

SUST-RUS

РЕЗУЛЬТАТЫ, ПОЛУЧЕННЫЕ ИЗ МОДЕЛИ УСТОЙЧИВОГО РАЗВИТИЯ РФ

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“Моделирование устойчивого развития...”

- ... чтобы понять механизмы, стоящие за сменой политики
- ... чтобы улучшить последовательность политики
- ... чтобы сравнить альтернативы
- ... чтобы увидеть взаимосвязь целей политики
- ... чтобы развить экономическую интуицию

Не подменять реальность как окончательный критерий истины!

Не провозглашать точных и окончательных прогнозов!

SUSTRUS

RESULTS FROM A SUSTAINABILITY MODEL FOR RUSSIA

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Overview

- Sustainable Russia or SUSTRUS
- Overview of project results
- Conclusions

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The SUSTRUS project

- **Goal:** Development of a tool for sustainability assessment in Russia
- **Partners:** CEFIR, Ural State University, Voronezh State University, Far Eastern Centre for economic development, Institute for the Economy in Transition, ZEW
- **Time & funding:** 3 years, EU DG Research grant
- **Expected result (s):**
 - Development of a regional computable general equilibrium model that can be used for integrated analysis of current sustainability policy in Russia
 - Database on economy, society and environment of Russia
 - Results of current policy analyzed with the model

“Modeling sustainability...”

- ... to understand the mechanisms behind a change in policies
- ... to support changes in policy
- ... to check alternatives
- ... to see the dependency between policy objectives
- ... to develop economic intuition

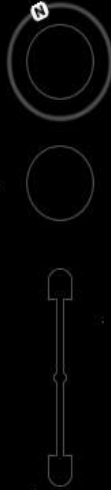
Not to have an exact representation of reality!

Not to make a perfect prognosis of the future!

Sustainable Russia

| Dimension | Advantages to sustainability | Threats to sustainability |
|---|---|-----------------------------------|
| Energy / Environment | Abundant natural resources | Low energy efficiency |
| Demographics / Social development | Highly educated labour force | Unfavorable demographic situation |
| Institutions / History | Improvements in institutional development | Inheritance of Soviet regime |
| Economic development / Social cohesion | High growth potential | Increasing income inequality |
| Economic development / International market | Diversification of economy | Export dependency |

In general, there is no specific model, which fits all requirements for comprehensive *SIA*, but rather a package of models or methods depending on the policy measure or issue to be assessed and the availability of data (Böhringer C., Löschel, 2006)



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55°15'21.79"N 65°37'36.47"E verh. 162 m

©2009 Google

Ooghoogte 11265.87 km

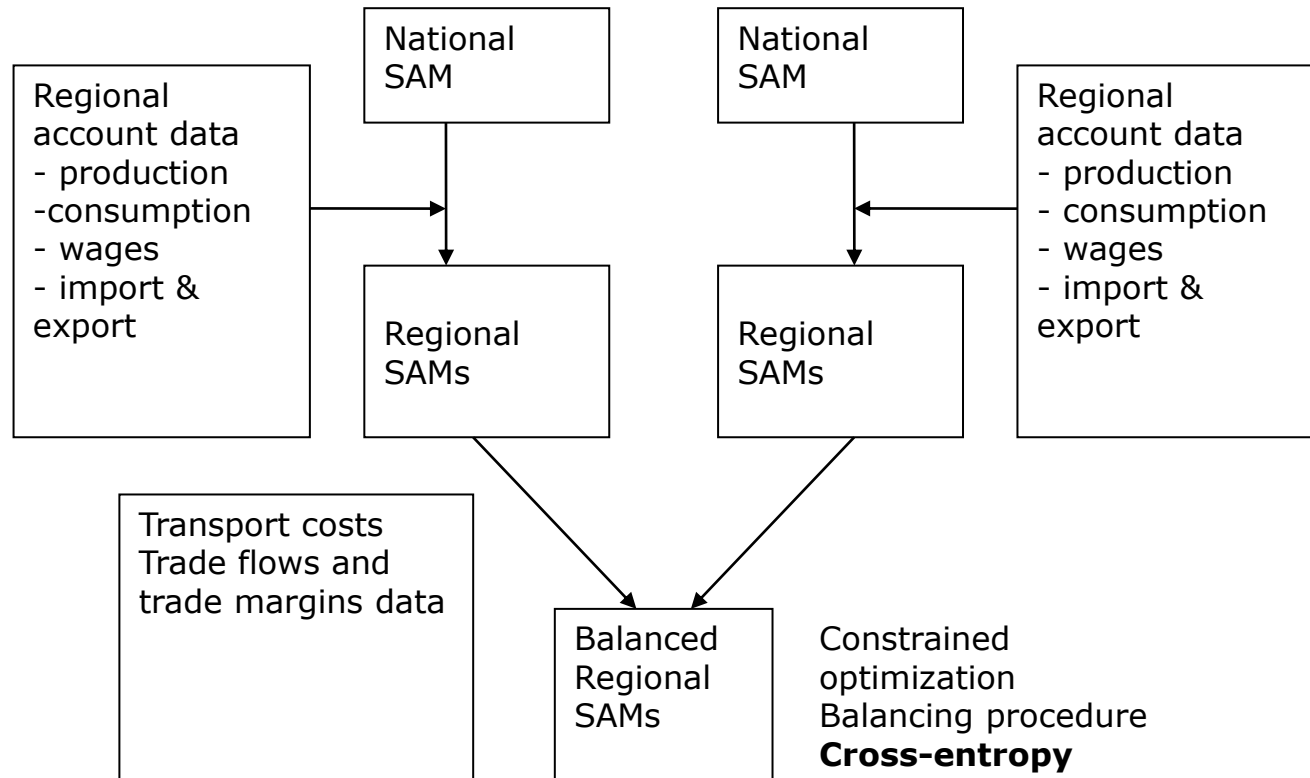
“Modelling... the SUSTRUS way”

| Dimension | Characteristics |
|--------------------------|---|
| Production sector | 32 sectors based on NACE classification |
| Households | Low, middle and high incomes |
| Regions | Russian Federations (7 regions) |
| Foreign sector | Disaggregated results by country |
| Transport & trade sector | Interregional and international transport costs and margins |
| Market structure | Allows for both perfect competition and imperfect competition |
| Government | Federal versus regional government |
| Model structure | Based mainly on RAEM model and GEM-E-3 |
| Dynamics | Static and dynamic version of the model |

Model database

| Data | Source |
|-------------------------------|------------------------------------|
| Input-Output table | Based on GTAP recalibrated (CEFIR) |
| Regional production by sector | Goskomstat / Rosstat |
| Interregional trade flows | CEFIR calculations |
| Trade margins on products | EXIOPOLL database (TNO) |
| Labour market / social data | ILO database / RLMS survey |
| International trade | GTAP 7 |
| National account data | Russian central bank & Goskomstat |

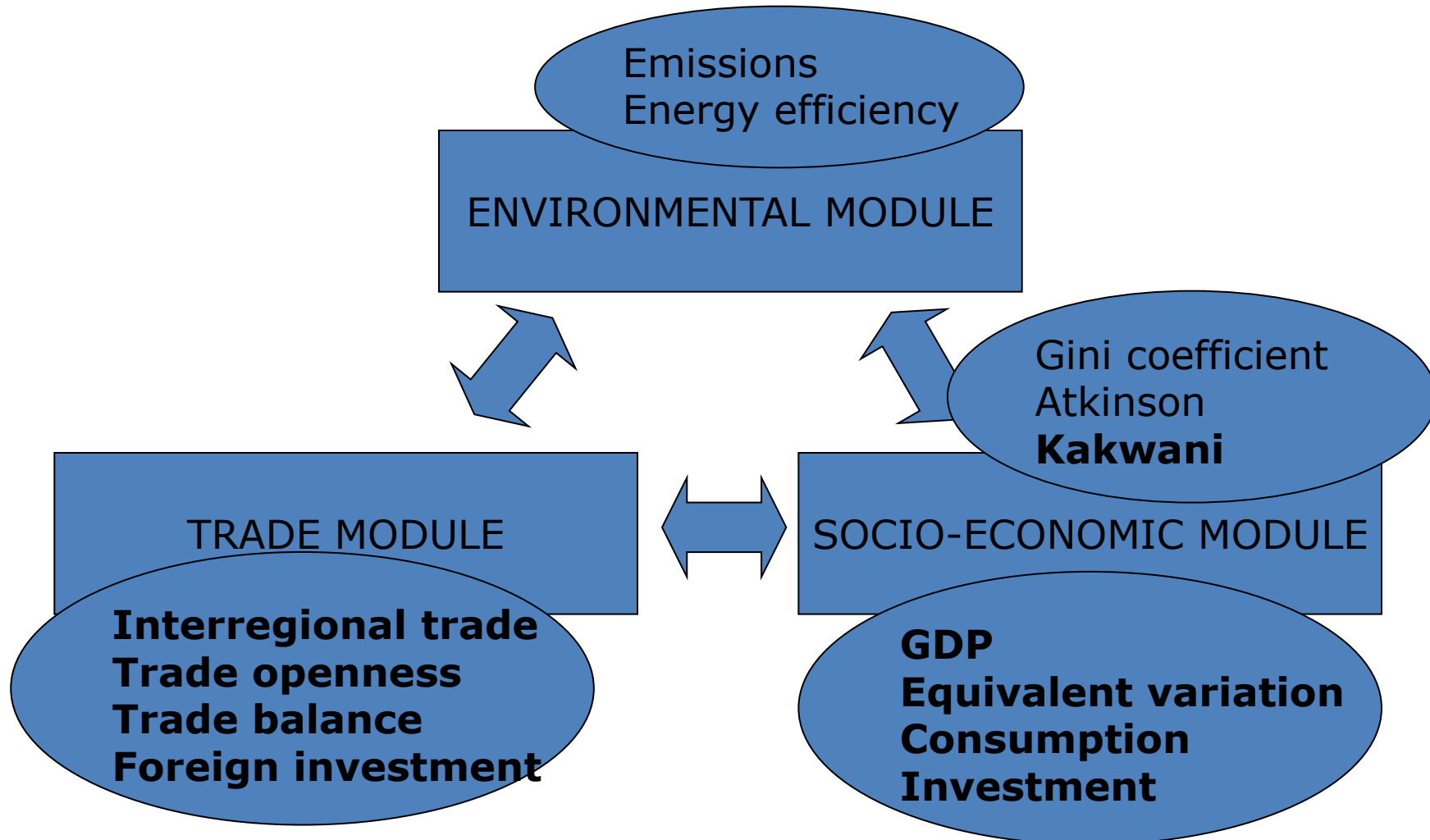
Calibration



$$\nabla = \sum_i p_i \cdot \log \frac{p_i}{g_i}$$

Consistency check = Are trade flows and calculated margins correct and consistent with historical data

Interrelated objectives



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Application 1: Environment

| Topic | Environmental concerns |
|------------------|---|
| Policy relevance | ETS accession Russia Increasing energy efficiency in Russia Economic diversification |
| Simulation | Emission tax of 38 rubles (+- 1 euro) / ton on carbon dioxide Static run |
| Assumptions | Government saves tax revenues Monopolistic competition Flexible foreign savings |
| Impacts | Reduction in energy consumption Reduction in production (GDP) Welfare effect Secondary effects on inequality |

| ENVIRONMENT | % |
|---------------|-------|
| CO2 emissions | -4.56 |
| Electricity | -0.65 |
| Fossil fuels | -0.89 |
| NOX emissions | -6.14 |
| PM emissions | -4.46 |
| SOX emissions | -3.66 |

| ECONOMY | % |
|----------------|-------|
| GDP Capita | -0.23 |
| Investment | 0.71 |
| Public Savings | 1.05 |
| Tax revenues | 0.58 |
| | |
| TRADE | |
| Trade Balance | 0.40 |
| Foreign Invest | 0.23 |
| Trade Integr | -0.09 |
| Trade Open | 0.13 |

| SOCIAL | % |
|--------------|-------|
| Unemployment | 0.63 |
| | |
| Welfare | -0.17 |
| | |
| Welfare QL | -0.19 |
| | |
| Welfare QM | -0.18 |
| | |
| Welfare QH | -0.17 |

| | Welfare | GDP | Tax revenues | CO2 | Shadow price CO2 (rubles/ ton) | |
|---------------|-------------------------|-------------------------|-------------------------|-------------------|--------------------------------|------------|
| <i>Unit</i> | <i>(billion rubles)</i> | <i>(billion rubles)</i> | <i>(billion rubles)</i> | <i>(Mega ton)</i> | <i>Welfare</i> | <i>GDP</i> |
| Totals | -32.76 | -60.68 | 34.85 | -76.48 | 428.37 | 793.35 |

Application 2: Social

| Topic | Social indicators |
|------------------|---|
| Policy relevance | Taxation and redistribution of income Test of social indicators |
| Simulation | Differential taxation of low, medium and high income households 10% increase in tax rate of low, medium and high income households |
| Assumptions | Government saves tax income Adjustment in foreign savings to balance international market |
| Impacts | Inequality indices react to progressive or regressive taxation |

| SOCIAL (% change) | Low | Medium | High |
|--------------------------|------------|---------------|-------------|
| Atkinson | 3.09 | 0.63 | -4.02 |
| Consumption budget | -0.33 | -0.65 | -1.51 |
| Gini | 0.00 | -0.02 | -0.06 |
| Kakwani | -110.91 | -61.91 | 177.28 |
| Poverty Intensity | -0.01 | -0.02 | -0.05 |
| Welfare | -0.21 | -0.42 | -0.95 |
| Welfare QL | -1.69 | 0.02 | 0.04 |
| Welfare QM | 0.01 | -1.69 | 0.05 |
| Welfare QH | 0.01 | 0.03 | -1.59 |

| ECONOMY (% change) | Low | Medium | High |
|---------------------------|------------|---------------|-------------|
| GDPcapitaReal | -0.04 | -0.08 | -0.17 |
| Herfindahl | -0.01 | -0.01 | -0.04 |
| Investment | -0.10 | -0.16 | -0.29 |
| Price Index | -0.07 | -0.14 | -0.33 |
| Public Savings | 0.04 | 0.08 | 0.17 |
| Tax Revenues | 0.40 | 0.79 | 1.85 |
| TRADE (% change) | | | |
| Foreign Invest | 0.04 | 0.08 | 0.17 |
| Current Account | 0.37 | 1.02 | 1.22 |
| Regional trade | -0.06 | -0.10 | -0.18 |
| Trade Openness | -0.02 | -0.08 | -0.02 |

Application 3: WTO accession

| Topic | International market |
|------------------|--|
| Policy relevance | WTO accession Russian Federation |
| Simulation | Introduction of tariff cuts on import tax Reform of FDI in service sector 2012 (short term) 2015 (long term) |
| Assumptions | Government reduces consumption to balance budget International closure via foreign savings adjustment Capital mobility between regions/sectors |
| Impacts | Reduction in real market prices Domestic investment and output adjustment Secondary effects on inequality |

Tariff reform?

| | Pre-WTO | WTO |
|----------------------------------|----------------|------------|
| Agriculture | 13.2 | 10.8 |
| Food products | 15 | 12 |
| Textiles and textile products | 9.5 | 7.3 |
| Leather and leather products | 9.5 | 7.3 |
| Wood and paper products | 13.4 | 8 |
| Petrol | 5 | 5 |
| Chemicals | 6.5 | 5.2 |
| Rubber and plastics | 15 | 15 |
| Non-metallic minerals | 9.5 | 7.3 |
| Basic metals | 9.5 | 7.3 |
| Machinery | 8.4 | 6.2 |
| Electrical and optical equipment | 8.4 | 6.2 |
| Transport equipment | 15.5 | 12 |
| Manufacturing n.e.c. | 9.5 | 7.3 |

+Service liberalization:
-> 10% decrease in fixed cost for foreign establishment

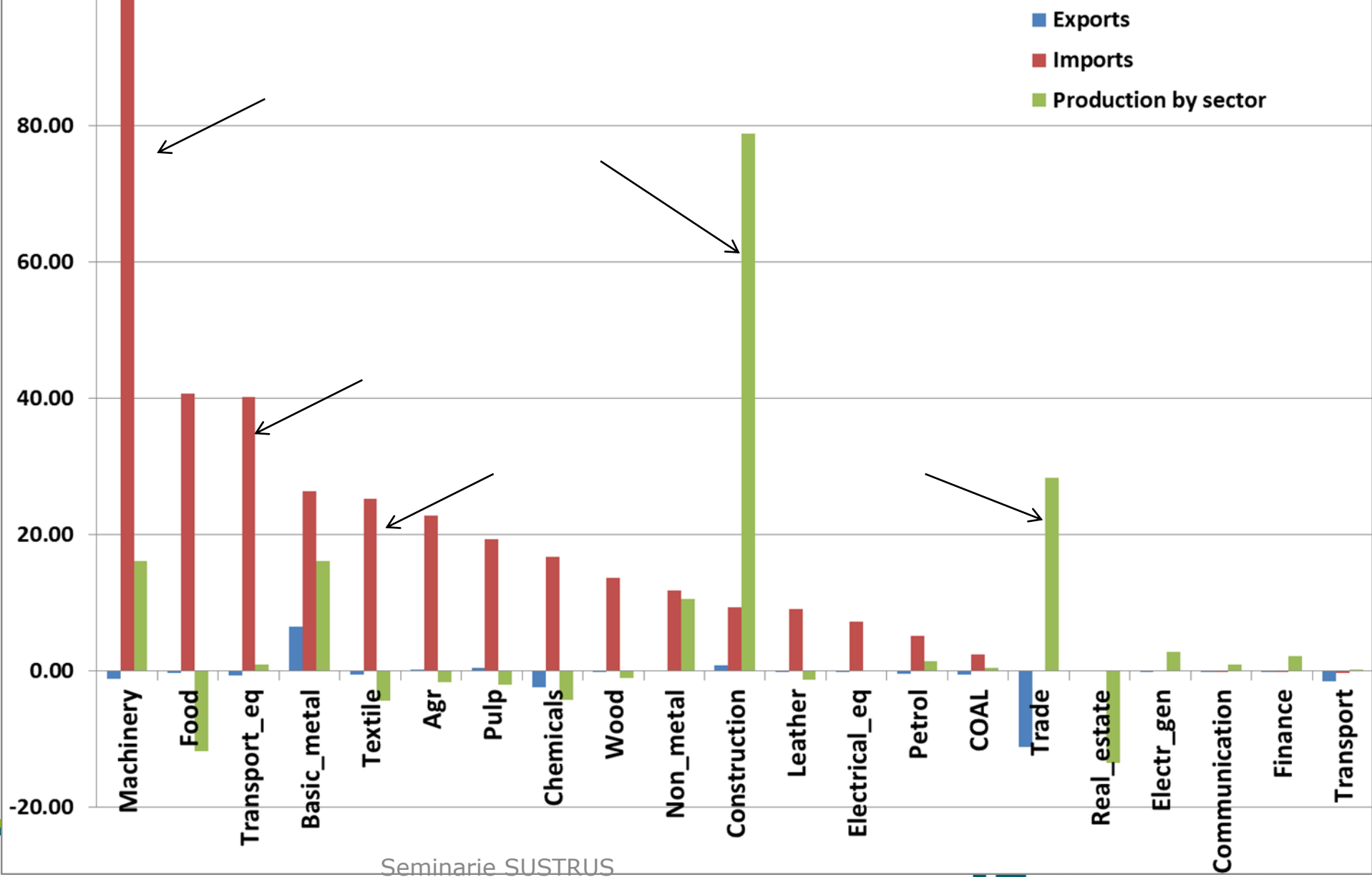
(ad valorem tax rates : source WTO 2011)

Main effects

| | Scenario | 2012 | 2015 |
|---------------|----------------|---------|---------|
| Welfare | Tariff reform | 0.41% | 0.96% |
| | Service reform | 0.80% | 1.38% |
| GDP | Tariff reform | -0.11% | 0.75% |
| | Service reform | -0.12% | 0.83% |
| Tax revenues | Tariff reform | -1.10% | -0.73% |
| | Service reform | -1.11% | -0.05% |
| Trade Balance | Tariff reform | -11.26% | -10.58% |
| | Service reform | -9.38% | -12.69% |

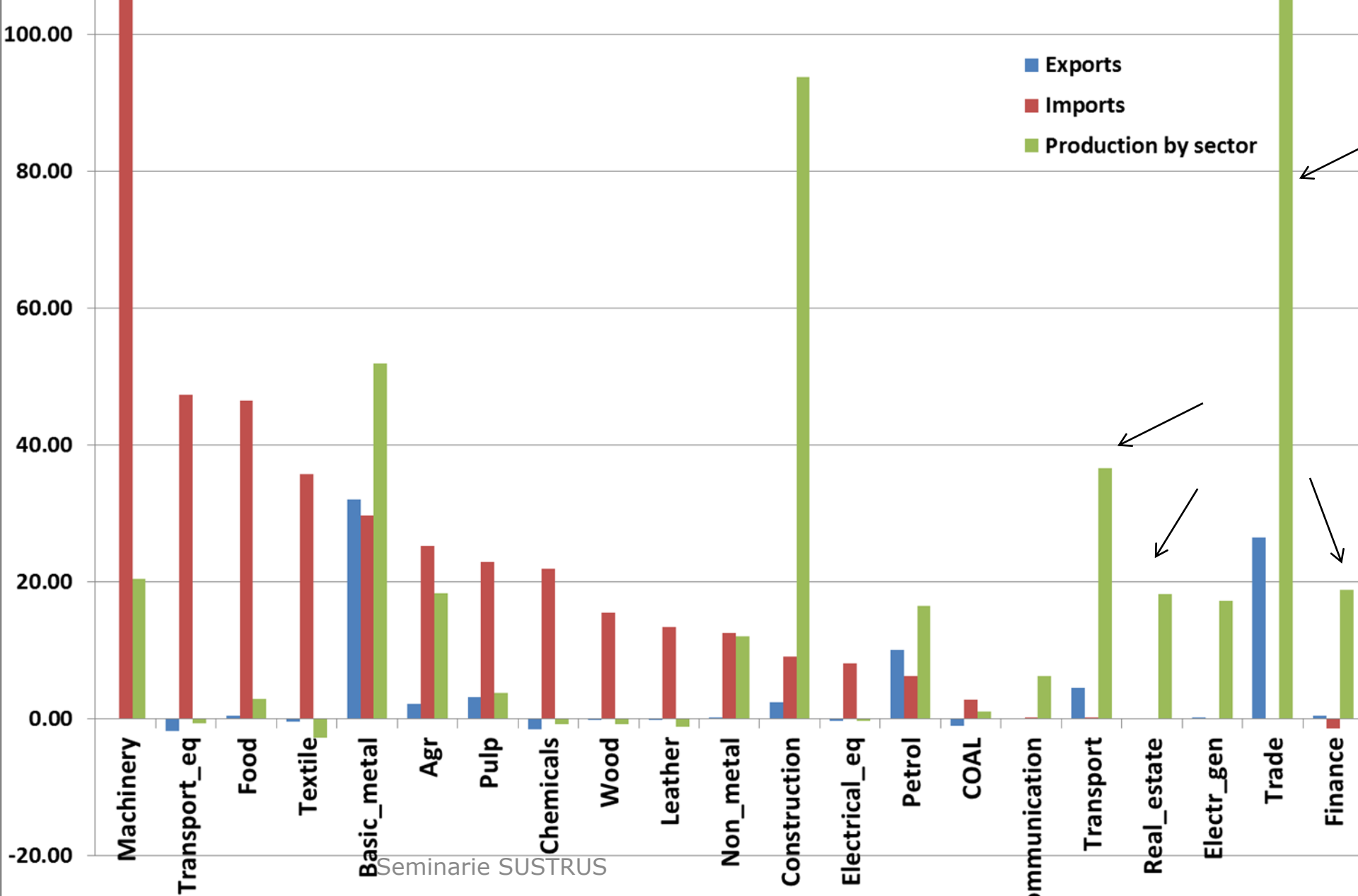
Import / export and output 2012

In absolute values



Import / export and output 2015

In absolute values

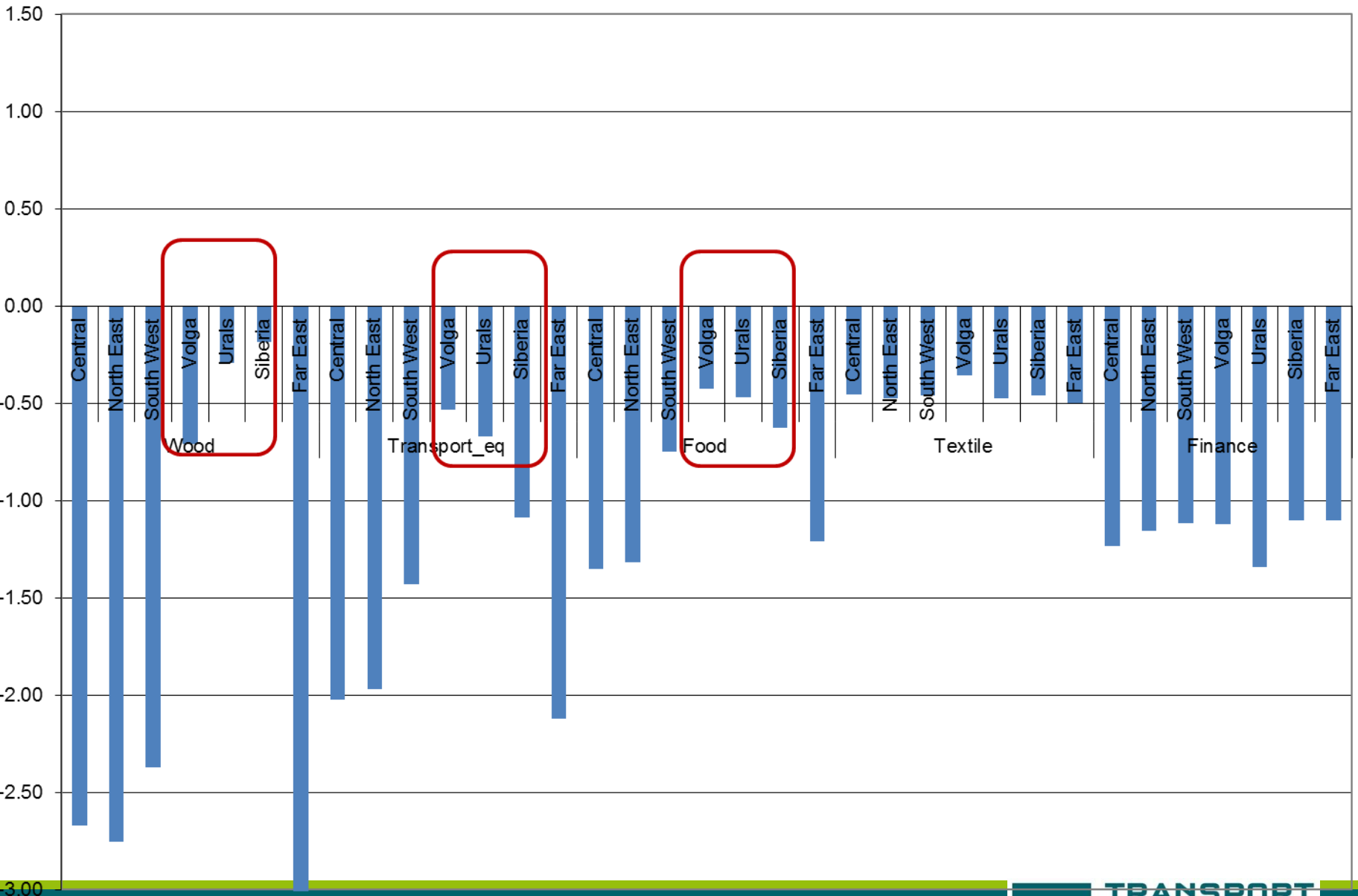


Inequality?

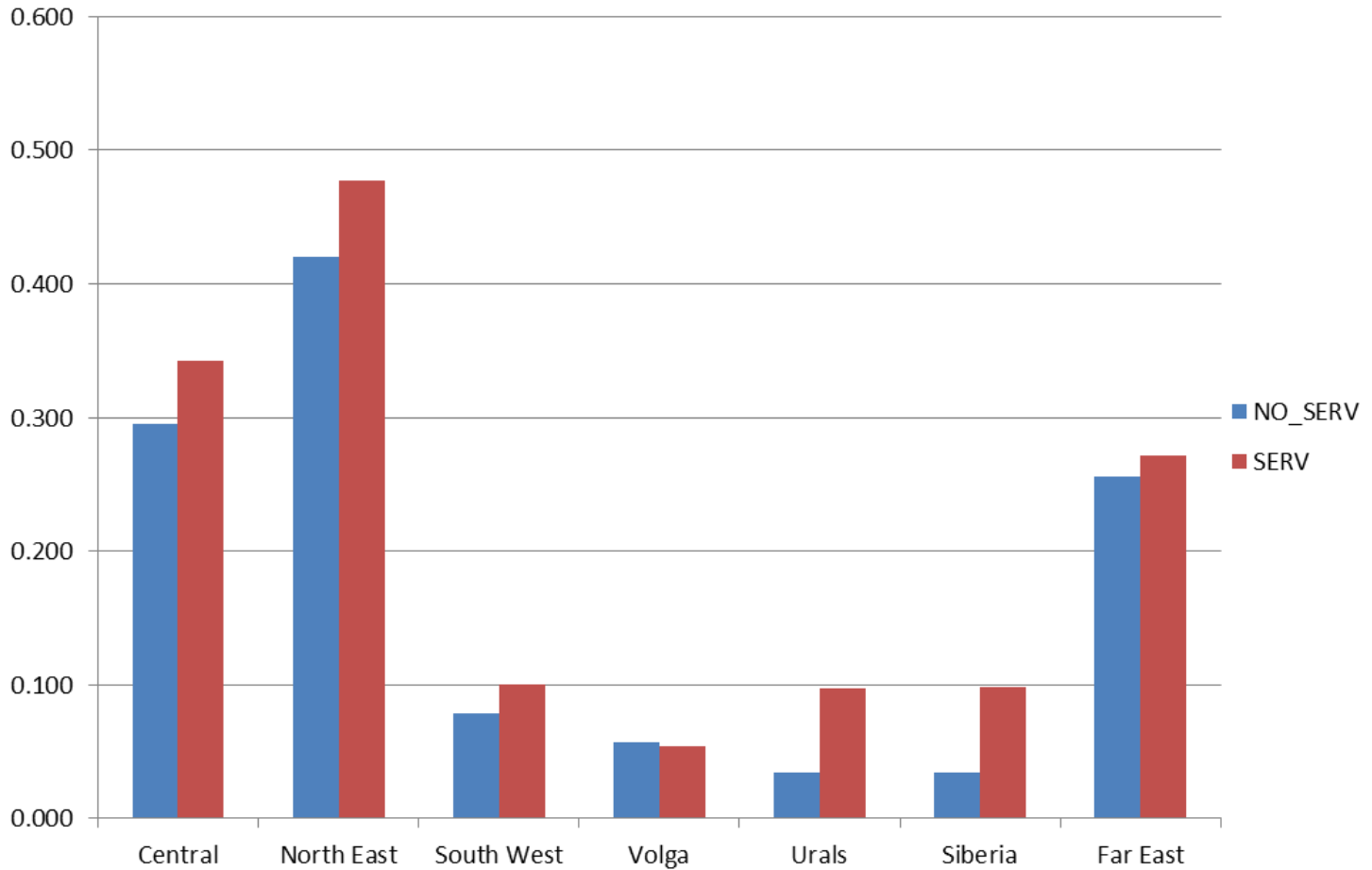
| 2012 | SERVICE REFORM | |
|-----------|----------------|--------|
| | WITHOUT | WITH |
| Welfare | 0.416% | 0.809% |
| WelfareQL | 0.480% | 0.793% |
| WelfareQM | 0.447% | 0.808% |
| WelfareQH | 0.389% | 0.814% |

| 2015 | SERVICE REFORM | |
|-----------------------|----------------|--------------|
| | WITHOUT | WITH |
| Welfare | 0.96% | 1.41% |
| WelfareQL | 0.82% | 1.17% |
| WelfareQM | 0.94% | 1.35% |
| WelfareQH | 1.00% | 1.48% |
| <i>Atkinson index</i> | 1.35% | 1.73% |
| <i>Gini indicator</i> | 0.13% | 0.14% |

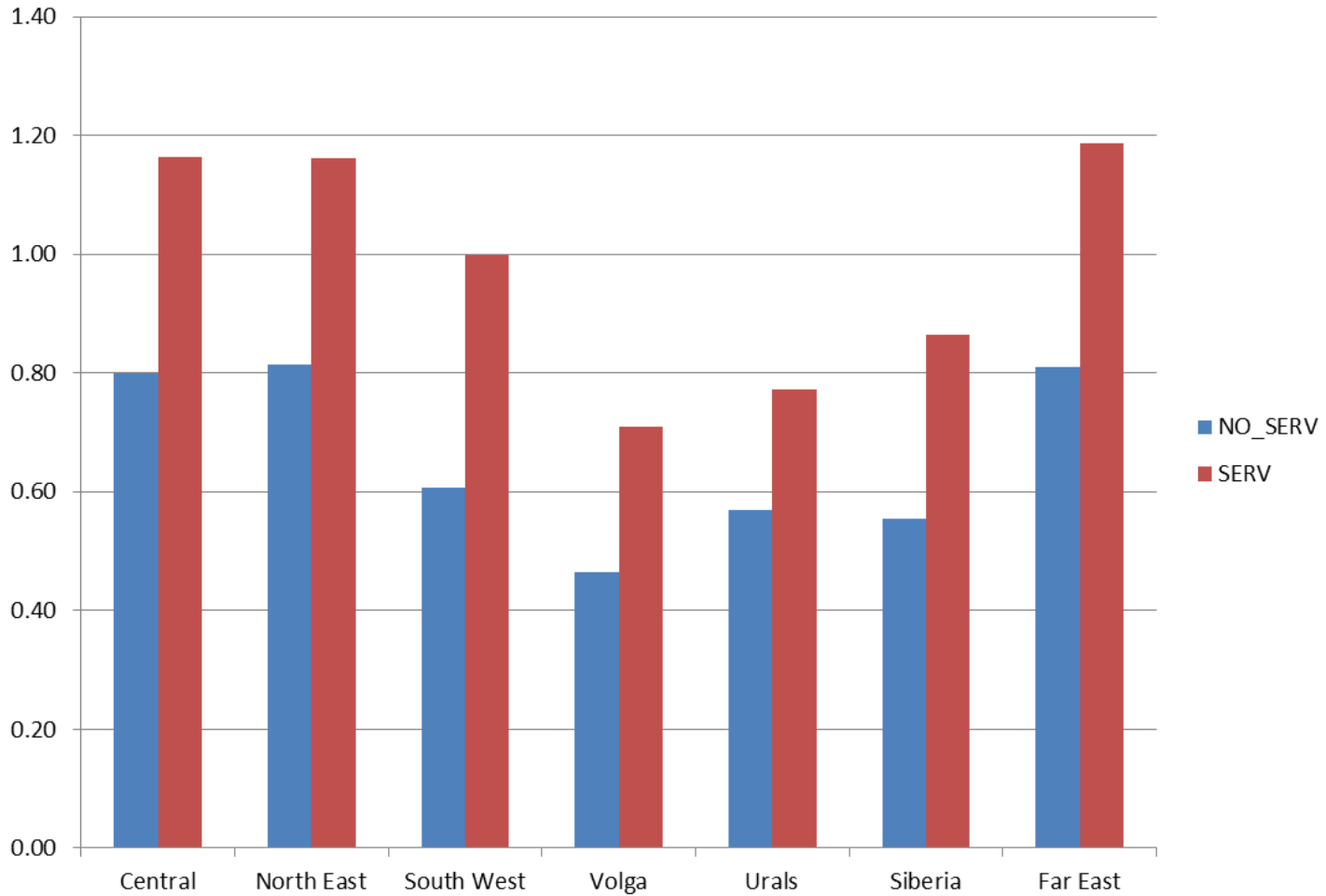
Regional price changes after WTO with service reform



Regional welfare effect 2012



Regional welfare effect 2015



Conclusions

- SUSTRUS is a novel general equilibrium model that allows for a balanced sustainability impact analysis
- Tests with the environmental model show that emissions of carbon dioxide and other pollutants can be reduced at relatively low cost and with the additional benefit of tax revenues
- As far as taxation and redistribution are issues, we stress the importance of transfers and the recycling of tax revenues to measure welfare effects
- A simulation of the WTO accession shows that the current reform leads to a modest improvement in welfare and output adjustment on long term.
- Welfare effects of WTO accession are dependent on the accessibility of the region. Central, North West and Far East region have the largest benefits

**Thank you
For your attention**