Use of simulation models for the tax reform in Slovenia

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Abstract

In 2007 Slovenia launched a comprehensive reform of its tax system. To estimate the different proposals (including a flat-tax proposal) and their overall effect on individual taxpayers and government budget a static micro-simulation model was constructed and combined with a computable general equilibrium model. It uses a large, comprehensive database (6% of the population) provided by relevant ministries and government agencies and proved to be a reliable tool during implementation of the reform. In the paper, the main characteristics of both models are presented along with the results of different reform scenarios, including those which finally passed the parliament and now form part of the Slovenian tax system.

Key words: tax reform, personal income tax, income inequality, microsimulation, CGE

1 INTRODUCTION

A significant part of the Slovenian current tax system, including the new personal income tax (PIT) and new corporate income tax (CIT), was formed at the start of 1990. 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[1]. However, freshly accepted tax codes were already changed by amendments in 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 two simulation models were constructed: (1) a microsimulation model; and (2) a macroeconomic recursive dynamic general equilibrium model. Both models were used to estimate the effect of different tax combinations on the income position of individual taxpayers, households, as well as on the long-term macroeconomic position of the economy.

At the same time, a wide public discussion was going on regarding tax reform in Slovenia. The basis was the claim that the Slovenian tax system produces 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 not only taxed with a 38.2% rate of social security contribution but also with a payroll tax[2] (with progressive marginal tax rates of between 0% and 14.8%). This combination of PIT, social security contribution and payroll tax effectively classifies Slovenia among those countries with the highest taxes on labour in the EU. In 2004, total taxes on labour in the EU25 represented on average 18.5% of GDP (15.9% in EU10 - new EU member states), while in Slovenia the share amounted to 21.6%. The implicit tax rate on employed labour in Slovenia (37.8%) also exceeded the EU25 average of 35.9% (34.7% in the EU10; EU Commission, 2006).

The discussion on tax reform in Slovenia mostly focused on the example of Slovakia, which introduced a flat-tax system for PIT in 2004 with a single tax rate of 19%. In addition, Slovakia employed the same (19%) and only one rate for value-added tax (VAT) and the same 19% rate for corporate income tax too (IBFD, 2006). The idea of a tax system similar to the Slovakian, which was even included among official government reform proposals (Odbor za reforme, 2005), triggered a sharp response from labour unions in Slovenia, mainly due to the fear of a replacement

[1] This PIT code differed from the system which was valid during the 1990s by its higher allowances for children, its broader tax base and 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.

[2] Payroll tax was a relatively important government revenue – it represented EUR 472.3 million in 2004 (1.9% of GDP or 4.4% of general government revenue (Ministry of Finance, 2007)).

of the existing double VAT rate system (with a reduced 8.5% and standard 20% rate) with a single VAT rate.

The purpose of this paper is to explain why the income tax reform passed in 2006 was chosen by the Slovenian Parliament. That is, the results of micro and macro simulations, whereby different combinations of taxes were considered (see below), suggested that options other than the Slovakia-like tax system are not inferior with respect to the country's long-term economic development. The final combination of changed taxes, which constitutes the 2007 tax reform, thus includes a reduction of the highest marginal tax rate of PIT (from 50% to 41%), a schedular 20% taxation of interest, dividends and capital gains, a reduction of the statutory CIT rate from 25% to 20% and the abolition of payroll tax. The 2007 tax reform thus represents a gradual step and once again Slovenia did not follow several other Eastern European countries that decided on more radical approaches[3].

The structure of the paper is as follows: Section 2 outlines the data and methodology, Section 3 describes the tax scenarios that were taken into account, the results are presented in Section 4, while the final section offers some concluding remarks.

2 DATA AND METHODOLOGY

2.1 The microsimulation model

For the purposes of the reform simulations the existing versions of the microsimulation model (Čok 2002, Čok, Stropnik and Stanovnik, 2004) were updated with a new database created specifically for the purposes of the 2007 tax reform. The database contains a sample of 111,705 individuals from 38,513 households. It is a merged database based on separate files from the Ministry of Finance (containing PIT records), the Ministry of Labour, Family and Social Affairs (containing records on social benefits), the Ministry of Internal Affairs (containing data on socio-economic characteristics). Since it is based on administrative data (not survey data) it is of high quality and enables the simulation of practically all direct taxes and benefits at individual and household levels.

[3] For example, Croatia, which (temporarily) introduced a 'consumption-based tax' PIT (Blažić, 1999); many Central and Eastern European countries (for example, Latvia, Estonia, Lithuania, Slovakia, Romania, Russia, Ukraine) opted for a 'flat-tax' concept of PIT (IBFD, 2006).

It originates from 2004 and all the results are thus stated in 2004 prices. The model is static in time; it does not include changes in behaviour or consequential macroeconomic second-order effects[4].

In the first step of the microsimulation, databases from different sources were prepared in the final form (final database), which enables simulations. Secondly, the PIT system from 2004 is replicated. Since the original data also include PIT calculated by the Ministry of Finance it is straightforward to compare the PIT calculated by the model with the recorded PIT for each individual taxpayer (the 'micro' validation of the model). While the database includes all relevant tax parameters for individual taxpayers (all sources of income subject to tax and tax allowances) it is no surprise that the PIT calculated by the model completely coincides with the recorded PIT. At this stage a 'macro' validation of the model and its database is also considered, taking into account that the sample represents 6% of the Slovenian population. In fact, the difference between the actual and estimated PIT is minor: the actual aggregate amount of PIT in 2004 was 0.5% higher compared with our simulation (1,596 million euros (Ministry of Finance, 2007) *vs.* the simulated1,588 million euros).

In the next step, the parameters of the PIT system from 2006 (PIT-2006) were built into the system to establish the year 2006 as the benchmark for the proposed tax changes. Finally, the parameters of the proposed tax changes – different scenarios – were built into the model and the results were compared with the PIT-2006. Selected results from the microsimulation, more precisely the net household income under different PIT scenarios, also provide an input for the macroeconomic recursive dynamic model.

2.2 The recursive dynamic computable general equilibrium model

The macroeconomic modelling platform of the Slovenian economy is represented by a dynamic multi-sectoral and multi-household computable general equilibrium model (CGE), based on a social accounting matrix (SAM) for the year 2004 (Bayar et al., 2006). The model 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 details 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.

[4] However, most microsimulation models are also static (Redmond, Sutherland and Wilson, 1998). In the case of Slovenia, the short time series of data and relative stability of the tax-benefit system in the last 15 years would hardly

Five household quintiles with respect to income are distinguished in the model. Each quintile receives a share of capital income, labour income, mixed income[5], 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 PIT. 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 (Geary, 1950; Stone, 1954). To evaluate the overall change in consumer welfare by quintile we use the equivalent variation[6] 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, of which each sector produces one or several types. Gross output for each sector is determined from a nested production structure. Producers are assumed to choose intermediate inputs and the mixed factor[7] 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[8].

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. The Armington (1969) assumption of limited substitution possibilities between domestically produced and imported goods is adopted in the model.

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

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even provide enough information to estimate taxpayers' responses to the tax-benefits changes.

[5] 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.

[6] 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 (Harrison and Kriström, 1999).

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

[8] 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, de Melo and Robinson, 1982).

rigidities. The investment is assumed to adjust to the available domestic and foreign savings. Government total expenditures are fixed as a share of GDP, whereas government deficit adjusts. The exchange rate is fixed, while the deficit of the current account adjusts.

The model 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 (Dixon and Rimmer, 2002). The model was built within the general algebraic modelling system (GAMS, 2006) and solved with an appropriate algorithm in annual steps.

3 TAX SCENARIOS

Five different tax scenarios were calculated and compared with the baseline scenario, i.e. tax system valid through 2006 (TAXES-2006). The main characteristics of the tax combinations which were simulated are presented in Table 1. In the last column, there are the actually accepted tax solutions (TAXES-2007) which were passed by the Slovenian Parliament in 2006 and have been effective since January 2007. Since the microsimulation and CGE models use data from 2004, the tax parameters are expressed in euros in 2004 prices.

Two of the scenarios (SC1 and SC2) represent the 'flat-tax' PIT system[9] since they employ a single marginal tax rate of 22% and 25%, while others retain tax schedules with two or more tax brackets. However, all of them include schedular 20% taxation of interest, capital gains and dividends. The scenarios also differ regarding the number of tax allowances and the actually accepted solution includes the same tax allowances as the 2006 system, with slightly modified values. Regarding CIT, the scenarios differ from the 2006 system in terms of the size of the statutory tax rate and tax

[9] It should be emphasised that the term flat-tax only refers to PIT and has no similarities with the broader concept of Hall and Rabushka (Hall and Rabushka, 1995), which is an expenditure tax connecting PIT and CIT.

allowances. The actually accepted solution thus reduces the statutory rate from 25% to 20%, besides reducing the tax allowances.

The assumptions regarding other elements do not change from one scenario to another; the rates of VAT remain constant at the existing 8.5% and 20%, while the rate of social security contributions remains at the 2006 level of 38.2%, the share of total government expenditures in GDP was assumed to be reduced by 2% by 2008 and by an additional 2% by 2012. Expenditures on research and development (R&D) and tertiary education were assumed to increase according to the EU Lisbon Strategy. The simulations were based on the assumption that transfers to households keep their existing growth (for pensions, maternity and sickness leave) or with the consumer price index (CPI) for other transfers (scholarship, housing subsidies, social assistance etc.).

Table 1 Parameters of the tax scenarios for simulations (in euros in 2004 prices)

	TAXES-2006	SC1	SC2	SC3	SC4	SC5	TAXES-2007
PIT							
PIT schedule:							
- number of tax brackets	5	1	1	2	3	3	3
- marginal tax rates (%)	16/33/37/41/50	22	25	15/25	15/25/35	16/28/39	16/27/41
- schedular taxation[1] (%)	20	20	20	20	20	20	20
PIT allowances:							
- general	2,460	3,053	4,071	3,053	3,053	2,732	2,665
- children:							
- 1st	1,974	1,974	1,974	1,974	1,974	1,974	1,966
- 2nd	2,146	2,146	2,146	2,146	2,146	2,146	2,138
- 3rd	2,861	2,861	2,861	2,861	2,861	2,861	3,565
- pensioner allowance[2] (%)	14.5	14.5	14.5	14.5	14.5	13.5	13.5
- seniority (65+ years)	1,144	0	0	0	0	0	1,147
- invalidity	14,305	14,305	14,305	14,305	14,305	14,305	14,250
- student work	4,988	0	0	0	0	2,732	2,665
- self-employed[3]	3,664	0	0	0	0	3,664	3,569
- pension insurance[4]	2,284	2,284	2,284	2,284	2,284	2,284	2,275
- for different purposes[5] (%)	2 / 4	0	0	0	0	0	0
PIT standardised cost:							
- contractual work (%)	10	10	10	10	10	10	10
- royalties (%)	10	10	10	10	10	10	10
- rents (%)	40	20	20	20	20	25	40
Payroll tax[6]	Abolished by 2009						
CIT							
- CIT rate (%)	25	22	25	25	25	23	20
- CIT allowances[7]	The same as 2006					Reduced	
VAT (%)	20/8.5						
Social security contributions (%)	38.2						

	TAXES-2006	SC1	SC2	SC3	SC4	SC5	TAXES-2007
Share of government spending in GDP	Reduced for 2% /4% by 2008/2012						
R&D (Lisbon strategy)	Growth of total factor productivity						
Indexation of transfers to households							
- pensions	With wages						
- maternity and sickness leave	With wages						

- other	With CPI
Transfers between Slovenian and EU budgets	According to GCA[8]
Budget deficit/surplus	Adjustable
Government subventions	Constant
Government final consumption	Adjustable

1 - schedular taxation refers to interest, dividends and capital gains.
2 - pensioner allowance is a tax credit at the level of 14.5% or 13.5% of an individual pension.
3 - self-employed journalists and cultural professionals.
4 - the allowance for additional (voluntary) pension insurance cannot be higher than 5.844% of an individual taxpayer's annual gross wage or cannot exceed the amount quoted in the table.
5 - the allowance for different purposes is defined as the sum of a taxpayer's expenses for selected purchases such as the acquisition of books or government securities. It cannot exceed 2% or 4% of an individual taxpayer's tax base.
6 - the law from 2005 has already gradually abolished payroll tax in three years by 2009. In different scenarios, a relevant (diminishing) annual rate of the tax was used.
7 - tax allowances at CIT mostly include allowances for R&D, additional (voluntary) pension insurance and the employment of selected categories of employees (disabled workers, apprentices, etc.). In the last two columns these allowances are further reduced.
8 - GCA-Government Consolidated Account, prepared by the Ministry of Finance.

Source: Zveza računovodij, finančnikov in revizorjev Slovenije (2007); Bayar et al. (2006).

Transfers between the Slovenian budget and the EU budget are taken into account using data from the general government consolidated accounts prepared by the Ministry of Finance. Finally, it was also assumed that government investments and subsidies remain constant at the level of the base year, 2004, while government final consumption is adjusted taking into account the assumed decrease of the share of total government expenditures in GDP.

4 RESULTS

4.1 Macroeconomic simulations

The main results of macroeconomic simulations are presented in Table 2, which includes comparisons of simulations with the baseline scenario (TAXES-2006). The latest is based on assumptions that there are no changes in the tax system from 2006, while the economy (all real variables and nominal incomes) grows at a steady rate of 4%. The parameters of other simulations (SC1-SC5) are already presented in Table 2, including the scenario TAXES-2007, which contains the parameters of the actually accepted tax reform.

Table 2 Results of the macroeconomic simulations

Macroeconomic aggregates – average 2007-25 (in %)	**TAXES-2006**	**SC1**	**SC2**	**SC3**	**SC4**	**SC5**	**TAXES-2007**
Growth rate of real GDP	4.00	5.06	5.06	5.05	5.05	5.06	5.06
Index (BASE=100)		126.5	126.5	126.3	126.3	126.5	126.5
Growth rate of private consumption	4.00	5.04	5.04	5.02	5.03	5.04	5.04
Index (BASE=100)		126.0	126.0	125.5	125.8	126.0	126.0
Growth rate of government consumption	4.00	4.15	4.15	4.18	4.17	4.14	4.14
Index (BASE=100)		103.8	103.8	104.5	104.3	103.5	103.5
Growth rate of investment	4.00	5.25	5.25	5.3	5.28	5.23	5.23
Index (BASE=100)		131.3	131.3	132.5	132.0	130.8	130.8
Growth rate of exports	4.00	5.36	5.36	5.32	5.34	5.38	5.38
Index (BASE=100)		134.0	134.0	133.0	133.5	134.5	134.5
Growth rate of imports	4.00	5.14	5.14	5.14	5.14	5.14	5.14
Index (BASE=100)		128.5	128.5	128.5	128.5	128.5	128.5
Unemployment rate in 2025 (in %)	10.71	3.29	3.35	3.44	3.42	3.33	3.33
Index (BASE=100)		30.7	31.3	32.1	31.9	31.1	31.1

Source: own calculations, CGE model.

The results shown in Table 2 reveal that the different scenarios do not differ from each other very much regarding the impact on the macroeconomic aggregates. However, from the individual taxpayer's point of view, the accepted PIT-2007, which is part of scenario TAXES-2007 changes

the income position of practically all households and individual taxpayers, as presented in Section 4.2, which focuses on the micro consequences of the examined PIT systems.

It is interesting to add that according to our simulations there will be a considerable decrease in the unemployment rate (see Table 2). This is due to significant job creation caused by strong expansion of the private sector (*cf.* Bayar *et al.*, 2006). The unemployment rate among unskilled workers would thus 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).

4.2 Microsimulations

In this section, static consequences of the different PIT scenarios are estimated at the household and individual levels[10]. The three different measures – Gini coefficient, squared coefficient of variation and the Atkinson index[11] – presented in Table 3 reveal that the overall inequality under all scenarios grew in comparison with the PIT-2006 system.[12]

Table 3 Income inequality measures, based on household equivalent disposable income, household level

Inequality measure	PIT-2006	PIT-SC1	PIT-SC2	PIT-SC3	PIT-SC4	PIT-SC5	PIT-2007
Gini	0.2730	0.2895	0.2896	0.2851	0.2876	0.2839	0.2785
Index (PIT-2006=100)		106.0	106.1	104.4	105.3	104.0	102.0
Atkinson $_{(\varepsilon = 2)}$	0.2523	0.2686	0.2686	0.2650	0.2689	0.2652	0.2594
Index (PIT-2006=100)		106.5	106.5	105.0	106.6	105.1	102.8
I_2	0.3024	0.3849	0.3852	0.3664	0.3688	0.3426	0.3210
Index (PIT-2006=100)		127.3	127.4	121.2	122.0	113.3	106.2

Source: own calculations, microsimulation model.

Additional results of the microsimulation at the household level are presented in Table 4. Individuals are aggregated into five quintile groups regarding household equivalent disposable

[10] The Ministry of Finance (2006) also estimated the consequences of the PIT reform, mostly at the level of individual taxpayers. In this paper a broader approach is chosen, also taking into account selected socio-economic elements and the household level.
[11] All three measures are calculated according to Cowel (1977).
[12] The dynamics of wage and income inequality as well as subjective economic well-being in Slovenia in the period after independence is analysed in Stanovnik and Verbič (2005) and Verbič and Stanovnik (2006).

income[13]. In the first column they are presented together, the second column includes individuals who were employed, the third are those employed at less than the average wage while the fourth column includes pensioners.

Table 4 Amount of PIT under different scenarios in comparison with PIT-2006 (PIT-2006=100), household level

PIT-SC1				
Quintile	**All**	**Employed**	**Employed with less than average wage**	**Pensioners**
1	101.4	101.5	101.8	114.8
2	104.9	104.7	108.8	120.6
3	103.6	103.4	109.5	123.0
4	94.0	93.8	104.6	98.9
5	71.9	71.9	92.5	72.2
All	**81.5**	**81.7**	**102.9**	**79.1**
PIT-SC2				
1	72.3	72.5	70.6	84.5
2	83.2	83.3	81.0	87.9
3	90.9	91.0	91.3	99.2
4	89.9	89.8	94.0	92.9
5	76.0	76.0	88.9	77.4
All	**80.4**	**80.6**	**89**	**80.4**
PIT-SC3				
1	73.4	72.8	72.3	94.6
2	76.0	75.8	75.1	87.7
3	77.8	77.7	77.8	86.7
4	77.0	77.1	78.0	71.0
5	70.1	70.6	76.1	60.5
All	**72.6**	**72.9**	**76.7**	**64.0**
PIT-SC4				
1	73.4	72.8	72.3	94.6
2	76	75.8	75.1	87.7
3	77.9	77.7	77.8	86.7
4	77.2	77.2	78.0	71.5
5	76.6	76.9	77.7	65.3
All	**76.8**	**77.0**	**77.2**	**67.9**
PIT-SC5				
1	88.4	87.9	88.2	107.3
2	88.4	88.3	89	101.1
3	87.3	87.2	88.9	94.5
4	85.1	84.9	85.8	88.3
5	89.0	88.9	85.6	90.3
All	**88.0**	**87.9**	**87.1**	**90.8**
PIT-2007				
1	88.3	87.9	88.1	93.0
2	88.3	88.1	89.0	100.5
3	87.0	86.9	88.8	93.3
4	84.7	84.6	85.5	86.5
5	90.8	90.8	85.8	90.7
All	**89.1**	**89.0**	**87.0**	**90.9**

[13] Household disposable income is calculated as the sum of net income subject to PIT and income not subject to PIT (social transfers). To calculate equivalent disposable income, the OECD's equivalence scale is used, which gives a weight of 1 for the first adult (over 16 years), a weight of 0.7 for the second and subsequent adult and a weight of 0.5 for any child.

As the results from Table 4 reveal, all the examined scenarios (PIT-SC1 to PIT-2007) lead to a substantial drop in government revenues compared with PIT-2006 – the relative decrease in revenues ranges between 10.9% (PIT-2007) and 27.4% (PIT-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 compared with the PIT-2006 tax code. The scenarios also differ regarding the relative taxation of income quintiles. For example, the lowest income quintile under PIT-SC1 would pay 1.4% more PIT compared with the PIT-2006 system. However, the actual reduction of government revenue and relative taxation of individuals from different income quintiles would be different due to economic growth, the changed pattern of income sources and demographic development that have occurred in the period since 2004 and that are not taken into account due to the static nature of the microsimulation model.

To obviate the need for a large volume of information, in the rest of this section we only compare PIT-2006 and PIT-2007. In Table 5, households are separated regarding the number of children, where a child is defined as a person below 18 or 26 years (if she is a full-time student).

Table 5 Distribution of the average household's after-tax income, by number of children, household level (in euros in 2004 prices)

Number of children	Share of households	PIT-2006	PIT-2007	Index (PIT-2006=100)
0	41.5%	16,840	17,151	101.8
1	28.5%	18,984	19,358	102.0
2	25.2%	19,873	20,238	101.8
3	4.0%	20,776	21,164	101.9
4	0.5%	23,584	24,108	102.2
5 or more	0.3%	23,747	24,267	102.2

Source: own calculations, microsimulation model.

The results in Table 5 show that the majority of households (41.5%) do not have children – pensioner households prevail here. Among the others, most of them have one child, while only 0.3% of households from the sample have five or more children. The data reveal that no one category of households is worse off (regardless of the number of children) and thus confirm the overall 'generosity' of the PIT reform as regards different subsets of taxpayers, which is confirmed by the rest of this section. The results presented in Table 6 suggest that the PIT-2007 reform increases after-tax income in all income quintiles (on average), which are better off under PIT-2007 compared with PIT-2006. The average after-tax income in the lowest quintile is thus 0.6% higher while in the top quintile it is 2.6% higher.

Table 6 Distribution of average annual after-tax income, by income quintiles, individual level (in euros in 2004 prices)

Quintile	PIT-2006	PIT-2007	Index (PIT-2006=100)
1.	4,288	4,313	100.6
2.	6,351	6,378	100.4
3.	8,104	8,258	101.9
4.	10,500	10,803	102.9
5.	18,088	18,557	102.6

Source: own calculations, microsimulation model.

Table 7 shows the distribution of after-tax income using the aggregation of taxpayers in five categories regarding their education. The results clearly confirm a correlation between the level of education and the level of income. More educated taxpayers report a substantially higher income; as the data in Table 7 show, the average annual income of a taxpayer with at least university education is 2.5 times higher than the income of a taxpayer who has completed primary school or lower education (16,792 euros *vs.* 6,476 euros). As for PIT-2007, it improves the income position of all education groups while it also provides a bigger income difference for more educated taxpayers.

Table 7 Distribution of average after-tax income, by education, individual level (in euros in 2004 prices)

Education	Share of taxpayers	PIT-2006	PIT-2007	Index (PIT-2006=100)
1.	15.6%	6,410	6,476	101.0
2.	23.0%	7,247	7,348	101.4
3.	33.2%	9,105	9,311	102.3
4.	8.8%	12,653	13,001	102.7
5.	12.4%	16,375	16,792	102.5

Note: Education is coded in the following manner:
1. primary school or less
2. lower cycle secondary school
3. upper cycle secondary school
4. non-university higher education
5. university education or more

Source: own calculations, microsimulation model.

As the above results show, the average changes in annual after-tax income at the taxpayer level are relatively modest and it is therefore no surprise that income inequality measures also reflect quite minor changes in the distribution of after tax-income. Finally, all three measures presented in Table 8 reveal that the overall inequality slightly increases between the PIT-2006 and PIT-2007 systems.

Table 8 Income inequality measures, based on individual after-tax income, individual level

Inequality measure	PIT-2006	PIT-2007	Index (PIT-2006=100)
Gini	0.2906	0.3010	103.6
I_2	0.4343	0.4482	103.2
Atkinson $_{(\varepsilon = 2)}$	0.2405	0.2466	102.5

Source: own calculations, microsimulation model.

5 CONCLUSIONS

In 2005 and 2006 a broad discussion emerged in Slovenia regarding the country's 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 with a single (and same) tax rate for PIT, CIT and VAT divided public opinion and was rejected in particular by labour unions.

However, the final 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 (for example, inheritance tax). To a large extent, the accepted solutions are based on estimations performed by the two simulation models: the microsimulation model and CGE model, which were constructed for the purposes of the reform. Several administrative databases were merged together to form a single data base, which contains a sample of 6% of the Slovenian population and represents a comprehensive foundation for the simulations. They resulted in a tax reform which is both politically acceptable and fiscally sustainable in the long term. Both models have thus proved to be useful and indispensable tools for the estimations of tax reform proposals and have fully met expectations.

In comparison with several CE countries, which have implemented quite radical tax reforms, Slovenia has once again decided on a gradual approach. As the results in the paper show, the consequences of the reform are relatively modest and give benefits to practically all taxpayers while they are detrimental to the government budget in the short run. However, by introducing several of these changes (reduction of the highest marginal PIT rate, reduction of statutory CIT rate and introduction of schedular taxation of capital income) Slovenia has merely taken a step closer to the common EU practice.

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