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# Bilateral trade elasticities for Russia

## An Inforum-type analysis

R. Bardazzi • – L. Ghezzi • •

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# Main features of Inforum-BTM:

- Bilateral trade flows
- Sector disaggregation of flows
- Endogenous sectoral competitiveness
- Econometrically estimated equations
- Tool for long-term forecasting and macro-policies evaluation
- Global coverage of world trade

**Bardazzi R., L.Ghezzi (2018), "Trade, competitiveness and investment: an empirical assessment", *Economic Systems Research*, 30**



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# **Bilateral trade elasticities for Россия**

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# Main contribution of this presentation:

We use the bilateral trade model in order to:

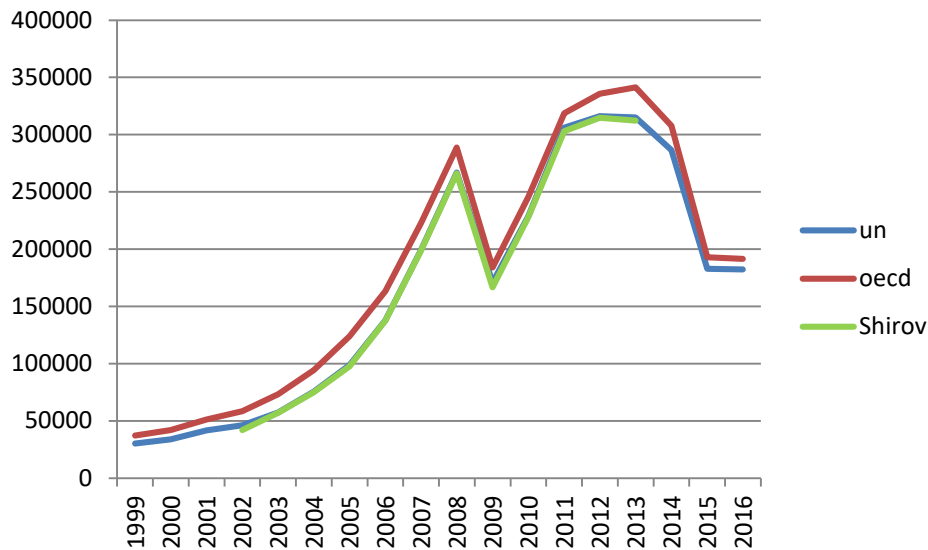
- describe the bilateral external relationships of Russia
- estimate price and non-price elasticities of competitors on the Russian market
- estimate competitiveness of the Russian products in the Chinese and Italian oil markets

**Bardazzi R., L.Ghezzi (2018), “A Multi-Scale System of Macroeconometric Models: the Inforum Approach”, *Studies on Russian Economic Development*, 29**

# Main figures of the Russian external position. (1)

## Imports of goods.

*Millions of US Dollar, nominal values*

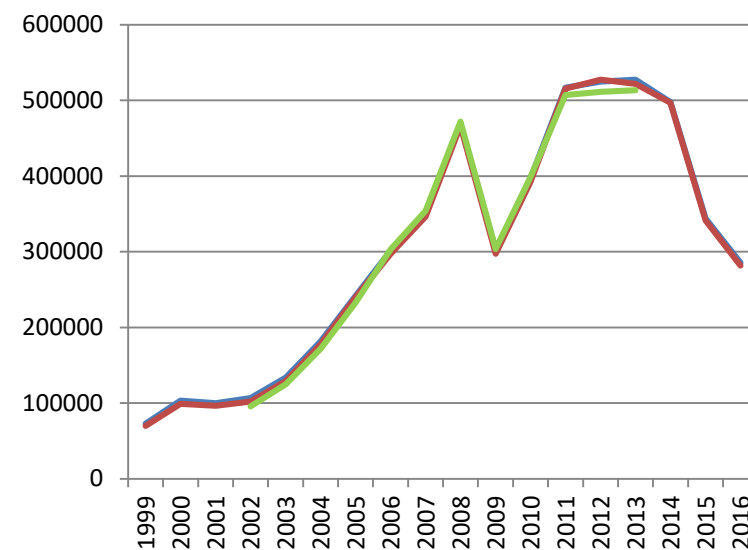


In 2013: Russia ranked 17°

In 2016: Russia ranked 24°

## Exports of goods.

*Millions of US Dollar, nominal values*



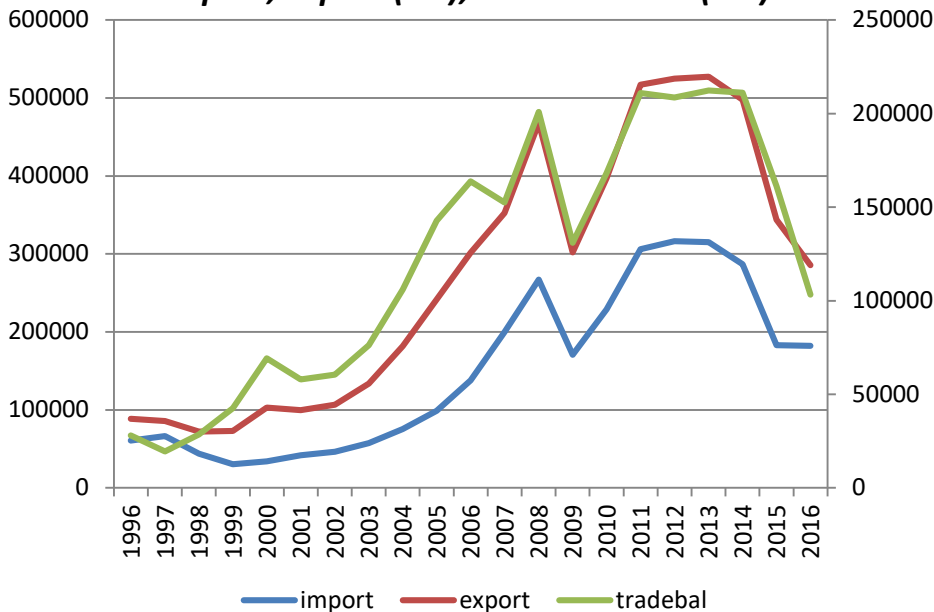
In 2013: Russia ranked 9°

In 2016: Russia ranked 15°

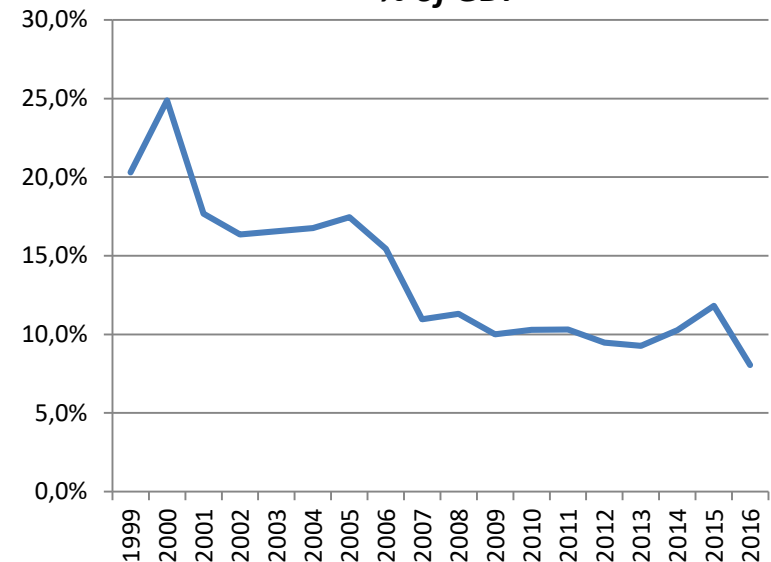


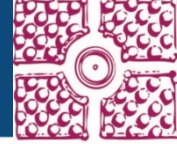
# Main figures of the Russian external position. (2)

**Merchandise trade balance.**  
*Millions of US Dollar, nominal values*  
*Import, export (lhs), trade balance (rhs)*



**Merchandise trade balance.**  
*Millions of US Dollar, nominal values*  
*% of GDP*





# Imports of the Russian economy in BTM

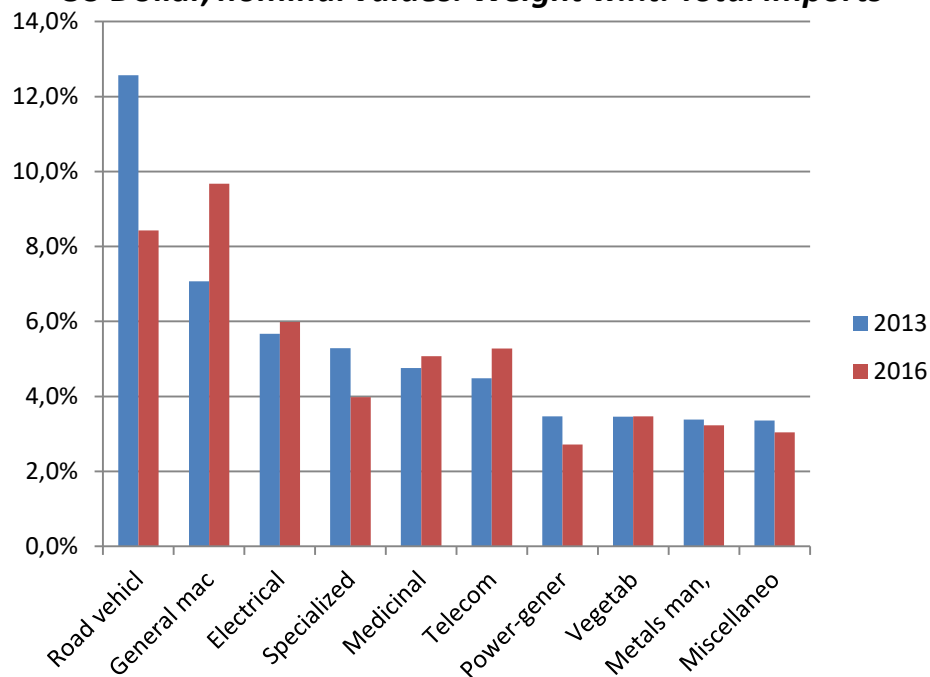


# Russian Imports.

Dollar in nominal terms. % Composition of imported basket

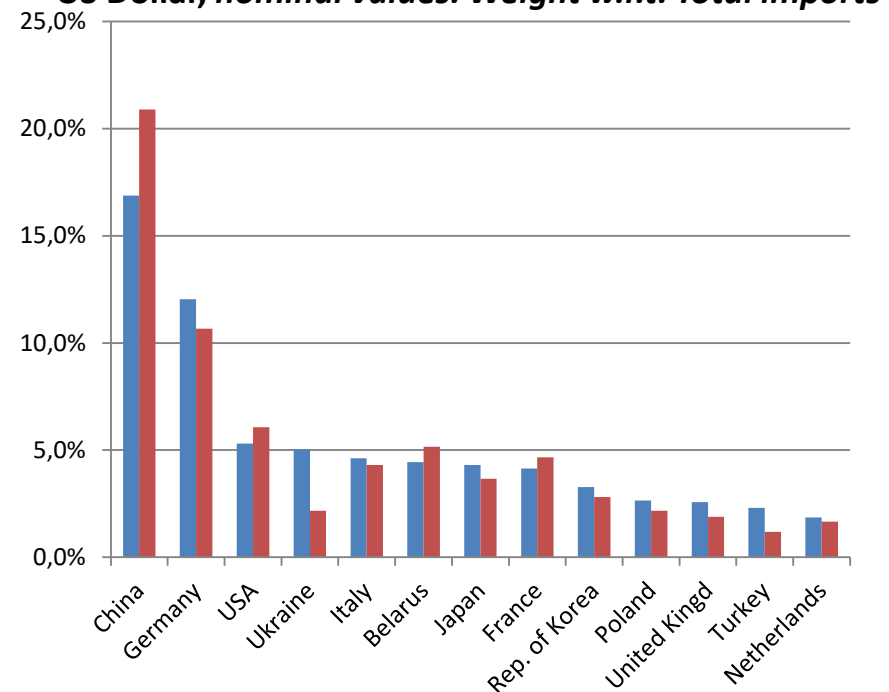
## Most relevant products imported.

US Dollar, nominal values. Weight w.r.t. Total imports



## Origin of imports

US Dollar, nominal values. Weight w.r.t. Total imports

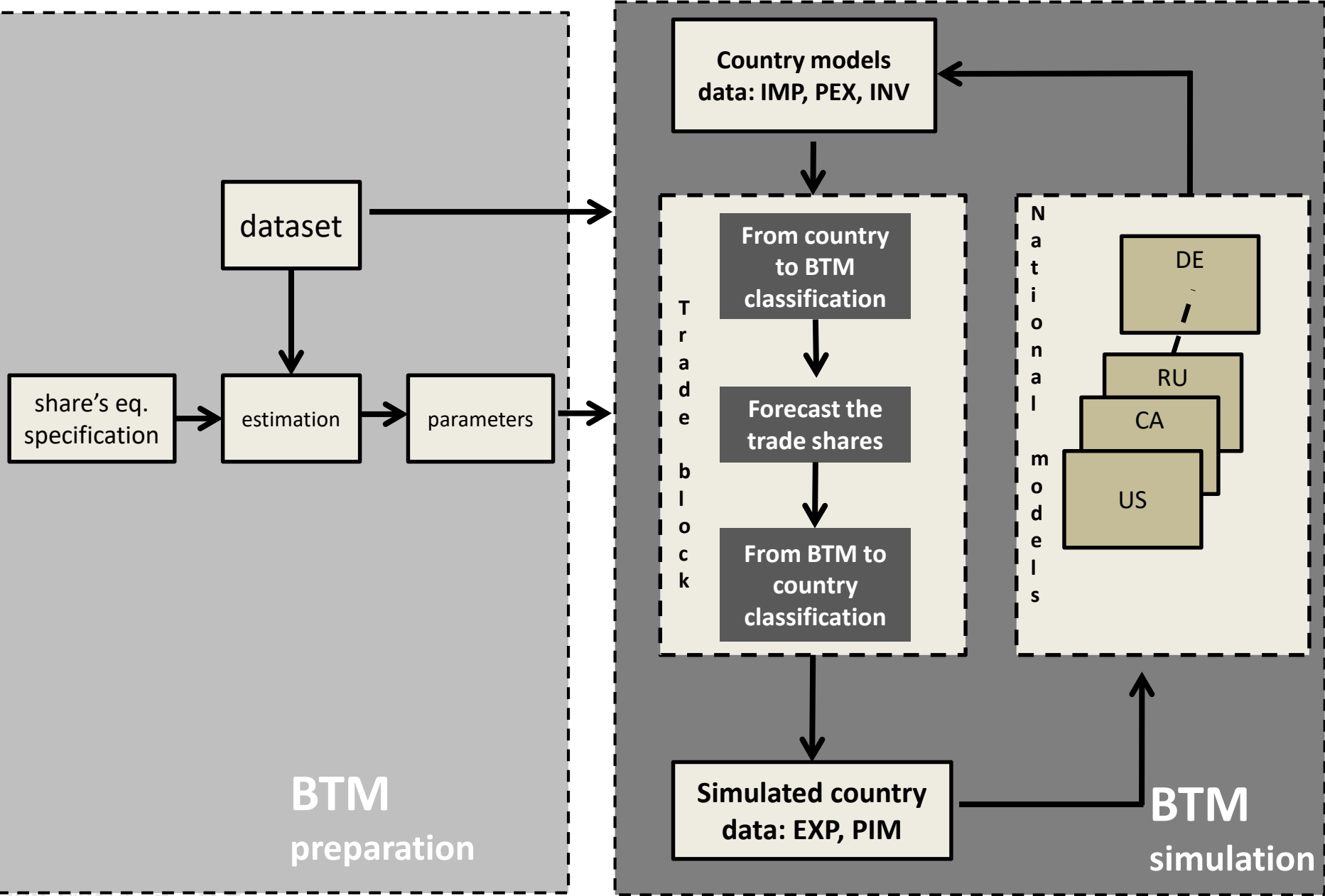




# Main imports flows. US Dollar in nominal terms

<b>ORIGIN</b>	<b>PRODUCT</b>	<b>IMPORT FLOWS (2013)</b>
Germany	Road vehicles	7281.74
China	Telecom equip	7174.79
Japan	Road vehicles	7174.20
RoW	Vegetables	6055.95
REZ	Road vehicles	5812.52
Germany	General mac	4450.98
China	Electrical mac	4349.86
China	Office mac	4288.10
RoW	Iron	4215.47
China	Clothing	4179.34





# Import Share equation

$$S_{i,j,t}^f = \beta_{i,j,0}^f \cdot \left( \frac{P_{e,i,t}^f \cdot er_{i,t} \cdot (1 + tar_{i,j,t}^f)}{P_{w,j,t}^f} \right)^{\beta_{i,j,1}^f} \cdot \left( \frac{K_{e,i,t}^f}{K_{w,j,t}^f} \right)^{\beta_{i,j,2}^f} \cdot e^{\beta_{i,j,3}^f \cdot T_t}$$

f= products (1,...,66) ; i= origin (1,...,18) ; j= destination (1,...,18)

- The first variable captures the “price competitiveness” effect, it includes both exchange rate and tariffs

$$P_{w,j,t}^f = \sum_i s_{i,j,base}^f \cdot P_{i,t}^f \cdot er_{i,t} \cdot (1 + tar_{i,j}^f)$$

- The second variable captures the “non price competitiveness” effect proxied by relative capital index
- Other non price factor (preferences, habits and trade restrictions) are assumed to follow a time trend (Nyhus trend, T)

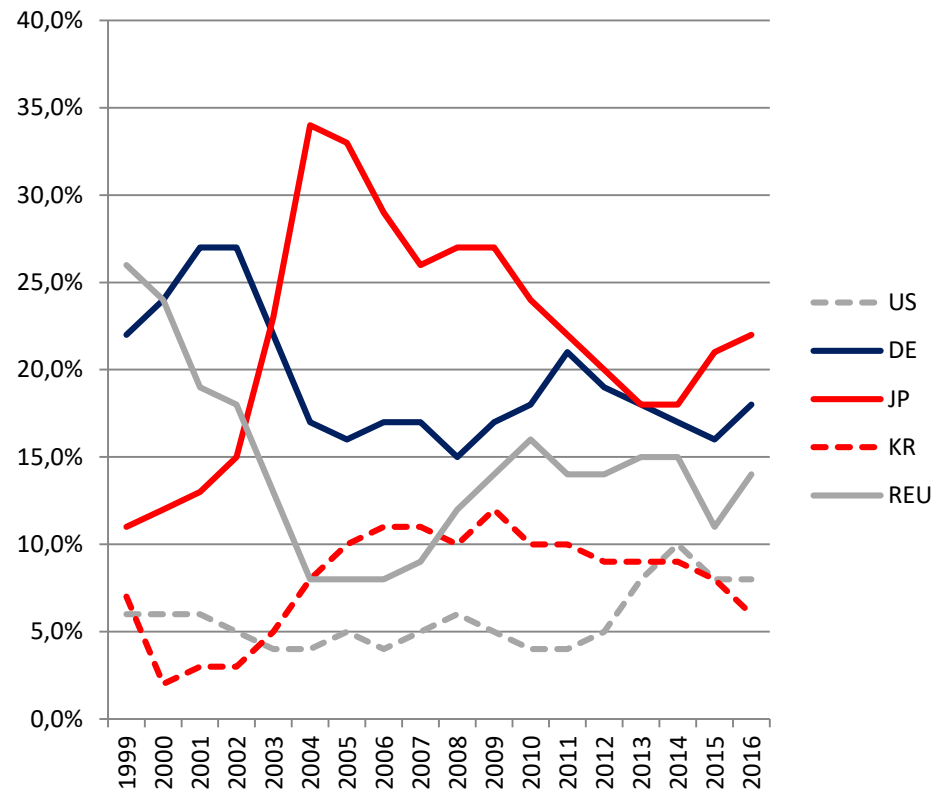
# Imports of Autovehicles in Russia.

## Estimation of elasticities.

	intercept	price elas	capital elas	Nyhus trend
Canada's	-5.585	0	0.384	-0.041
USA's	-2.726	-4.004	0.749	-0.071
Mexico's	-5.453	-14.662	0	0
Austria's	-6.243	-1.636	12.501	0
Belgium's	-3.796	-8.393	12.713	-0.344
France's	-4.548	-4.116	12.971	0.241
<b>Germany's</b>	<b>-1.371</b>	<b>-4.011</b>	<b>0</b>	<b>0.009</b>
Italy's	-4.318	-4.227	0	0.08
Spain's	-5.572	-0.579	16.838	0.043
UK's	-3.48	0	5.33	0.064
<b>Japan's</b>	<b>-2.232</b>	<b>-7.153</b>	<b>15.207</b>	<b>0.319</b>
China's	-3.337	-6.989	0.988	0.067
Korea's	-2.626	0	3.191	0
REZ's	-3.554	-5.899	2.148	0.002
REU's	-1.77	-5.575	0	0.034
OIL's	-6.004	0	0	-0.325
ROW's	-1.837	-6.413	0	-0.049

## Import's share in the Russian market of autovehicles.

Shares w.r.t. Total imports



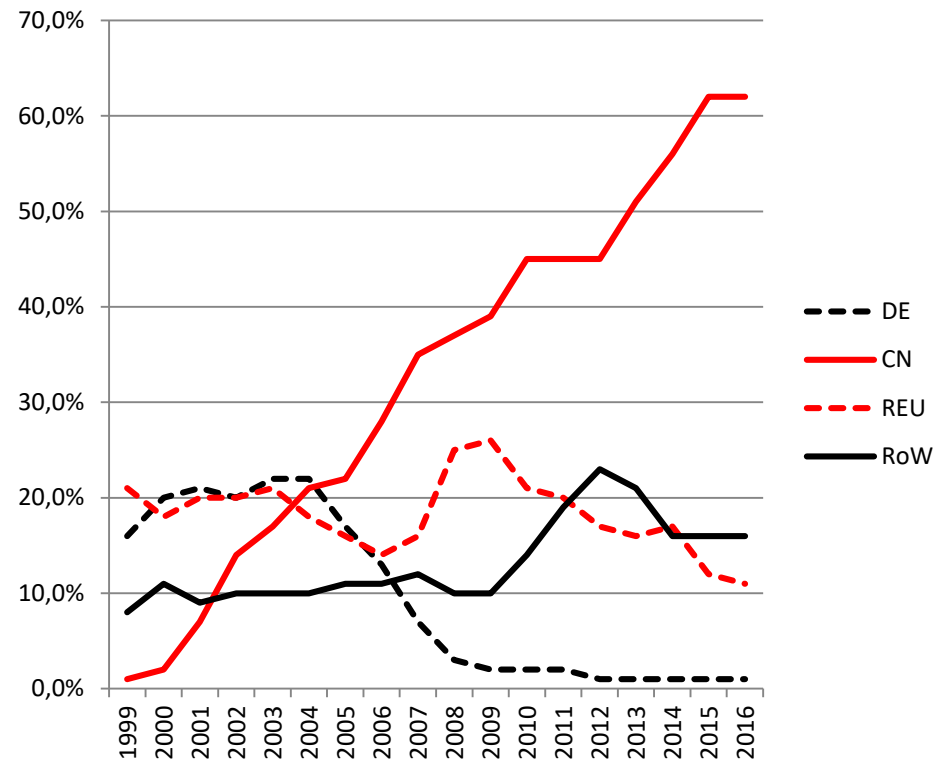
# Imports of telecommunication equip. in Russia.

## Estimation of elasticities.

	intercept	price elas	capital elas	Nyhus trend
Canada's	-5.417	-3.47	0	0
USA's	-3.878	0	1.077	-0.141
Mexico's	-9.043	-3.932	14.44	0.536
Austria's	-6.833	-13.093	0	0.164
Belgium's	-4.004	-12.214	0	0
France's	-3.344	-7.769	1.56	0
<b>Germany's</b>	<b>-2.19</b>	<b>-6.185</b>	<b>5.648</b>	<b>-0.382</b>
Italy's	-4.278	-4.96	0.153	0
Spain's	-6.092	0	8.882	-0.342
UK's	-3.398	-11.065	0	0
Japan's	-3.919	-1.966	6.935	0.094
<b>China's</b>	<b>-2.493</b>	<b>-0.711</b>	<b>9.957</b>	<b>-0.128</b>
Korea's	-3.318	0	12.123	-0.547
REZ's	-3.652	-4.692	10.038	0
REU's	-1.843	-1.489	2.338	0.032
OIL's	Not enough significant		Shares	
ROW's	-2.505	-6.154	7.424	0

## Import's share in the Russian market of telecom. Equi.

Shares w.r.t. Total imports





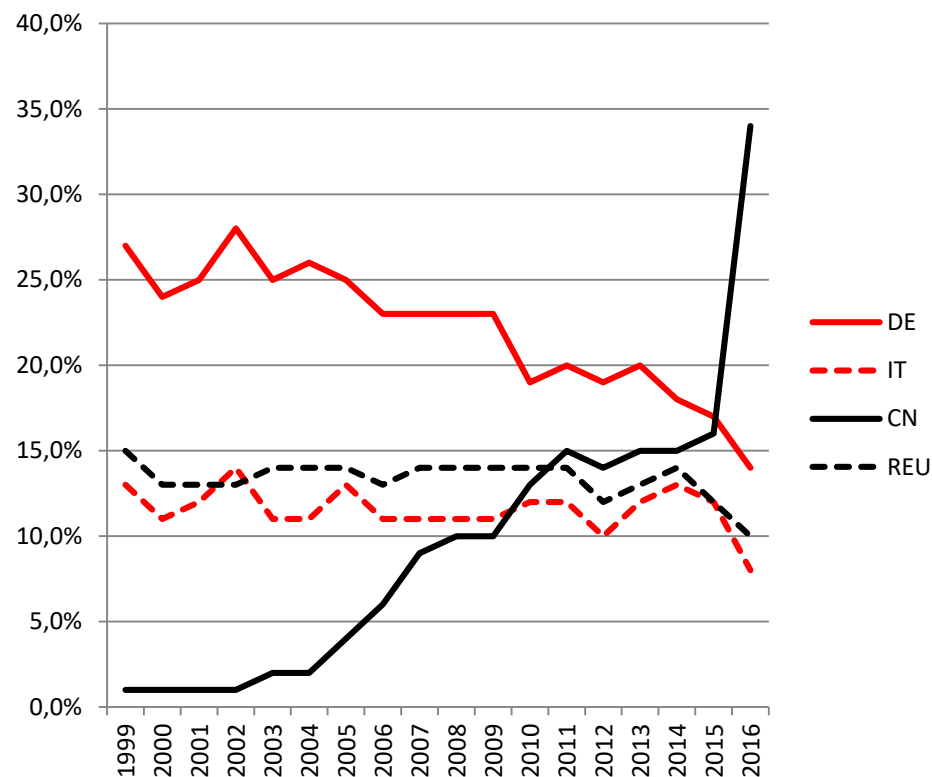
# Imports of General Machinery in Russia.

## Estimation of elasticities.

	intercept	price elas	capital elas	Nyhus trend
Canada's	-4.557	-1.103	0	0
USA's	-2.675	0	2.16	0
Mexico's	-7.083	-1.098	0	0.064
Austria's	-3.737	-0.765	0.781	-0.005
Belgium's	-4.142	0	1.354	-0.041
France's	-3.087	-2.075	0	0.004
<b>Germany's</b>	<b>-1.249</b>	<b>-2.884</b>	<b>0</b>	<b>-0.033</b>
Italy's	-2.111	-1.431	0.052	0
Spain's	-4.575	-1.717	2.498	0
UK's	-3.679	-1.998	0	-0.061
Japan's	-3.477	-1.599	4.52	0.107
<b>China's</b>	<b>-3.013</b>	<b>-4.591</b>	<b>0.091</b>	<b>0.231</b>
Korea's	-3.848	0	8.282	0.042
REZ's	-2.781	0	0.112	-0.026
REU's	-2.112	0	0.118	0.001
OIL's	-7.074	0	20	-0.549
ROW's	-2.11	-0.621	1.657	-0.02

## Import's share in the Russian market of General mach.

*Shares w.r.t. Total imports*

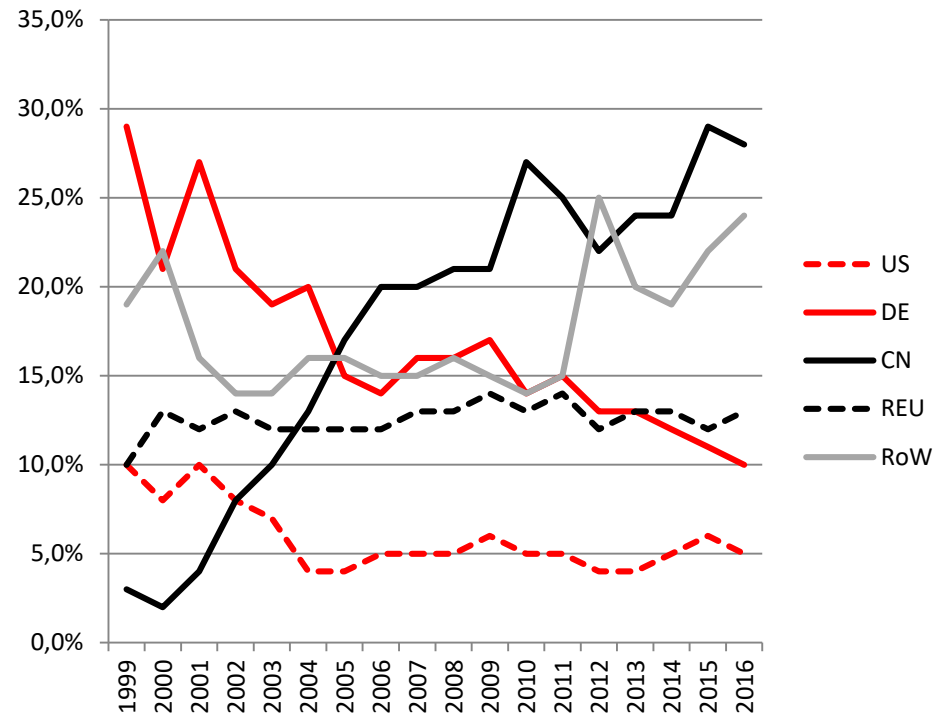


# Imports of Electrical Machinery in Russia.

## Estimation of elasticities.

	intercept	price elas	capital elas	Nyhus trend
Canada's	-5.391	-7.823	0.219	0
USA's	-2.795	-1.465	1.244	0
Mexico's	-6.777	-1.304	0.848	0.095
Austria's	-4.619	-2.598	1.4	0
Belgium's	-4.521	-5.273	0	0
France's	-2.916	-1.988	0.154	0
<b>Germany's</b>	<b>-1.676</b>	<b>-2.755</b>	<b>1.851</b>	<b>0</b>
Italy's	-2.96	-4.042	5.146	0.238
Spain's	-4.202	-1.569	2.08	0.133
UK's	-4.028	-0.743	2.318	-0.093
Japan's	-3.172	-1.462	0.23	0.009
<b>China's</b>	<b>-0.615</b>	<b>-11.002</b>	<b>2.57</b>	<b>0</b>
Korea's	-2.63	0	2.89	-0.113
REZ's	-3.176	-2.457	2.327	0
REU's	-2.288	-2.357	1.677	0.068
OIL's	Not enough shares			
<b>ROW's</b>	<b>-1.804</b>	<b>-5.701</b>	<b>6.063</b>	<b>-0.035</b>

## Import's share in the Russian market of Electrical mach. *Shares w.r.t. Total imports*



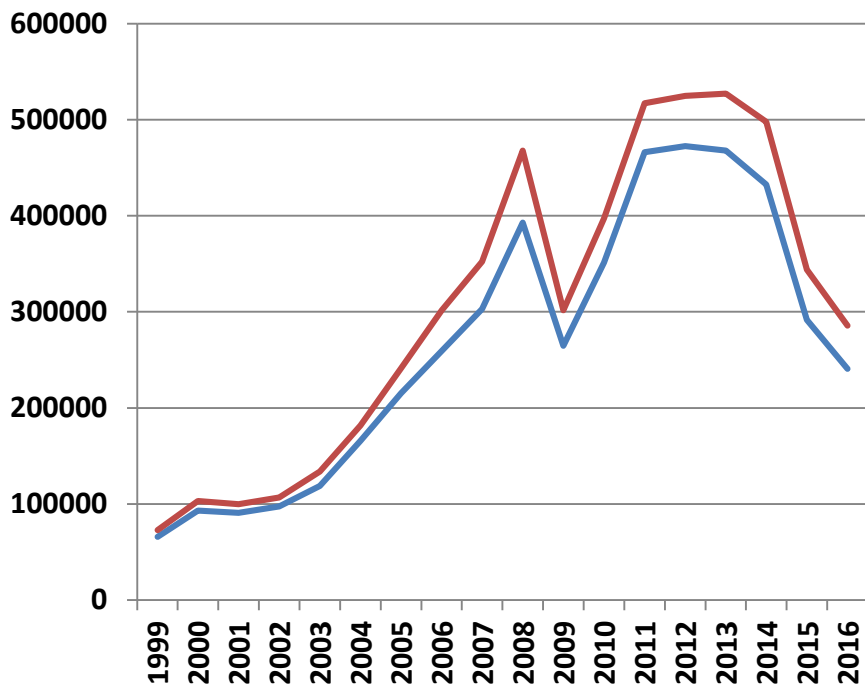


# Exports of the Russian economy in BTM

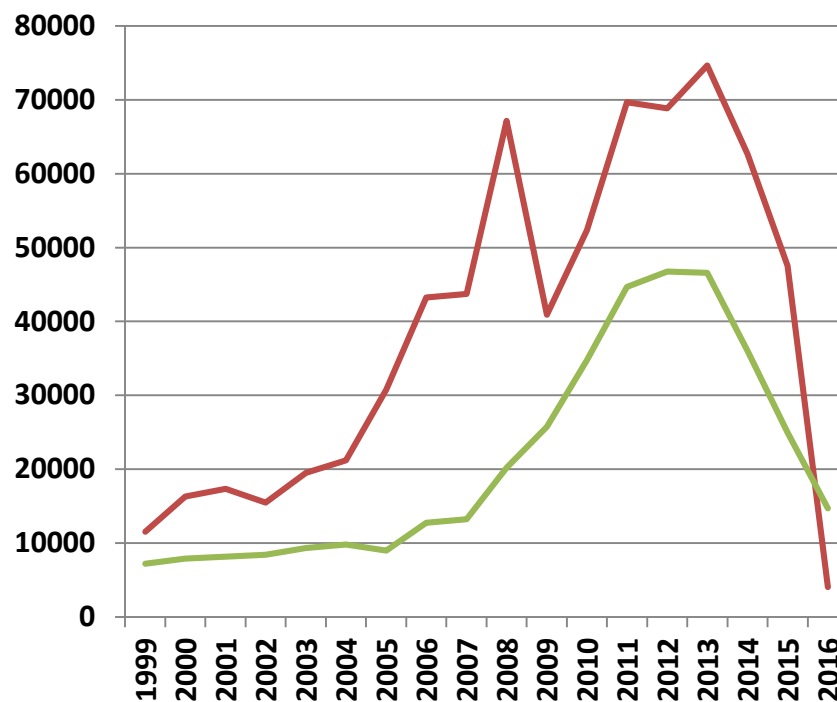


# Some problems with exports data.

**Total exports.**  
US Dollar nominal values



**Exports of Gas.**  
US Dollar nominal values



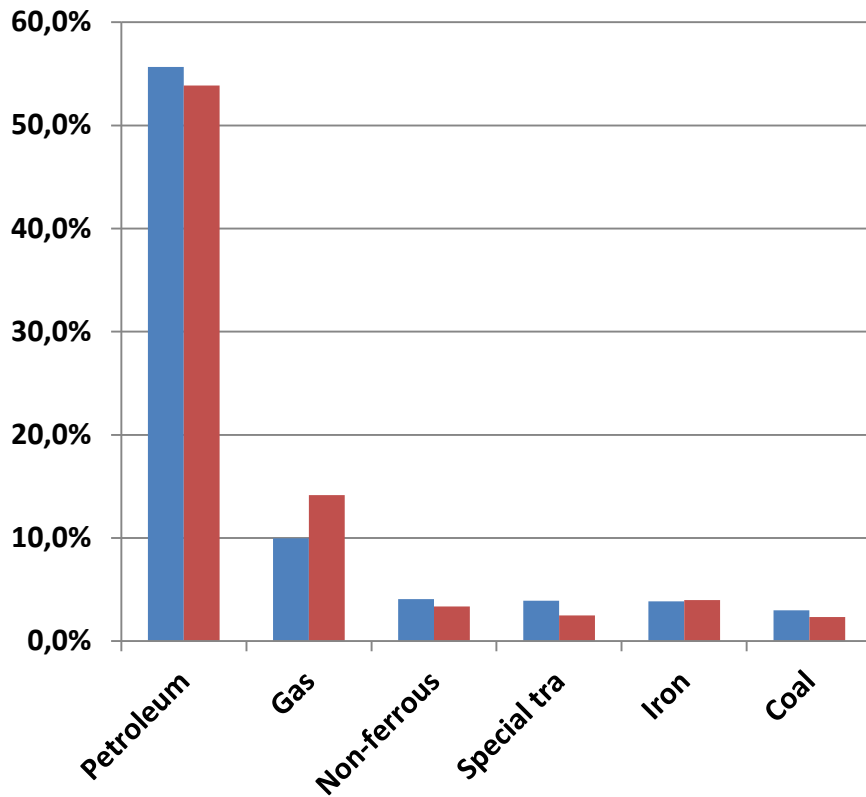
— exports obtained from imports data of other countries  
— export obtained from exports data of Russia

— export obtained as export data  
— export obtained by import data - new dataset

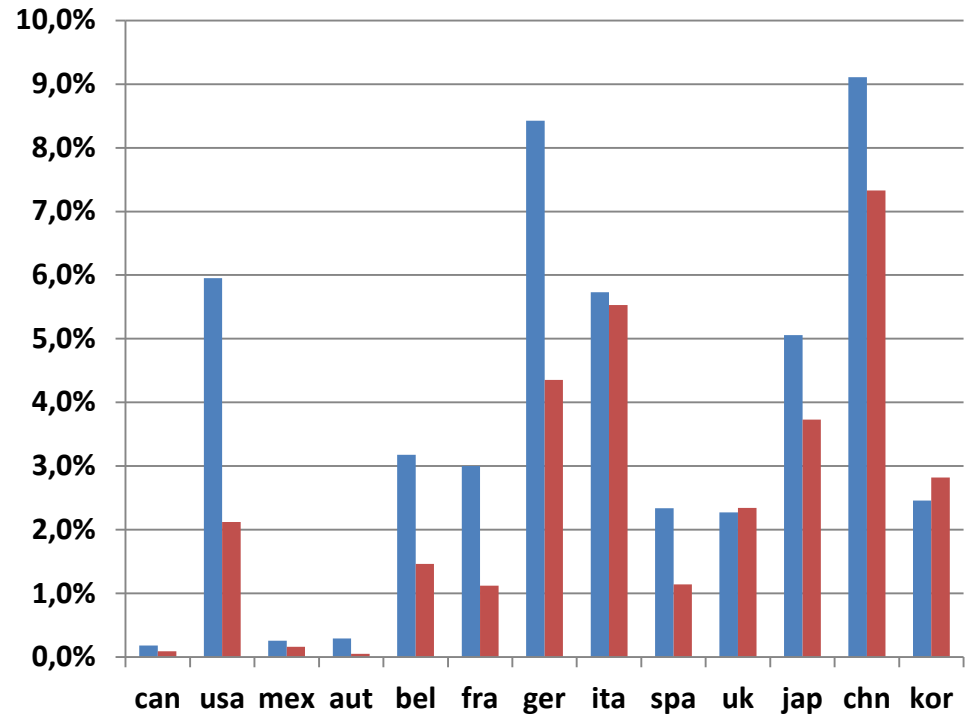


# Some problems with exports data.

**Exports by sector.**  
Shares w.r.t. Total exports



**Exports by destination.**  
Shares w.r.t. Total exports



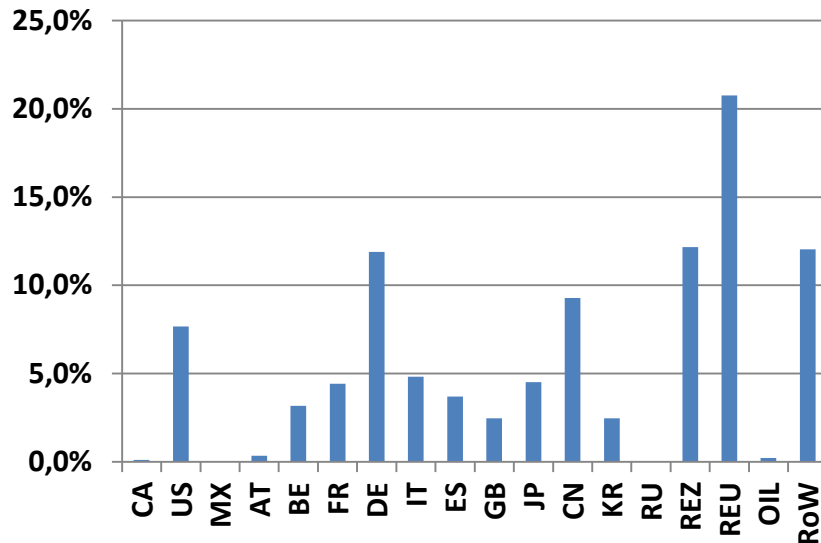
■ exports obtained from imports data of other countries  
■ export obtained from exports data of russia

■ export obtained from imports data of the other countries  
■ export obtained from exports data of russia

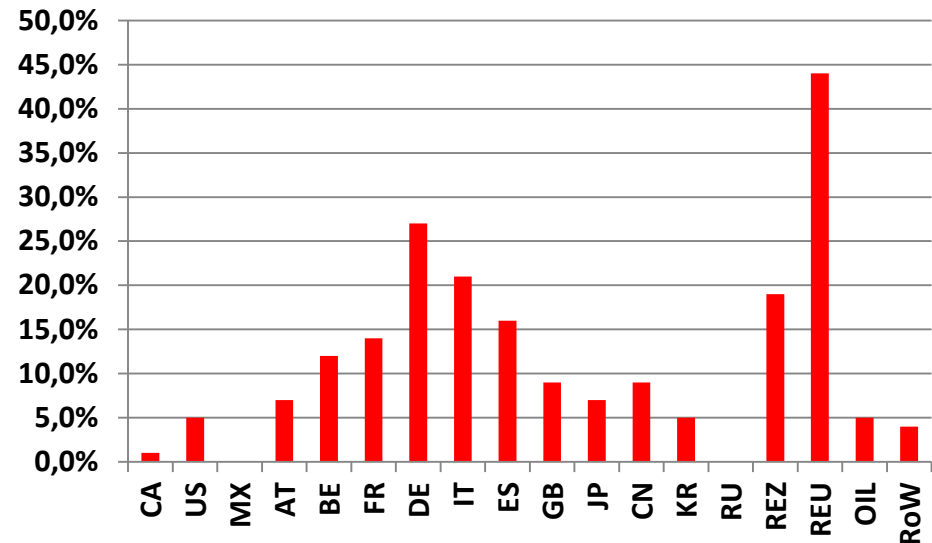
# Russian Exports of Oil

## Destination of oil exports

**Shares w.r.t. Total Russian exports of Oil.**  
US Dollar, nominal values. 2013



**Market Shares in countries Oil market.**  
US Dollar, nominal values. 2013



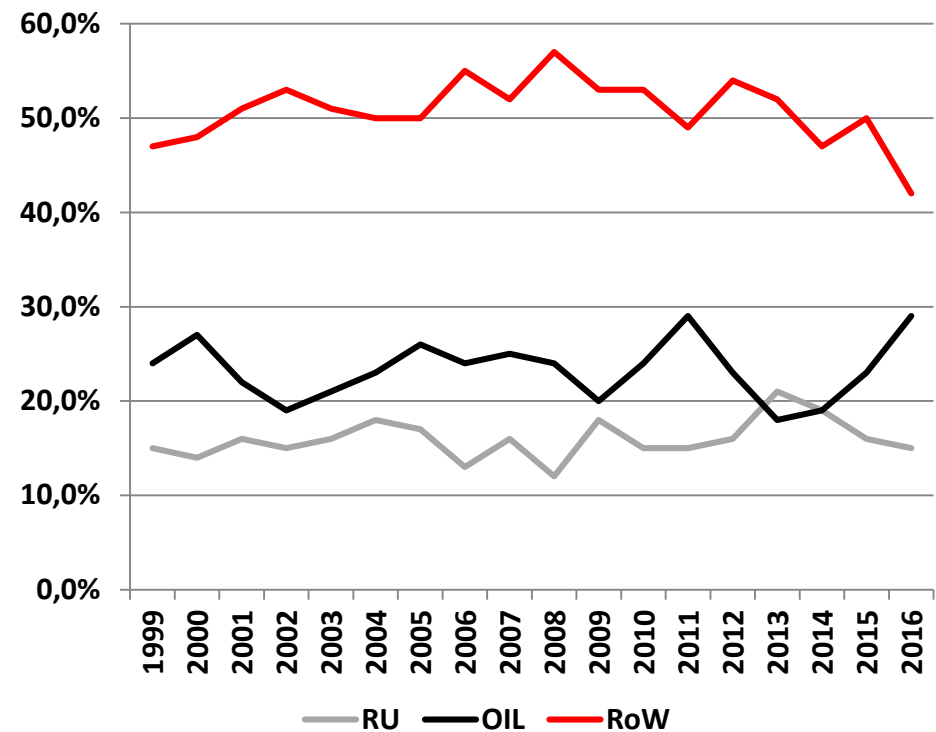
# Exports of Oil from Russia in Italy.

## Estimation of elasticities.

	intercept	price	capital	trend
Canada's	not enough shares			
USA's	-5.388	-2.639	10.695	0.366
Mexico's	not enough shares			
Austria's	not enough shares			
Belgium's	-5.685	-2.004	3.178	-0.195
France's	-7.386	-1.383	20	1.513
Germany's	-7.775	-3.976	17.651	1.159
Spain's	-6.468	-2.242	3.19	0
UK's	-4.856	0	4.407	0
Japan's	not enough shares			
China's	-7.721	0	4.898	-0.091
Korea's	not enough shares			
<b>Russia's</b>	<b>-1.879</b>	<b>-1.545</b>	<b>0.297</b>	<b>-0.037</b>
REZ's	-5.876	-8.296	12.532	0.153
REU's	-6.74	-4.511	20	0.807
<b>OIL's</b>	<b>-1.565</b>	<b>-0.205</b>	<b>4.072</b>	<b>0.102</b>
ROW's	-0.583	-2.435	0	0.002

## Export's share in the Italian market.

*Shares w.r.t. Total Italian imports of Oil*



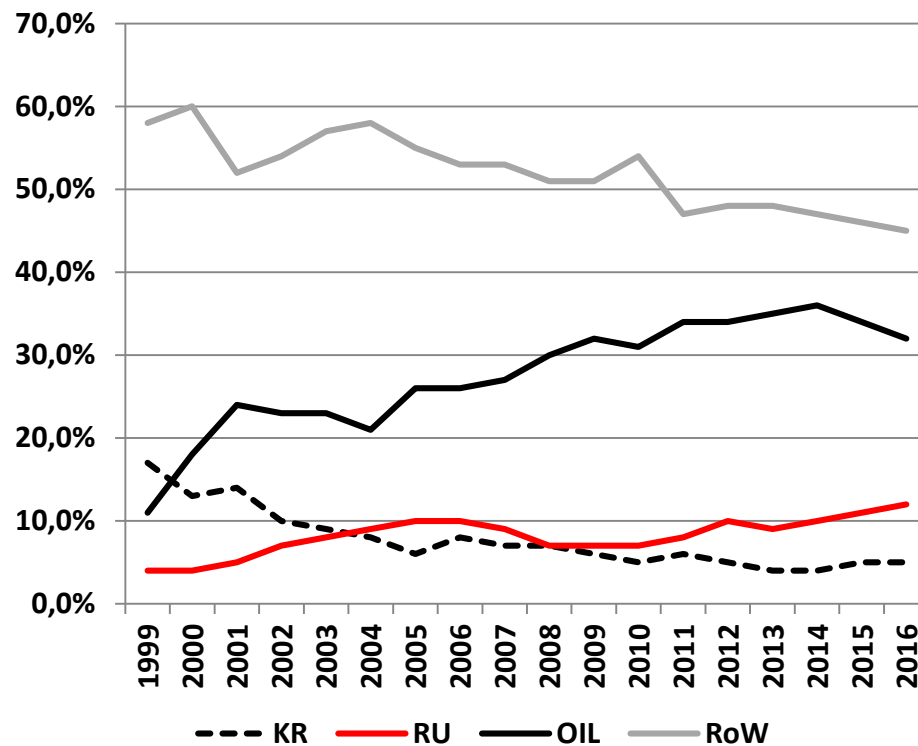
# Exports of Oil from Russia in China.

## Estimation of elasticities.

	intercept	price	capital	trend
Canada's	-9.005	-10.69	20	0.918
USA's	-5.24	-0.259	0	0
Mexico's	not enough shares			
Austria's	not enough shares			
Belgium's	not enough shares			
France's	-8.026	-5.915	1.14	0
Germany's	-7.14	0	0.954	0
Italy's	not enough shares			
Spain's	not enough shares			
UK's	-7.549	-11.825	5.439	0
Japan's	-4.671	-3.928	8.285	0.557
<b>Korea's</b>	<b>-2.842</b>	<b>-2.565</b>	<b>2.22</b>	<b>0</b>
<b>Russia's</b>	<b>-2.369</b>	<b>-1.482</b>	<b>0.774</b>	<b>0.042</b>
REZ's	-7.132	-4.66	0	0
REU's	-8.213	0	0	0.008
<b>OIL's</b>	<b>-1.189</b>	<b>-20</b>	<b>6.38</b>	<b>0.017</b>
ROW's	-0.671	0	1.274	0

## Export's share in the Chinese market.

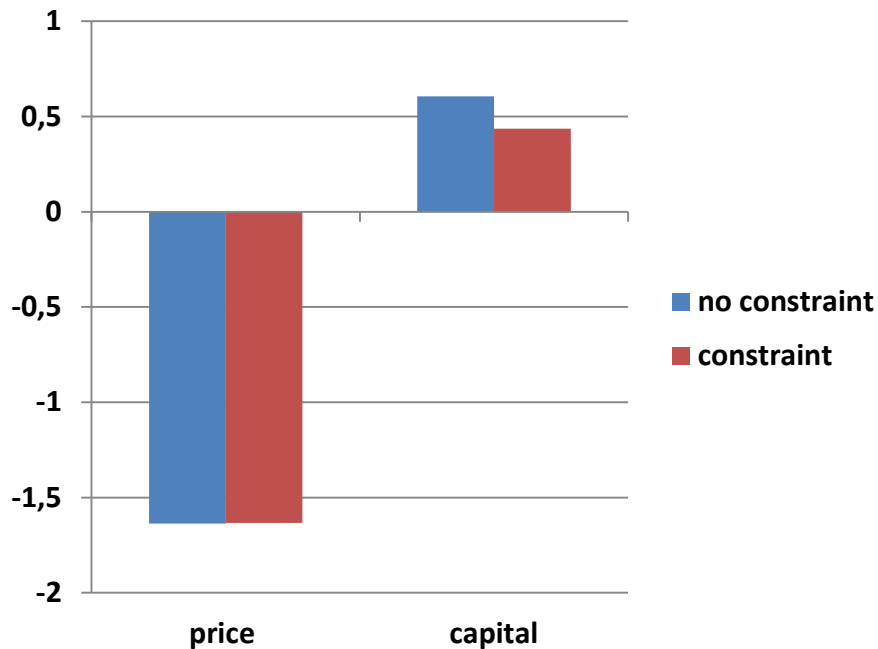
*Shares w.r.t. Total Chinese imports of Oil*





# Weighted exports elasticities. Russia

Real export in US Dollar; base year = 2013



	Our estimates	
	price elasticities	capital elasticities
France	-1.32	1.41
Germany	-0.81	0.74
Italy	-1.10	1.16
Spain	-1.74	1.43
United States	-1.12	0.65
China	-0.91	0.82

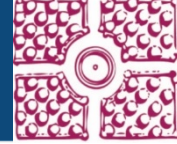
## Final remarks:

- it' s important to take into account both price elasticities and capital elasticities if you want to explain changes in market shares
- The magnitude of elasticities, in absolute terms, is relatively higher using a sectoral disaggregation analysis than we use aggregate data
- The level of heterogeneity is very high between sectors and among destination market. For this reason I think that it could be a big mistake to use some kind of aggregate equation for export in your country model





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Thanks ...



$$Export_i = f(share_i, WorldM)$$

$$share_i = f(P_i, P_w, Inv_i, Inv_w)$$

$$P_i = f(P_{dom,i}, e_i, t_i)$$

$$P_{dom,i} = f(A_i, M_i, v_i, P_{im,i})$$

$$v_i = f(output_i, w_i, \pi_i)$$

$$output_i = f(A_i, M_i, fd_i)$$

$$fd_i = f(C_i, Inv_i, G_i, Export_i)$$

$$worldM = \sum_j M_j \cdot output_j$$

$$P_{im,i} = f(\dots, P_{dom,j}, e_j, \dots)$$