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Abstract

In 2007 Slovenia launched a comprehensive reform of its tax system. This article presents an analysis of several envisaged tax and structural reform scenarios including the flat tax proposal with a dynamic general equilibrium model of the Slovenian economy. We focus mainly on the macroeconomic and welfare aspects of the proposed scenarios, thus capturing the overall effect on individual taxpayers and the government budget. The main characteristics of the model are presented along with the results of different reform scenarios, including the one that finally passed the parliament and now forms part of Slovenia's tax system. Our results suggest that options other than the flat tax system are better suited to the country's long-term economic development.

Keywords: flat tax, general equilibrium models, income inequality, macroeconomic effects, personal income tax, Slovenia, tax reform, welfare analysis.

JEL classification: C68, D58, D63, E62, H24, H30.

1. Introduction

A significant part of Slovenia's current tax system was formed at the start of 1990, including the new personal income tax (PIT) and new corporate income tax (CIT). During the 1990s few changes were introduced to both taxes, while in 2004 new PIT and CIT laws were passed by parliament, coming into effect in January 2005[3]. However, freshly accepted tax codes were already changed with amendments in 2004 and 2005. In addition, during 2006 completely new PIT and CIT tax codes were prepared, which have been effective since January 2007. For the purposes of this last tax reform a computable general equilibrium (CGE) model was constructed (Bayar *et al*., 2006). The models was used to determine the effects of different tax combinations on the income position of households, as well as on the long-term macroeconomic position of the economy (*cf*. Šušteršič *et al*., 2005; Government of the Republic of Slovenia, 2005). The results of different scenarios shall be presented in this article.

At the same time, a wide public discussion was going on regarding the tax reform in Slovenia. Its basis was the claim that the Slovenian tax system experiences a relatively high taxation of labour and an intransparent and complicated set of tax codes, which are difficult to implement. The fact is that wages in Slovenia are taxed not only with a 38.2% rate of social security contributions, but also with a payroll tax (with progressive marginal tax rates of between 0% and 14.8%). This combination of the PIT, social security contributions and the payroll tax effectively classifies Slovenia among those countries with the highest taxes on labour in the EU. The discussion in Slovenia mostly focused on the Slovakian example, which introduced a flat-tax system of the PIT with a single tax rate of 19% in 2004. The idea of a tax system similar to Slovakian, which was even included among the official government reform proposals (Government Office for Growth, 2005), triggered a sharp response of labour unions in Slovenia, mainly due to the fear of replacement of the existing double VAT rate system (with a reduced 8.5% and standard 20% rate) with a single VAT rate. At last, the flat tax reform was rejected in Slovenia in favour of a new three-tax-bracket PIT code and an altered CIT code.

[3] The PIT code differed from the system which was valid during the 1990s by its higher allowances for children, its broader tax base and the fact that it was based on the worldwide income concept, while the CIT code has introduced several new elements regarding the international aspects of the environment, which Slovenia encountered with its EU membership in 2004.

The main objective of the article is thus to quantify the potential impacts of several envisaged tax and structural reform scenarios using the dynamic general equilibrium model of the Slovenian economy (SloMod). The model and the simulations take into account all the fundamental mechanisms and the structure of the Slovenian economy, as well as all the important elements of the structural and tax reforms, the reform of social transfers, changes of the government expenditures, as well as the volume and structure of financial flows between the Slovenian and EU budgets. Different combinations of taxes shall be considered in the counterfactual simulation scenarios in order to establish the economic sustainability of the proposed tax reform in Slovenia, i.e. to ascertain whether the Slovakian-like flat tax system or some other type of taxation is better suited to the country's long-term economic development.

The outline of the article is as follows. In Chapter 2 a short description of the computable general equilibrium model of the Slovenian economy is presented, while the developments in the Slovenian tax system in relation to the proposed flat tax reform are explained in some detail in Chapter 3. In Chapter 4 we give a comparative overview of the simulation scenarios. In Chapters 5 and 6 the simulation results of the model are presented, with special focus on the long-term macroeconomic position of the economy and the effects of different tax combinations on welfare levels. In the final chapter we summarize the central findings of the article.

2. Description of the CGE Model of the Slovenian Economy

The modelling platform of the Slovenian economy is represented by a dynamic multi-sectoral and multi-household computable general equilibrium model, based on social accounting matrix (SAM) for the year 2004 (*cf*. Bayar *et al*., 2006). The model SloMod incorporates the economic behaviour of households, firms, government and the foreign sector. All economic agents are assumed to adopt an optimizing behaviour under relevant budget constraints and all markets operate under the perfect competition assumption. The model embodies considerable detail on the nature of production and demand in the economy and can thus be used to analyse a vast range of issues; either broad in scope or household - and industry-specific.

Five households with respect to income are distinguished in SloMod. Each quintile receives a share of capital income, labour income, mixed income[4], and transfers from the government, the firms and the EU. Taxable income is further derived for each quintile by taking into account the share of income that is subject to personal income tax. Households pay the PIT to the government and save a fixed fraction of net income. Their propensity to save is endogenous and reacts to changes in the after-tax average return to capital. The optimal allocation between the consumption commodities is given by optimizing a Stone-Geary utility function in the context of a linear expenditure system (LES), which represents a set of consumer demand equations linear in total expenditure (*cf*. Geary, 1950; Stone, 1954). To evaluate the overall change in consumer welfare by quintile we use the equivalent variation[5] in income, which is based on the concept of a money metric indirect utility function (Varian, 1992).

The model distinguishes twenty perfectly competitive production sectors consisting of both public and private enterprises. There are twenty types of commodities, where each sector produces one or several types of them. The producers operate on perfectly competitive markets and maximize profits to determine optimal levels of inputs and output. Furthermore, production prices equal average and marginal costs, a condition that implies profit maximization for a constant-returns-to-scale technology. The optimal allocation between different types of private investment commodities is given by optimizing a Cobb-Douglas utility function. Changes in inventories are modelled as a fixed share out of supply of commodities. Treated at an aggregate level, firms' savings are given by the net operating surplus less transfers by the firms to the households and to the foreign sector.

Gross output for each sector is determined from a nested production structure. Producers are assumed to choose intermediate inputs and the mixed factor[6] bundle according to a Leontief production function, and the optimal level of labour, capital and mixed factor is chosen according to a constant elasticity of substitution (CES) function. Labour is differentiated according to the level of education in three skill groups; unskilled labour, skilled labour and highly skilled labour. Substitution possibilities between labour by skill type are reflected by

[4] The mixed income corresponds to remuneration for work carried out by the owner or members of his family which cannot be distinguished from his profits as entrepreneur.

[5] Equivalent variation measures the income needed to make the household as well off as in the new counterfactual equilibrium evaluated at benchmark prices. The equivalent variation is positive for welfare gains from the policy scenario and negative for losses (*cf*. Harrison and Kriström, 1999).

[6] The mixed factor is a composite of labour and capital of the unincorporated enterprises.

another CES function. Labour market by skill type is closed by changes in unemployment. The latter introduces rigidities in the labour markets. The responsiveness of real wage rates to the labour market conditions is modelled by a wage curve, while the behaviour of labour supply is determined through a labour supply curve. Wage differentials of the wage curve are derived as the ratio between the wage rate by sector and skill and the average wage rate by skill level (Derviş *et al*., 1982), while the labour supply curve assumes a positive correlation between the domestic labour supply and the real average net wage rate.

Due to the homogeneity of degree zero in prices, the model only determines relative prices. In this case, the GDP deflator is chosen as the *numéraire* price level against which all relative prices in the model are measured. Consumption is valued at consumer prices, which incorporate trade and transport margins, excise duties, the value added tax, other taxes on consumption, and take into account subsidies on consumption. The consumer price index used in the model is of the Laspeyres type. The model accounts for a detailed cost structure at sectoral level, including taxes on intermediate consumption, labour, capital and the mixed factor. Firms pay corporate income tax to the government on the net profits and trade and transport margins on the intermediate consumption. Actually, the trade and transport margins are paid on all categories of demand in SloMod, except the government consumption. For the trade and transport services the sum of the demand should be equal to the total supply of the commodity from imports and domestic production (*cf.* Löfgren *et al*., 2002). With regard to labour SloMod accounts for the social security contributions paid by the employees and by the employers, and for the payroll taxes.

The specification of foreign trade is based on the small open economy assumption, i.e. with no influence on world market prices. Three main groups of trading partners are distinguished in the model; the EU15, the EU9 (new EU member states) and the rest of the world (ROW). The Armington (1969) assumption of limited substitution possibilities between domestically produced and imported goods is adopted in the model. Domestic consumers use composite goods of imported and domestically produced goods according to a CES function. Limited substitution possibilities are also assumed to exist between goods produced for the domestic market and exports, captured by a constant elasticity of transformation (CET) function.

Total government revenues consist of excise duties, the value added tax and other taxes on products, personal income taxes, social security contributions paid by the employees,

employers and self-employed, payroll taxes, corporate taxes, other taxes on production and transfers from the EU. Total government expenditures are given by the subsidies on products and on production, transfers to households, the EU and the ROW, gross capital fixed formation and current consumption. The transfers to the households include unemployment benefits, pensions, and social, family and other transfers differentiated by quintile and level of education (highly skilled, skilled and unskilled).

Due to the complexity of the model, a combination of consistent closure rules is needed. In order to achieve the clearing of the labour markets, inter-sectoral mobility of labour is assumed for each skill group. On the capital market the sectoral capital stock is exogenously fixed, thus introducing rigidities. The investment is assumed to adjust to the available domestic and foreign savings. This reflects an economy in which savings form a binding constraint, while the interest rate is assumed to effectively balance the supply and demand for investments. This macro closure rule is neoclassical in spirit, though the fact that the model allows for unemployment introduces a Keynesian element. Government total expenditures are fixed as a share of GDP, whereas government deficit adjusts. The transfers between Slovenia and the foreign sector, and the labour income from non-residential firms were exogenously fixed in real terms. The exchange rate is fixed, while the deficit of the current account adjusts.

SloMod has a recursive dynamic structure composed of a sequence of several temporary equilibria. The first equilibrium in the sequence is given by the benchmark year. In each time period, the model is solved for an equilibrium given the exogenous conditions assumed for that particular period. The equilibria are connected to each other through capital accumulation. Thus, the endogenous determination of investment behaviour is essential for the dynamic part of the model. Investment and capital accumulation in a given year depend on expected rates of return for the subsequent year, which are determined by actual returns on capital in the current year. The expected rate of return required to maintain indefinitely the current rate of capital growth was specified as an inverse logistic function of the proportionate growth in capital stock (*cf.* Dixon and Rimmer, 2002). The maximum possible growth rate of sector-specific capital stock is being set in order to avoid unrealistically large simulated growth rates. The weighted average return to capital has been taken as a proxy for the real interest rate in SloMod, where the return to capital is expressed in real terms using the production price index. The model was built within the general algebraic modelling system (GAMS, 2006) and solved with an appropriate algorithm in annual steps.

3. Developments in the Slovenian Tax System and the Flat Tax

Slovenia started with the introduction of a tax system similar to the one of EU countries at the beginning of 1990s, when (among other taxes) new corporate income tax and personal income tax was adopted. At the beginning of 2005 a completely new PIT code (PIT-2005) came into effect, answering the changed socioeconomic circumstances, Supreme Court rulings[7] from 1990s and the fact that Slovenia joined the EU in May 2004. Compared with the PIT system, which was valid through 1990s, the PIT-2005 code included higher allowances for children, a broader tax base, and it was based on the worldwide income concept. However, the code retained progressive tax schedule with five tax brackets, marginal tax rates between 16% and 50%, and several tax allowances. Together with the new PIT-2005 code, a new CIT-2005 code came into effect in January 2005, bringing elements necessary for the EU membership, while it retained the 25% statutory CIT rate.

At the same time, a public discussion emerged in Slovenia regarding the further steps of possible tax reforms. Additional reform steps were defended by claims that the tax system needed substantial simplification and especially the reduction of taxation on labour, where Slovenia held relatively high position in comparison with the other EU member states. Total taxes on labour represented on average 18.5% of GDP in EU-25 in 2004 (15.9% in EU-10 – new EU member states), while in Slovenia this share reached 21.6% of GDP (European Commission, 2006). Such a high share was a sum of the PIT, social security contributions and the payroll tax[8]. The implicit tax rate on employed labour in Slovenia (37.8%) also exceeded the EU-25 average of 35.9% (34.7% in the EU-10). Among different publicly debated proposals of the tax reform the idea that predominated, and was even included on the list of proposed government reforms (*cf.* Government Office for Growth, 2005), was the one of a flat tax system.

[7] During the 1990s the Supreme Court rulings demanded changes in the PIT code, especially higher tax allowances for children, which was finally implemented in the PIT-2005 code.

[8] Between 1992 and 1996 Slovenia reduced the rate of social security contributions from 50.35% to 40.22%. To retain the government revenue, the payroll tax was introduced simultaneously in 1996, with marginal tax rates between 1% and 10% (later increased to 3.8% – 14.8%). Compared with the social security contributions, which taxed all wages irrespective to their size, the payroll tax was introduced only to wages above certain threshold (530 EUR at the time of introduction). Through this mechanism the government reduced the tax burden for low-wage industries (mainly the textile and the metal industry) which faced several problems after the collapse of ex-Yugoslavian markets. Gradually, the payroll tax became rather important income source, representing EUR 472.3 million in 2004 (1.9% of GDP or 4.4% of general government revenue) (Ministry of Finance, 2007). As a part of the 2005-2006 tax reform package, the payroll tax was abolished by a special law in 2005.

The original flat tax idea of Hall and Rabushka (1985) includes an integrated expenditure tax system with cash flow business tax and connected wage tax, both using the same (single) tax rate. Tax base at the corporate level is the same as the base of expenditure type VAT, i.e. value of sales minus value of purchases (including investments) and wages. Tax base at the individual taxpayer level is equal to wages (labour income) with a uniform fixed tax allowance. So far, no country has entirely implemented this concept in practice. Thus nowadays the term "flat tax" is used to identify a family of personal income tax systems with one common characteristic, i.e. a single positive marginal tax rate on labour income (Keen, 2006), while those tax systems are rather different regarding other characteristics, such as width of the tax base and tax allowances).

First personal income tax systems with a single tax rate were introduced in the first half of 20th century in Jersey (1940), Guernsey (1940) and Hog Kong (1947), while the real era of flat tax started after the collapse of the socialism, when several CEE countries chose this option[9]. A special attention was given to Russia, so far the biggest country with flat-tax, where the tax reform was adopted in 2001. Crucial part of the reform was a replacement of three marginal tax rates between 12% and 30% with a single 13% flat rate. In Russia, the reform led to an increase of collected PIT revenue, even though it is not possible to prove that this increase is solely due to the flat tax itself (Ivanova *et al*., 2005). In some other countries, e.g. in Slovakia (*cf*. Krajčir and Odor, 2005), the flat tax was also generally introduced as a part of a wider tax reform, including broadening the tax base, abolishment of exemptions and reduction of compliance costs.

The general improvement in the functioning of the tax system is a combination of several elements, while *ceteris paribus* the replacement of a progressive PIT schedule with a single PIT rate leads to the immediate redistribution of tax burden among the taxpayers under the assumption of fiscal neutrality. On the other hand it also leads to the decrease of government revenue under the assumption of relatively low single PIT rate which would not put any taxpayer in a worse position compared with the "old" progressive PIT schedule. These consequences were confirmed e.g. for Germany (Peichl, 2006), Denmark (Larsen, 2006), and Netherlands (Camida and Goudswaard, 2001). It seems that these are main reasons why no one

[9] So far the flat-tax was introduced in several CEE countries (International Bureau of Fiscal Documentation, 2006): Estonia (1994), Latvia (1994), Lithuania (1994), Russia (2001), Slovakia (2004), Ukraine (2004), Serbia (2003), Georgia (2005) and Romania (2005).

country with “mature” (and well functioning) tax system has introduced the flat tax yet. On the other hand it is suitable in cases where the tax system is still to be developed and where the taxes are not “infected” with decade’s long influences of different interest groups and subtle policy measures resulting in a fragile social equilibrium. Under such circumstances it is difficult to introduce a flat-tax reform that would substantially change the income position of an important share of taxpayers (voters).

The Slovenian flat tax version, as firstly proposed, resembled the Slovakian tax system. Since 2004, Slovakia had a single PIT rate (of 19%) with limited set of allowances and the same and only one tax rate (19%) for VAT and the same rate (19%) for the CIT. Similar proposal with a PIT flat-tax rate of (presupposed) 20% and the same single rate (20%) for VAT (instead of actual 8.5% and 20% rates) and CIT (instead of actual 25% rate), combined with an immediate removal of payroll tax was widely discussed in media and received rather mixed responses in Slovenia, even before any projections of consequences were prepared. While it was welcomed by representatives of some big corporations (who were convinced that Slovakian-like-reform would reduce overall tax burden paid by corporations and increased their international competitiveness) it was sharply rejected by labour unions, mostly due to possible replacement of the existing VAT rates (reduced 8.5% and standard 20% rate) with a single (presupposed) 20% VAT rate, and to a lesser extend due to the possible shift of PIT burden from high income taxpayers toward mid and low income individuals.

In 2005 the new government (elected in autumn 2004) established a commission of tax experts coordinated by the ex-minister of finance (Mr. Marko Kranjec), which prepared some changes in existing PIT, CIT and tax procedure code. A major part of its proposals passed the parliament in December 2005 in forms of amendments to the existing PIT, CIT and tax procedure codes. Amendments brought several simplifications in the existing tax system as well as a schedular taxation of capital income inside the PIT. Namely, interest, capital gains and dividends were separated from other personal income subject to tax and taxed separately with a single rate of 20%. In addition, a payroll tax was abolished by special law accepted in December 2005 and thus it is being gradually removed from the tax system in annual steps by 2009 to avoid too big disturbances to the fiscal equilibrium. In 2006 a wide political, public and professional discussions continued regarding further steps of the reform. Beside the calculations made by the Ministry of Finance (2006) and Cajner *et al*. (2006), a thorough in-depth study was prepared by the Institute for Economic Research (*cf*. Bayar *et al*., 2006), where

different counterfactual scenarios were examined. An overview of results of the latter study will be given in the present article.

Based on the prepared simulations and political negotiations, as a final step of the tax reform a completely new PIT, CIT and tax procedure codes[10] passed the parliament at the end of 2006 and are effective from January 2007 (thereafter PIT-2007, CIT-2007). Slovenia finally did not accept the flat-tax. The PIT-2007 code indeed includes several simplifications compared with the previous code, while it still retains three tax brackets with marginal tax rates of 16%, 27% and 41% (presented also in the present article), as well as most of the "old" tax allowances. The statutory CIT rate decreased in CIT-2007 to 20% (from previous 25%), while several tax allowances are abolished. The final influence on effective CIT rate thus depends on individual company characteristics, while the CIT revenue neutrality is preserved.

4. Comparative Overview of the Scenarios

To begin with, we have the so-called baseline (or business as usual – BAU) scenario referring to the assumption that the Slovenian economy is on the steady state equilibrium growth path, where all the real variables and nominal incomes are growing at the 4% steady-state growth rate. This scenario represents the base for comparison of the other scenarios. Then we have the reference scenario (REF), which includes all the tax reforms except the proposed corporate income tax and personal income tax changes, which are finally analyzed in five counterfactual scenarios (SC1–SC5). The scenarios will be briefly describer hereinafter, while their overview is given in Table 1.

[10] Besides the changes in these major taxes, other, less important tax codes were also subject to revisions, e.g. the inheritance and gift tax.

Table 1. Summary of the scenario assumptions used for simulations

Scenario category	Reference scenario	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Marginal PIT rates	16%, 33%, 37%, 41% & 50%	22%	25%	15% & 25%	15%, 25% & 35%	16%, 27% & 41%
- tax brackets (in SIT)	0 - 1,300,000 16%					
	1,300,000 - 2,540,000 33%					
	2,540,000 - 5,140,000 37%				0 - 1,300,000 15%	0 - 1,629,552 16%
	5,140,000 - 10,330,000 41%			0 - 1,300,000 15%	1,300,000 - 4,800,000 25%	1,629,552 - 3,529,104 27%
	10,330,000 - 50%			1,300,000 - 25%	4,800,000 - 35%	3,529,104 - 41%
PIT allowances						
- general allowance	591,900 SIT	750,000 SIT	1,000,000 SIT	750,000 SIT	750,000 SIT	670,992 SIT
- children allowance[1]	structured	structured	structured	structured	structured	structured
- supplementary pension insurance	max. 24% of contributions & less than 549,400 SIT	max. 24% of contrib. & less than 549,400 SIT	max. 24% of contrib. & less than 549,400 SIT	max. 24% of contributions & less than 549,400 SIT	max. 24% of contributions & less than 549,400 SIT	max. 24% of contributions & less than 549,400 SIT
- pensioner allowance	14.5%	14.5%	14.5%	14.5%	14.5%	13.5%
- allowance for self-employed in culture and journalism	900,000 SIT	0 SIT	0 SIT	0 SIT	0 SIT	900,000 SIT
- student work allowance	1,200,000 SIT	0 SIT	0 SIT	0 SIT	0 SIT	670,992 SIT
- seniority allowance	275,300 SIT	0 SIT	0 SIT	0 SIT	0 SIT	0 SIT
- disabled persons allowance	3,441,500 SIT	3,441,500 SIT	3,441,500 SIT	3,441,500 SIT	3,441,500 SIT	3,441,500 SIT
- special allowance[2]	max. 2% (4%) of the tax base	0 SIT	0 SIT	0 SIT	0 SIT	0 SIT
PIT standardized costs						
- contractual work	10%	10%	10%	10%	10%	10%
- student work	10%	10%	10%	10%	10%	10%
- rents	40%	20%	20%	20%	20%	25%
- royalties	10%	10%	10%	10%	10%	10%
Income tax rate for the interests, dividends and profits	20%	20%	20%	20%	20%	20%
Payroll tax[3]	abolished by 2009	abolished by 2009	abolished by 2009	abolished by 2009	abolished by 2009	abolished by 2009
Marginal CIT rate	25%	22%	25%	25%	25%	20%
- allowances[4]	same as in 2006	same as in 2006	same as in 2006	same as in 2006	same as in 2006	reduced
Value added tax	8.5% and 20%	8.5% and 20%	8.5% and 20%	8.5% and 20%	8.5% and 20%	8.5% and 20%
Social security contributions	38.2%	38.2%	38.2%	38.2%	38.2%	38.2%
Share of government spending in GDP	reduced by 4% till 2012 (by 2% till 2008)	reduced by 4% till 2012 (by 2% till 2008)	reduced by 4% till 2012 (by 2% till 2008)	reduced by 4% till 2012 (by 2% till 2008)	reduced by 4% till 2012 (by 2% till 2008)	reduced by 4% till 2012 (by 2% till 2008)

Notes:

[1] The children allowance amounts to 474.900 SIT for the first child, to 516.200 SIT for the second child, and to 688.300 SIT for the third child.

[2] The special allowance is defined as the sum of a taxpayer's expenses for selected purchases such as the acquisition of books or government securities.

[3] The payroll tax is being gradually abolished by 2009. In different scenarios a relevant (diminishing) annual rate of the tax was used.

[4] The CIT allowances mostly include allowances for R&D, additional (voluntary) pension insurance and the employment of selected categories of employees.

Source: Bayar *et al*. (2006, p. 12); Chamber of Accountants, Financials and Auditors of Slovenia (2007).

Within the reference scenario several assumptions regarding the planned reforms, as well as some already initiated changes in particular areas were taken into account. Firstly, we took into account the changes within the tax system, which were introduced between 2004 and 2006: a) decrease of the payroll tax rates, which started in the year 2006 (with a 20% decrease) and will be concluded in the year 2009 with complete elimination of the payroll tax, b) changes in the PIT system (tax rates, income brackets, expenses, relieves, pensions, and new treatment of the income from capital), and c) changes in the CIT system (changed tax base and relieves). Secondly, we considered other changes, planned within the structural reform package, e.g. government deficit and expenditures, government transfers to the households, financial flows between Slovenian and the EU budget, government expenditures for R&D and tertiary education, and consequent changes in the total factor productivity (TFP) growth.

We assumed that the government total expenditure will decrease by two percentage points of GDP between 2007 and 2008, and by another two percentage points of GDP within the period 2009-2012. Regarding government deficit we assumed that it will be eliminated by the year 2010. Transfers to households (pensions, maternity and sickness leave) were indexed to wages, while the other transfers (e.g. scholarship, housing subsidies and social assistance) were indexed to the CPI. Unemployment benefits were endogenously determined within the model. Increased expenditures for R&D and education were taken into account for estimation of the change in the TFP growth. The reference scenario also assumes that the exchange rate is fixed and that foreign savings are adjusting. Furthermore, we assumed that the VAT rates remain the same, and the compensation is achieved through public deficits or surpluses.

In the group of counterfactual scenarios, specific tax reform characteristics were added to the reference scenario. The differences between these counterfactual scenarios are the result of different assumptions regarding the changes in the PIT and the CIT system. The first two counterfactual scenarios (SC1 and SC2) represent the flat-tax PIT system[11], since they employ a single marginal tax rate of 22% and 25%, respectively, while the other three counterfactual scenarios retain tax schedules with two or more tax brackets. However, all of them include scheduler 20% taxation of interest, capital gains and dividends. The

[11] It should be emphasized again that the term 'flat-tax' only refers to the PIT in the Slovenian case and has no similarities with the broader concept of Hall and Rabushka (1995).

counterfactual scenario SC5 represents the actually accepted PIT code (PIT-2007) and CIT code (CIT-2007), which were passed by the Slovenian parliament in 2006 and have been effective since January 2007.

The counterfactual scenarios also differ regarding the number of tax allowances and the actually accepted solution (scenario SC5) includes the same tax allowances as the reference system, with slightly modified values. Regarding the CIT, the scenarios differ from the reference system in terms of the size of the statutory tax rate and tax allowances. The finally accepted solution (scenario SC5) thus reduces the statutory rate from 25% to 20%, as well as the tax allowances. The assumptions regarding other characteristics do not change between scenarios; the VAT rates remain constant at the existing 8.5% and 20%, while the rate of social security contributions remains at the reference level of 38.2%. The share of total government expenditures in GDP remains to be reduced by 2% by 2008 and by an additional 2% by 2012. Expenditures on R&D and tertiary education were assumed to increase according to the Lisbon Strategy targets (*cf*. Government of the Republic of Slovenia, 2005).

5. Macroeconomic Results of the Simulations

In this chapter we provide an analysis of the macroeconomic simulations given the assumptions of scenarios presented in Chapter 4. The simulation results demonstrate that in the long term Slovenia would have a budget surplus, which is certainly needed due to the predicted deterioration of government finance sustainability, caused by the negative effects of its aging population. The results show that each one of the scenarios could generate considerably more economic growth than the baseline case, but attention must be drawn to the fact that the most important growth generator is the total factor productivity, which is dependant on the (successful) implementation of policy measures within the Lisbon Strategy.

5.1. Reference Scenario

Taking into account the results of the reference scenario, Slovenia's real GDP compared to the baseline case would be 13.4% higher in 2013 and 25.2% higher in 2025 (see Table 2). Productivity growth shifts the production capacities of the Slovenian economy upward, as

well as the annual growth rate, which increases to 5.5% on average during the 2007-2013 transition period and remains at 5.1% per year on average during the entire 2007-2025 period. Due to higher productivity, savings, and investment, the real private GDP would increase even faster, since its level compared to the baseline case would be 18.5% higher in 2013 and 31% higher in 2025 (see Table 10).

Table 2. Real GDP (percentage change in comparison to BAU)

Scenario	2007	2008	2009	2010	2011	2012	2013	2020	2025
Reference scenario	4.06	5.37	7.30	8.96	10.69	12.13	13.41	21.19	25.19
Scenario SC1	4.35	5.70	7.60	9.23	10.92	12.34	13.58	21.31	25.29
Scenario SC2	4.34	5.69	7.58	9.20	10.89	12.30	13.54	21.24	25.21
Scenario SC3	4.43	5.79	7.66	9.27	10.94	12.33	13.55	21.20	25.16
Scenario SC4	4.37	5.73	7.60	9.21	10.89	12.29	13.52	21.18	25.15
Scenario SC5	4.22	5.55	7.45	9.09	10.79	12.22	13.47	21.20	25.19

Source: Authors' simulations with SloMod; own calculations.

Investment would increase by 22.4% in 2013 and by 31.2% in 2025 thanks to higher total savings and necessary increases in production capacity (see Table 3). The state budget would have a surplus of 2.4% of the GDP, and household savings compared to the baseline case would increase by more than 20% in 2013 and by more than 30% in 2025 (see Table 11). Domestic production would expand in all industries (see Table 4). The increase in domestic output compared to the baseline case would exceed 30% in 2025 in manufacturing and 27% in services. The expansion would be much lower for agriculture (20.1%) and public services (8.1%).

Table 3. Real investment (percentage change in comparison to BAU)

Scenario	2007	2008	2009	2010	2011	2012	2013	2020	2025
Reference scenario	7.67	9.88	11.27	13.75	17.11	19.95	22.44	29.00	31.23
Scenario SC1	4.33	7.07	8.46	10.98	14.38	17.27	19.80	26.79	29.26
Scenario SC2	3.83	6.60	7.98	10.50	13.90	16.78	19.31	26.31	28.78
Scenario SC3	1.94	4.97	6.34	8.88	12.30	15.20	17.74	24.96	27.55
Scenario SC4	2.65	5.57	6.94	9.47	12.88	15.77	18.30	25.44	27.98
Scenario SC5	4.95	7.54	8.93	11.45	14.85	17.73	20.26	27.22	29.68

Source: Authors' simulations with SloMod; own calculations.

Table 4. Domestic production (percentage change in comparison to BAU)

Industry	Year	REF	SC1	SC2	SC3	SC4	SC5
Agriculture	2013	11.81	12.06	12.05	12.14	12.09	11.99
	2020	17.52	18.05	18.09	18.33	18.23	17.92
	2025	20.12	20.69	20.73	20.99	20.88	20.55
Mining	2013	18.00	17.54	17.54	17.34	17.43	17.67
	2020	27.11	26.33	26.31	25.95	26.11	26.52
	2025	32.05	31.16	31.14	30.73	30.91	31.37
Low technology	2013	20.26	19.74	19.74	19.54	19.65	19.97
	2020	29.64	28.88	28.84	28.51	28.68	29.22
	2025	34.65	33.78	33.72	33.34	33.54	34.20
Medium high technology	2013	18.55	17.71	17.63	17.21	17.38	17.83
	2020	28.30	26.78	26.62	25.83	26.14	26.96
	2025	34.08	32.24	32.03	31.06	31.45	32.43
Medium low technology	2013	17.25	16.83	16.81	16.61	16.70	16.93
	2020	25.90	25.16	25.12	24.75	24.90	25.31
	2025	30.59	29.70	29.65	29.20	29.39	29.88
High technology	2013	19.72	18.98	18.79	18.29	18.45	19.20
	2020	27.55	26.51	26.21	25.50	25.74	27.03
	2025	31.70	30.56	30.19	29.40	29.66	31.27
Services	2013	15.48	15.40	15.31	15.17	15.19	15.34
	2020	23.18	23.09	22.98	22.82	22.85	23.04
	2025	27.02	26.97	26.84	26.69	26.71	26.92
Public services	2013	–0.83	0.29	0.25	0.65	0.42	–0.18
	2020	5.39	6.77	6.75	7.28	6.99	6.23
	2025	8.12	9.62	9.61	10.19	9.88	9.05

Source: Authors' simulations with SloMod; own calculations.

In this dynamic environment of decreased production unit cost and increased production capacities, exports compared to the baseline case would increase by 18.8% in 2013 and by 33.5% in 2025 (see Table 5). Fast growth and increasing domestic demand implies higher import levels as well. These would increase compared to the baseline case by 15.8% in 2013 and by 27.5% in 2025 (see Table 6). Given the fixed nominal exchange rate, the current account deficit generates foreign capital inflow, which additionally increases total savings and thus the source of investment funds. However, thanks to increased exports the current account deficit would decline with respect to its baseline level.

Table 5. Real exports (percentage change in comparison to BAU)

Scenario	2007	2008	2009	2010	2011	2012	2013	2020	2025
Reference scenario	4.46	7.66	10.07	12.19	14.47	16.68	18.78	28.14	33.46
Scenario SC1	4.40	7.39	9.69	11.73	13.91	16.03	18.05	26.91	31.99
Scenario SC2	4.42	7.39	9.68	11.70	13.88	15.99	18.00	26.80	31.86
Scenario SC3	4.42	7.27	9.52	11.49	13.61	15.68	17.65	26.18	31.11
Scenario SC4	4.43	7.33	9.59	11.59	13.73	15.82	17.80	26.44	31.42
Scenario SC5	4.44	7.48	9.80	11.85	14.05	16.19	18.22	27.17	32.30

Source: Authors' simulations with SloMod; own calculations.

Table 6. Real imports (percentage change in comparison to BAU)

Scenario	2007	2008	2009	2010	2011	2012	2013	2020	2025
Reference scenario	4.74	6.55	8.46	10.29	12.39	14.21	15.83	23.62	27.52
Scenario SC1	4.39	6.29	8.16	9.97	12.04	13.83	15.43	23.15	27.04
Scenario SC2	4.30	6.21	8.07	9.87	11.93	13.72	15.31	23.00	26.88
Scenario SC3	4.06	6.00	7.84	9.62	11.67	13.44	15.02	22.66	26.52
Scenario SC4	4.14	6.06	7.91	9.70	11.75	13.52	15.11	22.77	26.64
Scenario SC5	4.43	6.30	8.17	9.98	12.06	13.85	15.45	23.18	27.06

Source: Authors' simulations with SloMod; own calculations.

The public sector's relative weight in the economy would decline in all the scenarios and the private sector would expand at an even faster rate. The current public consumption compared to the baseline case would decline by 6.2% in 2013 (see Table 7). However, in the long run (2025) the public sector would expand compared to the baseline thanks to higher growth and increasing tax revenues. Given the anticipated 4% decrease in the public expenditure to GDP ratio, the share of the public sector in the economy would remain at a lower level compared to the baseline case.

Table 7. Real government consumption (percentage change in comparison to BAU)

Scenario	2007	2008	2009	2010	2011	2012	2013	2020	2025
Reference scenario	0.35	–4.83	–3.99	–3.46	–3.66	–4.77	–6.20	–0.37	2.10
Scenario SC1	0.80	–4.01	–3.13	–2.57	–2.73	–3.83	–5.25	0.85	3.44
Scenario SC2	0.74	–4.05	–3.16	–2.61	–2.77	–3.86	–5.29	0.84	3.44
Scenario SC3	0.83	–3.78	–2.88	–2.31	–2.46	–3.55	–4.96	1.30	3.97
Scenario SC4	0.73	–3.95	–3.06	–2.50	–2.66	–3.74	–5.16	1.05	3.69
Scenario SC5	0.53	–4.38	–3.51	–2.96	–3.14	–4.23	–5.65	0.38	2.94

Source: Authors' simulations with SloMod; own calculations.

Even if employment in the public sector shrank by 1.5% in 2013 because of contractionary expenditure policy during the transition period, it would expand by more than 1% in the long run (2025) compared to the baseline case (see Table 8). Total employment would increase thanks to the strong expansion of the private sector and increasing labour supply. The total labour supply would increase by 1.4% in 2013 and by 2.5% in 2025 thanks to increasing real wages. The increase in the labour supply of highly skilled people would be particularly strong (2.2% in 2013 and 3.8% in 2025). Employment increase is significant in manufacturing (more than 10% in 2013 and almost 20% in 2025 in some sectors) and services (see Table 9). The expansion in the high technology sectors is especially vigorous (13% in 2013 and 16.1% in 2025). Employment increase compared to the baseline case is evident even in agriculture (2.9% in 2013 and 5.6% in 2025).

Table 8. Labour market effects

Labour market category	Year	BAU	REF	SC1	SC2	SC3	SC4	SC5
Unemployment rate, all skills (in per cent)	2013	10.71	5.41	5.49	5.57	5.68	5.66	5.55
	2020	10.71	3.86	3.92	3.99	4.09	4.07	3.97
	2025	10.71	3.23	3.29	3.35	3.44	3.42	3.33
Unemployment rate, unskilled (in per cent)	2013	19.82	12.00	12.18	12.32	12.51	12.46	12.24
	2020	19.82	9.53	9.71	9.85	10.04	9.99	9.76
	2025	19.82	8.40	8.58	8.72	8.90	8.85	8.62
Unemployment rate, skilled (in per cent)	2013	9.95	4.56	4.60	4.68	4.80	4.79	4.69
	2020	9.95	2.96	2.99	3.05	3.15	3.14	3.06
	2025	9.95	2.34	2.37	2.42	2.50	2.50	2.42
Unemployment rate, highly skilled (in per cent)	2013	2.98	0.79	0.90	0.89	0.91	0.89	0.84
	2020	2.98	0.40	0.46	0.46	0.47	0.46	0.43
	2025	2.98	0.28	0.33	0.32	0.34	0.33	0.30
Number of unemployed, total	2013	129,134	66,177	67,252	68,237	69,710	69,456	67,947
	2020	169,932	62,522	63,690	64,828	66,484	66,190	64,410
	2025	206,748	63,900	65,153	66,425	68,225	67,902	65,883
Labour supply, total (% change in comparison to BAU)	2013		1.42	1.65	1.71	1.85	1.80	1.63
	2020		2.09	2.31	2.37	2.50	2.45	2.29
	2025		2.45	2.67	2.72	2.85	2.80	2.64
Labour supply, unskilled (% change in comparison to BAU)	2013		0.80	0.75	0.89	0.96	0.96	0.88
	2020		1.15	1.10	1.23	1.29	1.30	1.22
	2025		1.34	1.28	1.41	1.48	1.48	1.41
Labour supply, skilled (% change in comparison to BAU)	2013		1.37	1.50	1.59	1.74	1.72	1.58
	2020		2.03	2.15	2.24	2.39	2.36	2.23
	2025		2.39	2.51	2.59	2.74	2.72	2.59
Labour supply, highly skilled (% change in comparison to BAU)	2013		2.24	3.08	2.96	3.13	2.95	2.59
	2020		3.29	4.11	3.99	4.15	3.98	3.62
	2025		3.83	4.64	4.52	4.68	4.51	4.16
Real wage growth rate, unskilled (in per cent)	2007-2013		0.62	0.61	0.60	0.59	0.59	0.61
Real wage growth rate, skilled (in per cent)	2007-2013		0.97	0.96	0.95	0.93	0.93	0.95
Real wage growth rate, highly skilled (in per cent)	2007-2013		1.58	1.50	1.49	1.46	1.48	1.53

Source: Authors' simulations with SloMod; own calculations.

As a consequence of significant job creation, unemployment would decline (see Table 8). The overall unemployment rate would decline from 10.7% in 2004 to 5.4% in 2013, and to only 3.2% in 2025. The unemployment rate among unskilled workers (i.e. with completed elementary school) would more than halve, declining from 19.8% in 2004 to 8.4% in 2025. Among skilled and highly skilled workers, the decline in the unemployment rate would be even more impressive; among skilled workers the unemployment rate would fall from almost 10% in 2004 to 4.6% in 2013 and to 2.3% in 2025, and among highly skilled workers it would be almost completely eliminated (decrease from 3% in 2004 to only 0.3% in 2025).

Table 9. Employment (percentage change in comparison to BAU)

Industry	Year	REF	SC1	SC2	SC3	SC4	SC5
Agriculture	2013	2.90	3.50	3.58	3.88	3.76	3.35
	2020	4.37	4.48	4.45	4.47	4.46	4.48
	2025	5.62	5.72	5.68	5.69	5.67	5.73
Mining	2013	9.98	9.69	9.72	9.63	9.69	9.82
	2020	13.36	12.90	12.94	12.78	12.88	13.09
	2025	15.13	14.61	14.66	14.49	14.59	14.83
Low technology	2013	13.20	12.80	12.85	12.75	12.84	13.04
	2020	17.10	16.60	16.66	16.53	16.64	16.92
	2025	19.03	18.49	18.55	18.41	18.53	18.87
Medium high technology	2013	12.86	12.09	12.05	11.69	11.85	12.23
	2020	17.04	15.74	15.65	15.01	15.27	15.93
	2025	19.69	18.15	18.04	17.28	17.60	18.35
Medium low technology	2013	10.76	10.47	10.49	10.39	10.45	10.57
	2020	13.80	13.36	13.40	13.23	13.32	13.49
	2025	15.35	14.82	14.87	14.67	14.78	14.97
High technology	2013	13.20	12.53	12.34	11.87	12.01	12.69
	2020	15.20	14.43	14.18	13.63	13.80	14.81
	2025	16.12	15.35	15.07	14.49	14.67	15.86
Services	2013	8.04	8.56	8.52	8.68	8.58	8.34
	2020	9.84	10.59	10.59	10.88	10.72	10.34
	2025	10.31	11.16	11.17	11.51	11.34	10.90
Public services	2013	–1.45	–0.96	–1.08	–1.04	–1.14	–1.31
	2020	0.26	0.72	0.57	0.57	0.48	0.37
	2025	1.18	1.63	1.48	1.46	1.37	1.28

Source: Authors' simulations with SloMod; own calculations.

Productivity growth, increased labour demand, and a significant decline in the unemployment rate should result in higher real wages and higher real income. The increase is particularly strong for highly skilled workers and amounts to 1.6% per year on average by 2013 (see Table 8). It is also strong for skilled workers (1.0% per year on average). The increase in real household income with respect to the baseline case (between 9.6% for the first quintile and 15% for the fifth quintile in 2013, and respectively 19.8% and 27.4% in 2025) should produce a significant boost in private consumption (around 20% for all the

categories in 2025) and savings (see Table 11). Savings would increase given higher real return on capital.

5.2. Counterfactual Scenarios

A comparative analysis of the simulation results for the tax reform scenarios, which upgrade the reference scenario, shows that they also generate considerable growth, income, employment, welfare, and exports compared the baseline case. The positive impacts of suggested tax reforms scenarios on growth and employment would however be small compared to the reference scenario.

In 2013, the real GDP growth is thus positive in all the tax reform scenarios, whereas the differences are very small (see Tables 2 and 10) and decrease even more in the long run; by 2025 these differences remain positive only for the two flat tax scenarios and the last scenario with three tax brackets. Reasons for this can be found in the accelerated economic growth in the first year of reduced income tax, in which the strongest effect (0.37 percentage points) would be achieved by applying two income tax rates. However, it must be stressed that in time, the (relatively small) differences between these scenarios decrease even more. Private GDP fluctuations are similar; the differences are small and decrease over time. The flat tax scenarios seem to perform better in the long run, but the differences are again relatively small. The simulation results thus show that tax reform will not have any major impact on Slovenian economic growth[12].

[12] It has to be emphasized that individual scenarios have various impacts on income and welfare of the population, which will be analyzed later in this chapter and in the following chapter.

Table 10. Macroeconomic aggregates (in mill SIT)

Macroeconomic category	Year	BAU	REF	SC1	SC2	SC3	SC4	SC5
Real GDP	2013	8,895,752	10,088,261	10,104,167	10,100,235	10,101,272	10,098,223	10,093,681
	2020	11,706,203	14,186,957	14,200,571	14,192,434	14,187,900	14,185,869	14,188,093
	2025	14,242,386	17,830,178	17,844,943	17,833,243	17,825,803	17,823,923	17,830,611
Real private GDP	2013	6,872,775	8,145,655	8,145,898	8,142,756	8,138,704	8,138,920	8,142,355
	2020	9,044,103	11,465,910	11,454,337	11,447,101	11,433,735	11,436,895	11,452,339
	2025	11,003,534	14,428,197	14,409,801	14,399,139	14,379,704	14,384,632	14,408,951
Private consumption	2013	5,197,180	5,887,158	5,962,645	5,967,122	6,000,960	5,985,397	5,940,735
	2020	6,839,135	8,260,154	8,360,502	8,364,624	8,407,464	8,387,169	8,330,932
	2025	8,320,853	10,379,645	10,504,771	10,508,773	10,561,299	10,536,134	10,468,278
Public consumption	2013	1,735,157	1,627,536	1,644,031	1,643,442	1,649,087	1,645,641	1,637,049
	2020	2,283,349	2,274,819	2,302,804	2,302,512	2,313,119	2,307,312	2,292,000
	2025	2,778,043	2,836,273	2,873,657	2,873,557	2,888,220	2,880,484	2,859,622
Investment	2013	2,338,339	2,863,038	2,801,296	2,789,798	2,753,155	2,766,348	2,812,128
	2020	3,077,095	3,969,554	3,901,574	3,886,739	3,845,032	3,859,790	3,914,725
	2025	3,743,757	4,912,929	4,839,227	4,821,339	4,775,040	4,791,239	4,854,829
Real exports	2013	4,911,025	5,833,318	5,797,546	5,795,122	5,777,834	5,785,290	5,805,985
	2020	6,462,574	8,281,164	8,201,626	8,194,569	8,154,480	8,171,185	8,218,721
	2025	7,862,709	10,493,474	10,378,365	10,367,384	10,308,959	10,333,166	10,402,526
Real imports	2013	5,285,950	6,122,789	6,101,351	6,095,249	6,079,764	6,084,454	6,102,216
	2020	6,955,950	8,598,734	8,565,935	8,556,009	8,532,196	8,539,587	8,568,284
	2025	8,462,976	10,792,142	10,751,077	10,737,810	10,707,715	10,717,100	10,754,645

Source: Authors' simulations with SloMod; own calculations.

The impacts of individual tax scenarios on domestic production demonstrate a decrease compared to the reference scenario, except for public services (see Table 4). Except in the services sector, this also results in a lower employment increase (see Table 9).

Reduced income tax should result in an additional increase in after-tax real wages compared to the reference scenario. This also results in an increased labour supply (see Table 8). However, given the increasing government budget deficit in the first years of the tax reform due to declining tax revenues, the economic environment is less favourable for the private sector; the real private GDP increase is lower even if the total real GDP is slightly higher (see Tables 2 and 10). The government temporarily spends too much compared to the reference scenario (see Table 13). National savings decrease because of temporarily higher current government deficits even if household savings are higher; in the short run government deficits would crowd out personal investment, which increases much less than in the initial period of the reference case (see Tables 3 and 11). However, the gap narrows in the long run due to the government budget surplus.

On the other hand, increased household disposable income should result in increased household consumption; again, the highest increase will be in the fifth quintile. The differences between individual scenarios concern the differences in the lower income tax paid (see Table 11). In the SC5 scenario, the increase in personal consumption is lower compared to other scenarios because households gain relatively less. This is also reflected in lower labour supply increase as the result of a smaller decrease in effective PIT rates compared to other scenarios (see Tables 8 and 12).

Table 11. Income, consumption and saving of households (percentage change in comparison to BAU)

Income category	Year	REF	SC1	SC2	SC3	SC4	SC5
Household income, 1. quintile	2013	9.64	9.73	9.52	9.40	9.41	9.59
	2020	16.36	16.40	16.15	15.98	16.00	16.26
	2025	19.84	19.87	19.60	19.42	19.45	19.74
Household income, 2. quintile	2013	12.12	12.11	11.93	11.77	11.79	11.98
	2020	19.20	19.13	18.92	18.70	18.73	19.01
	2025	22.89	22.82	22.58	22.34	22.38	22.70
Household income, 3. quintile	2013	12.98	12.92	12.77	12.61	12.63	12.83
	2020	20.35	20.22	20.03	19.81	19.85	20.14
	2025	24.21	24.06	23.86	23.61	23.66	23.99
Household income, 4. quintile	2013	13.50	13.40	13.27	13.12	13.15	13.36
	2020	21.18	20.99	20.83	20.61	20.67	20.97
	2025	25.20	24.99	24.81	24.57	24.64	24.98
Household income, 5. quintile	2013	15.02	15.24	14.90	14.85	14.87	15.15
	2020	23.17	23.31	22.93	22.82	22.87	23.25
	2025	27.35	27.47	27.08	26.95	27.01	27.42

Consumption category	Year	REF	SC1	SC2	SC3	SC4	SC5
Household consumption budget, 1. quintile	2013	10.98	10.99	11.35	11.21	11.23	11.12
	2020	17.76	17.71	18.07	17.87	17.90	17.86
	2025	21.30	21.23	21.60	21.38	21.42	21.40
Household consumption budget, 2. quintile	2013	13.90	13.56	14.37	14.50	14.54	14.18
	2020	21.06	20.63	21.46	21.54	21.59	21.31
	2025	24.84	24.39	25.23	25.30	25.36	25.10
Household consumption budget, 3. quintile	2013	14.72	14.32	15.06	15.74	15.78	15.32
	2020	22.15	21.64	22.39	23.06	23.12	22.73
	2025	26.10	25.57	26.33	27.00	27.07	26.70
Household consumption budget, 4. quintile	2013	14.63	15.14	15.45	16.58	16.61	15.96
	2020	22.31	22.78	23.08	24.22	24.27	23.68
	2025	26.37	26.85	27.14	28.31	28.37	27.79
Household consumption budget, 5. quintile	2013	12.09	16.42	15.60	16.41	15.47	13.78
	2020	19.90	24.44	23.54	24.33	23.34	21.63
	2025	23.99	28.69	27.74	28.54	27.52	25.78

Saving category	Year	REF	SC1	SC2	SC3	SC4	SC5
Household saving, 1. quintile	2013	22.71	25.14	24.71	25.03	24.85	24.70
	2020	30.38	33.21	32.81	33.31	33.06	32.67
	2025	33.43	36.42	36.04	36.62	36.35	35.84
Household saving, 2. quintile	2013	26.56	28.60	28.78	29.73	29.56	29.00
	2020	34.68	37.13	37.38	38.56	38.31	37.48
	2025	37.97	40.57	40.86	42.13	41.86	40.90
Household saving, 3. quintile	2013	27.64	29.73	29.66	31.67	31.49	30.76
	2020	36.08	38.57	38.55	40.87	40.62	39.61
	2025	39.53	42.19	42.20	44.64	44.37	43.22
Household saving, 4. quintile	2013	26.34	29.98	29.11	31.80	31.60	30.59
	2020	34.98	39.13	38.25	41.29	41.03	39.71
	2025	38.55	42.90	42.03	45.22	44.93	43.47
Household saving, 5. quintile	2013	21.65	33.19	30.07	32.38	30.18	26.83
	2020	30.28	42.94	39.65	42.31	39.88	36.02
	2025	33.78	46.89	43.55	46.35	43.82	39.73

Source: Authors' simulations with SloMod; own calculations.

Given that household and government demands are higher in the tax reform scenarios than in the reference scenario, prices would be higher as well compared to the reference scenario. This exerts a negative impact on exports, which are lower than in the reference scenario (see Tables 5 and 10). Of course the final result depends on changes resulting from reduced investment demand, reduced production of capital goods, and the relative decrease in the capital goods' prices compared to the reference scenario. Imports would also follow the changes in domestic market; taking into account the fixed exchange rate, as well as the current (given) world prices, they would result accordingly in an increase or a decrease (see Tables 6 and 10). The final result of all the changes shows that in the aggregate, imports would decrease, although less than exports. This would result in an increased current account deficit and increased external savings and partial replacement of the decreased domestic savings that would result from decreased budget revenues and covering these with a temporarily increased budget deficit.

Table 12. Effective average PIT rates in 2013 (in per cent)

Effective average PIT rate	REF	SC1	SC2	SC3	SC4	SC5
1. quintile, unskilled	11.01	13.41	17.14	9.40	9.40	9.53
1. quintile, skilled	14.60	18.47	21.12	13.42	13.42	13.93
1. quintile, highly skilled	15.73	18.16	20.25	14.37	14.37	14.62
2. quintile, unskilled	11.74	14.40	17.72	10.07	10.07	10.38
2. quintile, skilled	15.38	19.09	21.91	13.79	13.79	14.33
2. quintile, highly skilled	18.43	19.30	21.93	15.58	15.58	16.17
3. quintile, unskilled	12.26	15.07	18.03	10.67	10.67	11.01
3. quintile, skilled	16.24	19.03	21.90	14.17	14.17	14.61
3. quintile, highly skilled	20.16	19.64	22.41	16.54	16.58	17.31
4. quintile, unskilled	13.22	14.90	17.48	11.14	11.16	11.45
4. quintile, skilled	17.84	18.61	21.39	14.90	14.92	15.37
4. quintile, highly skilled	22.14	19.49	22.27	17.44	17.52	18.80
5. quintile, unskilled	14.84	13.67	16.02	11.41	11.75	12.66
5. quintile, skilled	22.53	18.71	21.49	17.09	17.89	19.58
5. quintile, highly skilled	29.50	20.21	23.08	20.46	22.80	26.30

Source: Authors' simulations with SloMod; own calculations.

A comparison of the results of scenarios SC1 through SC5 shows that in the SC5 scenario, the impact on increasing investment is greater than in the other scenarios (see Tables 8 and 10). The difference is especially evident compared to scenarios with two or three tax brackets (i.e. SC3 and SC4). Similar findings apply to foreign trade (see Tables 5 and 6). Employment in the SC5 scenario compared to other scenarios is a specific case; it is higher

in manufacturing and slightly lower in agriculture and services (see Table 9). Similar results apply to changes in domestic production[13] (see Table 4).

Given the assumptions of budget deficit (surplus) adjustment and gradual decrease of the share of GDP expenditure, the budget deficit gradually decreases and converts into a surplus (see Table 13). Only with the full implementation of the government expenditure decrease could all the scenarios could be implemented without raising VAT. However, if the assumed decrease in government expenditure was not fully implemented in practice, it would be necessary to appropriately increase the VAT rates, which would result in increased prices and other appurtenant effects.

Table 13. Government budget (change in GDP percentage points in comparison to BAU)

Government budget category	Year	REF	SC1	SC2	SC3	SC4	SC5
Total government revenues	2013	0.85	–0.35	–0.16	–0.59	–0.39	0.03
	2020	0.85	–0.35	–0.15	–0.58	–0.38	0.04
	2025	0.82	–0.37	–0.18	–0.61	–0.41	0.02
Total government expenditures	2013	–4.00	–4.00	–4.00	–4.00	–4.00	–4.00
	2020	–4.00	–4.00	–4.00	–4.00	–4.00	–4.00
	2025	–4.00	–4.00	–4.00	–4.00	–4.00	–4.00
Government deficit	2013	4.85	3.65	3.84	3.41	3.61	4.03
	2020	4.85	3.65	3.85	3.42	3.62	4.04
	2025	4.82	3.63	3.82	3.39	3.59	4.02

Source: Authors' simulations with SloMod; own calculations.

Additional simulations were performed, in which the two VAT rates or the (single) flat VAT rate were adjusting according to the assumed government budget changes. This meant that VAT rates increased in the case of a budget deficit and decrease in the case of a budget surplus. The simulations of the proposed tax reform scenarios, which assumed the adjustment of two VAT rates or a flat VAT rate, gradual budget deficit elimination, and a decrease in government expenditure, demonstrated that the required VAT increase would have strong short-term negative impacts on economic growth. In the first year of the tax reform, there would be no increase in growth, but a decrease at a level between 3.2% and 3.9%. At the same time, higher VAT rates in all the quintiles would neutralize the positive effects of the tax reform on household welfare (except for the fifth quintile in the case of a flat tax rate).

[13] It is evident that greater differences again appear primarily compared to the scenarios with two or three income tax brackets (i.e. SC3 and SC4).

6. Welfare Results of the Simulations

The results shown in the previous chapter reveal that the different scenarios do not differ much from each other regarding the impact on macroeconomic aggregates. However, from the individual taxpayer's point of view, the accepted PIT code (SC5) changes the income position of practically all households and individual taxpayers.

The reference scenario shows that all the income and skill groups would win from structural reforms and higher growth (see Tables 11 and 14). The distribution of the income and welfare gains among the different categories of the population is however not uniform. It is obvious that highly skilled workers and the fifth quintile would be the big winners. The present value of welfare gains for the fifth quintile would be 5,247 billion SIT. The gain for the first quintile would be 1,569 billion SIT. Real income for the first quintile would increase by 9.6% in 2013 and by 19.8% in 2025, whereas the increase for the fifth quintile would be 15% in 2013 and 25.4% in 2025.

Table 14. Welfare effects

Welfare category	REF	SC1	SC2	SC3	SC4	SC5
1. quintile, mill SIT	1,569,386	1,564,864	1,599,135	1,581,082	1,584,029	1,579,394
2. quintile, mill SIT	2,521,773	2,469,767	2,573,069	2,585,223	2,591,296	2,554,513
3. quintile, mill SIT	3,240,703	3,167,129	3,282,664	3,386,221	3,394,996	3,333,138
4. quintile, mill SIT	3,928,499	4,021,773	4,077,758	4,292,879	4,300,465	4,186,397
5. quintile, mill SIT	5,247,769	6,547,105	6,294,815	6,528,106	6,246,256	5,750,708
1. quintile, % of household income	12.88	12.84	13.14	13.01	13.03	12.97
2. quintile, % of household income	14.19	13.90	14.51	14.60	14.63	14.39
3. quintile, % of household income	14.21	13.90	14.42	14.90	14.94	14.64
4. quintile, % of household income	14.26	14.61	14.84	15.64	15.66	15.22
5. quintile, % of household income	11.27	14.04	13.53	14.05	13.43	12.34

Source: Authors' simulations with SloMod; own calculations.

In the case of a flat tax rate according to the first counterfactual scenario (SC1), welfare gains compared to the reference case would decline for the first three quintiles, which is a result of higher income tax paid, because even increased general PIT allowance would not be able to supplement the higher effective PIT rates. At the same time, the welfare gains of the households in the fourth quintile would slightly increase, whereas in the fifth quintile they would increase considerably (see Table 14).

In the remaining four counterfactual scenarios, the combination of PIT allowances and envisaged PIT rates is such that even the households in lower quintiles would pay less

income tax than in the reference scenario. This is also shown in increased welfare across all the quintiles, but again, the fifth quintile would win the most. Given the changes in the welfare structure the last scenario with three tax rates (SC5) seems the most appropriate, since a lower increase in the welfare gains for the fifth quintile means that the remaining quintiles receive a bigger share of welfare gains (welfare increases relatively the most in the second, third, and fourth quintiles). From the social point of view, this scenario seems to be the most acceptable. However, given the size of the welfare gains alone, the scenario with two tax brackets (SC3) seems to be the most appropriate, which is also confirmed by the calculation of the present value of welfare changes for individual scenarios (PV_W) in Table 16.

However, it needs to be emphasized that this calculation depends on scenario assumptions and that the scenario with two tax brackets (SC3) is the one that reduces the payment of PIT the most (households gain almost 100 billion SIT per year). Actually, as the results from Table 15 reveal, all the counterfactual scenarios examined lead to a substantial drop in government revenues compared with the reference case; the relative decrease in revenues ranges between 10.9% (SC5) and 27.4% (SC3). Assuming the same income pattern as in 2004, the government could expect 10.9% less revenue from PIT under the PIT-2007 tax code (SC5) compared with the reference tax code. The scenarios also differ regarding the relative taxation of income quintiles. For example, the lowest income quintile under the counterfactual scenario SC1 would pay 1.4% more PIT compared with the reference system.

Table 15. Amount of PIT under different counterfactual scenarios in comparison with the reference case (REF = 100, household level)

Quintile	SC1	SC2	SC3	SC4	SC5
1	101.4	72.3	73.4	73.4	88.3
2	104.9	83.2	76.0	76.0	88.3
3	103.6	90.9	77.8	77.9	87.0
4	94.0	89.9	77.0	77.2	84.7
5	71.9	76.0	70.1	76.6	90.8
All	81.5	80.4	72.6	76.8	89.1

Source: Authors' simulations with SloMod and the microsimulation model; own calculations.

Finally, all the scenarios increase income inequality in Slovenian society to a greater or lesser degree. In Table 16, the consequences of different PIT scenarios are assessed at the household and individual levels. Three different measures were used (*cf*. Cowel, 1977): (1) the Gini coefficient (*G*), (2) the Atkinson index (*A*), and (3) the squared coefficient of variation (*SCV*). They all reveal that the overall inequality under all counterfactual scenarios grew in comparison to the reference scenario. In addition, it can be concluded, as already foreseen on the basis of welfare gains distribution, that the flat tax scenarios (SC1 and SC2) would increase income inequality in Slovenia to a greater extent than scenarios with several tax rates (SC3 through SC5).

Table 16. Welfare variation measure and income inequality measures, based on household equivalent disposable income (household level)

Measure	REF	SC1	SC2	SC3	SC4	SC5
PV_W	16,508,130	17,770,638	17,827,440	18,373,510	18,117,042	17,390,967
Index (REF = 100)		107.6	108.0	111.3	109.7	105.3
G	0.2730	0.2895	0.2896	0.2851	0.2876	0.2785
Index (REF = 100)		106.0	106.1	104.4	105.3	102.0
$A_{\varepsilon=2}$	0.2523	0.2686	0.2686	0.2650	0.2689	0.2594
Index (REF = 100)		106.5	106.5	105.0	106.6	102.8
SCV	0.3024	0.3849	0.3852	0.3664	0.3688	0.3210
Index (REF = 100)		127.3	127.4	121.2	122.0	106.2

Source: Authors' simulations with SloMod and the microsimulation model; own calculations.

7. Concluding Remarks

In 2005-2006 a broad discussion emerged in Slovenia regarding its tax system. It was characterised by claims that the tax system needed simplifications and the effective reduction of taxation on labour. Among the different proposals, a flat-tax system similar to the Slovakian one with a single (and same) tax rate for PIT, CIT and VAT divided public opinion and was later rejected in particular by labour unions.

In the article we have analyzed several envisaged tax and structural reform scenarios using a dynamic general equilibrium model of the Slovenian economy. The simulation results show that the main engine of growth, employment, and welfare is the total factor productivity growth thanks to increasing R&D investment and education, as well the declining share of the government in the economy, so that more resources become available for the private sector as the principal actor of investment and growth. It has been shown that the simulation results show that the envisaged tax reform packages would have

positive impacts on economic growth, labour markets, and household welfare. However, flat tax scenarios show that the distributive impacts among different income groups and skills might be substantial. In some tax reform scenarios the low-income groups might lose and the high-income and high skill groups might win a lot. Thus our results suggested that options other than the Slovakian-like flat tax system are better suited to the country's long-term economic development.

The finally adopted tax reform, effective from January 2007, includes new PIT and CIT codes, new tax procedure rules, the gradual abolition of payroll tax and several changes to less important taxes, e.g. the inheritance tax. Among the major changes of the PIT and CIT codes one should emphasize the reduction of the highest marginal PIT rate from 50% to 41%, schedular 20% taxation of interest, dividends and capital gains, and the reduction of statutory CIT rate from 25% to 20%. In comparison with several CEEC countries that decided in favour of more radical approaches[14], Slovenia has thus once again decided on a more gradual approach. Namely, as our results show, the consequences of the reform are relatively modest and give benefits to practically all taxpayers, while they harm the government budget in the short run. However, by introducing several of these changes, such as the reduction of the highest marginal PIT rate and the schedular taxation of capital income, Slovenia has merely taken a step closer to the common EU practice.

[14] For example Croatia, which (temporarily) introduced a consumption-based tax PIT (*cf*. Blažić, 1999), or many Central and Eastern European countries that opted for a flat-tax concept of the PIT.

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