Macro-economic effects of the European environmental tax on Slovakia - preliminary results

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Capabilities and limitations of the economic modelling of European environmental tax as an EU own resource

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Computable General Equilibrium model on Slovakia

- Benčík (2001) – experimental model
- Brunovský, Páleník, Kotov a Mráz (2002) – new tax reform
- Páleník a Kotov (2003) – enlargement of EU
- Páleník, Ďuráš, Hrivnáková a Kvetan (2004) – new car factory
- Koronczi a Ezaki (2005) – World Bank
- Miťková (2007) – gradual expansion model
- Domonkos a Pániková (2009) – train transport
- Lichner (2013) – labour market
- Miklošovič (2014) – ex post analysis

Social accounting matrix

- Based on the year 2010
- Resources: Supply and use tables, Statistical office of SR, National bank of SR, Ministry of finance and others
- Expenditure of one subject subject generates equivalent revenue of the other subject, the principle of input-output tables
- Overall revenue of one subject is equal to overall expenditure of the same subject- Principles of National Account

Social accounting matrix

- Specification of essential SAM
  - 59 sectors by classification NACE 2
  - 6 institutional sectors

Primary and secondary generation and redistribution of income

- Aggregation of SAM
  - 1 sector
  - 4 institutional sectors (Household, Government, World, Enterprise)
  - 2 areas of World -> the rest of EU and the outside of EU
  - 3 types of capital input -> Human, Land and Capital
  - Several kinds of taxes

CGE model

- The macroeconomic model partially based on microeconomic theory
- Economic equilibrium -> exogenous shock -> New economic equilibrium
- *Ex ante* vs. *ex post* analyses
- Subjects behave according to production functions and utility functions
- The possibility of observing behavioral changes not only in the short and middle term but also in the long-term behavior (in a dynamic model only)

CGE model on IER SAS

- Recursive dynamic model
- The model simultaneusly calculates the economic equilibrium in demand and supply
- Model is applicable to any:
  - number of production sectors
  - number and structure of households
  - number and structure of enterprises
- The category of foreign countries is divided between the rest of EU and the outside of EU
- The model includes a number of production factors such as labor, land and capital, on top of that disaggregate production factors to more types
- Model includes demographic aspect of population (for the need of simulated shock)

CGE model on IER SAS

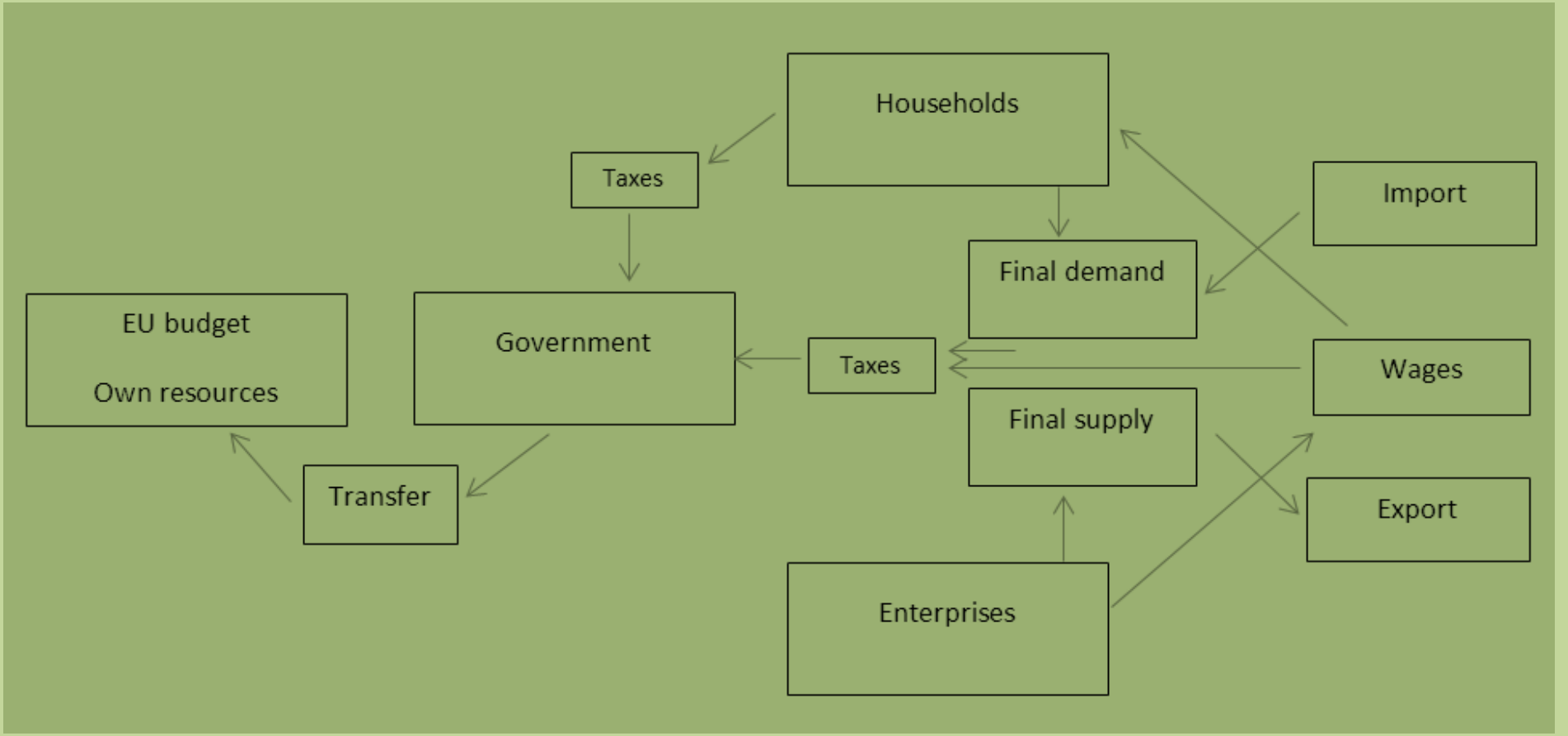
- The production is modelled with a nested CES production function, using capital, labour, land and intermediate goods
- Taxes in the model: import tax, export tax, tax on other taxes and subsidies on products, value added tax, sales tax, direct taxes on production = other taxes on production, subsidies on production, direct taxes on factors of production, direct taxes for households and enterprises
- Households decide their demand using a nested extended Stone Geary utility function
- Labour is immobile acros borders
- Model uses different market clearing mechanisms

Exogenous shock

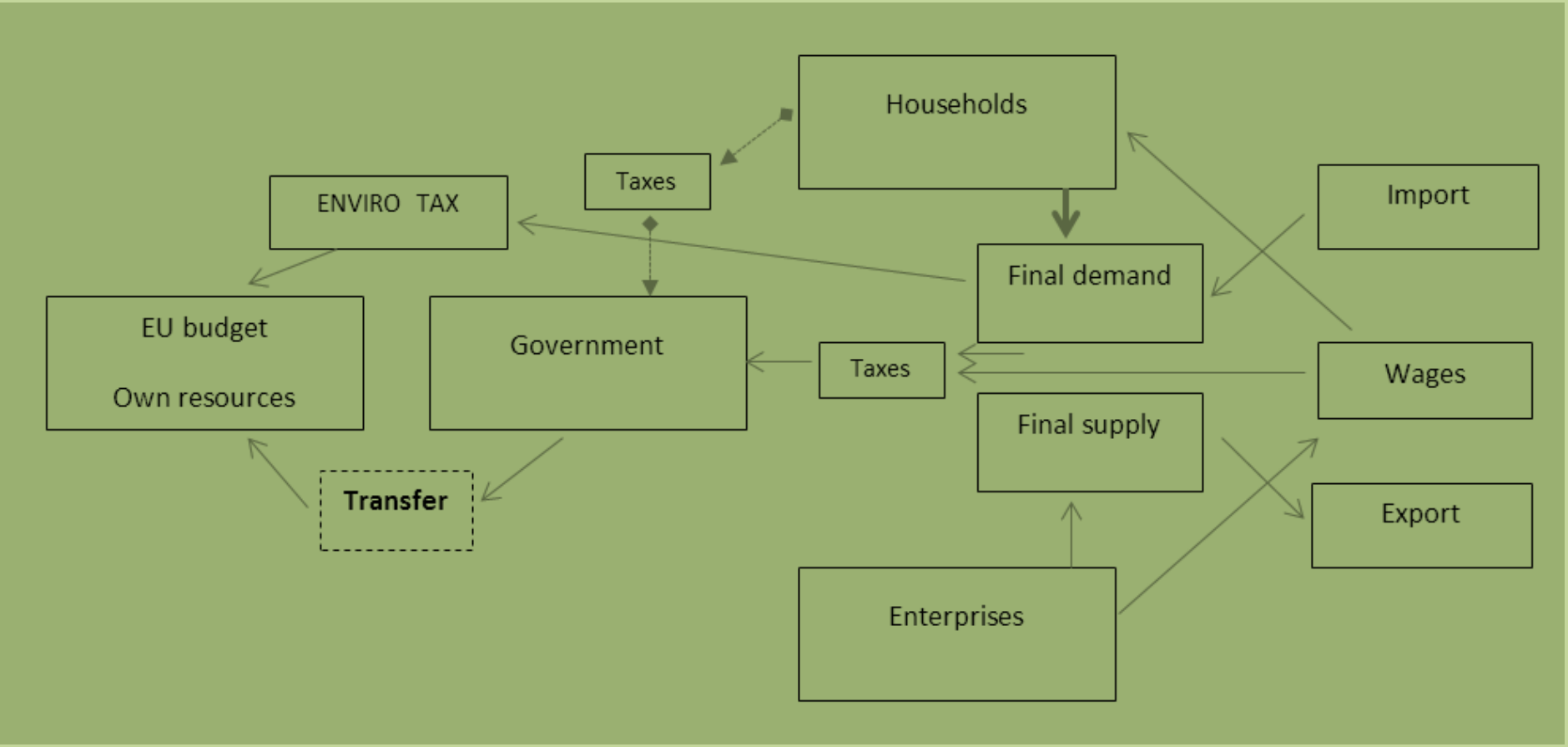
- Baseline scenario (**B**) + 4 alternative scenarios
- The introduction of Enviro tax of 1% of GDP* and the reduction in government transfers to the EU by 1% of GDP in all alternative scenarios
- **H** -> Reduction of wage tax by 1% of GDP, the benefit to **households** (wages unchanged)
  - Only Slovakia
- **H+EU** -> Reduction of wage tax by 1% of GDP, benefit to **households** (wages unchanged)
  - Slovakia and the rest of the **EU**
- **E** -> Reduction of wage tax by 1% of GDP, benefit to **enterprise**s (wages reduced by 1% of GDP)
  - Only Slovakia
- **E+EU** ->Reduction of wage tax by 1% of GDP, benefit to **enterprises** (wages reduced by 1% of GDP)
  - Slovakia and the rest of the **EU**

*(659 million of euro in Slovakia,2010)

Baseline scenario



Scenario H



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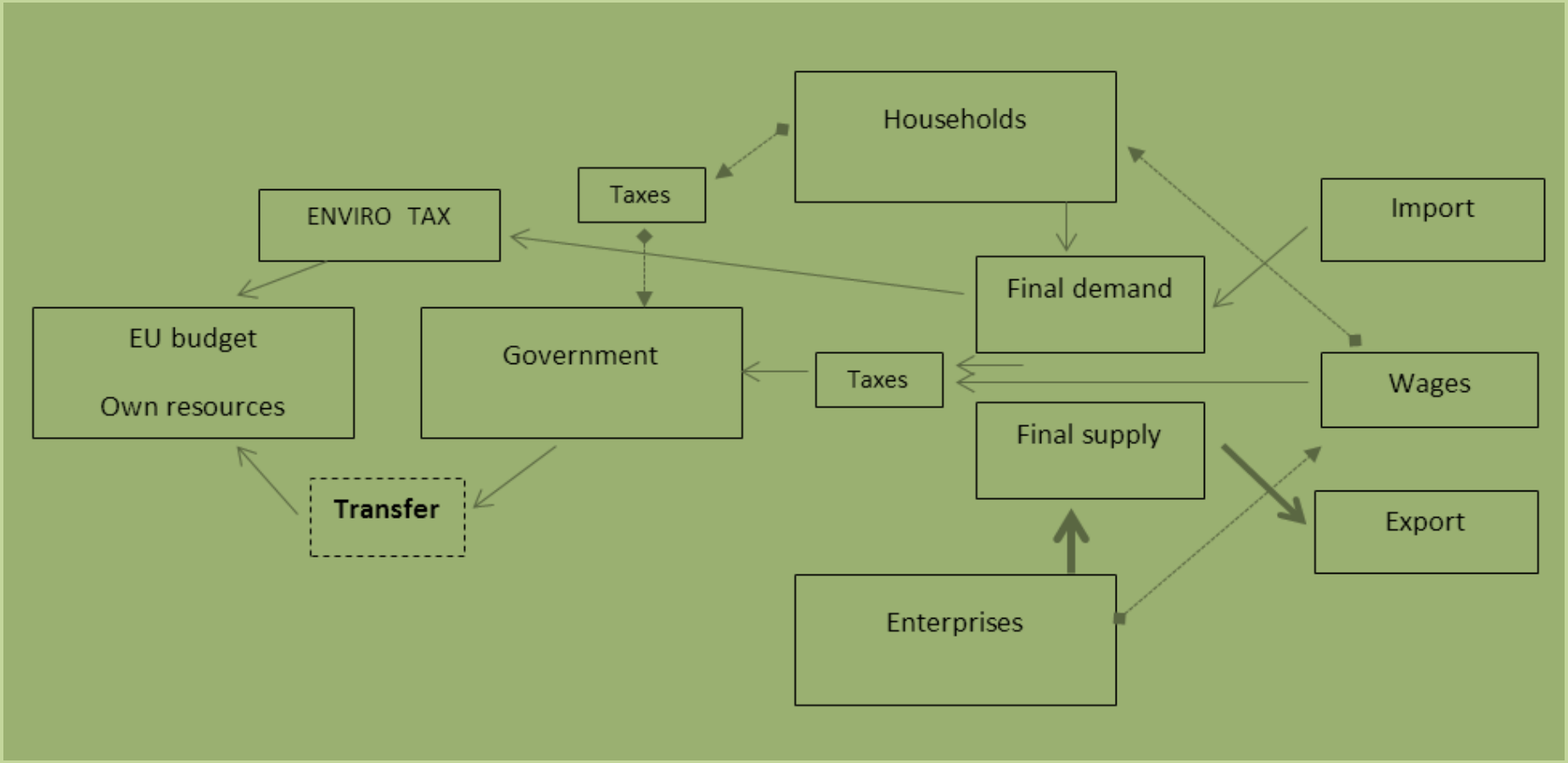
Scenario E



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Results

Results of scenarios, mil. EUR, *qty of people (Slovakia 2010)

	B	H	H+EU	E	E+EU
Gross domestic product	65 897	66 705	66 774	68 468	68 323
Consumption of households	37 142	38 208	38 278	39 048	38 905
Export to EU	44 804	45 396	45 476	46 467	46 302
Export to ROW	8 155	8 262	8 277	8 457	8 427
Import from EU	39 966	40 715	40 741	40 996	40 942
Import from ROW	13 290	13 540	13 574	13 633	13 564
Netto export EU	4 838	4 681	4 735	5 471	5 360
Netto export ROW	-5 136	-5 277	-5 296	-5 176	-5 137
Intermediate consumption	101 126	102 842	103 075	104 101	103 627
Domestic production	164 622	167 105	167 442	170 097	169 408
Income of households	42 858	44 089	44 169	45 058	44 893
Employment*	2 316 255	2 350 304	2 354 927	2 466 809	2 457 059

Results

Results of scenarios against B, mil. EUR, people

*absolute change against a basic scenario B

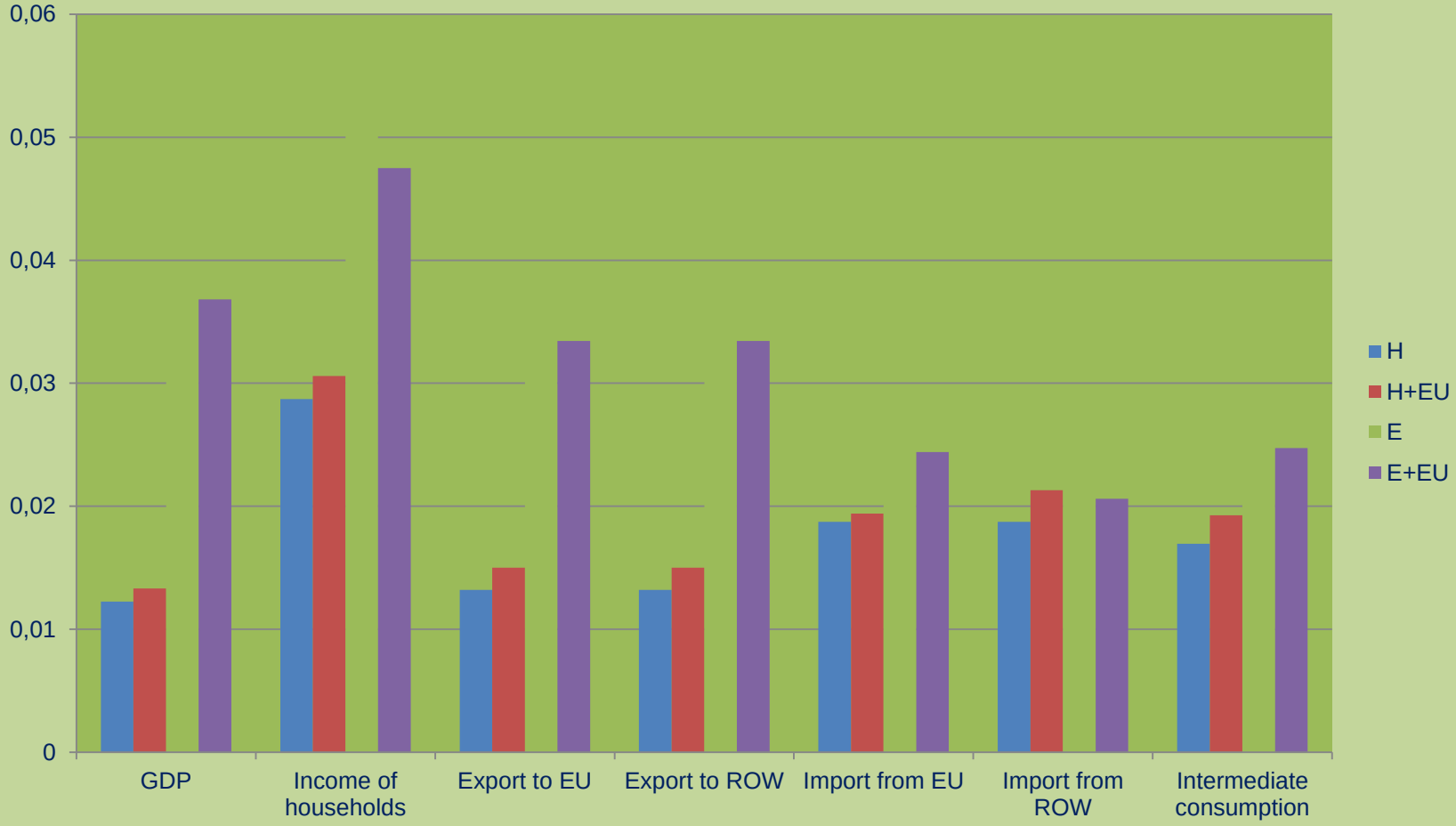
	H*	H+EU*	E*	E+EU*
Gross domestic product	808	877	2 571	2 426
Consumption of households	1 066	1 136	1 907	1 764
Export to EU	592	672	1 663	1 498
Export to ROW	108	122	303	273
Import from EU	749	776	1 030	976
Import from ROW	249	283	343	274
Netto export EU	-157	-104	633	522
Netto export ROW	-141	-161	-40	-1
Intermediate consumption	1 715	1 949	2 975	2 501
Domestic production	2 483	2 820	5 475	4 786
Income of households	1 231	1 311	2 200	2 035
Employment qty of people (SVK 2010)	34 048	38 671	150 554	140 804

Results

Results of scenarios compare B, % (SVK 2010)
*relative change against a basic scenario B (in %)

	H*	H+EU*	E*	E+EU*
Gross domestic product	1,2%	1,3%	3,9%	3,7%
Consumption of households	2,9%	3,1%	5,1%	4,7%
Export to EU	1,3%	1,5%	3,7%	3,3%
Export to ROW	1,3%	1,5%	3,7%	3,3%
Import from EU	1,9%	1,9%	2,6%	2,4%
Import from ROW	1,9%	2,1%	2,6%	2,1%
Netto export EU	-3,3%	-2,1%	13,1%	10,8%
Netto export ROW	2,8%	3,1%	0,8%	0,0%
Intermediate consumption	1,7%	1,9%	2,9%	2,5%
Domestic production	1,5%	1,7%	3,3%	2,9%
Income of households	2,9%	3,1%	5,1%	4,7%
Employment	1,5%	1,7%	6,5%	6,1%

Results compare with B scenario



Results and conclusions

- The results are the same as expected for small and open economy
- Positive aspects on GDP (between 1.2% to 3.9%) and the income of households (between 2.9% to 5.1%)
- Number of employees increases from between 30 thousand (1,5% negative scenario) to 150 thousand (6,5% positive scenario)

Results and conclusions

- The introduction of the environmental tax as the own resource of the EU while reducing taxes on labor by the same amount (1% of GDP)
- Calculated by using the CGE model of medium-term* possitive effects on the Slovak economy
- Approximate annual effects range:
- Increased GDP growth between 0.2 to 0.6 percentage points
- Additional household income growth between 0.6 to 1.0 percent (growth for the benefit of households)
- Additional employment growth between 0.3 to 1.2 percent

* 5 years

Thank you for attention

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