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IN ROMANIA: A COUNTERFACTUAL ANALYSIS**

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# Food consumption and diet quality choices of Roma in Romania: A counterfactual analysis\*

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## Abstract

This paper analyses the diet quality aspect of food security of Roma in Romania. We employ a modified Blinder-Oaxaca decomposition technique using Household Budget Survey data for the period 2004-2011. The estimates suggest that Roma have inferior diet quality compared to the non-Roma. Around one-third of the diet quality gap is explained by the differences in observed socio-economic factors, whereas the remaining part of the gap is attributed to unobserved factors. We argue that the unexplained component of the diet quality gap is caused by the discrimination of the Roma on the labour market and by their specific informal institutions.

**Key words:** Roma, food security, diet quality, informal institutions, discrimination, counterfactual analysis

**JEL codes:** D12, I12, J15, Q18

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# 1 Introduction

It is estimated there are around 11 million Roma people in Europe, mostly concentrated in the region of Central and Southeast Europe. Romania has one of the largest shares of Roma population in Europe. Around 16% of European and 30% of EU Roma live in Romania. The share of Roma in total Romanian population is above 10%, which is one of the highest shares in Europe (Council of Europe, 2012). Around 75% of Roma population in Romania lives below the poverty line, while 24% of Romanians and 25% of ethnic Hungarians lives below the poverty line (Amnesty International, 2010). In most European countries including Romania, Roma population faces, to various degrees, discrimination reflected in racism and exclusion from the formal labour market as well as more difficult access to healthcare and education than majority population (see, Tomovska, 2010; European Commission, 2012a; 2012b; 2014a; Bartoš et al., 2016; Ciaian and Kancs, 2016).

In this paper we evaluate food consumption and the food security situation of the Roma population in Romania. We focus on the diet quality aspect of food security and reveal a possible cultural (institutional) and economic (marginalisation) forces determining Roma food diet choices. We proxy diet quality with three diet diversity indicators: the count of consumed food items, Simpson index, and Entropy index. Nutrition literature (e.g. Hatloy et al., 2000; Carletto et al., 2013) shows that consumption of diverse diet has positive impact on health and diet diversity is a good indicator of household food security and diet quality. We compare Roma diet choices to that of majority Romanian population and to other non-Roma minorities living in Romania. We study the quality of food diet of the Romanian Roma population using the counterfactual decomposition technique introduced by Blinder (1973) and Oaxaca (1973). Household Budget Survey (HBS) data from the Romanian National Institute of Statistics (NIS) covering the period 2004-2011 is used.

Food insecurity and specifically diet quality of ethnic minorities has been studied mainly in the United States (e.g. Coleman-Jensen et al., 2014). Papers analysing diet composition of the Roma ethnic group in Europe are rather limited. There are only general studies on Roma food security and poverty (UNDP, 2005; European Commission, 2004; 2012a; 2014). An exception is the UNDP (2013) study which collected a more detailed survey data on diet compositions of Roma households in Slovakia. However, this survey does not compare Roma's diet quality with that of the majority population.

Our main contribution to the literature is the evaluation of Roma dietary behaviour and its comparison to majority and non-Roma minority populations using a unique survey micro-

data. To the best of our knowledge, there are no comparable studies on diet quality for the Roma ethnic group in Europe. Given a strong correlation between diet quality and food security this is a significant omission of the literature. Our second contribution to the literature is the application of the Blinder-Oaxaca decomposition technique to food and nutritional security of vulnerable households which has not been widely used in food demand studies.<sup>1</sup>

The paper is organized as follows. The next section provides a brief overview of the recent history of Roma ethnic group, which is followed by the section explaining the determinants of food consumption patterns of Roma that differ from non-Roma. The fourth section presents the methodology for measurement and estimation of diet diversity. The fifth section presents the data used in the estimation. The sixth section describes the results, while the last section concludes.

## **2 Brief overview of the recent history of Roma in Romania**

The current situation of Roma in Romania is heavily affected by the Communist regime installed in Eastern Europe after the World War II and the subsequent transition process following the collapse of the Communism in 1989. During the Communist period, Roma population was hurt by the policy of general nationalization of privately owned assets and factors of production. Roma were particularly affected by confiscation of gold which represented their principle source of wealth. For Roma, the gold confiscation had similar impact to what the collectivisation of agriculture and the nationalisation of industry implied for the non-Roma population (Achim, 2004).

Compared to other Communist countries, Romania did not adopt a coherent or special policy targeting the problem of Roma and thus was not characterised by the excesses observed in some of the neighbouring countries (e.g. sterilisation of Roma women in Czechoslovakia or taking away Roma children from their families and destruction of Roma villages in Hungary). The general policy objective of the Communist regime in Romania was to gradually assimilate Roma ethnic group by restricting their culture, language and their traditional way of life. These policies were an integral part of the general social and cultural policies. They were not ethnically motivated but were perceived as addressing poverty and social issues in the country. Roma were not treated as a distinct group that would require

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<sup>1</sup> An exception is a recent study by Hirvonen (2016) analysing differences in food diversity among children in urban-rural Ethiopia by means of the Blinder-Oaxaca method.

adoption of specific policy actions towards them. Even if some measures undertaken affected mostly Roma, they were not designed to only target the Roma. These policies, however, were not fully successful. Although, the Communism contributed to the modernisation of Roma lifestyles, improvement of social and material condition and helped creating Roma middle class (e.g. industrial workers, intellectuals), Roma underwent a process of socio-economic polarisation compared to non-Roma population. After several decades of the Communist regime in place, a large part of Roma represented the category of population with the most acute social and economic problems to a degree that was not observed in Romania in the past (Achim, 2004).

Roma underwent significant occupational transformations during the Communism; many of them were forced to abandon their traditional occupations and switch to unskilled or semi-skilled jobs. The main type of employment of Roma during the communist period included seasonal labour in cooperative or state farms, while some occupied unskilled jobs in the industrial sector. Other important activity of many Roma during the Communist period was trade. The shortage of basic goods and services was a typical state of the economy under the Communist regime. This however provided for many Roma an opportunity to expand both their legal and illegal trade activities. The centralised system did not allow for private entrepreneurship, thus Roma practically had no rivals in some of the markets. They conducted trade in all kinds of goods such as clothes, cosmetics, carpets, household items, knives, cigarettes, chewing gum, digital watches, gold, foreign currency, collecting scrap metals, etc. Although, private commercial activities were not allowed under the Communist laws, they were often tolerated or were not strictly enforced for Roma, because they were perceived to satisfy certain needs of society and reduce possible social tensions. Under the general conditions of shortages and economic stagnations of the Communist regime, some Roma enjoyed a relatively good economic status and often prestigious social position as their material situation was often significantly better than that of the 'mainstream' population. Although the general policy of the Communist State was to provide to population full employment and social benefits, a significant share of Roma (particularly those without profession or education) were not integrated into the Communist economic and social system and remained outside the job market or traditional Roma occupations. These Roma lived in deprived social and economic conditions usually at the edges of settlements or in marginal areas (Achim, 2004; Troc, 2002).

After the fall of Communism in 1989 the restrictions on cultural freedom and the use of Roma language were abolished. However, the economic situation of Roma deteriorated

drastically during the transition (especially in the early years). Due to widespread discrimination, low education and working skills; Roma were the first to lose their jobs during the transition from central planning to market economy. These factors also reduced their chances to re-enter the job market in the newly created market economic environment. Most Roma remained unemployed and mostly relied on seasonal and occasion type of jobs. The loss of agricultural employment had an especially adverse effect on Roma living in rural areas where the majority of Roma reside (Barany, 2004; Crețan and Turnock, 2009). As a consequence, Roma moved gradually from rural areas to the segregated communities in the suburbs of towns or to blocks of flats in downtown areas (Crețan and Turnock, 2009). The poverty and social exclusion forced many Roma to search for alternative activities such as begging, petty theft, black market trade and other types of semi-illegal activities thus further aggravating the conflict and discrimination tendencies in the mainstream population (Năstasă and Salat, 2003, Crețan and Turnock, 2009; Ciaian and Kancs, 2016).

The transition process to market economy had also a great impact on the Roma that were involved in trading activities during the former Communist system. Given that commercial trade became legal and a recognised activity, Roma lost to a large extent their market position. There were no longer shortages of goods and services in the market, as the private commercial sector was legalised. A greater competitive pressure pushed many Roma out of business. Those more competitive Roma were still able to maintain their former trade activities. However, many Roma were pushed out of the market or entered various semi-legal or illegal activities (Troc, 2002; Marushiakova and Popov, 2003).

These adverse impacts of the previous Communist regime and the subsequent developments during the transition process had repercussions, especially on Roma exclusion from the majority population socio-economic system and on the ability of Roma communities to ensure sufficient and stable incomes for healthy food consumption patterns.

### **3 Roma specific determinants of food consumption patterns**

In this section we first investigate the implications of Roma specific informal institutions on their food consumption patterns. Second, we analyse the role of economic marginalisation of Roma on their food consumption. Both these factors may importantly impact the Roma's food consumption level as well as its quality (diet diversity).

### 3.1 *Impact of Roma informal institutions on food consumption*

All aspects of Roma lives including consumption of food are heavily affected by the informal Roma institutions, *Romaniya*.<sup>2</sup> *Romaniya* rules are customary and oral and are enforced and administered by Roma informal enforcement system. The *Romaniya* legal system coexists with formal national legal order (Fraser, 1995; Weyrauch, 2001; Leeson, 2012). In line with Greif and Laitin (2004) theory of endogenous institutional change, *Romaniya* belongs to self-enforcing institutions (Leeson, 2012). In a self-enforcing institution, the belief-induced behaviour is self-enforcing leading individuals to act in a manner that reproduces the associated beliefs (Greif and Laitin, 2004; Leeson, 2012; Ciaian and Kanacs, 2016).

*Romaniya* regulates both internal functioning of Roma society as well as its interaction with external (non-Roma) people in both social and economic affairs. *Romaniya* relies on ritual belief system with its core concept distinguishing between behaviour that is polluted (*marimé*) and pure (*vujo*).<sup>3</sup> What is *marimé* is perceived in Roma's belief system morally "dirty", not necessarily physically only but also spiritually (ritually). It has powerful significance for Roma as it determines which actions and behaviours are accepted and are in line with rules.

The main source of pollution (*marimé*) is human body. According to *Romaniya*, the human body consists of pure and impure (polluted) parts. The waist is dividing line. The lower body is polluted, while the upper part is fundamentally pure and clean. Further, non-Roma (*Gaje*) are by definition unclean as they do not adhere to the *Romaniya* rules. They are outside the accepted boundaries and they represent a constant danger of contamination.

The Roma belief system based on of *marimé* implies a whole series of social boundaries to Roma and has direct and indirect implication for food consumption habits. Food preparation and consumption needs to respect certain taboos.

*Marimé* rules also restrict consumption of certain foods. For example, horse meat is forbidden to be prepared for food. Certain foods can only be eaten at certain events (e.g., peanuts only in funeral feast) (Weyrauch, 2001).

Important source of impurity and pollution are non-Roma places and objects because they do not observe the *Romaniya* rules. This is also valid for food. Food prepared by non-

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<sup>2</sup> This should not be confused with Romania which refers to country name. The apparent similarity is just a coincidence.

<sup>3</sup> The belief system of the Roma varies from country to country and community to community, but many beliefs are common and vary only in the degree in which they are observed or applied (Patrin, 2015).



Roma is polluted and thus needs to be avoided.<sup>4</sup> To avoid *marimé*, Roma may reject consuming food procured outside the Roma community (e.g. in restaurants, hospitals, prisons). A strategy often used to reduce the pollution risks used when eating away from home is by using disposable dishes and cutlery,<sup>5</sup> eating pre-packed food and drinking from cartons or bottles (Weyrauch, 2001; Leeson, 2012). For example, to avoid pollution, Roma patients may refuse food prepared by non-Roma in the hospital cafeteria and prefer bringing home made food (Honer and Hoppie, 2004).

Other factor that may have affected eating habits of Roma - not necessarily linked to *Romaniya* - is their nomadic way of life practiced particularly in the past. Their diet was restricted to a large extent to what was readily available. For example, this included wild fruits, berries, leafy plants, and small mammals. As the Roma have gradually come into greater contact with non-Roma people and sedentary lifestyle, their eating habits have conformed closer to those of the non-Roma (Patrin, 2015). However, some of the habits may have been preserved till present days and affect dietary choices and way of food preparation and consumption.

The food consumption habits of Roma have implications for diet diversity. First, the key effect is restriction of consuming food prepared by non-Roma. It gives preference to Roma self-prepared food, which likely reduces the dietary diversity and increases cost of some foods which in turn indirectly reduces dietary diversity, or imposes specific requirements on preparation and handling if acquired away from home (e.g. wrapped take-away foods). Overall, these aspects of Roma informal rules reduce the set of consumption options as the access to food procured outside is restricted. Second, certain foods are restricted and not allowed by Roma rules. Third, low availability of food diversity due to the nomadic way of life in the past may affect the present dietary choices. All these elements are specific to Roma and are expected to lead to different dietary behavior of Roma as compared to the non-Roma population.

### ***3.2 Impact of economic marginalisation on Roma food consumption***

The marginalisation and segregation experienced by Roma adversely impacts their income stream which ultimately reduces their possibility to purchase sufficient food particularly of better quality (Theil and Finke, 1983; Jackson, 1984; Dercon 2000, 2002). Roma

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<sup>4</sup> An exception is the children; they may eat food prepared by non-Roma given that they are less subject to *marimé* rule.

<sup>5</sup> Roma may simply eat with their hands rather than use cutlery that may not have been properly washed.

marginalisation is largely due to the labour market discrimination. According to O’Higgins and Ivanov (2006) the unemployment rate of Romanian Roma was 45% compared to 29% of non-Roma in 2004. Further, the study revealed that most Roma suffered from long-term unemployment: 88% of Roma did not have a job since 1996 or earlier.

Roma workers usually have access only to temporary jobs such as seasonal works on farms, specialised crafts (e.g. music), trade on local markets, as well as semi-legal activities (begging). According to European Commission (2012a), only around 29% of Roma were reported to be in paid employment in Romania compared to 38% for similar non-Roma population (Troc, 2002; O’Higgins and Ivanov, 2006). According to European Commission (2014a), a considerable share (66%) of Roma in paid employment face precarious employment conditions: 60% hold ad-hoc jobs, 4% are self-employed and 1% are employed part-time, while only 34% have full time job.

The Roma labor market participation gaps are reflected in low and unstable income. According to the European Commission (2014a), the large majority of Roma households (78%) have an income below the national at risk-of-poverty level (i.e. lower than 60% of the national median disposable income) in Romania, compared to 35% of similar non-Roma households.

Dercon (2000, 2002) argues that the vulnerability of households with risky income stream is high and it is reflected in fluctuations in consumption which adversely impacts nutrition and health of household members. Although households operating in risky environment may develop risk-coping strategies (e.g. income diversification, self-insurance through savings, informal insurance and credit markets, informal risk-sharing) that mitigate decrease of consumption (including food) in periods when income is low, these strategies do not fully eliminate variability in consumption (Dercon 2000, 2002). Further, coping with recurrent income declines is more difficult than coping with a single income shock.

## **4 Methodology: Measuring diet quality and econometric approach**

### ***4.1 Measuring diet quality***

In this paper we employ three measures of household diet quality: (i) the count of food items (CM), (ii) diversity measured by Simpson index (SI), and (iii) diversity measured by Entropy index (EI). The count of food items consumed during specific time period has been used as an indicator of the varied diet (e.g. Moon et al. 2002; Hirvonen, 2016). Other measures used in the literature (e.g. Thiele and Weiss, 2003; Hertzfeld et al., 2014; Liu et al., 2014) are the

Simpson index defined as  $SI = 1 - \sum w_i^2$ , and the Entropy (Berry) index defined as  $EI = \sum w_i \log(1/w_i)$ , where  $w_i$  is the budget share of the  $i^{th}$  (disaggregate) food item in the total food expenditure. Simpson and Entropy indices also take into account the distribution of food consumption. The formulation of SI and EI implies that diversity is higher when more food items are consumed in equal proportions.

#### 4.2 *Econometric approach: Decomposition analysis*

To analyse the differences in the diet quality between Roma and non-Roma ethnic groups we apply a modified Blinder-Oaxaca (Blinder, 1973; Oaxaca, 1973) framework. The Blinder-Oaxaca decomposition has been widely used in labour economics literature to decompose racial and gender wage differentials (e.g. Drydakis, 2012; Croucher et al., 2016). It has also been applied in the health literature to study differences in obesity across racial groups (e.g. Sen, 2014) or in the nutrition literature to study gaps in dietary diversity among children in Ethiopia (e.g. Hirvonen, 2016).

In our case, the Blinder-Oaxaca decomposition divides the mean diet quality differential between Roma and non-Roma groups into two parts - one explained by group differences in observable characteristics such as income, food prices, education, etc., and another that cannot be accounted for by differences in observed characteristics. This unexplained part is interpreted as a measure of specific Roma institutions as well as impacts of discrimination against Roma. It also subsumes the effects of group differences in unobserved characteristics. Let us consider two ethnic groups, A (non-Roma) and B (Roma). To identify the contribution of group differences to the overall outcome difference, we can write:

$$R = \{E(X_A) - E(X_B)\}\beta_B + E(X_B)(\beta_A - \beta_B) + \{E(X_A) - E(X_B)\}(\beta_A - \beta_B) \quad (1)$$

Thus, we have a “threefold” decomposition where the outcome differential  $R$  is divided into three components,  $R = E + C + I$ . The first component,  $E = \{E(X_A) - E(X_B)\}\beta_B$  amounts to the part of the differential that is due to differences between groups in observed characteristics (the “endowment effect”). The second component,  $C = E(X_B)(\beta_A - \beta_B)$  measures the contribution of differences in the coefficients. Third one,  $I = \{E(X_A) - E(X_B)\}(\beta_A - \beta_B)$  is an interaction between endowments and coefficients. Decomposition is formulated from the viewpoint of group  $B$ . The  $E$  component measures the expected change in group  $B$ 's mean outcome if group  $B$  had group  $A$ 's predictor levels (characteristics).

Similarly, the  $C$  component measures the expected change in group  $B$ 's mean outcome if group  $B$  had group  $A$ 's coefficients.

An alternative decomposition approach uses a non-discriminatory coefficient vector to determine the contribution of the differences in the observed characteristics (predictors). Let  $\beta^*$  be such a non-discriminatory coefficient vector that would exist if there were no differences between group  $A$  and group  $B$ . The outcome difference is then

$$R = \{E(X_A) - E(X_B)\}\beta^* + \{E(X_A)(\beta_A - \beta^*) + E(X_B)(\beta^* - \beta_B)\} \quad (2)$$

We now have a “twofold” decomposition,  $R = Q + U$  where  $Q = \{E(X_A) - E(X_B)\}\beta^*$  is the part of the outcome differential that is explained by group differences in the predictors (the quantity effect), and  $U = E(X_A)(\beta_A - \beta^*) + E(X_B)(\beta^* - \beta_B)$  is the unexplained part. The latter is attributed to unobservable factors such as discrimination, specific Roma institutions and cultural factors.

The unexplained part of  $U$  can be expressed as  $E(X_A)\delta_A - E(X_B)\delta_B$ , where  $U_A = E(X_A)\delta_A$  measures institutions and cultural traits in favour of group  $A$ 's diet quality and  $U_B = -E(X_B)\delta_B$  quantifies institutions and cultural traits effects against group  $B$ 's diet quality. Thus,  $U_A$  and  $U_B$  have opposite interpretations.

Estimates of unknown non-discriminatory coefficients vector  $\beta^*$  are needed. Neumark (1988) advocates use of the coefficients from a pooled regression over both groups as an estimate for  $\beta^*$ . Oaxaca and Ransom (1994) and others propose weighting models taking into account the relative importance of groups. An issue with the approach used by Neumark (1988) and Oaxaca and Ransom (1994) is that it can inappropriately transfer some of the unexplained parts of the differential into the explained component. To avoid this, we include a group indicator in the pooled model as an additional covariate.

## 5 Data

We use the Household Budget Survey (HBS) of Romania covering the period from 2004 to 2011. It is organized as a quarterly survey on a sample of 9,360 dwellings. It contains information on household's income, sources of income, expenditures as well as quantities of foodstuffs and beverages consumed. HBS also contains information on household's location and characteristics, residence area characteristics, period of data collection, and information on household's ethnicity. The majority of surveyed households are Romanians. Other ethnic groups include Hungarians, Germans, Serbs, Bulgarians, as well as Roma.

Following previous studies (e.g. Jackson, 1984; Lee and Brown, 1989; Thiele and Weiss, 2003; Hertzfeld et al., 2014) we specify a standard demand for diet diversity. As explanatory variables, we consider total household monthly income (*income*), and unit food price (*food\_price*)<sup>6</sup>. We also include income squared variable (*income\_2*) to account for potential non-linear relation between income level and diet quality. In an attempt to control for the type of income source and potentially for the income uncertainty and the importance of employment patterns, we consider a set of variables including the share of allowances (*share\_allowances*) and share of salaries (*share\_salaries*) in total household monthly income and a dummy variable capturing if the household head was working during the reference month (*d\_working*). The share of food expenditure in the total household disposable income (*w\_food*) accounts for the distribution of household consumption between food and non-food items. Given that households' composition and characteristics may importantly impact the household dietary choices, we include variables measuring household size (*hh\_size*), dummy variable indicating whether household has at least one dependent child (*d\_children*), gender of household's head (*d\_male*), age and age squared of household's head (*age*, *age\_2*), and a set of dummy variables indicating level of education of household head (*edu\_primary*, *edu\_secondary*, *edu\_tertiary*). Further, an important driver of diet composition and quality could be the location of household, in rural or urban area. This variable may capture own-food production as households in rural areas are expected to produce own food. For this reason we consider a dummy variable taking a value one if a household resides in urban area and zero otherwise (*d\_urban*). We also try to proxy regional differences by including a dummy variable for the Bucharest-Ilfov capital region (*d\_bucharest*) taking value one if household resides in this region and zero otherwise. Given that the HBS is a quarterly survey, we consider dummies to account for the quarter within the year for which the survey data were collected (*q1*, *q3*), thus accounting for seasonality in consumption. Finally, to account for common change of food consumption pattern over time we also include a trend variable in the estimated equation (*trend*). Definition of variables used in regressions is presented in Table 1.

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<sup>6</sup> Aggregated food price index is computed similarly to Cupák et al. (2015).

## 5.1 *Ethnic groups*

We distinguish between four ethnic groups in the paper: the majority Romanian households (*d\_romanian*), Roma households (*d\_gypsy*), Hungarian households (*d\_hungarian*), and households belonging to other minorities (*d\_other*). Alongside Roma, the Hungarian ethnic group is amongst the largest minorities in Romania. Table 2 shows the distribution of ethnic groups in the HBS survey for the covered period 2004-2011. In total, the survey includes 127,894 observations, out of which 115,978 (90.68% of total sample) are Romanians, 8,126 (6.35%) are Hungarians, 2,654 (2.07%) are Roma, and 1,137 (0.89%) are other minorities. The share of Roma in the total sample corresponds relatively closely to the 2011 Census according to which Roma account for 2.8% of total population in Romania. These official figures are significantly lower than those reported by Council of Europe (2012) which suggests that the upper estimates of Roma in total population may be as high as 12%.

As reference group A in the decomposition analysis we use three alternatives: the Romanian majority population, Hungarian ethnic group, and “Other” minority group. We estimate dietary differentials of Roma (group B) relative to each of these three non-Roma groups. The main purpose of including other non-Roma minorities (i.e. Hungarians and other minorities) in our analysis is to use them as further control groups. It allows us to test whether the estimated differences in Roma's diet quality with respect to the Romanian majority population are the same or different compared to the diet quality differences estimated with respect to other non-Roma minorities. If the estimated differences in diet quality are the same considering each reference group (Romanians and non-Roma minorities) this would suggest that the variation in the diet is independent from the choice of reference group. In this case we could conclude that indeed the Roma population is unique not only with respect to the majority Romanian population but also compared to other distinct minority groups. In other words, this would suggest that Roma attain different diet quality with respect to majority Romanian population and other non-Roma minorities as well as that the causes explaining them are Roma specific.

## 6 **Empirical results**

### 6.1 *Descriptive statistics*

Descriptive statistics of the HBS survey show a systematic difference in food consumption patterns between Roma, on the one hand, and majority Romanian population and non-Roma minorities, on the other hand. Figure 1 (panel a) depicts the development of the share of food

expenditures in the total income by ethnic group in Romania. The share for Roma is significantly higher (by more than 15%) than for other ethnic groups. For all ethnic groups the ratio declined over time but the difference between Roma and non-Roma was largely maintained. Note that the share of food expenditures of Hungarian and other non-Roma minorities show similar patterns with the majority Romanian population in terms of magnitude and trend over time.

Roma's diet diversity as measured by the number of food items consumed, Simpson and Entropy indices are lower by between 15% to 18% than the diet diversity of Romanians or Hungarians (Figure 1, panels b, c, d). These results indicate a significant gap in food diet quality between Roma and non-Roma ethnic groups. However, some of these differences could be caused by different socio-economic characteristics of households.

There are also important differences in the diet composition between Roma and other ethnic groups. Roma's diet has on average higher share of cereals and lower shares of dairy products and fruits and vegetables relative to other ethnic groups, while differences in diet composition between non-Roma minorities and Romanians seem to be insignificant (Figure 2). These results suggest that Roma households obtain macronutrients and calories from cheaper food sources such as cereals and low quality condiments than Romanians or non-Roma minorities living in Romania.

Table 3 reports descriptive statistics of households from which it follows that Roma ethnic group has lower education, larger household size, and more children per household than other ethnic groups in Romania. Roma purchase cheaper food and have lower incomes than Romanians or non-Roma minorities. These differences between Roma and non-Roma indicate that household characteristics may also explain a part of the observed differences in the diet quality between the ethnic groups.

## **6.2 *Decomposition results***

The estimates from the Blinder-Oaxaca decomposition analysis are reported in Table 4, Table 5, and Table 6.<sup>7</sup> We present results of the decomposition separately for the Roma minority group relative to each of the three reference (control) groups. Table 4 presents results for Roma compared to the Romanian majority. Table 5 shows the results for Roma versus Hungarian minority, while Table 6 reports the differential decomposition for Roma compared

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<sup>7</sup> Blinder-Oaxaca decomposition analysis was executed in Stata software using set of commands developed by Jann (2008).

to other minorities. In all three tables first, we report the mean predictions of diet diversity for the three diversity indicators and their differences between groups. Next, the diet differentials are decomposed into two main parts: the explained (endowment) effect, reflecting differences in the observed factors with the associated estimated coefficients, and the unexplained effect, of unobserved factors. The unexplained part is further divided into two subcomponents measuring factors in favour of group A's diet diversity,  $U_A$ , and factors against group B's diet diversity,  $U_B$ . A positive value of  $U_A$  implies that unobserved factors have positive effects on group A's (the reference group) diet diversity, while a positive value of  $U_B$  indicates unobserved factors having negative impact on the diet diversity of group B (Roma).

Overall, the results from the Blinder-Oaxaca decomposition show that the Roma's diet is quite different from the majority Romanian population diet and even more so when compared to non-Roma minorities (Hungarians and other minorities). First, there are statistically significant differences between Roma's diet and the diet of non-Roma groups (Romanians, Hungarians and other minorities) for all three diversity indicators. Second, the differences in diet diversity are due not only to differences in explanatory variables such as income, prices, and household characteristics but there is also substantial unexplained component which significantly exceeds in magnitude the explained component. All the explained and unexplained differentials are statistically significant at 1% level.

As reported in Table 4, the mean of the diet diversity measured by the count of food items consumed (CM) is 30.64 for the reference Romanian group and 25.80 for Roma, yielding a diet diversity gap of 4.837 between the two ethnic groups. The Blinder-Oaxaca technique splits the diet diversity gap into a part that is explained by differences in observed variables and a part that is caused by unobserved factors. The explained differential of 1.808 indicates that differences in explanatory variables account for around 37% of the diet diversity gap, measured by CM, between Roma and the majority Romanian households. The remaining 3.029 indicates that the unexplained component constitutes as much as 63% of the diet diversity gap of Roma relative to the reference Romanian group. Similar statistically significant results are obtained for the other two indicators of diet quality. The unexplained component accounts for 58% for the Simpson index and 52% for the Entropy index of the total gap observed between Roma and Romanians. The remaining share of the Simpson and the Entropy indexes – 42% and 48%, respectively – is explained by the differences in explanatory variables such as income, prices, and household characteristics.

The decomposition estimates obtained with respect to the control non-Roma minorities are also statistically significantly (Table 5, Table 6). First, Roma perform strictly



worse than the reference non-Roma minorities. That is, the estimated gaps of the mean values of all three diet quality indicators are positive, implying that non-Roma minorities attain better quality diet compared to Roma. Second, the estimated diet quality gap of Roma with respect to non-Roma minorities is greater by between 8% and 50% compared to the gap estimated with respect to Romanians in Table 4. These results imply that Roma perform worse relative to non-Roma minorities than they do with respect to the majority Romanians. That is, Roma have lower diet quality than Romanians and even lower than non-Roma minorities (Table 4, Table 5 and Table 6). Given that the absolute values of the estimated difference in diet quality of Roma relative to the reference Romanian population (Table 4) are lower than the absolute values of differentials estimated with respect to non-Roma minorities (Table 5 and Table 6), non-Roma minorities tend to attain a better diet quality than the majority Romanian population.

The decomposition results for the explained differentials (gap) show that most explanatory variables causing the explained part of diet quality gap are statically significant (Table 4, Table 5 and Table 6). Note that a positive estimated coefficient suggests that its corresponding (differential) variable increases the explained diet differentials (i.e. it is associated with a large explained gap in the diet quality) of Roma relative to the reference non-Roma households. A negative coefficient suggests an opposite result; it is associated with a smaller explained gap in the diet quality of Roma compared to non-Roma. As expected, the explained part of the diet gap due to lower Roma income (larger income differential) is positive on aggregate. The linear income part (*income*) increases the gap, whereas the squared term (*income\_2*) decreases the gap suggesting that households with higher income attain better diet quality as compared to low income households. These results are consistent across all three diversity indicators and reference groups. The employment related explanatory variables accounting for the importance of salary in total income (*share\_salaries*) and labor market participation (*d\_working*) are generally negative and thus reduce the explained part of the diet quality gap between Roma and non-Roma. These results indicate that salaried income and availability of jobs help Roma to improve their diet diversity (or reduce the gap) relative to non-Roma. The importance of allowances in total income (*share\_allowances*) appears to be positive but less statistically significant than the above three income and employment variables. An exception are the estimates for Roma compared to Romanian group (Table 4) where the estimated coefficient corresponding to allowances is negative in Simpson and Entropy index specifications. These results provide some evidence that the higher Roma dependency on state allowances reduces their diet quality.

The impact on explained differentials of food expenditure in total disposable income ( $w\_food$ ) appears to be negative and statistically significant across most diversity indices and reference groups. Considering the fact that the food expenditure share of Roma is larger than the share of non-Roma, reducing the gap in food expenditure shares would lead to reduction in the diet quality gap. In contrast, the impact on the explained gap of food prices ( $food\_price$ ) is positive and statistically significant across all three diversity indices and reference groups. Higher food price differentials increase the diet gap between Roma and the reference non-Roma households (Table 4, Table 5 and Table 6).

Household characteristics have mixed impact on the explained part of diet quality. The dummy accounting for the presence of children in the household ( $d\_children$ ) is negative, the dummies accounting for household male head ( $d\_male$ ) and primary education ( $edu\_primary$ ) are generally positive, while other household characteristics ( $hh\_size$ ,  $edu\_secondary$ ,  $edu\_tertiary$ ,  $age$ ,  $age\_2$ ) have mixed effects across diversity indices and reference groups (Table 4, Table 5 and Table 6). Overall, it appears that higher education (gap) is associated with widening the diet diversity gap.

The estimates for the trend variable ( $trend$ ) suggest that the explained diet gap of Roma increased over time relative to the majority Romanian population (Table 4), whereas it tends to marginally improve relative to other non-Roma minorities (Table 5 and Table 6). The explained differentials due to urban residence ( $d\_urban$ ) is positive and statistically significant for all three diversity indices and reference groups. Roma residing in urban areas consume relatively less diverse diet. Roma in rural areas could rely on own supply of food relative to urban households which usually procure food mostly from the market. Alternatively, the urban variable may capture fewer possibilities for employment of Roma which reduces their possibility to earn higher income to sustain better quality food diet (Table 4, Table 5 and Table 6). Interestingly, the impact of the dummy accounting for household residing in the capital region ( $d\_bucharest$ ) on the diet diversity differential is generally negative in the specification with the reference Romanian group (Table 4), while positive in non-Roma minority specifications (Table 5 and Table 6). These estimates suggest that the diet of Roma residing in the capital is relatively more similar to the diet of the Romanian majority, while compared to the non-Roma minorities Roma attain less diverse diet. The results taken together also suggest that the diet quality of non-Roma minorities is better than the diet quality of the Romanian population in Bucharest.

Turning to the decomposition results for the unexplained component of the diet quality gap, the estimates show that the subcomponent  $U_B$  by far accounts for the major share

(more than 95%) of the total unexplained differential and is statistically significant for all three diversity indicators and reference group specifications. These results suggest that unobserved factors lead to lower diet diversity of Roma relative to non-Roma. The subcomponent  $U_A$  is small and statistically insignificant implying that unobserved factors do not affect non-Roma diet relative to Roma. Similar to the overall gap, the absolute value of the unexplained subcomponent  $U_B$  for Roma relative to the reference Romanian population is smaller than in the case of non-Roma minorities by between 15% and 80%. These estimates indicate that the unobserved factors impact Roma more than non-Roma minorities in their food diet choices. They suggest that Roma are much more different compared to the non-Roma minorities than they are compared to the majority Romanian population (Table 4, Table 5 and Table 6).

Following these decomposition results, we cannot reject the hypothesis that there is a non-trivial incidence of Roma specific factors causing a lower diet quality compared to other non-Roma ethnic groups, even when controlling for the income level, household characteristics and other structural (observed) characteristics. The unexplained gap estimated with the Blinder-Oaxaca decomposition technique is usually attributed to discrimination in the labour literature (e.g. Drydakis 2012; Croucher et al. 2016). However, a direct association between discrimination and the Roma diet quality is difficult to be identified. The causality could occur through indirect channels. As argued in previous sections, the discrimination affects adversely Roma access to labour market which reduces their job opportunities, income level and income and job security/stability. We have attempted to control for some of these effects by including among the explanatory variables household monthly income (*income*), the share of allowances in total household income (*share\_allowances*), the share of salaries in total household income (*share\_salaries*) and dummy variable capturing if the household head was working during the reference month (*d\_working*). As the above results show these variables explain a share of the total observed diet gap between Roma and non-Roma. Although, these variables may capture some of the adverse labour market effects caused by discrimination, they may not fully account for the complex nature of Roma income insecurity and casual nature of jobs they usually have. As a result, following Dercon (2000, 2002), a part of the unexplained component of the diet quality gap of Roma relative to non-Roma could be caused by the risky income stream which is reflected in their inferior nutritional quality.

The unexplained component could be also largely due to the specificities of the Roma informal institutions. This type of ethnicity specific informal institutions and traditions is

difficult to account for in the estimations as the variables to measure them are not readily available. As explained above, Roma institutions and history have direct and indirect implications for their food consumption. Food preparation and consumption have to respect certain rules and taboos which may constrain Roma diet choices. First, restrictions are related to constrained use of food procured from non-Roma, some foods cannot be consumed or can be consumed only at particular events as well as the current eating habits of Roma could be strongly affected by their nomadic way of life practiced in the past when food storage was costly and own food production was limited potentially leading to a lower diet diversity. All these elements are specific to Roma and are likely the cause of the large unexplained relative differential in the Roma diet estimated in this paper compared to the counterfactual non-Roma groups.

Our results also show that unobserved factors affect non-Roma minorities to behave less differently relative to the majority Romanian population in term of their dietary choices than Roma do. Also non-Roma minorities tend to attain better diet quality than the majority Romanian population. This greater diet diversity of non-Roma minorities could be caused by the fact that minorities could combine own food dietary habits (cuisine) with that of majority Romanians and thus obtain a richer and more diverse diet. As our results show, this is not the case for Roma. Roma informal institutions constrain them to diversify their food diet through adoption of food consumption patterns from non-Roma. Indeed the food procured from outside, from non-Roma is perceived as undesirable by the Roma value system as defined by *Romaniya*. Roma informal rules require isolation of the whole aspects of food preparation and consumption from non-Roma and our results support this by suggesting that it leads to lower Roma diet diversity.

## **7 Conclusions**

The analysis of Roma food dietary quality has been generally ignored in the literature. Most studies focus on Roma food security in general such as their access to food, importance of food expenditure in the total income or occurrence of hunger and malnutrition. Nutrition literature shows that consumption of diverse diet and better quality food has positive impact on health status and may also have far reaching beneficial implications on socio-economic performance of individuals. In this paper we attempt to fill this gap in the literature by analysing in more detail the quality of Roma food diet in Romania by looking on how it compares with the non-Roma populations. We measure diet quality using three indicators, the count of consumed food items, Simpson index, and Entropy index. Roma is one of the most

economically marginalised minorities in Europe and thus a better understanding of Roma behaviour and their differences with the mainstream population is of utmost importance. Improved knowledge of Roma dietary choices can contribute to better understanding the food security challenges of Roma as well as it allows to better guide policies towards Roma.

We study the Roma food diet quality using the counterfactual decomposition technique by employing Blinder (1973) and Oaxaca (1973) approach which allows us to decompose the differential in diets between the groups into a part explained by common observable factors and a part that cannot be explained by differences in observed characteristics but which can be attributed to other determinants such as informal institutions or economic (marginalization) forces. Alongside using Romanian majority population as the reference group, we also compare dietary performance of Roma with non-Roma ethnic minorities (Hungarian and other minorities) which serve as control groups to better identify the importance of the diet quality gap of Roma and the relevance of potential Roma specific drivers of their dietary choices. Our data come from the Household Budget Survey (HBS) of Romania collected by the National Institute of Statistics (NIS) and covers the period 2004-2011.

The estimations suggest that the gap in diet quality between Roma and non-Roma populations is substantial. Roma show inferior dietary choices compared to the rest of the population. Around one-third (varying between 23% and 47%) of the gap is explained by the differences in the observed socio-economic factors such income, prices, and household characteristics. The remaining part of around two-thirds (varying between 57% and 77%) of the gap is attributed to unexplained Roma-specific factors. We argue that this unexplained component is caused by the discrimination induced inferior performance of Roma in the labour market (income insecurity and casual nature of jobs) and in particular by their specific informal institutions. Further, our estimates suggest that the dietary differences are significantly greater for Roma than those found for other non-Roma minorities. Unobserved factors cause Roma to be much more different from the majority Romanian population than the non-Roma minorities are which provides a stronger confirmation of the role of Roma-specific factors (e.g. informal institutions) explaining the diet quality gap of Roma with respect to non-Roma.

Our findings are highly important for policy makers, as they help to better understand food diet quality of Roma and potential causes of its gap compared to the rest of the population. The estimated results suggest that the observed dietary gap of Roma cannot be explained solely by standard economic determinants but one needs to take into account also

how the individual choices are impacted by informal institutions and norms, and histories. These results imply that a policy that will target only economic determinants may not be fully successful in improving Roma food diet if informal institutions and norms remain unaltered.

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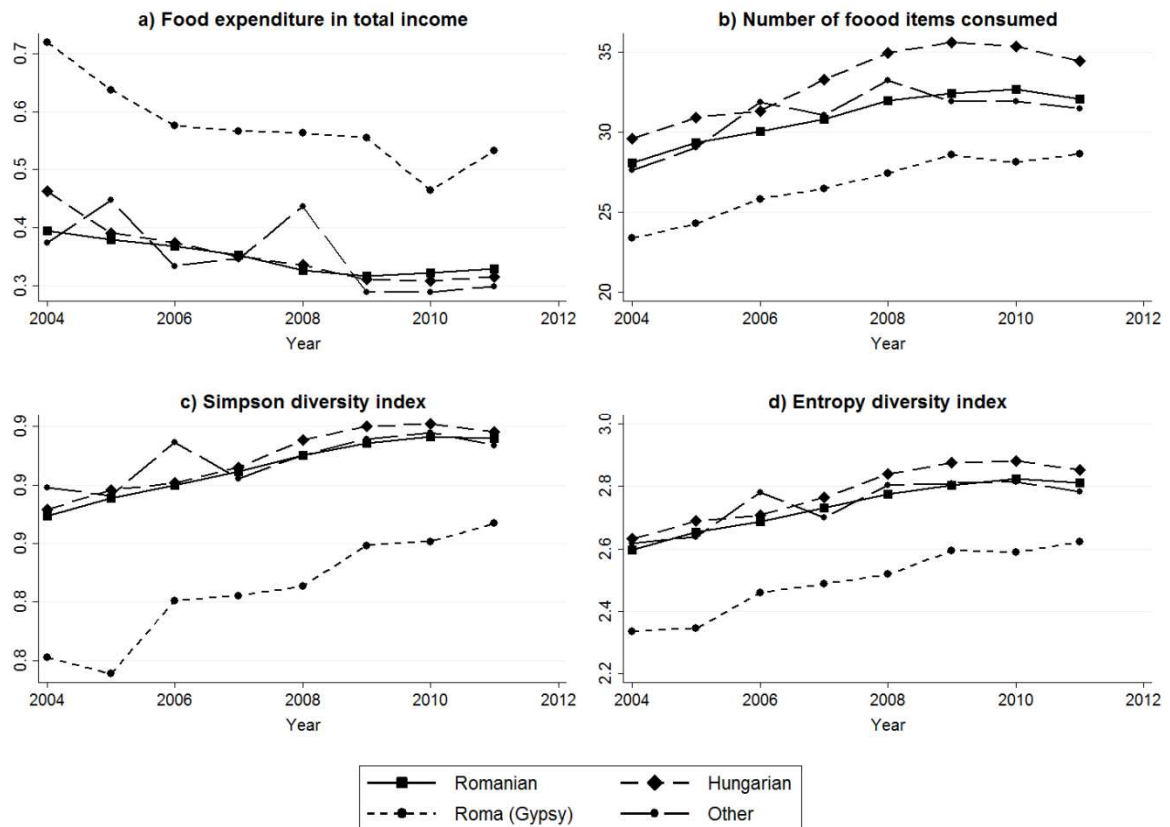
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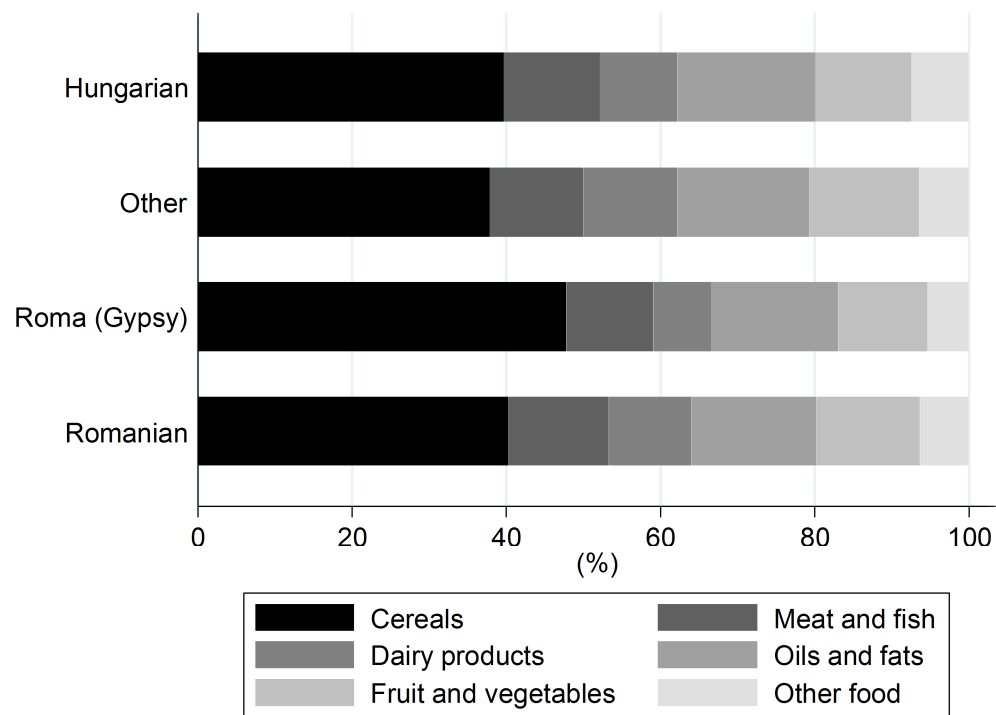
## Figures

**Figure 1. Evolution of food consumption and diet quality measures across ethnic groups and over time**



Source: Household Budget Survey of Romania; own processing

**Figure 2. Composition of diet across ethnic groups**



Source: Household Budget Survey of Romania; own processing

## Tables

**Table 1. Labels and definitions of variables**

| <b>Variable</b>         | <b>Definition</b>  |
|-------------------------|--|
| <i>CM</i>               | Number of food items consumed per month  |
| <i>SI</i>               | Simpson index of diversity   |
| <i>EI</i>               | Entropy index of diversity   |
| <i>income</i>           | Total household monthly income (Leu)   |
| <i>share_allowances</i> | Share of allowances in total household monthly income                                    |
| <i>share_salaries</i>   | Share of salaries in total household monthly income                                      |
| <i>w_food</i>           | Ratio of food expenditure to total household income                                      |
| <i>food_price</i>       | Imputed amount paid per kilogram of food (Leu)   |
| <i>hh_size</i>          | Household size   |
| <i>d_children</i>       | Dummy variable: 1 if household has at least one dependent child                          |
| <i>d_working</i>        | Dummy variable: 1 if household head was working during the reference month               |
| <i>edu_primary</i>      | Dummy variable: 1 if household head has no or primary education                          |
| <i>edu_secondary</i>    | Dummy variable: 1 if household head has lower or upper secondary education               |
| <i>edu_tertiary</i>     | Dummy variable: 1 if household head has university degree                                |
| <i>d_male</i>           | Dummy variable: 1 if household head is male  |
| <i>age</i>              | Age of household's head  |
| <i>d_romanian</i>       | Dummy variable: 1 if household's head declared Romanian nationality                      |
| <i>d_hungarian</i>      | Dummy variable: 1 if household's head declared Hungarian nationality                     |
| <i>d_gypsy</i>          | Dummy variable: 1 if household's head declared Gypsy (Roma) nationality                  |
| <i>d_other</i>          | Dummy variable: 1 if household declared other nationality                                |
| <i>q1</i>               | Dummy variable: 1 if 1 <sup>st</sup> quarter of the season                               |
| <i>q3</i>               | Dummy variable: 1 if 3 <sup>rd</sup> quarter of the season                               |
| <i>trend</i>            | Trend variable (from 2004 to 2011)   |
| <i>urban</i>            | Dummy variable: 1 if household resides in urban area                                     |
| <i>d_bucharest</i>      | Dummy variable: 1 if household resides in area of the Bucharest-Ilfov development region |

Source: Household Budget Survey of Romania; own processing

**Table 2. Distribution of ethnic groups in Romanian HBS data**

| <b>Group</b>     | <b>Frequency</b> | <b>Percent</b> | <b>Cumulative</b> |
|------------------|------------------|----------------|-------------------|
| Romanian         | 115,978          | 90.68          | 90.68             |
| Hungarian        | 8,126            | 6.35           | 97.04             |
| Roma             | 2,654            | 2.07           | 99.11             |
| Other minorities | 1,137            | 0.89           | 100               |
| Total            | 127,894          | 100            |                   |

Source: Household Budget Survey of Romania; authors' calculations

**Table 3. Summary statistics by ethnic groups, 2004-2011**

| Variable                | Ethnic group       |                     |                     |                    | Total              |
|-------------------------|--------------------|---------------------|---------------------|--------------------|--------------------|
|                         | Romanian           | Hungarian           | Roma                | Other minorities   |                    |
| <i>CM</i>               | 32.10<br>(8.360)   | 34.25<br>(8.134)    | 27.97<br>(7.829)    | 32.24<br>(8.254)   | 32.15<br>(8.373)   |
| <i>SI</i>               | 0.885<br>(0.0491)  | 0.887<br>(0.0433)   | 0.843<br>(0.0715)   | 0.886<br>(0.0532)  | 0.884<br>(0.0497)  |
| <i>EI</i>               | 2.747<br>(0.317)   | 2.782<br>(0.296)    | 2.511<br>(0.362)    | 2.748<br>(0.323)   | 2.744<br>(0.319)   |
| <i>income</i>           | 1446.1<br>(1118.3) | 1304.8<br>(969.5)   | 839.2<br>(690.0)    | 1335.6<br>(1055.8) | 1423.3<br>(1105.3) |
| <i>share_allowances</i> | 0.260<br>(0.351)   | 0.265<br>(0.357)    | 0.376<br>(0.359)    | 0.272<br>(0.370)   | 0.263<br>(0.352)   |
| <i>share_salaries</i>   | 0.405<br>(0.422)   | 0.399<br>(0.412)    | 0.162<br>(0.318)    | 0.312<br>(0.405)   | 0.399<br>(0.420)   |
| <i>w_food</i>           | 0.328<br>(0.214)   | 0.336<br>(0.195)    | 0.534<br>(0.257)    | 0.328<br>(0.186)   | 0.333<br>(0.215)   |
| <i>food_price</i>       | 6.385<br>(1.790)   | 6.445<br>(1.686)    | 5.678<br>(1.495)    | 6.473<br>(1.781)   | 6.375<br>(1.781)   |
| <i>hh_size</i>          | 2.893<br>(1.486)   | 2.826<br>(1.372)    | 4.321<br>(2.192)    | 2.811<br>(1.628)   | 2.918<br>(1.512)   |
| <i>d_children</i>       | 0.317<br>(0.465)   | 0.305<br>(0.460)    | 0.630<br>(0.483)    | 0.275<br>(0.447)   | 0.322<br>(0.467)   |
| <i>d_working</i>        | 0.587<br>(0.492)   | 0.513<br>(0.500)    | 0.627<br>(0.484)    | 0.508<br>(0.500)   | 0.583<br>(0.493)   |
| <i>edu_primary</i>      | 0.159<br>(0.365)   | 0.114<br>(0.317)    | 0.534<br>(0.499)    | 0.183<br>(0.387)   | 0.164<br>(0.370)   |
| <i>edu_secondary</i>    | 0.739<br>(0.439)   | 0.827<br>(0.378)    | 0.463<br>(0.499)    | 0.715<br>(0.452)   | 0.739<br>(0.439)   |
| <i>edu_tertiary</i>     | 0.103<br>(0.303)   | 0.0591<br>(0.236)   | 0.00276<br>(0.0525) | 0.103<br>(0.304)   | 0.0977<br>(0.297)  |
| <i>d_male</i>           | 0.745<br>(0.436)   | 0.730<br>(0.444)    | 0.792<br>(0.406)    | 0.719<br>(0.450)   | 0.745<br>(0.436)   |
| <i>age</i>              | 54.10<br>(16.06)   | 54.65<br>(16.02)    | 45.60<br>(14.27)    | 56.86<br>(16.16)   | 53.98<br>(16.07)   |
| <i>q1</i>               | 0.499<br>(0.500)   | 0.492<br>(0.500)    | 0.487<br>(0.500)    | 0.508<br>(0.500)   | 0.498<br>(0.500)   |
| <i>q3</i>               | 0.501<br>(0.500)   | 0.508<br>(0.500)    | 0.513<br>(0.500)    | 0.492<br>(0.500)   | 0.502<br>(0.500)   |
| <i>trend</i>            | 2007.5<br>(2.278)  | 2007.5<br>(2.290)   | 2007.8<br>(2.279)   | 2007.6<br>(2.293)  | 2007.5<br>(2.279)  |
| <i>d_urban</i>          | 0.570<br>(0.495)   | 0.515<br>(0.500)    | 0.462<br>(0.499)    | 0.502<br>(0.500)   | 0.563<br>(0.496)   |
| <i>d_bucharest</i>      | 0.115<br>(0.319)   | 0.00162<br>(0.0403) | 0.0863<br>(0.281)   | 0.0524<br>(0.223)  | 0.107<br>(0.309)   |
| <i>N</i>                | 110557             | 9160                | 2146                | 1158               | 123021             |

Source: Household Budget Survey of Romania; authors' calculations

**Table 4. Results of the Blinder-Oaxaca decomposition analysis: Roma minority compared to Romanian group**

|  | Dependent variable    |                          |                         |
|--|-----------------------|--------------------------|-------------------------|
|  | Number of food items  | Simpson index            | Entropy index           |
| <b>I. Differential</b>                           |                       |                          |                         |
| <i>Prediction (Romanian)</i>                     | 30.64***<br>(0.027)   | 0.883***<br>(0.000)      | 2.718***<br>(0.001)     |
| <i>Prediction (Roma)</i>                         | 25.80***<br>(0.309)   | 0.837***<br>(0.002)      | 2.450***<br>(0.011)     |
| <i>Difference</i>                                | 4.837***<br>(0.311)   | 0.0461***<br>(0.002)     | 0.269***<br>(0.011)     |
| <b>II. Decomposition</b>                         |                       |                          |                         |
| <i>Explained (Total)</i>                         | 1.808***<br>(0.047)   | 0.0192***<br>(0.000)     | 0.128***<br>(0.002)     |
| <i>Explained total (% of total difference)</i>   | 37.38                 | 41.65                    | 47.58                   |
| <i>income</i>                                    | 3.857***<br>(0.058)   | 0.00865***<br>(0.000)    | 0.0954***<br>(0.002)    |
| <i>income_2</i>                                  | -1.644***<br>(0.033)  | -0.00377***<br>(0.000)   | -0.0418***<br>(0.001)   |
| <i>share_allowances</i>                          | 0.0212***<br>(0.006)  | -0.0000538<br>(0.000)    | -0.0000345<br>(0.000)   |
| <i>share_salaries</i>                            | -0.0723***<br>(0.015) | -0.00165***<br>(0.000)   | -0.00664***<br>(0.001)  |
| <i>w_food</i>                                    | -1.084***<br>(0.049)  | -0.00103***<br>(0.000)   | -0.0216***<br>(0.001)   |
| <i>food_price</i>                                | 0.619***<br>(0.013)   | 0.00516***<br>(0.000)    | 0.0381***<br>(0.001)    |
| <i>hh_size</i>                                   | -0.350***<br>(0.029)  | 0.00903***<br>(0.000)    | 0.0378***<br>(0.001)    |
| <i>d_children</i>                                | -0.689***<br>(0.020)  | -0.00202***<br>(0.000)   | -0.0175***<br>(0.001)   |
| <i>d_working</i>                                 | -0.0149***<br>(0.003) | -0.000251***<br>(0.000)  | -0.00103***<br>(0.000)  |
| <i>edu_primary</i>                               | 0.255***<br>(0.014)   | 0.00180***<br>(0.000)    | 0.0132***<br>(0.001)    |
| <i>edu_secondary</i>                             | 0.136***<br>(0.011)   | -0.000135<br>(0.000)     | 0.00175***<br>(0.000)   |
| <i>edu_tertiary</i>                              | 0.0266***<br>(0.006)  | 0.0000985**<br>(0.000)   | 0.00123***<br>(0.000)   |
| <i>q3</i>  | 0.00108<br>(0.001)    | -0.0000496***<br>(0.000) | -0.000183***<br>(0.000) |
| <i>d_male</i>                                    | 0.0530***<br>(0.003)  | 0.000398***<br>(0.000)   | 0.00313***<br>(0.000)   |
| <i>age</i>                                       | 0.872***<br>(0.084)   | 0.00323***<br>(0.001)    | 0.0325***<br>(0.003)    |
| <i>age_2</i>                                     | -0.407***<br>(0.080)  | -0.00141**<br>(0.001)    | -0.0169***<br>(0.003)   |
| <i>trend</i>                                     | 0.0138***<br>(0.001)  | 0.0000563***<br>(0.000)  | 0.000421***<br>(0.000)  |
| <i>d_urban</i>                                   | 0.219***<br>(0.005)   | 0.00126***<br>(0.000)    | 0.00991***<br>(0.000)   |
| <i>d_bucharest</i>                               | -0.00623*<br>(0.003)  | -0.0000768***<br>(0.000) | -0.000165<br>(0.000)    |
| <i>Unexplained total</i>                         | 3.029***<br>(0.315)   | 0.0269***<br>(0.002)     | 0.141***<br>(0.012)     |
| <i>Unexplained total (% of total difference)</i> | 62.62                 | 58.35                    | 52.42                   |
| <i>Unexplained A (Romanian)</i>                  | 0.00502<br>(0.003)    | 0.0000240<br>(0.000)     | 0.000249<br>(0.000)     |
| <i>Unexplained B (Roma)</i>                      | 3.024***<br>(0.314)   | 0.0269***<br>(0.002)     | 0.141***<br>(0.011)     |

Note: Standard errors in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Source: Household Budget Survey of Romania; authors' calculations

**Table 5. Results of the Blinder-Oaxaca decomposition analysis: Roma minority compared to Hungarian group (robustness check)**

|  | Dependent variable    |                          |                         |
|--|-----------------------|--------------------------|-------------------------|
|  | Number of food items  | Simpson index            | Entropy index           |
| <b>I. Differential</b>                           |                       |                          |                         |
| <i>Prediction (Hungarian)</i>                    | 32.96***<br>(0.100)   | 0.887***<br>(0.001)      | 2.766***<br>(0.004)     |
| <i>Prediction (Roma)</i>                         | 25.80***<br>(0.309)   | 0.837***<br>(0.002)      | 2.450***<br>(0.011)     |
| <i>Difference</i>                                | 7.164***<br>(0.325)   | 0.0496***<br>(0.002)     | 0.316***<br>(0.012)     |
| <b>II. Decomposition</b>                         |                       |                          |                         |
| <i>Explained (Total)</i>                         | 1.656***<br>(0.140)   | 0.0174***<br>(0.001)     | 0.115***<br>(0.006)     |
| <i>Explained total (% of total difference)</i>   | 23.12                 | 35.08                    | 36.39                   |
| <i>income</i>                                    | 2.965***<br>(0.142)   | 0.00696***<br>(0.001)    | 0.0759***<br>(0.005)    |
| <i>income_2</i>                                  | -1.128***<br>(0.085)  | -0.00273***<br>(0.000)   | -0.0299***<br>(0.003)   |
| <i>share_allowances</i>                          | 0.0837***<br>(0.016)  | 0.000126<br>(0.000)      | 0.00146*<br>(0.001)     |
| <i>share_salaries</i>                            | -0.180***<br>(0.044)  | -0.00224***<br>(0.000)   | -0.0128***<br>(0.002)   |
| <i>w_food</i>                                    | -0.657***<br>(0.073)  | -0.000389<br>(0.001)     | -0.0134***<br>(0.003)   |
| <i>food_price</i>                                | 0.804***<br>(0.048)   | 0.00473***<br>(0.000)    | 0.0380***<br>(0.002)    |
| <i>hh_size</i>                                   | -0.542***<br>(0.089)  | 0.00862***<br>(0.001)    | 0.0334***<br>(0.004)    |
| <i>d_children</i>                                | -0.710***<br>(0.066)  | -0.00111*<br>(0.000)     | -0.0122***<br>(0.003)   |
| <i>d_working</i>                                 | -0.0981***<br>(0.024) | -0.000933***<br>(0.000)  | -0.00617***<br>(0.001)  |
| <i>edu_primary</i>                               | 0.275***<br>(0.055)   | 0.00209***<br>(0.000)    | 0.0158***<br>(0.002)    |
| <i>edu_secondary</i>                             | 0.165***<br>(0.050)   | -0.000723*<br>(0.000)    | -0.00236<br>(0.002)     |
| <i>edu_tertiary</i>                              | -0.00710<br>(0.014)   | -0.00000965<br>(0.000)   | -0.0000753<br>(0.001)   |
| <i>q3</i>  | -0.00157*<br>(0.001)  | -0.0000316***<br>(0.000) | -0.000202***<br>(0.000) |
| <i>d_male</i>                                    | 0.0612***<br>(0.013)  | 0.000538***<br>(0.000)   | 0.00414***<br>(0.001)   |
| <i>age</i>                                       | 0.0280<br>(0.289)     | 0.0000423<br>(0.002)     | 0.00111<br>(0.012)      |
| <i>age_2</i>                                     | 0.424<br>(0.273)      | 0.00127<br>(0.002)       | 0.0124<br>(0.011)       |
| <i>trend</i>                                     | 0.00223<br>(0.002)    | -0.0000388*<br>(0.000)   | -0.000154<br>(0.000)    |
| <i>d_urban</i>                                   | 0.0432***<br>(0.009)  | 0.000670***<br>(0.000)   | 0.00475***<br>(0.000)   |
| <i>d_bucharest</i>                               | 0.127***<br>(0.033)   | 0.000574<br>(0.000)      | 0.00512***<br>(0.002)   |
| <i>Unexplained (Total)</i>                       | 5.507***<br>(0.357)   | 0.0322***<br>(0.003)     | 0.201***<br>(0.014)     |
| <i>Unexplained total (% of total difference)</i> | 76.88                 | 64.92                    | 63.61                   |
| <i>Unexplained A (Hungarian)</i>                 | 0.0336<br>(0.036)     | 0.000460<br>(0.000)      | 0.00352*<br>(0.002)     |
| <i>Unexplained B (Roma)</i>                      | 5.474***<br>(0.347)   | 0.0318***<br>(0.003)     | 0.198***<br>(0.013)     |

Note: Standard errors in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Source: Household Budget Survey of Romania; authors' calculations

**Table 6. Results of the Blinder-Oaxaca decomposition analysis: Roma minority compared to ‘other’ minority group (robustness check)**

|  | Dependent variable   |                        |                        |
|--|----------------------|------------------------|------------------------|
|  | Number of food items | Simpson index          | Entropy index          |
| <b>I. Differential</b>                           |                      |                        |                        |
| <i>Prediction (Other minorities)</i>             | 31.03***<br>(0.255)  | 0.889***<br>(0.002)    | 2.742***<br>(0.011)    |
| <i>Prediction (Roma)</i>                         | 25.80***<br>(0.309)  | 0.837***<br>(0.002)    | 2.450***<br>(0.011)    |
| <i>Difference</i>                                | 5.229***<br>(0.401)  | 0.0515***<br>(0.003)   | 0.293***<br>(0.016)    |
| <b>II. Decomposition</b>                         |                      |                        |                        |
| <i>Explained (Total)</i>                         | 1.543***<br>(0.216)  | 0.0192***<br>(0.002)   | 0.125***<br>(0.010)    |
| <i>Explained total (% of total difference)</i>   | 29.51                | 37.28                  | 42.66                  |
| <i>income</i>                                    | 2.726***<br>(0.260)  | 0.00594**<br>(0.002)   | 0.0726***<br>(0.010)   |
| <i>income_2</i>                                  | -1.388***<br>(0.181) | -0.00297**<br>(0.001)  | -0.0372***<br>(0.007)  |
| <i>share_allowances</i>                          | 0.0340<br>(0.025)    | 0.000382<br>(0.000)    | 0.00207<br>(0.001)     |
| <i>share_salaries</i>                            | -0.0482<br>(0.045)   | -0.00131***<br>(0.000) | -0.00649***<br>(0.002) |
| <i>w_food</i>                                    | -0.404***<br>(0.119) | 0.00118<br>(0.001)     | -0.00198<br>(0.006)    |
| <i>food_price</i>                                | 1.007***<br>(0.093)  | 0.00905***<br>(0.001)  | 0.0575***<br>(0.004)   |
| <i>hh_size</i>                                   | -0.291*<br>(0.137)   | 0.00914***<br>(0.001)  | 0.0366***<br>(0.006)   |
| <i>d_children</i>                                | -1.111***<br>(0.129) | -0.00434***<br>(0.001) | -0.0323***<br>(0.006)  |
| <i>d_working</i>                                 | -0.0403<br>(0.039)   | -0.000899*<br>(0.000)  | -0.00382*<br>(0.002)   |
| <i>edu_primary</i>                               | 0.376***<br>(0.091)  | 0.00138<br>(0.001)     | 0.0164***<br>(0.004)   |
| <i>edu_secondary</i>                             | -0.0214<br>(0.072)   | 0.0000127<br>(0.001)   | -0.00206<br>(0.003)    |
| <i>edu_tertiary</i>                              | 0.0552<br>(0.052)    | -0.000492<br>(0.001)   | 0.000595<br>(0.002)    |
| <i>q3</i>  | -0.00610<br>(0.004)  | -0.000141**<br>(0.000) | -0.000645**<br>(0.000) |
| <i>d_male</i>                                    | 0.0486<br>(0.027)    | 0.000797**<br>(0.000)  | 0.00458***<br>(0.001)  |
| <i>age</i>                                       | -0.0473<br>(0.606)   | -0.00171<br>(0.005)    | -0.00796<br>(0.028)    |
| <i>age_2</i>                                     | 0.589<br>(0.611)     | 0.00270<br>(0.006)     | 0.0237<br>(0.029)      |
| <i>trend</i>                                     | -0.0282**<br>(0.011) | -0.0000651<br>(0.000)  | -0.000880<br>(0.000)   |
| <i>d_urban</i>                                   | 0.0446***<br>(0.008) | 0.000294***<br>(0.000) | 0.00215***<br>(0.000)  |
| <i>d_bucharest</i>                               | 0.0488***<br>(0.011) | 0.000254*<br>(0.000)   | 0.00203***<br>(0.001)  |
| <i>Unexplained (Total)</i>                       | 3.685***<br>(0.466)  | 0.0323***<br>(0.003)   | 0.168***<br>(0.019)    |
| <i>Unexplained total (% of total difference)</i> | 70.49                | 62.72                  | 57.34                  |
| <i>Unexplained A (other minorities)</i>          | 0.187<br>(0.141)     | 0.000257<br>(0.001)    | 0.00448<br>(0.006)     |
| <i>Unexplained B (Roma)</i>                      | 3.498***<br>(0.434)  | 0.0320***<br>(0.003)   | 0.163***<br>(0.017)    |

Note: Standard errors in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Source: Household Budget Survey of Romania; authors' calculations