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# **THE IMPACT OF OMNIVORISM ON CONSUMER CHOICE: THE CASE OF THE BOOK MARKET**

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## **THE IMPACT OF OMNIVORISM ON CONSUMER CHOICE: THE CASE OF THE BOOK MARKET**

This research analyzes the impact of the degree of omnivorousness on consumer choice in the book market. Panel Scanner data for 2012-2015 were provided by a Saint Petersburg chain store. The final sample was restricted to 10,789 purchase occasions made by 3,709 loyal clients in 2015. We assessed the degree of omnivorousness through the use of purchase histories of various book genres. A mixed logit model was employed to control for unobserved differences in preferences. The analysis revealed that consumers in the book market are highly heterogeneous, and this is partially explained by their degree of omnivorousness. Concerning such book characteristics like cover type, rating, format size, and publication year, omnivores' preferences differ from univores'. However, the anticipated distinction in the coefficients of price and number of pages, based on previous researches, was not proved.

JEL Classification: Z

Keywords: omnivorism, discrete choice, demand for books, consumer behavior.

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## Introduction

This research investigates consumer book preferences taking into account the phenomenon of omnivorism. The researched good itself is highly specific. In contrast with other cultural goods markets, the book market is poorly supported by the government. For this reason, it can be referred to as a normal good where retailers maximize their profits and compete for market share. On the other hand, consumer behavior in the book market is strongly associated with the peculiarities of books as cultural products.

The term ‘cultural omnivore’ was introduced by Richard Peterson in 1992. Rossman and Peterson (2005) offered the following definition for the notion: “The omnivore is a new form of cultural consumer who uses conspicuous diversity” (p.1). According to Rossman and Peterson omnivorism emerged in the early 1990s, and the prevalence of such preferences has fluctuated. The shift of highbrow tastes towards omnivorism has been observed in different societies and fields, which resulted in the need for this class to be studied. Omnivorism in music and film viewing has often been analyzed, but still there is a lack of research on omnivorism in reading preferences.

While sociologists study omnivores as a cultural class and economists try to reveal consumer consumption patterns, the present research assesses impact of the degree of omnivorism on consumer behavior in the book market. There is an urgent need for an analysis of the paper book market because of the threat from electronic books. Therefore, the present paper contributes to the consumer choice modeling and fills the gap in consumer characteristics data, which is quite common problem for purchase data analysis. The degree of omnivorousness was chosen because it can be calculated through the use of purchase history, and there is a sociological literature on this phenomenon. We assume that omnivorous preferences should lead to some deviation in consumer behavior. Unlike previous research on omnivorism, our models are based on scanner data which are not conventional for the investigation of cultural classes since they do not include consumer characteristics. Thus the present research investigates omnivores from another angle.

The results imply that an investigation of consumer behavior based on discrete choice model gives an understanding of consumer preferences. The database is unique and enables us to address the issue of consumer choice in the market. The results assess the possibility of using the degree of omnivorousness to investigate preferences. Moreover, it is helpful for decision-making concerning an optimal price policy and assortment planning.

The present paper consists of three parts. The theoretical background provides a literature review and a market review. The empirical study describes data processing, method, and the results. The conclusion summarizes the study, highlighting its contribution to theoretical and applied aspects of the issue, and lists limitations of the research.

## **Theoretical background**

### **Omnivorism**

Bourdieu (1984) showed that in 1960s the French high-status class consisted of two separate segments depending on their consumption pattern. While the first group's preferences were biased towards cultural consumption, the second group preferred material consumption. Later studies came to a different conclusion, finding a positive correlation between the level of material and cultural consumption (Lamont, 1992; Savage et al., 1995; Kraaykamp, 2002). However, Van Eijck and Van Oosterhout (2005) noticed a decrease in the strength of this connection in Netherlands. They said this change was probably related to the emergence of an omnivore class which was not as devoted to the high culture as the cultural elite.

The term 'cultural omnivore' was introduced by Richard Peterson in 1992. Rossman and Peterson (2005) define it as 'a new form of cultural consumer who uses conspicuous diversity rather than refinement and exclusion to signal his or her high status' (p.1). Omnivorism is supposed to have shifted snobbishness in the middle class. The shift in consumption patterns was observed in different societies and fields and resulted in the emergence of the need for this class to be studied. According to Rossman and Peterson (2005), omnivorousness emerged in the early 1990s and the prevalence of such preferences fluctuated. Based on Permanent Survey on Living Conditions of 2003 Coulangeon and Lemel (2007) found that omnivorism matched the available data. Bourdieu's idea of society being partitioned into cultural and economic capital consumers was rejected because in the majority of cases economic and cultural factors did influence the profile of musical tastes. Coulangeon and Lemel (2007) consider that 'people tend to rationalize and diversify their cultural investments in accordance with their assets' (p. 109).

Omnivores are distinguished from other classes in recent studies on cultural classes. The investigation of this phenomenon has mostly been done by sociologists since it refers to class analysis. Although understanding of the preferences of different classes may be useful for modeling consumer behavior, cultural class divisions have not been a conventional concept for economists.

Generally, omnivorousness is identified in terms of volume and composition. The first point suggests that the range of cultural activities is wide: the more extensive the engagement (or the greater the number of items consumed by a person), the higher his/her level of omnivorousness. Omnivorousness by volume may be calculated through the use of taste or participation data. Though participation differs from preferences, there is an overlap. Participation is a preference restricted by money, however it may not be forced by consumer tastes. The second point, omnivorousness by composition, takes into consideration the degree of attachment to various cultural forms. In some cases the preference profile is restricted by distinct genres, usually including both high and low culture to emphasize the diversity. Therefore, people's ability to consume cultural goods with dissimilar characteristics reflects their omnivorous preferences. However, there is no determined boundary between high and low culture, which leads to the problem of measurement (Warde et al., 2007). For this reason, the contemporary mainstream measurement is the by the number of genres.

Warde and Gayo-Cal (2009) emphasize the importance of a suitable measurement choice since it is critical for the results. The strength of the omnivorousness effect may vary significantly depending on how it is calculated. For instance, respondents' socio-demographic characteristics explain more of the variation in omnivorousness measured by participation than by taste. Unfortunately, the standard measurement of omnivorousness, represented by a large proportion of studies, is not effective since it does not penalize for the genre similarity; following Lizardo (2014), we assume that it is crucial to take this into consideration. Omnivorousness measurement will be discussed in details in methodology section.

The next aspect concerns the reasons for the growth in the share of omnivores. First of all, Bryson (1996) supposed that omnivore preferences might be a reflection of the personal trait of tolerance and showed that omnivores in USA were more liberal on racial and political matters. Also university education makes people open to new genres and more confident, which let them reveal their real preferences (Warde et al., 2007). Another reason for this rise is that these tastes are socially beneficial because it increases the probability of common interests. Being adaptive to changing conditions is even more important today because of social, educational and professional mobility. Among the reasons for the increase in omnivorousness, Lahire (2008) distinguished the decline of the effects of cultural legitimacy as a result of the spread of television. Generally speaking, changes in social patterns cause a shift from snobbishness towards omnivorism.

As omnivorousness characterizes high status groups, it is usually associated with high income and education. This hypothesis was confirmed by numerous empirical studies (Zavisca, 2005; Warde and Gayo-Cal, 2009). Based on these results we anticipated a higher willingness to

pay for omnivores. However, the present paper estimations do not confirm this hypothesis. Considering the influence of age and sex, there are conflicting opinions: DiMaggio and Mukhtar (2004) and Katz-Gerro (2002) found women to be more omnivorous, however, Van Eijck (2001) found the opposite result using Dutch data.

Previous empirical research on omnivorism explored various aspects of consumption, from dining out (Warde et al. 1999) and leisure activities (Sintas and Alvarez, 2002) to arts participation (DiMaggio and Mukhtar, 2004) and cultural goods consumption. Fernandez-Blanco et al. (2015) found a crucial change in musical consumption patterns. They distinguished between selective omnivores and high degree omnivores, using Spanish questionnaire data. In contrast to high degree omnivores, selective ones consume fewer musical genres. While omnivorism in music was often analyzed (Bryson 1996; Emmison 2003; Peterson and Kern 1996; Van Eijck 2001), there is a lack of papers studying omnivorism in reading preferences. Zavisca's research (2005) is an exception. The author showed that in Russia readers' tastes by genres are highly heterogeneous: the share of omnivores in Kaluga made up 36% which is a relatively high value.

Omnivorism, reasons for the shift from snobbishness towards omnivorism, and socio-demographical characteristics have been investigated in previous studies. Though, the connection between cultural and material consumption has been proved, the determinants of omnivores' choices have not been not studied. The present study reveals the differences in consumer preferences for books depending on their degree of omnivorousness. Particularly, it compares the price sensitivity of omnivores and univores, and tests omnivores' ability to consume those books which are not highly evaluated by public opinion. Based on previous research, we hypothesize that omnivore preferences considering these aspects differs from univore preferences. For a better understanding of the demand for books specificity we regard literature on this aspect and review some statistics for Saint Petersburg book market.

## **Demand for books**

The present study regards cultural books as cultural goods which are necessary for the fulfillment of cultural needs. Caves (2000) found some features that are common for such products: uncertainty of demand, short period of profitability, infinite variety (horizontal differentiation) and A-list/B-list (vertical differentiation). Canoy et al.'s (2006) book market review provides a solid grounding for understanding of books specifically as a good. One of the most important characteristic of books is that they are experience goods, i.e. their quality cannot be assessed by a consumer before the consumption. However, some signals help consumer to

estimate the expected utility: author, book reviews, word-of-mouth and others. This quality makes marketing a crucial factor for book sales. Marketing helps sellers to attract attention to a book and highlight those properties that are preferred by a consumer (Shehu et al., 2014).

The purchase of a book has some alternatives. In former times there were three ways to read a book: to buy a new book, to buy a used book, to borrow a book from a library. The last alternative was regarded as a determinant of reading habits by Fernandez-Blanco et al. (2015). The authors considered the availability of libraries as a factor influencing the number of books read. Canoy et al. (2006) mention that ‘the quality of the product in libraries is lower, which makes substitutability imperfect’. Moreover, the purchase of a book supposes its possession. Another aspect is that the assortment of books in libraries is limited. Consumers’ choice of books in a shop may depend on their availability in libraries. So, it is useful to control for the date of release. Another option is to buy a used book. Though the internet has developed the market for used books, lower quality decreases the extent of substitution. According to Ghose et al. (2006), used books are poor substitutes for new books for Amazon customers, and used books cannibalize only 16% of the market for new books. The recent reports show that the e-book market cannibalizes the print book market (Lenskii et al., 2016). The effect of e-books was considered by Zhang and Kudva (2014). They analyzed the differences in preferences of e-book and print book readers. 77.7% of readers still read only print books. However, the share of those, who prefer e-books is rising. As a result the neglect of used books, library books and e-books is not an essential limitation since these products are weak substitutes for printed new books. The new printed book market may be considered separately.

Considering consumer choice, there are two types of studies: the first are based on stated preferences and the second on revealed preferences. Stated preferences are usually obtained through questionnaires, while revealed preferences use real world data (for example, scanner data). We use revealed preferences to investigate consumer behavior. This type of data has both advantages and disadvantages. It removes the assessment bias as a result of distorted answers; preferences are revealed by consumer choice. However, the lack of information about consumer’s socio-demographic characteristics is an obvious drawback.

Some studies investigate various aspects of reader characteristics. To find a connection between socio-demographical indicators and reader preferences the stated preference method is more applicable since surveys are a better source of information required for such research. Using Spanish questionnaire data, Fernandez-Blanco et al. (2015) analyzed the connection between reading frequency and education level, age, population density and other factors concerning cultural preferences.

The analysis of reader preferences is popular among economists. Technical progress and the resultant purchase data availability, revealed preferences are often employed for book demand studies. Key issues are the determinants and characteristics of the demand for books, like price elasticity or quality signals. Consumer tastes may vary according to different parameters: genre, length, illustrations, coverage and others. Using aggregate purchase data, Clerides (1999) analyzed consumer preferences in the academic book market and found that consumer choice depends on available book versions (hardcover and paperback). Thus, a cover type variable would be beneficial for consumer preferences reconstruction. Revealed preferences were also employed by Dekker and Jong (2017) for the analysis of quality signals for book and movie consumers. They conclude that only authenticity, which was measured by inclusion in anthologies, had a positive connection with passive consumption, i.e. sales. A similar research question was investigated by Karpik (2011). Positive rating effect on consumer choice was found for some countries. The research emphasized the importance of composition quality. It is relevant to include some variables reflecting this quality, not only external attributes. Individual reader purchase data was used to model the demand for books in Aguzzoni et al. (2016). They employ book control variables: genre, edition date, dummy for books which are part of a series, dummy for illustrations, dummy for paperback; and location control variables: population, density of population, average annual sales, number of universities, education level, competitiveness level and house price. Taking into account consumer characteristics, one can improve the model because it captures consumer heterogeneity. Nevertheless, this is not the only possible way to regard this aspect of preferences. Some Discrete Choice Models allow consumers to be considered heterogeneous.

The influence of book characteristics has been examined by revealed and stated preferences method, nevertheless, demand for books has not been analyzed from the perspective of variety in tastes. The behavior of omnivore readers probably differs a lot and should be considered from the perspective of their preferences.

## **Empirical study**

### **Data**

The initial database consists of purchase records from Saint Petersburg chain stores 2012-15. In order to assess the impact of omnivorism on consumer preferences, the dataset is restricted



to consumers who have loyalty cards. The availability of purchase histories gives an opportunity to measure the omnivorousness based on all store data 2012-14. The basic discrete choice model employs only one point of sales data for 2015. Since the goal is to investigate the consumption of cultural omnivores we consider only fiction: Russian prose (classics), foreign prose (classics), Russian mysteries and thrillers, foreign mysteries and thrillers, Russian fiction and fantasy, foreign fiction and fantasy, romantic novels, and poetry.

We exclude December purchases because a large share of these are likely to be gifts and do not reflect real consumer preferences. During the considered period approximately 10,789 books (5,200 books with distinct title including 212 titles dropped due to the lack of characteristics data) were bought by loyal clients included in our sample. Their percentage by genre is represented in Table 1 of Appendix 1. However, the number of titles purchased in 2015 is almost three times greater among all clients. These titles are taken into consideration for choice set reconstruction as well.

Also we have data for books characteristics:

1. year of publication (year);
2. number of pages (items);
3. cover (1= paperback, 2 = hardcover, 3 = interactive cover);
4. format size (1 = small, 2 = average, 3 = large);
5. rating from livelib.ru (marks are ranged from 1 to 5).

Year of publication is transformed to a categorical variable. Table 2 and Table 3 of Appendix 1 contain descriptive statistics for all independent variables. All books included in choice set are taken into account.

## Methodology

We measure the degree of omnivorousness, to reconstruct the choice set, to employ a discrete choice model and, finally, to interpret the results. This is the general picture for the research design.

As mentioned, the degree of omnivorousness is not available. It is calculated through the use of purchase histories by Lizardo's approach (2014). His formula enables a more effective measure than the number of genres bought by a consumer because it penalizes for genre similarity:

$$EO_i = OV_i - \frac{\sum_{j \in N(i)} \sum_{k \in N(i)} o_{kj}}{OV_i - 1}, \quad (1)$$

where  $EO_i$  is effective omnivorousness,

$OV_i$  is omnivorousness by volume (number of genres read),

$o_{kj}$  is weighted audience overlap for genres  $j$  and  $k$ .

At the first step an  $i \times j$  matrix  $A$  is created as a persons by cultural items network. There are two approaches: binary values of the array cell, where  $a_{ij} = 1$  means that individual  $i$  reads genre  $j$ , and the real values reflecting the number of books of genre  $j$ , which are read by individual  $i$ . The first method is more common because it makes further calculation easier. In the present research we use binary values, however,  $a_{ij} = 1$  if individual  $i$  read at least two books from genre  $j$ . The rationale for the distinction is that the repetition of the choice of genre  $j$  increases the probability that individual  $i$  is loyal to the genre.

At the second stage cultural network matrix  $C$  is generated:

$$C = A'A, \quad (2)$$

Cell  $c_{kj}$  reflects the number of people who likes both genres  $k$  and  $j$ . Then the values are weighted in an adjacency matrix  $O$ :

$$o_{kj} = \frac{c_{kj}}{\min(c_{kk}, c_{jj})}, \quad (3)$$

The matrix is presented in Table 1 (Appendix 2).

Audience overlap means that genres are close since it is more likely that a person reads similar genres than completely different ones. For this reason an effective omnivorousness (EO) measure reflects the real diversity of preferences more precisely. Omnivorousness by volume can be from 1 (univore) to 8 (extreme omnivore), while EO ranges from 0 (univore) to 5.01 (extreme omnivore). Table 2 of Appendix 2 shows the comparison of descriptive statistics for these indicators. A visual representation of people by their omnivorousness is represented in Figure 1.

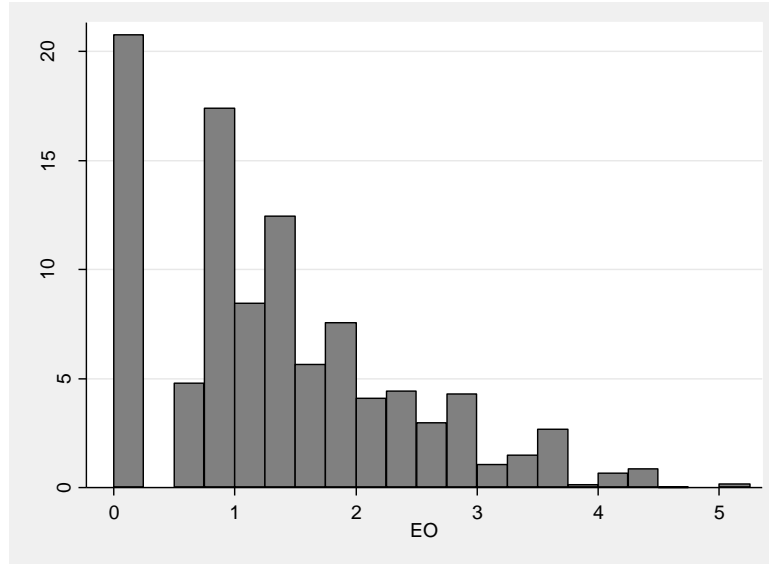


Fig. 1. Percentage of consumers by Effective degree of Omnivorousness

At the next stage the choice set is reconstructed. It is essential to make it correct to avoid distorted estimation results. The choice set is assessed through the use of rolling week sales data. The procedure is based on the assumption that the books which were bought three days before or after a purchase occasion made up the choice set for the occasion. The reconstruction of choice sets for every point of sale is impossible due to the memory restrictions. For this reason, only one point of sales is chosen for the research.

After the choice set reconstruction, book characteristics are transformed into a form appropriate for analysis. We assume that the probability of some genres being purchased is higher than for others. Based on this assumption, 7 dummies for each genre, except for the basic genre (Russian prose), are generated.  $d_{jg}=1$  means that book  $j$  is referred to the genre  $g$ . The next factor is cover type. To assess its influence, we use the hardcover dummy ( $\text{Hardcover}_i=1$  if a book  $i$  has a hardcover). To answer the research question and reveal some differences in omnivore choice we include an interaction effect variables. They are generated by multiplication of omnivorousness degree by other variables: number of pages, dummy for the hardcover, publication year, rating and price. These variable coefficients show whether the value of the coefficients of the corresponding books characteristics differs depending on omnivorousness.

The next variable serves for the consumer heterogeneity reflection. It is genre loyalty variable which is calculated by Guadagni and Little's (1983) method:

$$x_{ik}(n) = \alpha x_{ik}(n-1) + (1-\alpha) \begin{cases} 1 & \text{if customer } i \text{ bought} \\ & \text{alternative of genre } k \\ & \text{at occasion } (t-1) \\ 0 & \text{otherwise} \end{cases}, \quad (5)$$

First, it is necessary to calibrate  $\alpha$ , which reflects the influence of earlier purchases. For this purpose we use a sample consisting of customers who made at least 11 purchases 2012-14. Moreover, we consider only 8 genres. Then a logit regression was employed. The independent variables include book characteristics and dummies reflecting whether or not the genre was purchased on the  $n^{\text{th}}$  prior occasion ( $n = 1, \dots, 10$ ). The assessed coefficients reveal the influence of the corresponding time period purchase. Then the values are normalized to make the first lag coefficient equal to 1. The relation between coefficient values and time lags seems to be exponential. For this reason, a log-linear regression is applied to assess  $\alpha$  was 0,802. The value is a bit lower than in the paper Guadagni and Little (1983), which is explained by bigger time gaps between book purchases in comparison to coffee purchases.

Descriptive statistics of the most important book characteristics, used in the auxiliary regression, are given in Appendix 3 Table 1. The sample consists of fewer weeks, which resulted in fewer books in all choice sets. On the whole, the statistics are relatively similar to the final sample statistics.

Secondly, making the loyalty value equal to  $\alpha$  at the 1<sup>st</sup> purchase in the 2015 sample, we calculate its values for every client, genre, and purchase occasion. Although we use data of only one point of sales in our basic model, we can use the whole purchase history including all possible points of sales. It is also more appropriate as the exclusion of an occasion from client purchase histories distorts the real loyalty to a genre.

The goal of the research is achieved by the development of regression analysis through discrete choice modeling, which is based on the utility function. Particularly, a mixed multinomial logit suggests the following utility function form:

$$U_{ij} = \beta_i X_j + \gamma_i Z_{ij} + \varepsilon_{ij}, \quad (6)$$

where:  $U_{ij}$  is the utility of consumer  $i$  obtained by book  $j$  purchase;

$X_j$  are vectors of the observed variables relating to alternative  $j$ ;

$Z_j$  are vectors of the observed variables relating to alternative  $j$  and consumer  $i$  (interaction effects);

$\beta_i$  and  $\gamma_i$  are consumer  $i$  coefficient vectors;

$\varepsilon_{ij}$  is the unobserved portion of consumer  $i$  utility from book  $j$  purchase.

A mixed logit model is relevant for our goal because it supposes the opportunity to treat variables as random, consequently, consumers are considered to be heterogeneous. We assume the utility function to be linear though it can take other forms. As seen from the formula, each decision-maker may have his own coefficients. However, individual coefficients are not calculated. The density of each parameter is characterized by its mean and standard deviation which serve for choice probability. As a result, part of the utility may be decomposed the following way:

$$(X_j; Z_{ij}) \begin{pmatrix} \beta_i \\ \gamma_i \end{pmatrix} = (X_i; Z_{ij}) \begin{pmatrix} \beta \\ \gamma \end{pmatrix} + \Sigma v_i, \quad (7)$$

where  $\Sigma$  is a variance diagonal matrix,

$v_i$  is a multidimensional random variable.

Then the observed portion of utility is:

$$V_{ij} = (X_i; Z_{ij}) \begin{pmatrix} \beta \\ \gamma \end{pmatrix}. \quad (8)$$

Consequently, the unobserved portion of utility consists of two terms:

$$\eta_{ij} = \Sigma v_i + \varepsilon_{ij}. \quad (9)$$

Since  $\Sigma$  is specified to have a non-zero value in a mixed logit, utilities are correlated over alternatives.

Some variable coefficients may be equal for each decision-maker (i.e.  $\sigma_i = 0$  for each  $i$ ), but if there is not at least one random coefficient, we will have a standard logit model instead of a mixed logit. As a mixed logit model assumes Type I extreme value distribution of  $\varepsilon_{ij}$ , it has the following formula for choice probability:

$$Pr_j = \int \left( \frac{e^{V_{ij} + \Sigma v_i}}{\sum_k e^{V_{ik} + \Sigma v_i}} \right) f(\beta, \gamma) dv_i, \quad (10)$$

where  $V_{ij}$  is the observed portion of utility.

Instead of treating taste parameters  $\beta$ s as constants and using them for the choice probability calculation, the mixed logit evaluates the probabilities for any  $\beta$  from its distribution and weighs them in compliance with its density function. The assessment is based on maximum likelihood method. The model serves the purpose of the present inquiry since it models alternative choice probability:

$$\Pr(y_{ijt} = 1|\beta, \gamma, \Sigma) = g(X_j, Z_{ijt}|\beta, \gamma, \Sigma), \quad (11)$$

Where  $y_{ijt}$  is a dummy for the purchase of a book  $i$  by consumer  $j$  at time  $t$ ;

$\beta, \gamma$  are the vectors of parameter mean values;

$\Sigma$  is the variance diagonal matrix;

$X_j$  are the vectors of observed variables relating to alternative  $j$ ;

$Z_{ijt}$  are the vectors of observed variables relating to alternative  $j$  and consumer  $i$  (interaction effects).

Under the considered utility function specification  $X$  are book characteristic vectors, including price, format size, publication year, number of pages and rating,  $Z$  are the interaction effects of books characteristics and EO; in addition, there is a consumer attribute, loyalty to the genre. We cannot directly include variables constant across a purchase occasion because the same value is added to each alternative utility. This is the restriction of the logit model. The introduction of interaction effect coefficients not only reveals whether omnivores are more or less influenced by various factors but it also enables the calculation of coefficients for distinct omnivorousness degree levels (the sum of a factor coefficient and its interaction effect coefficient multiplied by EO gives the factor coefficient for the precise effective omnivorousness).

The interaction effect coefficients reveal differences in consumer preferences. We suppose that all independent variables have random coefficients since consumers are supposed to be heterogeneous. The price coefficient is specified as log-normally distributed because we assume that there is no consumer whose choice probability rises with a price increase.

The following hypotheses are put forward:

H1: book consumers are heterogeneous;

H2: book consumer heterogeneity is partially explained by their omnivorousness.

The first hypothesis can be proved by the superiority of the mixed logit over the standard logit model. The existence of significant interaction effects (EO and number of pages, EO and size, EO and publication year, EO and rating, EO and price) would evidence an alteration of preferences with the change in omnivorousness, i.e. the second hypothesis validity.

## Results

We hypothesized that book consumers are heterogeneous in their preferences. To test this hypothesis, two models with the same variables set were assessed. They are represented in Table 1. Model (1) and Model (2) are standard multinomial logit and mixed multinomial logit, respectively. We cannot compare the absolute coefficients values. However, we can consider their sign and statistical significance, which are stable, except for genres dummies and price. The price coefficient value change is surprising. In both the standard logit and mixed logit model it is statistically significant. In the first model the price coefficient is 0.00034, in the second it is -7.995. From an economics perspective, the mixed logit result seems to be more realistic. Concerning econometrics, the standard logit model may be biased if the assumption about error distribution is incorrect. Distinctions between standard and mixed logit coefficients with the use of similar independent variables pools means a violation of this assumption. Hence, in our case estimated parameters of standard logit are biased.

The difference in the quality of these models is essential. A decrease in AIC and BIC means that despite a doubling in the number of parameters which are penalized, the second model is more informative. The necessity of assessing standard deviation parameters is also proved by a sharp rise of pseudo  $R^2$  (from 0.065 to 0.697). Consequently, the mixed logit model fits better, and consumer preferences differ.

To test the significance of omnivorousness, we considered four specifications for the mixed multinomial logit model ranging from the most parsimonious one to the most complex in Table 2. The first specification includes only book attribute variables, the second also has dummies for genres. Consumer characteristics, loyalty and the interaction effects of omnivorousness, complement the third and the fourth specification parameters, respectively. According to both AIC and BIC, the additional variables improve the first three models. Though, for the fourth model this is contradictory: AIC decreases, while BIC increases. Otherwise, while Pseudo R-squared evidence is approximately equal to the first three specifications, the superiority of the fourth one is considerable.

On the whole, the results are not consistent in terms of the signs and statistical significance of the coefficients. For instance, the influence of genres changes its direction. It means that more simple models have omitted variables. The problem is gradually eliminated by an increase of parameters. To test the dependence of consumer preferences on their EO, the fourth specification results are given further.

Tab. 1. The comparison of conditional logit and mixed logit estimation results

	(1) Purchase	(2) Purchase
Loyalty	8.157*** (70.90)	9.198*** (46.16)
SD (Loyalty)		3.252*** (16.14)
Price	0.00034*** (6.13)	-7.995*** (-44.60)
SD (Price)		-0.054 (-0.44)
EO×Price	-0.000 (-0.23)	-0.000 (-0.54)
SD (EO×Price)		0.000 (0.02)
Size	-0.195*** (-3.84)	-0.183*** (-3.38)
SD (Size)		0.396*** (6.07)
EO×Size	0.094*** (3.61)	0.097*** (3.36)
SD (EO×Size)		0.174*** (4.78)
Publication year	0.145*** (5.18)	0.220*** (6.74)
SD (Publication year)		-0.412*** (-14.03)
EO×Publication year	0.064*** (4.37)	0.071*** (4.26)
SD (EO×Publication year)		-0.008 (-0.25)
Pages	-0.0002*** (-2.68)	-0.0003*** (-3.13)
SD (Pages)		0.00044*** (4.60)
EO×Pages	-0.000 (-1.54)	-0.000 (-1.38)
SD (EO×Pages)		0.0001** (2.00)
Hardcover	0.278*** (5.36)	0.472*** (6.35)



SD (Hardcover)		1.574 <sup>***</sup> (25.07)
EO×Hardcover	0.011 (0.42)	0.075 <sup>*</sup> (1.94)
SD (EO×Hardcover)		-0.002 (-0.06)
Rating	0.159 <sup>***</sup> (3.58)	0.152 <sup>***</sup> (3.39)
SD (Rating)		-0.057 (-0.82)
EO×Rating	-0.135 <sup>***</sup> (-6.47)	-0.129 <sup>***</sup> (-6.06)
SD (EO×Rating)		-0.032 (-1.44)
Foreign prose	-0.336 <sup>***</sup> (-10.55)	-0.286 <sup>***</sup> (-8.53)
SD (Foreign prose)		-0.074 (-0.89)
Russian detective and thriller	0.423 <sup>***</sup> (8.62)	-0.045 (-0.44)
SD (Russian detective and thriller)		1.035 <sup>***</sup> (8.93)
Foreign detective and thriller	0.546 <sup>***</sup> (11.64)	0.215 <sup>***</sup> (2.70)
SD (Foreign detective and thriller)		-0.764 <sup>***</sup> (-8.52)
Russian fiction and mystery	0.006 (0.12)	-0.518 <sup>***</sup> (-4.97)
SD (Russian fiction and mystery)		1.033 <sup>***</sup> (8.07)
Foreign fiction and mystery	0.161 <sup>***</sup> (3.74)	0.083 (1.49)
SD (Foreign fiction and mystery)		-0.319 <sup>**</sup> (-2.37)
Sentimental novel	0.310 <sup>***</sup> (2.89)	-0.611 <sup>**</sup> (-1.98)
SD (Sentimental novel)		-1.359 <sup>***</sup> (-5.83)
Poetry	0.084 (1.33)	-0.135 (-1.27)
SD (Poetry)		-0.654 <sup>***</sup>

(-4.63)

Number of observations	14767642	14767642
Number of individuals	3709	3709
Number of choice sets	10257	10257
Number of parameters	20	40
pseudo $R^2$	0.065	0.697
<i>AIC</i>	142353.6	140493.5
<i>BIC</i>	142643.7	141073.9

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The availability of control variables for genres gives an opportunity to compare the probability of a distinct genre book in comparison to Russian prose. Dummies for foreign prose, foreign mysteries and thrillers, Russian fiction and fantasy, and romantic novels are statistically significant. Moreover, the exponent of the coefficient value equals the odds ratio (corresponding the variable genre choice to the basic genre choice). For foreign prose it is 0.75, for foreign mysteries and thrillers - 1.24, for Russian fiction and fantasy - 0.60, for romantic novels - 0.54.

We have one more dummy for hardcover, whose coefficient is also statistically significant, and can calculate the odds ratio of hardcover choice to paperback choice. It was 1.6. The idea that consumers prefer hardcover to paperback versions, corresponds to common sense: hardcover books are more durable.

The size variable has a statistically significant negative coefficient which implies the negative effect of larger size. At the same time interaction effect of EO and size is statistically significant and positive. Though we cannot interpret the absolute coefficients values, it is possible to assess the size coefficient for the consumer of a certain omnivorousness. For example, taking into consideration that the maximum value of EO was 5.0, we can calculate the coefficient value for the highest degree omnivores, which is 0.3. Moreover, the sign is positive when EO exceeds 1.9. The size effect for omnivores is the opposite for univores: omnivores prefer large formats.

The publication year coefficient is positive and statistically significant which means that the less time elapsed since publication, the greater probability of the book choice. The interaction effect of EO and publication year is statistically significant. Consequently, the publication year effect on omnivore choice is stronger.

The number of pages variable has a statistically significant negative coefficient, i.e. consumer utility decreases when number of pages increases. The interaction effect of EO and the number of pages is not statistically significant, though we expected omnivores to be able to get more pleasure from sophisticated compositions which are often longer.

Tab. 2. Mixed logit estimation results

	(1) Purchase	(2) Purchase	(3) Purchase	(4) Purchase
Loyalty			9.307*** (46.63)	9.198*** (46.16)
SD (Loyalty)			3.628*** (15.59)	3.252*** (16.14)
Price	-8.570*** (-40.83)	-8.009*** (-68.11)	-8.139*** (-63.66)	-7.995*** (-44.60)
SD (Price)	-0.495*** (-2.87)	-0.225* (-2.16)	0.090 (0.52)	-0.054 (-0.44)
EO×Price				-0.000 (-0.54)
SD (EO×Price)				0.000 (0.02)
Size	-0.0486 (-1.46)	-0.049 (-1.62)	-0.0437 (-1.36)	-0.183*** (-3.38)
SD (Size)	0.735*** (15.02)	-0.262** (-2.30)	-0.547*** (-9.87)	0.396*** (6.07)
EO×Size				0.097*** (3.36)
SD (EO×Size)				0.174*** (4.78)
Publication year	0.407*** (15.75)	0.247*** (14.78)	0.313*** (14.72)	0.220*** (6.74)
SD (Publication year)	0.604*** (18.19)	0.019 (0.16)	0.403*** (11.82)	-0.412*** (-14.03)
EO×Publication year				0.071*** (4.26)
SD (EO×Publication year)				-0.008 (-0.25)
Pages	-0.0005*** (-8.30)	-0.00033*** (-4.65)	-0.00036*** (-6.68)	-0.0003*** (-3.13)
SD (Pages)	-0.0009*** (-11.39)	0.0002 (0.50)	0.0005*** (5.53)	0.00044*** (4.60)
EO×Pages				-0.000 (-1.38)
SD (EO×Pages)				0.0001** (2.00)
Hardcover	0.551*** (11.02)	0.460*** (10.76)	0.566*** (12.26)	0.472*** (6.35)

SD (Hardcover)	1.849 <sup>***</sup> (25.67)	1.539 <sup>***</sup> (23.56)	-1.694 <sup>***</sup> (-25.16)	1.574 <sup>***</sup> (25.07)
EO×Hardcover				0.075 <sup>*</sup> (1.94)
SD (EO×Hardcover)				-0.002 (-0.06)
Rating	-0.059 <sup>**</sup> (-2.04)	-0.069 <sup>***</sup> (-2.67)	-0.052 <sup>*</sup> (-1.86)	0.152 <sup>***</sup> (3.39)
SD (Rating)	0.487 <sup>***</sup> (13.62)	-0.088 <sup>*</sup> (-1.77)	-0.172 <sup>**</sup> (-2.38)	-0.057 (-0.82)
EO×Rating				-0.129 <sup>***</sup> (-6.06)
SD (EO×Rating)				-0.032 (-1.44)
Foreign prose		0.089 <sup>**</sup> (2.45)	-0.290 <sup>***</sup> (-8.52)	-0.286 <sup>***</sup> (-8.53)
SD (Foreign prose)		1.172 <sup>***</sup> (19.41)	-0.083 (-1.43)	-0.074 (-0.89)
Russian detective and thriller		-1.603 <sup>***</sup> (-10.21)	0.030 (0.33)	-0.045 (-0.44)
SD (Russian detective and thriller)		2.670 <sup>***</sup> (20.91)	0.835 <sup>***</sup> (8.26)	1.035 <sup>***</sup> (8.93)
Foreign detective and thriller		-0.819 <sup>***</sup> (-6.92)	0.126 (1.43)	0.215 <sup>***</sup> (2.70)
SD (Foreign detective and thriller)		1.851 <sup>***</sup> (18.36)	0.984 <sup>***</sup> (9.53)	-0.764 <sup>***</sup> (-8.52)
Russian fiction and mystery		-2.476 <sup>***</sup> (-9.32)	-0.476 <sup>***</sup> (-5.13)	-0.518 <sup>***</sup> (-4.97)
SD (Russian fiction and mystery)		3.320 <sup>***</sup> (16.68)	-0.931 <sup>***</sup> (-9.29)	1.033 <sup>***</sup> (8.07)
Foreign fiction and mystery		-0.690 <sup>***</sup> (-8.18)	0.118 <sup>**</sup> (2.52)	0.083 (1.49)
SD (Foreign fiction and mystery)		-1.455 <sup>***</sup> (-16.06)	-0.133 (-0.62)	-0.319 <sup>**</sup> (-2.37)
Sentimental novel		-1.836 <sup>***</sup> (-6.40)	-0.482 <sup>*</sup> (-1.84)	-0.611 <sup>**</sup> (-1.98)
SD (Sentimental novel)		2.122 <sup>***</sup> (12.78)	1.236 <sup>***</sup> (5.77)	-1.359 <sup>***</sup> (-5.83)
Poetry		-0.622 <sup>***</sup> (-3.71)	-0.090 (-0.88)	-0.135 (-1.27)

SD (Poetry)		-0.817*** (-3.48)	0.553*** (3.54)	-0.654*** (-4.63)
Number of observations	14767642	14767642	14767642	14767642
Number of individuals	3709	3709	3709	3709
Number of choice sets	10257	10257	10257	10257
Number of parameters	12	26	28	40
pseudo $R^2$	0.135	0.156	0.141	0.697
<i>AIC</i>	149529.3	145788.7	140587.7	140493.5
<i>BIC</i>	149703.4	146166.0	140993.9	141073.9

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The rating variable reflects the content quality (according to the majority's opinion), thus, the positive value of its coefficient complies with the anticipation. It is statistically significant at the 1% level. However, the more omnivorous a consumer, the less the rating influences his/her choice. Its effect becomes negative when EO exceeds 1.18.

The price coefficient is statistically significant at 0.00% level. Its positive value corresponds to economic theory: the demand curve for a normal good has a negative slope. Omnivore price sensitivity is not lower: the interaction effect of EO and price is close to zero and not statistically significant.

To improve the model, a loyalty indicator supplements consumer characteristic variables. The loyalty coefficient is positive and statistically significant at the 0.00% level. Thus, the book market is characterized by loyalty to genre which has a great influence on consumer choice.

## Conclusion

This research reveals the differences in consumer preferences depending on their omnivorousness degree. The hypotheses put forward before the parameter estimation were proved. Discrete choice analysis revealed that consumers in the book market are highly heterogeneous, and this is partially explained by their omnivorousness. Omnivore preferences differ from univore preference. Estimation results revealed that some characteristics of the books purchased by omnivores and univores are even opposite. However, the results do not completely comply with expectations based on previous research. First of all, omnivores are supposed to be wealthy and more interested in cultural activities than others. This assumption leads to the anticipation of a decreased impact of price on omnivore choice. However, the price effect does not weaken with a rise in the degree of omnivorousness. As the age of omnivores in different

countries may vary, omnivores in Saint Petersburg are probably younger generation which is not so wealthy at the moment.

Book characteristics such as publication year and book size differ for omnivores: they are more influenced by publication year (preferring recent editions) and, unlike univores, prefer large format books. This may imply that they read books in other circumstances. According to previous research, omnivores are more active and have less leisure time.

The number of pages was expected to have a positive effect on omnivore choice. This cultural class is considered to be able to appreciate more sophisticated works because of their adaptability. However, both univores and omnivores from the sample prefer fewer pages.

Otherwise, the ability to appreciate something different from what is commonly acceptable was shown by the omnivore attitude to rating. The books ratings were made by readers on the internet and can be regarded as an audience evaluation. While univores tastes comply with the taste of the majority, omnivores are not susceptible to public opinion. Moreover, from this perspective, their choice is often opposite to univores' choice.

We can conclude that recent results (Lamont, 1992; Savage et al., 1992; Kraaykamp, 2002; Van Eijck and Van Oosterhout, R., 2005; Coulangeon and Lemel, 2007) were indirectly confirmed by survey data and purchase data. Cultural omnivores have their own consumer characteristics and preferences. A connection between cultural and materialistic consumption is observed. Nevertheless, we cannot compare our results directly because there is no research devoted to the omnivorous reader preferences based on scanner data. Previous studies, underlying the hypotheses in the present study, used survey data and concentrated on omnivorism, reasons for its appearance, and the socio-demographical characteristics of omnivores, but did not analyze their preferences and cultural good choice.

The present research has theoretical and practical implications. The theoretical aspect concerns omnivore consumer behavior in the book market. From the perspective of practical implications, the results may be used for pricing policy, for assortment planning and individualized consumer treatment (for instance, targeted adverting).

There are several limitations of the study. The results can be applied to Saint Petersburg book market since preferences of this city readers differ (Ivanov, 2009). In addition, according to previous studies, socio-cultural patterns change relatively fast. This means that the analysis of other time period data may yield different findings. Secondly, the revealed preference method has a substantial limitation: the lack of data on consumer socio-demographical characteristics (this not available via the loyalty card) – at the stage questionnaire data is not available. Another limitation concerns assessment bias as a result of incorrect choice set reconstruction. This is also a consequence of the revealed data method. Moreover, the discrete choice model assumes that

consumer chooses only one alternative. This assumption is violated when we consider books purchases. In the dataset we distinguish simultaneous multiple choices of alternatives into several cases which may lead to biased results.

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Tab. 1. Purchases by genres distribution

Foreign prose	Russian prose	Russian fiction and mystery	Foreign fiction and mystery	Russian detective and thriller	Foreign detective and thriller	Poetry	Sentimental novel
4451	2302	978	962	845	778	339	134
41.2%	21.3%	9.0%	8.9%	7.8%	7.3%	3.2%	1.3%

Tab. 2. Summary statistics for price, number of pages, and rating

	Obs	Mean	SD	Min	Max
Price, rubles	13215	307.3	210.5	12.2	5501.3
Pages, items	13215	423.0	200.6	18	5888
Rating, points	13215	4.0	0.49	1	5

Tab. 3. Summary statistics for variables

	Freq.	Percent
Cover		
Paperback	5137	38.9
Hardcover	8078	61.1
Total	13215	100
Size		
Small (from 107x177mm to 100x140mm)	3676	27.8
Average (from 120x165 mm to 170x240mm)	9375	70.9
Large (from 205x260 mm)	164	1.2
Total	13215	100
Publication year		
Before 2000	8	0.06
From 2000 to 2011	2601	19.7
From 2012 to 2013	3503	26.5
From 2014	7103	53.8
Total	13215	100

Tab. 1. Weighted genre audience overlap matrix

	Foreign prose	Russian prose	Russian fiction and mystery	Foreign fiction and mystery	Russian detective and thriller	Foreign detective and thriller	Poetry	Sentimental novel
Foreign prose	1.000	0.563	0.488	0.479	0.345	0.376	0.507	0.641
Russian prose	0.563	1.000	0.462	0.707	0.421	0.613	0.685	0.677
Russian fiction and mystery	0.488	0.462	1.000	0.352	0.220	0.181	0.421	0.182
Foreign fiction and mystery	0.479	0.707	0.352	1.000	0.205	0.254	0.295	0.164
Russian detective and thriller	0.345	0.421	0.220	0.205	1.000	0.289	0.227	0.187
Foreign detective and thriller	0.376	0.613	0.181	0.254	0.289	1.000	0.246	0.223
Poetry	0.507	0.685	0.421	0.295	0.227	0.246	1.000	0.109
Sentimental novel	0.641	0.677	0.182	0.164	0.187	0.223	0.109	1.000

Tab. 2. Descriptive statistics for omnivorousness degree measures

	Mean	SD	Min	Max
Effective Omnivorousness	1.3	1.0	0.0	5
Omnivorousness by volume	2.8	1.5	1.0	8
<i>Number of observations</i>	3709			

Tab. 1. Summary statistics for price, number of pages, and rating for auxiliary model

	Obs	Mean	SD	Min	Max
Price, rubles	4023	306.867	208.151	19	3071
Pages, items	4023	445.601	200.570	32	2784
Rating, points	4023	4.070	0.409	1	5

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