez-Naude, Hijonosa-Ojeda, Lewis, and Devarajan (1999). For the technical structure and solution of the model we closely follow the work of Löfgren, Harris, and Robinson (2001), and Koronczi (2005b). Major differences from these models are the heterogeneous labor market definition (in disequilibrium), specification of the numéraire (DPI), specification of the Walras' law (by S-I balance), and enhancement of the static model into a dynamic one (factor growth, factor movement across regions, money flows across regions - remittances, FDI), and the world-linkage part of individual regional models together. Detailed description is given in the following section.

5.1 Model structure

The research presented in this paper is new in several aspects, and in its substance can claim to be the first of its kind for the Slovak Republic.

Extended by several specific features, the country-based CGE model is based on a Standard CGE model used by the World Bank. The model developed in this research has been designed to analyze the whole economy with any sector. The model is designed to allow to carry out static and dynamic simulations at the same time, and to do simulations with detailed disaggregated data without the need of simplifying production and other functions. Static version of the model explains direct impacts of an economic policy (or shock), regardless of time element. The dynamic version is designed to follow the economic development induced by a shock within a certain range of time, in this case period of 10 years with 2001 as the benchmark year. Industrial structure is dependent mostly on availability of data and here is disaggregated into 10 homogenous sectors. The various kinds of functions implemented are either of CES (Constant Elasticity of Substitution), or CET (Constant Elasticity of Transformation) type. Specifically, the model applies a CES production function of quantities between value-added and aggregate intermediate input. Alternatively, the

[28] depending on the version of the model or simulation, this number may vary

production function can be defined in a Cobb-Douglas form; however this alternative is not implemented. Value added is defined by another CES function of quantities between production factors, i.e. labor and capital. Output aggregation is defined by CES function between activity-specific marketed production of a given commodity. The aggregate output is then transformed by CET function between exports and domestic sales. There is another CES function for aggregation of domestic production sold at domestic market and imports, also called as Armington function.

A strong feature of the model implemented in this research is the linkage of individual country-based model into a world model. Specific stress is put to relations within the three EU regions, i.e. the Slovak Republic, rest of countries accessing in 2004, and the former EU member countries. The CGE model of each individual region with economy in equilibrium is linked to the world, which is in equilibrium, too. Country models are linked through bilateral trade flows. The model allows for import (and also exports, if not zero, payments of which are bared by the importer side) tariff differentiation by country of origin, import price varies depending on source of import. Particularly, the import price at the domestic market is equal to the export price of the country of origin time the corresponding tariff rate. Domestic consumers and producers differentiate imports by sources, i.e. imports from various countries are treated as imperfect substitutes, and is modeled by Armington function. At the aggregate level, total import is a CES function of imports from different sources, demand for which is derived from the cost minimization condition. On the export side, exporters do not differentiate exports by destination, i.e. commodities supplied to foreign (destination) countries are perfectly homogenous and are sold at a same price. For consistency in trade, total exports supplied by source countries are made equal to the sum of imports by destination countries, i.e. imports from a country sum up to total exports by that country.

The dynamic part of the model assumes intertemporal labor growth (increments defined by an explicit growth rate), and capital growth (increments defined by investment quantities). The model has been designed to allow for labor and capital movement between EU regions[29], i.e. labor and capital is mobile internationally, depending on factor wage distortion between regions. However, assumption of perfect mobility especially in case of labor is not very reasonable, especially due to geographical and legislative barriers within EU; therefore elasticity of adjustment[30] has been introduced. Besides movement, labor mobility between regions has been designed to affect also unemployment because of the labor market that is in

[29] or any other regions, if specified
[30] i.e. speed of response to price differences

disequilibrium. Unemployment of a country with labor outflows will decrease by the amount of labor (supply) that has left the region. However, in order not to allow the labor market to clear perfectly due to the only factor of labor movement, unemployment is affected only to a certain level (natural unemployment rate), and not below it. Another strong feature of the model is disaggregating the foreign savings account. The exogenously fixed part of foreign savings is extended by introduction of labor remittances from/to abroad as payments of labor that has internationally relocated, and FDI financial flows as counter-flows to capital movement. Thus, there are 5 channels that transmit effects of economic policy and demographic changes of one country to other regions, i.e. trade flows, labor movement, capital movement, labor remittances, and FDI flows.

Model flows and relations between individual subjects are in Figure 1.

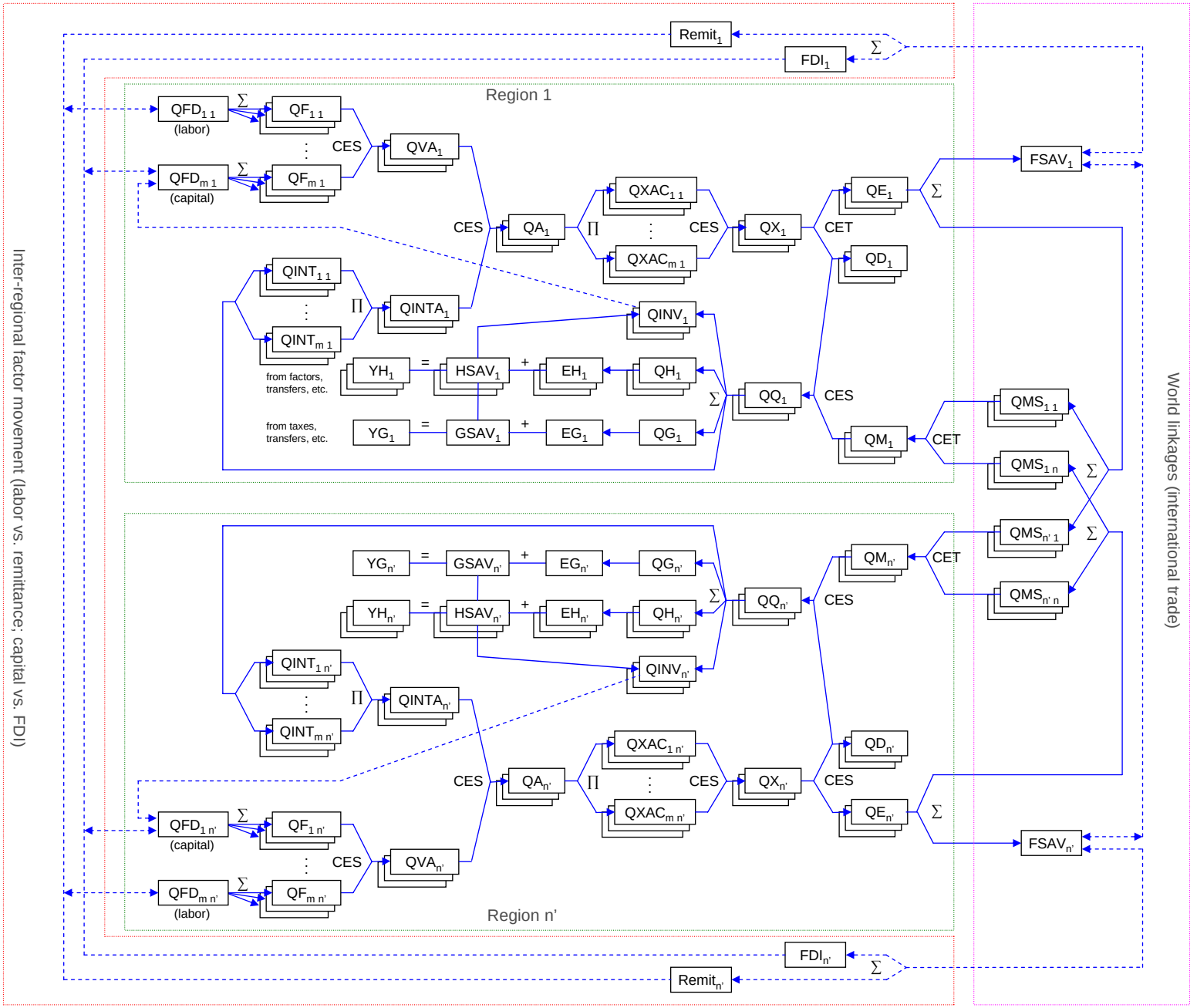

Figure 1:
Link CGE model flows

with: ONE activity
ONE commodity
TWO regions

Legend:

QFD	- aggregate factor demand
QF	- sectoral factor demand
QVA	- aggregate value added
QINTA	- intermediate inputs
QINT	- intermediate inputs to activity
QA	- activity output
QXAC	- marketed output of commodities from activity
QX	- aggregate domestic output of commodity
QD	- domestic output sold domestically
QE	- aggregate export of commodity
QM	- aggregate import of commodity
QQ	- composite supply
QH	- household consumption
QG	- government consumption
QINV	- fixed investment
EH	- household expenditure
EG	- government expenditure
HSAV	- household saving
GSAV	- government saving
YH	- household income
YG	- government saving
QMS	- int'l trade by source and destination
FSAV	- foreign savings
Remit	- labor foreign remittances
FDI	- FDI payments
1…n'	- number of regions
1…m	- number of factors, int. inputs, etc.
∑	- aggregation (sum)
∏	- allocation (multiply)
CES	- (constant elasticity) substitution fn
CET	- (const. elasticity) transformation fn
→	- Static (endogenous) relations
⇢	- Dynamic (exogenous) relations

5.2 Model equations

The complete system of equations of the model is in Appendix 1. The model consists of 10 industrial sectors represented by index *a* - activities and their products *c* - commodities. Although the model is designed for multiple products, in this case each activity produces exactly one unique commodity for the domestic market creating a sum of 10 commodities, and exporting sectors another one commodity for exports to the rest of the world.

Prices, production and trade block. Producers maximize sales income. Quantities of commodities that are produced for domestic and foreign markets are determined by CET function (equations 19, 20), and for domestically sold output without exports or exports without domestic sales by equation 21. The structure of the model makes it possible to carry out both static simulations with direct effects of a shock or policy without considering time factor (short-term simulations), and dynamic simulations with 2001 as benchmark year up to about 10 years (medium- and long-term simulations). Each region is defined by a small economy model with competitive markets, and is assigned with a numéraire. Global market from the point of view of an individual economy is represented the rest of the world, with a different world price of imports and exports determined by world trade relation (equation 54). Exchange rate is endogenous, except for the region with its exchange rate serving as world numéraire. Domestic price of imports includes tariffs (equation 1). Demand price for domestic non-traded goods is determined directly by supply (equation 2). There is an assumption of imperfect substitutability of goods produced domestically and those produced abroad, therefore composite supply of goods for domestic market from domestic production and foreign markets is determined by Armington (CES) function (equations 22, 23), and for non-imported outputs or non-produced imports directly (equation 24). Consumers minimize the cost of the purchase of a determined quantity of the composite good, based on their relative prices. Prices for domestic market are endogenous, determined by supply and demand (equation 3). Marketed output value (and its price) is determined by equation 4, quantity is determined by Leontief function of intermediate inputs (equations 17, 18), and allocated by equation 16. Activity price is determined by equation 5, price of intermediate inputs by equation 6, and value added price by equation 7. Producers minimize production costs by selecting the optimal combination of value-added and intermediate inputs, determined by CES technology production function (equations 10, 11). The optimal combination of factor demands determining value-added is also determined by a CES

function from primary (unskilled labor, skilled labor, and capital) inputs (equations 12, 13), based on which average EU labor price necessary for dynamic simulations is calculated (equation 14).

Disaggregating of intermediate inputs is introduced by equation 15. Additional price indexes are introduced in form of *CPI* - consumer price index (equation 8), and $\overline{DPI}$ - producer price index that is set at the same time as the single-regions' system numéraire (equation 9).

Institution block. Institutions of the model are represented by an aggregated household account, account for corporations (or enterprises), one government account, and an account for the rest of the world. Equation 27 defines that corporations and households (domestic non-government institutions) receive income 1) from factors at the domestic market (defined as product of the average wage and quantity of the given factor - equation 25, and from foreign markets in form of transfers (equation 26), 2) in form of transfers from other domestic non-government institutions (infra-institutional factors, equation 28), 3) transfers from the government, and 4) in form of transfers from abroad. Transfer payments in the model with foreign world are defined as net payments, allowing only transfers from abroad (unskilled labor, skilled labor and capital), and transfers (towards) abroad (households, corporations, government, savings-investment)[31]. Household expenditures are defined as the remaining part of income after taxes, savings and taxes to other domestic non-governmental institutions (equation 29), part of which is spent on marketed commodities (equation 30), and part on home commodities (equation 31). Investment demand (equation 32) is endogenous, and government demand (equation 33) is defined exogenously. Government has revenues from taxes, factors, and transfers from abroad (equation 34), and government spending is defined as the sum of government consumption and transfers (equation 35).

System constraint block. Three main macroeconomic balances must be defined: government (or public finance) balance (equation 43), savings-investment balance (equation 46), and balance of the foreign account, in our case defined as a current account balance (equations 41, 42). Savings-investment balance is due to the Walras' law redundant, therefore it is dropped and substituted by equation 48 to check for legitimacy of the difference between savings and investment, which in an equilibrium economy must be equal to zero.

[31] if values of transfers have a positive sign, then the direction of transfers in case of labor and capital is from abroad into the local economy, and in case of household, corporation, government, and savings-investment transfers from the economy (towards) abroad. Because all transfer payments with the foreign world are defined as net of inflow and outflow, negative values are legal. In this case the direction of flows is reverse, i.e. inflows become outflows, and outflows become inflows.

Walras' law may also be defined based on Labor market equilibrium, Capital market equilibrium, Equilibrium of supply and demand of gross marketed output, and Foreign exchange market (current account balance) equilibrium, or best by a zero identity of all of them. Character of this variable makes it possible to utilize it also during the solution process as the variable that's absolute value or a square is minimized (equation 49). Other balances are defined for factor markets (equations 36, 37, 38, 39), composite commodity markets (equation 40), direct institutional tax rates (equation 44), and for institutional savings rates (equation 45). Three additional equations are introduced to permit additional savings-investment closures, for total absorption as GDP plus imports minus exports (equation 50), ratio of investment absorption (equation 51), and ratio of government consumption to absorption (equation 52).

World linkage block. The main difference of the model from standard CGE models is the World linkage between regions. Equations 53 through 65 define these relations. Domestic price of exports (equation 53) is the weighted average of world price of exports. World price of international trade defined by source and destination (export of one region is an import for another) is in equation 54. World price of exports for a specific region is defined by its trade constraint (equation 55). In order to be able to calculate the world price of imports in domestic currency of a specific region (equation 57), it is necessary to calculate this region's average import tariff (equation 56). Total import of a specific region is the aggregate of imports from different sources, demand for which is derived from the cost minimization condition defined by a CES function (equation 59). Depending on region's specification, equations 61, 62, and 63 are related to dynamic simulations and define foreign savings that change due to FDI payments and labor remittances between regions. A balance between savings and investment holds not only for a specific economy, but also across the whole world. This means that the sum of total foreign savings across the world must sum to zero (equation 64), and if dropped, it is possible to check by equation 65 - a kind of all-across-the-world Walras' law (must be zero).

Dynamic block. The remaining equations (equations 66 through 80) define the dynamic part of the model, i.e. the intertemporal change or the model behavior in time. The application and selection of these definitions is dependent mostly on availability of consistent data allowing a model with thousands of variables and single equations lead to a solution, and on purposes of simulations. Particularly, equation 66 defines factor movement based on wage differences between regions. In case of labor, unemployment is affected by labor migration, and defined by equations 67 and 68. If labor force migrates and works abroad, it remits part

of its income to the country of origin (equation 71, defining current year's change in remittances). Moreover, it keeps remitting every year, until it returns back, i.e. remittance base is accumulating over years (equation 72). The situation is very similar in case of capital, with FDI payments for capital that moves to regions with higher rates of return (wage of capital). In this case, however, the payment occurs only once, during the first year when the particular capital is transferred abroad (equation 77). Remittances and FDI payments are reflected in foreign savings that change according to the size and direction of these flows (equation 78). The overall change across the world, however, must again satisfy the condition of zero sum. Total labor supply is an extrapolation in constant yearly increments (equation 79). The intertemporal capital supply is defined by accumulation of real investment over years net of depreciation (equation 80). Alternatively, the dynamic element of the model can be defined in combination of capital accumulation defined by nominal investment over years; constant capital accumulation at a constant rate; growth of labor wage rates; growth of capital rates of return; appreciation or depreciation of the fixed exchange rate; increase/decrease of foreign capital inflow/outflow in form of factor transfers or institutional transfers, etc.

Model calibration is based on benchmark data, mainly based on the SAM. Parameters are estimated from benchmark data, prices of variables not affected by exchange rate or taxes are set to 1 (in benchmark year of the baseline scenario), that way making values equal to quantities. CES and CET exponents, depreciation rates, growth rates of investment, factor movement adjustment factors, remittance ratios, economically active population, unemployment ratios, natural unemployment, and other exogenous variables are mainly estimates or educated guess, or partly taken from GTAP or other third-party global analysis projects. Data on stocks of labor, and stocks of fixed capital is from GTAP, data for the Slovak Republic are estimates based on 2000 data (Koronczi, 2005a).

For a detailed general description of parameters, variables and equations of the model, see Löfgren, Harris, and Robinson (2001).

Calibration of the model and simulations were carried out in General Algebraic Modeling System (GAMS) - see Brooke, Kendrick, Meeraus, Raman, and Rosenthal (1998), and GAMS (1998). Upon request, the GAMS programming code is available from the authors.

5.3 System constraints and model closures

Closures in the CGE model serve as tools to balance the number of endogenous variables with equations to reach a solution, i.e. to close the system. There closures take the role of equilibrium conditions that may be changed based on what type of model is desired. Selection of a closure significantly affects model results, because generally the system residuals are defined by it. Depending on the policy modeled, following closures may be applied:

1. Government:
   - *GOVCLOS1* - flexible government savings, fixed direct tax rates ($TINSADJ_r$, $DTINS_r$, and $GADJ_r$ are fixed, $GSAV_r$ is flexible) - default closure;
   - *GOVCLOS2* - fixed government savings, uniform direct tax rate point change for selected institutions ($TINSADJ_r$, $GSAV_r$, and $GADJ_r$ are fixed, $DTINS_r$ is flexible);
   - *GOVCLOS3* - fixed government savings, scaled direct tax rates for selected institutions ($DTINS_r$, $GSAV_r$, and $GADJ_r$ are fixed, $TINSADJ_r$ is flexible)
   - *GOVCLOS4* - fixed government savings, flexible government consumption ($TINSADJ_r$, $DTINS_r$, and $GSAV_r$ are fixed, $GADJ_r$ is flexible).
2. Rest of the world:
   - *ROWCLOS1* - fixed foreign savings, flexible real exchange rates ($FSAVGROSS_r$ is fixed, EXR_r is flexible) - default closure for all regions $r \in WALRASREG$, except for "world numéraire" $r \in WALRASREGN$;
   - *ROWCLOS2* - fixed real exchange rate, flexible foreign savings (EXR_r is flexible, $FSAVGROSS_r$ is fixed).
3. Savings-investment:
   - *SICLOS1* - investment-driven savings, i.e. fixed capital formation, uniform *mps* rate point change for selected institutions ($IADJ_r$ and $GADJ_r$ are fixed, $INVSHR_r$ and $GOVSHR_r$ are flexible; $MPSADJ_r$ is fixed, $DMPS_r$ is flexible);
   - *SICLOS2* - investment-driven savings, i.e. fixed capital formation, scaled *mps* rate for selected institutions ($IADJ_r$ and $GADJ_r$ are fixed, $INVSHR_r$ and $GOVSHR_r$ are flexible; $DMPS_r$ is fixed, $MPSADJ_r$ is flexible);
   - *SICLOS3* - savings-driven investment, i.e. flexible capital formation, fixed *mps* rate for all non-government institutions ($GADJ_r$ is fixed, $IADJ_r$, $INVSHR_r$, and $GOVSHR_r$ are flexible; $MPSADJ_r$ and $DMPS_r$ are fixed) - default closure;
   - *SICLOS4* - balanced closure, i.e. fixed absorption shares for investment demand, fixed absorption share for government demand, flexible investment demand quantity

adjustment factors, flexible government demand quantity adjustment factors, uniform mps_{ir} rate point change for selected institutions ($INVSHR_r$ and $GOVSHR_r$ are fixed, $IADJ_r$ and $GADJ_r$ are flexible; $MPSADJ_r$ is fixed, $DMPS_r$ is flexible);

- *SICLOS5* - balanced closure, i.e. fixed absorption shares for investment demand, fixed absorption share for government demand, flexible investment demand quantity adjustment factors, flexible government demand quantity adjustment factors, scaled mps_{ir} rate for selected institutions ($IADJ_r$ and $GOVSHR_r$ are fixed, $IADJ_r$ and $GADJ_r$ are flexible; $DMPS_r$ is fixed, $MPSADJ_r$ is flexible).

4. Selecting numéraire:

- *NUMERAIRE1* - consumer price index CPI_r is the system numéraire (CPI_r is fixed, DPI_r is flexible);

- *NUMERAIRE2* - producer price index for domestically marketed output DPI_r is the system numéraire (DPI_r is fixed, CPI_r is flexible) - default closure.

5. Factor closures:

- *FMOBFE* - factors are fully employed and mobile between activities; factor price WF_{fr} is the market-clearing variable for each factor ($QFSUP_{fr}$ and $WFDIST_{far}$ are fixed, QF_{far} and WF_{fr} are flexible) - default closure for capital $f \in FCAP$;

- *FACTFE* - factors with are fully employed and activity-specific; wage sectoral distortion $WFDIST_{far}$ is the clearing variable, one for each segment of the factor market (QF_{far} and WF_{fr} are fixed, $QFSUP_{fr}$ and $WFDIST_{far}$ are flexible);

- *FMOBUE* - factors are unemployed and mobile; the wage for each activity $WFDIST_{far} \cdot WF_{fr}$ is fixed, factor supply $QFSUP_{fr}$ is the market-clearing variable for the unified labor market ($WFDIST_{far}$ and WF_{fr} are fixed, QF_{far} and $QFSUP_{fr}$ are flexible).

- *FUNEMP1* - factors are unemployed (defined explicitly) and mobile; factor supply $QFSUP_{fr}$ is fixed, the wage for each activity $WFDIST_{far} \cdot WF_{fr}$ is fixed, QFD_{fr} is the adjusting each factor demand, and the disequilibrium between supply and demand at the labor market is attained through adjustment in unemployment quantity $QFUNEMP_{fr}$ ($QFSUP_{fr}$, $WFDIST_{far}$ and WF_{fr} are fixed; QF_{far}, QFD_{fr}, $QFUNEMP_{fr}$ and UR_{fr} are flexible);

- *FUNEMP2* - factors are unemployed (defined explicitly) and mobile; factor supply $QFSUP_{fr}$ is fixed, wage differences between sectors $WFDIST_{far}$ are fixed, and unemployment quantity $QFUNEMP_{fr}$ is fixed in the static model (changes are explicitly defined in dynamic simulations), factor price WF_{fr} is the market-clearing variable for each factor market, and factor demand QFD_{fr} is defined as difference between supply and unemployment ($QFSUP_{fr}$, $WFDIST_{far}$, and $QFUNEMP_{fr}$ are

fixed; QF_{far}, QFD_{fr}, WF_{fr} and UR_{fr} are flexible) - default closure for labor $f \in FLAB$;

- *FUNEMP3* - factors are unemployed (defined explicitly) and mobile; factor supply $QFSUP_{fr}$ is fixed, wage differences between sectors $WFDIST_{far}$ are fixed, and unemployment rate UR_{fr} is fixed in the static model (changes are explicitly defined in dynamic simulations), factor price WF_{fr} is the market-clearing variable for each factor market, and factor demand QFD_{fr} is defined as difference between supply and unemployment ($QFSUP_{fr}$, UR_{fr}, and $WFDIST_{far}$ are fixed; QF_{far}, QFD_{fr}, WF_{fr} and $QFUNEMP_{fr}$ are flexible).

6. Institutions:

- $mps01_{ir}$ - selecting institutions with potentially flexible savings rates (only for government closures where $MPSADJ_r$ or $DMPS_r$ is flexible) - default $=1$ for all domestic non-governmental institutions $i \in INSDNG$;
- $tins01_{ir}$ - selecting institutions with potentially flexible direct tax rates (only for savings-investment closures where $TINSADJ_r$ or $DTINS_r$ is flexible) - default $=1$ for all domestic non-governmental institutions $i \in INSDNG$.

7. Foreign direct investment:

- *fdi01* - allowing FDI flows in dynamic simulations between regions - default $=0$, for EU enlargement simulations $=1$).

6. Simulations and results

Along with the baseline, 23 policy simulations had been carried out. Their brief description is in Table 6. The simulations may be divided into the following groups: 1) baseline simulation (Sim 0); 2) simulations related to the process of EU enlargement (Sim 1 through Sim 6) 3); 3) simulations related to economic reforms in the Slovak Republic (Sim 7 through Sim 16); and 3) combination of previous simulations (Sim 17 through Sim 23).

Table 6: Simulation scenarios

Simulation	Content
Base-run simulation:	
Sim 00 (BASE)	base simulation (baseline scenario)
EU-enlargement related simulations:	
Sim 01 (TARCUTSR)	100 % SR's cut of EU tariffs
Sim 02 (TARCUTEU)	100 % EU's cut of EU tariffs - unified commodity market
Sim 03 (FREELAB)	EU labor market liberalization - unified labor market with free movement
Sim 04 (REMEU)	FREELAB + allowing labor foreign remittances in EU
Sim 05 (FREECAP)	EU capital market liberalization - unified capital market with free movement
Sim 06 (FDIEU)	FREECAP + allowing FDI payments in EU
SR-reform related simulations:	
Sim 07 (FLSTAX000)	introducing a flat indirect tax rate in SR
Sim 08 (FLSTAX280)	FLSTAX000 + 280 % increase
Sim 09 (FLSTAX500)	FLSTAX000 + 500 % increase
Sim 10 (YTAXCONEW)	60% cut of SR's Corporate income tax to about 19 % from 48 %
Sim 11 (SLIMGOV)	Fiscal consolidation - SR's balanced gov't budget
Sim 12 (WAGGUP)	3 % gradual increase SR's UnskLab and 5% of SkLab wages each year
Sim 13 (UNEMPDN)	5 % gradual decrease of SR's unemployment each year
Sim 14 (APPREC)	1 % gradual appreciation of SKK each year
Sim 15 (DEPREC)	1 % gradual depreciation of SKK each year
Sim 16 (QINVINCR)	10 % gradual increase of SR's real investment each year
Combined simulations:	
Sim 17 (COMBINE1)	EU enlargement: TARCUTEU+REMEU+FDIEU
Sim 18 (COMBINE2)	SVK reforms: FLSTAX000+YTAXNEW
Sim 19 (COMBINE3)	SVK reforms: FLSTAX280+YTAXNEW
Sim 20 (COMBINE4)	SVK reforms: FLSTAX500+YTAXNEW
Sim 21 (COMBINE5)	Eu enlargement + SVK reforms: COMBINE1+COMBINE2 (comfortable scenario)
Sim 22 (COMBINE6)	Eu enlargement + SVK reforms: COMBINE1+COMBINE3 (ideal scenario)
Sim 23 (COMBINE7)	Eu enlargement + SVK reforms: COMBINE1+COMBINE4 (futile scenario)

Source: Authors.

The simulations were carried out for 10 years, starting with 2001 as benchmark. Simulation results for the Slovak Republic in the short-term are in Table 7, in the medium-term in Table 8, and in long-term in Table 9. Short-term in this case means that the simulations measure the impacts of only static shocks, i.e. results for the benchmark year 2001. Medium-term combines the effect of the static shock with a short-term dynamic impact,

i.e. results for the second year 2002. Long-term results show impacts of the static shock and of an afterward dynamic development for 10 years, i.e. results for 2010, the last year of the period under evaluation. Basic indicators of long-term development in particular regions in the long-term are in Table 10.

Sim 0 - BASE is the baseline simulation, and serves as base for comparison with other simulations. This simulation is calibrated to give the initial (input) values in the benchmark year. The assumption for the following years is that the economy will develop according to this scenario, if no policy measures or shocks occur.

6.1 Simulations directly related to EU enlargement

Under Sim 1 - TARCUTSR, a static initial shock abolishing all tariffs of the Slovak Republic in relation to EU countries is applied. The simulation has been carried out to show the pure effect of Slovak Republic's entry to the unified EU commodity market. Impacts especially at the macroeconomic level are not very extensive, due to the fact that SR has been preparing and adjusting the structure of its economy especially in trade for EU accession long before the actual entry. Even though real GDP in the short-term show slight increase, together with the nominal it falls in the long-term. Because of the lost income from import tariffs, the government balance has negative impact, and impact on the government balance in the long-term remains in spite that deficit becomes surplus in the baseline. Positive impact to the trade balance can be observed. Real depreciation of the exchange rate occurs.

Sim 2 - TARCUTEU with a static shock similar to Sim 1, however all EU countries at the unified commodity market abolish their import tariffs with each other. This simulation is aimed to investigate the impact of introducing a common market for goods and services within the EU. Results, slightly different in size, have similar impacts to the Slovak economy as Sim 1. An exception is the negative impact to trade balance in short- and long-term. Real depreciation is milder than under Sim 1.

Sim 3 - FREELAB is a dynamic simulation aimed to investigate impacts of introducing a common labor market with free movement of labor between regions. In an extent limited by geographic, social, economic and other conditions, labor force is free to move between regions with different wage levels. Due to the dynamic nature of the simulation (alike each following), results in the short-term show no distortion from the benchmark. However from

the medium- and long-term results it is straightforward that heading for high wage regions, labor force slowly flows out of the Slovak Republic. And due to the model definition, there is positive impact on unemployment because vacancies after the labor leaving the home economy are filled from these "labor force reserves". The model however allows this substitution only to a certain level, i.e. up to the level of natural unemployment, and never clears the labor market perfectly.

Sim 4 - REMEU is a dynamic simulation, similar to Sim 3. Here, besides labor movement itself, labor remittances of foreign workers are introduced. Remittances are payments from workers that left their home country to work at a high income region, and send part of their wage each year back to their home country. They are financial counter-flows to physical movement of labor. The effects for the Slovak Republic are negative to production in the medium-term, but positive in the long-term, when almost all sectors show increase in production. Trade balance development is negative. There is however a significantly positive effect due to the accumulation of labor force continuously remitting over years through the increasing investment. There is also a slight improvement in the government balance.

Sim 5 - FREECAP, and Sim 6 - FDIEU are two dynamic simulations, in a nature similar to Sim 3 and Sim 4, respectively. The difference is that movement of physical capital and its financial counter-flows in form of FDI are investigated. Another small difference is that while labor continues remitting part of its income over the years, payments in case of FDI occur only once, i.e. during the first year when FDI was made. Capital is freely moving from regions with low rates of return to high return regions, followed by financial flows in form of FDI. And since it is reasonable to assume that barriers for free movement of capital are significantly smaller than for labor, degree of freedom is set double of that of labor. As a result, FDI is crowding into the Slovak economy due to higher interest rates than the rest of EU. The speed of capital inflow however decreases in time. Simultaneously, capital rates of return between EU regions converge significantly. A divergence in foreign savings between Sim 6 and Sim 4 is especially in the long-term, where while labor keeps remitting over the years (volume of remittances accumulates), FDI flows do not accumulate. The largest positive impact of FDI is therefore in the medium-term, while for labor movement it is in the long-term.

6.2 Simulations related to Slovak economic reforms

Sim 7 - FLSTAX000, Sim 8 - FLSTAX 280, and Sim 9 - FLSTAX 500 are simulations with a static shock, aimed to investigate the implementation of flat indirect tax rates[32] by the Slovak government. In Sim 7, only the effect of introducing a flat indirect tax (including subsidies) at the level of current average rate is investigated. In Sim 8, this flat rate is furthermore increased by 280.0 %, and in Sim 9 by 500.0 %. The decision on size of the tax rate increase has been made based on simulations combining other policies and EU enlargement. A detailed discussion on this is given in Sim 18 through Sim 23.

Government deficit increases in Sim 7. However introducing a flat indirect tax followed by increase in its level in Sim 8, and a rather drastic implementation of this policy measure in Sim 9 significantly improves the government budget which flips from negative to positive values. Increase of real GDP, significant increase of nominal GDP especially due to CPI growth, real appreciation of the exchange occurs. However the higher the increase of the tax level the lower this appreciation becomes. And in spite of strong support from economic theory and also from several international institutions including the World Bank and IMF, to continue with this policy practically in the long-term will, however, require an extremely strong will of most economic segments, which is under present social and political conditions quite questionable. Large pressure on "weak" sectors and also on households, consumption of whose fall rapidly supports the hesitation about its sustainability even more. Identification of weak sectors from Table 7 through Table 9, by looking at activities with increasing and with decreasing production due to the flat tax introduced, propose further economic restructuralization especially in agriculture, mining, services, but also in heavy manufacturing.

Sim 10 - YTAXCONEW is a static shock simulation to investigate impacts of tax reform for corporations, i.e. reduction of corporate income tax from 48.0 %[33] to present 19.0 %. As a result, reduction of government income from corporate income taxes by 60.0 % causes widening of the negative government deficit in the short-term. The negative pressure to government balance remains in the long-term, however significant improvement is visible from the final (2010) deficit close to zero (balanced budget). In spite of the results that are not so negative to the government balance in the long-term, independent implementation of the policy is unacceptable from the point of view of quick Eurozone accession, where there is

[32] sales tax in the model
[33] tax rate calculated from SAM (official rate was 40.0 %)

a condition that the fiscal deficit of government may not exceed 3.0 % of GDP. Tax reduction must therefore be implemented as part of a whole reform package, with corrections (reduction) on the expenditure side, and/or compensation of budget income from other sources.

Sim 11 - SLIMGOV is static shock simulation related to Eurozone accession of the Slovak Republic. Here, government income and expenditures are exogenously balanced (reduction of government deficit to zero level) and compared with baseline simulation. Since the baseline model had to be modified (fixed government savings $GSAV_r$, equilibrium adjustment via government consumption by flexing $GADJ_r$), results of this policy are evaluated individually, and cannot be used for comparison with other simulations[34]. It is also impossible to combine this simulation with others, which are based on the same model as baseline. Impacts at both the macro- and the micro-level are positive, i.e. nominal GDP, real GDP, and production in each sector with exception of Machinery and Construction show additional growth. In the short- and medium-term, government income shows slight increase, on the other side reduction in government expenditures is substituted by private investment. And in spite the increase in private investment might seem a little high (due to the nature of the model), the direction of this policy is definitely positive and strongly recommended in the medium-term. In the long-term, the baseline scenario shows positive development of the government balance, with a surplus in 2010. Therefore bringing the balance back to zero from surplus has an opposite effect with government income decreasing and expenditures increasing. Recommendation for the long-term may therefore also be generally recommended. However if we think of the balance between shares of private and public sector in the aggregate domestic product, and do not wish to increase the role of government too much, conclusions have to be made more carefully. Looking at private investment results show that a too extensive increase in government consumption causes crowding-out of private investment.

Sim 12 - WAGGUP is a dynamic simulation, and together with scenario of Sim 13 - UNEMPDN is aimed at the labor market. The baseline model has been modified in definition of unemployment. In Sim 12, labor wages (WF_{fr}, where $f \in FLAB$) have been fixed and labor market equilibrium (supply side) is reached by flexing unemployment ($QFUNEMP_{fr}$, where $f \in FLAB$). In Sim 13, rate of unemployment (UR_{fr}, where $f \in FLAB$) has been

[34] as any other simulation based on a different model

fixed and unemployment in absolute terms ($QFUNEMP_{f\,r}$, where $f \in FLAB$) set flexible. Both simulations are implemented in a model different from the baseline, and the results must be evaluated individually. It is also impossible to combine this simulation with others based on a different model.

In Sim 12, real wages of unskilled labor and skilled labor are gradually increased, by 3.0 % and by 5.0 % respectively each year. Except for labor income and GDP per unit of labor force which are increasing, the economic impacts are negative. Sectoral and aggregate production, investment, government savings, private consumption, exports, imports, and also the trade deficit, GDP per capita are decreasing, while there is an appreciation of the exchange rate. Results for the long-term have the same direction, only the effect is stronger. Unemployment shows rapid increase. On the other side, in Sim 13, unemployment is decreasing explicitly. In accordance with theory results show that with a different magnitude, direction of impacts is opposite of those in Sim 12.

Sim 14 - APPREC, and Sim 15 - DEPREC are dynamic simulations aimed at appreciation and depreciation of the Slovak Crown. Definition of this model has also been modified from baseline, where instead of the fixed exchange rate (EXR_r), equilibrium at the foreign market is reached through flexible foreign savings ($FSAVGROSS_r$). Individual comparison with baseline is still possible, because the explicit appreciation/depreciation of the exchange rate is not independent, but is defined as divergence from baseline values of the same year. As expected, the results of the two simulations are opposite of each other. While during appreciation private consumption, fixed investment, government consumption, and trade deficit are increasing, during depreciation the development is opposite.

Sim 16 - QINVINCR is a dynamic simulation to show the impact of gradual increase in average domestic investment. In spite of a slight reduction in private consumption, impacts to both nominal and real aggregate indicators are positive. Impacts at the sectoral level depend on the strength of individual sectors and their ability to create new investment. While impacts to nominal values appear immediately, development of real values is gradual.

6.3 Combined simulations

Sim 17 - COMBINE1 is a dynamic simulation, combining simulations related to EU enlargement (Sim 2, Sim 4, and Sim 6). Goal of the simulation is to investigate the direct

impacts of EU enlargement to the Slovak, but also to the rest of EU economies. Since Sim 17 is a dynamic simulation, short-term results reflect the impacts of only liberalization of commodity market, and therefore are same as Sim 2. Impacts at structural level in both the medium- and long-term are strict to weak industries, i.e. agriculture and for light manufacturing. With exception of trade deficit that slightly grows, aggregate indicators show positive development. Private consumption, fixed investment, exports, imports, aggregate GDP, GDP per capita, GDP per worker, all in real terms show growth in the long-term. Exchange rate is appreciating.

Sim 18 - COMBINE 2, Sim 19 - COMBINE 3, and Sim 20 - COMBINE 4, are dynamic simulations aimed at economic reforms in the Slovak Republic realized during the period of EU accession. The flagship of these reforms is introduction of the 19.0 % flat rate for indirect taxes, and for the corporate income tax. Because of a fiscal policy, most affected is the government budget. The higher the increase in tax rate the better impact to the government balance. The same is true for GDP growth, change of which is affected mostly by government consumption.

Sim 21 - COMBINE 5, Sim 22 - COMBINE 6, and Sim 23 - COMBINE 7, is the last set of combined, dynamic simulations. These simulations cover both the impacts of EU enlargement and impacts of Slovak reform policies. The difference between the three simulations is rate by which the indirect tax is raised. The decision on size of the tax rate increase is based on these three simulations combining other policies and EU enlargement. According to the results, subtitle for simulations has been assigned. Simulations with flat indirect tax but no increase are called "comfortable", because of small but negative impact on real GDP, and because this no overall tax increase is implemented. Flat tax, increased in average by 280.0 % brings strong positive impacts on real GDP, and at the same time it serves with a good base for combination with other policies, i.e. it is called "ideal scenario". This level draws the best synergic effects, as shown in Sim 22. Increasing the flat indirect tax rate by 500.0 % is meant to show impacts of an extreme situation, where excessively high additional real GDP growths on one side cancel out the positive impacts of other policies. Synergic effect from combination with other policies is close to zero, and therefore simulations in combination with it are called the "futile scenario". At the same time it is quite improbable that such high tax rates could be sustained in conditions of the Slovak economy for long time.

Table 7: Short-term simulations for the Slovak Republic (static shock only, 2001), %-age changes

Simulation number	Sim 0	Sim 1	Sim 2	Sim 3	Sim 4	Sim 5	Sim 6	Sim 7	Sim 8	Sim 9	Sim10	Sim11	Sim12	Sim13	Sim14	Sim15	Sim16	Sim17	Sim18	Sim19	Sim20	Sim21	Sim22	Sim23
Simulation ID	BASE	TARCUTSR	TARCUTEU	FREELAB	REMEU	FREECAP	FDIEU	FLSTAX000	FLSTAX280	FLSTAX500	YTAXCONEW	SLIMGOV	WAGGUP	UNEMPDN	APPREC	DEPREC	QINVINCR	COMBINE1	COMBINE2	COMBINE3	COMBINE4	COMBINE5	COMBINE6	COMBINE7
PRICES: ##																								
CPI	1.02	-0.37	-0.38	0.00	0.00	0.00	0.00	0.54	2.81	5.72	-0.01	0.18	0.00	0.00	0.00	0.00	0.00	-0.38	0.54	2.81	5.72	0.20	2.47	5.37
DPI	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXR	1.00	1.07	0.40	0.00	0.00	0.00	0.00	-2.35	-1.94	-1.43	-0.17	1.21	0.00	0.00	0.00	0.00	0.00	0.40	-2.49	-2.09	-1.57	-2.14	-1.60	-1.22
GADJ	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-32.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IADJ	1.00	-3.78	-3.06	0.00	0.00	0.00	0.00	-5.07	5.73	17.90	-5.90	24.10	0.00	0.00	0.00	0.00	0.00	-3.06	-11.06	-0.01	12.44	-14.27	2.98	10.02
MPS.HHD	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MPS.CORP	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MPSADJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WF.UnskLab	3.27	1.54	2.05	0.00	0.00	0.00	0.00	3.67	-0.16	-4.88	-0.03	0.64	0.00	0.00	0.00	0.00	0.00	2.05	3.64	-0.19	-4.91	5.53	1.72	-3.05
WF.SkLab	3.27	1.80	2.25	0.00	0.00	0.00	0.00	2.85	-1.13	-6.00	0.24	-2.88	0.00	0.00	0.00	0.00	0.00	2.25	3.06	-0.93	-5.81	5.12	0.91	-3.82
WF.CAP	0.14	1.50	2.13	0.00	0.00	0.00	0.00	3.45	-0.35	-5.01	0.06	-0.58	0.00	0.00	0.00	0.00	0.00	2.13	3.49	-0.31	-4.98	5.45	1.60	-3.06
QUANTITIES: ##																								
QA.Crops-A	0.65	-1.92	-0.81	0.00	0.00	0.00	0.00	1.95	-3.87	-10.68	1.93	0.92	0.00	0.00	0.00	0.00	0.00	-0.81	3.94	-1.99	-8.93	2.74	-4.94	-9.91
QA.OtherA-A	1.10	0.82	1.74	0.00	0.00	0.00	0.00	0.23	-5.03	-11.23	1.67	1.14	0.00	0.00	0.00	0.00	0.00	1.74	1.92	-3.43	-9.73	3.40	-3.62	-8.35
QA.Mining-A	0.21	2.91	2.87	0.00	0.00	0.00	0.00	8.10	3.07	-2.99	-0.38	6.20	0.00	0.00	0.00	0.00	0.00	2.87	7.80	2.77	-3.27	10.76	5.88	-0.61
QA.FoodP-A	4.89	-0.39	1.81	0.00	0.00	0.00	0.00	0.53	-5.64	-12.85	2.63	-0.30	0.00	0.00	0.00	0.00	0.00	1.81	3.19	-3.12	-10.49	4.71	-4.20	-9.12
QA.LightM-A	6.19	0.43	-1.32	0.00	0.00	0.00	0.00	-0.41	-3.89	-8.10	0.32	3.59	0.00	0.00	0.00	0.00	0.00	-1.32	0.05	-3.46	-7.71	-1.55	-5.39	-9.08
QA.HeavyM-A	9.66	0.57	3.16	0.00	0.00	0.00	0.00	20.12	15.60	10.06	-0.55	4.95	0.00	0.00	0.00	0.00	0.00	3.16	19.62	15.12	9.60	23.37	19.22	13.08
QA.Machine-A	8.30	3.56	2.91	0.00	0.00	0.00	0.00	6.12	4.08	1.38	-1.27	7.03	0.00	0.00	0.00	0.00	0.00	2.91	4.86	2.88	0.25	7.78	6.91	3.02
QA.Utility-A	1.29	1.44	1.63	0.00	0.00	0.00	0.00	5.39	0.19	-6.00	0.91	0.61	0.00	0.00	0.00	0.00	0.00	1.63	6.35	1.11	-5.14	7.97	1.74	-3.66
QA.Constr-A	4.82	-2.37	-1.75	0.00	0.00	0.00	0.00	-2.96	3.98	11.63	-4.34	17.66	0.00	0.00	0.00	0.00	0.00	-1.75	-7.39	-0.26	7.61	-9.33	2.40	6.29
QA.Serv-A	18.23	0.95	0.92	0.00	0.00	0.00	0.00	-1.92	-4.14	-6.88	0.68	-7.43	0.00	0.00	0.00	0.00	0.00	0.92	-1.34	-3.57	-6.32	-0.59	-3.39	-5.57
QFD.UnskLab	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QFD.SkLab	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QFD.CAP	70.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QFSUP.UnskLab	2.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QFSUP.SkLab	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QFSUP.CAP	70.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QFUENMP.UnskLab	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QFUENMP.SkLab	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QFUENMP.CAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UR.UnskLab	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UR.SkLab	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UR.CAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GSAV	-1.62	24.89	24.40	0.00	0.00	0.00	0.00	43.12	-21.97	-101.19	38.44	-100.00	0.00	0.00	0.00	0.00	0.00	24.40	81.37	15.73	-64.14	104.73	0.53	-42.11
FSAVGROSS	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
REMCHGWADJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
REMACCX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FDICHGWADJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GDP ELEMENTS: ##																								
Real absorption	21.83	-0.21	0.27	0.00	0.00	0.00	0.00	-0.24	0.05	0.20	-0.04	0.51	0.00	0.00	0.00	0.00	0.00	0.27	-0.26	0.03	0.18	-0.06	0.32	0.52
Real private cons	11.23	1.76	2.27	0.00	0.00	0.00	0.00	2.44	-3.17	-9.83	3.30	-0.61	0.00	0.00	0.00	0.00	0.00	2.27	5.80	0.06	-6.75	8.04	-1.08	-4.71
Real fixed inv	6.41	-3.78	-3.06	0.00	0.00	0.00	0.00	-5.07	5.73	17.90	-5.90	24.10	0.00	0.00	0.00	0.00	0.00	-3.06	-11.06	-0.01	12.44	-14.27	2.98	10.02
Real gov't cons	4.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-32.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real export	14.47	2.50	2.99	0.00	0.00	0.00	0.00	8.03	4.94	1.10	-0.47	4.35	0.00	0.00	0.00	0.00	0.00	2.99	7.61	4.53	0.72	10.83	8.06	3.74
Real import	-16.25	1.83	2.80	0.00	0.00	0.00	0.00	5.86	3.62	0.82	-0.34	3.19	0.00	0.00	0.00	0.00	0.00	2.80	5.56	3.33	0.55	8.56	6.54	3.38
Real trade deficit	-2.22	-2.34	1.63	0.00	0.00	0.00	0.00	-8.81	-5.35	-1.20	0.47	-4.04	0.00	0.00	0.00	0.00	0.00	1.63	-8.31	-4.88	-0.76	-6.72	-3.67	0.95
Real GDP	20.05	0.10	0.18	0.00	0.00	0.00	0.00	0.79	0.68	0.35	-0.10	1.11	0.00	0.00	0.00	0.00	0.00	0.18	0.69	0.60	0.28	0.82	0.86	0.52
Nominal GDP	20.05	-0.62	-0.09	0.00	0.00	0.00	0.00	1.52	4.11	7.24	-0.06	0.80	0.00	0.00	0.00	0.00	0.00	-0.09	1.54	4.12	7.24	1.44	4.04	7.23
Real indirect tax	1.46	2.98	4.51	0.00	0.00	0.00	0.00	14.02	11.19	7.59	-1.35	15.56	0.00	0.00	0.00	0.00	0.00	4.51	12.87	10.09	6.54	17.93	16.07	11.28
CPI (100 for base)	100.00	-0.37	-0.38	0.00	0.00	0.00	0.00	0.54	2.81	5.72	-0.01	0.18	0.00	0.00	0.00	0.00	0.00	-0.38	0.54	2.81	5.72	0.20	2.47	5.37
Real exchange rate	100.00	1.42	0.81	0.00	0.00	0.00	0.00	-4.11	-3.27	-2.20	-0.23	1.53	0.00	0.00	0.00	0.00	0.00	0.81	-4.29	-3.46	-2.40	-3.57	-2.55	-1.67
Nominal exchange rate	100.00	1.07	0.40	0.00	0.00	0.00	0.00	-2.35	-1.94	-1.43	-0.17	1.21	0.00	0.00	0.00	0.00	0.00	0.40	-2.49	-2.09	-1.57	-2.14	-1.60	-1.22
MACROECONOMIC INDICATORS: ##																								
ABSORP.NOMINAL	21.83	-0.48	-0.05	0.00	0.00	0.00	0.00	1.20	3.61	6.53	-0.07	0.83	0.00	0.00	0.00	0.00	0.00	-0.05	1.21	3.61	6.52	1.15	3.58	6.54
ABSORP.REAL	21.83	-0.21	0.27	0.00	0.00	0.00	0.00	-0.24	0.05	0.20	-0.04	0.51	0.00	0.00	0.00	0.00	0.00	0.27	-0.26	0.03	0.18	-0.06	0.32	0.52
PRVCON.NOMINAL	11.23	1.43	1.95	0.00	0.00	0.00	0.00	3.20	-0.21	-4.41	3.30	-0.46	0.00	0.00	0.00	0.00	0.00	1.95	6.58	3.10	-1.16	8.41	1.57	0.63
PRVCON.REAL	11.23	1.76	2.27	0.00	0.00	0.00	0.00	2.44	-3.17	-9.83	3.30	-0.61	0.00	0.00	0.00	0.00	0.00	2.27	5.80	0.06	-6.75	8.04	-1.08	-4.71
FIXINV.NOMINAL	6.41	-4.59	-4.14	0.00	0.00	0.00	0.00	-8.40	4.80	20.84	-6.03	25.09	0.00	0.00	0.00	0.00	0.00	-4.14	-14.28	-1.01	15.11	-18.29	0.96	11.41
FIXINV.REAL	6.41	-3.78	-3.06	0.00	0.00	0.00	0.00	-5.07	5.73	17.90	-5.90	24.10	0.00	0.00	0.00	0.00	0.00	-3.06	-11.06	-0.01	12.44	-14.27	2.98	10.02
GOVCON.NOMINAL	4.19	0.68	0.85	0.00	0.00	0.00	0.00	10.54	12.06	13.97	0.02	-32.84	0.00	0.00	0.00	0.00	0.00	0.85	10.55	12.07	13.98	11.44	12.97	14.94
GOVCON.REAL	4.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-32.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXP.NOMINAL	14.47	3.12	3.70	0.00	0.00	0.00	0.00	4.09	2.05	-0.52	-0.55	4.85	0.00	0.00	0.00	0.00	0.00	3.70	3.62	1.59	-0.97	7.44	5.78	2.67
EXP.REAL	14.47	2.50	2.99	0.00	0.00	0.00	0.00	8.03	4.94	1.10	-0.47	4.35	0.00	0.00	0.00	0.00	0.00	2.99	7.61	4.53	0.72	10.83	8.06	3.74
IMP.NOMINAL	-16.25	2.89	3.34	0.00	0.00	0.00	0.00	3.38	1.61	-0.62	-0.51	4.45	0.00	0.00	0.00	0.00	0.00	3.34	2.95	1.19	-1.04	6.39	4.97	2.24
IMP.REAL	-16.25	1.83	2.80	0.00	0.00	0.00	0.00	5.86	3.62	0.82	-0.34	3.19	0.00	0.00	0.00	0.00	0.00	2.80	5.56	3.33	0.55	8.56	6.54	3.38
GDPMP.NOMINAL	20.05	-0.62	-0.09	0.00	0.00	0.00	0.00	1.52	4.11	7.24	-0.06	0.80	0.00	0.00	0.00	0.00	0.00	-0.09	1.54	4.12	7.24	1.44	4.04	7.23
GDPMP.REAL	20.05	0.10	0.18	0.00	0.00	0.00	0.00	0.79	0.68	0.35	-0.10	1.11	0.00	0.00	0.00	0.00	0.00	0.18	0.69	0.60	0.28	0.82	0.86	0.52
NETITAX.NOMINAL	1.46	-28.24	-28.22	0.00	0.00	0.00	0.00	-22.87	61.42	164.38	-1.59	17.57	0.00	0.00	0.00	0.00	0.00	-28.22	-23.06	61.15	164.00	-49.27	35.80	139.50
NETITAX.REAL	1.46	2.98	4.51	0.00	0.00	0.00	0.00	14.02	11.19	7.59	-1.35	15.56	0.00	0.00	0.00	0.00	0.00	4.51	12.87	10.09	6.54	17.93	16.07	11.28
QABSTOT	21.83	-0.21	0.27	0.00	0.00	0.00	0.00	-0.24	0.05	0.20	-0.04	0.51	0.00	0.00	0.00	0.00	0.00	0.27	-0.26	0.03	0.18	-0.06	0.32	0.52
QHTOT	11.23	1.76	2.27	0.00	0.00	0.00	0.00	2.44	-3.17	-9.83	3.30	-0.61	0.00	0.00	0.00	0.00	0.00	2.27	5.80	0.06	-6.75	8.04	-1.08	-4.71
QINVTOT	6.41	-3.78	-3.06	0.00	0.00	0.00	0.00	-5.07	5.73	17.90	-5.90	24.10	0.00	0.00	0.00	0.00	0.00	-3.06	-11.06	-0.01	12.44	-14.27	2.98	10.02
QGTOT	4.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-32.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QETOT	14.47	2.50	2.99	0.00	0.00	0.00	0.00	8.03	4.94	1.10	-0.47	4.35	0.00	0.00	0.00	0.00	0.00	2.99	7.61	4.53	0.72	10.83	8.06	3.74
QMTOT	16.69	1.85	2.81	0.00	0.00	0.00	0.00	5.78	3.57	0.80	-0.34	3.24	0.00	0.00	0.00	0.00	0.00	2.81	5.49	3.28	0.52	8.49	6.50	3.37
TRDDEFTOT	-2.22	-2.34	1.63	0.00	0.00	0.00	0.00	-8.81	-5.35	-1.20	0.47	-4.04	0.00	0.00	0.00	0.00	0.00	1.63	-8.31	-4.88	-0.76	-6.72	-3.67	0.95
REXR	100.00	1.42	0.81	0.00	0.00	0.00	0.00	-4.11	-3.27	-2.20	-0.23	1.53	0.00	0.00	0.00	0.00	0.00	0.81	-4.29	-3.46	-2.40	-3.57	-2.55	-1.67
NEXR	100.00	1.07	0.40	0.00	0.00	0.00	0.00	-2.35	-1.94	-1.43	-0.17	1.21	0.00	0.00	0.00	0.00	0.00	0.40	-2.49	-2.09	-1.57	-2.14	-1.60	-1.22
PWEIND	100.00	-0.46	0.28	0.00	0.00	0.00	0.00	-1.19	-0.71	-0.07	0.09	-0.71	0.00	0.00	0.00	0.00	0.00	0.28	-1.13	-0.64	-0.01	-0.82	-0.40	0.30
PWMIND	100.00	1.05	0.52	0.00	0.00	0.00	0.00	-2.34	-1.94	-1.43	-0.17	1.22	0.00	0.00	0.00	0.00	0.00	0.52	-2.48	-2.08	-1.58	-2.02	-1.48	-1.11
PWIND	100.00	0.34	0.41	0.00	0.00	0.00	0.00	-1.80	-1.36	-0.79	-0.05	0.31	0.00	0.00	0.00	0.00	0.00	0.41	-1.84	-1.40	-0.84	-1.46	-0.97	-0.45
PDIND	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CPI	100.00	-0.37	-0.38	0.00	0.00	0.00	0.00	0.54	2.81	5.72	-0.01	0.18	0.00	0.00	0.00	0.00	0.00	-0.38	0.54	2.81	5.72	0.20	2.47	5.37
TOFT	100.00	-1.49	-0.24	0.00	0.00	0.00	0.00	1.18	1.25	1.37	0.26	-1.90	0.00	0.00	0.00	0.00	0.00	-0.24	1.39	1.47	1.59	1.22	1.10	1.42
INVGDP	31.99	-3.99	-4.06	0.00	0.00	0.00	0.00	-9.77	0.66	12.68	-5.97	24.09	0.00	0.00	0.00	0.00	0.00	-4.06	-15.59	-4.93	7.33	-19.45	-2.96	3.89
PRVSAVGDP	31.15	2.06	2.04	0.00	0.00	0.00	0.00	1.66	-4.14	-10.83	3.87	-1.25	0.00	0.00	0.00	0.00	0.00	2.04	5.47	-0.48	-7.34	7.38	-2.37	-5.66
FORSAVGDP	8.90	1.70	0.49	0.00	0.00	0.00	0.00	-3.81	-5.81	-8.08	-0.11	0.41	0.00	0.00	0.00	0.00	0.00	0.49	-3.97	-5.96	-8.22	-3.53	-5.42	-7.89
TRDDEFGDP	11.09	-16.05	-17.00	0.00	0.00	0.00	0.00	-3.24	-5.50	-8.10	-0.19	1.36	0.00	0.00	0.00	0.00	0.00	-17.00	-3.47	-5.71	-8.30	-20.25	-21.85	-23.95
GOVSAVGDP	-8.06	25.67	24.52	0.00	0.00	0.00	0.00	40.99	-25.04	-101.11	38.53	-100.00	0.00	0.00	0.00	0.00	0.00	24.52	78.62	11.15	-66.56	101.82	-3.37	-46.02
IMPTAXGDP	2.19	-88.29	-88.17	0.00	0.00	0.00	0.00	-0.92	-4.25	-8.20	-0.50	5.24	0.00	0.00	0.00	0.00	0.00	-88.17	-1.40	-4.71	-8.62	-88.29	-88.74	-89.31
DIRTAXGDP	14.12	1.80	1.77	0.00	0.00	0.00	0.00	1.52	-3.64	-9.58	-21.05	-1.24	0.00	0.00	0.00	0.00	0.00	1.77	-19.89	-24.17	-29.11	-18.52	-2.10	-27.91
GDPNpCAP	3709.18	-0.62	-0.09	0.00	0.00	0.00	0.00	1.52	4.11	7.24	-0.06	0.80	0.00	0.00	0.00	0.00	0.00	-0.09	1.54	4.12	7.24	1.44	4.04	7.23
GDPNpECP	6181.96	-0.62	-0.09	0.00	0.00	0.00	0.00	1.52	4.11	7.24	-0.06	0.80	0.00	0.00	0.00	0.00	0.00	-0.09	1.54	4.12	7.24	1.44	4.04	7.23
GDPNpLAB	7727.45	-0.62	-0.09	0.00	0.00	0.00	0.00	1.52	4.11	7.24	-0.06	0.80	0.00	0.00	0.00	0.00	0.00	-0.09	1.54	4.12	7.24	1.44	4.04	7.23
GDPRpCAP	3709.18	0.10	0.18	0.00	0.00	0.00	0.00	0.79	0.68	0.35	-0.10	1.11	0.00	0.00	0.00	0.00	0.00	0.18	0.69	0.60	0.28	0.82	0.86	0.52
GDPRpECP	6181.96	0.10	0.18	0.00	0.00	0.00	0.00	0.79	0.68	0.35	-0.10	1.11	0.00	0.00	0.00	0.00	0.00	0.18	0.69	0.60	0.28	0.82	0.86	0.52
GDPRpLAB	7727.45	0.10	0.18	0.00	0.00	0.00	0.00	0.79	0.68	0.35	-0.10	1.11	0.00	0.00	0.00	0.00	0.00	0.18	0.69	0.60	0.28	0.82	0.86	0.52
EVTOT	0.00	1.75	2.26	0.00	0.00	0.00	0.00	2.18	-3.38	-9.98	3.30	-0.61	0.00	0.00	0.00	0.00	0.00	2.26	5.52	-0.17	-6.92	7.69	-1.35	-4.94

Source:
Authors' calculations
Notes:
1. Value variables are in USD billions, labor units are millions of persons
2. BASEline simulation results in the BENCHmark year (2001) show actual values
3. Other simulation results show %-age changes from the BENCHmark year (2001) of the BASEline scenario
4. EVTOT comparisons are made with household income (EH)
5. Variable notations are as follows:

SIM ID - simulation ID
CPI - consumer price index (PQ-based)
DPI - index for domestic producer prices (PDS-based)
EXR - exchange rate
GADJ - government demand scaling factor
IADJ - investment scaling factor (for fixed capital formation)
MPS - marginal propensity to save for dom non-gov inst ins
MPSADJ - savings rate scaling factor
WF - economy-wide wage (rent) for factor f
QA - level of domestic activity
QFD - quantity of factor demand
QFSUP - quantity of factor supply (demand + unemployment)
QFUENMP - quantity of factor (labor) unemployment
UR - factor (labor) unemployment rate
GSAV - government savings
FSAVGROSS - foreign savings including FDI movement and labor remittances
REMCHGWADJ - change in FSAVGROSS due to labor remittances from abroad
REMACCX - accumulated labor remittances from the benchmark year
FDICHGWADJ - change in FSAVGROSS due to FDI movement (in FCU's)
ABSORP - absorption
PRVCON - private consumption
FIXINV - fixed investment
GOVCON - government consumption
EXP - exports
IMP - imports
GDPMP - GDP at market prices
NETITAX - net indirect taxes
QABSTOT - real absorption (LCU at base prices)
QHTOT - real household consumption (LCU at base prices)
QINVTOT - real investment (LCU at base prices)
QGTOT - real government consumption (LCU at base prices)
QETOT - total real exports (LCU at base prices)
QMTOT - total real imports (LCU at base prices)
TRDDEFTOT - real trade deficit (LCU at base prices)
REXR - PPP real exchange rate (LCUs per FCU)
NEXR - nominal exchange rate (LCUs per FCU)
PWEIND - export price index (FCU; 100 for base)
PWMIND - import price index (FCU; 100 for base)
PWIND - world (tradables) price index (FCU; 100 for base)
PDIND - domestic (non-tradables) price index (100 for base)
CPI - consumer price index (100 for base)
TOFT - terms of trade (ratio pwe index & pwm index) (100 for base)
INVGDP - investment (% of nominal GDP)
PRVSAVGDP - private (household + enterprise) savings (% of nominal GDP)
FORSAVGDP - foreign savings (% of nominal GDP)
TRDDEFGDP - trade deficit (% of nominal GDP)
GOVSAVGDP - government savings (% of nominal GDP)
IMPTAXGDP - tariff revenue (% of nominal GDP)
DIRTAXGDP - direct tax revenue (% of nominal GDP)
GDPNpCAP - nominal GDP per capita (in LCUs - not millions)
GDPNpECP - nominal GDP per economically active person (in LCUs - not millions)
GDPNpLAB - nominal GDP per worker (in LCUs - not millions)
GDPRpCAP - real GDP per capita (in LCUs - not millions)
GDPRpECP - real GDP per economically active person (in LCUs - not millions)
GDPRpLAB - real GDP per worker (in LCUs - not millions)
EVTOT - total equivalent variation of household income
(if EV>0 --> income increase; EV<0 --> income decrease)

Table 8: Medium-term simulations for the Slovak Republic (static shock + short-term dynamic effect, year 2002), %-age changes

Simulation number	Sim 0	Sim 1	Sim 2	Sim 3	Sim 4	Sim 5	Sim 6	Sim 7	Sim 8	Sim 9	Sim10	Sim11	Sim12	Sim13	Sim14	Sim15	Sim16	Sim17	Sim18	Sim19	Sim20	Sim21	Sim22	Sim23
Simulation ID	BASE	TARCUTSR	TARCUTEU	FREELAB	REMEU	FREECAP	FDIEU	FLSTAX000	FLSTAX280	FLSTAX500	YTAXCONEW	SLIMGOV	WAGGUP	UNEMPDN	APPREC	DEPREC	QINVINCR	COMBINE1	COMBINE2	COMBINE3	COMBINE4	COMBINE5	COMBINE6	COMBINE7
PRICES: ##########																								
CPI	0.08	-0.30	-0.31	0.08	0.03	0.08	0.03	0.60	2.89	5.84	0.06	0.27	-0.05	0.10	-0.17	0.33	0.09	-0.41	0.59	2.88	5.82	0.11	2.44	5.40
DPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXR	0.02	1.03	0.36	0.00	-0.20	0.02	-0.18	-2.44	-1.91	-1.25	-0.23	1.20	-0.63	0.09	-1.00	1.00	0.32	-0.08	-2.63	-2.11	-1.46	-2.83	-2.00	-1.40
GADJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-27.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IADJ	7.48	-3.91	-3.15	-0.02	1.87	0.14	2.17	-5.30	5.89	18.59	-6.03	20.06	-4.83	0.74	10.40	-10.34	10.00	1.81	-11.39	0.01	12.96	-8.25	7.79	13.01
MPS.HHD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MPS.CORP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MPSADJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WF.UnskLab	1.68	1.43	1.96	0.02	0.01	0.06	0.05	3.54	0.02	-4.38	-0.20	1.20	3.00	-0.53	-0.05	0.07	0.06	2.04	3.33	-0.17	-4.56	5.23	1.90	-2.74
WF.SkLab	0.93	1.73	2.19	0.02	0.01	0.04	0.04	2.78	-1.00	-5.68	0.13	-1.81	5.00	-0.53	-0.03	0.04	-0.42	2.26	2.86	-0.92	-5.59	4.92	1.03	-3.62
WF.CAP	-1.45	1.62	2.23	-0.01	0.02	-0.07	-0.03	3.63	-0.51	-5.54	0.25	-1.22	-1.94	0.30	0.17	-0.15	-0.09	2.20	3.87	-0.29	-5.35	5.87	1.50	-3.34
QUANTITIES: ##########																								
QA.Crops-A	4.73	-2.07	-0.93	-0.02	-0.19	0.10	-0.10	1.72	-3.61	-9.94	1.64	1.82	-3.71	0.59	-1.02	1.03	-3.40	-1.26	3.40	-2.00	-8.42	1.69	-5.08	-9.70
QA.OtherA-A	4.67	0.66	1.60	-0.02	-0.15	0.09	-0.05	0.01	-4.79	-10.54	1.39	1.94	-3.59	0.57	-0.75	0.77	-2.93	1.38	1.41	-3.45	-9.26	2.51	-3.69	-8.12
QA.Mining-A	5.76	2.60	2.62	-0.02	-0.49	0.16	-0.35	7.69	3.55	-1.60	-0.82	6.72	-4.86	0.75	-2.62	2.67	0.70	1.64	6.91	2.81	-2.29	8.30	5.16	-0.39
QA.FoodP-A	4.45	-0.52	1.70	-0.02	-0.06	0.09	0.04	0.36	-5.39	-12.22	2.36	0.75	-3.06	0.48	-0.32	0.33	-4.63	1.67	2.74	-3.12	-10.07	4.12	-4.07	-8.81
QA.LightM-A	5.14	0.24	-1.49	-0.02	-0.43	0.11	-0.32	-0.71	-3.62	-7.22	0.01	4.07	-4.66	0.74	-2.14	2.19	-0.55	-2.33	-0.57	-3.48	-7.10	-3.25	-6.00	-9.07
QA.HeavyM-A	5.93	0.37	2.98	-0.02	-0.18	0.12	-0.07	19.81	15.98	11.17	-0.86	5.19	-3.56	0.55	-1.07	1.07	0.99	2.67	18.93	15.15	10.39	21.98	19.07	13.50
QA.Machine-A	6.31	3.39	2.75	-0.02	-0.15	0.08	-0.06	5.85	4.24	2.01	-1.46	6.39	-3.87	0.60	-0.68	0.68	2.22	2.50	4.39	2.84	0.69	6.85	6.67	3.15
QA.Utility-A	4.94	1.24	1.49	-0.02	-0.14	0.10	-0.05	5.21	0.57	-5.08	0.60	1.68	-3.21	0.49	-0.88	0.89	-1.58	1.28	5.83	1.18	-4.48	7.01	1.78	-3.24
QA.Constr-A	6.76	-2.54	-1.87	-0.02	1.41	0.12	1.66	-3.21	4.20	12.45	-4.53	15.05	-4.39	0.67	7.87	-7.82	7.41	1.90	-7.81	-0.23	8.22	-4.94	6.12	8.72
QA.Serv-A	3.62	0.82	0.82	-0.01	-0.02	0.07	0.07	-2.09	-3.99	-6.39	0.48	-5.15	-2.66	0.40	-0.02	0.01	-1.20	0.90	-1.72	-3.61	-6.01	-0.96	-3.26	-5.32
QFD.UnskLab	2.50	0.00	0.00	-0.04	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-6.95	1.22	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	-0.04	-0.04	-0.04
QFD.SkLab	2.50	0.00	0.00	-0.04	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-9.63	1.22	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	-0.04	-0.04	-0.04
QFD.CAP	6.79	-0.31	-0.25	0.00	0.00	0.17	0.17	-0.42	0.47	1.47	-0.49	1.98	0.00	0.00	0.00	0.00	0.00	0.00	-0.91	0.00	1.02	-0.80	0.48	0.88
QFSUP.UnskLab	2.00	0.00	0.00	-1.57	-1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.56	0.00	0.00	0.00	-1.55	-1.57	-1.59
QFSUP.SkLab	2.00	0.00	0.00	-1.60	-1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.59	0.00	0.00	0.00	-1.58	-1.59	-1.61
QFSUP.CAP	6.79	-0.31	-0.25	0.00	0.00	0.17	0.17	-0.42	0.47	1.47	-0.49	1.98	0.00	0.00	0.00	0.00	0.00	0.00	-0.91	0.00	1.02	-0.80	0.48	0.88
QFUENMP.UnskLab	0.00	0.00	0.00	-7.86	-7.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.51	-5.00	0.00	0.00	0.00	-7.82	0.00	0.00	0.00	-7.75	-7.83	-7.93
QFUENMP.SkLab	0.00	0.00	0.00	-7.98	-7.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.48	-5.00	0.00	0.00	0.00	-7.93	0.00	0.00	0.00	-7.87	-7.96	-8.05
QFUENMP.CAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UR.UnskLab	-1.96	0.00	0.00	-6.39	-6.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.51	-5.00	0.00	0.00	0.00	-6.36	0.00	0.00	0.00	-6.30	-6.36	-6.45
UR.SkLab	-1.96	0.00	0.00	-6.48	-6.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.48	-5.00	0.00	0.00	0.00	-6.45	0.00	0.00	0.00	-6.40	-6.47	-6.55
UR.CAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GSAV	-13.87	30.88	30.17	0.05	-0.36	-0.32	-0.76	54.09	-27.01	-126.61	47.03	-100.00	11.29	-1.69	-2.13	2.12	-2.15	29.10	100.61	19.18	-80.87	128.05	-0.50	-54.34
FSAVGROSS	0.00	0.00	0.00	0.00	6.93	0.00	7.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.50	-37.84	0.00	17.65	0.00	0.00	0.00	22.82	16.82	9.29
REMCHGWADJ	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.12	0.12	0.13
REMACCX	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.12	0.12	0.13
FDICHGWADJ	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.29	0.18	0.04
GDP ELEMENTS: ##########																								
Real absorption	4.38	-0.35	0.16	-0.02	0.58	0.08	0.72	-0.42	0.26	0.86	-0.25	1.27	-2.91	0.45	3.29	-3.26	0.05	1.78	-0.66	0.03	0.64	1.54	1.98	1.71
Real private cons	4.25	1.63	2.16	-0.01	0.04	0.08	0.13	2.30	-2.96	-9.28	3.06	0.35	-2.82	0.44	0.29	-0.27	-5.79	2.39	5.42	0.06	-6.39	7.86	-0.74	-4.33
Real fixed inv	7.48	-3.91	-3.15	-0.02	1.87	0.14	2.17	-5.30	5.89	18.59	-6.03	20.06	-4.83	0.74	10.40	-10.34	10.00	1.81	-11.39	0.01	12.96	-8.25	7.79	13.01
Real gov't cons	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-27.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real export	5.70	2.33	2.84	-0.02	-0.28	0.09	-0.19	7.77	5.21	1.94	-0.72	4.49	-3.71	0.58	-1.46	1.47	0.83	2.29	7.08	4.54	1.31	9.43	7.65	3.88
Real import	4.83	1.71	2.70	-0.02	0.52	0.07	0.64	5.71	3.84	1.44	-0.53	3.31	-2.73	0.42	2.92	-2.85	0.60	4.14	5.21	3.36	0.98	9.97	8.04	4.48
Real trade deficit	-0.82	-2.33	1.81	0.02	6.06	-0.08	6.42	-9.17	-6.06	-2.22	0.79	-4.62	3.97	-0.63	33.36	-32.87	-0.94	17.07	-8.31	-5.25	-1.47	13.22	10.40	8.54
Real GDP	4.97	-0.07	0.05	-0.02	0.01	0.10	0.13	0.57	0.96	1.17	-0.37	1.96	-3.63	0.56	0.14	-0.16	0.17	0.24	0.20	0.62	0.85	0.45	1.19	1.04
Nominal GDP	4.88	-0.78	-0.23	-0.02	0.02	0.09	0.12	1.16	4.20	7.87	-0.31	1.63	-3.24	0.50	0.15	-0.14	0.12	-0.07	0.94	3.97	7.63	0.91	4.17	7.57
Real indirect tax	6.97	2.73	4.27	-0.02	0.36	0.12	0.52	13.62	11.47	8.60	-1.63	13.36	-4.27	0.66	1.66	-1.62	2.33	5.38	12.15	10.06	7.26	18.36	17.16	12.35
CPI (100 for base)	0.08	-0.38	-0.38	0.00	-0.05	0.00	-0.05	0.52	2.81	5.75	-0.02	0.19	-0.12	0.02	-0.25	0.25	0.01	-0.49	0.51	2.80	5.74	0.04	2.36	5.32
Real exchange rate	0.33	1.36	0.77	0.00	-0.27	0.02	-0.25	-4.22	-3.24	-2.00	-0.30	1.49	-0.65	0.09	-1.39	1.40	0.41	0.16	-4.46	-3.49	-2.26	-4.47	-3.10	-1.90
Nominal exchange rate	0.02	1.03	0.36	0.00	-0.20	0.02	-0.18	-2.44	-1.91	-1.25	-0.23	1.20	-0.63	0.09	-1.00	1.00	0.32	-0.08	-2.63	-2.11	-1.46	-2.83	-2.00	-1.40
MACROECONOMIC INDICATORS: ##########																								
ABSORP.NOMINAL	4.48	-0.64	-0.18	-0.02	0.54	0.08	0.68	0.88	3.72	7.15	-0.30	1.60	-3.04	0.47	3.05	-3.04	0.14	1.31	0.66	3.50	6.92	2.36	4.97	7.59
ABSORP.REAL	4.38	-0.35	0.16	-0.02	0.58	0.08	0.72	-0.42	0.26	0.86	-0.25	1.27	-2.91	0.45	3.29	-3.26	0.05	1.78	-0.66	0.03	0.64	1.54	1.98	1.71
PRVCON.NOMINAL	4.32	1.30	1.84	-0.02	-0.01	0.08	0.09	3.04	0.01	-3.81	3.05	0.51	-2.92	0.45	0.04	-0.03	-5.78	1.96	6.15	3.08	-0.77	8.04	1.80	0.98
PRVCON.REAL	4.25	1.63	2.16	-0.01	0.04	0.08	0.13	2.30	-2.96	-9.28	3.06	0.35	-2.82	0.44	0.29	-0.27	-5.79	2.39	5.42	0.06	-6.39	7.86	-0.74	-4.33
FIXINV.NOMINAL	7.70	-4.74	-4.25	-0.03	1.81	0.14	2.11	-8.66	4.96	21.62	-6.19	20.93	-5.18	0.79	10.06	-10.07	10.27	0.52	-14.67	-1.01	15.69	-12.74	5.55	14.38
FIXINV.REAL	7.48	-3.91	-3.15	-0.02	1.87	0.14	2.17	-5.30	5.89	18.59	-6.03	20.06	-4.83	0.74	10.40	-10.34	10.00	1.81	-11.39	0.01	12.96	-8.25	7.79	13.01
GOVCON.NOMINAL	-0.04	0.69	0.86	0.00	-0.02	0.00	-0.03	10.55	12.06	13.95	0.03	-27.28	0.16	-0.01	-0.13	0.13	-0.03	0.79	10.57	12.08	13.97	11.36	12.90	14.89
GOVCON.REAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-27.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXP.NOMINAL	5.91	2.93	3.53	-0.02	-0.41	0.10	-0.32	3.80	2.30	0.33	-0.82	4.94	-3.67	0.56	-2.18	2.22	0.99	2.66	3.04	1.57	-0.38	5.60	5.05	2.64
EXP.REAL	5.70	2.33	2.84	-0.02	-0.28	0.09	-0.19	7.77	5.21	1.94	-0.72	4.49	-3.71	0.58	-1.46	1.47	0.83	2.29	7.08	4.54	1.31	9.43	7.65	3.88
IMP.NOMINAL	5.27	2.73	3.20	-0.02	0.33	0.09	0.47	3.15	1.86	0.17	-0.76	4.55	-3.35	0.51	1.92	-1.90	0.92	4.21	2.45	1.19	-0.49	7.03	6.04	3.17
IMP.REAL	4.83	1.71	2.70	-0.02	0.52	0.07	0.64	5.71	3.84	1.44	-0.53	3.31	-2.73	0.42	2.92	-2.85	0.60	4.14	5.21	3.36	0.98	9.97	8.04	4.48
GDPMP.NOMINAL	4.88	-0.78	-0.23	-0.02	0.02	0.09	0.12	1.16	4.20	7.87	-0.31	1.63	-3.24	0.50	0.15	-0.14	0.12	-0.07	0.94	3.97	7.63	0.91	4.17	7.57
GDPMP.REAL	4.97	-0.07	0.05	-0.02	0.01	0.10	0.13	0.57	0.96	1.17	-0.37	1.96	-3.63	0.56	0.14	-0.16	0.17	0.24	0.20	0.62	0.85	0.45	1.19	1.04
NETITAX.NOMINAL	7.54	-27.88	-27.82	-0.02	0.20	0.14	0.38	-24.76	58.05	160.13	-1.93	15.22	-5.28	0.80	1.13	-1.14	2.74	-27.41	-25.15	57.39	159.14	-50.41	33.39	135.31
NETITAX.REAL	6.97	2.73	4.27	-0.02	0.36	0.12	0.52	13.62	11.47	8.60	-1.63	13.36	-4.27	0.66	1.66	-1.62	2.33	5.38	12.15	10.06	7.26	18.36	17.16	12.35
QABSTOT	4.38	-0.35	0.16	-0.02	0.58	0.08	0.72	-0.42	0.26	0.86	-0.25	1.27	-2.91	0.45	3.29	-3.26	0.05	1.78	-0.66	0.03	0.64	1.54	1.98	1.71
QHTOT	4.25	1.63	2.16	-0.01	0.04	0.08	0.13	2.30	-2.96	-9.28	3.06	0.35	-2.82	0.44	0.29	-0.27	-5.79	2.39	5.42	0.06	-6.39	7.86	-0.74	-4.33
QINVTOT	7.48	-3.91	-3.15	-0.02	1.87	0.14	2.17	-5.30	5.89	18.59	-6.03	20.06	-4.83	0.74	10.40	-10.34	10.00	1.81	-11.39	0.01	12.96	-8.25	7.79	13.01
QGTOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-27.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QETOT	5.70	2.33	2.84	-0.02	-0.28	0.09	-0.19	7.77	5.21	1.94	-0.72	4.49	-3.71	0.58	-1.46	1.47	0.83	2.29	7.08	4.54	1.31	9.43	7.65	3.88
QMTOT	4.83	1.74	2.71	-0.02	0.52	0.07	0.65	5.64	3.79	1.41	-0.53	3.34	-2.74	0.43	2.93	-2.85	0.60	4.15	5.14	3.31	0.96	9.90	8.00	4.47
TRDDEFTOT	-0.82	-2.33	1.81	0.02	6.06	-0.08	6.42	-9.17	-6.06	-2.22	0.79	-4.62	3.97	-0.63	33.36	-32.87	-0.94	17.07	-8.31	-5.25	-1.47	13.22	10.40	8.54
REXR	0.33	1.36	0.77	0.00	-0.27	0.02	-0.25	-4.22	-3.24	-2.00	-0.30	1.49	-0.65	0.09	-1.39	1.40	0.41	0.16	-4.46	-3.49	-2.26	-4.47	-3.10	-1.90
NEXR	0.02	1.03	0.36	0.00	-0.20	0.02	-0.18	-2.44	-1.91	-1.25	-0.23	1.20	-0.63	0.09	-1.00	1.00	0.32	-0.08	-2.63	-2.11	-1.46	-2.83	-2.00	-1.40
PWEIND	0.18	-0.43	0.31	0.00	0.07	-0.02	0.05	-1.15	-0.74	-0.21	0.13	-0.74	0.67	-0.10	0.27	-0.26	-0.15	0.44	-1.03	-0.63	-0.10	-0.56	-0.29	0.32
PWMIND	0.42	1.00	0.49	0.00	-0.19	0.02	-0.18	-2.43	-1.90	-1.25	-0.23	1.20	-0.63	0.09	-0.98	0.98	0.31	0.07	-2.62	-2.10	-1.46	-2.68	-1.85	-1.25
PWIND	0.30	0.33	0.40	0.00	-0.07	0.00	-0.07	-1.82	-1.36	-0.76	-0.06	0.29	-0.02	0.00	-0.39	0.40	0.10	0.24	-1.87	-1.41	-0.82	-1.68	-1.12	-0.51
PDIND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CPI	0.08	-0.38	-0.38	0.00	-0.05	0.00	-0.05	0.52	2.81	5.75	-0.02	0.19	-0.12	0.02	-0.25	0.25	0.01	-0.49	0.51	2.80	5.74	0.04	2.36	5.32
TOFT	-0.24	-1.42	-0.18	0.01	0.25	-0.04	0.22	1.31	1.18	1.06	0.37	-1.92	1.31	-0.19	1.26	-1.23	-0.46	0.37	1.63	1.50	1.37	2.17	1.59	1.59
INVGDP	2.70	-3.99	-4.03	-0.01	1.79	0.06	1.99	-9.70	0.74	12.75	-5.90	19.00	-2.00	0.29	9.89	-9.94	10.14	0.59	-15.46	-4.79	7.49	-13.53	1.33	6.32
PRVSAVGDP	-0.53	2.09	2.07	0.00	-0.02	-0.01	-0.03	1.86	-4.01	-10.79	3.87	-1.10	0.35	-0.05	-0.11	0.11	10.21	2.03	5.67	-0.35	-7.31	7.57	-2.26	-5.64
FORSAVGDP	-4.63	1.83	0.59	0.01	6.70	-0.07	7.14	-3.55	-5.86	-8.45	0.07	-0.42	2.71	-0.41	36.90	-37.13	0.19	17.63	-3.53	-5.84	-8.44	18.26	9.91	0.17
TRDDEFGDP	-3.61	-16.72	-17.67	0.01	5.41	-0.05	5.76	-2.98	-5.49	-8.35	-0.05	0.53	2.08	-0.32	29.73	-29.91	0.34	-4.12	-3.07	-5.58	-8.43	-3.64	-10.37	-18.22
GOVSAVGDP	-17.88	31.92	30.47	0.07	-0.38	-0.41	-0.88	52.33	-29.94	-124.67	47.48	-100.00	15.03	-2.18	-2.28	2.26	-2.26	29.19	98.75	14.63	-82.23	125.99	-4.47	-57.56
IMPTAXGDP	0.55	-88.30	-88.18	0.00	0.41	0.00	0.43	-0.77	-4.06	-7.94	-0.53	4.20	-0.35	0.04	2.05	-2.06	0.89	-88.07	-1.29	-4.54	-8.39	-88.15	-88.63	-89.23
DIRTAXGDP	-0.82	1.85	1.82	0.00	-0.01	-0.01	-0.03	1.73	-3.54	-9.62	-20.93	-1.13	0.90	-0.13	-0.09	0.08	-0.60	1.79	-19.60	-23.97	-29.00	-18.24	-2.00	-27.80
GDPNpCAP	2.82	-0.78	-0.23	1.59	1.62	0.09	0.12	1.16	4.20	7.87	-0.31	1.63	-3.24	0.50	0.15	-0.14	0.12	1.53	0.94	3.97	7.63	2.51	5.83	9.32
GDPNpECP	2.82	-0.78	-0.23	1.59	1.62	0.09	0.12	1.16	4.20	7.87	-0.31	1.63	-3.24	0.50	0.15	-0.14	0.12	1.53	0.94	3.97	7.63	2.51	5.83	9.32
GDPNpLAB	2.32	-0.78	-0.23	0.02	0.05	0.09	0.12	1.16	4.20	7.87	-0.31	1.63	4.91	-0.71	0.15	-0.14	0.12	-0.03	0.94	3.97	7.63	0.95	4.21	7.62
GDPRpCAP	2.92	-0.07	0.05	1.59	1.62	0.10	0.13	0.57	0.96	1.17	-0.37	1.96	-3.63	0.56	0.14	-0.16	0.17	1.83	0.20	0.62	0.85	2.04	2.81	2.68
GDPRpECP	2.92	-0.07	0.05	1.59	1.62	0.10	0.13	0.57	0.96	1.17	-0.37	1.96	-3.63	0.56	0.14	-0.16	0.17	1.83	0.20	0.62	0.85	2.04	2.81	2.68
GDPRpLAB	2.41	-0.07	0.05	0.02	0.05	0.10	0.13	0.57	0.96	1.17	-0.37	1.96	4.49	-0.65	0.14	-0.16	0.17	0.27	0.20	0.62	0.85	0.49	1.23	1.08
EVTOT	4.32	1.63	2.16	-0.01	0.04	0.08	0.13	2.04	-3.17	-9.44	3.06	0.35	-2.82	0.44	0.29	-0.27	-5.79	2.39	5.13	-0.17	-6.56	7.49	-1.02	-4.56

Source:
Authors' calculations
Notes:
1. BASEline simulation results are %-age changes from the BENCHmark year (2001) of the same simulation
2. Other simulation results show %-age changes from the same year (2002) of the BASEline scenario
3. EVTOT comparisons are made with household income (EH)
4. Variable notations are under Table 7

Table 9: Long-term simulations for the Slovak Republic (static shock + long-term dynamic effect, year 2010), %-age changes

Simulation number	Sim 0	Sim 1	Sim 2	Sim 3	Sim 4	Sim 5	Sim 6	Sim 7	Sim 8	Sim 9	Sim10	Sim11	Sim12	Sim13	Sim14	Sim15	Sim16	Sim17	Sim18	Sim19	Sim20	Sim21	Sim22	Sim23
Simulation ID	BASE	TARCUTSR	TARCUTEU	FREELAB	REMEU	FREECAP	FDIEU	FLSTAX000	FLSTAX280	FLSTAX500	YTAXCONEW	SLIMGOV	WAGGUP	UNEMPDN	APPREC	DEPREC	QINVINCR	COMBINE1	COMBINE2	COMBINE3	COMBINE4	COMBINE5	COMBINE6	COMBINE7
PRICES: ##########																								
CPI	0.66	0.23	0.24	0.67	0.47	0.68	0.67	1.05	3.49	6.62	0.57	0.68	-0.34	0.79	-1.80	4.00	1.30	0.07	0.96	3.42	6.54	0.40	2.96	6.01
DPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXR	0.53	0.74	0.10	-0.10	-0.84	0.11	0.10	-3.00	-1.71	-0.18	-0.60	-0.01	-5.31	0.71	-9.00	9.00	6.03	-0.52	-3.55	-2.25	-0.70	-4.05	-2.20	-1.21
GADJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IADJ	83.19	-4.64	-3.63	-0.92	12.10	0.59	2.09	-6.59	6.67	22.23	-6.65	-5.85	-33.37	5.27	161.29	-121.22	90.00	11.95	-13.20	0.12	15.79	3.33	17.59	21.07
MPS.HHD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MPS.CORP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MPSADJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WF.UnskLab	17.36	0.70	1.34	0.56	1.99	0.33	0.66	2.61	1.26	-0.96	-1.30	1.13	27.00	-3.38	12.05	-9.06	9.64	4.45	1.22	-0.02	-2.10	6.53	5.40	0.92
WF.SkLab	10.07	1.22	1.78	0.54	1.60	0.24	0.47	2.19	-0.13	-3.40	-0.67	2.28	45.00	-3.31	9.15	-5.77	2.64	4.19	1.41	-0.82	-3.99	6.13	3.72	-0.95
WF.CAP	-12.31	2.42	2.85	-0.39	-1.55	-0.31	-0.61	4.90	-1.43	-8.56	1.38	-1.22	-10.69	1.52	-7.98	17.13	-8.42	0.24	6.34	-0.18	-7.52	5.29	-1.16	-6.24
QUANTITIES: ##########																								
QA.Crops-A	52.83	-3.06	-1.71	-0.82	0.32	0.49	0.89	0.16	-2.00	-5.26	-0.16	1.93	-31.33	5.16	4.96	-7.85	-19.52	0.01	-0.06	-2.06	-5.16	0.86	-2.44	-6.74
QA.OtherA-A	51.58	-0.43	0.69	-0.78	0.52	0.47	0.88	-1.52	-3.28	-6.00	-0.35	1.74	-29.62	4.90	8.53	-9.11	-14.07	2.66	-1.92	-3.54	-6.12	1.75	-1.12	-5.25
QA.Mining-A	60.66	0.72	1.14	-1.09	-0.52	0.76	1.30	5.07	6.45	7.10	-3.38	1.00	-39.41	6.73	-7.69	-0.96	30.40	2.77	1.50	3.10	3.99	5.79	9.03	4.86
QA.FoodP-A	49.70	-1.47	0.90	-0.67	1.17	0.46	0.92	-0.85	-3.77	-7.94	0.61	2.32	-26.01	4.22	14.34	-13.81	-31.61	3.57	-0.33	-3.10	-7.12	4.33	-0.84	-5.66
QA.LightM-A	56.36	-1.06	-2.55	-0.92	-0.97	0.54	0.87	-2.77	-1.95	-1.54	-1.91	1.08	-35.42	6.13	-7.06	3.28	11.00	-2.05	-4.55	-3.61	-3.06	-5.61	-4.15	-6.23
QA.HeavyM-A	67.28	-0.93	1.90	-0.89	0.76	0.59	1.11	17.67	18.37	18.31	-2.74	0.60	-28.50	4.62	6.67	-10.09	25.79	4.42	14.51	15.40	15.57	21.12	23.23	18.59
QA.Machine-A	70.64	2.37	1.78	-0.82	0.06	0.39	0.71	4.00	5.09	5.87	-2.59	-1.04	-28.86	4.59	4.72	-4.16	30.49	3.00	1.36	2.55	3.46	5.20	7.88	5.19
QA.Utility-A	55.62	-0.06	0.56	-0.60	0.99	0.53	1.01	3.95	3.05	1.14	-1.35	2.31	-26.95	4.36	9.30	-10.39	0.56	3.22	2.43	1.72	0.03	7.17	6.03	1.38
QA.Constr-A	75.33	-3.49	-2.57	-0.88	9.79	0.56	1.84	-4.68	5.43	17.06	-5.53	-3.99	-31.63	5.01	130.14	-99.44	72.19	10.30	-10.23	-0.03	11.75	3.96	14.82	16.35
QA.Serv-A	40.36	-0.10	0.13	-0.62	1.23	0.41	0.82	-3.42	-2.92	-2.89	-0.92	5.50	-22.85	3.67	16.94	-15.34	-1.53	2.75	-4.45	-3.82	-3.64	-0.74	-0.64	-2.71
QFD.UnskLab	24.39	0.00	0.00	-1.51	-1.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-46.17	9.04	0.00	0.00	0.00	-1.50	0.00	0.00	0.00	-1.49	-1.50	-1.52
QFD.SkLab	24.39	0.00	0.00	-1.54	-1.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-56.22	9.04	0.00	0.00	0.00	-1.53	0.00	0.00	0.00	-1.52	-1.53	-1.55
QFD.CAP	82.10	-2.32	-1.84	-0.17	3.80	0.87	1.77	-3.22	3.41	11.07	-3.45	4.16	-10.17	1.58	36.53	-32.30	24.83	4.84	-6.67	0.04	7.79	0.64	7.80	9.10
QFSUP.UnskLab	19.51	0.00	0.00	-13.22	-13.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-13.13	0.00	0.00	0.00	-13.04	-13.12	-13.28
QFSUP.SkLab	19.51	0.00	0.00	-13.46	-13.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-13.37	0.00	0.00	0.00	-13.30	-13.40	-13.55
QFSUP.CAP	82.10	-2.32	-1.84	-0.17	3.80	0.87	1.77	-3.22	3.41	11.07	-3.45	4.16	-10.17	1.58	36.53	-32.30	24.83	4.84	-6.67	0.04	7.79	0.64	7.80	9.10
QFUENMP.UnskLab	0.00	0.00	0.00	-71.50	-71.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	229.71	-45.00	0.00	0.00	0.00	-71.01	0.00	0.00	0.00	-70.52	-70.95	-71.79
QFUENMP.SkLab	0.00	0.00	0.00	-72.76	-72.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	279.73	-45.00	0.00	0.00	0.00	-72.30	0.00	0.00	0.00	-71.89	-72.45	-73.25
QFUENMP.CAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UR.UnskLab	-16.32	0.00	0.00	-67.16	-67.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	229.71	-45.00	0.00	0.00	0.00	-66.63	0.00	0.00	0.00	-66.09	-66.56	-67.48
UR.SkLab	-16.32	0.00	0.00	-68.53	-68.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	279.73	-45.00	0.00	0.00	0.00	-68.02	0.00	0.00	0.00	-67.58	-68.19	-69.06
UR.CAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GSAV	-156.37	-78.55	-74.90	-5.13	17.39	3.84	8.23	-146.78	63.71	335.99	-109.31	-100.00	-204.95	33.03	215.28	-193.78	157.02	-48.41	-250.78	-44.48	223.65	-293.06	18.99	166.18
FSAVGROSS	0.00	0.00	0.00	0.00	64.92	0.00	5.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	909.40	-587.96	0.00	75.11	0.00	0.00	0.00	96.44	68.82	44.44
REMCHGWADJ	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.13	0.13	0.14
REMACCX	0.00	0.00	0.00	0.00	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.16	0.00	0.00	0.00	1.15	1.16	1.17
FDICHGWADJ	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.57	0.07	-0.38
GDP ELEMENTS: ##########																								
Real absorption	48.83	-1.31	-0.58	-0.70	5.13	0.42	1.19	-1.73	1.65	5.25	-1.65	1.78	-24.23	3.86	69.05	-52.48	10.83	6.55	-3.39	0.07	3.78	5.55	7.60	6.92
Real private cons	47.42	0.73	1.44	-0.72	1.48	0.41	0.86	1.29	-1.49	-5.47	1.49	2.13	-23.86	3.83	21.07	-16.97	-42.60	4.37	2.71	0.06	-3.80	8.54	2.44	-1.36
Real fixed inv	83.19	-4.64	-3.63	-0.92	12.10	0.59	2.09	-6.59	6.67	22.23	-6.65	-5.85	-33.37	5.27	161.29	-121.22	90.00	11.95	-13.20	0.12	15.79	3.33	17.59	21.07
Real gov't cons	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real export	63.76	1.20	1.87	-0.85	-0.29	0.48	0.83	6.09	6.92	7.30	-2.27	0.37	-28.77	4.67	-1.77	-0.13	21.15	2.95	3.70	4.65	5.19	7.85	9.98	7.11
Real import	53.92	0.93	2.04	-0.75	4.26	0.38	1.05	4.69	5.29	5.53	-1.73	0.28	-22.61	3.56	60.88	-40.72	15.63	8.10	2.89	3.59	3.95	13.39	13.08	9.20
Real trade deficit	-9.66	-1.99	4.09	0.36	58.03	-0.74	3.74	-12.72	-14.58	-15.53	4.62	-0.91	49.73	-9.57	801.82	-520.90	-48.98	69.06	-7.56	-9.64	-10.89	78.09	49.19	33.73
Real GDP	55.48	-1.20	-0.81	-0.77	1.71	0.50	1.03	-0.94	2.74	6.58	-2.05	1.91	-28.98	4.72	21.78	-22.13	14.82	2.57	-3.05	0.73	4.71	1.01	5.02	5.24
Nominal GDP	54.57	-1.90	-1.16	-0.75	1.56	0.47	0.96	-1.33	4.74	12.03	-1.88	1.80	-26.41	4.25	21.22	-17.00	14.08	1.87	-3.11	2.98	10.30	0.04	6.40	10.43
Real indirect tax	77.98	1.25	2.90	-0.84	3.67	0.53	1.26	11.27	13.08	14.47	-3.14	-3.35	-31.01	4.95	44.60	-35.17	33.75	8.74	8.00	9.96	11.55	19.70	21.87	17.52
CPI (100 for base)	0.66	-0.43	-0.42	0.01	-0.19	0.02	0.01	0.38	2.81	5.92	-0.09	0.02	-0.99	0.12	-2.44	3.32	0.64	-0.59	0.30	2.74	5.84	-0.26	2.28	5.32
Real exchange rate	2.88	1.01	0.46	-0.07	-1.15	0.12	0.10	-4.92	-3.05	-0.76	-0.73	-0.05	-5.27	0.72	-12.98	14.47	7.89	-0.47	-5.57	-3.69	-1.40	-6.07	-3.45	-1.75
Nominal exchange rate	0.53	0.74	0.10	-0.10	-0.84	0.11	0.10	-3.00	-1.71	-0.18	-0.60	-0.01	-5.31	0.71	-9.00	9.00	6.03	-0.52	-3.55	-2.25	-0.70	-4.05	-2.20	-1.21
MACROECONOMIC INDICATORS: ##########																								
ABSORP.NOMINAL	50.15	-1.76	-1.09	-0.71	4.95	0.45	1.22	-1.42	4.39	11.36	-1.81	1.70	-25.26	4.06	64.85	-50.65	13.64	5.83	-3.14	2.70	9.70	4.88	9.62	12.19
ABSORP.REAL	48.83	-1.31	-0.58	-0.70	5.13	0.42	1.19	-1.73	1.65	5.25	-1.65	1.78	-24.23	3.86	69.05	-52.48	10.83	6.55	-3.39	0.07	3.78	5.55	7.60	6.92
PRVCON.NOMINAL	48.28	0.37	1.11	-0.71	1.28	0.42	0.86	1.86	1.49	0.37	1.42	2.15	-24.53	3.94	18.13	-14.17	-42.32	3.85	3.20	3.01	2.06	8.36	4.95	4.09
PRVCON.REAL	47.42	0.73	1.44	-0.72	1.48	0.41	0.86	1.29	-1.49	-5.47	1.49	2.13	-23.86	3.83	21.07	-16.97	-42.60	4.37	2.71	0.06	-3.80	8.54	2.44	-1.36
FIXINV.NOMINAL	86.47	-5.59	-4.83	-0.96	11.85	0.64	2.15	-10.19	5.76	25.86	-6.95	-5.95	-35.33	5.66	153.20	-120.50	96.56	10.42	-16.79	-1.02	18.91	-2.19	15.05	22.62
FIXINV.REAL	83.19	-4.64	-3.63	-0.92	12.10	0.59	2.09	-6.59	6.67	22.23	-6.65	-5.85	-33.37	5.27	161.29	-121.22	90.00	11.95	-13.20	0.12	15.79	3.33	17.59	21.07
GOVCON.NOMINAL	-0.46	0.73	0.89	-0.02	-0.22	-0.02	-0.04	10.66	12.01	13.71	0.10	21.83	0.72	-0.08	-1.99	4.06	-0.71	0.60	10.75	12.11	13.80	11.23	12.67	14.63
GOVCON.REAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXP.NOMINAL	66.49	1.71	2.44	-0.85	-0.96	0.51	0.82	1.84	3.85	5.77	-2.46	0.28	-28.37	4.57	-10.23	8.65	24.05	2.85	-0.62	1.49	3.52	3.10	6.79	5.55
EXP.REAL	63.76	1.20	1.87	-0.85	-0.29	0.48	0.83	6.09	6.92	7.30	-2.27	0.37	-28.77	4.67	-1.77	-0.13	21.15	2.95	3.70	4.65	5.19	7.85	9.98	7.11
IMP.NOMINAL	59.24	1.64	2.28	-0.79	3.51	0.48	1.15	1.50	3.47	5.36	-2.33	0.26	-26.77	4.30	47.21	-35.75	22.81	7.80	-0.82	1.23	3.23	9.02	10.83	8.13
IMP.REAL	53.92	0.93	2.04	-0.75	4.26	0.38	1.05	4.69	5.29	5.53	-1.73	0.28	-22.61	3.56	60.88	-40.72	15.63	8.10	2.89	3.59	3.95	13.39	13.08	9.20
GDPMP.NOMINAL	54.57	-1.90	-1.16	-0.75	1.56	0.47	0.96	-1.33	4.74	12.03	-1.88	1.80	-26.41	4.25	21.22	-17.00	14.08	1.87	-3.11	2.98	10.30	0.04	6.40	10.43
GDPMP.REAL	55.48	-1.20	-0.81	-0.77	1.71	0.50	1.03	-0.94	2.74	6.58	-2.05	1.91	-28.98	4.72	21.78	-22.13	14.82	2.57	-3.05	0.73	4.71	1.01	5.02	5.24
NETITAX.NOMINAL	85.13	-25.88	-25.53	-0.82	3.28	0.65	1.41	-35.48	38.92	136.03	-3.84	-3.27	-36.15	5.89	39.89	-34.92	41.80	-21.48	-36.90	36.17	131.81	-56.77	19.37	111.05
NETITAX.REAL	77.98	1.25	2.90	-0.84	3.67	0.53	1.26	11.27	13.08	14.47	-3.14	-3.35	-31.01	4.95	44.60	-35.17	33.75	8.74	8.00	9.96	11.55	19.70	21.87	17.52
QABSTOT	48.83	-1.31	-0.58	-0.70	5.13	0.42	1.19	-1.73	1.65	5.25	-1.65	1.78	-24.23	3.86	69.05	-52.48	10.83	6.55	-3.39	0.07	3.78	5.55	7.60	6.92
QHTOT	47.42	0.73	1.44	-0.72	1.48	0.41	0.86	1.29	-1.49	-5.47	1.49	2.13	-23.86	3.83	21.07	-16.97	-42.60	4.37	2.71	0.06	-3.80	8.54	2.44	-1.36
QINVTOT	83.19	-4.64	-3.63	-0.92	12.10	0.59	2.09	-6.59	6.67	22.23	-6.65	-5.85	-33.37	5.27	161.29	-121.22	90.00	11.95	-13.20	0.12	15.79	3.33	17.59	21.07
QGTOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QETOT	63.76	1.20	1.87	-0.85	-0.29	0.48	0.83	6.09	6.92	7.30	-2.27	0.37	-28.77	4.67	-1.77	-0.13	21.15	2.95	3.70	4.65	5.19	7.85	9.98	7.11
QMTOT	53.98	0.96	2.05	-0.75	4.27	0.38	1.06	4.62	5.24	5.52	-1.73	0.27	-22.64	3.56	61.02	-40.82	15.67	8.12	2.82	3.54	3.93	13.34	13.05	9.19
TRDDEFTOT	-9.66	-1.99	4.09	0.36	58.03	-0.74	3.74	-12.72	-14.58	-15.53	4.62	-0.91	49.73	-9.57	801.82	-520.90	-48.98	69.06	-7.56	-9.64	-10.89	78.09	49.19	33.73
REXR	2.88	1.01	0.46	-0.07	-1.15	0.12	0.10	-4.92	-3.05	-0.76	-0.73	-0.05	-5.27	0.72	-12.98	14.47	7.89	-0.47	-5.57	-3.69	-1.40	-6.07	-3.45	-1.75
NEXR	0.53	0.74	0.10	-0.10	-0.84	0.11	0.10	-3.00	-1.71	-0.18	-0.60	-0.01	-5.31	0.71	-9.00	9.00	6.03	-0.52	-3.55	-2.25	-0.70	-4.05	-2.20	-1.21
PWEIND	1.12	-0.23	0.46	0.10	0.17	-0.08	-0.11	-0.82	-0.97	-1.05	0.41	-0.09	6.24	-0.81	0.55	0.74	-3.17	0.43	-0.43	-0.60	-0.71	-0.15	-0.50	-0.06
PWMIND	3.43	0.71	0.25	-0.04	-0.74	0.10	0.10	-2.99	-1.70	-0.18	-0.60	-0.01	-5.35	0.72	-8.67	8.74	6.04	-0.28	-3.54	-2.24	-0.70	-3.81	-1.96	-0.97
PWIND	2.34	0.27	0.35	0.03	-0.31	0.02	0.00	-1.98	-1.36	-0.58	-0.13	-0.04	0.04	0.01	-4.38	5.01	1.75	0.05	-2.09	-1.48	-0.70	-2.11	-1.28	-0.55
PDIND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CPI	0.66	-0.43	-0.42	0.01	-0.19	0.02	0.01	0.38	2.81	5.92	-0.09	0.02	-0.99	0.12	-2.44	3.32	0.64	-0.59	0.30	2.74	5.84	-0.26	2.28	5.32
TOFT	-2.23	-0.93	0.21	0.14	0.92	-0.17	-0.21	2.24	0.74	-0.87	1.01	-0.08	12.24	-1.52	10.09	-7.36	-8.68	0.71	3.23	1.68	-0.01	3.80	1.49	0.93
INVGDP	20.64	-3.76	-3.72	-0.21	10.14	0.17	1.18	-8.98	0.97	12.34	-5.18	-7.61	-12.12	1.35	108.87	-124.70	72.30	8.39	-14.12	-3.88	7.80	-2.23	8.12	11.04
PRVSAVGDP	-4.12	2.31	2.29	0.04	-0.27	-0.04	-0.09	3.23	-3.09	-10.39	3.83	0.35	2.66	-0.31	-2.54	3.40	82.47	1.94	7.00	0.50	-7.01	8.82	-1.36	-5.27
FORSAVGDP	-34.96	2.69	1.27	0.65	61.03	-0.36	4.68	-1.69	-6.16	-10.90	1.30	-1.77	28.68	-3.40	657.75	-740.82	-7.06	71.00	-0.45	-5.08	-9.98	88.41	55.17	29.21
TRDDEFGDP	-27.20	-23.06	-24.03	0.56	44.55	-0.26	3.42	-1.15	-5.22	-9.66	0.76	-1.83	20.02	-2.38	478.94	-539.07	-2.59	26.06	-0.44	-4.61	-9.15	38.58	14.59	-4.22
GOVSAVGDP	-136.47	-78.13	-74.61	-4.41	15.59	3.36	7.20	-147.40	56.30	289.17	-109.48	-100.00	-242.62	27.60	160.08	-212.99	125.30	-49.36	-255.63	-46.08	193.41	-292.98	11.83	141.05
IMPTAXGDP	4.40	-88.32	-88.20	0.31	2.78	-0.01	0.22	0.23	-2.84	-6.51	-0.60	-1.98	-1.93	0.18	25.61	-27.61	8.72	-87.86	-0.40	-3.44	-7.06	-87.75	-88.30	-88.97
DIRTAXGDP	-6.16	2.14	2.11	0.13	-0.16	-0.05	-0.10	3.13	-2.77	-9.60	-20.17	0.35	6.83	-0.79	-2.36	3.12	-6.29	1.86	-17.77	-22.61	-28.21	-16.39	-1.10	-26.89
GDPNpCAP	29.34	-1.90	-1.16	14.47	17.11	0.47	0.96	-1.33	4.74	12.03	-1.88	1.80	-26.41	4.25	21.22	-17.00	14.08	17.37	-3.11	2.98	10.30	15.15	22.60	27.46
GDPNpECP	29.34	-1.90	-1.16	14.47	17.11	0.47	0.96	-1.33	4.74	12.03	-1.88	1.80	-26.41	4.25	21.22	-17.00	14.08	17.37	-3.11	2.98	10.30	15.15	22.60	27.46
GDPNpLAB	24.26	-1.90	-1.16	0.78	3.12	0.47	0.96	-1.33	4.74	12.03	-1.88	1.80	44.98	-4.39	21.22	-17.00	14.08	3.43	-3.11	2.98	10.30	1.56	8.03	12.14
GDPRpCAP	30.10	-1.20	-0.81	14.45	17.29	0.50	1.03	-0.94	2.74	6.58	-2.05	1.91	-28.98	4.72	21.78	-22.13	14.82	18.18	-3.05	0.73	4.71	16.26	21.00	21.47
GDPRpECP	30.10	-1.20	-0.81	14.45	17.29	0.50	1.03	-0.94	2.74	6.58	-2.05	1.91	-28.98	4.72	21.78	-22.13	14.82	18.18	-3.05	0.73	4.71	16.26	21.00	21.47
GDPRpLAB	25.00	-1.20	-0.81	0.76	3.28	0.50	1.03	-0.94	2.74	6.58	-2.05	1.91	39.93	-3.96	21.78	-22.13	14.82	4.14	-3.05	0.73	4.71	2.55	6.63	6.88
EVTOT	48.28	0.73	1.45	-0.72	1.48	0.41	0.86	1.01	-1.72	-5.64	1.49	2.13	-23.87	3.83	21.06	-16.97	-42.61	4.37	2.42	-0.18	-3.98	8.15	2.14	-1.60

Source:
Authors' calculations
Notes:
1. BASEline simulation results are %-age changes from the BENCHmark year (2001) of the same simulation
2. Other simulation results show %-age changes from the same year (2010) of the BASEline scenario
3. EVTOT comparisons are made with household income (EH)
4. Variable notations are under Table 7

Table 10: Long-term (2010) impacts in regions, %-age changes

Simulation \ Region	SVK	EU09	EU15	RUS	REUR	JPN	CHN	RASIA	USA	ROWD
BENCHmark (2001) values										
Real private cons	11.23	217.07	4651.22	162.34	477.74	2334.11	494.96	1666.33	6945.72	2368.17
Real gov't cons	4.19	56.50	1623.63	47.05	131.22	718.31	147.47	379.24	1526.33	572.85
Real fixed inv	6.41	83.06	1612.33	70.78	151.92	1059.64	408.35	629.33	1987.62	733.50
Real export	14.47	157.76	2578.86	106.88	304.93	467.37	403.44	1207.15	910.42	975.14
Real import	-16.25	-171.99	-2566.75	-74.61	-298.94	-412.97	-278.17	-1093.82	-1284.83	-928.06
Real GDP (market price)	20.05	342.40	7899.28	312.43	766.86	4166.46	1176.06	2788.24	10085.26	3721.59
Real GDP/Pop (GDPRpCAP)	3709.18	4923.40	20855.70	2139.66	2845.75	32834.81	921.04	1275.43	35383.89	2640.03
Real GDP/LAB (GDPRpLAB)	7727.45	9324.63	35468.87	4052.39	4992.54	55841.51	1566.40	2169.09	60176.69	4631.63
Simulation 0.BASE										
Real private cons	47.418	39.600	35.349	34.753	31.452	32.294	69.233	51.955	39.520	38.198
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	83.186	63.055	73.638	82.606	62.087	56.990	122.172	96.215	61.847	72.857
Real export	63.760	49.084	42.222	34.107	35.468	39.747	66.522	59.259	49.841	45.187
Real import	53.922	44.009	43.135	50.154	37.204	50.926	92.129	63.769	35.133	45.862
Real GDP (market price)	55.476	40.911	35.613	36.461	31.494	31.996	72.587	53.406	39.430	39.069
Real GDP/Pop (GDPRpCAP)	30.096	17.908	13.475	14.184	10.028	10.449	44.413	28.363	16.669	16.367
Real GDP/LAB (GDPRpLAB)	24.995	15.340	13.429	11.698	9.091	10.082	43.934	27.937	16.281	15.376
Income EV (EVTOT)	48.280	39.947	35.235	34.301	31.443	31.943	70.842	52.037	39.476	38.358
Simulation 1.TARCUTSR										
Real private cons	0.726	-0.016	0.003	-0.006	-0.002	0.000	-0.001	0.000	0.000	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	-4.638	-0.023	0.005	-0.012	-0.003	-0.001	-0.001	-0.001	0.000	0.000
Real export	1.204	-0.036	0.002	-0.007	-0.004	-0.001	-0.001	-0.002	-0.001	-0.001
Real import	0.931	-0.052	0.007	-0.021	-0.008	-0.003	-0.002	-0.002	-0.001	-0.002
Real GDP (market price)	-1.195	-0.007	0.001	-0.004	-0.001	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	-1.195	-0.007	0.001	-0.004	-0.001	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	-1.195	-0.007	0.001	-0.004	-0.001	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	0.731	-0.016	0.003	-0.006	-0.002	0.000	-0.001	0.000	0.000	0.000
Simulation 2.TARCUTEU										
Real private cons	1.441	0.731	0.014	-0.068	-0.065	-0.004	-0.009	-0.009	-0.002	-0.006
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	-3.626	-4.256	-0.033	-0.076	-0.091	-0.007	-0.015	-0.013	-0.002	-0.006
Real export	1.871	1.284	0.002	-0.061	-0.088	-0.018	-0.015	-0.026	-0.010	-0.015
Real import	2.038	1.368	0.017	-0.195	-0.176	-0.040	-0.036	-0.038	-0.018	-0.025
Real GDP (market price)	-0.814	-0.812	-0.006	-0.027	-0.027	-0.002	-0.006	-0.005	0.000	-0.002
Real GDP/Pop (GDPRpCAP)	-0.814	-0.812	-0.006	-0.027	-0.027	-0.002	-0.006	-0.005	0.000	-0.002
Real GDP/LAB (GDPRpLAB)	-0.814	-0.812	-0.006	-0.027	-0.027	-0.002	-0.006	-0.005	0.000	-0.002
Income EV (EVTOT)	1.446	0.729	0.014	-0.068	-0.065	-0.004	-0.009	-0.009	-0.002	-0.006
Simulation 3.FREELAB										
Real private cons	-0.718	-2.151	0.318	-0.004	0.010	0.000	0.003	0.005	0.001	0.005
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	-0.917	-2.717	0.508	0.000	0.014	0.001	0.006	0.011	0.004	0.011
Real export	-0.848	-2.295	0.361	-0.004	0.009	0.001	0.002	0.002	0.004	0.001
Real import	-0.753	-1.768	0.314	-0.014	0.028	0.004	0.011	0.012	0.015	0.017
Real GDP (market price)	-0.768	-2.325	0.335	0.000	0.002	0.000	0.001	0.002	0.000	0.002
Real GDP/Pop (GDPRpCAP)	14.449	11.415	-2.068	0.000	0.002	0.000	0.001	0.002	0.000	0.002
Real GDP/LAB (GDPRpLAB)	0.763	2.232	-0.194	0.000	0.002	0.000	0.001	0.002	0.000	0.002
Income EV (EVTOT)	-0.718	-2.151	0.318	-0.004	0.010	0.000	0.003	0.005	0.001	0.005
Simulation 4.REMEU										
Real private cons	1.478	-0.403	0.235	0.017	0.009	0.000	0.004	0.006	0.001	0.005
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	12.096	10.204	-0.162	0.035	0.015	0.000	0.008	0.012	0.001	0.011
Real export	-0.286	-2.560	0.420	0.020	0.013	-0.001	0.002	0.002	0.000	0.001
Real import	4.261	3.441	-0.024	0.071	0.030	-0.001	0.014	0.013	0.004	0.017
Real GDP (market price)	1.707	-0.403	0.248	0.008	0.002	0.000	0.002	0.002	0.000	0.002
Real GDP/Pop (GDPRpCAP)	17.286	13.591	-2.151	0.008	0.002	0.000	0.002	0.002	0.000	0.002
Real GDP/LAB (GDPRpLAB)	3.275	4.229	-0.281	0.008	0.002	0.000	0.002	0.002	0.000	0.002
Income EV (EVTOT)	1.477	-0.403	0.235	0.017	0.009	0.000	0.004	0.006	0.001	0.005
Simulation 5.FREECAP										
Real private cons	0.410	0.276	-0.014	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	0.593	0.391	-0.022	0.003	0.001	0.000	0.000	0.000	0.000	0.000
Real export	0.479	0.301	-0.014	0.002	0.001	0.000	0.000	0.000	0.000	0.000
Real import	0.382	0.237	-0.010	0.008	0.001	0.000	-0.001	0.000	0.000	0.000
Real GDP (market price)	0.498	0.308	-0.015	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	0.498	0.308	-0.015	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	0.498	0.308	-0.015	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	0.410	0.276	-0.014	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Simulation 6.FDIEU										
Real private cons	0.856	0.582	-0.028	0.006	0.000	0.000	0.000	0.000	0.000	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	2.091	2.196	-0.113	0.008	0.001	0.000	0.000	0.000	-0.001	0.000
Real export	0.827	0.347	-0.011	0.006	0.001	0.000	0.000	0.000	-0.001	0.000
Real import	1.053	0.979	-0.056	0.022	0.002	-0.001	0.000	0.000	-0.002	0.000
Real GDP (market price)	1.026	0.648	-0.031	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	1.026	0.648	-0.031	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	1.026	0.648	-0.031	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	0.856	0.581	-0.028	0.006	0.000	0.000	0.000	0.000	0.000	0.000
Simulation 7.FLSTAX000										
Real private cons	1.290	0.033	0.000	0.015	0.001	-0.001	0.000	0.001	0.000	0.001
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	-6.593	0.034	0.000	0.006	0.001	-0.001	0.000	0.001	0.000	0.002
Real export	6.085	0.020	-0.006	0.011	-0.003	-0.003	0.000	-0.003	-0.002	-0.002
Real import	4.688	0.058	-0.005	0.043	-0.001	-0.007	0.000	-0.002	-0.002	0.001
Real GDP (market price)	-0.937	0.010	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	-0.937	0.010	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	-0.937	0.010	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	1.008	0.033	0.000	0.015	0.001	-0.001	0.000	0.001	0.000	0.001
Simulation 8.FLSTAX280										
Real private cons	-1.494	0.033	0.001	0.014	0.001	0.000	0.000	0.001	0.000	0.001
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	6.669	0.041	0.001	0.005	0.001	-0.001	0.000	0.001	0.000	0.001
Real export	6.918	0.037	-0.002	0.010	-0.002	-0.002	0.000	-0.002	-0.001	-0.001
Real import	5.285	0.077	0.000	0.040	0.001	-0.004	0.001	-0.001	-0.001	0.001
Real GDP (market price)	2.736	0.011	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	2.736	0.011	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	2.736	0.011	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	-1.721	0.033	0.001	0.014	0.001	0.000	0.000	0.001	0.000	0.001
Simulation 9.FLSTAX500										
Real private cons	-5.466	0.031	0.001	0.011	0.001	0.000	0.000	0.000	0.000	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	22.225	0.045	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000
Real export	7.301	0.054	0.002	0.008	0.000	0.000	0.001	0.000	0.000	0.000
Real import	5.534	0.093	0.006	0.033	0.002	0.000	0.001	0.001	-0.001	0.001
Real GDP (market price)	6.581	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	6.581	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	6.581	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	-5.635	0.031	0.001	0.011	0.001	0.000	0.000	0.000	0.000	0.000
Simulation10.YTAXCONEW										
Real private cons	1.491	-0.008	-0.001	-0.003	0.000	0.000	0.000	0.000	0.000	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	-6.652	-0.013	-0.002	-0.002	-0.001	0.000	0.000	0.000	0.000	0.000
Real export	-2.269	-0.017	-0.002	-0.003	-0.001	0.000	0.000	0.000	0.000	0.000
Real import	-1.727	-0.027	-0.003	-0.009	-0.002	-0.001	0.000	0.000	0.000	0.000
Real GDP (market price)	-2.054	-0.003	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	-2.054	-0.003	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	-2.054	-0.003	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	1.493	-0.008	-0.001	-0.003	0.000	0.000	0.000	0.000	0.000	0.000
Simulation11.SLIMGOV										
Real private cons	2.128	0.006	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real gov't cons	21.775	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	-5.848	0.003	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real export	0.366	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real import	0.280	0.001	-0.001	0.005	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP (market price)	1.905	0.004	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	1.905	0.004	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	1.905	0.004	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	2.128	0.006	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Simulation12.WAGGUP										
Real private cons	-23.864	-0.117	-0.007	-0.039	-0.004	0.000	0.001	-0.001	0.000	-0.001
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	-33.370	-0.135	-0.016	-0.036	-0.009	0.000	0.002	-0.001	0.001	-0.002
Real export	-28.774	-0.153	-0.009	-0.040	-0.006	0.000	0.003	0.000	0.000	-0.002
Real import	-22.611	-0.297	-0.027	-0.132	-0.014	0.000	0.007	-0.001	0.001	-0.005
Real GDP (market price)	-28.979	-0.033	-0.002	-0.010	-0.001	0.000	0.001	0.000	0.000	-0.001
Real GDP/Pop (GDPRpCAP)	-28.979	-0.033	-0.002	-0.010	-0.001	0.000	0.001	0.000	0.000	-0.001
Real GDP/LAB (GDPRpLAB)	39.927	-0.033	-0.002	-0.010	-0.001	0.000	0.001	0.000	0.000	-0.001
Income EV (EVTOT)	-23.865	-0.117	-0.007	-0.039	-0.004	0.000	0.001	-0.001	0.000	-0.001
Simulation13.UNEMPDN										
Real private cons	3.834	0.018	0.001	0.006	0.001	0.000	0.000	0.000	0.000	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	5.272	0.021	0.002	0.006	0.001	0.000	0.000	0.000	0.000	0.000
Real export	4.674	0.024	0.001	0.006	0.001	0.000	-0.001	0.000	0.000	0.000
Real import	3.557	0.046	0.004	0.021	0.002	0.000	-0.001	0.000	0.000	0.001
Real GDP (market price)	4.722	0.005	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	4.722	0.005	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	-3.964	0.005	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	3.833	0.018	0.001	0.006	0.001	0.000	0.000	0.000	0.000	0.000
Simulation14.APPREC										
Real private cons	21.066	0.123	0.008	0.031	-0.003	-0.001	0.001	-0.001	-0.057	-0.012
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	161.287	0.157	0.023	0.133	0.011	0.004	0.033	0.017	-0.585	-0.029
Real export	-1.767	0.286	0.037	0.018	0.008	-0.024	-0.023	-0.017	0.236	-0.046
Real import	60.878	0.440	0.058	0.159	0.007	-0.021	0.009	-0.013	-0.788	-0.084
Real GDP (market price)	21.783	0.035	0.003	0.020	0.001	0.000	0.005	0.002	-0.053	-0.005
Real GDP/Pop (GDPRpCAP)	21.783	0.035	0.003	0.020	0.001	0.000	0.005	0.002	-0.053	-0.005
Real GDP/LAB (GDPRpLAB)	21.783	0.035	0.003	0.020	0.001	0.000	0.005	0.002	-0.053	-0.005
Income EV (EVTOT)	21.061	0.124	0.008	0.030	-0.003	-0.001	0.001	-0.001	-0.057	-0.012
Simulation15.DEPREC										
Real private cons	-16.974	-0.089	-0.005	-0.027	0.002	0.000	-0.002	0.000	0.045	0.008
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	-121.215	-0.111	-0.015	-0.092	-0.008	-0.003	-0.022	-0.011	0.390	0.020
Real export	-0.127	-0.207	-0.028	-0.020	-0.008	0.013	0.013	0.008	-0.144	0.029
Real import	-40.715	-0.315	-0.042	-0.124	-0.007	0.010	-0.008	0.006	0.516	0.055
Real GDP (market price)	-22.126	-0.026	-0.002	-0.016	-0.001	0.000	-0.005	-0.002	0.043	0.004
Real GDP/Pop (GDPRpCAP)	-22.126	-0.026	-0.002	-0.016	-0.001	0.000	-0.005	-0.002	0.043	0.004
Real GDP/LAB (GDPRpLAB)	-22.126	-0.026	-0.002	-0.016	-0.001	0.000	-0.005	-0.002	0.043	0.004
Income EV (EVTOT)	-16.972	-0.089	-0.005	-0.027	0.002	0.000	-0.002	0.000	0.045	0.008
Simulation16.QINVINCR										
Real private cons	-42.602	0.052	0.006	0.020	0.004	0.001	-0.001	0.000	0.000	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	90.000	0.123	0.015	0.014	0.009	0.001	-0.001	0.000	-0.001	0.000
Real export	21.145	0.169	0.018	0.020	0.007	0.005	0.000	0.004	0.001	0.004
Real import	15.633	0.246	0.035	0.068	0.015	0.009	-0.003	0.004	-0.001	0.003
Real GDP (market price)	14.818	0.024	0.002	0.004	0.001	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	14.818	0.024	0.002	0.004	0.001	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	14.818	0.024	0.002	0.004	0.001	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	-42.611	0.052	0.006	0.020	0.004	0.001	-0.001	0.000	0.000	0.000
Simulation17.COMBINE1										
Real private cons	4.368	1.143	0.209	-0.044	-0.056	-0.005	-0.006	-0.004	-0.001	-0.001
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	11.946	8.164	-0.315	-0.034	-0.075	-0.007	-0.008	-0.001	-0.002	0.005
Real export	2.954	-0.615	0.397	-0.033	-0.075	-0.020	-0.014	-0.025	-0.012	-0.014
Real import	8.099	5.895	-0.065	-0.100	-0.146	-0.043	-0.024	-0.026	-0.016	-0.010
Real GDP (market price)	2.569	-0.316	0.199	-0.017	-0.025	-0.002	-0.004	-0.003	-0.001	-0.001
Real GDP/Pop (GDPRpCAP)	18.176	13.633	-2.190	-0.017	-0.025	-0.002	-0.004	-0.003	-0.001	-0.001
Real GDP/LAB (GDPRpLAB)	4.141	4.268	-0.329	-0.017	-0.025	-0.002	-0.004	-0.003	-0.001	-0.001
Income EV (EVTOT)	4.373	1.142	0.209	-0.044	-0.056	-0.005	-0.006	-0.004	-0.001	-0.001
Simulation18.COMBINE2										
Real private cons	2.714	0.025	0.000	0.012	0.000	-0.001	0.000	0.001	0.000	0.001
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	-13.197	0.021	-0.002	0.004	0.000	-0.001	0.000	0.001	0.000	0.002
Real export	3.695	0.002	-0.008	0.007	-0.004	-0.004	0.000	-0.004	-0.002	-0.002
Real import	2.891	0.031	-0.008	0.032	-0.003	-0.007	0.000	-0.002	-0.002	0.000
Real GDP (market price)	-3.045	0.007	-0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	-3.045	0.007	-0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	-3.045	0.007	-0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	2.416	0.025	0.000	0.012	0.000	-0.001	0.000	0.001	0.000	0.001
Simulation19.COMBINE3										
Real private cons	0.057	0.026	0.000	0.011	0.000	0.000	0.000	0.001	0.000	0.001
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	0.120	0.028	0.000	0.003	0.001	-0.001	0.000	0.001	0.000	0.001
Real export	4.654	0.020	-0.004	0.007	-0.002	-0.002	0.000	-0.002	-0.001	-0.001
Real import	3.587	0.051	-0.003	0.030	-0.001	-0.004	0.001	-0.001	-0.001	0.001
Real GDP (market price)	0.734	0.008	-0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	0.734	0.008	-0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	0.734	0.008	-0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	-0.182	0.026	0.000	0.011	0.000	0.000	0.000	0.001	0.000	0.001
Simulation20.COMBINE4										
Real private cons	-3.797	0.024	0.001	0.008	0.000	0.000	0.000	0.000	0.000	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	15.793	0.033	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000
Real export	5.189	0.038	0.000	0.005	-0.001	0.000	0.001	0.000	0.000	0.000
Real import	3.952	0.068	0.003	0.024	0.001	-0.001	0.001	0.001	-0.001	0.001
Real GDP (market price)	4.708	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/Pop (GDPRpCAP)	4.708	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real GDP/LAB (GDPRpLAB)	4.708	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income EV (EVTOT)	-3.976	0.024	0.001	0.008	0.000	0.000	0.000	0.000	0.000	0.000
Simulation21.COMBINE5										
Real private cons	8.538	1.172	0.205	-0.028	-0.056	-0.005	-0.005	-0.003	-0.001	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	3.326	8.190	-0.338	-0.027	-0.075	-0.008	-0.008	0.000	-0.002	0.006
Real export	7.846	-0.603	0.388	-0.023	-0.079	-0.023	-0.014	-0.029	-0.014	-0.016
Real import	13.388	5.941	-0.083	-0.058	-0.149	-0.051	-0.024	-0.029	-0.019	-0.010
Real GDP (market price)	1.009	-0.309	0.193	-0.015	-0.025	-0.002	-0.004	-0.003	-0.001	0.000
Real GDP/Pop (GDPRpCAP)	16.261	13.640	-2.194	-0.015	-0.025	-0.002	-0.004	-0.003	-0.001	0.000
Real GDP/LAB (GDPRpLAB)	2.546	4.274	-0.334	-0.015	-0.025	-0.002	-0.004	-0.003	-0.001	0.000
Income EV (EVTOT)	8.152	1.171	0.205	-0.028	-0.056	-0.005	-0.005	-0.003	-0.001	0.000
Simulation22.COMBINE6										
Real private cons	2.440	1.180	0.211	-0.029	-0.055	-0.005	-0.005	-0.003	-0.001	0.000
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	17.588	8.219	-0.310	-0.029	-0.074	-0.007	-0.008	0.000	-0.002	0.006
Real export	9.982	-0.577	0.394	-0.023	-0.077	-0.021	-0.014	-0.027	-0.013	-0.015
Real import	13.075	5.974	-0.063	-0.059	-0.145	-0.047	-0.023	-0.027	-0.018	-0.009
Real GDP (market price)	5.020	-0.300	0.199	-0.016	-0.025	-0.002	-0.004	-0.003	-0.001	0.000
Real GDP/Pop (GDPRpCAP)	21.002	13.651	-2.190	-0.016	-0.025	-0.002	-0.004	-0.003	-0.001	0.000
Real GDP/LAB (GDPRpLAB)	6.630	4.284	-0.329	-0.016	-0.025	-0.002	-0.004	-0.003	-0.001	0.000
Income EV (EVTOT)	2.143	1.178	0.211	-0.029	-0.055	-0.005	-0.005	-0.003	-0.001	0.000
Simulation23.COMBINE7										
Real private cons	-1.362	1.166	0.215	-0.037	-0.055	-0.005	-0.005	-0.004	-0.001	-0.001
Real gov't cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Real fixed inv	21.070	8.243	-0.289	-0.036	-0.074	-0.007	-0.008	0.000	-0.002	0.005
Real export	7.111	-0.591	0.399	-0.031	-0.076	-0.020	-0.013	-0.025	-0.012	-0.014
Real import	9.197	5.961	-0.049	-0.083	-0.145	-0.043	-0.022	-0.025	-0.017	-0.009
Real GDP (market price)	5.242	-0.302	0.205	-0.018	-0.025	-0.002	-0.004	-0.003	-0.001	-0.001
Real GDP/Pop (GDPRpCAP)	21.474	13.649	-2.187	-0.018	-0.025	-0.002	-0.004	-0.003	-0.001	-0.001
Real GDP/LAB (GDPRpLAB)	6.876	4.282	-0.323	-0.018	-0.025	-0.002	-0.004	-0.003	-0.001	-0.001
Income EV (EVTOT)	-1.601	1.165	0.216	-0.037	-0.055	-0.005	-0.005	-0.004	-0.001	-0.001

Source:
Authors' calculations
Notes:
1. BASELine (2001) values are in USD billions
2. BASEline simulation results are %-age changes from the BENCHmark year (2001) of the same simulation
3. Simulation results show %-age changes from the same year (2010) of the BASEline scenario
4. EVTOT comparisons are made with household income (EH)
5. Region notations are as follows:
   - SVK - Slovak Republic
   - EU09 - Rest of new EU members (joining in 2004)
   - EU15 - Old EU members (before 2004)
   - RUS - Russia
   - REUR - Rest of Europe
   - JPN - Japan
   - CHN - China
   - RASIA - Rest of Asia
   - USA - United States
   - ROWD - Rest of the World

7. Summary and conclusions

In parallel with EU accession, several reforms by the Slovak government are being carried out recently. At the stage when reform of foreign trade has reached the final stage by entering EU, reform of the tax system has been introduced at the beginning of 2004. In combination with other reforms and strong support of foreign investors, the government policy on FDI seems to be picking up on speed. Although the government's incentives in this field have to be admired, it is necessary also to say that reasons for increase in FDI inflow are also greatly influenced by comparative advantages of skilled but relatively cheap labor, and by privatizing the remaining state-owned enterprises with largest scale - steel, telecommunications, railways, gas, electricity, and water. Several reforms are run in parallel - reform of school system (introduction of paid schooling), health system (free health service is abolished starting from 2005), pension system (introduction of a three-pillar pension system, where one pillar is the traditional state-based pension, the second is private where each individual has the right to chose a private company for pension savings, and the third one is optional insurance; age of retirement has been increased to 62 and gradually to 65), transportation (subsidizing of state-owned companies especially bus transport, and price regulation), public administration (decentralization of government administration, fiscal decentralization), support of employment programs. Impact analysis of all these aspects is dependent on data availability; however policies quantifiable are carried out in our work.

There are several positive factors of the reform and the economy in general is probably on the right track, although it is hard to judge at this time yet. Market economy practices come to the foreground, foreign investment (incl. speculative) flows into the economy, employment in selected regions seem to increase, slow increase is in real wages of some sectors, etc. Keeping the current trend inviting foreign car manufacturers, Slovak Republic will be world's number one in car production per capita in 2008. The World Bank in its recent report (World Bank, 2004) is evaluating Slovak Republic as a top number 1 reformer from between all of the 148 countries reviewed, with an overall rank 18 on the ease of doing business. According to the World Bank, Slovak Republic is leader in reducing the costs of starting a new business, lowest costs of employer dismissal, and there is a stable system of lender guarantees. The success of these reforms should directly bring an additional 2.5 % GDP increase.

However radical reforms are followed by a range of negative effects with deep social impacts. Especially due to privatization of strategic sectors, there is a huge consistent

pressure on price increase, and social differences are expected to grow. High unemployment rates together with constant price increases and almost no increase in real wages, payments introduced for schooling, health, public administration, increased payments to the social and pension system, radical increase of indirect tax rates on basic food products, medicine, and books, in the production sector priority given to foreign investors, all this induce a suspicion of strong social impacts. Reductions in public administration cause difficulty, inconsistency and unavailability of standard macroeconomic data collection, based on which serious policy analyses could be built. Information exchange and cooperation between strategic organizations and government, or between departments of the government itself are absolutely without mutual coordination. Different institutions provide varying reports on identical indicators. Differences are in Central Bank reports and reports of the Statistical Office. As a specific example, reporting of unemployment rates vary between the Ministry of Social Affairs and the Statistical Office by 25.0 %, in absolute values about 400.000 people, which is in comparison to the Slovak population well over the line of statistical errors. Budgets of research institutes, majority of which is state owned (or state managed) are drastically reduced, causing specialists to look for jobs in other sectors or abroad. Assistance of science and development has dropped from 3.88 % of GDP in 1989 to 0.69 % in 2000 (Outrata, 2002). Very similar situation is in University research with low motivating factors and poorly equipped research facilities, causing young people to search for acknowledgement abroad. And in spite of major cuts in government expenditures, the absolute public debt in absolute values is further constantly growing.

Simulation results of the link CGE model are the main output of this research. Several simulations have been carried out in order to investigate the impacts of several policies and various scenarios of Slovak Republic's EU accession. The results in general give positive impacts of EU accession, under at least two conditions. One condition is that various, politically not always popular reforms in the Slovak Republic are run in parallel to EU accession. This is actually is happening under the lead of the present government. There is, however, another condition, which is even more severe. The direct positive effect from EU enlargement is not very big and the comparative advantage is expected to faint in time. Therefore it is necessary that the accompanying Slovak reforms are correctly tuned, coordinated, continuously evaluated and if necessary, instantly reevaluated. Only the implementation of the reform objectives in the long-term will guarantee the best synergic effects from EU accession for the Slovak Republic, and at the same time for the whole region.

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Appendix 1:

World CGE link model - system of equations

Price block:

Domestic import price including tariffs:

$$PMT_{cr} = \left(1 + TMA_{cr}\right) \cdot PM_{cr} \quad (1)$$

where $c \in CM$

$r \in R$

Demand price of domestic non-traded goods:

$$PDD_{cr} = PDS_{cr} \quad (2)$$

where $c \in CD$

$r \in R$

Absorption:

$$PQ_{cr} \cdot \left(1 - tq_{cr}\right) \cdot QQ_{cr} = PDD_{cr} \cdot QD_{cr} + PMT_{cr} \cdot QM_{cr} \quad (3)$$

where $c \in \left(CD \cup CM\right)$

$r \in R$

Marketed output value:

$$PX_{cr} \cdot QX_{cr} = PDS_{cr} \cdot QD_{cr} + PE_{cr} \cdot QE_{cr} \quad (4)$$

where $c \in CX$

$r \in R$

Activity price:

$$PA_{ar} = \sum_{c \in C} PXAC_{acr} \cdot \theta_{acr} \quad (5)$$

where $a \in A$

$r \in R$

Aggregate intermediate input price:

$$PINTA_{ar} = \sum_{c \in C} PQ_{cr} \cdot ica_{car} \quad (6)$$

where $a \in A$

$r \in R$

Activity revenue and costs:

$$PA_{ar} \cdot \left(1 - ta_{ar}\right) \cdot QA_{ar} = PVA_{ar} \cdot QVA_{ar} + PINTA_{ar} \cdot QINTA_{ar} \quad (7)$$

where $a \in A$

$r \in R$

Consumer price index:

$$CPI_{r} = \sum_{c \in C} PQ_{cr} \cdot cwts_{cr} \quad (8)$$

where $r \in R$

Producer price index for non-traded market output (regional numéraire):

$$\overline{DPI}_{r} = \sum_{c \in C} PDS_{cr} \cdot dwts_{cr} \quad (9)$$

where $r \in R$

Production and trade block:

CES technology production function:

$$QA_{ar} = \alpha^{a}_{ar} \cdot \left[\delta^{a}_{ar} \cdot QVA_{ar}^{-\rho^{a}_{ar}} + \left(1 - \delta^{a}_{ar}\right) \cdot QINTA_{ar}^{-\rho^{a}_{ar}}\right]^{-\frac{1}{\rho^{a}_{ar}}} \quad (10)$$

where $a \in A$

$r \in R$

CES technology value-added - intermediate input ratio:

$$\frac{QVA_{ar}}{QINTA_{ar}} = \left(\frac{PINTA_{ar}}{PVA_{ar}} \cdot \frac{\delta^{a}_{ar}}{1 - \delta^{a}_{ar}}\right)^{\frac{1}{1+\rho^{a}_{ar}}} \quad (11)$$

where $a \in A$

$r \in R$

Value-added and factor demands:

$$QVA_{ar} = \alpha^{va}_{ar} \cdot \left(\sum_{f \in F} \delta^{va}_{far} \cdot QF_{far}^{-\rho^{va}_{ar}} \right)^{-\frac{1}{\rho^{va}_{ar}}} \quad (12)$$

where $a \in A$
$r \in R$

First order condition of factor demand (of factors in disequilibrium - labor, and in equilibrium - other than labor):

$$WF_{fr} \cdot \overline{WFDIST}_{far} = PVA_{ar} \cdot (1 - tva_{ar}) \cdot QVA_{ar} \cdot \left(\sum_{f' \in F} \delta^{va}_{f'ar} \cdot QF_{f'ar}^{-\rho^{va}_{ar}} \right)^{-1} \cdot \delta^{va}_{far} \cdot QF_{far}^{-\rho^{va}_{ar}-1} \quad (13)$$

where $a \in A$
$f \in F$
$r \in R$

EU average wage in foreign currency:

$$WLEUAVW = \frac{\sum_{f \in FLAB} \sum_{r \in EUMOV} \frac{WF_{fr} \cdot QFD^t_{fr}}{EXR_r}}{\sum_{f \in FLAB} \sum_{r \in EUMOV} QFD^t_{fr}} \quad (14)$$

where $\overline{EXR}_{r \in WALRASREG}$ is exogenous

Disaggregated intermediate input demand:

$$QINT_{car} = ica_{car} \cdot QINTA_{ar} \quad (15)$$

where $a \in A$
$c \in C$
$r \in R$

Commodity production and allocation:

$$QXAC_{acr} + \sum_{h \in H} QHA_{achr} = \theta_{acr} \cdot QA_{ar} \quad (16)$$

where $a \in A$
$c \in CX$
$r \in R$

Output aggregation function:

$$QX_{cr} = \alpha^{ac}_{cr} \cdot \left(\sum_{a \in A} \delta^{ac}_{acr} \cdot QXAC_{acr}^{-\rho^{ac}_{cr}} \right)^{-\frac{1}{\rho^{ac}_{cr}-1}} \quad (17)$$

where $c \in CX$
$r \in R$

First order condition for output aggregation function:

$$PXAC_{acr} = PX_{cr} \cdot QX_{cr} \cdot \left(\sum_{a \in A'} \delta^{ac}_{acr} \cdot QXAC_{acr}^{-\rho^{ac}_{cr}} \right)^{-1} \cdot \delta^{ac}_{acr} \cdot QXAC_{acr}^{-\rho^{ac}_{cr}-1} \quad (18)$$

where $a \in A$
$c \in CX$
$r \in R$

CET output transformation function:

$$QX_{cr} = \alpha^t_{cr} \cdot \left(\delta 1^t_{cr} \cdot QD_{cr}^{\rho^t_{cr}} + \delta 2^t_{cr} \cdot QE_{cr}^{\rho^t_{cr}} \right)^{\frac{1}{\rho^t_{cr}}} \quad (19)$$

where $c \in (CE \cap CD)$
$r \in R$
$\delta 1^t_{cr} + \delta 2^t_{cr} = 1$

Export - domestic supply ratio:

$$\frac{QE_{cr}}{QD_{cr}} = \left(\frac{PE_{cr}}{PDS_{cr}} \cdot \frac{\delta 1^t_{cr}}{\delta 2^t_{cr}} \right)^{\frac{1}{\rho^t_{cr}-1}} \quad (20)$$

where $c \in CE$
$r \in R$

Output transformation for domestically sold output without exports and for exports without domestic sales:

$$QX_{cr} = QD_{cr} + QE_{cr} \quad (21)$$

where $c \in (CD \cap CEN) \cup (CE \cap CDN)$
$r \in R$

Composite supply (Armington function):

$$QQ_{cr} = \alpha^{q}_{cr} \cdot \left(\delta 1^{q}_{cr} \cdot QD_{cr}^{-\rho^{q}_{cr}} + \delta 2^{q}_{cr} \cdot QM_{cr}^{-\rho^{q}_{cr}} \right)^{-\frac{1}{\rho^{q}_{cr}}} \quad (22)$$

where $c \in (CM \cap CD)$
$r \in R$
$\delta 1^{q}_{cr} + \delta 2^{q}_{cr} = 1$

Import - domestic demand ratio:

$$\frac{QM_{cr}}{QD_{cr}} = \left(\frac{PDD_{cr}}{PMT_{cr}} \cdot \frac{\delta 2^{q}_{cr}}{\delta 1^{q}_{cr}} \right)^{\frac{1}{1+\rho^{q}_{cr}}} \quad (23)$$

where $c \in CM$
$r \in R$

Composite supply for non-imported outputs and non-produced imports:

$$QQ_{cr} = QD_{cr} + QM_{cr} \quad (24)$$

where $c \in (CD \cap CMN) \cup (CM \cap CDN)$
$r \in R$

Institution block:

Income of factors (in disequilibrium - labor, and in equilibrium - other than labor):

$$YF_{fr} = \sum_{a \in A} WF_{fr} \cdot \overline{WFDIST}_{far} \cdot QF_{far} \quad (25)$$

where $f \in F$
$r \in R$

Institutional factor incomes:

$$YIF_{ifr} = shif_{ifr} \cdot \left[(1 - tf_{fr}) \cdot YF_{fr} - trnsfr_{row\,fr} \cdot EXR_{r} \right] \quad (26)$$

where $i \in INSD$
$f \in F$
$r \in R$
$\overline{EXR}_{r \in WALRASREG}$ is exogenous

Income of domestic, non-government institutions:

$$YI_{ir} = \sum_{f \in F} YIF_{ifr} + \sum_{i' \in INSDNG} TRII_{ii'r} + trnsfr_{i\,gov\,r} \cdot CPI_{r} + trnsfr_{i\,row\,r} \cdot EXR_{r} \quad (27)$$

where $i \in INSDNG$
$r \in R$
$\overline{EXR}_{r \in WALRASREG}$

Infra-institutional transfers:

$$TRII_{ii'r} = shii_{ii'r} \cdot (1 - MPS_{i'r}) \cdot (1 - TINS_{i'r}) \cdot YI_{i'r} \quad (28)$$

where $i \in INSDNG$
$i' \in INSDNG$
$r \in R$

Household consumption expenditure:

$$EH_{hr} = \left(1 - \sum_{i \in INSDNG} shii_{ihr} \right) \cdot (1 - MPS_{hr}) \cdot (1 - TINS_{hr}) \cdot YI_{hr} \quad (29)$$

where $h \in H$
$r \in R$

Household consumption spending on marketed commodities:

$$PQ_{cr} \cdot QH_{chr} = PQ_{cr} \cdot \gamma^{m}_{chr} + \beta^{m}_{chr} \cdot \left(EH_{hr} - \sum_{c' \in C} PQ_{c'r} \cdot \gamma^{m}_{c'hr} - \sum_{a \in A} \sum_{c' \in C} PXAC_{ac'r} \cdot \gamma^{h}_{ac'hr} \right) \quad (30)$$

where $c \in C$
$h \in H$
$r \in R$

Household consumption spending on home commodities:

$$PXAC_{acr} \cdot QHA_{achr} = PXAC_{acr} \cdot \gamma^{h}_{achr} + \beta^{h}_{achr} \cdot \left(EH_{hr} - \sum_{c' \in C} PQ_{c'r} \cdot \gamma^{m}_{c'hr} - \sum_{a \in A} \sum_{c' \in C} PXAC_{ac'r} \cdot \gamma^{h}_{ac'hr} \right) \quad (31)$$

where $a \in A$
$c \in C$
$h \in H$
$r \in R$

Investment demand:

$$QINV_{cr} = IADJ_{r} \cdot \overline{qinv}_{cr} \quad (32)$$

where $c \in C$
$r \in R$

Government consumption demand:

$$QG_{cr} = \overline{GADJ}_{r} \cdot \overline{qg}_{cr} \quad (33)$$

where $c \in C$
$r \in R$

Government revenue:

$$\begin{aligned} YG_{r} = & \sum_{i \in INSDNG} TINS_{ir} \cdot YI_{ir} + \sum_{f \in F} tf_{fr} \cdot YF_{fr} \\ & + \sum_{a \in A} tva_{ar} \cdot PVA_{ar} \cdot QVA_{ar} + \sum_{a \in A} ta_{ar} \cdot PA_{ar} \cdot QA_{ar} \\ & + \sum_{c \in CM} \sum_{r' \in R} tm_{cr'r} \cdot PWET_{cr'r} \cdot EXR_{r} \cdot QMS_{cr'r} \\ & + \sum_{c \in CE} \sum_{r' \in R} te_{crr'} \cdot \frac{PWET_{crr'}}{\left(1 + te_{crr'}\right)} \cdot EXR_{r} \cdot QMS_{crr'} \\ & + \sum_{c \in C} tq_{cr} \cdot PQ_{cr} \cdot QQ_{cr} + \sum_{f \in F} YIF_{gov\,fr} + trnsfr_{gov\,row\,r} \cdot EXR_{r} \end{aligned} \quad (34)$$

where $r \in R$
$\overline{EXR}_{r \in WALRASREG}$ is exogenous

Government expenditure:

$$EG_{r} = \sum_{c \in C} PQ_{cr} \cdot QG_{cr} + \sum_{i \in INSDNG} trnsfr_{i\,gov\,r} \cdot CPI_{r} \quad (35)$$

where $r \in R$

System constraint block:

Factor demand (of factors in disequilibrium - labor, and in equilibrium - other than labor):

$$\sum_{a \in A} QF_{far} = QFD_{fr} \quad (36)$$

where $f \in F$
$r \in R$

Factor market equilibrium (of factors in disequilibrium - labor):

$$\overline{QFSUP}_{fr} = QFD_{fr} + \overline{QFUNEMP}_{fr} \quad (37)$$

where $f \in FLAB$
$r \in R$

Factor market equilibrium (of factors in equilibrium - other than labor):

$$\overline{QFSUP}_{fr} = QFD_{fr} \quad (38)$$

where $f \in FCAP$
$r \in R$

Factor unemployment (of factors in disequilibrium - labor):

$$\overline{QFUNEMP}_{fr} = UR_{fr} \cdot \overline{QFSUP}_{fr} \quad (39)$$

where $f \in FLAB$
$r \in R$

Composite commodity markets:

$$QQ_{cr} = \sum_{a \in A} QINT_{car} + \sum_{h \in H} QH_{chr} + QG_{cr} + QINV_{cr} \quad (40)$$

where $c \in C$
$r \in R$

Current account balance (in foreign currency) for all but one region:

$$\sum_{c\in CM}\sum_{r'\in R}\frac{PWM_{cr'r}\cdot QMS_{cr'r}}{EXR_r}+\sum_{f\in F}trnsfr_{row\,f\,r}$$
$$=\sum_{c\in CE}\sum_{r'\in R}PWET_{crr'}\cdot QMS_{crr'}+\sum_{i\in INSD}trnsfr_{i\,row\,r}+\overline{FSAVGROSS}_r \quad (41)$$
where $r\in WALRASREGN$

Current account balance (in foreign currency) for the one region with its exchange rate selected as world numéraire:

$$\sum_{c\in CM}\sum_{r'\in R}\frac{PWM_{cr'r}\cdot QMS_{cr'r}}{\overline{EXR}_r}+\sum_{f\in F}trnsfr_{row\,f\,r}$$
$$=\sum_{c\in CE}\sum_{r'\in R}PWET_{crr'}\cdot QMS_{crr'}+\sum_{i\in INSD}trnsfr_{i\,row\,r}+FSAVGROSS_r \quad (42)$$
where $r\in WALRASREG$

Government balance:

$$YG_r=EG_r+GSAV_r \quad (43)$$
where $r\in R$

Direct institutional tax rates:

$$TINS_{ir}=\overline{tins}_{ir}\cdot\left(1+\overline{TINSADJ}_r\cdot tins01_{ir}\right)+\overline{DTINS}_r\cdot tins01_{ir} \quad (44)$$
where $i\in INSDNG$
$r\in R$

Institutional savings rates:

$$MPS_{ir}=\overline{mps}_{ir}\cdot\left(1+\overline{MPSADJ}_r\cdot mps01_{ir}\right)+\overline{DMPS}_r\cdot mps01_{ir} \quad (45)$$
where $i\in INSDNG$
$r\in R$

Regional savings-investment balance (dropped and substituted by regional Walras' law equation):

$$\sum_{i\in INSDNG}MPS_{ir}\cdot\left(1-TINS_{ir}\right)\cdot YI_{ir}+GSAV_r+\overline{FSAVGROSS}_r\cdot EXR_r$$
$$=\sum_{c\in C}PQ_{cr}\cdot QINV_{cr} \quad (46)$$
where $r\in R$
$\overline{EXR}_{r\in WALRASREG}$ is exogenous
$FSAVGROSS_{r\in WALRASREG}$ is endogenous

Regional Walras' law (defined by savings-investment balance):

$$\sum_{i\in INSDNG}MPS_{ir}\cdot\left(1-TINS_{ir}\right)\cdot YI_{ir}+GSAV_r+\overline{FSAVGROSS}_r\cdot EXR_r$$
$$=\sum_{c\in C}PQ_{cr}\cdot QINV_{cr}+WALRAS_r \quad (47)$$

that can be rearranged to:

$$WALRAS_r=\sum_{i\in INSDNG}MPS_{ir}\cdot\left(1-TINS_{ir}\right)\cdot YI_{ir}+GSAV_r$$
$$+\overline{FSAVGROSS}_r\cdot EXR_r-\sum_{c\in C}PQ_{cr}\cdot QINV_{cr} \quad (48)$$
where $r\in R$
$\overline{EXR}_{r\in WALRASREG}$ is exogenous
$FSAVGROSS_{r\in WALRASREG}$ is endogenous

Definition of Walras' law can also be based on Labor market equilibrium, Capital market equilibrium, Equilibrium of supply and demand of gross marketed output, and Foreign exchange market (current account balance) equilibrium.

Objective equation that is minimized when finding solution (only for computer programming purposes):

$$WALRASSQR = \sum_{r \in R} WALRAS_r^{\,2} \tag{49}$$

Total absorption:

$$\begin{aligned} TABS_r &= \sum_{h \in H} \sum_{c \in C} PQ_{cr} \cdot QH_{chr} + \sum_{a \in A} \sum_{c \in C} \sum_{h \in H} PXAC_{acr} \cdot QHA_{achr} \\ &+ \sum_{c \in C} PQ_{cr} \cdot QG_{cr} + \sum_{c \in C} PQ_{cr} \cdot QINV_{cr} \end{aligned} \tag{50}$$

where $r \in R$

Ratio of investment to absorption:

$$INVSHR_r \cdot TABS_r = \sum_{c \in C} PQ_{cr} \cdot QINV_{cr} \tag{51}$$

where $r \in R$

Ratio of government consumption to absorption:

$$GOVSHR_r \cdot TABS_r = \sum_{c \in C} PQ_{cr} \cdot QG_{cr} \tag{52}$$

where $r \in R$

International linkages:

Domestic price of exports:

$$PE_{cr} \cdot QE_{cr} = \sum_{r' \in R} EXR_r \cdot PWET_{crr'} \cdot QMS_{crr'} \tag{53}$$

where $c \in CE$
$r \in R$
$\overline{EXR}_{r \in WALRASREG}$ is exogenous

World price of international trade in foreign currency (including export tariffs paid by the importer):

$$PWET_{crr'} = \left(1 + te_{crr'}\right) \cdot PWE_{cr} \tag{54}$$

where $c \in CMM$
$r \in R$

Trade constraint defining world price of exports:

$$QE_{cr} = \sum_{r' \in R} QMS_{crr'} \tag{55}$$

where $c \in CE$
$r \in R$

Average import tariff rates:

$$TMA_{cr} = \frac{\sum_{r' \in R} \left(tm_{cr'r} \cdot PWET_{cr'r} \cdot EXR_r \cdot QMS_{cr'r} \right)}{\sum_{r' \in R} PWET_{cr'r} \cdot EXR_r \cdot QMS_{cr'r}} \tag{56}$$

where $c \in CM$
$r \in R$
$\overline{EXR}_{r \in WALRASREG}$ is exogenous

World price of imports by source (in domestic currency):

$$PWM_{cr'r} = PWET_{cr'r} \cdot \frac{1 + tm_{cr'r}}{1 + TMA_{cr}} \cdot EXR_r \tag{57}$$

where $c \in CMM$
$r \in R$
$\overline{EXR}_{r \in WALRASREG}$ is exogenous

Domestic price of imports excluding tariffs:

$$PM_{cr} \cdot QM_{cr} = \sum_{r' \in R} PWM_{cr'r} \cdot QMS_{cr'r} \tag{58}$$

where $c \in CM$
$r \in R$

First order condition of international trade supply (imports by source - column-wise, and exports by destination - row-wise):

$$QMS_{c\,r'\,r} = \left(\alpha^{s}_{c\,r}\right)^{\frac{-\rho^{s}_{c\,r}}{1+\rho^{s}_{c\,r}}} \cdot \left(\delta^{s}_{c\,r'\,r} \cdot \frac{PM_{c\,r}}{PWM_{c\,r'\,r}}\right)^{\frac{1}{1+\rho^{s}_{c\,r}}} \cdot QM_{c\,r} \tag{59}$$

where $QM_{c\,r} = \alpha^{s}_{c\,r} \cdot \left[\sum_{r' \in R} \delta^{s}_{c\,r'\,r} \cdot \left(QMS_{c\,r'\,r}\right)^{-\rho^{s}_{c\,r}}\right]^{-\frac{1}{\rho^{s}_{c\,r}}}$ (60)

$c \in CMM$

$r \in R$

Foreign-savings, including changes in FDI inflows and changes in labor remittances from abroad - EU regions:

$$\overline{FSAVGROSS}_{r} = \overline{FSAVNET}_{r} + \overline{REMACC}_{r} + \overline{FDICHGWADJ}_{r} \tag{61}$$

where $r \in EUMOV$

Foreign-savings, including changes in FDI inflows and changes in labor remittances from abroad - all other regions except $r \in WALRASREG$:

$$\overline{FSAVGROSS}_{r} = \overline{FSAVNET}_{r} \tag{62}$$

where $r \in \left(WALRASREGN - EUMOV\right)$

Foreign-savings, including changes in FDI inflows and changes in labor remittances from abroad - for $r \in WALRASREG$:

$$FSAVGROSS_{r} = FSAVNET_{r} \tag{63}$$

where $r \in WALRASREG$

All-across-the-world savings-investment balance (dropped and substituted by Worldwide Walras' law equation):

$$\sum_{r \in WALRASREGN} \overline{FSAVGROSS}_{r} + FSAVGROSS_{r \in WALRASREG} = 0 \tag{64}$$

Worldwide Walras' law (defined by all-across-the-world savings-investment balance):

$$WWALRAS = \sum_{r \in WALRASREGN} \overline{FSAVGROSS}_{r} + FSAVGROSS_{r \in WALRASREG} \tag{65}$$

Definition of dynamic model behavior (intertemporal change in time):

Intertemporal factor movement between regions (inter-regional physical adjustment - inside EU):

$$\frac{\overline{QFSUP}^{t+1}_{f\,r}}{\sum_{r' \in EUMOV} \overline{QFSUP}^{t+1}_{f\,r'}} = \left[1 + \mu_{f} \cdot \frac{WF^{t-1}_{f\,r} - \frac{\sum_{r' \in EUMOV} WF^{t}_{f\,r'} \cdot \overline{QFSUP}^{t}_{f\,r'}}{\sum_{r' \in EUMOV} \overline{QFSUP}^{t}_{f\,r'}}}{\frac{\sum_{r' \in EUMOV} WF^{t}_{f\,r'} \cdot \overline{QFSUP}^{t}_{f\,r'}}{\sum_{r' \in EUMOV} \overline{QFSUP}^{t}_{f\,r'}}}\right] \cdot \frac{\overline{QFSUP}^{t}_{f\,r}}{\sum_{r' \in EUMOV} \overline{QFSUP}^{t}_{f\,r'}}$$

$$= \left[1 + \mu_{f} \cdot \left(\frac{WF^{t}_{f\,r}}{\frac{\sum_{r' \in EUMOV} WF^{t}_{f\,r'} \cdot \overline{QFSUP}^{t}_{f\,r'}}{\sum_{r' \in EUMOV} \overline{QFSUP}^{t}_{f\,r'}}} - 1\right)\right] \cdot \frac{\overline{QFSUP}^{t}_{f\,r}}{\sum_{r' \in EUMOV} \overline{QFSUP}^{t}_{f\,r'}} \tag{66}$$

where $f \in F$

$r \in EUMOV$

$t = \{2001, \ldots, 2010\}$

$\sum_{r' \in EUMOV} \overline{QFSUP}^{t+1}_{f\,r'} = \sum_{r' \in EUMOV} \overline{QFSUP}^{t}_{f\,r'}$

Change in unemployment due inter-regional to labor movement:

$$\overline{QFUNEMP}^{t+1}_{f\,r} = \overline{QFUNEMP}^{t}_{f\,r} + \left(\overline{QFSUP}^{t+1}_{f\,r} - \overline{QFSUP}^{t}_{f\,r}\right) \tag{67}$$

for $UR_{f\,r} \geq$ *natural unemployment rate*

where $f \in FLAB$

$r \in EUMOV$

$t = \{2001, \ldots, 2010\}$

$$\overline{QFUNEMP}_{f\,r}^{t+1} = \overline{QFUNEMP}_{f\,r}^{t} \quad (68)$$

for $UR_{f\,r} < \textit{natural unemployment rate}$

where $f \in FLAB$

$r \in EUMOV$

$t = \{2001, ..., 2010\}$

Remittances of labor from abroad, across EU regions (counter-payments of labor that moved abroad, as percentage from their wage income):

1. Change in foreign savings due to labor remittances from/to abroad in physical units:

$$\overline{REMCHD}_r = \sum_{f \in FLAB} \left(\overline{QFSUP}_{f\,r}^{t+1} - \overline{QFSUP}_{f\,r}^{t} \right) \quad (69)$$

where $r \in EUMOV$

$t = \{2001, ..., 2010\}$

2. Total labor remittance in physical units:

$$\overline{REMCHGDT} = \sum_{r \in EUMOV} \left| \overline{REMCHGD}_r \right| \quad (70)$$

3. Re-distribution of labor remittances, converted from physical units to foreign currency:

$$\overline{REMCHGWADJ}_r = -\left(remit \cdot \frac{WLEUAVW^t \cdot \overline{REMCHGD}_r}{\overline{REMCHGDT}} \right) \quad (71)$$

where $r \in EUMOV$

$t = \{2001, ..., 2010\}$

4. Intertemporal accumulation of remittances over time (labor that moved abroad continues remitting every year, not only the first one):

$$\overline{REMACC}_r^{t+1} = \overline{REMACC}_r^{t} + \overline{REMCHGWADJ}_r \quad (72)$$

where $r \in EUMOV$

$t = \{2001, ..., 2010\}$

FDI payments across EU regions (counter-payments for physical capital that moved abroad):

1. Change in foreign savings due to FDI payments from/to abroad in foreign currency:

$$\overline{FDICHGW}_r = EXR_r^t \cdot IADJ_r^t \cdot \sum_{r \in EUMOV} \left(QFSUP_{f\,r}^{t+1} - QFSUP_{f\,r}^{t} \right) \quad (73)$$

where $r \in EUMOV$

$\overline{EXR}_{r \in WALRASREG}$ is exogenous

$t = \{2001, ..., 2010\}$

2. Change in foreign savings due to FDI payments from/to abroad in physical units (domestic currency):

$$\overline{FDICHGD}_r = \sum_{r \in EUMOV} \left(QFSUP_{f\,r}^{t+1} - QFSUP_{f\,r}^{t} \right) \quad (74)$$

where $r \in EUMOV$

$t = \{2001, ..., 2010\}$

3. Total FDI payments in foreign currency:

$$\overline{FDICHGWT} = \sum_{r \in EUMOV} \left| \overline{FDICHGW}_r \right| \quad (75)$$

4. Total FDI payments in physical units (domestic currency):

$$\overline{FDICHGDT} = \sum_{r \in EUMOV} \left| \overline{FDICHGD}_r \right| \quad (76)$$

5. Re-distribution of FDI payments, adjusted from physical units to foreign currency:

$$\overline{FDICHGWADJ}_r = fdi01 \cdot \overline{FDICHGWT} \cdot \frac{\overline{FDICHGD}_r}{\overline{FDICHGDT}} \quad (77)$$

where $r \in EUMOV$

Transferring remittances and FDI payments to the foreign savings account:

$$\overline{FSAVGROSS}_r^{t+1} = \overline{FSAVNET}_r^{t} + \overline{REMACC}_r + \overline{FDICHGWADJ}_r \quad (78)$$

where $r \in EUMOV$

$t = \{2001, ..., 2010\}$

Intertemporal factor stock accumulation (labor, defined by constant explicit growth):

$$\overline{QFSUP}_{f\,r}^{t+1} = (1+\sigma)\cdot\overline{QFSUP}_{f\,r}^{t} \qquad (79)$$

where $f \in FLAB$
$r \in R$
$t = \{2001, ..., 2010\}$

Intertemporal factor stock accumulation (capital, growth defined by real investment):

$$\overline{QFSUP}_{f\,r}^{t+1} = (1-\delta^{c})\cdot\overline{QFSUP}_{f\,r}^{t} + \sum_{c\in C} QINV_{c\,r}^{t} \qquad (80)$$

where $f \in FCAP$
$r \in R$
$t = \{2001, ..., 2010\}$

Summary of model sets, parameters, and variables:

Sets:

$a \in A$	activities (also referred to as a')
$c \in C$	commodities (also referred to as c')
$c \in CD (\subset C)$	commodities with domestic sales of domestic output
$c \in CDN (\subset C)$	commodities not in CD
$c \in CE (\subset C)$	exported commodities
$c \in CEN (\subset C)$	commodities not in CE
$c \in CM (\subset C)$	imported commodities
$c \in CMN (\subset C)$	commodities not in CM
$c \in CMM$	commodities with international transactions by source
$c \in CMMN$	commodities not in CMM
$c \in CX (\subset C)$	commodities with domestic production
$f \in F$	factors (also referred to as f')
$f \in FLAB (\subset F)$	categories of labor (skilled and unskilled)
$f \in FCAP (\subset F)$	capital
$i \in INS$	institutions (domestic, and rest of the world) (also referred to as i')
$i \in INSD (\subset INS)$	domestic institutions
$i \in INSDNG (\subset INSD)$	domestic non-government institutions
$h \in H (\subset INSDNG)$	households (also referred to as h')
$r \in R$	regions (countries) (also referred to as r')
$r \in WALRASREG (\subset R)$	one region with its exchange rate selected as world numéraire
$r \in WALRASREGN (\subset R)$	regions not in $WALRASREG$, i.e. all other regions
$r \in EUMOV (\subset R)$	countries and regions inside EU with free movement of goods, and/or labor, and/or capital
$t \in T$	intertemporal change in time ($t = \{2001, ..., 2010\}$)

Parameters:

$cwts_{c\,r}$	weight of commodity c in the CPI
$dwts_{c\,r}$	weight of commodity c in the producer price index
$fdi01$	0-1 parameter with 1 for simulations allowing FDI payments across regions
$ica_{c\,a\,r}$	quantity of c as intermediate input per unit of activity a
$icd_{c\,c'\,r}$	quantity of commodity c as trade input per unit of c' produced and sold domestically
$ice_{c\,c'\,r}$	quantity of commodity c as trade input per unit of exported commodity c'
$icm_{c\,c'\,r}$	quantity of commodity c as trade input per unit of imported commodity c'
$inta_{a\,r}$	quantity of aggregate intermediate input per activity unit
$iva_{a\,r}$	quantity of value-added per activity unit

$\overline{mps}_{ir}$	base savings rate for domestic institution i
$mps01_{ir}$	0-1 parameter with 1 for institutions with potentially flexed saving rates
$\overline{qg}_{cr}$	base-year quantity of government demand
$\overline{qinv}_{cr}$	base-year quantity of private investment demand
$remit$	percentage of income (wage) of a worker that moved to work abroad
$shif_{ifr}$	share for domestic institution i in income of factor f
$shii_{ii'r}$	share of net income of i' to i ($i' \in INSDNG'$; $i \in INSDNG$)
ta_{ar}	tax rate for activity a
$te_{crr'}$	export tax rate of region r to region r' for commodity c (by export destination - row-wise)
tf_{fr}	direct tax rate for factor f
$\overline{tins}_{ir}$	exogenous direct tax rate for domestic institution i
$tins01_{ir}$	0-1 parameter with 1 for institutions with potentially flexed direct tax rates
$tm_{crr'}$	import tariff rate of region r' from region r for commodity c (by import source - column-wise)
tq_{cr}	rate of sales tax (indirect tax incl. subsidies)
$trnsfr_{ifr}$	transfer from factor f to institution i
$trnsfr_{rowfr}$	transfer from factor f to rest of the world
$trnsfr_{irowr}$	transfer from rest of the world to institution i
tva_{ar}	rate of value-added tax from activity a
α^{a}_{ar}	efficiency parameter in the CES activity function
α^{va}_{ar}	efficiency parameter in the CES value-added function
α^{ac}_{ar}	shift parameter for domestic commodity aggregation function
α^{q}_{cr}	composite supply (Armington function) shift parameter
α^{s}_{cr}	shift parameter for Armington (CES) function of world imports (trade)
α^{t}_{cr}	CET output transformation function shift parameter
β^{h}_{achr}	marginal share of consumption spending on home commodity c from activity a for household h
β^{m}_{chr}	marginal share of consumption spending on marketed commodity c for household h
δ^{a}_{ar}	CES activity production function share parameter
δ^{ac}_{acr}	share parameter for domestic commodity aggregation function
δ^{va}_{far}	CES value-added function share parameter for factor f in activity a
$\delta 1^{q}_{cr}$	composite supply (Armington function) share parameter of domestic use of domestic output
$\delta 2^{q}_{cr}$	composite supply (Armington function) share parameter of imports
$\delta^{s}_{crr'}$	share parameter for Armington function of world imports (trade)
$\delta 1^{t}_{cr}$	CET output transformation function share parameter of domestic use of domestic output
$\delta 2^{t}_{cr}$	CET output transformation function share parameter of exports
δ^{c}	depreciation rate of capital in region r
γ^{m}_{chr}	subsistence consumption of marketed commodity c for household h
γ^{h}_{achr}	subsistence consumption of home commodity c from activity a for household h
μ_{f}	elasticity of intertemporal factor adjustment (no movement $=0$, perfect mobility $=1$) - speed of inter-regional mobility of factor f
θ_{acr}	yield of output c per unit of activity a
ρ^{a}_{ar}	CES production function exponent

ρ_{ar}^{va}	CES value-added function exponent
ρ_{cr}^{ac}	domestic commodity aggregation function exponent
ρ_{cr}^{q}	composite supply (Armington function) exponent
ρ_{cr}^{s}	world import (Armington) function exponent
ρ_{cr}^{t}	CET output transformation function exponent
σ	intertemporal factor (labor) growth

Exogenous variables:

$\overline{DMPS}_r$	change in domestic institution savings rates (for base $=0$; exogenous variable)
$\overline{DPI}_r$	producer price index for domestically marketed output (selected as regional numéraire)
$\overline{DTINS}_r$	change in domestic institution tax share (for base $=0$; exogenous variable)
$\overline{EXR}_r$	exchange rate of region r (units of domestic currency per unit of foreign currency), where $r \in WALRASREG$
$\overline{FDICHGD}_r$	change in foreign savings due to FDI payments from/to abroad in physical units (domestic currency), where $r \in EUMOV$
$\overline{FDICHGDT}$	total FDI payments in physical units (domestic currency)
$\overline{FDICHGW}_r$	change in foreign savings due to FDI payments from/to abroad in foreign currency, where $r \in EUMOV$
$\overline{FDICHGWT}$	total FDI payments in foreign currency
$\overline{FDICHGWADJ}_r$	change in foreign savings due to FDI payments from/to abroad, where $r \in EUMOV$ (re-distributed FDI payments in foreign currency)
$\overline{FSAVGROSS}_r$	gross foreign savings of region r (including labor remittances and FDI payments from abroad), where $r \in WALRASREGN$
$\overline{FSAVNET}_r$	net foreign savings of region r (excluding labor remittances and FDI payments from abroad), where $r \in WALRASREGN$
$\overline{GADJ}_r$	government consumption adjustment factor
$\overline{MPSADJ}_r$	savings fate scaling factor (for base $=0$; exogenous variable)
$\overline{QFSUP}_{fr}$	quantity supplied of factor f in region r, where $f \in F$
$\overline{QFUNEMP}_{fr}$	quantity unemployed of factors in disequilibrium in region r, where $f \in FLAB$
$\overline{REMACC}_r$	intertemporal labor remittance accumulation
$\overline{REMCHGD}_r$	change in foreign savings due to labor remittances from/to abroad in physical units (kind of domestic currency), where $r \in EUMOV$
$\overline{REMCHGDT}$	total labor remittance in physical units (kind of domestic currency)
$\overline{REMCHGWADJ}_r$	change in foreign savings due to labor remittances from/to abroad, where $r \in EUMOV$ (re-distributed labor remittances in foreign currency)
$\overline{TINSADJ}_r$	direct tax scaling factor (for base $=0$; exogenous variable)
$\overline{WFDIST}_{far}$	wage distortion factor for factor f in activity a

Endogenous variables:

CPI_r	consumer price index for region r
EG_r	government expenditures
EH_{hr}	consumption spending for household
EXR_r	exchange rate of region r (units of domestic currency per unit of foreign currency), where $r \in WALRASREGN$
$FSAVGROSS_r$	gross foreign savings of region r (including labor remittances and FDI payments from abroad), where $r \in WALRASREG$
$FSAVNET_r$	net foreign savings of region r (excluding labor remittances and FDI payments from abroad), where $r \in WALRASREG$
$GOVSHR_r$	government consumption share in nominal absorption

$GSAV_r$	government savings
$IADJ_r$	investment adjustment factor (for benchmark of base $=1$)
$INVSHR_r$	investment share in nominal absorption
MPS_{ir}	marginal propensity to save for domestic non-government institutions
PA_{ar}	activity price (unit gross revenue)
PDD_{cr}	demand price for commodity produced and sold domestically
PDS_{cr}	supply price for commodity produced and sold domestically
PE_{cr}	domestic price of exports including export tariffs (domestic currency)
$PINTA_{ar}$	aggregate intermediate input price for activity a
PM_{cr}	domestic price of imports excluding import tariffs (domestic currency)
PMT_{cr}	domestic price of imports including import tariffs (domestic currency)
PQ_{cr}	composite commodity price
PVA_{ar}	value-added price (factor income per unit of activity)
PWE_{cr}	world price of exports excluding export tariffs (foreign currency)
$PWM_{crr'}$	world price of imports by source (column-wise) (domestic currency)
$PWET_{crr'}$	world price of international trade including export tariffs (imports by source - column-wise, and exports by destination - row-wise) (foreign currency)
PX_{cr}	aggregate producer price for commodity
$PXAC_{acr}$	producer price of commodity c for activity a
QA_{ar}	quantity (level) of activity
QD_{cr}	quantity of domestic output sold domestically
QE_{cr}	quantity of exports of commodity c to region r
QF_{far}	quantity of factor f demanded from activity a
QFD_{fr}	quantity demanded (stock) of all factors (in equilibrium and in disequilibrium) in region r, where $f \in F$
QG_{cr}	government consumption demand for commodity c
QH_{chr}	quantity of commodity c consumed by household h
QHA_{achr}	quantity of household home consumption of commodity c from activity a for household h
$QINTA_{ar}$	quantity of aggregate intermediate input
$QINT_{car}$	quantity of commodity c as intermediate input to activity a
$QINV_{cr}$	quantity of investment demand for commodity
QM_{cr}	quantity of imports of commodity c from region r
$QMS_{crr'}$	quantity of international trade (imports by source - column-wise, and exports by destination - row-wise); i.e. imports of region r' by commodity (c) by source (r), and of exports by destination vice-versa
QQ_{cr}	quantity of goods supplied to domestic market (composite supply)
QVA_{ar}	quantity of (aggregate) value-added
QX_{cr}	aggregated marketed quantity of domestic output of commodity c
$QXAC_{acr}$	quantity of marketed output of commodity c from activity a
$TABS_r$	total nominal absorption (total value of domestic final demands equal to GDP at market prices plus imports minus exports) of region r
$TINS_{ir}$	direct tax rate for institution i ($i \in INSDNG$)
TMA_{cr}	average import tariff rate of region r
$TRII_{ii'r}$	transfers from institution i' to i ($i' \in INSDNG'$; $i \in INSDNG$)
UR_{fr}	unemployment rate of factor f in disequilibrium, where $f \in FLAB$

$WALRAS_r$	region r's savings-investment (im)balance (should be zero)
WALRASSQR	objective function variable (to minimize or maximize when finding solution)
WWALRAS	all-across-the-world savings-investment (im)balance - Worldwide Walras (should be zero)
$WF_{f\,r}$	average price (wage) of all factors (in equilibrium and in disequilibrium) in region r, where $f \in F$
WLEUAVW	average labor wage of EU regions with labor movement $r \in EUMOV$
$YF_{f\,r}$	income of factor f
YG_r	government revenue
$YI_{i\,r}$	income of domestic non-government institution i
$YIF_{i\,f\,r}$	income of domestic institution i from factor f

Notes:

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1. Endogenous variables are in upper case Latin letters without a bar.
2. Exogenous variables are in upper case Latin letters with a bar.
3. Parameters (generally exogenous) are in lower case Latin letters with or without a bar, or lower case Greek letters.
4. Set indices are in lower case Latin letters as subscripts to variables and parameters.
5. This system corresponds to the default version of the CGE link model. Various versions of the model depending on different simulations, market closures, factor closures, or model definitions, may require some exogenous variables become endogenous and vice versa.