

CHARLES UNIVERSITY

FACULTY OF SOCIAL SCIENCES

Institute of Economic Studies

Bachelor thesis

2018

Jana Holková

CHARLES UNIVERSITY

FACULTY OF SOCIAL SCIENCES

Institute of Economic Studies



Jana Holková

**Discrimination of Slovak people in the
Prague rental housing market - A field
experiment**

Bachelor thesis

Prague 2018

Author: Jana Holková

Supervisor: PhDr. Václav Korběl

Academic Year: 2017/2018

Bibliographic note

Holková, J. (2018), *Discrimination of Slovak People in the Prague Rental Housing Market*. Bachelor thesis (Bc.) Charles University, Faculty of Social Sciences, Institute of Economic Studies. Thesis supervisor PhDr. Václav Korbel

Abstract

Discrimination is a broadly discussed issue. The housing market is no exception and we may observe many examples of discriminatory behaviour. Discrimination in various subjects (e.g. race, gender) was a target of a large number of experiments. However, researches regarding discrimination between two nations are lacking. The thesis presents a field experiment on discrimination of Slovaks in the Prague rental housing market and further examines the effect of working status on the discrimination rate. The experiment uses eight male fictitious identities which reveal their national affiliation through a language of the request (Slovak or Czech) and their names typical for Slovak and Czech nationalities. The request specifies working status of a potential tenant (student or full-time worker). Data indicates that applications in the Slovak language have about 10 percent lower chance of receiving a positive response than Czech applications, which is significant on 1 per cent level. Students compared to workers received about 6 per cent fewer invitations for a flat viewing. Even though students have slightly lower response rate than workers, the difference is insignificant.

Keywords

Discrimination, Housing market, Rental housing market, Field Experiment, Response Rate, Slovakia, Czech Republic, Internet

Abstrakt

Diskriminácia je široko diskutovaný problém. Ani trh s nájomným bývaním nie je výnimkou. Množstvo experimentov skúmalo diskrimináciu voči rôznym subjektom (napr. rasa, pohlavie). Avšak, práce skúmajúce diskrimináciu medzi dvomi národnosťami v tomto odbore chýbajú. Bakalárska práca prezentuje terénny výskum skúmajúci diskrimináciu Slovákov na pražskom realitnom trhu s nájomným bývaním a ďalej skúma efekt pracovného statusu na mieru diskriminácie. Experiment využíva osem fiktívnych identít, ktoré odhaľujú svoju národnostnú príslušnosť prostredníctvom jazyka v ktorom je žiadosť o nájom písaná a typicky slovensky, prípadne česky znejúcim menom. Žiadosť ďalej špecifikuje pracovný status potenciálneho nájomníka (študent alebo pracujúci na plný úväzok). Dáta indikujú, že slovenskí kandidáti majú o 10 percent nižšiu šancu získať pozitívnu odpoveď ako českí kandidáti, táto hodnota je signifikantná na 1 percentnom leveli. Napriek tomu, že študenti majú o niečo nižšiu mieru odozvy než zamestnanci, rozdiel nie je signifikantný.

Kľúčové slová

diskriminácia, trh s bývaním, nájomný trh s bývaním, terénny experiment, miera odozvy, Slovensko, Česká republika, internet

Declaration of Authorship

I hereby proclaim that I wrote my bachelor thesis on my own under the leadership of my supervisor and that the references include all resources and literature I have used.

I grant a permission to reproduce and to distribute copies of this thesis document in whole or in part.

Prague, 11 May 2018

Signature

Acknowledgment dedication

I would like to express my gratitude to PhDr. Václav Korbel for supervising me during the entire process, for sharing his time, expertise and willingness to provide valuable assistance. I would like to express sincere gratitude to Matěj Novotný, Bc. Vojtěch Pacák and Richard Karolík for their valuable advice and motivation.

Bachelor's Thesis Proposal

Institute of Economic Studies
Faculty of Social Sciences
Charles University in Prague



Author's name and surname: Jana Holková

E-mail: holkova.janka@gmail.com

Phone: +421 948 614 315

Supervisor's name: PhDr. Václav Korbel

Supervisor's email: Vaclav.korbel@fsv.cuni.cz

Notes: Please enter the information from the proposal to the Student Information System (SIS) and submit the proposal signed by yourself and by the supervisor to the Academic Director ("garant") of the undergraduate program.

Proposed Topic:

Discrimination of Slovak people in the Prague rental housing market – A field experiment

Preliminary scope of work:

Research question and motivation

Discrimination is a common and well-known problem in various sectors. The housing market is considered to be one of the most affected ones. Plenty of researches and experiments targeting this major issue have been published and discrimination was investigated in different countries on ethnic or racial minorities, or on alternatively specified groups. Relative to local market, have been written for instance, Attention Discrimination: Theory and Field Experiments with Monitoring Information Acquisition (Bartoš, Bauer, Chytilová, Matějka, 2014). The subject of the paper was discrimination against Roma and Asian people in the rental housing market. In addition, discrimination against abovementioned minorities was confirmed. There are almost twice as many Slovaks as Vietnamese living in the Czech republic. However there are not many researches investigating discrimination against Slovaks in local market. Slovaks and Czechs were united until 1993. Consequently, these two nations have perpetually much in common culturally, linguistically, historically and geographically. On the other hand, there is an anecdotal evidence, that they may be discriminated in certain situations. It could be especially true for young Slovaks. In my thesis, I am seeking, to investigate this relationship and to focus on following research questions.

- Is there any rate of discrimination against Slovak people in the Czech rental housing market?
- If discrimination exists, what it could be possibly caused by? Does discrimination occur on behalf of asymmetries of information, law, prejudices and personal experience, or is it caused by something else?
- Does the rate of discrimination differ based on age and a type of renting place?

Contribution

The thesis should bring new results and information considered the rental housing market in Prague. It should contribute to better understanding of statistical discrimination in this field of study, if it exists. In further analysis I may discover whether this discrimination is more significant for certain categories. For instance, if young Slovak is less likely to obtain a positive response as middle-aged Slovak. Examine a potential discrimination between two nations may help reveal current situation between them and look to potentially more complex relationships across nations than between majority and a minority population.

Methodology

According to the most recent measures, there are more than 493 thousand foreigners living in the Czech republic, which represents approximately 4.66% of the Czech population.¹ Around 40% of foreigners live in the capital city - Prague. Because of this fact, I find it convenient to specify my research solely on Prague. To obtain desired results, I am going to collect data using a field experiment. In the experiment, I am going to search specifically on websites where offers are made by owners of the property or landlords to avoid association with real estate agents. Firstly, as a potential tenant, I will send an email as the response to an advertisement. Communication via email is less time and cost demanding in comparison to other techniques. I will write the email with the request in the Czech language from an email address that indicates a person of a Czech nationality. To avoid omitted variables bias, additional parameters as gender, marital status, etc., that could affect landlord's decision-making process will be part of the initial request as well. Afterward, I will repeat this process. However in this case, the message will be sent in Slovak language by an email address indicating Slovak tenant. Importantly, additional information should be consistent with Czech tenant. Price level of the property will be considered in the further analysis as well in order to observe whether owners and landlords possessing more expansive tenancies will more-likely discriminate. Secondly, in a similar manner I will manipulate age of the tenant. To simplify the experiment I am going to target specifically offers of two bedrooms flat.

Outline

1. Introduction
2. Theory and history of discrimination in the housing market
3. Field experiment
 - 3.1 Data collection
 - 3.2 Representation of data
 - 3.3 Results of the experiment
4. Conclusion

List of academic literature:

Bibliography

BARTOŠ, Vojtěch, et al. *Attention Discrimination: Theory and Field Experiments with Monitoring Information Acquisition*. The American Economic Review, 2016, 106.6: 1437-1475. Available at: <http://anon-ftp.iza.org/dp8058.pdf>

BERTRAND, Marianne; CHUGH, Dolly; MULLAINATHAN, Sendhil. *Implicit discrimination*. The American Economic Review, 2005, 94-98.

WASMER, Etienne. *Housing market discrimination, housing regulations and intermediaries*. In: Expanding the Frontiers of Economics: session Interactions Between Urban Housing and Labor Markets. American Economic Association, 2005. p. 1-33. Available at: https://www.researchgate.net/publication/251591500_Housing_market_discrimination_housing_regulations_and_intermediaries

KAIN, J. & QUIGLEY, J. Introduction to "Housing Markets and Racial Discrimination: A Microeconomic Analysis". *Housing Markets and Racial Discrimination: A Microeconomic Analysis*. NBER, 1975. pp. 1-8. [online]. Available at <http://www.nber.org/books/kain75-1> ISBN 0-870-14270-4.

HANSON, Andrew; HAWLEY, Zackary. *Do landlords discriminate in the rental housing market? Evidence from an internet field experiment in US cities*. *Journal of Urban Economics*, 2011, 70.2: 99-114. Available at: http://andrewrhanson.com/Research_files/Discrimination%20on%20Craigslist.pdf

AHMED, Ali M.; HAMMARSTEDT, Mats. *Discrimination in the rental housing market: A field experiment on the Internet*.

¹'Výstupní Objekt VDB', accessed 21 May 2017, https://vdb.czso.cz/vdbvo2/faces/cs/index.jsf?page=vystup-objekt&z=T&f=TABULKA&ds=ds57517&pvo=CIZ01&katalog=31032&c=v23%7E2__RP2016MP12DP31&evo=v57516_%21_VUZEMI97-100-nezj_1&str=v19.

Journal of Urban Economics, 2008, 64.2: 362-372. Available at:
https://www.researchgate.net/publication/222011648_Discrimination_in_the_Rental_Housing_Market_A_Field_Experiment_on_the_Internet

Author

Supervisor

Contents

Introduction	1
1 Theories of Discrimination	4
1.1 Economic Models of Discrimination	5
1.1.1 Taste-based Discrimination	5
1.1.2 Statistical Discrimination	6
1.2 Types of Discrimination	7
1.2.1 Implicit Discrimination	7
1.3 Subjects of Discrimination	8
2 Literature Review	11
2.1 Laboratory Experiments	12
2.2 Field Experiments	12
2.2.1 Audit Studies	13
2.2.2 Correspondence Studies	16
3 Experimental Design	19
3.1 Identities of Fictitious Applicants	20
3.2 Other Characteristics	22
3.3 Text of Applications	23
3.4 Data Collection	24
3.5 Selection of Offers	25
3.6 Tracked Variables	26
4 Dataset and Statistical Analysis	29
4.1 Completeness of an Offer	29

4.2	Dataset Treatment	30
4.3	Responses from owners and landlords	31
4.4	Sample Characteristics	34
4.4.1	Characteristics of Flats	35
4.4.2	Results per identities	36
5	Econometric Analysis	38
5.1	The Logit Model	38
5.2	Assumptions and properties	39
5.3	Results	40
5.3.1	Regression on Slovak and Student	40
5.3.2	Models with Control Variables	42
5.3.3	Model with the Interaction Term	44
	Conclusion	47
	List of tables and figures	56
	Appendix	61

Introduction

Discrimination in housing occurs in various forms. When a person is seeking for a flat and landlords says 'no' solely because they will not rent to people under 25 years (refers to age discrimination) or because they not allow children in their building (refers to family structure discrimination) these are examples of discriminatory behaviour. Moreover, the landlord could refuse an individual legally, although his true preferences might be preoccupied for instance against race, sex or religion.

According to Becker (1971), one of the discrimination definitions describes a situation when a person acts against (or in favour of) another, based on subjective consideration of evidence. It is necessary to emphasise that not each subjective action must be viewed as a discriminatory behaviour. It is essential to see the difference between discrimination and personal preferences.

For instance, consider a situation when an owner or landlord of a property from the Czech Republic had been deciding between two candidates, one from the Czech Republic and the other from Slovakia. Finally, he or she accepted the offer from the Czech applicant. When the reasons for his or her choice were rational (e.g. higher offered price, payment in advance), it scarcely could be seen as discrimination. Assuming that the choice was made due to some prejudice against Slovak people, biased and irrational judgement, this might be the case of discrimination. In other words, the owner or landlord discriminated when his decision was based on characteristics which are not relevant to the process of renting or buying. In order to understand discrimination and for correct examination, precise definition of

the concept is crucial.

Slovakia and the Czech Republic are tightly connected historically, culturally, linguistically, politically and also geographically since they are neighbouring states. Until the year 1918, they were part of Austria-Hungary. After World War I they formed Czechoslovakia. With the pause (during World War II), they had figured as one state for 75 years. Independent states Slovakia and the Czech Republic were established on January 1st 1993. More than 20 per cent of foreigners living in the Czech Republic are of Slovak nationality (*Výstupní Objekt VDB, Cizinci podle státního občanství k 31.12. - územní srovnání*, 2017). At least some of these 107 thousand Slovaks might have been looking for a place to stay. Several studies examined discrimination against racial minorities in the Czech rental housing market, for instance, Bartoš et al. (2014). To the best of my knowledge, there is no such research investigating discrimination against Slovaks in the local market.

Due to research gap, I intend to investigate following research questions: Is there any rate of discrimination against Slovak people in the Czech rental housing market? Does the rate of discrimination differ based on a working status?

Discrimination on the housing market is studied using a field experiment. The experiment is aimed at the beginning of a rental process, on searching for a new flat in the Czech capital. Eight fictitious identities contacted owners or landlords with request on a flat view. Altogether 820 applications for rent were sent.

Results reveal the difference in response rates for Slovaks and Czechs equal to almost 10 percentage points and significant at 1 per cent significance level. Students received almost 42 per cent of positive responses while workers received about 5.8 per cent more responses although, this difference is not significant.

The thesis brings new results and information considered the rental housing market in Prague. Many researches using field experiments have been

conducted regarding the housing market, their overview is provided by ?. To the best of my knowledge no paper investigates discrimination between two nations, therefore my work highly contributes to literature on discrimination in the field. Moreover, my experiment tracks more subtle type of discrimination which is not visible to eye as gender or race.

This bachelor thesis is organised as follows. Chapter 1 and Chapter 2 provide theories of discrimination and review of the recent literature, respectively. Chapter 3 presents the strategy of the field experiment. Chapter 4 introduces results of descriptive statistics obtained from collected data and Chapter 5 interprets econometric methods. Conclusion summarises important points and additional materials could be seen in Appendices.

Chapter 1

Theories of Discrimination

This paper focuses solely on the market discrimination. Another definition from Becker (1971) can be used on restricted scope of interest. "If an individual has a 'taste for discrimination,' he must act as if he were willing to pay something, either directly or in the form of a reduced income, to be associated with some persons instead of others."

Examples of markets, where discrimination occurs the most frequently, are labour market, housing market, insurance market or capital market. Nevertheless, discrimination exists also outside the market. The evidence of non-market discrimination could be observed in the selection process at the university, in the expression of political beliefs (for example women' suffrage Sneider (2010)), or the exclusion of specific community from social needs like health services. Thorat and Neuman (2012) describe an example of discrimination based on caste classification which they call the 'complete exclusion'.

In the first part, this chapter discusses models of discrimination. Specifically two main concepts taste-based and statistical discrimination. Second part introduces implicit discrimination as a third concept, which stands in contrast to explicit discrimination. Last part is dedicated to various subjects, which cause discrimination.

1.1 Economic Models of Discrimination

The aim of the paper is an investigation of discrimination against Slovak minority in the Czech Republic. In general, discrimination can be described as a differential on the bases of a characteristic (e.g. nationality, ethnicity, gender). The economic models of discrimination can be divided into two categories: taste-based discrimination and statistical discrimination.

1.1.1 Taste-based Discrimination

Becker proposed taste-based discrimination model in his first edition of the book *The Economics of Discrimination* from 1957. The concept defines term 'taste for discrimination'. That is an attitude against members of out-group that has a form of willingness to carry the burden of additional costs, which arises from avoidance of discriminated group representatives. The model assumes that a decision in favour of a specific group is unrelated to objective reasons. Becker's approach is built on the assumption about a preference of perfect substitutes (e.g. when landlord or owner chooses between Slovak and Czech tenants which are in other characteristics seen as equal applicants and he or she chooses Czech person only because of nationality).

Money as a measure of discrimination might not exactly reveal a net costs of such behaviour. The net costs might include time consumption or opportunity costs. Becker's discrimination coefficient counts these effects and interprets 'taste for discrimination' in a measurable way. Later Yinger (1995) reviewed these costs for racial minorities in the United States. A real estate agent might have benefit or harm from particular actions. When the agent dedicates more time on decision process particularly because of discriminatory behaviour or perhaps the agent changes the price of property only in order to meet budget constraint of an individual from the preferred group. Therefore discrimination coefficient might have both positive and negative values as a result of such actions.

In 1970s several economists criticised Becker's model. They were sceptical about the concept based on preferences and that Becker takes the taste for

discrimination as given factor. Arrow was one of them and he claimed that discriminated individuals would be driven out of the market providing situation of perfect competition (Arrow, 1972).

1.1.2 Statistical Discrimination

Later, after the critique of the taste-based model, Phelps (1972) and Arrow (1973) introduced a different approach intended to investigate discrimination.

Profiling or statistical discrimination according to Arrow (1973) is a situation in which a party makes a decision about another individual based on prejudices towards the group with the specific characteristics where the individual belongs to (e.g. race, nationality). It could be as well based on beliefs which are considered as a truth about a particular group (e.g. women are less productive than man). Discrimination occurs when the statement is assumed to be valid on average about members of a group while it is not true about a specific individual.

Another assumption which must be fulfilled in the case of statistical discrimination is a limited information about the individual from a non-preferred group. In the context of the housing market, we are talking about a potential tenant or buyer, who is possibly discriminated because landlords or real estate agents have an incomplete knowledge of the individual. Subsequently, owners/landlords/real estate agents review the interested person according to stereotypes or facts which are known about the group. The individual is linked to this group by remarkable attributes and specific characteristics (e.g. gender, nationality, race). Statistical discrimination generalizes characteristics about specific groups that may influence the decision process and possibly cause additional costs.

Statistical discrimination is found often on the housing market. That may lead to an occurrence of a phenomenon called steering. Steering is the discriminatory practice when an owner, landlord or usually real estate agent prefers to show rental or buying offers in neighbourhood based on the same

race of actual residents and the client. Yinger (1995) concluded that racial steering is constantly widespread in the housing market. This study also claims that Hispanics are less affected by steering than Blacks.

1.2 Types of Discrimination

Taste-based and statistical discrimination, which were introduced in the previous part (see 1.1 Economic Models of Discrimination), are models under which conscious biased behaviour may occur (Bertrand et al., 2005). Specific concepts form explicit or intentional discrimination, which might combine verbal and nonverbal expression.

Discriminatory behaviour towards other races could be divided into five forms of increasing severity: verbal antagonism, avoidance, segregation, physical attack, and extermination (Allport, 1954). An unpleasant environment might arise from insulting remarks against a minority group, what could be supported by nonverbal action and jointly refer to antagonism. More serious form of discrimination occurs when an individual seeks to interact only with members of his own group. Allport (1954) further introduced a concept of segregation, what is the case when an individual not only avoids contact with the minority but also holds an active position in preventing equal opportunities for minorities. Extreme forms of intentional discrimination are physical attacks and extermination when members of a minority group are severely injured or even lost their lives.

Implicit discrimination, another concept in addition to taste-based and statistical discrimination, describes a situation when an individual behaves discriminatory without being aware of his or hers behaviour (Bertrand et al., 2005).

1.2.1 Implicit Discrimination

Implicit discrimination is similarly associated with prejudices, stereotypes or attitudes often based on previous experiences or common cases from history towards a disadvantaged group. Members of majority are not aware of their

discriminatory behaviour and they might act subconsciously (Blank et al., 2004). Defenders of this theory claim that opinions and preferences of individuals arise from associations which they have been creating during life and number of them are unconscious associations they may never acknowledge.

Greenwald et al. (1998) explain a possible measurement of unintentional process via the Implicit Association test. The test measures the strength of associations between two concepts (e.g. black and white person, flower and insect, pleasant and unpleasant). Based on this measure Bertrand et al. (2005) conducted a research on implicit associations and people's decision under time pressure. Results indicate behaviour in favour of implicit biases. However, more detailed analysis showed that removing the time constraint caused change in participants choices. With additional time, they tend to control more their unconscious preferences.

1.3 Subjects of Discrimination

Market and non-market discrimination are usually based on gender, ethnicity or race, age, religious beliefs, nationality, sexual orientation, caste or disability. Typically, the most frequent forms of discrimination have their own specific terms. Discriminatory behaviour based on gender is called sexism, prejudices against race or ethnicity referred to racism and ageism is stereotyping based on age.

Sexism is connected to discrimination of women or girls. The examples are known across history when women had a lower position in society than men. For instance, according to the ancient law, women were forbidden to participate in the political process (Frier and McGinn, 2003). When a Spanish woman was married during the Franco era, husband had a legal control over her. Wife needed a permission in case she wanted to work, own something or travel (Solsten and Meditz, 1988). Currently a substantial emphasis is placed on gender equality, however, the modern world is still consistently facing gender stereotypes. One of the issues, a gender pay gap, is investigated in Arulampalam et al. (2007) or in Olivetti and Petrongolo

(2008).

The following definition of a racial discrimination consists of two parts: ”(1) differential treatment on the basis of race that disadvantages a racial group and (2) treatment on the basis of inadequately justified factors other than race that disadvantages a racial group(differential effect)” (Blank et al., 2004). This type of discrimination is typically prohibited by law, especially in the field of labour market, housing market or educational system. Despite this fact, many pieces of research have shown a presence of discrimination.

For instance, Bertrand and Mullainathan (2004) observed that applicants with African-American sounding names had to send about 50 per cent more resumes for job applications than similarly qualified representatives of a majority to get a callback. In their analysis, they also examined effect of additional year of experience. An extra year of experience means an increment of a 0.4 per cent in a probability of getting a response. In the context of racial preference, it could be concluded that 8 additional years are comparable in response rate to a white sounding name of the applicant. Furthermore, Pager et al. (2009) investigated discrimination also in the US low-wage labour market. The results indicate that blacks had an about 50 per cent lower chance of getting a positive response than whites, considering similar qualification of applicants. Recently, a similar study was conducted on wage discrimination against immigrants in Austria by Hofer et al. (2017). They observed that wages of immigrants account for 85 per cent of the domestic workers’ wages.

Mickelson (2003) specified racial discrimination in education as a dishonest behaviour of institutions against students of a different race or ethnic group compared to the majority. In order to prevent such discrimination in education, many policies were established. European Union released *The Race Equality Directive* (2007). Universities around the world typically have their own anti-discrimination policy, such as Columbia University (*Policies and Procedures on Discrimination and Harassment*, 2016), Northwestern University (*Northwestern University’s Policy on Discrimination and Har-*

assessment, n.d.) or The University of New Mexico (*Administrative Policies and Procedures Manual - Policy 2720: Prohibited Discrimination and Equal Opportunity*, 1991). These policies among other things emphasise diverse and equal environment. Unfortunately, the focus on minorities could result in reverse discrimination. The term is defined as "the unfair treatment of members of majority groups resulting from preferential policies, as in college admissions or employment, intended to remedy earlier discrimination against minorities."¹ The Bakke case (Posner, 1979) is an example of these settings. Allan Bakke, a white American man, was twice dismissed by the University of California in the admission process. The medical school of the university, where he applied, had reserved 16 out of 100 places for applicants from a minority group. The average score of the minority group was below other medical students and Bakke saw this as a violation of the law and sued the university for the racial discrimination. This case follows Wang's paper (Wang, 1988) which examines racial discrimination in higher education in the United States, specifically in the post-Bakke era.

Examples of discrimination on the housing market will be discussed in the following chapter.

¹According to *Reverse discrimination*. Dictionary.com [online]. [Accessed 1 April 2018]. Available from: <http://www.dictionary.com/browse/reverse-discrimination>

Chapter 2

Literature Review

Various methodologies are used to examine discrimination in the market. There are three major types of experiments: laboratory experiments, field experiments and natural experiments. A large number of articles and books review the literature on discrimination. For instance, experimental methods and analyses for measuring racial discrimination are explained by Blank et al. (2004). A recent article, oriented on overview of studies using field experiment, is written by Bertrand and Duflo (2017). Similarly, Reiley and List (2007) present field experiment in economics as well as its most important types.

Each type of experiment suits better for different questions and purposes. The controlled experiment allows formulating of more precise causal inference on restricted conditions because the researcher is able to control all potential confounding effects. Nevertheless, the conclusion from this type of experiments frequently cannot be applied to a general population, in other words, they have limited external validity. Field experiments are more appropriate for this purpose, even though variables are not under absolute control. Reiley and List (2007) stress the distinction between the field and laboratory experiments. This is even more important in the social sciences, such as economics. The field experiment uses the advantage of the real-world environment and concurrently researchers create a variation in control and treatment conditions.

Literature related to the subject will be sequentially introduced according to the methodology used in an experiment. The first part is discussing laboratory experiments, their advantages and limits. Field experiments have two forms, audits and correspondence studies which are discussed in the second part.

2.1 Laboratory Experiments

Design of laboratory experiment is unique compared to other approaches in several points. Researchers are able to control for all confounding factors in a lab and therefore to properly observe causal inference. For instance, Blank et al. (2004) highlight the measurement precision of dependent variable and more detailed observations by this method.

Laboratory experiments have disadvantages for studying discrimination (Orne, 1962). Lab experiments can help to uncover the causal relationship but they are susceptible to researcher demand effect. Rosenthal (1966) analyses another problem which might cause bias of results. He refers to a situation when researchers themselves present experiment to participants in a way that they would confirm a hypothesis, although in the real world under unrestricted conditions they would not.

2.2 Field Experiments

The importance of field experiments increases over the past decades. Due to randomization during an experiment examined groups are similar on average, except for the investigated variable. Thanks to the argument, it is possible to observe differences caused by examined characteristic.

Field experiments represent a bridge between laboratory and natural experiments, trying to take an advantage from both methodologies. One of the benefits is a natural setting through which observations are collected, what brings higher external validity. Another strength of field experiment over laboratory experiment is in large accessibility to a capacity of participants

and the scale of settings. Further, they measure the effect in a clearer way since they occur in the real world and besides that, control for a variable of interest and allow for generalization.

When researchers are conducting a field experiment, they have to know about its limitations. Bertrand and Duflo (2017) mentioned the problematic interpretation of coefficients since tracked variables do not have to explain studied phenomenon correctly and some important variables might be unobserved. Such situation is in statistics denoted as omitted-variable bias. In case of discrimination in the housing market, they emphasise a situation when an owner or a real estate agent observes some characteristics, but researchers do not notice their presence during the experiment. Hence, researchers may explain the reason for discriminatory behaviour incorrectly. Since my research question is whether there is a discrimination of Slovaks in the housing market, the field experiment seems to be the most appropriate methodology.

2.2.1 Audit Studies

An audit, sometimes called a paired-testing methodology, is a type of field experiment frequently used in economics for a study of discrimination. Their origins are dated in the 1950s. Fix and Struyk (1993) provide one of the method descriptions, firstly, auditors or testers are chosen. Typically one represents a majority or a controlled group and the other one (or others) is the representative of some minority. Then they are trained similarly, with same characteristics, the difference is only in the one which is the subject of study (in our case it will be nationality and working status of a candidate). Secondly, the experiment itself proceeds, when auditors show the interest for some goods or services (e.g. a rental offer, job application). Lastly, the results and the entire process are tracked and subsequently analysed.

The main advantage lies in the possibility to monitor the whole process from the first contact till the successful (or unsuccessful) attempt in obtaining property. Through audits is possible to inspect the behaviour of owners,

landlords or real estate agents and their reactions to various incentives. The article written by Oh and Yinger (2015) among other things studies reasons and conditions under which an unfair treatment occurs in a housing audit.

As was mentioned before, the essential assumption for audits is in equally accomplished home seekers. The parallelism should not be found only in inner characteristics but also in appearance, age and other observable perceptions. Consequently, the achievement of the similarity is almost impossible within the required level.

Several audit studies conducted in the USA confirmed supposition about discrimination by real estate agents (Purnell et al., 1999, Roychoudhury and Goodman, 1996). In the first phase, Turner, Ross, Galster and Yinger (2002) came with the claim about the occurrence of steering in the US housing market. A year later, in the second phase Turner and Ross (2003) confirm the presence of the racial discrimination against Asian-Americans and Pacific Islanders. In addition, this rate is similar to that of African-Americans and Hispanics. Riach and Rich (2002) summarised audit studies in housing sales and rental accommodation. The discrimination was statistically significant and greater than 20 percent for twenty audit studies from the United States. Overview of audits conducted in the rental housing market is reported in Table 2.1.

Country/Region¹	Audit date	No of audits	Race/Sex	Net discrimination²(%)
<i>England</i>				
Birmingham, Greater London, Leeds, Leicester, Slough (Daniel, 1968)	1966	228	West Indian	60.1
London, Birmingham (McIntosh and Smith, 1974)	1973	41	Asian/W.I.	26.8
<i>France</i>				
Paris (Bovenkerk et al.,1979)	1976	135	Black	31.9

Country/Region ¹	Audit date	No of audits	Race/Sex	Net discrimination ² (%)
<i>United States</i>				
National (Wienk et al.,1979)	1977	3,264	Black	16.3
National (Yinger, 1993)	1989	801	Black	28.0
National (Yinger, 1993)	1989	787	Hispanic	23.0
Boston, MA	1981	156	Black	24.0
Sunnyvale, CA	1981	23	Black	61.0
Redwood City, CA	1982	35	Black	69.0
Palo Alto, CA	1983	20	Black	70.0
Hayward, CA	1984/5	25	Black	20.0
Cleveland Heights, OH	1985	29	Black	14.0
Wooster, OH	1985/6	15	Black	20.0
Washington, DC	1986	280	Black	48.0
Washington, DC	1988	295	Black	28.0
Carmichael/Citrus Heights	1982	18	Hispanic	22.0
Redwood City, CA	1985	32	Hispanic	47.0
Hayward, CA	1985/6	25	Hispanic	4.0
Wooster (Galster and Constantine, 1991)	1985	11	Female	81.8

Table 2.1: Audit Studies for Racial Discrimination in the housing market, Source: Riach and Rich (2002)

At present, the method of audit studies is not commonly used. It was gradually replaced by correspondence field experiments.

²Unless stated otherwise the studies are from Galster (1190a)

²All tests statistically significant at the 0.05 level except Hayward, CA (1985)

2.2.2 Correspondence Studies

Various reasons help to dislodge in-person audits from typically used methods of research. Mainly their resource intensity, such as money, time and people accounted for incentives to create new, more efficient method. Technological development in the late 90s offered a clear solution. Internet growth affected also the real estate market since websites became the prime source of adverts (Turner and James, 2015). Correspondence study, which uses solely written communication, solves the greatest disadvantage of an audit. The problem of auditors similarity and moreover impossibility to control actors may lead to bias due to different behaviour of groups. A difference between the number of responses for treatment and control group is used as a measure of discrimination.

One of the first researches using this methodology, regarding the housing market, was conducted by Carpusor and Loges (2006) in Los Angeles. The research, using exclusively email contact, confirmed prejudice against minority sounding names, specifically Arabian and Afro-American. The number of received responses on the minority sounding name was about 39 per cent lower than for white sounding name.

Discrimination of many groups, such as Arabs, Afro-Americans, Asians or Caucasians was also studied in the United States and Canada by Hogan and Berry (2011) Hanson and Hawley (2011), Ewens et al. (2014) and others. All listed studies confirmed the presence of discrimination. Further, Yinger (1995) introduced terms 'opportunity denying' and 'opportunity diminishing'. First one described the treatment of rejection in overall and *opportunity diminishing* refers to provide less information or fewer opportunities. According to Hogans' and Berry's research the situation with no response which is denoted as opportunity denying is around 10 times more frequent than a rejecting response or alternative offer. Ewens et al. (2014) observe the effect of application content on results. However, they concluded that additional positive information increases the probability of response, the difference amongst races remain practically unchanged.

Studies in Europe often investigate discrimination against foreigners and migrants. For instance, Van der Bracht et al. (2015) focus on the Belgian rental housing market. One of their research questions investigates immigrants' knowledge of home-language (in this case, the Belgian language). They found that if immigrant declares proficiency in the language it does not change the effect of discrimination compared to those immigrants who are not able to speak Belgian. Further, they observe no impact of neighbourhood structure on the discrimination occurrence. Baldini and Federici (2011) studied among racial and gender discrimination also the importance of language ability, although this hypothesis was not confirmed. Germany is also known by a great incidence of immigrants, one of the typical foreign groups is Turks. Auspurg et al. (2017) review the issue in the German rental market and show a difference in treatment between Germans and Turks by 9 percentage points. They found a stronger effect in areas where is an occurrence of Turkish residents at the highest level.

Several studies investigate discrimination in Scandinavian countries against Arabs (Ahmed et al., 2010, Andersson et al., 2012, Bengtsson et al., 2012, Carlsson and Eriksson, 2014, Öblom and Antfolk, 2017). Öblom and Antfolk (2017) observe a difference between Finns and Arabs, besides that they varied gender of applicants. Results indicate that the Arabs men have the lowest response rate, only about 16 per cent. On the contrary, Finns women get a positive response in 42 per cent. (Carlsson and Eriksson, 2014) similarly look also over gender discrimination. Ahmed, Andersson and Hammarstedt (2010) examine whether more information about an applicant reduces the level of discrimination. The response rates change within both studied groups, although the proportion between them remain unchanged. In other words, detailed information about an individual does not reduce the discrimination gap.

Whereas I intend to research discrimination in the Czechs' capital city rental housing market, it is necessary to mention studies from this region. Bartoš et al. (2014) conducted a field experiment in the Czech rental mar-

ket against Roma and Asian minority. The measured effect between Czech applicants and representative of minorities (both Roma and Asian) is equal to 37 percentage points, which means that Czech tenant has about 90 per cent greater chance to obtain a positive response. The difference between two minority groups, the Roma and Asians, is not significant. Moreover, they implement Monitored Information Treatment, when application consists only from brief information expressing interest and a hyperlink to a personal page of an applicant. The page allows acquiring additional information about a potential tenant. The research shows that owners or landlords were seeking more information about a minority tenant than about person from the control group. Afterwards, similar research was conducted in Slovakia, which investigates the situation with Roma community in the Slovak rental housing market Sacherová (2016). The results indicate discrimination rate about 8-9.5 per cent and the highest occurrence in a district with average Roma contribution.

Chapter 3

Experimental Design

The results of a field experiment in the housing area can bring a valuable information about discrimination against tenants and buyers. The literature review shows that this is the state-of-the-art methodology which will be used also in this experiment, where I would like to determine the rate of discrimination against Slovaks in the Czech rental housing market. Additionally, I attempt to observe the effect of being a student versus fully employed worker. The experiment was conducted on the internet between 3rd December 2017 and 8th March 2018. 820 requests altogether were sent to 205 different offers for flat rental. Hence, each offer advertiser received four responses within the experiment, from which one was from Slovak student, Slovak worker, Czech student and Czech worker. Owners or landlords of offered flat were not aware that they were part of the experiment. This method seems to be better on behalf of unbiasedness, since advertisers may react dishonestly in case they know that their reaction (even if there is no reaction) is the subject matter of research.

Level of randomization determines the lowest level at which an outcome is measured. In this case, randomization is at the offer level, offers were selected under several conditions (see part 3.5 Selection of Offers). Through a ratio of positive responses to an overall number of requests for each subgroup is estimated a rate of discrimination.

The matched design is a special case of treatment with randomization

which determines the actual process of the experiment. Considering two groups of interest (e.g. two nationalities Slovak and Czech), which are exactly the same in all characteristics except for the treatment condition (e.g. nationality). Specifically for purpose of this experiment subjects were formed into two group of Slovaks and Czechs. Since working status is another object of the study, they were also divided into students and workers. Furthermore, cross-categories are recognized: Slovak student, Slovak worker, Czech student and Czech worker. One representative from each subgroup was randomly assigned to a specific offer, in other words, two identities from the same subgroup never response on the same offer. Matched application method was applied in the experiment due to a possibility to observe discrimination with a lower number of observations than with using the between subject randomization.

In this chapter, I am going to gradually describe steps of the experiment preparation and process of collecting the data.

3.1 Identities of Fictitious Applicants

Preparation for the experiment begins with creating eight fictitious identities, four with Slovak sounding names and four with Czech sounding names. The name represents one of the signals for owners or landlords about the nationality of an applicant and therefore has to be chosen carefully to fulfil this idea. Since the intention of this experiment is not to study gender discrimination, purely male names were chosen.

First, names of Slovak's potential tenants were chosen. The purpose was not only to use names which are typical in the Slovak Republic but also to choose those which are at least slightly different from names used in the Czech Republic. Ministry of Interior of the Slovak Republic published the list of the most frequent first names in the country (*Najčastejším menom, ktorým rodičia pomenovali svoje dieťa v roku 2013, je Jakub*, 2014). Ján is the most common name, however, this name is also typical in the Czech Republic and hence was excluded. The second name on the list is Jozef, with

more than 250 thousands residents having this name and was used as the first fictitious identity. Another selected name was Peter, with more than 173 thousand occurrences, then Matúš and Juraj.

From Institute of Language Studies of Ľudovít Štúr (Ďurčo et al., 1998) were extracted the most frequented last names in Slovakia. Subsequently, those names which might signal another ethnicity (e.g. Roma sounding names) or nationality (e.g. names with Hungarian or Polish origin) were excluded. Ultimately Kováč, Baláž, Lukáč, Slovák were preferred and randomly assigned to previously chosen first names.

Lastly, the similar procedure was used to create Czech identities. Ministry of the Interior of the Czech Republic reported the frequency of names and surnames(*Četnost jmen a příjmení*, 2017). Complete Czech names used in the experiment are Zdeněk Novák, Jiří Novotný, Petr Svoboda and Josef Dvořák.

Each fictitious identity has own email address, a form of an email address is another signal about the nationality of a potential tenant. For this reason local email providers, which are frequently used in both countries (*Největší statistika českých a slovenských freemailů. Kdo vládne e-mailové komunikaci?*, 2014), were chosen. Email addresses for Slovak identities were established at `zoznam.sk` or `centrum.sk`, for Czech potential tenants at `seznam.cz` and `email.cz`.

The table below summarises fictitious identities and their email addresses. Each name has a specific number which was subsequently used in randomization process.

Number	Country	Name	Email Address
1	SK	Juraj Kováč	jurajkovac@centrum.sk
2	SK	Peter Slovák	slovak.peter1@zoznam.sk
3	SK	Jozef Baláž	balazjozef@centrum.sk
4	SK	Matúš Lukáč	lukac.matus@zoznam.sk
5	CZ	Zdeněk Novák	zdeneknovak21@seznam.cz
6	CZ	Jiří Novotný	novotny-jirii@email.cz

7	CZ	Petr Svoboda	svobodap37@seznam.cz
8	CZ	Josef Dvořák	jo.sef.dvorak@email.cz

Table 3.1: Fictitious identities and their email addresses

3.2 Other Characteristics

Discrimination of Slovaks is primarily researched in this experiment. The intention is to examine the possible difference in response rates between Slovaks and Czechs. Besides that, I investigate if the effect differs for students and non-students. To the best of my knowledge, there is no paper which studied discrimination of students in the housing market. There is a conviction that they are less responsible, unwilling to pay for rent or they possibly destroy a flat what can lead to a negative conclusion of landlords or owners towards students. Consequently, landlords may prefer working adults instead of students as people who are living in their abode or as their neighbours. Age of applicants might be a case of hidden effect. Elder person, who has a full-time job as a general rule, is considered as more trustworthy compared to a youngster, who does not have to have a stable job or is a student without income. The supposition may be confirmed or disproved by this field experiment. Therefore, except nationality, employment or study of potential tenants will be tracked, although the age of the applicant is not specified in the sent email (more about the wording of applications in part 3.3 Text of Applications).

Each email also specifies that the candidate is a non-smoker and does not have a pet since these requests were frequently stated in the offer description. Naturally, landlords and owners are afraid of additional costs which might occur from smoking or keeping an animal in a flat. Smoking in an enclosed space depreciates its value, damage furniture especially curtains or fabric items as couch or bed. Painting of rooms where people smoke is necessary

more often than in those where no one smoke. The presence of a pet can cause destroyed furniture or floors. This additional information could raise response rate so, I see convenient to highlight it.

3.3 Text of Applications

After creation of identities next step in the experiment is to write a text of the application. Four versions in each language containing only fundamental information. Each text contains information about non-smoker applicant without a pet. The difference is mainly in the used language, which most likely signals nationality of the potential tenant. Another difference is in "working status" of the applicant, which suggests if an individual is a student or worker. In this experiment is used matched application method. Four different fictitious identities sent a request, two Slovaks and two Czechs and for each nationality one student and one worker, on each offer. As four emails were sent together for each advert, it was necessary to precede undesirable revelation of the experiment. Because of that, none of the names is used more than once for the same property offer. The texts could not be used repeatedly even in the different languages. Besides that, the identity and version of the text were randomly assigned each time when the response was sent to prevent bias of results caused by a preference for the specific name or text. It is important to emphasise that each version of the text has slightly different wording, although they include the same information and are framed similarly. The following texts are examples (one for student and one for working adult potential tenant) of translated versions from Czech or Slovak language (for complete texts in original languages see Appendix A).

Example 1 - Slovak/Czech, Student

Good afternoon.

My name is (insert the NAME), I am a student of a university, non-smoker without pets. I am writing you based on your offer of the rent on (insert name of the street) street. I am really interested in your flat. I would like

to ask, if the offer is still actual and whether it is possible to set up an appointment and viewing your flat.

Sincerely,

(insert the NAME)

Example 2 - Slovak/Czech, Worker

Good afternoon,

I am seriously interested in your offer published at portal bezrealitky.cz. As far as is flat still available, would it be possible to agree on a date of a meeting for flat visit? My name is (insert the NAME), I'm working on full-time, I do not have pets and I am a non-smoker.

Have a nice day.

(insert the NAME)

3.4 Data Collection

For complete preparation of the experiment, it is necessary to ensure randomization during data collection. Firstly number for randomization process was chosen. The randomization number represents the order in which applications were sent by nationality. Since there are two Slovaks and two Czechs, six possible outcomes exist. For instance, when randomization number is equal to 2, first mail was send in Slovak language, second in Czech, third again in Slovak and fourth in the Czech language. From this, it is not known which specific identity sent respond either if it is a student or working adult, but only the nationality of the applicant. This process of randomization was done via MS Excel function randbetween¹. All possible events of randomization are summarized in the following table. Randomization number represents the outcome of the randbetween function, values of Order 1,2,3 and 4 represent order and corresponding language in which was a mail sent (1-Slovak,0-Czech).

¹Function randbetween returns a random integer number between the numbers you specify. In this case, was generated numbers between 1 and 6.

Randomization number	Order 1	Order 2	Order 3	Order 4
1	1	1	0	0
2	1	0	1	0
3	1	0	0	1
4	0	1	1	0
5	0	1	0	1
6	0	0	1	1

Table 3.2: Randomization table

Secondly, identities itself were randomised, using again function `rand-between`, where possible outcomes are between 1 and 8 (see Table 1 for fictitious identities). Numbers between 1 and 4 belong to Slovaks and between 5 and 8 to Czechs. Lastly, version of the text was randomized, this randomization was limited by results from the previous randomization. Version 1 and 2 was for students, version 3 and 4 for workers. It was necessary to match one Slovak and one student version, similarly for worker and Czech.

3.5 Selection of Offers

More than 107 thousands of Slovak people live in the Czech Republic, 27.10 per cent of them live in the capital city, Prague (*Výstupní Objekt VDB, Cizinci podle státního občanství k 31.12. - územní srovnání, 2017*). 40 per cent of all foreigners, living in Czech Republic, lives in the capital city, what makes it the most diverse city in the country and this experiment was conducted solely on offers in Prague.

Since most of the real-estate adverts are published online, the experiment was conducted on www.bezrealitky.cz. The portal is the first of this kind in the Czech Republic, through which is possible to sell or rent property without the assistance of real estate agencies, therefore the owners themselves publish offers and communicate with potential tenants and buyers. Supply on the rental market is formed from direct owners and real estate agents, which represent the third part in the process. Because the owner

has a greater interest in a treatment of the flat than real estate agents and therefore the owner might better represent taste for discrimination. The research is focused solely on the owners in order to observe preferences of ordinary inhabitants. Real estate agents do not bear any future costs related to lease and their actions might be influenced by a hidden interest, personal benefit from a number of completed transactions, therefore greater profit.

I restricted the data collection only on studios and one room flats. Also, half of the applications were sent by students and they are usually not financially independent, therefore price ceiling had to be set. On the other hand, to obtain the specific amount of offers, the ceiling could not be too low and it is important to find a balance between these two conditions.

The housing market in the Czech Republic has strongly grown. Price changes of all purchased properties on the housing market are measured by the house price index (HPI). During first three-quarters of 2017, HPI for the Czech Republic displays the highest percentage change compared to previous year among all European Union countries. For instance, in the first quarter of 2017 prices increased by 12.8 per cent compared to first quarter of 2016. At the same time prices rose at average in European Union only about 4.2 per cent (*Your key to European statistics, House price index*, 2015). This progress consequently affects the rental housing market. Rent in Prague increased by almost 10 per cent in 2017 (*Nájemné prudce roste*, 2017). Average price for square meter per month in Prague was in December 2017 363 CZK, when in December 2016 it was about 335 CZK (prices are without additional fees, such as electricity, heating or internet) (*Statistika nemovitostí - Průměrná cena pronájmu - 1m²/měsíc - graf - Praha*, 2018). With consideration of both assumptions rent for a flat per month, including fees cannot exceed 15 000 CZK in my sample.

3.6 Tracked Variables

All relevant information and parameters about offers were recorded during the whole experiment period. Four records have been added to each offer

about responses from fictitious identities and additional parameters. Data was completed several days after dispatch of the last message since some owners react with a delay. Main characteristics of interest and their descriptions are listed in this section (the complete list of tracked variables in Appendix B).

First, details about the offered flat were documented. The main interest was the amount of the rent, additional fees (variables *Rent*, *Charges*, respectively), size of the flat is expressed by binary variable *One-room*, which could be studio (value equal to 0) or one bedroom flat (value equal to 1) and also in square metres which represent an area of property (variable *Area*). The location was tracked through variables *Street* and *District*. Further, the nearest type of public transport available from the apartment building was recorded. Various flat facilities were tracked like a bed, washing machine, fridge or cooker. The variable *Link* contains a website where is (or was) the offer available.

Second, I also track information about request and particular identity. Except for *Name* used in request, *Order* in which it was send is recorded and the number of text version (*Version*). Further, this variable determines whether an applicant was a student or full-time worker (tracked separately via binomial variable *Student*). Unfortunately, the system does not provide information about the exact time when the advert had been released, what might be undoubtedly highly useful for the analysis. At least the exact time when the response from applicant had been sent was tracked under variable *Time*. Variable *Time* is related with variable *Availnow*, the binary variable, which is equal to 1 in the case that first reaction was sent by the time when the flat was available for moving immediately.

Last, the most important variables in dataset are *Response* and *Slovak*. First of them contains information about the final status of the response from an owner. The variable is equal to 1 when the identity received a positive response to flat view request from the particular owner. It takes the value 0 in case of negative response and blank space for no response. Further it is

used as a dependent variable for the analysis. Binary variable *Slovak* denotes language of an application and together with variable *Student* represent two main dependent variables on the basis of which analysis is conducted.

Chapter 4

Dataset and Statistical Analysis

As was mentioned before, eight fictitious identities sent in overall 820 messages expressing interest in a rental. All applications were sent via the web form on the web page. Exactly 410 messages were in the Slovak language, the same number for the Czech, therefore 206 for each subgroup (for details see chapter 3 Experimental Design). Consequently, I received 432 responses from owners or landlords, including both positive and negative meaning of the message.

In this chapter, I introduce a special treatment of the data. Further, characteristics of the dataset are discussed in detail and last part presents results and an outcome of the analysis.

4.1 Completeness of an Offer

If all four representatives of the subgroups successfully sent their answers on a specific offer, the offer would be labelled as complete. Overall eleven reactions were not sent due to deactivation of the offer, what regarding six offers. These uncompleted offers were tracked because it means that at least one individual was successful in his attempt to contact the owner or landlord. It should be acknowledged that I received responses from owners or landlords

on four of these six offers. In three cases, two messages were successfully sent and subsequently, both received a positive response. Presumably owners or landlords of these properties were willing to show their flats or communicate otherwise with fictitious identities, although in the meantime, someone outside the experiment expressed interest and made an agreement. As the result, offeror cancelled his advertisement and therefore it was impossible to finish the experiment for that offer. Six offers are excluded from further analysis due to incompleteness.

4.2 Dataset Treatment

The measurement of discrimination is derived from the ratio of positive responses to the number of sent messages. Therefore, the response and the treatment of observations are crucial for analysis accuracy. The process of collecting the data was tracked as follows: Variable *Response* is equal to "1" if the positive answer was received, "0" if the answer had a negative meaning and was left blank in case that no one responded.

Three ways of response treatment are established. The first way treats all no responses as negative (Blank space was replaced by "0"). Additionally, this approach does not see the difference between negative response and no response, whereas an applicant in both cases does not have a possibility to make an agreement. This idea was used the most frequently during data evaluation (in statistical analysis as well as in econometric analysis).

The second way of treatment distinguishes between individual offers. Four responses to the one specific offer are considered as one entity. When at least one answer was received from the offeror, either positive or negative, I assume that the offer is up-to-date and that the owner or landlord is currently looking for a tenant. Hence, each entity was completed with "0" and when there was no response on neither from four applications the offer was excluded from the subsequent analysis. The number of observations increases from 423 to 551 due to the treatment, therefore increment is around 30 per cent.

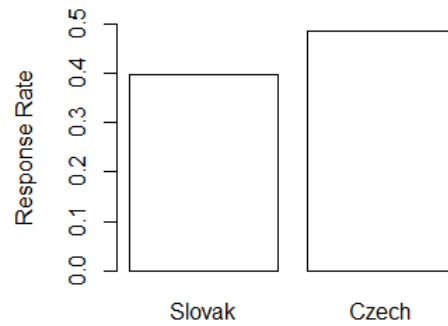


Figure 4.1: Response rates for Slovaks and Czechs

The last way of treatment depicts a real situation where no additional adjustments were made. 423 observations are evaluated considering this treatment.

4.3 Responses from owners and landlords

From now on all presented results will apply to the restricted dataset consisting of 796 measurements and corresponding to the first treatment (see part 4.2 Dataset Treatment) if not stated otherwise. 423 responses were tracked, both 'positive' - an owner agreed on a flat viewing or in other words confirmed availability of the flat, and 'negative' - response claimed that a flat was not available anymore. The overall response rate is equal to 53.14 per cent, of which 83.92 per cent have a positive meaning. Data indicate that in 158 cases Slovaks received a positive response, what corresponds to 39.69 percent from all requests. For the Czech potential tenants were tracked 39 more responses than for Slovaks what means the change in almost 10 percentage points. Hence, Slovaks, in order to obtain a similar amount of positive responses, need to send about almost 25 per cent more requests for rental. Figure 4.1 graphically interprets response rates for both nationalities.

To show significance of differences in mean was used Fisher’s exact test for count data. Table 4.1 shows obtained values.

	Slovak vs. Czech
p-value	0.005446

Table 4.1: Results from Fisher’s Exact Test for Nationalities

Values suggest strong significance in the difference between two nationalities, although when they are tested against entire dataset the differences are less significant.

As was stated many times before, except monitoring of discrimination against Slovak people in the Prague rental market, the intention of this work is also to examine the impact of working status on response rates. From collected data could be concluded that the gap between students and working adults is not that great as expected. Students, regardless their nationality received in 41.79 per cent cases positive response and workers only about 5.8 percentage points more. Therefore, when students have an intention to obtain a similar number of responses as workers they need to react on 13.86 per cent more offers than workers. Figure 4.2 and Table 4.2 summarises result for working status similarly as Figure 4.1 and Table 4.1 for nationalities.

	Student vs. Worker
p-value	0.1167

Table 4.2: Results from Fisher’s Exact Test for Working Status

The difference in rates between these two groups is smaller, what confirm p-values since the differences based on working status are not significant.

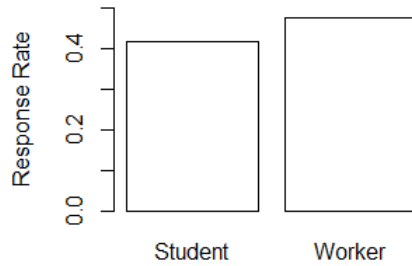


Figure 4.2: Response rates for Students and Workers

In a more detailed analysis, I compare results from cross-groups. According to the hypothesis, I assume the greatest difference between Slovak students and Czech workers since a representative of first sub-group has both potentially non-preferable characteristics and a Czech worker represents a member of the control group. The gap that arises due to different nationality and together with working status is the greatest of all measured sub-group pairs. Slovak students collected only 36.5 per cent of positive feedback compared to Czech workers with 52 per cent. The opposite phenomenon could be seen between Slovak workers and Czech students, the difference is the smallest of all measures, only 4.1 percentage points.

Table 4.3 summarises response rates for each sub-group and percentage difference among them. Percentage change is determined by dividing the rate of change by the lower value. Where R_H denotes higher response rate from the compared pair and R_L similarly for lower response rate. Besides that, the table provides information about p-values from Fisher's exact test for the difference in mean for sub-groups.

$$PercentageChange = \frac{R_H - R_L}{R_L}$$

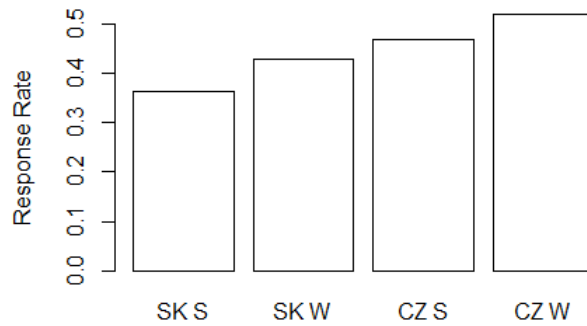


Figure 4.3: Response rates for Sub-groups

Sub-group	<i>Slovak Student</i>	<i>Slovak Worker</i>	<i>Czech Student</i>	<i>Czech Worker</i>
<i>Slovak Student</i>	-	17.53%(0.26)	28.77%(0.053)	42.4%(0.002)
<i>Slovak Worker</i>	17.53%(0.26)	-	9.56%(0.48)	21.21%(0.07)
<i>Czech Student</i>	28.77%(0.053)	9.56%(0.48)	-	10.64%(0.32)
<i>Czech Worker</i>	42.4%(0.002)	21.21%(0.07)	10.64%(0.32)	-

Note: p-values in parentheses

Table 4.3: Percentage Change for Sub-groups and Corresponding p-values

Moreover, figure 4.3 graphically interpret response rates for all followed sub-groups. Used abbreviations: SK-Slovak, CZ-Czech, S-Student, W-Worker.

4.4 Sample Characteristics

Except to main followed characteristics, such as *Slovak*, *Student* and *Response* are additional variables essential for analysis. Description of tracked variables is provided in section 3.6 Tracked Variables or complete list of variables

could be seen in Appendix B. Supplementary characteristics about offers bring new ways in data evaluation which will be presented in this part.

4.4.1 Characteristics of Flats

Types of real estates in the dataset are divided primarily based on the flat disposition. 71.86 per cent of all offers consists of one-room flats and remaining are studios. Area of offered properties is from 13 square metres up to 65 square metres per unit in my sample. The sample mean is around 32 square metres.

Another important measure is rent of a property per month. The lowest measured price was 8200 CZK per month and the price ceiling was set to 15 000 CZK (see part 3.5 Selection of Offers for explanation). The sample mean price is approximately 13 276 CZK. Both variables area and price of a flat have great range. I think it is convenient to combine these two parameters and create new variable price per square metre. Minimum of the variable is 215.4 CZK per square metre, the value at maximum is 723.1. By the end of 2017 was an average rental price per square metre in Prague 363 CZK without additional fees (*Statistika nemovitostí - Průměrná cena pronájmu - 1m²/měsíc - graf - Praha, 2018*), my sample counts for these fees and results show sample mean equal to 411 CZK. Prices in the rental market are still increasing and additional fees also contributed to the higher sample mean and therefore I do not consider the higher value of the mean as incorrect or biased. Both the area range of flat and its price range are considerable, therefore in the further analysis is preferable to use instead of these variables price per square metre for rent per one month. Figure 4.4 shows distributions for total price and price per squared meter.

The response rate on cheaper properties is significantly below the average rate and when an applicant sends a request for one of the most expensive flats he has better opportunity to obtain a positive response. For instance, the response rate for Slovaks on the cheapest flats is 22 per cent, for Czechs almost 29 per cent and when they send a request for the most expensive

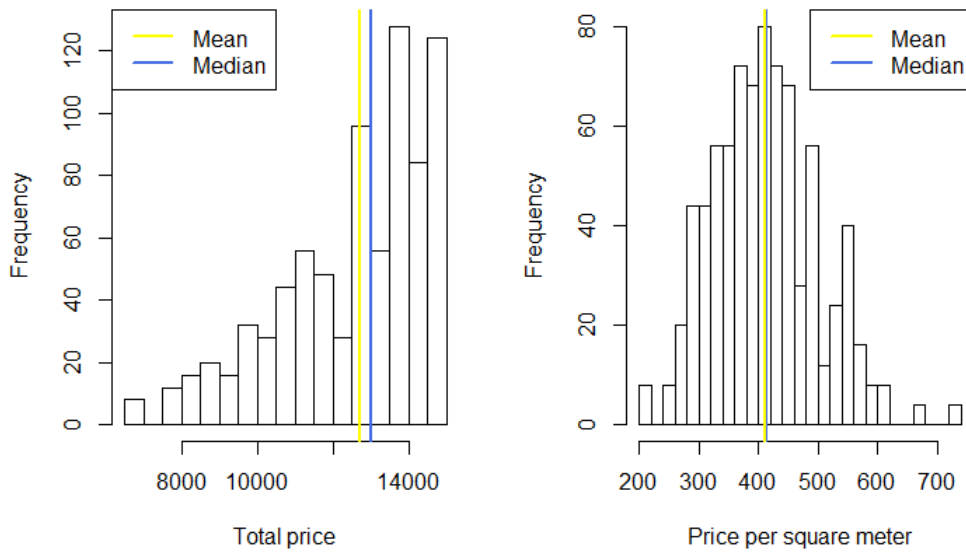


Figure 4.4: Distribution of Total price and Price per Square Meter

flats in the sample response rates for both groups increase almost about 35 percentage points (for a detailed analysis see Appendix C). The reasons for this effect might be straightforward. Naturally, for the cheapest flats is the greatest demand, therefore owner or landlord has more possibilities and he or she is more selective. On the contrary owner of more expensive flat than is average price has limited possibilities with potential tenants. At the same time, he might assume that when an applicant expresses interest in the costly real estate, he does not have financial problems and he could afford to pay the rent.

4.4.2 Results per identities

The lowest response rate, among all used fictitious identities, get Slovak sounding name Matúš Lukáč with total rate 0.34. The best performing Slovak identity Juraj Kováč with overall 49 per cent of positive responses. Preference might be a cause of the difference, although important is to consider that Matúš Lukáč was used 64 times as student applicant, with the

rate only 0.28, and as working adult 38 times. Some differences across names are present, although they are probably random and the order in which applications were sent also affect results. Further analysis will control for these effects.

Chapter 5

Econometric Analysis

Authors of similar studies which examine discrimination in the housing market typically use linear probability model (LPM) (Bosch et al., 2010), probit model (Ahmed and Hammarstedt, 2008) or logit model (Auspurg et al., 2017).

5.1 The Logit Model

Main advantage of linear probability models is in their interpretation, although they have an inbuilt heteroskedasticity. Except for this issue, another main problem is with fitted probabilities which may lie outside the interval $< 0, 1 >$. However from the definition, probability must range between 0 and 1. Moreover, the general problem of all linear models is a constant partial effect of explanatory variables. Obstacles may be overcome by design of binary response model.

The logit model is a type of binary response model which uses CDF for the standard logistic random variable as the logistic function. Three specifications are used in the analysis and they can be expressed as follows: First examine the main effect on the variables of interest,

$$P(\text{Resfull} = 1 | \text{Slovak}, \text{Student}, \mathbf{X}) = \Lambda(\beta_0 + \beta_1 * \text{Slovak} + \beta_2 * \text{Student}),$$

second further extend on a vector of control variables,

$$P(\text{Resfull} = 1 | \text{Slovak}, \text{Student}, \mathbf{X}) = \Lambda(\beta_0 + \beta_1 * \text{Slovak} + \beta_2 * \text{Student} + \boldsymbol{\beta} * \mathbf{X}),$$

last describes relationship with the interaction term,

$$P(\text{Respfull} = 1 | \text{Slovak}, \text{Student}, \mathbf{X}) = \Lambda(\beta_0 + \beta_1 * \text{Slovak} + \beta_2 * \text{Student} + \beta_3 * \text{Student} * \text{Slovak} + \boldsymbol{\beta} * \mathbf{X}),$$

where Λ is the logistic function¹. \mathbf{X} is a vector of control variables, β_0 is population parameter, β_1, β_2 and $\boldsymbol{\beta}$ are slope parameters and an error term is denoted as ϵ .

5.2 Assumptions and properties

Due to nonlinear nature of the logit, application of Maximum Likelihood Estimation is inevitable. Compared to the OLS assumptions, conditions for logit regression are very general. According to Wooldridge (2015) for maximum likelihood estimation being consistent, asymptotically normal and asymptotically efficient is crucial to obtain a large random sample. Derivation of asymptotic standard errors for estimates is consequently simple, but desirable for the purpose of a testing single hypothesis. Hence, the only concern rests in a enough large random sample. Dependent variable *Respfull* is the only one used in logistic regression since *Respcompl* and *Response* have only 552 and 423 observations, respectively.

Three main groups of independent variables are used during regression. The first group controls for randomization within an offer using a randomization number, which signifies used pattern (see 3.4 Data collection). Previous analysis suggests that a sequence of sent applications might affect the possibility of getting a positive response, hence the second group controls for this effect. The last group distinguishes between price levels (specified in 4.4.1 Characteristics of flats). Except for these control groups, variables *One – room* and *Availnow* are added. Interaction term *Slovak * Student* is used in one regression as well.

While it resolves the problem of fitted probabilities smaller than zero or greater than one, it brings difficulty of interpreting results. The logistic re-

¹ $\Lambda(z) = \exp(z)/(1 + \exp(z))$

gression coefficients are in log odds, whose magnitudes do not have direct comprehensible interpretation. Fortunately, exponentiation of the coefficients allows for interpretation through odds-ratios. The estimated coefficient gives the percentage change in the odds ratio of the outcome for a change in the explanatory variable.

The marginal effect for a binary variable is expressed by a single number which represents the effect of a change in a variable (e.g. from 0 to 1) on $P(Respfull = 1)$. Different ways of computing marginal effects are known. For instance, Average Partial Effect (APE) is used in Auspurg et al. (2017). The alike approach is applied in this thesis as well.

5.3 Results

In this section results from econometric analysis are presented using models specified in the previous part. First, regressions on variables of interest, Slovak and Student, are described. Second, control variables are added to the previous model. And the last part is dedicated to models with the interaction term.

5.3.1 Regression on Slovak and Student

The main effect of both nationality and working status is studied at first through dependent variable *Respfull*. Further, analysis of the restricted dataset with *Respcmpl* is conducted. Column 1 provides results of the logit regression and column 2 discuss corresponding APEs. (Appendix D introduced LPM models and specifies results from regression on Slovak and Student).

	(1)	(2)
(Intercept)	0.10	
	(0.12)	
Slovak	-0.40**	-0.10**
	(0.14)	(0.04)

Student	-0.23	-0.06
	(0.14)	(0.04)
Num. obs.	796	796
Pseudo R-squared	0.0095	

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 5.1: The Logit regression and Corresponding APEs on Slovak and Student

Regression, using *Respfull* as the dependent variable, estimates that the difference caused by nationality is equalled to 9.77 percentage points, the estimate is significant at 1 per cent significance level. When an applicant states that he is a student, his chances decreased on average approximately by 5.7 percentage points, although the effect is not significant. Negative values of estimators signal presence of discrimination.

The method using a restricted number of observations, which treats data in order to exclude eventually inactive offers, signals a higher discrimination for both characteristics of interest. Slovaks have the rate of positive responses lower by 13.71 percentage points than Czechs. The difference for students, in this case, is 7.87 percentage points. The coefficient for Slovak is similarly significant as in the previous case although, the estimate for Student is statistically significant at 10 per cent significance level. This approach might better reveal real owners' preferences despite the fact of the smaller number of observations due to restriction. However, this restriction filtered inactive offers which may otherwise bias estimates from the owners' point of view.

Overall, the results on discrimination are robust to alternative specifications. As it was mentioned, working status does not seem to have a high effect on response rate. In terms of coefficient size, nationality is twice as important as working status.

5.3.2 Models with Control Variables

In this part, independent variables are two variables of interest and a vector of control variables. The logit model is used as the main methodology, whose results are provided in Table 5.1, column 1. APEs were calculated since coefficients of the logit regression do not have a natural interpretation. Column 2 presents results of APEs. The LPM with similar variables was also regressed as a robustness check for obtained estimates (see Appendix E).

	Logit(1)	APE(2)
	Respsfull	Respsfull
(Intercept)	-1.33*** (0.32)	
Slovak	-0.48** (0.15)	-0.10** (0.03)
Student	-0.27 (0.15)	-0.06 (0.03)
Rand1	0.11 (0.25)	0.02 (0.05)
Rand2	0.64* (0.27)	0.14* (0.06)
Rand3	0.27 (0.27)	0.06 (0.06)
Rand4	0.86** (0.28)	0.18** (0.06)
Rand5	0.37 (0.28)	0.08 (0.06)
ord_d2	-0.31 (0.22)	-0.06 (0.04)
ord_d3	-0.55* (0.22)	-0.12** (0.04)
ord_d4	-0.47* (0.22)	-0.10* (0.04)

	Logit(1)	APE(2)
	Respfull	Respfull
	(0.22)	(0.04)
Dispozition	0.61***	0.13***
	(0.17)	(0.04)
Avail_now	0.21	0.04
	(0.23)	(0.05)
middlep	1.14***	0.23***
	(0.20)	(0.04)
highp	1.69***	0.36***
	(0.20)	(0.04)
Num. obs.	796	796
Pseudo R-squared	0.1093	

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 5.2: The Logit Model and APEs

The intuition behind APE is in comparison of two hypothetical populations - one only Slovaks, one only Czechs. They have the exact same values on other independent variables. Premise is that the difference is only in the nationality, therefore nationality has to be the cause of the difference in response rates. OLS coefficients and APEs are often very similar to each other.

Column 2 reveal discrimination of Slovaks on 10 percentage points in the rental housing market at 1 per cent significance level. The coefficient for students is not significant and estimate discrimination rate about 6 per cent. LPM estimates are almost identical in values to APEs, the significance is present to the same extent. Hence, I consider that the analysis and used methods are appropriate and suitable for observing the effect.

Moreover, regression displays a significant effect of the order for the third

and the fourth applicant in the sample. Results indicate that it is essential to follow new offers and react as quickly as possible to ensure a higher chance of positive response. Undoubtedly, time is an important aspect. As it was mentioned before, a time difference between released an offer and reaction from an applicant might be useful. Unfortunately, the website on which the experiment was conducted does not provide information about an exact time when an offer was released, therefore, it was not possible to study this trend in details.

Both variables regarding the price of a property are highly significant. As it was shown before, the probability of positive response increases along with rising price.

5.3.3 Model with the Interaction Term

Adding interaction term, *Slovak * Student*, to a model can improve understanding of the relationship among the variables. Collumn 1 discuss the logit regression with interaction term. Column 2 shows corresponding APEs.

	(1)	(2)
	Resfull	Resfull
(Intercept)	-1.34***	
	(0.33)	
Slovak	-0.46*	-0.10*
	(0.22)	(0.05)
Student	-0.25	-0.05
	(0.22)	(0.05)
Slovak:Student	-0.04	-0.01
	(0.31)	(0.07)
Rand1	0.11	0.02
	(0.25)	(0.05)
Rand2	0.64*	0.14*
	(0.27)	(0.06)
Rand3	0.27	0.06

	(0.27)	(0.06)
Rand4	0.86**	0.18**
	(0.28)	(0.06)
Rand5	0.37	0.08
	(0.28)	(0.06)
ord_d2	-0.31	-0.06
	(0.22)	(0.04)
ord_d3	-0.55*	-0.12**
	(0.22)	(0.04)
ord_d4	-0.47*	-0.10*
	(0.22)	(0.04)
Dispozition	0.61***	0.13***
	(0.17)	(0.04)
Avail_now	0.21	0.04
	(0.23)	(0.05)
middlep	1.14***	0.23***
	(0.20)	(0.04)
highp	1.69***	0.36***
	(0.20)	(0.04)
<hr/>		
Num. obs.	796	796
Pseudo R-squared	0.1094	
<hr/>		

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 5.3: Regression with interaction term and corresponding APEs

The interaction term is equal to -0.04, the APE is equalled to -0.0085 and values are not significant. Since interaction term is not significant (p-value is equal to 0.9) it does not change initial coefficients. In general, a negative interaction term suggests that when Slovak is also a student his negative effect is even greater. P-values for both variables *Slovak* and

Student indicates lower significance than in previous models.

Conclusion

The intention of the thesis is to reveal possible discrimination of Slovak people in the Czech rental market, with a focus on the Prague. Working status of a potential tenant is the second point of interest, specifically whether a university student is a less preferable tenant than a full-time worker. The field experiment was conducted to examine these effects and to answer research questions. Fictitious identities contacted owners and landlords via the internet page *www.bezrealitky.cz*. Identities are divided into the following groups of interest: Slovak student, Slovak worker, Czech student and Czech worker. Consequently, responses of owners represent the main interest for the analysis.

To reach the final conclusion is important to review research questions and summarise findings. To answer the first question, whether there is any rate of discrimination against Slovak people in the Czech rental housing market, methods of descriptive statistics are used as well as an econometric analysis. Results of the statistical analysis suggest that a Slovak candidate must send about 25 per cent more requests in order to obtain a similar amount of positive responses than a Czech competitor. This corresponds to 9.81 percentage points of net discrimination. Econometric models confirm the prediction since for the same dataset estimators indicate discrimination within range of 9.77 to 9.83 percentage points. The field experiment reveals the presence of discrimination against Slovak people in the Prague market, although for further analyses it might be interesting to extend the scope to other parts of the Czech Republic.

Second research question, an effect of a working status was studied as

another case of discriminatory behaviour. The difference in response rates depending on working status is smaller than for different nationalities, exactly 5.79 percentage points (based on statistical analysis) and between 5.37 and 5.73 percentage points (based on econometric analysis). All stated numbers are not significant and the rate does not differ significantly based on age.

A further suggestion I would propose for a follow-up study is, except for extending the scope to the whole country, examination of the time effect. Moreover, detailed analysis for students and their financial constraints in comparison with full-time workers might bring interesting results and clarify suppositions.

The study reveals the presence of discrimination against Slovak, even though these two nations are tightly connected. Since the reasons of this behaviour are not clear, future studies might focus on sociological and psychological aspect behind this phenomenon.

Bibliography

Administrative Policies and Procedures Manual - Policy 2720: Prohibited Discrimination and Equal Opportunity (1991), [online]. Revised 26.2.2018 [Accessed 18 April 2018].

URL: <http://policy.unm.edu/university-policies/2000/2720.html>

Ahmed, A. M., Andersson, L. and Hammarstedt, M. (2010), ‘Can discrimination in the housing market be reduced by increasing the information about the applicants?’, *Land Economics* **86**(1), 79–90.

Ahmed, A. M. and Hammarstedt, M. (2008), ‘Discrimination in the rental housing market: A field experiment on the internet’, *Journal of Urban Economics* **64**(2), 362–372.

Allport, G. W. (1954), ‘The nature of prejudice.’.

Andersson, L., Jakobsson, N. and Kotsadam, A. (2012), ‘A field experiment of discrimination in the norwegian housing market: Gender, class, and ethnicity’, *Land Economics* **88**(2), 233–240.

Arrow, K. e. a. (1973), ‘The theory of discrimination’, *Discrimination in labor markets* **3**(10), 3–33.

Arrow, K. J. (1972), ‘Some models of race in the labor market’, *Racial Discrimination in Economic Life, Lexington Books* .

Arulampalam, W., Booth, A. L. and Bryan, M. L. (2007), ‘Is there a glass ceiling over europe? exploring the gender pay gap across the wage distribution’, *ILR Review* **60**(2), 163–186.

- Auspurg, K., Hinz, T. and Schmid, L. (2017), ‘Contexts and conditions of ethnic discrimination: Evidence from a field experiment in a german housing market’, *Journal of Housing Economics* **35**, 26–36.
- Baldini, M. and Federici, M. (2011), ‘Ethnic discrimination in the italian rental housing market’, *Journal of Housing Economics* **20**(1), 1–14.
- Bartoš, V., Bauer, M., Chytilová, J. and Matějka, F. (2014), ‘Attention discrimination: Theory and field experiments with monitoring information acquisition’, *American Economic Review* **106**(6), 1437–75.
- Becker, G. S. (1971), *The economics of discrimination*, University of Chicago press.
- Bengtsson, R., Iverman, E. and Hinnerich, B. T. (2012), ‘Gender and ethnic discrimination in the rental housing market’, *Applied Economics Letters* **19**(1), 1–5.
- Bertrand, M., Chugh, D. and Mullainathan, S. (2005), ‘Implicit discrimination’, *American Economic Review* **95**(2), 94–98.
- Bertrand, M. and Duflo, E. (2017), Field experiments on discrimination, in ‘Handbook of Economic Field Experiments’, Vol. 1, pp. 309–393.
- Bertrand, M. and Mullainathan, S. (2004), ‘Are emily and greg more employable than lakisha and jamal? a field experiment on labor market discrimination’, *American economic review* **94**(4), 991–1013.
- Blank, R. M., Dabady, M. and Citro, C. F. (2004), *Measuring Racial Discrimination*, The National Academies Press, Washington, DC.
- Bosch, M., Carnero, M. A. and Farre, L. (2010), ‘Information and discrimination in the rental housing market: Evidence from a field experiment’, *Regional science and urban Economics* **40**(1), 11–19.
- Carlsson, M. and Eriksson, S. (2014), ‘Discrimination in the rental market for apartments’, *Journal of Housing Economics* **23**, 41–54.

- Carpusor, A. G. and Loges, W. E. (2006), ‘Rental discrimination and ethnicity in names’, *Journal of Applied Social Psychology* **36**(4), 934–952.
- Četnost jmen a příjmení (2017), [online]. [Accessed 4 April 2018].
URL: <http://www.mvcr.cz/clanek/cetnost-jmen-a-prijmeni-722752.aspx?q=Y2hudW09MQ==>
- Đurčo, P. et al. (1998), ‘Databáza vlastných mien a názvov lokalít na slovensku’.
- Ewens, M., Tomlin, B. and Wang, L. C. (2014), ‘Statistical discrimination or prejudice? a large sample field experiment’, *Review of Economics and Statistics* **96**(1), 119–134.
- Fix, M. and Struyk, R. J. (1993), *Clear ad Convincing Evidence: Measurement of Discrimination in America*, Urban Institute Press.
- Frier, B. W. and McGinn, T. A. (2003), *A casebook on Roman family law*, number 5, Oxford University Press.
- Greenwald, A. G., McGhee, D. E. and Schwartz, J. L. (1998), ‘Measuring individual differences in implicit cognition: the implicit association test.’, *Journal of personality and social psychology* **74**(6), 1464.
- Hanson, A. and Hawley, Z. (2011), ‘Do landlords discriminate in the rental housing market? evidence from an internet field experiment in us cities’, *Journal of Urban Economics* **70**(2-3), 99–114.
- Hofer, H., Titelbach, G., Winter-Ebmer, R. and Ahammer, A. (2017), ‘Wage discrimination against immigrants in austria?’, *Labour* **31**(2), 105–126.
- Hogan, B. and Berry, B. (2011), ‘Racial and ethnic biases in rental housing: An audit study of online apartment listings’, *City & Community* **10**(4), 351–372.
- Mickelson, R. A. (2003), ‘When are racial disparities in education the result of racial discrimination? a social science perspective.’, *Teachers College Record* .

Najčastejším menom, ktorým rodičia pomenovali svoje dieťa v roku 2013, je Jakub (2014), [online]. Revised 31.10.2016, [Accessed 4 April 2018].

URL: <http://www.minv.sk/?tlacove-spravy&sprava=najcastejsim-menom-ktorym-rodicia-pomenovali-svoje-dieta-v-roku-2013-je-jakub>

Nájemné prudce roste (2017), [online]. [Accessed 18 April 2018].

URL: <https://www.trigema.cz/cs/o-nas/tisk-a-media/tyden-najemne-trigema-analyzy-soural>

Největší statistika českých a slovenských freemailů. Kdo vládne e-mailové komunikaci? (2014), [online]. Revised November 1 2015, [Accessed 4 April 2018].

URL: <https://www.mail-komplet.cz/blog/nejvetsi-statistika-ceskych-a-slovenskych-freemilu/>

Northwestern University's Policy on Discrimination and Harassment (n.d.), [online]. [Accessed 18 April 2018].

URL: <https://www.northwestern.edu/hr/equopp-access/equal-employment-opportunity/nondiscrimination.html>

Öblom, A. and Antfolk, J. (2017), 'Ethnic and gender discrimination in the private rental housing market in finland: A field experiment', *PloS one* **12**(8), e0183344.

Oh, S. J. and Yinger, J. (2015), 'What have we learned from paired testing in housing markets?', *Cityscape* **17**(3), 15.

Olivetti, C. and Petrongolo, B. (2008), 'Unequal pay or unequal employment? a cross-country analysis of gender gaps', *Journal of Labor Economics* **26**(4), 621–654.

Orne, M. T. (1962), 'On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications.', *American psychologist* **17**(11), 776.

Pager, D., Bonikowski, B. and Western, B. (2009), 'Discrimination in a

- low-wage labor market: A field experiment', *American sociological review* **74**(5), 777–799.
- Phelps, E. S. (1972), 'The statistical theory of racism and sexism', *The American Economic Review* **62**(4), 659–661.
URL: <http://www.jstor.org/stable/1806107>
- Policies and Procedures on Discrimination and Harassment* (2016), [online].
 [Accessed 18 April 2018].
URL: <http://www.essential-policies.columbia.edu/policies-and-procedures-discrimination-and-harassment>
- Posner, R. A. (1979), 'The bakke case and the future of" affirmative action"', *California Law Review* **67**(1), 171–189.
- Purnell, T., Idsardi, W. and Baugh, J. (1999), 'Perceptual and phonetic experiments on american english dialect identification', *Journal of language and social psychology* **18**(1), 10–30.
- Reiley, D. H. and List, J. A. (2007), 'Field experiments in economics', *The New Palgrave Dictionary of Economics* .
- Riach, P. A. and Rich, J. (2002), 'Field experiments of discrimination in the market place', *The economic journal* **112**(483).
- Rosenthal, R. (1966), 'Experimenter effects in behavioral research.'
- Roychoudhury, C. and Goodman, A. C. (1996), 'Evidence of racial discrimination in different dimensions of owner-occupied housing search', *Real Estate Economics* **24**(2), 161–178.
- Sacherová, K. (2016), 'How discriminatory is the housing market in slovakia: experimental investigation.'
- Sneider, A. (2010), 'The new suffrage history: Voting rights in international perspective', *History Compass* **8**(7), 692–703.

- Solsten, E. and Meditz, S. W. (1988), Social values and attitudes, *in* ‘Spain: A Country Study, Washington: GPO for the Library of Congress’, chapter 43, p. 2013.
- Statistika nemovitostí - Průměrná cena pronájmu - 1m²/měsíc - graf - Praha* (2018), [online]. [Accessed 18 April 2018].
URL: <http://realitymix.centrum.cz/statistika-nemovitosti-graf.php?mesto=19&praha=0&s=byty-prodej-prumerna-cena-za-1m2-bytu>
- The Race Equality Directive* (2007), [online]. [Accessed 18 April 2018].
URL: <http://europa.eu/rapid/>
- Thorat, S. and Neuman, K. S. (2012), *Blocked by caste: economic discrimination in modern India*, Oxford University Press.
- Turner, M. A. and James, J. (2015), ‘Discrimination as an object of measurement’, *Cityscape: A Journal of Policy Development and Research* **17**(3), 3–13.
- Turner, M. A. and Ross, S. L. (2003), ‘Discrimination in metropolitan housing markets phase ii: Asians and pacific islanders’.
- Turner, M. A., Ross, S. L., Galster, G. C. and Yinger, J. (2002), ‘Discrimination in metropolitan housing markets: National results from phase i hds 2000’, *Washington, DC: US Department of Housing and Urban Development*.
- Van der Bracht, K., Coenen, A. and Van de Putte, B. (2015), ‘The not-in-my-property syndrome: The occurrence of ethnic discrimination in the rental housing market in belgium’, *Journal of Ethnic and Migration Studies* **41**(1), 158–175.
- Výstupní Objekt VDB, Cizinci podle státního občanství k 31.12. - územní srovnání* (2017), [online]. [Accessed 4 April 2018].
URL: <https://vdb.czso.cz/vdbvo2/faces/cs/index.jsf?page=statistiky&katalog=31032>

Wang, L. L.-C. (1988), ‘Meritocracy and diversity in higher education: Discrimination against asian americans in the post-bakke era’, *The Urban Review* **20**(3), 189–209.

Wooldridge, J. M. (2015), *Introductory econometrics: a modern approach*, South-Western Cengage Learning.

Yinger, J. (1995), *Closed doors, opportunities lost: The continuing costs of housing discrimination*, Russell Sage Foundation.

Your key to European statistics, House price index (2015), [online]. Revised April 11 2018, [Accessed 18 April 2018].

URL: <http://ec.europa.eu/eurostat/web/products-datasets/-/teicp270>

List of Tables

2.1	Audit Studies for Racial Discrimination in the housing market, Source: Riach and Rich (2002)	15
3.1	Fictitious identities and their email addresses	22
3.2	Randomization table	25
4.1	Results from Fisher's Exact Test for Nationalities	32
4.2	Results from Fisher's Exact Test for Working Status	32
4.3	Percentage Change for Sub-groups and Corresponding p-values	34
5.1	The Logit regression and Corresponding APEs on Slovak and Student	41
5.2	The Logit Model and APEs	43
5.3	Regression with interaction term and corresponding APEs	45
6.1	Description of monitored variables	65
6.2	Response Rates According to the Price Level	66
6.3	OLS Regressions and Logit's APE	68
6.4	The LPM with a Vector of Control Variables	70

List of Figures

4.1	Response rates for Slovaks and Czechs	31
4.2	Response rates for Students and Workers	33
4.3	Response rates for Sub-groups	34
4.4	Distribution of Total price and Price per Square Meter . . .	36

Appendix A

First version (Slovak, Young)

Dobrý deň.

Moje meno je (insert NAME), som študentom vysokej školy, nefajčiar a bez domácich zvierat. Reagujem na Vašu ponuku prenájmu v (insert STREET) ulici. O byt mám vážny záujem. Rád by som sa informoval či je ponuka stále aktuálna a či je možné dohodnúť sa na prehliadke bytu.

S pozdravom,

(insert NAME)

First version (Czech, Young)

Dobrý den,

Jmenuji se (insert NAME). Studuji vysokou školu, jsem nekuřák a nemám žádná domácí zvířata. Reaguji na Vaši nabídku pronájmu v (insert STREET) ulici, mám o byt vážný zájem. Rád bych se tedy informoval, zda-li je nabídka stále aktuální. Pokud ano, bylo by případně možné dohodnout se na prohlídce bytu? Předem děkuji.

S pozdravem,

(insert NAME)

Second version (Slovak, Young)

Vážený pán/pani,

zaujal ma Váš inzerát na prenájom bytu na (insert STREET) ulici. Chcel by som sa dohodnúť na možnej prehliadke bytu, v prípade, že je ponuka stále platná. Študujem vysokú školu, nefajčím a nemám žiadne domáce zvieratá.

Na ostatné otázky Vám rád odpoviem osobne.

Prajem pekný deň.

(insert NAME)

Second version (Czech, Young)

Vážený pane/paní

Zaujal mě Váš inzerát ohledně pronájmu bytu v (insrt STREET) ulici. Chtěl bych se s Vámi domluvit na jeho možné prohlídce v případě, že je nabídka stále aktuální. Studuji vysokou školu, nemám žádné domácí zvířata, nekuřák. Na ostatní otázky Vám rád odpovím osobně.

Přeji pěkný den,

(insert NAME)

Third version (Slovak, Adult)

Dobrý deň,

mal by som vážny záujem o byt, ktorý ponúkate k prenájmu na portáli bezrealitky.cz. Pokiaľ je byt stále k dispozícií rád by som si s Vami naplánoval osobnú prehliadku. Volám sa (insert NAME), pracujem na plný úväzok, nevlasťním zvieratá a ani nefajčím.

S pozdravom a prianím pekného dňa,

(insert NAME)

Third version (Czech, Adult)

Dobrý den.

Měl bych vážný zájem o byt, který nabízíte k pronájmu na portálu bezrealitky.cz. Pokud je byt stále k dispozici, rád bych s Vámi naplánoval osobní prohlídku. Jmenuji se (insert NAME), pracuji na plný úvazek a nevlasťním žádná zvířata, nekouřím.

S pozdravem a přáním pěkného dne,

(insert NAME)

Fourth version (Slovak, Adult)

Vážený pán/paní,

obraciam sa na Vás so žiadosťou o prehliadku Vášho bytu, v prípade, ak je ponuka k prenájmu stále platná. Som pracujúci muž, nefajčiar bez domácich zvierat.

Teším sa na prípadne stretnutie a spoluprácu.

S pozdravom,

(insert NAME)

Fourth version (Czech, Adult)

Vážený pane/paní, Obracím se na Vás s žádostí o prohlídku Vašeho bytu v případě, že je nabídka k pronájmu stále aktuální. Jsem pracující muž, nekuřák bez domácích zvířat.

Těším se na případné setkání a spolupráci.

S pozdravem,

(insert NAME)

Appendix B

Table of monitored variables and their description, which were recorded in the field experiment.

Variable	Description
<i>Ad. Number</i>	A serial number of the advertisement in the experiment. Ordered by time, when was the first answer sent.(The same <i>Ad. Number</i> appears four times, since four mails were sent to each advertisement)
<i>Time</i>	Exact date and time of the mail being sent
<i>Complete</i>	Binary variable, which is equal to 1 if all four representatives of the subgroups successfully sent their answers on a specific offer, 0 otherwise.
<i>Slovak</i>	Binary variable, which is equal to 1 if the answer to advertisement was sent from mail address of Slovak potential tenant, 0 otherwise. Therefore, 0 describe the case, when mail address belongs to Czech potential tenant
<i>Randnat</i>	Variable gets values between one and six. Each number represents the specified order in which the answers were sent, according to nationality of potential tenants (Slovak/Czech)
<i>Rand1</i>	Binary variable, which is equal to 1 if the randomization number is equal to 1, 0 otherwise

Variable	Description
<i>Rand2</i>	Binary variable, which is equal to 1 if the randomization number is equal to 2, 0 otherwise
<i>Rand3</i>	Binary variable, which is equal to 1 if the randomization number is equal to 3, 0 otherwise
<i>Rand4</i>	Binary variable, which is equal to 1 if the randomization number is equal to 4, 0 otherwise
<i>Rand5</i>	Binary variable, which is equal to 1 if the randomization number is equal to 5, 0 otherwise
<i>Name</i>	Variable gets values between one and eight. Each number represents name of a fictional identity. Numbers one to four belongs to Slovak identities and numbers five to eight to Czech identities
<i>Order</i>	The order in which was the potential tenant responding to the advertisement. Variable gets values between one to four, since four answers were sent to each advertisement from different fictional identities in the experiment.
<i>ord_d2</i>	Binary variable, which is equal to 1 if the answer to the advertisement was sent as the second one in order, 0 otherwise
<i>ord_d3</i>	Binary variable, which is equal to 1 if the answer to the advertisement was sent as the third in order, 0 otherwise
<i>ord_d4</i>	Binary variable, which is equal to 1 if the answer to the advertisement was sent as the fourth in order, 0 otherwise
<i>Version</i>	Value of the variable represents version of a text which was sent. There was four versions in each language, hence the variable gets values between one to four

Variable	Description
<i>Student</i>	Binary variable, which is equal to 1 if the potential tenant was student, 0 otherwise. Therefore, 0 represents working tenants
<i>Response</i>	Binary variable, which is equal to 1 if an owner or a landlord responded positively, 0 if response was negative. NA occurs in case of no response
<i>Respfull</i>	Binary variable, which is equal to 1 if an owner or a landlord responded positively, 0 otherwise (Involves negative or no response)
<i>Respcomp</i>	Binary variable, which is equal to 1 if an owner or a landlord responded positively, 0 if response was negative or when the owner or the landlord responded to another potential tenants considering the same advertisement. NA occurs in case of no response in all four observations
<i>Dispozition</i>	Binary variable, which is equal to 1 if the advertisement is for one-room flat, 0 for studio
<i>Street</i>	Name of a street, where the advertised flat is located
<i>District</i>	Name of a district, where the advertised flat is located
<i>Districtnum</i>	Number of a district, where the advertised flat is located
<i>Rent</i>	The amount of the rent in Czech crowns per month
<i>Charges</i>	The amount of the charges in Czech crowns corresponding to flat for one person per month, if available
<i>Total price</i>	Sum of values of variables <i>Rent</i> and <i>Charges</i>
<i>pricem</i>	Price per square meter
<i>lowp</i>	Binary variable, which is equal to 1 if the corresponding offer is based on analysis considered of low price, 0 otherwise
<i>middlep</i>	Binary variable, which is equal to 1 if the corresponding offer is based on analysis considered of middle price, 0 otherwise

Variable	Description
<i>highp</i>	Binary variable, which is equal to 1 if the corresponding offer is based on analysis considered of high price, 0 otherwise
<i>Stage</i>	The floor on which the flat is located
<i>Area</i>	The area of the flat in square meters
<i>Type</i>	Type of a building in which is corresponding flat (Brick/Lowenergetic/Panel/Other)
<i>Fridge</i>	Binary variable, which is equal to 1 if the flat furnishing includes fridge, 0 otherwise
<i>Cooker</i>	Binary variable, which is equal to 1 if the flat furnishing includes cooker, 0 otherwise
<i>Oven</i>	Binary variable, which is equal to 1 if the flat furnishing includes oven, 0 otherwise
<i>Dishwasher</i>	Binary variable, which is equal to 1 if the flat furnishing includes dishwasher, 0 otherwise
<i>Microwave</i>	Binary variable, which is equal to 1 if the flat furnishing includes microwave, 0 otherwise
<i>Washing machine</i>	Binary variable, which is equal to 1 if the flat furnishing includes washing machine, 0 otherwise
<i>Bed</i>	Binary variable, which is equal to 1 if the flat furnishing includes bed, 0 otherwise
<i>Wardrobe</i>	Binary variable, which is equal to 1 if the flat furnishing includes wardrobe, 0 otherwise
<i>Table</i>	Binary variable, which is equal to 1 if the flat furnishing includes table, 0 otherwise
<i>Chairs</i>	Binary variable, which is equal to 1 if the flat furnishing includes chairs, 0 otherwise
<i>Balcony</i>	Binary variable, which is equal to 1 if the flat is with balcony or terrace, 0 otherwise

Variable	Description
<i>Public transport</i>	The nearest type of public transport from the flat (Bus,Tram,Metro)
<i>Availability</i>	Date from which the flat is available
<i>Availnow</i>	Binary variable, which is equal to 1 if the flat was available immediately from the date of release of the advertisement
<i>Link</i>	Link to the website where the advertisement was published

Table 6.1: Description of monitored variables

Appendix C

In order to observe the effect of price level dataset was divided into three segments. At the earliest I compute quantiles of 33 per cent and 66 per cent of price per square meter, they are equal to 367 CZK and 440 CZK, respectively. Quantiles allow dividing observations into three numerous equal parts according to the price per square meter. The first segment represents the cheapest offers, second average rents and last one is for the expensive flats. The table below compared these price levels on their response rates and also provided information about total rates for better illustration of the phenomenon.

Price level	Low	Middle	High	Without Price Level (original data)
<i>Slovak</i>	22%	40.48%	56.72%	39.7%
<i>Czech</i>	28.78%	54.76%	64.18%	49.5%
<i>Student</i>	25%	44.4%	56.72%	41.7%
<i>Worker</i>	25.75%	50.8%	64.18%	47.49%
<i>Slovak Student</i>	22.39%	38.09%	50.75%	36.5%
<i>Slovak Worker</i>	21.54%	42.86%	62.69%	42.9%
<i>Czech Student</i>	27.69%	50.79%	62.69%	47%
<i>Czech Worker</i>	29.85%	58.73%	65.67%	52%
<i>All groups</i>	25.38%	47.62%	60.44%	44.6%

Table 6.2: Response Rates According to the Price Level

Appendix D

Respfull (or *Respcompl*) as the dependent variable is regressed on variables of main interest (*Slovak*, *Student*) and on a vector of control variables. *Respfull* refers to the first treatment method when both no response and negative response are marked as "0". *Respcompl* counts only for those offers on which at least one response (positive or negative) was received (see 4.2 Dataset Treatment).

Specification for the LPM, whose results will be discussed in the following section, is:

$$Respfull = \beta_0 + \beta_1 * Slovak + \beta_2 * Student + \beta * \mathbf{X} + \epsilon,$$

where \mathbf{X} is a vector of control variables, β_0 is population parameter, β_1, β_2 and β are slope parameters and an error term is denoted as ϵ .

The OLS assumptions were tested since under these five assumptions, the estimator is the best linear unbiased estimator (Wooldridge, 2015). The experiment methodology (see chapter 3 Experimental Design) and included variables in regressions ensure the linearity in parameters, random sample and no perfect collinearity. However, collected data do not have zero-conditional mean². Thanks to sufficiently large sample, estimators are consistent if zero correlation between independent variables and disturbances is present (Wooldridge, 2015). The weaker assumption is satisfied thanks to experimental design.

A LPM is a specific model which has a binary dependent variable. Under first four assumptions stated in the previous paragraph, the OLS estimator is

²Checked by graphic visualisation of models, specifically relationship between fitted values and residuals.

still consistent. By definition of the LPM, disturbances are heteroskedastic³. Fortunately for a sufficiently large sample, heteroskedasticity-robust inference represents one solution.

Columns (1) and (3) describe the OLS regressions with various dependent variable. Column (2) is calculation of APEs for the corresponding logit, what serves as robust-check. The coefficients in (1) and (2) are similar, therefore the coefficient from the LPMs are estimated correctly and could be interpreted.

	(1)	(2)	(3)
	Respfull	Respfull	Respcompl
(Intercept)	0.52*** (0.03)		0.75*** (0.03)
Slovak	-0.10** (0.04)	-0.10** (0.04)	-0.14*** (0.04)
Student	-0.06 (0.04)	-0.06 (0.04)	-0.08 (0.04)
Num. obs.	796	796	552
Adj. R-squared		0.01055	0.02379

Robust standard errors in parentheses;*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 6.3: OLS Regressions and Logit's APE

³Studentized Breusch-Pagan test was used to detect any linear heteroskedasticity.

Appendix E

The following table review the results of the OLS regression. Results serves mainly as a robust check of estimates from the logit regression and corresponding APEs in part 5.3.2 Models with Control Variables

	(1)
	Respsfull
(Intercept)	0.22*** (0.07)
Slovak	-0.10** (0.03)
Student	-0.06 (0.03)
Rand1	0.02 (0.05)
Rand2	0.14* (0.06)
Rand3	0.06 (0.06)
Rand4	0.18** (0.06)
Rand5	0.08 (0.06)
ord_d2	-0.07 (0.05)

ord_d3	-0.12*
	(0.05)
ord_d4	-0.10*
	(0.05)
Dispozition	0.12***
	(0.03)
Avail_now	0.04
	(0.05)
middlep	0.24***
	(0.04)
highp	0.37***
	(0.04)
Num. obs.	796
Adj. R-squared	0.125

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 6.4: The LPM with a Vector of Control Variables