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## Game of Prejudice: Experiments at the Extensive and Intensive Margin

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## ABSTRACT

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# Game of Prejudice: Experiments at the Extensive and Intensive Margin\*

In an unique lab-in-the-field experiment we design a novel labor market environment, the Game of Prejudice, to elicit preferences for discrimination towards the largest minority group in Europe (the Roma) at the intensive margins as well as at the extensive margins. Our unique experiment design allows us to separate taste-based discrimination from statistical discrimination and examine the impacts of raising the costs of discrimination in such situations. We find discrimination to be commonplace at both margins, with stronger incidence at the extensive margin. We also find higher incidence of taste-based discrimination compared to statistical discrimination. Importantly, we find that when the cost of taste-based discrimination is made sufficiently high, such behavior disappears at the intensive and extensive margins, providing support for labor market policies that make discrimination very costly for the employer.

**JEL Classification:** C9, D3, I1, O1

**Keywords:** discrimination, extensive margin, intensive margin, lab-in-the field experiment, Slovakia

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## 1. Introduction

Discrimination is commonplace in the labor market, often leading to important differences in social and economic outcomes between genders, ethnicities, and religious groups. Much of this literature can be classified into: 1) people facing discrimination at the extensive margin, i.e., when applying for a job, and 2) people facing discrimination at the intensive margin, i.e., in the workplace that involves unfair treatments in promotions, task assignments, wage offers, etc. Extensive margin discrimination has often been measured through differences in call back rates across pairs of workers with otherwise similar characteristics (see Bertrand and Duflo (2016) and Neumark (2018) for excellent reviews).<sup>1</sup> Experimental evaluations of intensive margin discrimination, in contrast, remain understudied.<sup>2</sup> This is not necessarily due to a lack of discriminatory practices at the intensive margin, as prominent press coverage and frequent legal actions taken by employees reveal. Instead, it is plausibly due to the difficulty in eliciting such preferences in the field.<sup>3</sup>

Although surveys can shed some light on the nature and extent of discrimination among different groups, there are very few surveys which provide comparable results on the prevalence of discrimination at the intensive and extensive margins. One such survey, the 2017 European Union Minorities and Discrimination survey (FRA, 2017a), finds that minorities typically report higher rates of discrimination when looking for work, relative to while working. For instance, 16% of Roma respondents, the largest minority in Europe, report discrimination while looking for a job relative to 5%, who report discrimination while in a job. This trend seems to be pervasive across national boundaries. A small survey in 1994, studying urban inequality in Los Angeles found that 44.7% of African American respondents reported being refused a job because of their race, while 22.6% reported being discriminated at their place of work (Bobo and Suh, 2000). However, results from such surveys are restricted in important ways. First, it is not possible to identify the source of discrimination

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<sup>1</sup> The willingness to pay experiments (both lab and field) also capture discrimination only in the worker/partner selection stage, that is, at the extensive margin and while they measure choices at the intensive margin stage as well, those choices are fraught with selection (Rao, 2019; Mobius and Rosenblat, 2006). For instance, once the subject has chosen a partner of a certain type (gender or ethnicity) from the pool of available partners, the amount of effort the subject exerts with the partner in the next stage then becomes endogenous.

<sup>2</sup> One exception is Babcock et al. (2017) who use a series of lab experiments to examine gender differences in low promotability tasks and find that in comparison to males, females are more likely to volunteer, asked to volunteer, and accept requests to volunteer on low promotability tasks.

<sup>3</sup> Current and former employees routinely sue large companies such as, NY1, Farmers Insurance, Microsoft, Walt Disney Company, Intel, and several others where workers claim discrimination along the lines of gender, age, disability, pregnancy, national origin, and others (Paybarah 2019; Barnes 2019). In fact, the U.S. Equal Employment Opportunity Commission (EEOC) routinely updates and provides press releases on the latest discrimination lawsuits won by them (<https://www.eeoc.gov/eeoc/newsroom/release/>).

using a survey – that is whether discrimination is statistical, or taste-based (Becker, 1957), making corrective policy design difficult.<sup>4</sup> Second, the surveys by design cannot dwell into causality. Critically, surveys also rely on the responder’s own perception of discrimination which can be biased. Laboratory experiments in the field have known to successfully overcome each of these obstacles and in this paper we accordingly chose to use experimental methods primarily to investigate the incidence, sources, and costs of labor market discrimination.

Our goal in this paper is to extend the current discussion on labor market discrimination in the following important ways: First, we design a unique lab-in-the-field experiment that facilitates measuring the incidence of labor market discrimination at the extensive margin and at the intensive margin. This stands out from the standard laboratory experimental literature which only measures discrimination at the intensive margin (see for instance, Eckel and Grossman, (2001), Freshman and Gneezy (2001), Goette et al, (2006) Chen and Li, (2009), Slonim and Guillen, 2010) and artificial in-group out-group networks (see Lane, 2016). Second, our experimental design allows us to decompose discrimination into two possible sources – taste-based and statistical. Here, importantly, we exogenously vary the cost of discrimination at both the extensive and the intensive margin to examine how it impacts the extent as well as the sources of discrimination. It is important to note here that by virtue of our unique design we can provide comparable evidence on the extent, sources, and impact of costly discrimination on employer behavior at both margins.

To measure discrimination at the extensive as well as at the intensive margin and provide greater external validity for our results, we chose to exploit the ingrained dynamics between Roma and Slovaks in Slovakia, instead of artificially creating in-group out-group members commonly implemented in laboratory experiments on discrimination.<sup>5</sup> Roma are the largest minority in Europe, and experience far lower living standards than other groups. Approximately 20% never finish a single grade of primary school, 87% live below the national poverty line, and less than 30% of European Roma are involved in paid work (FRA, 2014). We framed the experiment as a labor market interaction to exploit a common home-

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<sup>4</sup> The policy response to taste-based discrimination would be to increase the employer’s cost of engaging in discriminatory behavior, whereas to address statistical discrimination, we need to provide more information about the workers’ and break stereotypes.

<sup>5</sup> As the experiment was conducted in Slovakia, presumably, all participants were of Slovak citizenship; but differed in their ethnic identity (also referred to as nationality). For the sake of simplicity; throughout the paper we refer to Slovak/Roma/Hungarian employees (or simply Slovaks, Roma, Hungarians; respectively) as students who declared Slovak/Roma/Hungarian ethnicity (respectively) in the background questionnaire (Table 1).

grown belief among the Slovak majorities that the minority groups (especially Roma) are typically unproductive, lazy, and a community “parasitizing” on the labor of the society making their living mainly from social assistance and child allowances (Podolinská, 2017; Marushiakova and Popov, 2016).

Our lab in the field experiment proceeds as follows. Subjects were randomized into either the “extensive margin design” or the “intensive margin design,” and within each design subjects made choices under the various treatments. In each treatment information on the worker’s ethnicity (Slovak, Roma or Hungarian) and/or productivity (high or low effort) is exogenously varied allowing us to draw causal inference on the prevalence, sources (taste and statistical), and effects of costly discrimination at the intensive and extensive margins. Employer preferences at the extensive margin is elicited by the type of employees he/she hires and at the intensive margin via wage offers made to prospective employees conditional on their types. A more detailed discussion of the experiment design is provided in Section 3.

Our results suggest that discrimination is common at the extensive and intensive margins. However, our results suggest that the incidence of discrimination is significantly larger at the extensive margin compared to the intensive margin. We also find important differences in the types of discrimination (statistical vs. taste) practiced at the extensive and intensive margins. We find that taste-based discrimination is practiced at the extensive margin more often than at the intensive margin. Interestingly, we also find that as the cost of taste-based discrimination increases, such behavior disappears at the intensive margin as well as at the extensive margins.

## **2. Background on Ethnic Friction Among Subjects**

The Roma population constitutes the largest minority in Europe. According to the European Committee of Social Rights (2009), they suffer from pervasive historic discrimination which has risen significantly since the economic crisis. According to the 2011 Census, 4.2% of the population identify themselves as Roma, and 5.4% report Roma language as their mother tongue.<sup>6</sup> However, according to the Atlas of Roma Communities in Slovakia (Mušinka et al., 2014), the most comprehensive Census assessment of the Roma

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<sup>6</sup> According to the Slovak census ethnicity is defined as belonging to an ethnic group. It is a self-reported identifier and not generated from responses about mother tongue or language most often spoken at home.

population in the country, approximately 13% of the population in our selected regions are considered Roma.<sup>7</sup>

In Europe, Roma were found to be the second most frequently discriminated minority with 26% of them reporting experiencing discrimination, after the North Africans (31%), and followed by Sub-Saharan Africans (24%), Turks (20%), South Asians, Asians (10%), recent immigrants (10%), and Russians (6%) (FRA, 2017a). According to Bielíková (2010), Slovak adolescents are the least tolerant towards Roma – 39% of respondents consider Roma to be “inferior people”, while 5.9% of pupils consider Africans, and 6.5% of pupils consider Asians to be “inferior people”. In the context of education, around 60% of Slovak pupils reported an objection to share a desk with a Roma pupil, and almost 50% reported “bad,” or “very bad” experience with Roma people (Slovíková, 2012). Not surprisingly, improving the conditions of Roma are a policy priority for the EU. To this end, the EU has spent over 7 billion euro since 2000 on inclusion and anti-poverty programs (European Commission, 2010).

Our experiment was conducted in Eastern Slovakia, during June and September 2017. Our sample includes 779 adolescents (aged 15-18). All subjects were school students. Although experiments are typically conducted among undergraduate student population, we found that according to the latest data from the Census (2011) there were only around 100 Roma university students spread over 36 universities. Thus, it was not practical or feasible to sample Roma college students as subjects unless we were ready to sample the large majority of students from each university to possibly unearth the few Roma students spread over all the universities. Our experiment design required that we have sufficient Roma subjects to be matched with Slovak. Hence we followed the Bauer et al. (2018) study that used primary school students instead to investigate destructive and peaceful behavior between the majority population and Roma students. A key advantage of recruiting school students is that we were able to match subjects with existing peers who lived in the same region. Organizing the experiments in schools also helped avoid problems that could arise from self-selection into the experiment itself. We selected 7 high schools from a region with a relatively high proportion of people with Roma ethnicity. High schools were selected to correctly reflect the distribution of students across different types of schools.

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<sup>7</sup> The Atlas utilizes so-called attributed (imputed) ethnicity, which is based on occurrence, location, and nature of communities perceived as Roma by the majority.



### 3. Experiment Design

We propose a novel lab in the field design to understand and identify the extent to which majority in-group employers discriminate against the minority out-group employees at the extensive margin as well as at the intensive margin. Further, our experiment explores whether observed discriminatory behavior is due to animosity or due to statistical reasons (Becker 1970; Arrow 1972; Phelps 1972). Importantly, and seldom studied in laboratory experiments, we examine the impact of making discrimination costly.

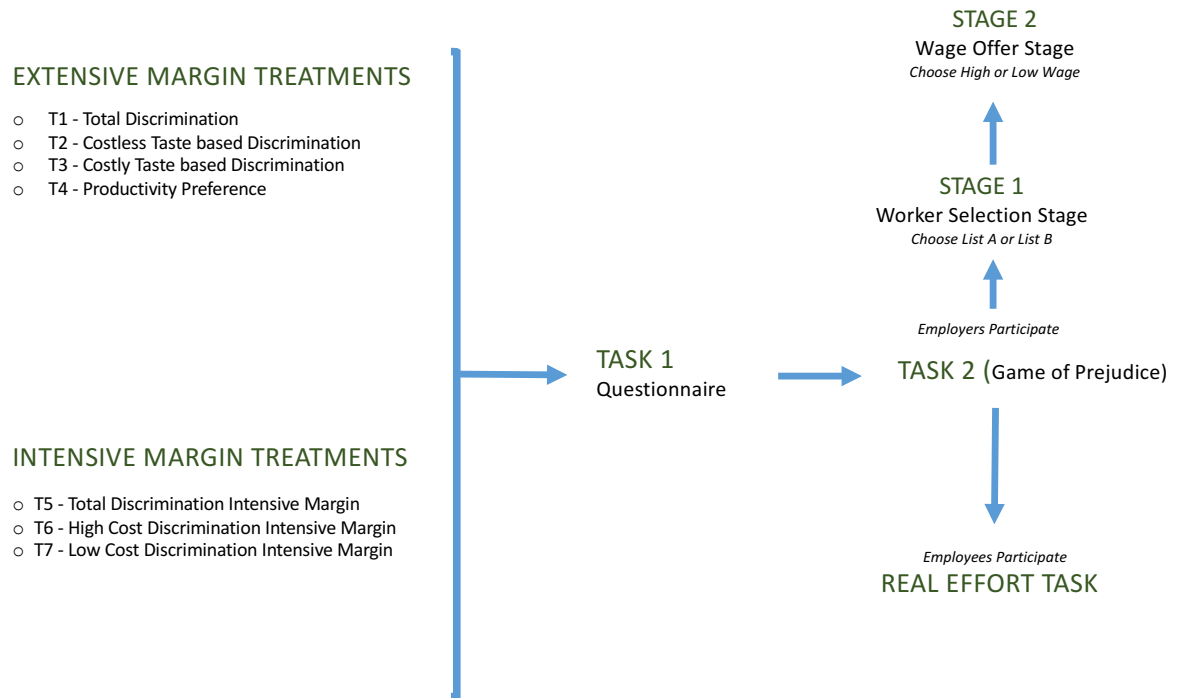
Each subject participated in two tasks. Task 1 is a background questionnaire that elicits information on height, language spoken at home, and ethnicity (see Table 1).

**Table 1: Background Questionnaire**

| Question                                       | Response   |
|--|--|
| 1 What is your height?                         | <input type="checkbox"/> 0-100 cm<br><input type="checkbox"/> 101-200 cm   |
| 2 Is summer one of your favorite seasons?      | <input type="checkbox"/> Yes<br><input type="checkbox"/> No  |
| 3 What is your ethnicity?                      | <input type="checkbox"/> Slovak<br><input type="checkbox"/> Hungarian<br><input type="checkbox"/> Roma<br><input type="checkbox"/> Other |
| 4 What language do your parents speak at home? | <input type="checkbox"/> Slovak<br><input type="checkbox"/> Hungarian<br><input type="checkbox"/> Roma<br><input type="checkbox"/> Other |
| 5 Have you ever been to Iceland?               | <input type="checkbox"/> Yes<br><input type="checkbox"/> No  |

Task 2 introduces the *Game of Prejudice*. As pointed out earlier, there is often a prejudice shared among Slovaks about Roma being unproductive and lazy. Such prejudice is not unique to our field setting. For example, a similar perception prevails among the whites towards black minorities in the USA (DeSante, 2013; Reyna, 2000; Hamermesh, Genadek and Burda 2019). To exploit the homegrown prejudices among our subjects in Slovakia, we frame this second task as an interaction between an employer and an employee. Each Slovak subject is assigned the role of an employer matched with an employee. The employee can exert either *high* or *low effort* in a real effort game. In each treatment we exogenously vary the composition of prospective employees along ethnic identities and/or effort levels.

Employer behavior at the extensive margin is elicited using the pool of prospective employees he hires to work with, and at the intensive margin via wage offers made to prospective employees conditional on their types. Figure 1 below provides an overview of our experiment design and treatments therein.



**Figure 1:** Overview of the Experiment Design

### 3.1 Extensive margin: Employer’s decisions

In our labor market setting prejudice at the extensive margin can manifest in the following way: an employer may prefer working with employees of certain characteristics who belong to their in-group, or alternatively try to minimize the chances of working with employees of certain characteristics belonging to the minority ethnicity/out-group members. Accordingly, our *Game of Prejudice* has two stages of decision making.

#### ***Stage 1: Worker selection stage***

In stage one, the worker selection stage, all subjects playing as employers are given the opportunity to influence the recruitment of potential employees who vary in ethnicity and their effort choices. We implement it in the following way: employers are given two lists (A and B) where each list contains information on the characteristics of four possible group

members. Each of the two lists use three possible ethnic identities – Roma, Slovak, and Hungarian; along with two possible effort parameters – high and low effort (except for Treatments 1 and 5 where we elicit employer decisions unconditional on effort parameters).<sup>8</sup> Once the employer chooses one of the two lists, he is matched with one of the employees from that list with equal chance. To measure the incidence, source, and costs of employers' discriminatory preferences, we exogenously vary information on the characteristics (ethnicity and effort) of the possible employees in each list-pair (see Panels A-D in Table 2). These constitute our four treatments. The treatments are described in detail in Section 3.3 below.

**Table 2: Extensive Margin – Treatments**

| <b>Panel A: Total Discrimination (T1)</b>                |                       |
|--|-----------------------|
| <b>List A</b>  | <b>List B</b>         |
| Roma   | Slovak                |
| Hungarian  | Hungarian             |
| Hungarian  | Hungarian             |
| Roma   | Slovak                |
| <b>Panel B: Costless Taste based Discrimination (T2)</b> |                       |
| <b>List A</b>  | <b>List B</b>         |
| Roma – high type   | Slovak – high type    |
| Hungarian – high type                                    | Hungarian – high type |
| Roma – high type   | Roma – high type      |
| Slovak – high type                                       | Slovak – high type    |
| <b>Panel C: Costly Taste based Discrimination (T3)</b>   |                       |
| <b>List A</b>  | <b>List B</b>         |
| Roma – high type   | Slovak – low type     |
| Hungarian – high type                                    | Hungarian – high type |
| Hungarian – high type                                    | Hungarian – high type |
| Roma – high type   | Slovak – low type     |

<sup>8</sup> The ethnic identities of employees are based on their responses as given in the Background Questionnaire (Table 1). It is useful to point out part of our design choice here. Even though our primary interest is to identify the extent and sources due to which majority might prefer to have or avoid the prospects of a Roma employee, we included a third ethnic identity in each list – that of Hungarians. Since the presence of this third identity remains identical across lists A and B in each treatment (see Panels A-D of Table 2), the choice of either of the two lists A and B cannot be attributed to the presence of Hungarians. Our interest in including Hungarians into the group composition was to minimize social desirability response bias and/or experimenter demand effects, which is an important concern and cause of bias in measuring discrimination using lab experiments. In particular, including a third group, who are also a prominent minority in Slovakia can help obfuscate the experimenter's interest towards measuring behavior towards Roma and possibly helps in reducing the extent to which subjects might provide socially desirable responses of no discrimination. Additionally, to increase the external validity of our decision environment we would like to point out that it is not unusual for the majority to interact with Hungarians since, according to the official 2011 Census data, they are the largest (officially reported) ethnicity in Slovakia (8.5%). In the region of the experiment: 6% of the population belongs to the Hungarian ethnicity, and 8.7% reported Hungarian language as their mother tongue.

| Panel D: <i>Productivity Preference</i> (T4) |                      |
|--|----------------------|
| List A                                       | List B               |
| Slovak – high type                           | Slovak – low type    |
| Hungarian – high type                        | Hungarian – low type |
| Roma – high type                             | Roma – low type      |
| Slovak – high type                           | Slovak – low type    |

Notes: We will interchangeably use the *italicized* part of the treatment name and the treatment number used in Table 2 to refer to a treatment throughout the paper.

### ***Stage 2: Wage offer stage***

After the employer selects one of the two lists (A or B) of potential employees, comes stage 2, the wage offer stage. Here they are randomly matched with an employee from their chosen list and the matched employee's characteristics collected in Task 1 is revealed to the employer. Remember, answers to Task 1 contained information on ethnicity, height, visit to Iceland, whether summer is the subjects' preferred season, and language spoken at home (see Table 1). Other than language spoken at home and ethnicity, the other responses were the same from all subjects.<sup>9</sup> To make it clear and salient we used the terms “*Roma*”, “*Slovak*,” or “*Hungarian*” *employee* in the information sheets given to the employers, where subjects who declared Roma (Slovak/Hungarian) ethnicity or Roma (Slovak/Hungarian) language spoken at home were referred to as Roma (Slovak/Hungarian) employees.

In the wage offer stage, the payoff to the employer and the employee depends on the wage offer chosen by the employer in conjunction with the real effort levels provided by the employee (See Table 3). Note that there are two Nash equilibria (High wage, High effort) and (Low wage, Low effort), and the former equilibrium is Pareto superior. Although this is reminiscent of a coordination game, this is not a traditional coordination game due to the asynchronous way it is implemented in our experiment. In our treatments after the employer chose a list (stage 1), one of the members were chosen with equal probability from that list and matched with the employer in stage 2. Further, in stage 2, relevant information about the randomly selected employee was revealed to the employer who then chose a wage offer. Matching employers with employees this way removed the uncertainty of coordination completely, and hence, choosing a high wage or a low wage, conditional on the effort level of the employee, is a matter of preference for the deciding employer and not related to uncertainty about the worker's productivity (except for T1 and T5). In T1 and T5 after the

<sup>9</sup> Among our subjects, as expected 99.17% of them have never been to Iceland and 86.96% say that summer is their favorite season. Although our interest was to provide ethnic information of the selected employee, we purposely used these additional questions that are irrelevant for our experiment in order to minimize experimenter demand effects which appears to be an important factor in discrimination experiments (Lane, 2016).

employer chose a list, one of the ethnic identities were randomly chosen and revealed to the employer, and the employer chose a wage offer *without knowing* the productivity type of the worker. This was done to elicit taste as well as statistical discrimination together – that is total discrimination. In all other treatments ethnic information about the employee was provided to the employer before they chose a wage offer as required by the information conditions underlying those treatments.

In the wage offer stage, an employer may offer a high wage when an employee puts in high effort, maximizing worker and employer payoffs. However, an employer can also choose to offer a low wage to a high effort worker imposing a payoff of zero on the latter and incurring a cost of two euros on himself. This is equivalent to taking punitive actions against the worker at a cost to the employer's own self, similar to the Joy of Destruction game (Abbink and Sadrieh, 2009). We use this aspect of the design to identify and measure the price of prejudice (Becker 1957) as discussed later. Higher rates of such punitive choices towards one social group over another would be a strong indicator of costly discriminatory behavior.

**Table 3: Wage offers**

|                   |           | Other Participant (Employee)        |   |
|-------------------|-----------|-------------------------------------|---|
|                   |           | High Effort<br>(completed the task) | Low Effort<br>(did not complete the task) |
| YOU<br>(Employer) | High wage | 6, 6                                | 0, 4                                      |
|                   | Low wage  | 4, 0                                | 4, 4                                      |

It is important to point out that employers select their preferred list (A or B) in any treatment only after reading the instructions from stage one and stage two. The stage two instructions provided a description of the prospective employee's real effort task. We did this to enhance saliency and reinforce any existing beliefs towards prospective employee's productivity and success in the real effort task. Note that for the extensive margin experiment, wage offers chosen by the employers are not our primary interest since those choices are endogenous, i.e., conditional on the choices employers previously made in stage 1. Instead, our primary aim is to look at choices of employers at the extensive margin, i.e., whether people discriminate at the point of group selection (stage 1). Consequently, we can

comment on whether Slovak employers prefer to hire an employee with a Slovak identity or a Roma identity.

### 3.2 Extensive margin: Employee's decisions

Subjects participating as employees were informed about the *Game of Prejudice* and then performed the real effort task. In the real effort task, each employee had to copy 35 sentences in Swedish, an unfamiliar language to all participants, onto lined paper in the same format as given to them, i.e., in capitals and on the same lines (see Appendix B). Subjects had 20 minutes to complete the task. Our task was designed to make cumbersomeness strongly salient and to invoke a sense that completing the task requires considerable effort. Subjects who completed the task in the allotted time limit were identified as exerting *high effort*, while those who did not complete were identified as putting *low effort*. Notice, unlike many such coordination games, the employee's choice of effort were not about choosing just labeled action, but was dependent on actual performances. As explained in the previous section, complete information about the worker's task, including the sentences the workers were expected to copy was also communicated to employers.

### 3.3 Extensive Margin Treatments

The four treatments presented in Panels A-D of Table 2 allow us to measure the incidence of discrimination as well as disentangle the sources (taste-based discriminatory behavior from statistical) and the impact of costly discrimination at the extensive margin. In the *Discrimination* treatment (T1), list A includes two Roma and two Hungarians, while list B includes two Slovaks and two Hungarians (see Table 2, Panel A). So, the only difference between list A and list B is the proportion of Roma and Slovak members in each list. Other than the ethnic identity the lists do not provide any other information especially on productivity levels of each employee. Consequently, a Slovak employer who prefers to be matched with a Slovak employee has an incentive to select list B since the probability of hiring a Slovak partner is 50% in list B and zero in list A. If the employer is indifferent between the two lists then on average the proportion of Slovaks choosing list A should be similar to the proportion of Slovaks choosing list B. Formally, no discrimination in this treatment would suggest that the proportion of subjects choosing list A is equal to the proportion of subjects choosing list B (see  $H_1$  in Table 4). Rejecting the null here would indicate that employers discriminate against Roma. This treatment is designed to measure total discrimination, without being able to comment on the sources of discrimination.

In the *Costless Taste* treatment (T2), list A contains two Roma, one Hungarian and one Slovak, whereas list B contains two Slovaks, one Hungarian and one Roma (see Table 2, Panel B). In addition to the ethnic identities, in T2 all employees are of high effort type, i.e., they all completed the effort task in the allotted time. The only difference between list A and list B again is the proportion of Roma and Slovak found in each group. Consequently, a Slovak employer who prefers to be matched with a Slovak employee has an incentive to select list B, as the probability of a Slovak partner is 50% in list B and only 25% in list A. Importantly, in this treatment we hold the productivity/effort level of each prospective employee constant. Here taste-based discriminatory behavior would imply that the Slovak employers chose list B more often.

It is important to highlight here that any discriminatory behavior in the *Costless Taste* treatment at the extensive margin is not costly for the Slovak employers since employees in both lists are of high effort type. Consequently, independent of the employee list that the employer gets matched with, as long as he is willing to make high wage offers he/she will always make 6 euros. Formally, no taste-based discrimination in this treatment would suggest that the proportion of subjects who chose list A is equal to the proportion of subjects who chose list B (see H<sub>2</sub> Table 4). Rejecting the null would indicate that employers discriminate against high effort Roma when it is costless to them.

In the *Costly Taste* treatment (T3), list A includes two high effort Roma and two high effort Hungarians, while list B includes two high effort Hungarians and two low effort Slovaks (see Table 2, Panel C). If employers choose list B in the presence of list A in this treatment, there is a 50% chance that he will be matched with a low effort Slovak, indicating that the Slovak employer has a clear preference for Slovak employees even if the latter is a low effort employee. This reveals costly taste-based discriminatory attitudes at the extensive margin. Formally, taste-based discrimination would suggest that the proportion of subjects who choose list A in this treatment is equal to the proportion of subjects who choose list B (see H<sub>3</sub> in Table 4).<sup>10</sup> Rejecting the null would indicate that employers *do not* discriminate against high effort Roma when it is costly to do so.

Note that we can impute costs of such taste-based discrimination. If the employer selects list A, they will receive 6 euros (provided they reward the high effort employee with high wages, the Nash equilibrium of the game). Instead, when the employer chooses list B,

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<sup>10</sup> Taste-based discrimination would suggest that the proportion of subjects who choose list A in this treatment can be *less than or equal* to the proportion of subjects who choose list B. However, to establish evidence of taste-based discrimination in this treatment, H<sub>3</sub> is sufficient.

they can only receive an expected payoff of 5 euros ( $0.5 \cdot 6 + 0.5 \cdot 4$ ) as long as they reward a high effort employee with high wages and a low effort employee with low wages.<sup>11</sup> Consequently, this net loss of 16% of the maximum possible payoff for the employer, is the “price of prejudice” an employer is willing to pay for their prejudice.

In the *Productivity Preference* treatment (T4), we keep the same composition of ethnic identities in each of the two lists A and B (Slovak, Hungarian, Roma, and Slovak) but vary the productivity levels of the employees across the two lists (see Table 2, Panel D). In particular, employees in list A exerted high effort while all employees in list B exerted low effort independent of their ethnic identities. Note then the probability of being matched with a Slovak employee is 50% for each list. However, Slovak employees in list A all exerted high effort while Slovaks in list B exerted low effort. We use this treatment to measure an employer’s preferences for a high vs. low effort employee, holding the ethnic distribution of prospective employees in each list constant. Formally, a disregard for productivity differences would suggest that the proportion of employers who choose list A in this treatment is equal to the proportion of employers who choose list B (see H<sub>4</sub> in Table 4). Rejecting the null would indicate that employers always prefer a high effort employee to a low effort employee.

To measure statistical discrimination with (without) costs to the discriminator we use measures of total discrimination elicited from the *Discrimination* (T1) treatment and taste-based discrimination elicited using the *Costless Taste* (T2) and the *Costly Taste* (T3) treatments. Assuming that the two sources of discrimination are linearly additive, we propose the following: any evidence of residual discrimination in T1 after accounting for taste-based discrimination elicited through T2 and T3 can be assigned to statistical discrimination. Accordingly, H<sub>5</sub> formally tests for statistical discrimination; rejecting H<sub>5</sub> against H<sub>5A</sub> suggests the presence of statistical discrimination.

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<sup>11</sup> Notice that in Treatment 3, if the employer chose list B, there is a 50% chance of being matched to a low type Slovak and a 50% chance of being matched to a high type Hungarian. The employer’s maximum expected payoff from this choice would be 5 euros ( $0.5 \cdot 6 + 0.5 \cdot 4$ ). Where with 50% probability the employer receives 6 euros for rewarding a high effort employee with high wages and with 50% probability the employer receives 4 euros for rewarding a low effort employee with low wages.



**Table 4: Discrimination at the Extensive Margin**

| Hypothesis   | Corresponding Treatment(s)                                | Elicits/Measures   | Implication of Rejecting the Null   |
|--|---|--|---|
| H <sub>1</sub> : Percentage of employers choosing List B = Percentage of employers choosing list A<br><br>H <sub>1A</sub> : Percentage of employers choosing list B > Percentage of employers choosing list A  | Discrimination (T1)                                       | Discrimination   | Employers discriminate against Roma by choosing to hire Slovaks more often  |
| H <sub>2</sub> : Percentage of employers choosing list B = Percentage of employers choosing list A<br><br>H <sub>2A</sub> : Percentage of employers choosing list B > Percentage of employers choosing list A  | Costless Taste (T2)                                       | Cost-less taste-based discrimination   | Employers discriminate against high effort Roma by choosing to hire high effort Slovaks more often when it is cost-less to them   |
| H <sub>3</sub> : Percentage of employers choosing list B = Percentage of employers choosing list A<br><br>H <sub>3A</sub> : Percentage of employers choosing list B < Percentage of employers choosing list A<br>H <sub>4</sub> : Percentage of employers choosing list B = Percentage of employers choosing list A<br><br>H <sub>4A</sub> : Percentage of employers choosing list B < Percentage of employers choosing list A | Costly Taste (T3)<br><br><br>Productivity Preference (T4) | Costly taste-based discrimination<br><br><br>Preference for high effort Slovak employees | Employers do not discriminate against high effort Roma by choosing to hire the low effort Slovaks more often when it is costly for them<br>Employers prefer high effort Slovak employees over low effort Slovak employees |
| H <sub>5</sub> : Difference in percentage of employers choosing list B and list A in T1 = Difference in percentage of employers choosing list B and list A from T2 and T3<br><br>H <sub>5A</sub> : Difference in percentage of employers choosing list B and list A in T1 > Difference in percentage of employers choosing list B and list A from T2 and T3  | T1, T2 and T3   | Statistical discrimination   | Employers practice statistical discrimination against Roma by choosing to hire them less often when productivity information is not available   |

### 3.4 Intensive Margin – Employer’s Decisions

The Intensive Margin treatments are designed to examine the extent to which a Slovak employer is willing to discriminate against a Roma worker by offering a low wage to the latter. In the Intensive Margin treatments, subjects as before participate in two tasks: A questionnaire, followed by the Game of Prejudice. The Game of Prejudice consists of two stages: stage 1, the worker selection stage, and stage 2, the wage offer stage. However, since our focus is to measure behavior at the intensive margin, i.e., employer choices towards employees after they are hired, we keep lists A and B at the worker selection stage identical in each of the treatments (see Table 5). Each list contains a single Roma, Slovak, and Hungarian employee, and as before we vary the information on worker productivity that is available to the prospective Slovak employer in each treatment. We purposely hold the prospective employee composition in stage 1 constant between lists A and B in each intensive margin treatment so that selecting a particular list does not allow the employer to influence the composition of the possible employees, and they will expect to be matched with any one of them with equal probability. Employers make wage choices after receiving information about the randomly matched employee from the list, as before. As discussed earlier, in the wage offer stage, i.e., at the intensive margin, discrimination is always costly since offering a low wage to a high effort employee (due to taste-based discrimination) forces the employer to realize less than the maximum payoff from the game.<sup>12</sup>

**Table 5: Intensive margin – Treatments**

| <b>Panel A: Total Discrimination Intensive Margin (T5)</b>     |                      |
|--|----------------------|
| <b>List A</b>  | <b>List B</b>        |
| Roma   | Roma                 |
| Hungarian  | Hungarian            |
| Slovak   | Slovak               |
| <b>Panel B: High Cost Discrimination Intensive Margin (T6)</b> |                      |
| <b>List A</b>  | <b>List B</b>        |
| Roma – Low type  | Roma – Low type      |
| Hungarian – Low type   | Hungarian – Low type |
| Slovak – Low type  | Slovak – Low type    |

<sup>12</sup> This reflects the conditions in the naturally occurring markets where progressive laws have made it relatively more costly to discriminate workers along ethnic identities.

| <b>Panel C: <i>Low Cost Discrimination Intensive</i> Margin (T7)</b> |                       |
|--|-----------------------|
| <b>List A</b>  | <b>List B</b>         |
| Roma – High type   | Roma – High type      |
| Hungarian – High type  | Hungarian – High type |
| Slovak – High type   | Slovak – High type    |

Notes: We will interchangeably use the italicized part of the treatment name and the treatment number to refer to a treatment throughout the draft.

### 3.5 Intensive Margin Treatments

We compare wage offers by Slovak employers across the three treatments *Discrimination Intensive* (T5), *High Cost Intensive* (T6), and *Low Cost Intensive* (T7) (see Table 5). In the treatment *Discrimination Intensive* (T5) only ethnic identities are provided to the employer without any information on the employee's productivity. Hence a comparison of wage offers between Roma and Slovak employees allows us to identify the prevalence of discrimination, but not its sources (taste and/or statistical). Formally, no discrimination here would imply that the percentage of high wage offers made to the Slovak employees equal the percentage of high wage offers made to Roma employees (see  $H_6$  in Table 6).<sup>13</sup> Rejecting the null would indicate that employers discriminate against Roma by offering Slovaks high wage offers more often.

Next, in the *High Cost Intensive* (T6) and *Low Cost Intensive* (T7) treatments, we provide information on both the employees ethnic identities as well as productivity that allows us to elicit behavior conforming to taste-based discrimination. Remember, discrimination is always costly at the intensive margin. This can manifest in two ways.

First, in the *Low Cost Intensive* treatment (T7), where each employee is identified as high type, independent of the ethnicity, offering a low wage to a Roma high type is costly for the Slovak employer (See Table 3). In particular, indulging in such taste-based discriminatory behavior costs the employer 2 euros, i.e., 33% of their maximum possible earnings of 6 euros (if they played the equilibrium choice of High wage – High effort, they could have earned 6 euros). Formally, no taste-based discrimination here would imply that the percentage of high wage offers made to high effort Slovak employees equals the percentage of high wage offers made to high effort Roma employees (see  $H_7$  in Table 6). Rejecting the null would indicate

<sup>13</sup> We also compare the wage offers made by Slovak towards Non-Slovak (combining Roma and Hungarians). This result is reported in Appendix Table A6 and is similar and robust to the main results reported in Table 10 below.

that employers discriminate against high-effort Roma by making high wage offers to high-effort Slovaks more often even though this practice is somewhat costly to the employer.

We can also evaluate the costs of prejudice in another way in our intensive margin design through the *High Cost Intensive* (T6) treatment. An extreme and almost warped form of taste-based discrimination would imply that underserving in-group members are rewarded while deserving out-group members are shunned. Office promotions of undeserving in-group members serve as an ideal example. Practicing taste-based discrimination in this way can be very costly here, akin to Becker's idea of the price of prejudice where he argues that taste-based discrimination of this form cannot be sustained in the long-run; Hiring/promoting inefficient workers in this way would ensure the eventual shut down of the firm due to it being a breeding ground for inefficient workers. In our set up this amounts to offering a high wage to the low effort in-group Slovak member more often than to a high effort Roma. Notice, offering a high wage to a low effort worker earns the employer zero (Table 3), where equilibrium would predict offering a low wage to the low effort employee and a payoff of 4. In this case the employer forgoes 100% of his earning to "reward" (offer a high wage) non-performing Slovaks. Formally, such extreme form of taste-based discrimination would imply that the percentage of high wage offers made to the low effort Slovak employees are at least as frequent as the percentage of high wage offers made to high effort Roma employees (see  $H_8$  in Table 6). Rejecting the null would indicate that employers *do not* discriminate against high effort Roma once it's extremely costly to do so.

Next, behavior in *High Cost Intensive* (T6) and *Low Cost Intensive* treatment (T7) allows us to investigate whether on average employers prefer to reward the high effort employees independent of their ethnicity, i.e., whether they make high wage offers to the high effort (T7) employees more often compared to the low effort (T6) employees. Formally, if payments are not based on productivity, and instead driven by some other motives, the percentage of high wage offers to the high effort Slovak employees equals the percentage of high wage offers to low effort Slovak employees (see  $H_9$  in Table 6). Rejecting the null would indicate that employers always prefer high effort employees to low effort employees.

Similar to the extensive margin design, to measure statistical discrimination in the intensive margin design, we use measures of total discrimination elicited from T5 and taste-based discrimination elicited using T6 and T7. As earlier we assume that the two sources of discrimination are linearly additive, and propose the following: any evidence of residual discrimination in *Discrimination Intensive* (T5) after accounting for taste-based discrimination elicited through the *High Cost Intensive* (T6) and the *Low Cost Intensive* (T7)

treatments can be assigned to statistical discrimination. Consequently, hypothesis  $H_{10}$  formally tests for statistical discrimination (see  $H_{10}$  in Table 6). Rejecting  $H_{10}$  against  $H_{10A}$  suggests the presence of statistical discrimination.

**Table 6: Discrimination at the Intensive Margin**

| Hypothesis  | Corresponding Treatment(s)                   | Elicits/Measures   | Implication of Rejecting the Null   |
|---|--|--|---|
| H <sub>6</sub> : Percentage of high wage offers to Slovaks = Percentage of high wage offers to Roma<br><br>H <sub>6A</sub> : Percentage of high wage offers to Slovaks > Percentage of high wage offers to Roma   | Discrimination Intensive (T5)                | Discrimination   | Employers discriminate against Roma by offering Slovaks high wages more often   |
| H <sub>7</sub> : Percentage of high wage offers to <i>high effort</i> Slovaks = Percentage of high wage offers to <i>high effort</i> Roma<br><br>H <sub>7A</sub> : Percentage of high wage offers to <i>high effort</i> Slovaks > Percentage of high wage offers to <i>high effort</i> Roma   | Low Cost Intensive (T7)                      | Low cost taste-based discrimination                                    | Employers discriminate against high effort Roma by offering high effort Slovaks high wages more often even though it is costly to them                                      |
| H <sub>8</sub> : Percentage of high wage offers to <i>high effort</i> Roma = Percentage of high wage offers to <i>low effort</i> Slovaks<br><br>H <sub>8A</sub> : Percentage of high wage offers to <i>high effort</i> Roma > Percentage of high wage offers to <i>low effort</i> Slovaks   | High Cost and Low cost Intensive (T6 and T7) | High cost taste-based discrimination                                   | Employers do not discriminate against high effort Roma by offering high wages to low effort Slovaks more often than offering high wages to high effort Roma                 |
| H <sub>9</sub> : Percentage of high wage offers to <i>high effort</i> Slovaks = Percentage of high wage offers to <i>low effort</i> Slovaks<br><br>H <sub>9A</sub> : Percentage of high wage offers to <i>high effort</i> Slovaks > Percentage of high wage offers to <i>low effort</i> Slovaks   | High Cost and Low cost Intensive (T6 and T7) | Preference for giving high wage offers to high effort Slovak employees | Employers prefer to pay high wages to high effort Slovaks employees rather than low effort Slovak employees   |
| H <sub>10</sub> : Difference in percentage of high wage offers to Slovaks and Roma in T5 = Difference in percentage of high wage offers to Slovaks and Roma in T6 and T7<br><br>H <sub>10A</sub> : Difference in percentage of high wage offers to Slovaks and Roma in T5 > Difference in percentage of high wage offers to Slovaks and Roma in T6 and T7 | T5, T6 and T7                                | Statistical discrimination   | Employers practice statistical discrimination against Roma by offering them low wages more often when productivity information is not available, even though this is costly |

#### 4. Procedure

During June-September 2017 we collected data on 721 subjects who participated as employers in our seven treatments across 65 sessions. These sessions were conducted among adolescents (aged 15-18), namely, high school students in Eastern Slovakia. Each session was first randomized into an “extensive margin” session or an “intensive margin” session. Next, all “extensive margin” and “intensive margin” sessions were further randomized into one of the experimental treatment arms presented in Figure 1. Each session lasted around 45 minutes (i.e., during the time of a typical class). To minimize contamination across sessions arising from student subjects potentially discussing the experiment post-participation, we completed all sessions in a chosen school on a single day.

Subject instructions were provided by three Slovak experimenters (undergraduate students) who were randomly assigned into each of the sessions. To ensure common knowledge instructions were read aloud, and the relevant payoff tables and lists were used to illustrate relevant payoffs. To ensure comprehension, participants were asked control questions on payoff consequences of their decisions after the experimenters finished reading the instructions. Perfect anonymity with respect to the experimenters, classmates, and teachers was ensured.<sup>14</sup> After a general introduction was read out, each student picked a randomized ID number which was used for payoff computations, decision sheets, and to determine the order in which the lists appeared on their decision sheets. In the extensive margin treatments half the students in each session saw list A (from Table 2) first, and the other half saw list B first. In the intensive margin treatments one third of the students saw row 1 (from Table 3) first, one third saw row two first, and one third will saw row three first. To control for order effects, we randomized both the columns and lists that the students get to observe first.

Although our main interest in this experiment is the behavior of employers, in order to have real implications for the employer choices we needed a sample of actual participants in the role of employees.<sup>15</sup> Hence, we collected decisions from subjects who played in the role of employers as well as subjects who participated in the role of employees to be able to match employer choices with employee choices in the Game of Prejudice. Employees’ decisions for the real effort task were collected from participants at three different schools

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<sup>14</sup> Subjects were assured that only researchers involved in the project would have access to the data; we never asked for subjects’ names; subjects had to fold answer sheets in halves and were collected in a bag by experimenters; rewards were paid in a sealed envelope.

<sup>15</sup> Note that we are interested in Slovak employer behavior towards Roma employees. The dataset contains a similar number of Hungarians as Roma.

before administering the Game of Prejudice to elicit employer behavior. Each school had enough representation of students belonging to each ethnicity. Responses of participants who identified themselves as Slovak/Hungarian/Roma were used in the Game of Prejudice. Our employee sample consisted of 58 subjects consisting of 21 Slovaks, 18 Hungarians and 19 Roma. Following a procedure implemented by Bauer et al. (2018), each student in the employer sample was matched with a selected student from the employee sample, and further, each student from the employee sample was matched with multiple students from the employer sample.<sup>16</sup>

After the conclusion of all sessions, we re-visited the schools to make final payments to the students who participated in the role of employees. The payment procedure was transparent to all subjects. To assure real payoff consequences for each employer's decision on an employee's payoff, we computed an average payoff resulting from wage offers of all employers matched with each employee. We implemented this procedure as we were only interested in the behavior of employers, a one to one matching would have required over 700 additional employee observations.

Each subject received a fixed show up fee of 2 euros in addition to payments from the experiment. Average payouts were approximately 6 euros. As most of the subjects were not adults, subjects received their rewards in the form of a generic gift card (<https://www.up-slovensko.sk/gift-coupon/>), that could be spent on a variety of goods and services (including food and beverages, sport, culture and health services) in hundreds of stores in the region.<sup>17</sup> A similar approach was used by Bauer et al. (2018) when eliciting social norms about destructive behavior among teenagers from Eastern Slovakia.

## 5. Results

We have 721 subjects who participated as employers in our seven treatments across 65 sessions. The sample size in each treatment is provided in Appendix Table A1.<sup>18</sup> Average

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<sup>16</sup> We find that 85% of all subjects who participated as an employee in our experiments complete the task exerting “high effort”. We are not able to reject the null of no difference in performance between Roma and Slovak ( $p$ -value = 0.58). And also between Roma and Hungarians ( $p$ -value = 0.412) and Hungarians and Slovak ( $p$ -value = 0.77). All  $p$ -values use two-sided proportions test.

<sup>17</sup> The gift cards are very common in Slovakia and often used by employers to provide non-monetary employee compensation as a part of employee benefits, or alternatively, for marketing purposes.

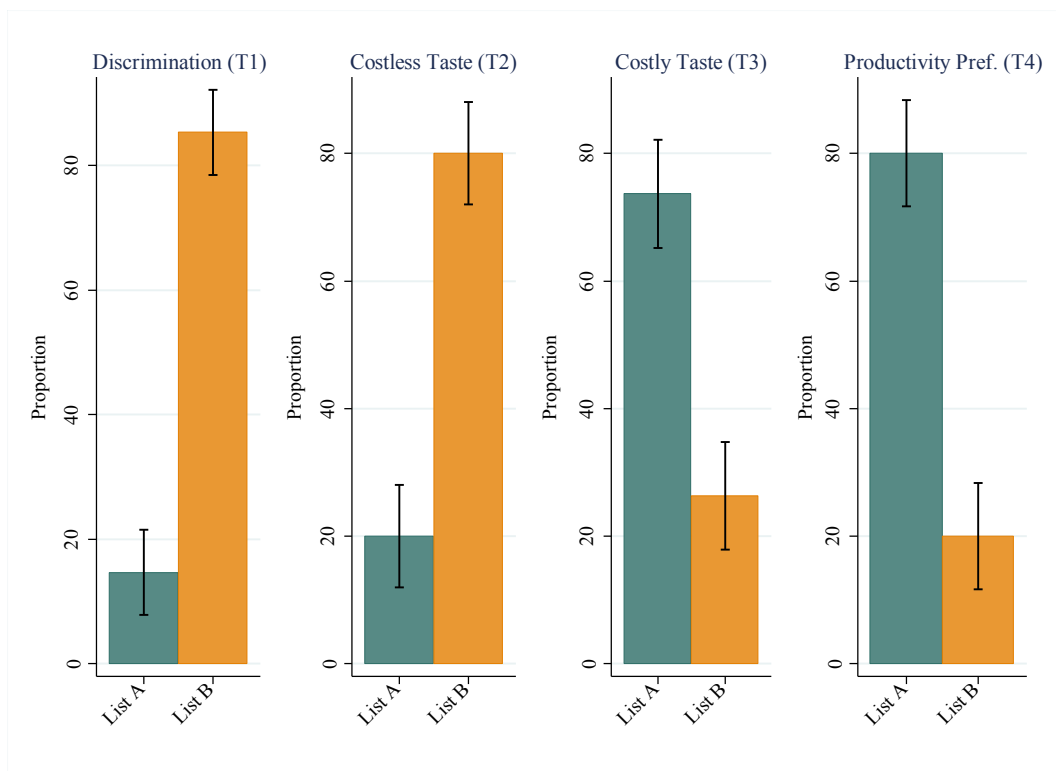
<sup>18</sup> We ran a set of pilot experiments in June 2017 and use the effect sizes from the pilot to compute our desired sample size for the two experiment designs. We found that the smallest difference between any two groups (or lists) in the extensive margin experiments is approximately 35% and the associated sample size required to detect this difference with 80% power using a 5% level two-sided test is approximately 33 individuals. Order effects are an important concern in the extensive margin design and to account for this we double the sample size requirement in treatments 1-4 targeting approximately 66 individuals in each treatment. We conduct a



subject characteristics are reported in Appendix Table A2. There are equal proportions of males and females in the experiment. The average subject has a little over one sibling and comes from households that have on average four members (including the subject). In our sample, almost 55% of mothers of the subjects were found to have completed secondary schooling and 60% of fathers had completed secondary schooling. Overall, subjects score 4.65 on the subjective well-being question, revealing that the average subject thinks their household can make ends meet fairly easily. Options on the subjective well-being question vary between 1 (making ends meet with great difficulty) to 6 (making ends meet very easily). As shown in Appendix Table A2, there is balance in all baseline background socioeconomic characteristics across treatments.

## 5.1 Results on the Extensive Margin Treatments

Figure 2 below reports the average behavior observed in each of the extensive margin treatments.



**Figure 2:** Results from the Extensive Margin Treatments

similar exercise for the intensive margin experiments where our pilots indicate that the smallest difference found between any two groups is approximately 30% and the associated sample size required to detect this difference with 80% power using a 5% level two-sided test is approximately 45 individuals. Further note that sample size requirements diminish substantially for one-tailed test and one-sample mean comparisons. And since many of our hypotheses are one-sided tests, our experiments are sufficiently powered to detect small to medium size differences in choices made in both the intensive and extensive margin experiments.

Table 7 provides the results obtained from testing hypothesis  $H_1$ - $H_5$  presented in Table 4 earlier. We discuss them one by one. First, note that in the *Discrimination* (T1) treatment, the percentage of employers choosing List B is not equal to the percentage of employers choosing list A, and the observed 70% point gap between the two choices is statistically significant at the 1% level (see Column 4, Table 7). We reject the null  $H_1$  in favor of  $H_{1A}$  set up in Table 4 establishing the prevalence of discrimination against Roma subjects.

In the *Costless Taste* (T2) treatment, the percentage of employers choosing List B is not equal to the percentage of employers choosing list A, and the observed 60% point gap between list A and list B is statistically significant at the 1% level (see Column 4, Table 7). We reject the null  $H_2$  in favor of  $H_{2A}$  outlined in Table 4 establishing evidence of taste-based discrimination when such prejudice is costless for the Slovak employer.

In the *Costly Taste* (T3) treatment, the percentage of employers choosing List B is not equal to the percentage of employers choosing list A, and the observed 47% point gap between list A and list B is statistically significant at the 1% level (see Column 4, Table 7). Note that this gap is now reversed. We reject the null  $H_3$  in favor of  $H_{3A}$  outlined in Table 4, which suggests that employers avoid taste-based discrimination once it's made prohibitively costly. This result is similar to Hedegaard and Tyran (2018) who show that prejudice responds to costs, albeit, in a different context where they show that Danish (Muslim) are more likely to partner with Muslims (Danish) to complete a small task when the cost of avoiding the Muslim (Danish) partner increases.

In the *Productivity Preference* (T4) treatment, the percentage of employers choosing List B is not equal to the percentage of employers choosing list A, and the observed 60% point gap between list A and list B is statistically significant at the 1% level (see Column 4, Table 7). We reject the null  $H_4$  in favor of  $H_{4A}$  outlined in Table 4, which shows that employers always prefer choosing a high effort employee to a low effort employee, holding ethnic composition between the two groups constant.

To capture statistical discrimination in our experiment, we compare total discrimination (behavior in T1) with costless taste-based discrimination (behavior in T2) and costly taste-based discrimination (behavior in T3). We reject the null and confirm evidence of

statistical discrimination. Finally, note that both parametric and non-parametric tests reported in Table 7 share the same conclusions.<sup>19</sup>

Overall, our results at the extensive margin indicate prevalence of taste-based as well as statistical discrimination, where the effects of taste-based discrimination are stronger when it is costless for the employer to do so. Such discrimination interestingly goes down significantly once the cost of taste-based discrimination is made sufficiently high.

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<sup>19</sup> We also discuss the wage offers made in the extensive margin treatment in stage 2 in Appendix Table A2. Note that these choices are endogenous. However, they are similar to the overall exogenous results obtained in the intensive margin experiment discussed in Table 8 below. These are in contrast to the findings reported in Slonim and Guillen (2010) who find little evidence of discrimination without selection but significant gender discrimination with selection, albeit in a completely different context – trust between genders. Though note that the choices made in the selection treatment are fraught with endogeneity.

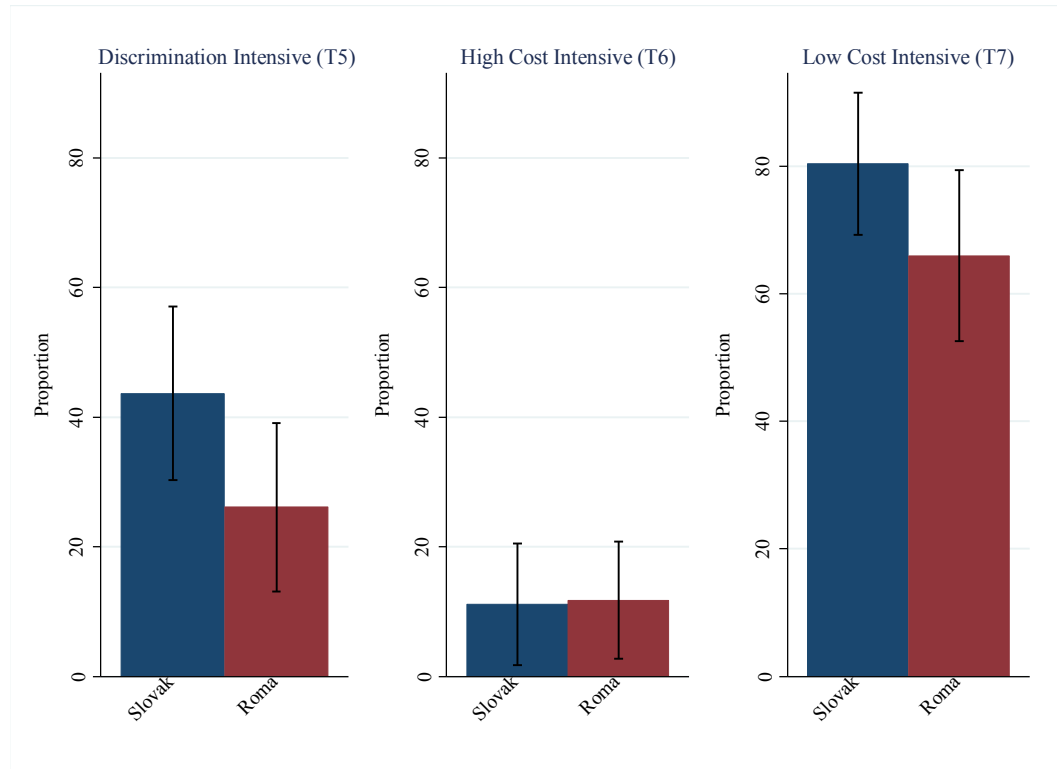
**Table 7: Extensive Margin Results**

| Treatments<br>(1) | Choice of Employers (%) |               | Difference<br>(4)   | Decision<br>(5) | Implication<br>(6)  |
|-------------------|-------------------------|---------------|---|-----------------|---|
|                   | List B<br>(2)           | List A<br>(3) |   |                 |   |
| T1                | 85.34                   | 14.67         | 70.66***<br>[<0.01]<br>(<0.01)                            | Reject H1       | Employers discriminate against Roma by choosing to hire Slovaks more often  |
| T2                | 80                      | 20            | 60***<br>[<0.01]<br>(0.01)                                | Reject H2       | Employers discriminate against high effort Roma by choosing to hire high effort Slovaks more often when it is cost-less to them               |
| T3                | 26.32                   | 73.68         | -47.36***<br>[<0.01]<br>(<0.01)                           | Reject H3       | Employers do not discriminate against high effort Roma by choosing to hire the low effort Slovaks more often when it is costly for them       |
| T4                | 20                      | 80            | -60***<br>[<0.01]<br>(<0.01)                              | Reject H4       | Employers prefer high effort Slovak employees over low effort Slovak employees  |
| T1, T2 & T3       |                         |               | 70.66-(60-47.36)<br>= 70.66-<br>12.64=58.02***<br>[<0.01] | Reject H5       | Employers practice statistical discrimination against Roma by choosing to hire them less often when productivity information is not available |

**Notes:** \*\*\*p<0.01, \*\*p<0.05, \* p<0.10. Total sample size = 721. In square brackets we report p-values from proportion test for H1-H4 and t-test for H5. In parenthesis () we report p-values from non-parametric Wilcoxon signed-rank test for H1-H4 and Mann-Whitney test for H5.

### 5.3 Results on Intensive Margin Treatments

Figure 3 below describes average behavior in each of our intensive margin treatments.



**Figure 3:** Results from the Intensive Margin Treatments

Results from hypothesis  $H_6$ - $H_{10}$  set up in Table 6 are presented in Table 8 below. We discuss them one by one. First note that in the *Discrimination Intensive* treatment (T5) percentage of high wage offers to Slovaks and Roma are not equal, and the 17.54% point gap is significant at the 5% level (see Column 4, Table 8). We reject the null  $H_6$  in favor of  $H_{6A}$  set up in Table 6 establishing the prevalence of discrimination against Roma at the intensive margin as well.

In the *High Cost Intensive* treatment (T6) percentage of high wage offers to high effort Roma are not equal to the percentage of high wage offers made to Slovaks, and this 14.39% point gap is significant at the 10% level (see Column 4, Table 8). We reject  $H_7$  in favor of  $H_{7A}$  in Table 6 establishing that employers discriminate against high effort Roma by offering them a low wage more often than to high effort Slovaks despite the fact that it is costly for the employer to do so.

Using the High Cost Intensive (T6) and the Low Cost Intensive treatments (T7) we reject  $H_8$  in favor of  $H_{8A}$  in Table 6 at the 1% level establishing that when the cost of discrimination at the intensive margin is very high for the employers they resist from discriminatory behavior.

Using the High Cost Intensive (T6) and the Low Cost Intensive treatments (T7) we further find that the percentage of high wage offers to high effort Slovaks are not equal to the percentage of high wage offers made to low effort Slovaks, and this 69.28% point difference is significant at the 1% level (see Column 4, Table 8). We reject  $H_9$  in favor of  $H_{9A}$  in Table 6 suggesting that employers prefer to pay high wages to high effort Slovak employees rather than to low effort Slovak employees.

To capture statistical discrimination in our experiment, we next compare total discrimination (behavior in T5) with costless taste-based discrimination (behavior in T6) and costly taste-based discrimination (behavior in T7). We reject  $H_{10}$  in favor of  $H_{10A}$  set up in Table 6 at the 1% level (see Column 4, Table 8) establishing that Slovak employers practice statistical discrimination against Roma employees by offering them low wages more often when productivity information is not available. Note that both parametric and non-parametric tests result in the same conclusions.

Overall, our results on the intensive margin indicate that employers routinely offer lower wages to minority group Roma members based on taste as well as statistical reasons even when there are modest costs of such discriminatory actions.

**Table 8: Intensive Margin Results**

| Treatments<br>(1) | High Wage Offers By Employers (%) |             | Difference<br>(4)   | Decision<br>(5) | Implication<br>(6)  |
|-------------------|-----------------------------------|-------------|---|-----------------|---|
|                   | Slovak<br>(2)                     | Roma<br>(3) |   |                 |   |
| T5                | 43.63                             | 26.08       | 17.54**<br>[0.03]<br>(0.03)   | Reject H6       | Employers discriminate against Roma by offering Slovaks high wages more often   |
| T6                | 80.39                             | 66.66       | 14.39*<br>[0.051]<br>(0.051)  | Reject H7       | Employers discriminate against high effort Roma by offering high wages to high effort Slovaks more often even when it is costly to them                                     |
| T6 & T7           | 11.11                             | 66          | -54.89***<br>[<0.01]<br>(<0.01)                                     | Reject H8       | Employers do not discriminate against high effort Roma by offering high wages to low effort Slovaks more often than offering high wages to high effort Roma                 |
| T6 & T7           |                                   |             | (80.39-11.11)=69.28***<br>[<0.01]<br>(<0.01)                        | Reject H9       | Employers prefer to pay high wages to high effort Slovak employees rather than to low effort Slovak employees   |
| T5, T6 & T7       |                                   |             | =17.54 – (14.39-54.89)<br>= 17.54- (-40.5) =<br>58.04***<br>[<0.01] | Reject H10      | Employers practice statistical discrimination against Roma by offering them low wages more often when productivity information is not available, even though this is costly |

**Notes:** \*\*\*p<0.01, \*\*p<0.05, \* p<0.1. In square brackets [] we report p-values from proportion test for H6-H9 and t-test for H10. In parenthesis () we report p-values from non-parametric Mann-Whitney test for H6-H9.

## 6. Belief Elicitation

We elicited incentivized beliefs among subjects who participated in T1 (extensive margin) and T5 (intensive margin) where the employers were not provided productivity information. We find that in T1 91% of employers who chose List A believe that the Roma workers will put in high effort, and 67% who selected list B believe that the Slovaks are going to put in high effort, the difference is large but not significant ( $p\text{-value}=0.11$ ). At the intensive margin T5, we find that 64% of the employers believe that Slovaks will put in high effort in contrast only 57% believe that Roma workers will put in high effort in treatment T5 ( $p\text{-value}=0.47$ ). Both these results suggest that discrimination primarily operates through pure distaste for the Roma and not due to beliefs about differences in productivity.

## 7. Follow-up Survey Evidence

Overall, our results suggest an acute prevalence of taste-based discrimination both at the intensive as well as the extensive margin. That is, even when the Slovak employer believes Roma employees are not different relative to Slovak employees in terms of effort, Slovak employers still exhibits a strong in-group preference (taste-based discrimination). To investigate the external validity of our results, we followed up further with a modestly sized survey measuring perception of such experiences at the extensive and intensive margins in US.

The survey was administered using the Qualtrics survey platform and the sample was obtained from Amazon's Mechanical Turk (Mturk) subject pool. A total of 293 observations were collected.<sup>20</sup> Subjects were paid \$0.85 and the survey took 4.21 minutes on average to complete. To elicit perceptions on exposure to discrimination and ensure consistency with the largest and most recent survey on this topic we followed the questions outlined in the European Union Minorities and Discrimination Survey Questionnaire<sup>21</sup> (FRA, 2017b). In particular, we asked the following two questions: 1) When *looking for work* in the past 5 years have you ever been a victim of discrimination? 2) We will now ask you a few questions about discrimination *at work*. This includes incidents involving your employers or colleagues. In the past 5 years have you ever been a victim of discrimination *at*

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<sup>20</sup> To ensure the validity of the results, (i) subjects were initially screened to ensure they resided in the US and were above the age of 18 years, (ii) three attention checks at different points in the survey were undertaken to discourage respondents from randomly selecting responses, and (iii) respondents could not quickly click through the survey without reading questions, as they could move to the next question only after 15 seconds.

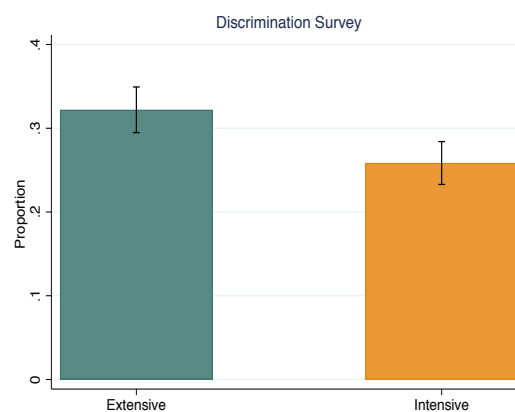
<sup>21</sup> The questionnaire is designed to provide EU-wide comparable equality data, that can be used to monitor the situation of minorities and immigrants, and the outcomes of integration policies (FRA, 2017a).



*work?* Respondents were also asked several demographic questions such as occupation and number of jobs in the past 5 years.

Figure 4 provides an overview of responses on exposure to discrimination at the extensive and intensive margins. We find that 32.0% of respondents report experience with discrimination while looking for a job relative to 25.8% when in a job. This difference is statistically significant at the 5% level ( $p\text{-value}=0.024$ , two-sided t-test).

While these results are consistent with our experimental findings, it is important to note that surveys are limited in measuring discrimination in this context. Subject perceptions of the acuteness of discrimination at the extensive margin, are at best a lower bound of reality. While discrimination at the intensive margin might be more evident since workers are aware of the status and outcomes of their peers, discrimination at the extensive margin is less perceptible because the employee is typically not aware, or has little information on the applicant pool he or she is being compared to during the job offer stage. As a result, naïve employees might often be clueless that they are being discriminated and therefore will not report discrimination.



**Figure 4:** Discrimination Survey

## 7. Conclusion

In this paper we design a novel lab in the field experiment to examine the prevalence, sources, and impacts of costly discrimination at the extensive margin (when a prospective employee is looking for a job offer) as well as at the intensive margin (involving wage offers or promotions for the employee) among Slovakian adolescents.

Our results indicate first that Slovak subjects indulge in taste-based as well as statistical discrimination at the extensive as well as the intensive margins towards the minority Roma participants. Interestingly, we observe that Slovaks exert much higher rates of

discrimination at the extensive margin relative to the intensive margin. Evidence of discrimination is 53 percent points higher in the extensive margin design compared to intensive margin design (p-value<0.01, one-sided t-test). Our complementary survey implemented among the US population also indicates a similar higher prevalence of discrimination at the extensive margin. The incidence of taste-based discrimination in the no-cost treatment at the extensive margin is 45.6 percent points higher than the incidence of taste-based discrimination in the low-cost treatment at the intensive margin (p-value<0.01, one-sided t-test). We also find that taste-based discrimination to be more prevalent relative to statistical, and our elicited beliefs data substantiate our findings.

Importantly, from a policy perspective, we find that once taste-based discrimination is made prohibitively costly in our experiment, there are no differences in the incidence of discrimination between the extensive margin design and the intensive margin design (p-value = 0.29, two-sided t-test). Our results, however, also indicate that *even with modest economic costs* of practicing prejudice, employers frequently indulge in discriminatory practices in our subject group. Consequently, our results suggest that anti-discriminatory policies must target discrimination at the extensive margin more aggressively as we find that discrimination at the point of selection is more common than discrimination once already selected. This is possibly due to the remedial measures that have been progressively put into place over the years for discouraging discrimination at the intensive margin. Consequently, we advocate pushing for prohibitive costs for discrimination at the extensive margins as well.

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## Appendix A: Tables

**Table A1: Sample Distribution by Treatment**

|   | Sample size |
|---|-------------|
| <b>Panel A: Extensive Margin Treatments</b> |             |
| Discrimination (T1)                         | 75          |
| Costless Taste (T2)                         | 70          |
| Costly Taste (T3)                           | 76          |
| Productivity Preference (T4)                | 65          |
| <b>Panel B: Intensive Margin Treatments</b> |             |
| Discrimination Intensive (T5)               | 143         |
| High Cost Intensive (T6)                    | 140         |
| Low Cost Intensive (T7)                     | 152         |

Notes: Sample size = 721. This is the sample of employers.

**Table A2: Balance in Socioeconomic Characteristics**

|                                   | Mean<br>(sd)<br>(1) | Joint F<br>[p-value] <sup>+</sup><br>(2) |
|-----------------------------------|---------------------|--|
| Male                              | 0.49                | 1.14<br>[0.33]                           |
| Household size                    | 4.04<br>(1.10)      | 0.52<br>[0.79]                           |
| No. of siblings                   | 1.27<br>(0.95)      | 1.35<br>[0.23]                           |
| Mother's with secondary schooling | 0.55                | 0.53<br>[0.78]                           |
| Father's with secondary schooling | 0.60                | 1.43<br>[0.20]                           |
| Subjective well-being             | 4.32<br>(0.96)      | 1.35<br>[0.23]                           |

Notes: Joint F statistic and p-values in Column 2 are obtained from regressing each of these variables separately on the full set of treatment dummies. \*\*\*p<0.01, \*\*p<0.05, \* p<0.10. SD not presented for dichotomous variables.

**Table A3: Wage Offers in the Extensive Margin Treatments**

| <b>Treatments</b>            | <b>High wage offers<br/>to Slovak<br/>(in %)<br/>(1)</b> | <b>High wage offers<br/>to Roma<br/>(in %)<br/>(2)</b> | <b>Difference<br/>[p-value]<br/>(3)</b> |
|------------------------------|--|--|---|
| Discrimination (T1)          | 58.06<br>(n=31)  | 66.66<br>(n=6)   | -8.60<br>[0.65]                         |
| Costless Taste (T2)          | 76<br>(n=25)   | 57.14<br>(n=21)  | 18.85*<br>[0.08]                        |
| Costly Taste (T3)            | 0<br>(n=3)   | 71.42<br>(n=21)  | -71.42<br>[0.99]                        |
| Productivity Preference (T4) | 60.00<br>(n=25)  | 40.90<br>(n=22)  | 19.09*<br>[0.09]                        |

Notes: \*\*\*p<0.01, \*\*p<0.05, \* p<0.10. In Column 3 we report p-values from a one-tailed proportions test.

**Table A4: Order Effects in the Extensive Margin Treatments**

| <b>Treatments</b>            | <b>Choice of list A<br/>(1)</b>                                     | <b>P-values from<br/>proportion<br/>test<br/>(2)</b> |
|------------------------------|---|--|
| Discrimination (T1)          | 10.52% - list A presented first<br>18.91% - list A presented second | 0.304  |
| Costless Taste (T2)          | 27% - list A presented first<br>11% - list A presented second       | 0.0941*  |
| Costly Taste (T3)            | 73.68% - list A presented first<br>73.68% - list A presented second | 1.00   |
| Productivity Preference (T4) | 81.81% - list A presented first<br>78.12% - list A presented second | 0.71   |

Notes: We examine if choices in the extensive margin treatments are influenced by the order in which the subjects view the list. For each of the treatments, T1-T4, we run a simple proportions test where we examine if the choices made in the treatment vary by the order in which the lists were presented. The associated p-values are reported in Column 2. \*\*\*p<0.01, \*\*p<0.05, \* p<0.10. Sample size = 721.



**Table A5: Understanding of the Game**

| <b>Comprehension questions</b>  | <b>% Correct</b> |
|---|------------------|
| Q1) If you decide to select High Wage, and at the same time the employee decides to put in High Effort, how much will you earn? How much will the employee earn?<br><br>You will earn:.....EUR      The employee will earn:.....EUR | 98.47            |
| Q2) If you decide to select High Wage, and the employee decides to put in Low Effort, how much will you earn? How much will the employee earn?<br><br>You will earn:.....EUR      The employee will earn:.....EUR                   | 95.56            |
| Q3) If you decide to select Low Wage, and the employee decides to put in High Effort, how much will you earn? How much will the employee earn?<br><br>You will earn:.....EUR      The employee will earn:.....EUR                   | 95.15            |
| Q4) If you decide to select Low Wage, and at the same time the employee decides to put in Low Effort, how much will you earn? How much will the employee earn?<br><br>You will earn:.....EUR      The employee will earn:.....EUR   | 97.23            |
| Excellent Comprehension (=1 if Q1-Q4 are all correct, 0 otherwise)  | 93.48            |

**Table A6: Intensive Margin Results – Slovak vs. Roma and Hungarian**

| Treatments<br>(1)                            | High wage offers by<br>employers<br>to<br>Slovak<br>(2)      Hungarian and<br>Roma<br>(3) |       | Difference<br>(4)   | Decision<br>(5) | Implication<br>(6)  |
|--|---|-------|---|-----------------|---|
| Discrimination Intensive<br>(T5)             | 43.63   | 31.81 | 11.81*<br>[0.07]  | Reject H6       | Employers discriminate against both Roma and Slovak by offering Slovaks high wages more often   |
| High Cost Intensive<br>(T6)                  | 80.39   | 66.33 | 14.05**<br>[0.03]   | Reject H7       | Employers discriminate against high effort Roma and Hungarians by offering high wages to high effort Slovaks more often even when it is costly to them                                    |
| High Cost and Low cost Intensive (T6 and T7) | 11.11   | 66.33 | -55.22***<br>[<0.01]  | Reject H8       | Employers do not discriminate against high effort Roma and Hungarians by offering high wages to low effort Slovaks more often than offering high wages to high effort Roma and Hungarians |
| High Cost and Low cost Intensive (T6 and T7) |   |       | (80.39-11.11)=69.28***<br>[<0.01]                                     | Reject H9       | Employers prefer to pay high wages to high effort Slovak employees rather than to low effort Slovak employees   |
| T5, T6 & T7                                  |   |       | =11.81 – (14.05-55.22)<br>= 11.81 – (-41.17)<br>= 52.98***<br>[<0.01] | Reject H10      | Employers practice statistical discrimination against Roma and Hungarian by offering them low wages more often when productivity information is not available, even though this is costly |

## Appendix B: Real Effort Task

Subjects were told to copy the sentences in the space under each sentence.

|    |                                 |   |
|----|---------------------------------|---|
| 1  | MIDVINTERNATTENS KOLD AR HARD,  | → |
| 2  | STJARNORNA GNISTRA OCH GLIMMA.  | → |
| 3  | ALLA SOVA I ENSLIG GARD DJUPT   | → |
| 4  | UNDER MIDNATTSTIMMA.            | → |
| 5  | MANEN VANDRAR SIN TYSTA BAN,    | → |
| 6  | SNON LYSER VIT PA FUR OCH GRAN, | → |
| 7  | SNON LYSER VIT PA TAKEN.        | → |
| 8  | ENDAST TOMTEN AR VAKEN STAR     | → |
| 9  | DAR SA GRA VID LADGARDSDORR,    | → |
| 10 | GRA MOT DEN VITA DRIVA,         | → |
| 11 | TITTAR, SOM MANGA VINTRAR FORR, | → |
| 12 | UPP EMOT MANENS SKIVA,          | → |
| 13 | TITTAR MOT SKOGEN,              | → |
| 14 | DAR GRAN OCH FUR DRAR           | → |
| 15 | KRING GARDEN SIN DUNKLA MUR,    | → |
| 16 | GRUBBLAR, FAST EJ DET LAR BATA, | → |
| 17 | OVER EN UNDERLIG GATA.          | → |

18 FOR SIN HAND GENOM SKAGG OCH HAR,  
→

19 SKAKAR HUVUD OCH HATTA  
→

20 NEJ, DEN GATAN AR ALLTFOR SVAR,  
→

21 NEJ, JAG GISSAR EJ DETTA  
→

22 SLAR, SOM HAN PLAGAR, INOM KORT  
→

23 SLIKA SPORJANDE TANKAR BORT,  
→

24 GAR ATT ORDNA OCH PYSSLA,  
→

25 GAR ATT SKOTA SIN SYSSLA.  
→

26 GAR TILL VISTHUS OCH REDSKAPSHUS,  
→

27 KANNER PA ALLA LASEN  
→

28 KORNA DROMMA VID MANENS LJUS  
→

29 SOMMARDROMMAR I BASEN;  
→

30 GLOMSK AV SELE OCH PISK OCH TOM  
→

31 PALLE I STALLET HAR OCK EN DROM:  
→

32 KRUBBAN HAN LUTAR OVER  
→

33 FYLLS AV DOFTANDE KLOVER;  
→

34 GAR TILL STANGSLET FOR LAMM OCH FAR,  
→

35 SER, HUR DE SOVA DAR INNE;  
→

36 GAR TILL HONSEN, DAR TUPPEN



37 STAR STOLT PA SIN HOGSTA PINNE;



38 KARO I HUNDBOTS HALM MAR GOTT,



39 VAKNAR OCH VIFTAR SVANSEN SMATT,



40 KARO SIN TOMTE KANNER.

