Who Will Pay for Russian Food Sanctions?

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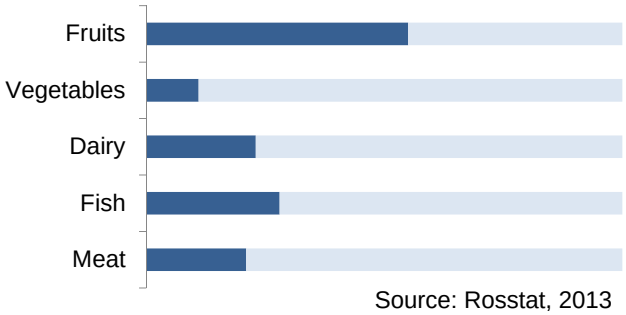
10th August 2015

Introduction

- **March 2014** – EU, USA and other countries introduced sanctions against Russian individuals, businesses and officials
- **August 2014** – Russia responded by total ban of food import from these countries.
- **August 2016** – Russian food embargo should be kept

Introduction
Russia's Food Import

- Russia depends on food import
- Import share in consumption, by product, %:



Source: Rosstat, 2013

Introduction
Russia's Import from embargo addressees

- Addressees played significant role in import
- Import shares by country, %:

	Beef	Pork	Poultry	Fish	Dairy	Vegetables	Fruits
Australia	4.1	0.0	0.0	0.0	0.9	0.0	0.1
Canada	0.0	11.1	0.0	4.1	0.0	0.1	0.0
EU	4.6	58.9	10.6	7.5	37.4	31.9	23.5
Norway	0.0	0.0	0.0	39.0	0.1	0.0	0.0
USA	0.0	0.9	37.7	2.6	0.0	0.3	3.6
Total	**8.7**	**70.9**	**48.3**	**53.2**	**38.4**	**32.2**	**27.3**
World	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Food and Agriculture Organization of the United Nations, 2014

Introduction
Agenda

- **Gains and loss:** who will gain from the embargo? Russian customers, producers or other countries?
- **Regions:** which Russian regions win more from the embargo
- **Compare** results for different products

Gains and loss
Computable Partial Equilibrium Model (1)

Assumptions

1) the domestic good and the imported good are imperfect substitutes;

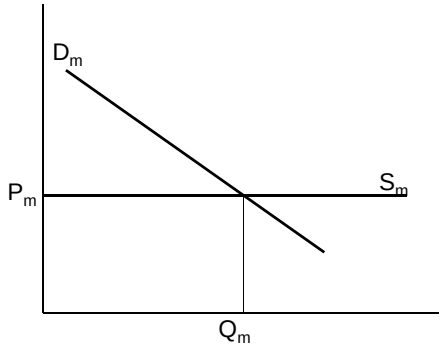
2) the import supply is flat (perfectly elastic);

3) the domestic supply is upwardly sloped (less then perfectly elastic);

4) all markets are perfectly competitive

Gains and loss
Computable Partial Equilibrium Model (2)

Import Market



P_m– price of import

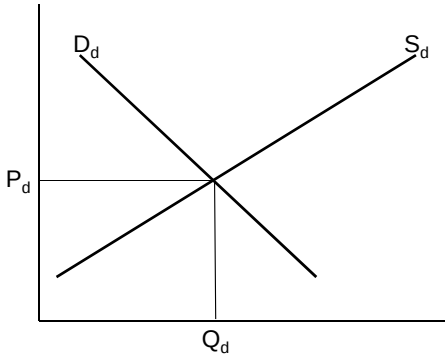
Q_m , – import quantity

D_m , - demand on import

S_m - import supply

Gains and loss
Computable Partial Equilibrium Model (3)

Domestic Market



P_d, P_d' – price of import

Q_d , Q_d' – import quantity

D_d , D_d' - demand on domestic product

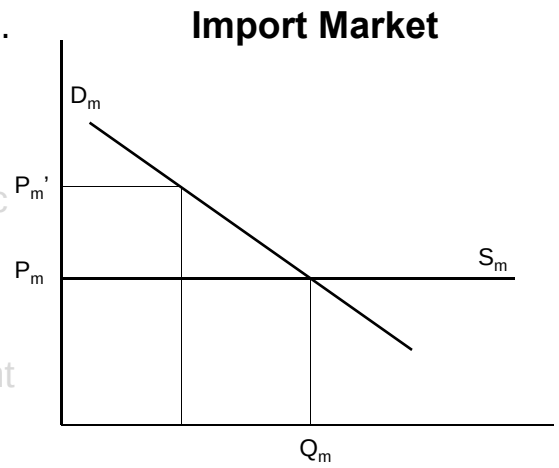
S_d –domestic supply

Gains and loss
Computable Partial Equilibrium Model (4)

Let $P_m \rightarrow P_m'$ (e.g. import tariff increase)

It pushes domestic demand

Domestic price growth lead to right shift of $D_m \rightarrow D_m'$

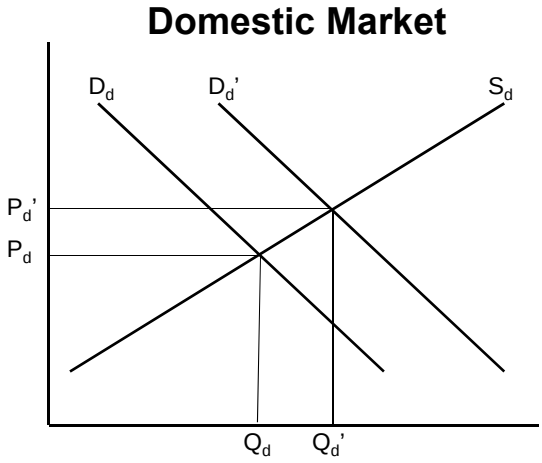


Gains and loss
Computable Partial Equilibrium Model (5)

Let $P_m \rightarrow P_m'$ (e.g. import tariff increase)

It pushes domestic demand

Domestic price growth lead to right shift of $D_m \rightarrow D_m'$



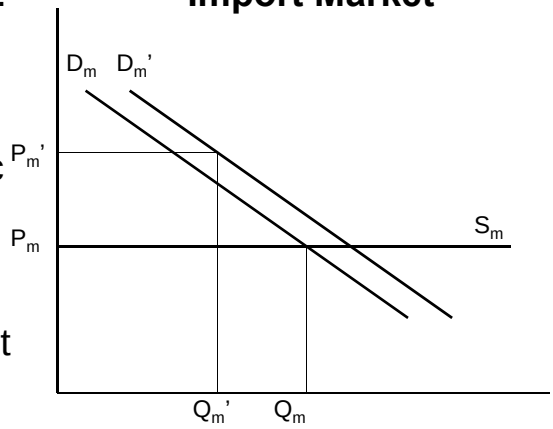
Gains and loss
Computable Partial Equilibrium Model (6)

Let $P_m \rightarrow P_m'$ (e.g. import tariff increase)

It pushes domestic demand

Domestic price growth lead to right shift of $D_m \rightarrow D_m'$

Import Market

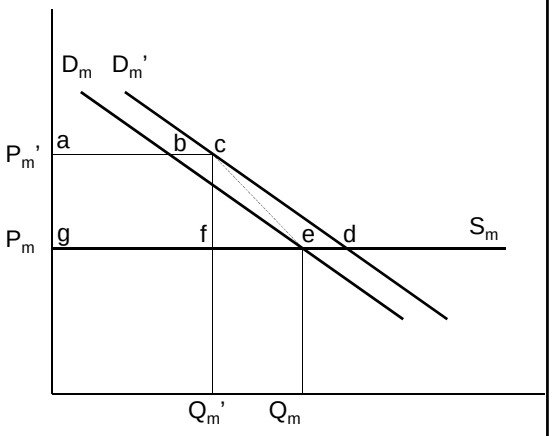


Gains and loss
Computable Partial Equilibrium Model (7)

Welfare changes

Import market

	Gain
Consumers	- aceg
Domestic producers	
Restrictions rent	acfg
Efficiency gain	- cef

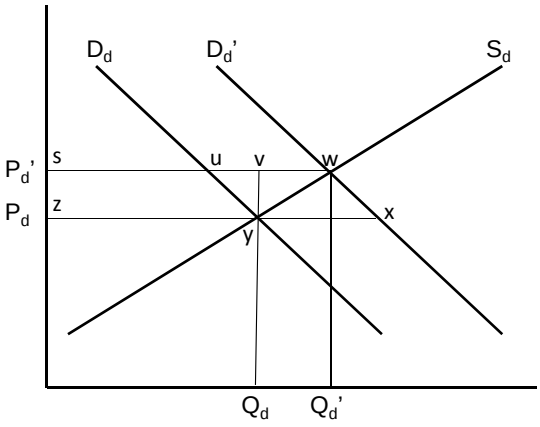


Gains and loss
Computable Partial Equilibrium Model (8)

Welfare changes

Domestic market

	Gain
Consumers	- swyz
Domestic producers	swyz
Restrictions rent	
Efficiency gain	



Gains and loss
Computable Partial Equilibrium Model (9)

- Domestic demand and supply equations:

(1) $\ln Q_d = \ln a + E_{dd} \ln P_d + E_{dm} \ln P_m$

(2) $\ln Q_s = \ln b + E_s \ln P_d$

E_{dd} - own-price elasticity of demand for the domestic good

E_{dm} - cross-price elasticity of demand for the domestic good with respect to the price of the imported good

E_s - own-price elasticity of the supply of the domestic good

- Demand and supply equilibrium:

(3) $Q_s = Q_d$

Gains and loss
Computable Partial Equilibrium Model (10)

- Import demand and supply equations:

(4) $\ln Q_m = \ln c + E_{md} \ln P_d + E_{mm} \ln P_m$

(5) $Q_m = M$

E_{md} - the cross-price elasticity of demand for the imported commodity with respect to the price of the domestic commodity

E_{mm} - the own-price elasticity of demand for imported commodity

M – import volume after embargo initiation

- M has tariff equivalent (which price leads to such import)

Gains and loss
Milk (1)

- Elasticities

E_{dd}	E_{mm}	E_{md}	E_{dm}	E_s
-1.27	-1.20	0.07	0.13	0.04

- Estimation results

	July 2014 (actual)	February 2015 (actual)	February 2015 (model)
Import			
Quantity	22 037	14 659 (-33%)	
Price	29 137	35 953 (23%)	39 621 (36%)
Domestic			
Quantity	436 002	440 259 (1%)	437 120 (<1%)
Price	26 530	22 452 (-15%)	26 687 (<1%)

Quantities are given in tons
Prices are given in rubles per ton
(%) in parenthesis indicates changes compared to July 2014

Gains and loss
Milk (2)

- Welfare changes estimates:

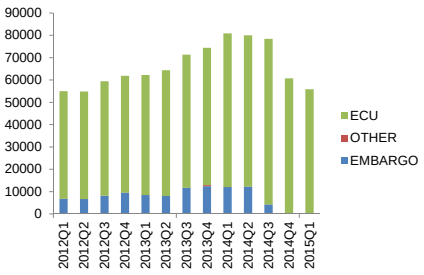
	Gain, mln rubles
Consumers	261 (2%[1])
Domestic producers	69 (1%[2])
Foreign producers	154 (26%[2])

[1] (%) in parenthesis indicates share in monthly consumption (as it was at July 2014)

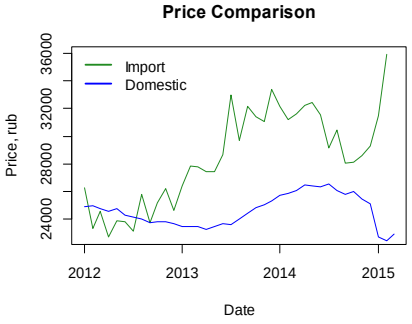
[2] (%) in parenthesis indicates share in monthly realization (as it was at July 2014)

Gains and loss
Milk (3)

- Banned import was not compensated



- Due to other reasons domestic prices show decrease



Prices are seasonally adjusted and in real terms

Gains and loss
Fish (1)

- Elasticities

E_{dd}	E_{mm}	E_{md}	E_{dm}	E_s
-0.71	-0.80	0.21	0.92	0.54

- Estimation results

	July 2014 (actual)	February 2015 (actual)	February 2015 (model)
Import			
Quantity	32551	8 250 (-75%)	8 250 (-75%)
Price	81032	100 072 (23%)	667 446 (724%)
Domestic			
Quantity	32308	38 424 (19%[1])	74 389 (130%)
Price	30992	36 406 (17%)	144 851 (367%)

Quantities are given in tons
Prices are given in rubles per ton
(%) in parenthesis indicates changes compared to July 2014

Gains and loss
Fish (2)

- Welfare changes estimates:

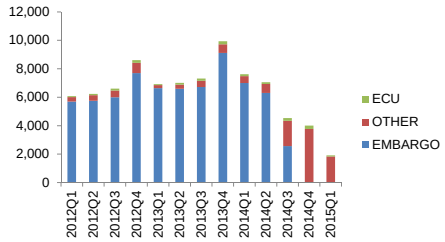
	Gain, mln rubles
Consumers	18037 (110%[1])
Domestic producers	6074 (56%[2])
Foreign producers	4838 (87%[2])

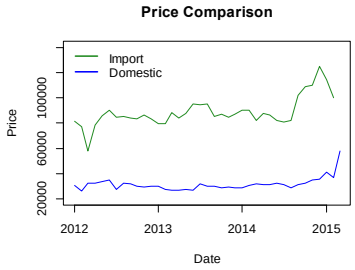
[1] (%) in parenthesis indicates share in monthly consumption (as it was at July 2014)

[2] (%) in parenthesis indicates share in monthly realization (as it was at July 2014)

Gains and loss
Fish (3)

- Banned import was not compensated, but new players came
- As expected, prices grew





Prices are seasonally adjusted and in real terms

Regions

Hypothesis 1. Regions which are the biggest producers of the products are less affected by embargo.

- prices during embargo should be significantly lower in these regions

Hypothesis 2. Regions with borders shared with "sanctioned" countries significantly differ

- if smuggling is significant, price in these regions should be lower OR
- prices should be higher because old suppliers became inaccessible

Regions
Methodology (1)

- Supply and demand:

$$Q_s = f(price, costs, competition)$$
$$Q_d = f(price, income, population, Prices)$$
$$Q_s = Q_d$$

- Prices is prices of complements, substitutes

Regions
Methodology (2)

- From $Q_s = Q_d$ base regression equation drawn:

$$\log(P_{i,t}) = B = \alpha + \alpha_i + \beta_1 wage_{i,t} + \beta_2 appl\_amnt_{i,t} + \beta_3 population_{i,t} + \beta_3 afterSanctions1_t + \beta_4 afterSanctions3_t + \beta_5 afterSanctions3_t + \sum seasonalDummy_k + \varepsilon_{i,t}$$

$wage_{i,t}$ – log of average monthly wage in region i in time t

$appl\_amnt_{i,t}$ – log of average monthly number of suppliers in the product procurement auctions

$afterSanctions1..3_t$- dummies corresponding to three sub periods after the embargo was introduced

Regions
Methodology (3)

- **Hypothesis 1** regression:

$$P_{i,t} = B + \gamma_1 producer1_{i,t} + producer2_{i,t} + producer3_{i,t}$$

- $producer1..3_{i,t}$- dummies, corresponding to the embargo sub periods, which equal 1 if region i is among the biggest producers and observation t is lie in the embargo sub period

Regions
Methodology (4)

- **Hypothesis 2** regression:

$$P_{i,t} = B + \gamma_1 border1_i + border2_i + border3_i$$

- $border1..3_i$- dummies, corresponding to the embargo sub periods, which equal 1 if region is among “border shared”

Regions
Methodology (5)

- Observations: 2012:M1..2015:M3
- In real terms

Regions
Hypothesis 1: Milk

```
                Estimate   Std. Error t value  Pr(>|t|)
(Intercept)    -1.5781307  0.5022448 -3.1422 0.0017038 **
log(wage)       0.4869488  0.0475333 10.2444 < 2.2e-16 ***
log(appl_amnt) -0.0590478  0.0144350 -4.0906 4.488e-05 ***
afterSanctions1  0.1156762  0.0612299  1.8892 0.0590206 .
afterSanctions2  0.1418425  0.0717684  1.9764 0.0482594 *
afterSanctions3  0.1812923  0.0245693  7.3788 2.404e-13 ***
producer1      -0.0992269  0.1196450 -0.8293 0.4070168
producer2       0.0344504  0.0855210  0.4028 0.6871206
producer3       0.0118709  0.0525234  0.2260 0.8212180
...
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’
Multiple R-squared: 0.6464, Adjusted R-squared: 0.6292 F-statisti
c: 37.42 on 90 and 1842 DF, p-value: < 2.2e-16
```

- Prices in the largest producers aren’t different from prices in other regions

Regions
Hypothesis 1: Fish

```
                 Estimate   Std. Error t value  Pr(>|t|)
(Intercept)      1.2629372  0.9496962  1.3298 0.1838391
log(wage)        0.3192585  0.0861335  3.7066 0.0002202 ***
log(appl_amnt)  -0.0830700  0.0160631 -5.1715 2.741e-07 ***
afterSanctions1  0.0473704  0.0460901  1.0278 0.3042715
afterSanctions2  0.3195055  0.0454794  7.0253 3.665e-12 ***
afterSanctions3  0.2950386  0.0307442  9.5966 < 2.2e-16 ***
producer1       -0.2580023  0.1326040 -1.9457 0.0519409 .
producer2       -0.1060960  0.1046564 -1.0138 0.3109143
producer3       -0.1017749  0.0580854 -1.7522 0.0800148 .
...
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
Multiple R-squared: 0.4541, Adjusted R-squared: 0.4115 F-
statistic: 10.66 on 89 and 1141 DF, p-value: < 2.2e-16
```

- Prices in the largest producers differs from prices in other regions in sub periods 1 and 3

Regions
Hypothesis 2: Milk

```
                 Estimate   Std. Error t value  Pr(>|t|)
(Intercept)     -1.5823943  0.4979587 -3.1778 0.0015088 **
log(wage)        0.4873767  0.0471671 10.3330 < 2.2e-16 ***
log(appl_amnt)  -0.0579792  0.0146207 -3.9655 7.603e-05 ***
afterSanctions1  0.0612976  0.0750628  0.8166 0.4142522
afterSanctions2  0.1443393  0.0531651  2.7149 0.0066909 **
afterSanctions3  0.1855133  0.0246002  7.5411 7.271e-14 ***
bs1              0.0396128  0.0807818  0.4904 0.6239326
bs2              0.0758183  0.0802190  0.9451 0.3447104
bs3             -0.0091095  0.0343220 -0.2654 0.7907224
...
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
Multiple R-squared: 0.6463, Adjusted R-squared: 0.629 F-statistic
: 37.4 on 90 and 1842 DF, p-value: < 2.2e-16
```

- Prices in the “border shared” regions aren’t different from prices in other regions

Regions
Hypothesis 2: Fish

```
                 Estimate   Std. Error t value  Pr(>|t|)
(Intercept)      1.2538852  0.9460803  1.3253 0.1853212
log(wage)        0.3203765  0.0857942  3.7342 0.0001976 ***
log(appl_amnt)  -0.0844350  0.0159628 -5.2895 1.470e-07 ***
afterSanctions1 -0.0270709  0.0463322 -0.5843 0.5591494
afterSanctions2  0.3033922  0.0424525  7.1466 1.583e-12 ***
afterSanctions3  0.2784237  0.0291448  9.5531 < 2.2e-16 ***
bs1              0.3307035  0.1817640  1.8194 0.0691107 .
bs2             -0.0516921  0.2226666 -0.2321 0.8164632
bs3             -0.0775983  0.1035549 -0.7493 0.4538041
...
---
Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Multiple R-squared: 0.4528, Adjusted R-squared: 0.4101 F-statisti
c: 10.61 on 89 and 1141 DF, p-value: < 2.2e-16
```

- Prices in the “border shared” were different during first quarter.

Regions
Summary

- Possible differences are not common for all products
- Fish price is more heterogeneous than milk price

  - fish “producers” have less price in period of embargo

  - “border shared” had bigger price during part of the embargo period and needed time to find new suppliers; results don’t confirm smuggling