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Impact of the Consequences of Shocks on Consumer Choice: Food Embargo Effect

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Motivation

Shocks can occur in the markets for goods and services, affecting the consumer basket and individual spending. However, if the impact of price shocks on consumers is deeply studied, then there are gaps in the study of the impact of changes in the supply of goods. Such shocks can be a consequence of the trade and social policy of the state, and represent both restrictions on the sale of certain goods, and the entry of new goods on the market. This paper presents a methodology that assesses the impact of such shocks on household consumption and expenditure.

A striking example of this kind of shocks can be called Russian food counter-sanctions. In August 2014, by a decree of the Government of the Russian Federation, in response to the economic sanctions imposed on Russia, a ban was imposed on the import into the Russian Federation of a fairly wide range of agricultural products, raw materials and food, including meat, fish, milk and dairy products, a number of vegetables, fruits and nuts, from a large list of countries. The shock impact on the consumer in 2014 is distinguished by the fact that the food embargo was accompanied by a significant drop in the ruble exchange rate and a sharp jump in food prices. The share of imported goods has dropped significantly, and the list of dominant exporting countries has undergone a radical metamorphosis. A simple Russian buyer faced a modification of the assortment-price matrix of goods and was forced to modify the consumer basket. In this regard, the study of the reaction of Russian families in the period after the key events of 2014 and the assessment of the loss of consumer welfare is of considerable interest.

The extreme scarcity and methodological limitations of works studying the impact of the food embargo and inflation on consumers at the micro level determines **the relevance of the study**. Analysis of the consequences of shocks on the food market at the household level makes it possible to shed light on the perception of new products on the market by Russian families, to understand the mechanisms of consumer

strategies for maintaining the required level of well-being, and to single out the least and most affected groups of the population and food categories.

Brief Literature Review

At the moment, there are not so many studies concerning the assessment of the welfare losses of the Russian population from changes in the food market, and only a few of them use econometric analysis or micro-data as a tool.

The work [Ponomareva, Magomedov, 2017] studies the impact of food counter-sanctions on prices for both sanctioned (their analogs) and non-sanctioned goods. To assess the effect on prices, the authors build autoregressive models for two groups of goods separately on data up to 2014, that is, under the scenario of the absence of a food embargo. When comparing the predicted values with actual researchers, it was found that in 2014-2016, only due to the food embargo, prices for sanctioned goods increased by 3%, and for unsanctioned ones by 2.9%. The annual welfare loss per resident of Russia was estimated at 4,380 rubles. However, this figure is calculated on the assumption of a constant structure of demand within the sanctioned and unauthorized set of goods, but, as the authors themselves note, this structure has changed due to uneven growth in prices for various products and changes in exported goods.

The study [Volchkova, Kuznetsova, 2019] uses the classical model of partial equilibrium at the macro level to assess the losses of economic agents. Changes in welfare are analyzed on the market for each product separately, the products themselves are conditionally divided into 3 groups: “import substitution took place” (consumption growth and price stabilization), “no import substitution” (decrease in consumption and high price growth), “expensive import substitution” (growth and consumption , and prices). The authors demonstrated that the greatest losses were incurred by consumers in the dairy market, that is, “expensive import substitution,” but in the poultry and pork markets, according to the analysis, there is even a consumer gain. The total consumer losses are estimated at 445 billion rubles per year, or 3 thousand rubles. per person annually.

The article [Hinz, Monastyrenko, 2019] presents a methodology for assessing welfare losses and price changes from the food embargo in Russia based on the difference-in-difference approach and the Ricardian trade model with internal industry ties, trade in intermediate goods and industry heterogeneity in production. The constructed model makes it possible to simulate the consumption scenario in the absence of counter-sanctions on regional data, as well as to separate the direct (on the market of goods) and indirect (on the markets of related goods) effect of price changes. The authors show that the embargo led to an increase in prices for sanctioned goods by 10-13% in the short term and 1-6% in the medium term, and the regions with a pre-shock level of food imports above the average turned out to be the most vulnerable. The authors also found that food restrictions influenced not only the food markets, but also the markets for other goods, which is explained by the interrelationships of the production of industries within the country. The overall welfare loss is estimated in the study at 1.88% of the potential scenario level, and the overall increase in the price index associated with the food embargo at 0.19%.

The approach presented in this paper differs in that:

1. The impact assessment is carried out on the basis of a microeconometric model (at the household level) in the context of food categories, which means that the least and most affected consumer groups and food markets where spending has changed the most.

2. Comparison of actual and scenario consumption, rather than prices, is given; for the first time, the difference is decomposed into two effects: the effect associated with an increase in prices relative to income, and - with a change in supplied products and relative prices.

Objectives of the Research

The aim of the study is to develop an approach to assess the shock-related change in household expenditures relative to the potential level, and to test the approach for the food market in the context of the introduction of import restrictions from 2014.

The novelty of the approach is that the change is calculated in relation to the scenario level of consumer spending and is decomposed into two effects. Effect decomposition is a modification of the Blinder–Oaxaca methodology, where the first component shows the effect based on the difference in regressors, and the second - the difference in coefficients. Since the expansion is applied to the consumer demand model, where the regressors used are prices and incomes, and the elasticities of demand are calculated from the coefficients, we will call for brevity the first effect the "prices effect" and the second "elasticities effect", although the second also contains the contribution of the relative change prices. These two effects are important because they demonstrate whether it is possible in the market to overcome the negative consequences of shocks, thanks exclusively to adaptation to new absolute prices, or require changes in the assortment-price matrix of the goods and services offered.

In the case of a food embargo, the first effect shows the change in expenditure due to an increase in food prices uncompensated by a corresponding increase in nominal income. The rise in prices, in turn, is the result of both economic instability and the depreciation of the ruble, and the reaction to the introduction of a food embargo on the part of sellers. The second effect demonstrates a shift caused directly by the substitution of imported goods in the market by domestic and goods from new suppliers, as well as by the price ratio between them.

To achieve this goal, it is necessary to solve the following **research tasks**.

1. Systematize the main applied models of consumer demand and choose the best approach for this purpose and sample.

2. To propose a methodological apparatus that allows in monetary terms to bring the effects of shocks on the market to consumer demand and to distinguish between the "prices effect" and the "elasticities effect".

3. Evaluate the effects on the basis of the selected econometric model, check their adequacy and stability by testing statistical hypotheses and nonparametric methods.

4. To identify the degree of consistency of the results obtained with micro- and macroeconomic theory in the context of import restrictions and inflationary shocks, as well as with the results of applied research on the consequences of the food embargo.

5. Reveal the most vulnerable categories of consumers and product markets that make the most of the overall assessment of the difference between actual and potential levels of spending, assess the prospects for import substitution and the pace of adaptation of the food market.

The **main hypotheses of the research** can be divided into 2 blocks. The first concerns the construction of a consumer demand model and the formulation of a methodology to assess and decompose the impact of shocks on household spending. The second is the applied results of applying the model to food embargo shocks and price surges.

1.1) The use of a consumer demand model combining the components of the QUAIDS and Working-Leser model with instrumentation of individual purchase prices, coupled with scenario modeling, allows us to assess the impact of the studied shocks on household consumption expenditures.

1.2) By modifying the Oaxaca-Blinder approach for the consumer demand model, it is possible to decompose the estimated impact into the two previously described effects.

1.3) Using the example of the food embargo, the use of microdata makes it possible to identify the categories of goods that have experienced the largest gaps in consumer spending, as well as consumer groups that are more sensitive to shocks.

2.1) A more significant impact of the studied shocks was experienced by the expenditures on the categories of goods that underwent the greatest transformation of the assortment-price matrix, that is, they were subjected to active import substitution.

2.2) The most sensitive to shocks were the expenditures of consumers, who are more inclined to buy imported goods, which are considered residents of Moscow.

Households are **the object of research**. The food embargo was studied for Russian households, data on which were collected by the RLMS project (Russian Monitoring of the Economic Situation and Health of the Population of the Higher School of Economics). This database is a series of annual nationwide representative household surveys concerning expenditures on various types of goods and services, incomes by various items, and social and demographic characteristics.

Research period: the applied part of the work uses data from 2010-2019. The lower boundary of the study period was chosen based on the fact that in 2010 the population of Russia largely overcame the consequences of the global economic crisis of 2008-2009. Thus, there are 4 years of follow-up before the studied shifts and 6 years after.

The subject of the research is consumer spending. For the analysis of food counter-sanctions, 5 food categories were selected:

- flour products: a market with a consistently low level of imports and stable inflation;
- fruits and vegetables: a market subject to import restrictions, with low pre-shock and high post-shock inflation;
- meat products: a market subject to import restrictions, where, according to official statistics, the share of imports from 2013 to 2019 fell by 3.7 times;

- dairy products: a market subject to import restrictions, where the share of imports has decreased by 40%, and exporting countries have changed radically;
- candies: a market that is not subject to direct import restrictions, but has experienced high inflation due to the rise in the cost of raw materials.

Methodology

The paper proposes a toolkit to assess the reaction of consumption to the changes that have occurred. Scenario modeling is used to calculate consumption levels in the absence of events in 2014 and the subsequent deviation of the economy from the trajectory that developed in the pre-shock period. For this, the vector of coefficients of the consumer demand equation before the structural break and the vector of average growth in economic indicators up to 2014 were used.

The advantage of the scenario approach over classical methods for assessing the effects of exposure, such as Difference-in-Differences, Propensity Score Matching, is, first of all, taking into account trends in consumption and prices, which are ignored in classical approaches when comparing the post-shock level of consumption with the pre-shock one. In addition, the approach does not require the isolation of a control and experimental group, which is impossible under the conditions of the introduction of a food embargo. An important innovation of the proposed approach was the division of the shift in consumption based on the Blinder–Oaxaca decomposition methodology into the effect associated with the deviation of prices and incomes from the pre-shock trajectory, and the effect associated with the reaction of consumers to the transformation of supply in the market, indicated by a structural shift in the coefficients of the model.

The econometric model used in the study is based on several classical models of consumer demand described earlier. The first model that formed the basis is the QUAIDS model, which allows you to calculate income and price elasticities, since it examines dependencies primarily on economic parameters, such as family welfare and commodity prices. The second model that served as the basis is the Working-Leser model, which has the advantage of its simplicity, since it assumes that demand depends only on household characteristics, such as size and gender composition, as well as total expenditures. The model's coefficients allow you to calculate economies of scale, which is also an important indicator of consumer demand.

In General, the estimated model looks like this:

$$w_{jit} = \beta_{0jt} + \sum_{g=1}^{G_{products}} \beta_{1jg} \ln p_{itg} + \beta_{2j} \ln y_{it} + \beta_{3j} (\ln y_{it})^2 + \beta_{4j} \ln n_{it} +$$
$$+ \sum_{l=1}^{L_{reg}} \beta_{5jl} region_{itl} + \sum_{l=1}^{L_{urb}} \beta_{6jl} urban_{itl} + \sum_{l=1}^{L_m} \beta_{7jl} month_{itl} + \quad (1)$$
$$+ \sum_{l=1}^{L_h} \beta_{8jl} \frac{n_{itl}}{n_{it}} + \beta_{9j} \text{crops}_{it} + \beta_{10j} \text{out}_{it} + u_{jit}$$

where j is product category identifier (that is, a different model is evaluated for each category), w_{jit} - share of expenditures on product category *j* in all consumer costs of household i in year t, p_g is price of the g-th product, y is a real (deflated) per capita household income, n total number of individuals in the family, n_s the number of individuals in a certain category in the family (children, pensioners, etc.), *region* and *urban* territorial factors *month* - the month of the survey, *crops* the existence of private family farms *out* – dummy variable indicating whether the family eats in public. Thus, the coefficients from the group β_1 will be used for calculating price elasticities (own and cross), and the coefficients β_2 and β_3 -for calculating income elasticities, β_4 - for calculating economies of scale.

Traditionally, when evaluating models from the AIDS family, either aggregated indicators of price indices or individual purchase prices are used. However, it is not advisable to use aggregated indicators. As was shown in [Matytsin and Yershov, 2012], it is incorrect to consider prices equal for all consumers, since they are the result of consumer choice. The authors found differences for income groups in both price levels and inflation, but for food products, the burden of inflation is the same for all groups. In the article [Matytsin, 2011], food price indices differentiated by income groups were also calculated. The results showed that food price inflation varies by group, but does not behave monotonically and is highly volatile. The use of individual purchase prices, at the same time, leads to a significant problem of endogeneity, since these prices are selected simultaneously with the quantity and brand of the product. The problem of

endogeneity was discussed in more detail earlier. In this regard, the consumer demand model did not use purchase prices calculated based on RLMS, but their model forecasts, where the main tools are aggregated prices from GKS and belonging to decile income groups. Thus, the assessment of consumer demand is already a two-step procedure with an instrumented price variable.

To construct the price vectors, we used a technique similar to that used in [Matytsin, 2011], i.e., the following model with random effects was evaluated for each product group:

$$\begin{aligned} ln(p)_{it} &= a_o + a_1 \ln\left(p_{gks}\right)_t + \sum a_{2j} region_{itj} + \sum a_{3k} urban_{itk} + \\ &+ \sum a_{4d} group_{itd} + \sum a_{5d} group_{itd} * \ln\left(p_{gks}\right)_t + \sum a_{6m} month_{itm} + \varepsilon_{it} \end{aligned} \quad (2)$$

where p_{gks} - consumer price indices for goods and services in the grouping of the classifier of individual consumption by goals (COICOP) from the GKS website, *group* – a set of dummy variables showing belonging to the decile income group, the remaining variables correspond to model (1). Intersections of income group indicators and GKS price indices have been added to the model to test the hypothesis that different groups also bear a different burden of inflation.

However, after evaluation, it turned out that the coefficients at these intersections were insignificant in the aggregate, which suggests that the increases in food prices for different deciles are close, which was previously found in [Matytsin and Ershov, 2012]. Therefore, the model (2) was reduced to the form (3).

$$\begin{aligned} ln(p)_{it} &= a_o + a_1 \ln\left(p_{gks}\right)_t + \sum a_{2j} region_{itj} + \\ &+ \sum a_{3k} urban_{itk} + \sum a_{4d} group_{itd} + \sum a_{6m} month_{itm} + \varepsilon_{it} \end{aligned} \quad (3)$$

The predicted values obtained after evaluating this regression will be used as final prices in consumer demand models. Thus, the problem of the lack of price differentiation by income groups and territorial affiliation of households is solved, but at

the same time the problem of endogeneity, which occurs if individual purchase prices are used, is leveled.

However, using similar models for prices of different food groups leads to multicollinearity in construction. In view of this, the coefficient estimates for price logarithms are inadequate and cannot be used to calculate price elasticities, so it was decided to use only the logarithm of the product's own price as a regressor in further calculations. This step can also be justified by the fact that, as noted earlier, work is carried out with groups of products with a high degree of aggregation , which is why cross-elasticities for prices are assumed to be zero, since the categories studied are not substitutes or complementary to each other . Thus, the model (1) was modified and took the form (4).

$$\begin{aligned} w_{jit} &= \beta_{0jt} + \beta_{1j} \ln \hat{p}_{jit} + \beta_{2j} \ln y_{it} + \beta_{3j} (\ln y_{it})^2 + \beta_{4j} \ln n_{it} + \\ &+ \sum_{l=1}^{L_{reg}} \beta_{5jl} region_{itl} + \sum_{l=1}^{L_{urb}} \beta_{6jl} urban_{itl} + \sum_{l=1}^{L_m} \beta_{7jl} month_{itl} + \\ &+ \sum_{l=1}^{L_h} \beta_{8jl} \frac{n_{itl}}{n_{it}} + \beta_{9j} \text{crops}_{it} + \beta_{10j} \text{out}_{it} + u_{jit} \end{aligned} \qquad (4)$$

where $\ln \hat{p}_{jit}$ are the estimates obtained from model (3).

Several methods for evaluating the selected model of consumer demand were tested during the research. Since the RLMS sample is panel data, Pooled, Fixed Effects, and Random Effects models as well as the system of seemingly unrelated regressions SUR were tried. The model with random effects turned out to be optimal. In addition, since the data contains a large number of households that did not consume certain foods in the period preceding the survey, the Tobin model was evaluated, that is, the censored regression, also with the addition of random individual effects, which, however, showed results similar to the results of the RE model. Among other things, the adequacy of the results was checked using nonparametric modeling, namely the LOWESS smoothing method (locally weighted scatterplot smoothing), based on which Engel curves were constructed.

The econometric model (4) was evaluated in the period before and after the studied shocks. Further, a modification of the Blinder–Oaxaca decomposition was used, adapted for the chosen econometric model of consumer demand, and comparison of the scenario and actual levels of consumer spending.

We introduce the following notation:

Y_0 and Y_1 − average monthly food expenses before and after 2014, respectively.

Z_0 and Z_1 − average total household expenditures before and after 2014, respectively.

β_0 and β_1 − vector of model coefficients in the period before and after 2014, respectively.

X_0 and X_1 − vector of the average values of the explanatory indicators of the model before and after 2014, respectively.

We can assume what the vector of average food prices and total household spending would have been if food market shocks had not occurred. To do this, we multiply the economic components X_0 by the average pre-shock growth values, leaving the regional and gender-age structure unchanged. Thus, we get X_1^* a scenario vector of the average values of the explanatory indicators of the model after 2014. Multiply β_0 by X_1^* get Y_1^* -the scenario amount of spending on food in the absence of shocks.

$$Y_1^* = Z_1^*(X_1^{*'}\beta_0) \qquad (5)$$

Then $Y_1^* - Y_1$ – the overall effect of the impact on Russian households, taking into account both changes in food prices, as well as family incomes, and changes in the composition of the food basket associated with the food embargo.

$$E_{total} = Y_1^* - Y_1 = Z_1^*(X_1^{*\prime}\hat{\beta}_0) - Z_1(X_1'\hat{\beta}_1) \qquad (6)$$

The methodology for decomposing the overall impact effect by income and substitution effects is more complex and controversial. In this paper, the following assumption is made: since potential consumption, from which the income effect is calculated, is the amount of expenditure that an individual would incur if the prices of all food products (domestic and imported) were changed proportionally – this consumption can be described by a situation in which only economic changes occurred in the food market, without changes in household consumption strategies (elasticities). That is, the potential level of consumption can be represented as a scenario in which X_0 the do changes X_1, that is, to actual economic indicators , but β_0 does not change to β_1, that is, consumers maintain the same behavior as before shocks.

Then, the income effect is equal to:

$$E_{inc} = Z_1^* (X_1^{*\prime} \hat{\beta}_0) - Z_1 (X_1' \hat{\beta}_0) \ , \qquad (7)$$

and the substitution effect is:

$$E_{sub} = E_{total} - E_{inc} = Z_1 X_1' (\hat{\beta}_0 - \hat{\beta}_1) . \qquad (8)$$

To simplify calculations, we assume that the vector X_1^*, which consists of both economic and socio-demographic indicators, differs from the vector X_1 only by economic regressors, namely, real household incomes, expenditures, and food prices. This is due to the fact that, based on rational expectations, shocks in the food market could not lead to shifts in socio-demographic indicators, such as mass migrations or changes in family composition.

Thus, to estimate the vector X_1^*, it is necessary to construct potential levels of economic regressors. To do this, we use the assumption that outside of shocks, the average values of indicators grow at a single constant rate, so for each economic component, we assume:

$$x_{ti} - x_{(t-1)i} = \Delta x_{ti} = \theta_i \, x_{(t-1)i} + \varepsilon_{ti} , \qquad (9)$$

where θ_i is the average growth of the component i up to 2014, ε and is a random error.

Contribution

1. Within the framework of the dissertation research, a new, previously not used in the scientific literature, approach to assessing the discrepancies between the actual and scenario levels of consumption of goods was developed and tested, which took the Blinder- Oaxaca decomposition as a basis. This approach allows us to separate the differences into the effect associated with a decrease in real incomes relative to prices, and the effect associated with changes in the supply of goods and relative prices within the market. Such a decomposition can be useful for the formation of measures to achieve the preservation of consumer welfare and, in particular, food security. The approach can be generalized to analyze other shocks affecting the proposed set of goods and services, not only import restrictions.

2. For the first time, using Russian data, a quantitative assessment was made of the consequences of the food embargo and high food inflation at the household level, in the context of food categories, in terms of nominal and real expenditures on food. The obtained decomposed effects on the markets of various categories of foodstuffs make it possible to understand what consumption of which goods can be stabilized due to the achievement of an acceptable price level, and which ones suffered during import substitution and the change of exporting countries and does not satisfy buyers with quality.

3. Based on the systematization of theoretical and empirical studies of consumer demand modeling, the author has developed an econometric model that combines the advantages of the classical QUAIDS and Workinging-Leser models, supplemented by instrumentation of the price vector in order to get rid of endogeneity. This model can be used not only for analyzing the food market, but also applied to a wide range of goods and services with minimal modifications.

Main Findings

The conducted scientific research is devoted to the development of a methodology for analyzing consumer behavior during shock periods and approbation of this methodology to study the impact of economic shocks and the food embargo of 2014 on the demand for food in Russian households. The class of shocks that can be studied using this methodology is limited to those in which there was a change in the proposed set of goods and services. The most common example of this kind of shock is the restriction of imports of certain goods, import substitution. However, other kinds of restrictions can also be studied: for example, the closure of food service outlets and other services during a pandemic, or a social policy of limiting the sale of unhealthy products.

The results of the analysis of the effects of the complex crisis of 2014 within the framework of the proposed methodology showed that shocks caused by high inflation and embargoes had a significant impact on households, which confirms the main hypothesis tested in the work. The total nominal effect on the products under study was about 3400 rubles, that is, a representative household spends 3400 rubles less per month in the period after 2014 than it would spend if the economy and trade moved along a stationary trajectory.

Table 1 shows the effects in monetary terms. The general effects were found to be significant for all food groups except flour products. This fact is consistent with the hypothesis that those food groups turned out to be more sensitive, where there was a sharp decline in the level of imports. The largest overall effects were found in the market for fruits and vegetables and meat, which is due to the fact that for these two markets the gap between potential and actual price levels turned out to be the largest.

It is important to note that the total overall effect has split in half between the effects of prices and the effects of elasticities, however, if we go down to the level of goods, here the mentioned effects differ significantly. This indicates the validity of the

hypothesis of the existence of two effects, the first of which is associated with an increase in prices, and the second with a modification of the proposal. Price effects are greatest in the meat and dairy markets. Hence, it follows that in these markets, the decline in consumption is associated primarily with a reduction in disposable income relative to the prices of these products. At the same time, in the market for fruits and vegetables, the effect of elasticities is of paramount importance, that is, the consumption of fruits and vegetables is lower than the scenario due to the reaction of consumers. Perhaps the effect is due to the fact that consumers decided to first reduce their consumption of fruits and vegetables in favor of other products. At the same time, in other markets, there is no nominal substitution effect, which suggests that the modification of the offered assortment did not lead to a decrease in demand.

Table 1. Nominal effects

	Overall effect	**Prices effect**	**Elasticities effect**
Flour products	134	80	54
	(113)	(118)	(97)
Fruits and vegetables	1364	88	1276
	(125)	(135)	(106)
Meat products	1177	946	231
	(262)	(270)	(227)
Dairy products	474	463	12
	(131)	(131)	(114)
Candies	250	197	53
	(85)	(88)	(74)
Sum	3399	1774	1625
	(349)	(361)	(301)

The total value of the price effect is the value that can be correctly compared with the values obtained in the studies [Ponomareva, Magomedov, 2017] and [Hinz, Monastyrenko, 2019]. Thus, the price effect amounted to approximately 21 thousand rubles per year, or 3.6% of the total scenario level of expenditures, which is twice as high as in [Hinz, Monastyrenko, 2019] and almost 5 times higher than in [Ponomareva,

Magomedov, 2017]. However, it is important to remember that RLMS data are not representative of regions and income groups, and the fact that RLMS primarily includes low-income decile groups and a large share of Moscow residents may overestimate the average effect, since these groups could be most sensitive.

Meanwhile, the real effect was about 3,000 rubles, which means that households buy products in real terms less than they would buy in the scenario calculation, that is, in fact, demand has fallen, or households cannot afford such a level of consumption.

Table 2 shows the effects in real terms. In contrast to nominal effects, it can be seen here that the overall effect of prices is overwhelming, and the effect of elasticities is statistically indistinguishable from zero. This means that the deviation of deflated demand from the scenario trajectory is primarily associated with an increase in food prices.

The most interesting from the point of view of the studied effects is the candy market. The negative effect of elasticities suggests that structural shifts in estimates, given unchanged economic regressors, would lead to an increase in candy consumption. That is, new products in this market or changes in consumer behavior have led to an increase in the propensity to buy sweets. At the same time, the effect of prices is a positive and more significant value, that is, people cannot afford to consume the desired level.

Table 2. Real effects (in 2010 prices)

	Overall effect	**Prices effect**	**Elasticities effect**
Flour products	163	129	33
	(106)	(111)	(91)
Fruits and vegetables	1037	251	786
	(96)	(104)	(81)
Meat products	1053	911	142
	(244)	(251)	(212)
Dairy products	464	457	7
	(128)	(128)	(111)
Candies	222	795	-573

	(78)	(81)	(68)
Sum	2939	2543	396
	(320)	(330)	(277)

In addition, the results unambiguously indicate that the assumption that the most sensitive to shocks were consumers who are more inclined to buy imported goods is also correct. Residents of Moscow were chosen as such a group of consumers, for whom the real effect was almost 60% higher than the average. In addition, for Muscovites, the mechanisms of influence of the price effect and consumer reaction turned out to be fundamentally different, and the most vulnerable category of goods is dairy products. The high level of elasticity effect in this market, which is not typical for the general sample, may be a sign that the population of Moscow is not satisfied with the quality of the supply of the dairy market, while the residents of the regions, judging by the effects, evaluate the substitutes that have appeared positively. The real effects for Moscow residents are shown in Table 3.

Table 3. Real effects- Moscow

	Overall effect	**Prices effect**	**Elasticities effect**
Flour products	863	784	79
	(97)	(102)	(81)
Fruits and vegetables	184	-390	574
	(108)	(117)	(88)
Meat products	1397	1366	31
	(226)	(232)	(189)
Dairy products	1426	524	901
	(113)	(113)	(95)
Candies	776	2548	-1772
	(74)	(61)	(41)
Sum	4646	4833	-187
	(301)	(307)	(247)

Approbation of Research Results

The results of the dissertation research were published in leading Russian journals included in the Scopus system:

- Berendeeva E. V. Transformation of the Russian food market: income and substitution effects // Economic journal of the Higher school of Economics. 2019. Vol. 23. No. 4. Pp. 605-623. doi
- Berendeeva E. V., Ratnikova T. A. Modeling the reaction of consumer demand of Russian households to the food embargo // Economic journal of the Higher school of Economics. 2018. Vol. 22. No 1. Pp. 9-39. doi
- Berendeeva E. V., Ratnikova T. A. The Deaton-Paxson Paradox in the consumption of Russian households. 2016. Vol. 42, No. 2, Pp. 54-74.

Preliminary results of the study were discussed as part of reports at the following scientific conferences:

- 3rd Workshop «Applied Econometrics» in the framework of XXIth April International Scientific Conference on Problems of Economic and Social Development (Moscow). Report: Transformation of the Russian food market: effects of income and substitution. 2021.
- 11th International Scientific and Practical Conference of Students and Postgraduates «Statistical Methods Of Economic And Social Analysis» (Moscow). Report: Transformation of the Russian food market: effects of income and substitution. 2020.
- XXth April International Scientific Conference on Problems of Economic and Social Development (Moscow). Report: Transformation of the food market in Russia: assessment of consumer welfare losses. 2019.
- XIXth April International Scientific Conference on Problems of Economic and Social Development (Moscow). Report: Consumer demand of Russian households under the food embargo. 2018.

- 9th International Scientific and Practical Conference of Students and Postgraduates «Statistical Methods Of Economic And Social Analysis» (Moscow). Report: Modeling of consumer demand of Russian households in the context of the food embargo. 2018.
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