



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

**Publicly Disclosing Vulnerable Neighborhoods,
The Costs and Consequences**

Evidence from the Big City Areas of Sweden

Abstract

In recent years, the police's listing of "vulnerable neighborhoods" in Sweden has become a highly debated topic. Intense attention has been directed toward such areas, and the social consequences of the lists have been highly debated. However, research on the economic impact of the listing practice has been given less interest. Using the difference-in-difference method, together with the introduction of the police's list of vulnerable areas, we provide causal effects of the public disclosure on (1) housing prices, (2) the risk of residents moving out of a neighborhood, and (3) net income. Our results show that listing an area as vulnerable has a negative effect on housing prices and net income. We find no significant effect on the risk of residents moving out of neighborhoods listed as vulnerable. The impact on housing prices is negative, immediate and lasting, with a stronger impact in higher treatment intensity areas.

Anna Jahre
Johanna Midhage

Supervisor: Vorada Limjaroenrat
Master's Thesis in Economics, 30 HEC

**Graduate School, School of Business, Economics and Law at the University of
Gothenburg, Sweden**

June 21, 2023

Acknowledgements

We would like to express our sincere gratitude to our supervisor, Vorada Limjaroenrat. Her dedicated support, helpful insights, and unwavering encouragement have been essential for the work and development of our thesis. We would also like to give a special thanks to Police Officer Johan Kardell from the National Operations Department, who provided us with a greater understanding of the Swedish Police Authority and their work with vulnerable areas.

Finally, we want to give our appreciation to the School of Business, Economics and Law at the University of Gothenburg and, especially, all the wonderful people we have met here who made our time as students unforgettable.

Contents

1	Introduction	5
2	Background and Institutional Context	6
2.1	Listing and Identification of Vulnerable Areas	6
2.2	Characteristics and Risk Factors of Vulnerable Areas	10
2.3	Public Debate	11
3	Literature Review	12
3.1	Vulnerable Areas in Sweden	12
3.2	Territorial Stigmatization, Public Disclosure and Neighborhood Mobility	13
4	Theoretical Framework and Hypothesis	15
4.1	The Labeling Perspective and Territorial Stigmatization	15
4.2	Determinants of Housing Prices, Neighborhood Mobility and Income . . .	16
5	Data and Method	19
5.1	Data	19
5.1.1	Geographical Setting	19
5.1.2	Data Collection	20
5.2	Method	25
5.2.1	Static Difference-in-Difference	25
5.2.2	Event Study	29
6	Empirical Results	30
6.1	Static Difference-in-Difference	30
6.2	Event Study	35
6.3	Mechanisms	38
6.4	Robustness Checks	40
7	Discussion	41
8	Conclusions	46
A	Appendix - Lists of Vulnerable Areas and Geographical Division	52
B	Appendix - Selected Crimes	65
C	Appendix - Maps of Vulnerable Areas	66

D Appendix - Robustness Check	68
E Appendix - Event Study: Stockholm, Gothenburg, Malmö	68

List of Figures

2.1 Total Number of Listed Areas Divided into Subcategories	8
2.2 Search Interest for the Term Vulnerable Areas (<i>"Utsatta områden"</i>), 2010-2021.	11
5.1 Histogram Housing Prices, Listed and Non-listed Areas	22
5.2 Histogram Risk of Moving Out, Listed and Non-listed Areas	22
5.3 Histogram Net Income, Listed and Non-listed Areas	23
5.4 Average Housing Prices, 2010-2021	26
5.5 Average Risk of Moving Out, 2010-2021	26
5.6 Average Net Income, 2010-2021	27
6.1 Event Study Housing Prices	37
6.2 Event Study Risk of Moving Out	37
6.3 Event Study Net Income	37
C.1 Maps of Vulnerable Areas in Stockholm	66
C.2 Maps of Vulnerable Areas in Gothenburg	67
C.3 Maps of Vulnerable Areas in Malmö	67
E.1 Event Study Housing Prices	69
E.2 Event Study Risk of Moving Out	69
E.3 Event Study Net Income	70

List of Tables

5.1	Descriptive Statistics of Stockholm, Gothenburg, and Malmö	20
5.2	Number of Listed Areas in Stockholm, Gothenburg, and Malmö	20
5.3	Variable Description	23
5.4	Descriptive Statistics of Data	24
6.1	Regression Results: Housing Prices	32
6.2	Regression Results: Risk of Moving Out	33
6.3	Regression Results: Net Income	35
6.4	Regression Results: Treatment Intensity	40
A.1	Full List of Vulnerable Areas in Stockholm, Gothenburg and Malmö for 2015, 2017, 2019 and 2021	52
A.2	Vulnerable Areas and Belonging RegSOs - Stockholm	53
A.3	Vulnerable Areas and Belonging RegSOs - Malmö	53
A.4	Vulnerable Areas and Belonging RegSOs - Gothenburg	54
A.5	City Area-, RegSO-, and District Division, Stockholm	55
A.6	City Area-, RegSO-, and District Division, Gothenburg	58
A.7	City Area-, RegSO-, and District Division, Malmö	62
D.1	Robustness Check - Dropping Ambiguous RegSOs	68

1 Introduction

Historically, deadly violence and criminal activity have been relatively low in Sweden compared to countries in the rest of the world. However, in the last 20 years, Sweden has experienced an alarming development regarding criminal networks influencing local communities, resulting in deadly violence not seen in any other European country (The Swedish National Council for Crime Prevention, [Brottsförebyggande Rådet], 2021). The issues are mainly present in what is today commonly known as “vulnerable neighborhoods”, most of them located in the big city areas of Sweden, namely Stockholm, Gothenburg, and Malmö (ibid.). In an attempt to overview the situation, the Swedish Police compile the identified vulnerable areas into a list that is publicly disclosed. The police published the first list in 2015 and have since released updated versions every subsequent year. High criminal activity, fragile socioeconomic standards, and unsafety among citizens are some of the factors that characterize these areas (The Swedish Police Authority, 2015). After the public release of the list, the areas receive significant media attention, often highlighting issues such as crime, honor-related oppression, parallel societal structures, and gang violence. The attention has, in turn, sparked public debates on the consequences of labeling areas as vulnerable. While identifying and listing areas is considered a helpful tool by the police, opponents argue that the list is stigmatizing, polarizing, and contributes to us-versus-them thinking in society (The Swedish National Audit Office [Riksrevisionen], 2020).

Despite intense discussions of the list of vulnerable areas and its social impact, the economic consequences of the police’s lists have received little interest. This study aims to fill the gap in literature by providing quantitative evidence on the impact of such policy. The research question of this thesis can hence be formulated as the following:

How does the Swedish police’s list of vulnerable areas affect local economic outcomes?

If classifying areas and communicating them to the public contributes to adverse economic consequences in these areas, it would provide incentives to evaluate the public disclosing of the list. Furthermore, from a policy point of view, if labeling areas as vulnerable leads

to a worsening of local outcomes, there are reasons to reevaluate the policy design and its implementation.

We construct a panel data set combining the list of vulnerable areas with data on local economic outcomes, covering the three big cities in Sweden (Stockholm, Gothenburg, and Malmö) between 2010-2021. The data is analyzed using a difference-in-difference method, investigating the causal effects of public disclosure on (1) housing prices, (2) the risk of residents moving out from a neighborhood, and (3) the net income.

The remainder of this thesis is structured as follows: Section 2 provides the institutional context regarding the listing, identification, and characteristics of vulnerable areas, followed by a discussion regarding the public debate. Section 3 provides an overview of the existing research on vulnerable areas and factors affecting housing prices, mobility rates, and income levels. Section 4 presents the theoretical framework of the research and our hypotheses. Section 5 presents the data, its geographical setting and the process of collecting it. Furthermore, the section provides a full presentation of our methodological approach. Section 6 presents the empirical results as well as a robustness analysis. Finally, in section 7 and 8, we discuss and conclude the results of the study.

2 Background and Institutional Context

2.1 Listing and Identification of Vulnerable Areas

During the 1990s, the Swedish Police began to observe a previously unseen phenomenon in certain suburbs of Sweden. In these neighborhoods, local criminal actors had begun to join forces, seeking to increase their power stance in the local community through acts of threat and violence. Local criminal networks grew stronger and more powerful by creating fear and unsafety among citizens in these neighborhoods. The increase of power among criminal networks led to the police experiencing difficulties performing their work tasks, developing a negative spiral regarding safety for the citizens. Since the beginning of the 2000s, the problems with criminal actors and their influence over the local community have only increased (The Swedish Police Authority, [2014](#)).

In 2014, the Swedish Police, supported by the Swedish Government, made it an outspoken priority to stop and turn around this negative development in the suffering

neighborhoods (The Swedish National Audit Office [Riksrevisionen], 2020). The National Criminal Police Intelligence Section was commissioned to present a Common Operational Picture (COP) of the current situation of criminal networks in Sweden. The COP identified, defined, and described the local community's general problem with criminal actors, its impact, and risk factors (The Swedish Police Authority, 2014). For the first time the expression "vulnerable areas" was introduced in a policiary context. The COP is updated continuously and contains suggestions for actions to combat the problems (ibid.). In 2015, the initial COP was updated and 53 neighborhoods throughout Sweden were initially identified and listed as "Vulnerable Areas". The police further divided the neighborhoods into three categories; *Vulnerable Areas*, *Risk Areas*, and *Particularly Vulnerable Areas* (The Swedish Police Authority, 2015).

Vulnerable Areas are neighborhoods with low socioeconomic status where criminal actors influence the local community. The influence can occur through direct pressures, such as threats or blackmailing, or more indirect pressures. It can be acts of violence that risk harming third party, open drug dealing, or criminal actors acting out on their dissatisfaction with society. Several adverse consequences follow; residents feel insecure, leading to a low willingness to participate in legal processes. Furthermore, residents avoid reporting crimes they have been exposed to, contributing to a culture of silence (The Swedish Police Authority, 2021).

Particularly Vulnerable Areas fulfill all characteristics of vulnerable areas but are exposed to crime to an even greater extent. There is a potential level of threat from criminal actors in these residential areas. Parallel social structures, extremism, and a high concentration of criminal actors may also characterize a particularly vulnerable area. Sometimes systematic threats and violence are directed toward witnesses, crime reporters, and plaintiffs. The culture of silence is widespread, and there is an unwillingness in the local community to participate in legal processes. Furthermore, the police struggle with or are unable to perform their work tasks in these areas (ibid.).

Risk Areas fulfill all criteria of the vulnerable area and some of the criteria of the particularly vulnerable areas. Hence, regarding severeness, risk areas can be placed between the previously mentioned categories (ibid.).¹

¹In this thesis, the terms "vulnerable areas" and "listed areas" will refer to all three categories (vulnerable areas, risk areas, and particularly vulnerable areas). The terms "neighborhoods" and "areas"

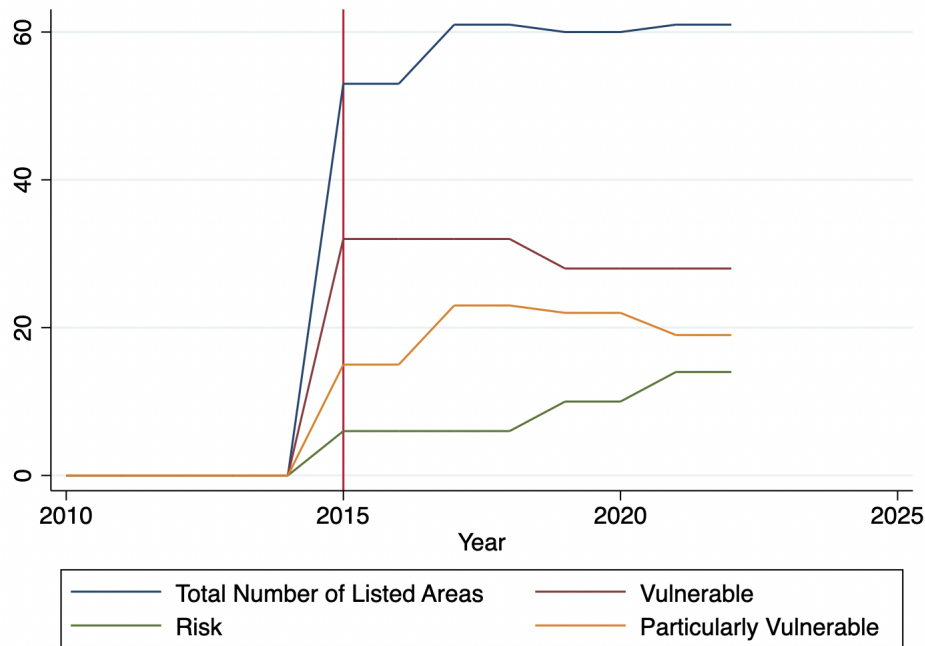


Figure 2.1: Total Number of Listed Areas Divided into Subcategories

When the police published the list in 2015, it was the first time a compilation of areas pointed out as problematic by the police was publicly disclosed. The list of vulnerable areas have since been updated and revised every second year. The total number of listed areas in Sweden and in each category over time is presented in figure 2.1. With the list’s publication in 2015, a goal was set by the Police Authority that particularly vulnerable areas were to have at least one police officer per 5000 citizens. To fulfill this goal, the Swedish Government increased its funding to the Police Authority by 35%, approximately 7,4 billion SEK, between 2015-2021 (The Swedish National Audit Office [Riksrevisionen], 2020). As of 2021, the list contains 61 neighborhoods in Sweden, whereas 20 are located in Stockholm, Gothenburg, or Malmö. No vulnerable areas are located north of Borlänge, concentrating the problem in Sweden’s middle and southern parts (The Swedish Police Authority, 2021). Appendix A provides a detailed specification regarding the classification of areas over the years.

In order to identify vulnerable areas, all police regions in Sweden are commissioned to identify areas within their region of operation where they consider the influence of criminal networks on the local community as problematic and consistent. The police region is then asked to map out the affected area and complete a questionnaire. The will be used synonymously.

questionnaire aims to describe further the consequences of criminal actors' behavior on the local community (The Swedish Police Authority, 2021).² The central organization of the Swedish Police collects the answers from the questionnaires and the nominated areas are thereafter evaluated according to four criteria: (1) the population's willingness to take part in legal proceedings, (2) the police's ability to perform their work tasks, (3) the existence of parallel societal structures, and (4) the existence of religious extremism, particularly violent Islamism (added in 2017) (ibid.). If the area is considered vulnerable, it is also categorized in one of the previously mentioned categories; vulnerable-, risk-, or particularly vulnerable area.

After the release of the first list in 2015, the work with vulnerable areas has received increasing attention and awareness, both externally and internally, within the police force. Over the years, it has led to a refined and further elaborated method for distinguishing vulnerable areas (Kardell, 2023). In 2020, The Swedish National Audit Office [Riksrevisionen] (2020) criticized the method of identifying vulnerable areas, especially the usage of subjective estimates and insufficient standardization. Nominations of vulnerable areas are made from approximations by local police departments, implying that issues considered problematic by the police department in one region might be perceived differently by police departments in other regions. The Swedish National Audit Office argue that since there is no standardized classification of areas, comparison between them is not possible. The critique led the police to refine the method in 2021, adding more statistical elements to the identification. Since then, a listed area, based on the police's subjective estimates, is compared to statistical variables so there is a consensus between subjective and objective estimates. The variables used for the comparison are income, education, acquisition frequency, the share of the population with foreign background, cramped housing accommodation, single-parent households, and share of the population between 0-19 years old (The Swedish Police Authority, 2021). However, the broad definition of a vulnerable area and the criteria communicated to the public

²The questionnaire contains 80 questions and is divided into three categories: *The individual, Residential environment & Security, Societal Systems & Societal Functions, and Social Development in the area*. The first category concerns crime and disorder in and around the residential environment, at schools, etc. The second category concerns the criminal actors and the types of criminal cooperation in the area. The third category concerns how the police authority's operations and missions are affected by the issues in the area. The questions are answered by estimating the problem on a scale from one to five. Each estimation is accompanied by an assessment regarding the level of uncertainty that the estimate is based on. This estimate is also based on a scale from one to five (The Swedish Police Authority, 2021)

have remained the same over the years.

2.2 Characteristics and Risk Factors of Vulnerable Areas

Ever since the initial work with identifying vulnerable areas began in 2014, it has been observed by the police that neighborhoods highly affected by local criminal networks share many other similar characteristics beyond criminality. These can be seen as risk factors to remain or become vulnerable. The neighborhoods all suffer from ethnic and economic segregation, higher unemployment, lower educational level, and lower health status than the rest of the country (The Swedish Police Authority, 2015). In addition, most vulnerable areas are so-called “million program areas” (The Swedish Police Authority, 2014). These neighborhoods were built in 1965-1975, primarily outside of the city center, at an affordable price for working- and middle-class citizens (Stockholmskällan, 2022). Several factors contribute to the correlation between vulnerability and million program areas. Due to the low standard of the apartments and a decreasing demand to live in rentals, residents with sufficient economic resources eventually left the million program areas (Johansson, 2019). The remaining residents had weaker economic resources, where a majority had immigrant backgrounds or were socially excluded in other ways (The Swedish Police Authority, 2015).

Half of the apartments in the million program areas are three-room apartments, which has led to a significant problem with overcrowding. As a result, youths tend to spend their free time outside in the neighborhood rather than in their homes, making them more exposed to the criminal environment in the neighborhood (The Swedish Police Authority, 2017). Furthermore, the presence of a large youth population is mentioned by the police as a risk factor since it broadens the possible recruitment base of local criminal actors (The Swedish Police Authority, 2021). Over the years, many neighborhoods have been subject to various reforms and efforts to improve the situation by the Swedish Government and other authorities, but the situation has remained. The Swedish Police conclude that issues with a high concentration of local criminal actors in an area stem from a social vulnerability that has been developing in these neighborhoods for a long time and is far more complex than just the criminal phenomenon itself (ibid.).

2.3 Public Debate

The idea for this research originated from the vast increase and the potential impact of the public discourse on vulnerable areas. In a report by The Swedish National Audit Office [Riksrevisionen] (2020), the publication of the list is mentioned as a controversial and debated question. The report further states that the list could lead to stigmatization of the neighborhoods. Since the first publication of the list in 2015, the attention has increased exponentially, with over 63 million hits on Google in November 2022 (Salonen, 2023). Figure 2.2 shows the Google search trend of the Swedish term for vulnerable areas and its apparent increase from 2015.³ The search interest for the term can be seen as a reflection of the public interest in the subject. As seen in the figure, the interest has risen significantly after the implementation of the list in 2015. The three top notations in the graph are all directly associated with the publication of the list in 2017, 2019, and 2021.

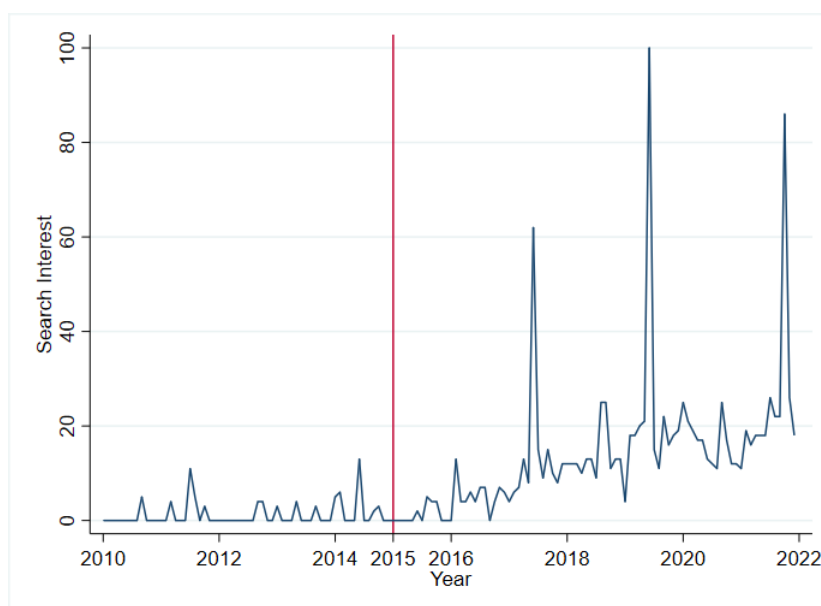


Figure 2.2: Search Interest for the Term Vulnerable Areas (*"Utsatta områden"*), 2010-2021.

The list has received both criticism and praise from the public and other actors. In a working paper by Salonen (2023), the author states that no critique can be directed to the police's need to map problematic areas. However, problems arise when an internal working document becomes a dominant reality description. He also underlines the

³The figure presents the search interest in relation to the month of the highest search interest, where 100 indicates the period with the highest interest.

problem that the list creates a one-sided focus on these housing areas that risk ignoring the underlying patterns of inequality that impede the development in these areas. Moreover, critique has been raised that the list is being used as a central indicator for distributing state grants to residential areas with difficulties (ibid.).

The other side of the public debate sees the police listing of vulnerable areas as helpful. According to the police, making the list public has helped highlight the issues in these areas. They are now seen as a social problem rather than a policiary problem to a larger extent than before, which has facilitated the work of the police (The Swedish National Audit Office [Riksrevisionen], 2020; Kardell, 2023). Municipalities are other actors actively using the police’s list as a tool. The former chairman of the municipal board of Gothenburg, Axel Josefson (2023), states that the police’s list of vulnerable areas has positively contributed to the municipality’s work to gather strength and achieve a common goal regarding the vulnerable areas. The municipality has used the list to identify areas in the city that they invest in to reduce criminality, increase employment and improve school results. Furthermore, Josefson mentions that the list has engaged both private companies and civil society in the issue.

3 Literature Review

3.1 Vulnerable Areas in Sweden

As mentioned in the introduction, little quantitative research has been done on the subject of vulnerable areas in Sweden. Previous research focuses mainly on the characteristics of the neighborhoods. Puur (2020) examines the possibility of creating a statistical model which can objectively identify vulnerable areas instead of, or as a complement to, the subjective estimations of the police. By using a statistical grid of 250x250 meter squares containing data on socioeconomic variables, Puur identifies characteristics within the squares that coincide with the vulnerable areas and finds these characteristics to be; a relatively high share of the population with foreign background, unemployment, three-generation- and single-parent households, and a slightly higher share of children and youths in the vulnerable squares. Based on the obtained model, the areas that statistically appeared vulnerable were compared to those classified as vulnerable by the police. The statistical model identified 13 new free-standing areas that had not been

classified as vulnerable by the police but fulfilled the requirement based on the statistical model. Sixteen areas were found adjacent to already vulnerable areas. Lastly, the result showed that 16 of the already classified and mapped out vulnerable areas could be reduced in geographical size. Puur concludes that capturing objective features of classified vulnerable neighborhoods is possible. She states that in the future, the model has the potential to identify vulnerable areas more effectively and accurately than today, with a reduced risk of labeling neighborhoods and their residents as criminogenic.

In many contexts, “vulnerable areas” is used as a label to describe socioeconomically challenged neighborhoods. Salonen (2023) investigates whether there is a consensus between the areas listed as vulnerable by the police and Sweden’s most segregated and socioeconomically challenged areas. The Delegation Against Segregation has categorized Sweden’s statistical regions (RegSO) into five area types based on a socioeconomic index to map segregation in the country (The Swedish National Board of Housing, Building and Planning [Boverket], 2023). The types range from *type 1*, which has significant socioeconomic challenges, to *type 5*, which has excellent socioeconomic conditions. Salonen made a comparative analysis of the neighborhoods classified by the police and the five area types. The comparison shows that type 1 areas have a significantly greater spread in the country than the police’s vulnerable areas. The results show that there are type 1 areas in three times as many municipalities as there are vulnerable areas. Salonen also finds that 70% of type 1 areas are located outside the big cities, compared to 36% of the police’s vulnerable areas. Less than half, 47%, of the police’s vulnerable areas are classified as type 1. Conversely, only 40% of the type 1 areas are classified as vulnerable by the police. These results indicate a much more widespread problem of areas with low socioeconomic status in the country. Furthermore, the research implies that using the term vulnerable areas to label areas with socioeconomic challenges might exclude areas with severe problems. Conversely, the term can cover and label areas that are not considered socioeconomically challenged from a statistical point of view.

3.2 Territorial Stigmatization, Public Disclosure and Neighborhood Mobility

Sweden is not unique in labeling socioeconomically challenged areas. Other countries with corresponding labeling are, for example, “Sink Estates” in the UK, “Ghettos” in Denmark,

and “Sensitive Urban Zones” in France (Slater, 2018; Larsen, 2014; Tissot, 2018). The public debate has argued that listing and communicating disadvantaged areas to the public could lead to *territorial stigmatization*. The stigma could then potentially harm perceptions and economic outcomes in such areas. Jensen and Christensen (2012)[p. 77] define territorial stigmatization as “...social and media discourses which demonize the term of living in a way that causes fear and insecurity both internally and outside of these areas.” In recent years there has been emerging literature regarding territorial stigmatization. Tissot (2018) discusses how the term Sensitive Urban Zones in France affects the material and symbolic resources that planners, governments, the public, and other actors direct toward them. How neighborhoods are described and perceived can, in turn, have consequences for the people who live there and the overall society. Bunel, Petit, and L’Horty (2015) find that having an address in an advantaged area substantially increases the chances of being invited to a job interview in France. Furthermore, in Denmark, Gulis, Safi, and Linde (2022) find that identifying disadvantaged areas has led to labeling people and creating stigma and social exclusion. The results from these studies imply that the classification of vulnerable areas could negatively impact how the areas are perceived, which may have negative consequences for the citizens and economic outcomes in the neighborhood.

Disclosure of information in the context of the perceived crime risk has been proven to harm housing prices. In the United States, several studies have found that disclosure of information on the address and identity of a sex offender has a negative impact on the prices of properties in proximity to the offender (Linden and Rockoff, 2008; Pope, 2008; Wentland, Waller, and Brastow, 2014). Similar results have been found in South Korea by Kim and Lee (2018), where information about the addresses and identities of sex offenders is easily accessible on a public website. The results from these studies suggest that a similar reaction in housing prices is possible in the context of the police’s listing of vulnerable areas in Sweden. On the contrary, evidence from a natural experiment in Italy shows that people less exposed to news regarding criminal activity are also less concerned about the matter (Mastorocco and Minale, 2018). Since the list of vulnerable areas is public information, with a high focus on criminality and unsafety, there could be reasons to believe that the publication of the list increases the public’s concern. It can, in turn, further increase territorial stigmatization.

Several studies have examined how neighborhood quality affects residential mobility. In a study from the United States, Boehm and Ihlanfeld (1986) find the households' perceptions of neighborhood quality and its changes to be the most important determinants of residential mobility within inner-city neighborhoods. Likewise, Ham, Permentier, and Bolt (2009) and Permentier (2013) find the perceived neighborhood reputation to be a significant predictor of out-moving intentions in the Netherlands. The results hold even when people are satisfied with their current neighborhood. In Denmark, Andersen (2008) finds the perception that a neighborhood has a poor reputation among outsiders to be the most critical reason people plan to move away from that neighborhood. Furthermore, Fell et al. (2021) state that the media, police, and politicians often paint an unfair and stigmatizing picture of poor neighborhoods without nuances. The article exemplifies this with a Swedish suburb, Frösunda, where the public's negative perception of the area as a hostile and unsafe place due to territorial stigmatization has led to people and several local businesses moving away.

Residential mobility affects not only individual households but also neighborhoods as a whole. In particular, it has been established that high moving-out rates may reduce social capital and social control in neighborhoods (Morenoff, Sampson, and Raudenbush, 2001). Mobility has also been found to be characterized by selectivity. Poor neighborhoods might appear or get even poorer as better-off households leave and become replaced by residents with lower socioeconomic status (Friedrichs, 1991; Andersen, 2008). Previous research within the field hence implies that listing areas as vulnerable might negatively impact how such neighborhoods are perceived internally and externally. The perception might, in turn, lead to an increased risk of out-migration and adverse economic outcomes.

4 Theoretical Framework and Hypothesis

4.1 The Labeling Perspective and Territorial Stigmatization

In 1938, Tannenbaum invented what is today known as "The Labeling Perspective", the theory that a person becomes the thing she is described as being. The labeling perspective can be described as follows:

“The process of making the criminal is a process of tagging, defining, identifying, segregating, describing, emphasizing, making conscious and self-conscious; it becomes a way of stimulating, suggesting, emphasizing, and evoking the very traits that are complained of.” (Grove, 1975, p.3)

The theory states that when an individual is labeled as deviant, the theory describes how the labeling initiates a self-fulfilling prophecy, leading to a response that further stimulates deviant behavior and aligns with the initial labeling. The labeling theory states that different members of society are at different risks of being perceived as deviant by others. It can be based on socioeconomic status or a person living in a socially deprived neighborhood (Puur, 2020).

Wacquant, Slater, and Pereira (2014) further addresses these ideas with their theory of territorial stigmatization and advanced marginality. According to Wacquant, territorial stigmatization is driven by negative and stereotypical representations by journalists, politicians, bureaucrats, and state officials, resulting in the degradation and defamation of specific areas and their residents. Stigmatization might accelerate existing neighborhood problems and contribute to negative processes (Larsen, 2014). Wacquant, Slater, and Pereira (2014)[p.1273] describe territorial stigmatization as *“being tied to, but autonomized from, the stain of poverty, subaltern ethnicity, degraded housing, imputed immorality, and street crimes, which has generated a generic label to those urban neighborhoods.”* They continue by stating that territorial stigmatization has become established to a degree where some urban neighborhoods are universally known for their self-inflicted depravity in every country. The names of the neighborhoods circulate, not only in the journalistic and political discourse but also among the citizens at large, as synonyms for “social hell.” (ibid.).

4.2 Determinants of Housing Prices, Neighborhood Mobility and Income

According to theory, “high-quality neighborhoods” typically exhibit attributes such as high property values, low out-migration rates, and high household incomes (Ding and Knaap, 2002; Can, 1990; Greenberg, 1999; Kain and Quigley, 1970). If listing vulnerable neighborhoods can be seen as a stigmatizing measure, there could be reasons to believe that these characteristics will be affected, which, in turn, could be economically harmful

to the neighborhoods.

The traditional hedonic price model is widely used to determine the relationship between household expenditures on housing and the level of certain characteristics of housing (Can, 1992). The model can be written as follows:

$$P(H) = f(h_1, h_2, \dots, h_k) \quad (4.1)$$

where $P(H)$ is the observed household expenditures on housing as a function of k housing characteristics contained in vector H . The price of any attribute k contained in H is expressed as the equilibrium marginal price of each respective attribute. Can (1992) specifically highlights the importance of including the impact of locational effects on housing prices. The specification is extended (4.1) to include these effects, which are seen as positive or negative externalities. They are distinguished as structural- (S) and neighborhood (N) characteristics, such as the socioeconomic and physical form of the neighborhood, accessibility to amenities, and level of public services. The extension is specified as follows:

$$P = f(S, N, \beta, \gamma) + \epsilon \quad (4.2)$$

where P is a vector of observed house values, S and N are vectors of structural characteristics and neighborhood characteristics, β and γ are the corresponding parameter vectors and ϵ is the vector of random error terms. As seen by the model, the house value at any location, P , depends on both structural and neighborhood attributes, S and N . Assuming that listing an area as vulnerable is seen as a negative neighborhood externality, being listed will, according to theory, impact P negatively. By the structure of specification (4.2), we formulate our first hypothesis:

Hypothesis I: Listing a neighborhood as vulnerable will have a negative impact on housing prices in that neighborhood.

Rabe and Taylor (2010) propose a framework in which households' neighborhood mobility decisions are modeled as reactions to desired changes in type, location, and cost of the current place of living, i.e., the housing consumption. The housing consumption comprises a vector of housing characteristics H_t (such as the number of rooms, costs, and

housing tenure), a vector of subjective and objective neighborhood quality characteristics (N_t), and a vector of demographic variables (D_t). The level of satisfaction that can be obtained from housing consumption, h_t^* , can thus be expressed as:

$$h_t^* = h(D_t, H_t, N_t, u_t) \quad (4.3)$$

where u_t is an unobserved component comprising factors not captured in the observable characteristics. As in standard economic theory, the household's relative utility from the consumption of housing and non-housing goods is maximized in equilibrium and restricted by the budget constraint (Rabe and Taylor, 2010). Following specification (4.3), if components determining the household's optimal housing consumption change, the satisfaction that the household derives from housing consumption also changes. A change in neighborhood quality, N_t , for the worse will hence lead to lower satisfaction from the current housing consumption. It will, in turn, cause the household to move if it can expect a higher utility from living in another neighborhood. The quality of a neighborhood is not only determined by objective factors but also subjective factors. All factors that impact whether or not an individual is satisfied with their current neighborhood will therefore affect the utility of housing consumption and moving intentions. If listing areas as vulnerable has a negative impact on how they are perceived, the model predicts a lower utility from living in such areas, which will cause more people to move. Using this reasoning, we formulate our second hypothesis:

Hypothesis II: Listing a neighborhood as vulnerable will lead to a higher risk of residents moving out of that neighborhood.

This thesis will extend the reasoning of neighborhood characteristics affecting the mobility rate from Rabe and Taylor (2010) to investigate the potential effect on income levels. If the public disclosure of vulnerable areas is perceived as a negative neighborhood characteristic, causing more people to move, one could reason that the residents moving are the ones who can afford to alter their living situation. The residents remaining could be assumed not to have the financial possibility to move, even if their utility from living in the neighborhood has decreased. Furthermore, previous research has presented evidence that residential areas can be a determinant of job opportunities

(Bunel, Petit, and L'Horty, 2015). Based on these findings and mentioned premises, we hence expect public disclosure of vulnerable areas to have a negative effect on income levels in a neighborhood, and formulate our third hypothesis as follows:

Hypothesis III: Listing a neighborhood as vulnerable will lead to lowered income levels in that neighborhood.

5 Data and Method

5.1 Data

5.1.1 Geographical Setting

The geographical distinction of vulnerable areas is set by the police and does not consider any existing administrative division of Sweden. In other words, it is not possible to obtain statistical data based on this geographical division of areas. To collect data on the vulnerable areas, we have chosen the administrative geographical division called *RegSO*, short for “Regional Statistical Areas,” as the default area division for our study. It is a nationwide statistical area classification created by Statistics Sweden. In Sweden, there are a total of 3363 RegSOs. Using RegSOs as the geographical division fits the scope of this study well since one or several RegSOs combined can be matched almost exactly to the police’s division of the vulnerable areas. In order to decide which RegSOs are included in a vulnerable area, the outlines of the vulnerable areas in Stockholm, Gothenburg, and Malmö have been layered over the cities’ RegSOs. RegSOs covered by the vulnerable areas have then, for the scope of this study, been labeled as vulnerable. The number of RegSOs included in a vulnerable area varies from one to six in the three cities. For some of our variables, it is not possible to obtain data on the RegSO-level. In these cases, two other geographical divisions are used, *District level* and *City Area level*. Similar to the assignment of RegSOs to vulnerable areas, the districts and city areas have been mapped with the RegSOs. Each RegSO has then been assigned to a city area and a district, respectively. Descriptive statistics regarding the geographical setting of Stockholm, Gothenburg, and Malmö can be found in table 5.1. A detailed specification and maps on which RegSOs are assigned to which vulnerable area, as well as a full table of districts, city areas, and their belonging RegSOs are found in Appendix A and C.

Table 5.1: Descriptive Statistics of Stockholm, Gothenburg, and Malmö

	Stockholm	Gothenburg	Malmö	Sweden
RegSOs	127	147	91	3363
Population (2021)	978 770	587 549	351 749	10 452 326
Least populated RegSO (2021)	776	1 369	1 086	663
	<i>(Bällsta)</i>	<i>(Heden Östra)</i>	<i>(Vintrie-Skumparp)</i>	-
Most populated RegSO (2021)	22 897	9 595	9 076	22 897
	<i>(Gärdet)</i>	<i>(Eriksberg)</i>	<i>(Ribersborg)</i>	-
Average population per RegSO	7 707	3 997	3 865	3 108
City Areas	15	10	5	-
Districts	28	35	19	-
Amount of population living in VAs	132 222	110 304	60 595	~ 550 000
Share of population living in VAs (%)	13,5	18,8	17,2	~ 5

Table 5.2: Number of Listed Areas in Stockholm, Gothenburg, and Malmö

	Stockholm				Gothenburg				Malmö				Sweden			
	VA	RA	PVA	Total	VA	RA	PVA	Total	VA	RA	PVA	Total	VA	RA	PVA	Total
2015	5	0	2	7	3	0	6	9	1	0	2	3	32	6	15	53
2017	6	0	2	8	2	0	7	9	0	1	3	4	32	6	23	61
2019	6	0	2	8	2	1	6	9	0	1	3	4	28	10	22	60
2021	6	0	2	8	2	1	5	8	0	1	3	4	28	14	19	61

5.1.2 Data Collection

We have constructed a panel data set of 365 RegSOs, covering Stockholm, Gothenburg, and Malmö between 2010-2021. Our treatment group consists of all vulnerable RegSOs, i.e., all RegSOs assigned to a vulnerable area. The control group consists of all other RegSOs that are not part of any vulnerable area. A dummy variable has been generated to indicate treatment status and takes on the value one for all RegSOs in the treatment group and zero otherwise. The list was first published in 2015, which indicates the treatment year. The pre-treatment period is 2010-2014, and the post-treatment period is 2015-2021. To obtain a treatment group that receives treatment the same year (2015) and remains treated throughout the entire period (2015-2021), three vulnerable areas containing 9 RegSOs, are excluded from our sample.⁴ Our treatment group contains 48 RegSOs, and our control group contains 308 RegSOs. Since the police publish the list every second year, all areas remain listed in the years between the reports (2016, 2018, 2020). Additionally, dummy variables indicating treatment intensity have been generated. The treatment intensity refers to whether the area is listed as either a *vulnerable area*,

⁴The vulnerable areas excluded from our sample are; Nydala/Hermodsdal/Lindängen in Malmö, Värberg in Stockholm (both listed for the first time in 2017) and Rannebergen in Gothenburg (excluded from the list in 2021).

risk area, or *particularly vulnerable area*, where the latter is considered the most intense level of treatment.

To answer our research question, i.e., to measure the economic impact of the public disclosure of the police’s list of vulnerable areas, we will estimate the effect of treatment on three outcome variables; *housing prices*, *risk of moving out*, and *net income*. The data on *housing prices* is obtained from “Svensk Mäklarstatistik”. The variable is measured as the average SEK/m² for every sold apartment in a particular district and is based on over 95% of all housing deals that take place via brokers in Sweden (Mäklarstatistik, 2023). The data on housing prices is collected at the district level, which is a more aggregated level than RegSO.

The second outcome variable, *risk of moving out*, is calculated by and obtained from Statistics Sweden. The variable compares actual- with expected out-migration from the area in question, considering the age structure. The expected out-migration is estimated by Statistics Sweden. A value of 150 indicates that the area experienced 50% higher out-migration than expected for the period in question. Similarly, a value below 100 indicates a lower out-migration than expected (Statistics Sweden, 2023). The data on risk for moving out is collected at the RegSO level.

Lastly, the third outcome variable, *net income*, is obtained from Statistics Sweden as well. The variable contains data on the median net income for both men and women, expressed in thousands of SEK. It is collected at the RegSO level. Table 5.4 displays the descriptive statistics of the variables as well as the control variables. Figures 5.1-5.3 display the dispersion of the outcome variables between listed and non-listed areas.

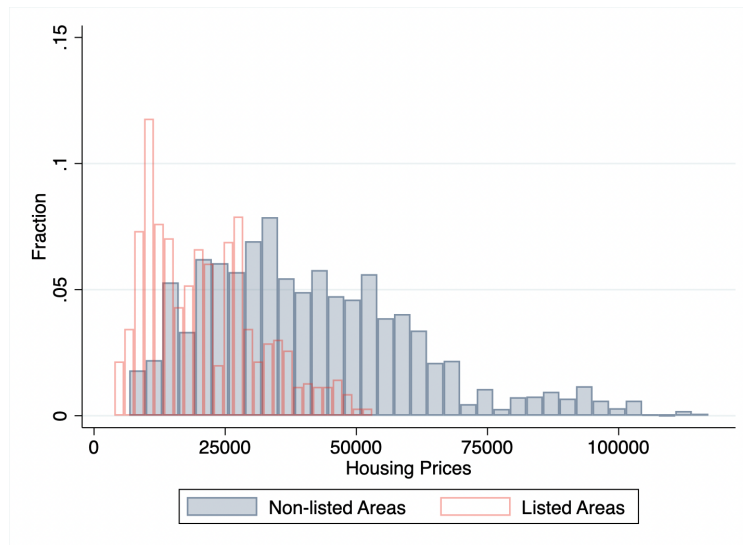


Figure 5.1: Histogram Housing Prices, Listed and Non-listed Areas

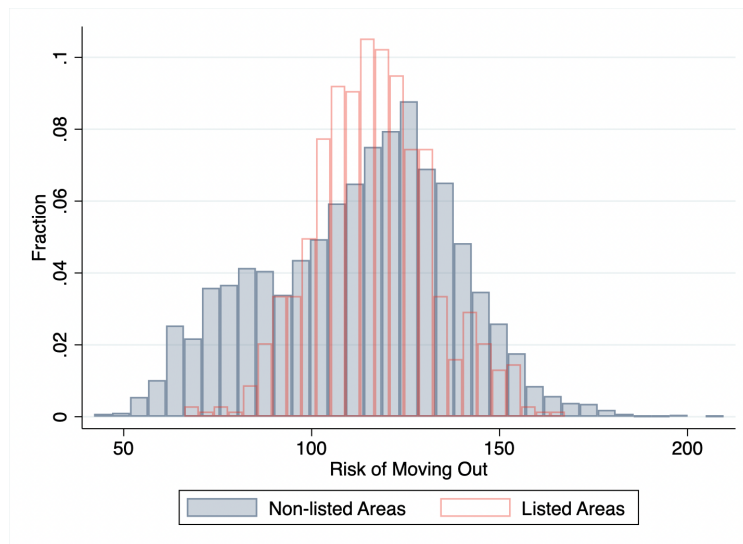


Figure 5.2: Histogram Risk of Moving Out, Listed and Non-listed Areas

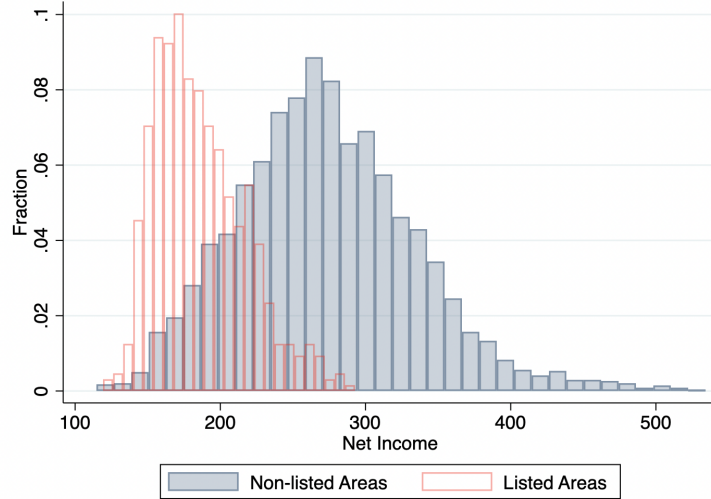


Figure 5.3: Histogram Net Income, Listed and Non-listed Areas

A selection of confounding variables is included in our model to avoid omitted variable bias. These are observables likely to affect the possibility of receiving treatment as well as the outcome variables. Excluding them from the model would hence bias the results. The confounding variables are selected based on the characteristics mentioned in the assessment item used by the police when evaluating areas as vulnerable (The Swedish Police Authority, 2017), as well as the statistical model obtained by Puur (2020). In addition, the police have identified social risk factors that increase the risk of criminal activity in an area and, hence, increase the risk of becoming a vulnerable area.⁵ To ensure that our model captures the effect of being listed as a vulnerable area and not the effect of the risk factors, relevant control variables on the RegSO level have been collected from Statistics Sweden and can be found in Table 5.3.

Table 5.3: Variable Description

Variables	Definition	Geographical level
<i>Outcome variables:</i>		
Housing prices	Average price (SEK/m ²) of the sold apartments in each district	District
Risk of moving out	Actual out-migration compared to expected out-migration, considering the age structure	RegSO
Net income	Median, thousands SEK/year	RegSO
<i>Control variables:</i>		
Youth population (%)	Share of the population between 0-19 years old	RegSO
Foreign background (%)	Share of the population with foreign background	RegSO
Single-parent household (%)	Share of single-parent households	RegSO
Unemployment (%)	Average unemployment rate	RegSO
Tenancy (%)	Share of population living in tenements	RegSO
Living area (m ²)	Average living area (m ²) per person	RegSO
Grade	Average grade from primary school	RegSO
Crime (per 100 inhabitants)	Number of reported crimes (shootings, reported drug offenses, crimes of damage, and illegal threats)	City area

⁵The identified social risk factors are high unemployment, low-income levels, low educational level, ethnic segregation, and marginalized youths (The Swedish Police Authority, 2017).

Moreover, the main criterion for an area to be considered vulnerable is the issue of criminal actors influencing the local society. Criminal activity is hence the most dominating risk factor for a neighborhood to become listed by the police. Not controlling for criminal activity would induce bias in our results and will, therefore, also be included as a control variable in the model. Criminal activity will also likely affect our outcome variables, especially housing prices (Wentland, Waller, and Brastow, 2014; Iqbal and Ceccato, 2015; Wong et al., 2019). The variable will be measured as the total amount of reported crimes in some selected categories of crime. These are selected based on the assessment item from the police and relate mainly to shootings, drug offenses, vandalism, violent crimes, weapon offenses, and illegal threats. In Appendix B a full list of the selected crime categories can be found. The crime statistics are collected from the Swedish National Council for Crime Prevention on *city area level*, which is a more aggregated level than RegSO. The number of reported crimes is divided by the total population in a city area and multiplied by 100 to obtain the number of reported crimes per 100 citizens.

Table 5.4 presents the descriptive statistics of the variables included in the study. Dividing the full sample into treatment- and control groups, we observe significant differences in characteristics between the two groups. These differences are as expected and align with the risk factors mentioned in the police’s assessment item, as well as the characteristics found by Puur (2020). We can observe that the treatment group is characterized by a higher share of youth population, population with foreign background, single-parent households, unemployment, and share of the population living in tenancies, as well as lower primary school grades and smaller living areas. The higher levels of reported crimes in the control group are expected due to a higher concentration of crimes occurring in the central areas of the three cities.

Table 5.4: Descriptive Statistics of Data

	Full Sample					Treatment Group					Control Group				
	Obs	Mean	Std. dev	Min	Max	Obs	Mean	Std. dev	Min	Max	Obs	Mean	Std. dev	Min	Max
<i>Outcome variables:</i>															
Housing price	4 269	38 615	20 818	3 855	132 043	588	21 796	11 069	3 855	53 049	3 681	41 301	20 753	6 693	132 043
Moving-out risk	4 270	114	27.8	0	582.2	588	116.7	16.6	66.1	247.4	3 682	113.6	29.1	0	582.2
Net income	3 911	261.4	66.1	114.7	534.2	539	187.3	32.6	119.2	292.8	3 372	273.2	62.3	114.7	534.2
<i>Control variables:</i>															
Youth population (%)	4 271	21.9	7.1	0	45.9	588	27.4	6.3	13.2	45.9	3 683	21.0	6.8	0	38.3
Foreign background (%)	4 271	34.5	21.7	5.9	95.6	588	70.1	17.3	31.2	95.6	3 683	28.8	15.7	5.9	89.3
Single parent household (%)	3 916	3.6	1.2	0.2	7.7	539	4.6	1.0	1.7	7.0	3 377	3.4	1.2	0.2	7.7
Unemployment (%)	4 199	2.2	1.5	0.3	11.4	588	4.3	2.0	0.9	11.4	3 611	1.9	1.1	0.3	8.9
Tenancy (%)	3 879	43.6	29.8	0.1	100	539	74.4	27.1	0.6	100	3 340	38.6	27.2	0.1	100
Living area (m ²)	3 904	35.8	6.2	21	61	539	29.6	4.6	22	43	3 365	36.8	5.9	21	61
Grade	3 890	222	31.6	35	307	539	186.7	22.2	116	257	3 351	227.6	29.1	35	307
Crime (per 100 inhabitants)	4 127	14.6	8.2	2.1	51.1	561	10.7	3.4	2.1	21.3	3 566	15.2	8.6	2.1	51.1

5.2 Method

5.2.1 Static Difference-in-Difference

We use the quasi-experimental difference-in-difference method (DD) to estimate the average treatment effect of becoming listed on the three outcome variables. The DD method is applicable when one group is exposed to a treatment, such as a policy change or a medical treatment, and another is not. The method distinguishes two time periods. In the first period, neither of the groups are exposed to treatment. In the second period, one of the groups is exposed to the treatment, and the other remains unaffected. The two groups might be observationally different. However, as long as the difference is constant over time (in the absence of treatment), the DD estimator can obtain the average treatment effect by calculating the difference between the average outcome in the treatment and control group before and after treatment. The estimation of the average treatment effect can be specified as follows:

$$\hat{\beta}^{did} = (\bar{Y}_{treatment}^{post} - \bar{Y}_{treatment}^{pre}) - (\bar{Y}_{control}^{post} - \bar{Y}_{control}^{pre}) \quad (5.1)$$

As clarified in the previous section, we have constructed the data such that treatment, i.e., becoming listed, is received simultaneously for all treated units. It provides us with a setup of two groups, listed and non-listed areas, over two periods, before and after the implementation of the list. The setup makes it ideal to use the DD method.

For the DD method to estimate the true average treatment effect and produce unbiased results, some key assumptions need to hold: *the parallel trend assumption*, *the assumptions of no anticipatory effects*, and *no spillover effects* (e.g. Bilinski and Hatfield, 2020; Goodman-Bacon, 2021; Callaway and Pedro H.C. Sant Anna, 2021; Vannutelli, 2022).

The parallel trends assumption states that, in the absence of treatment, the difference between the treated and control groups would have remained constant over time. In other words, the treatment group and control group would have followed the same trend in the outcome of interest if treatment had not been implemented for the treatment group. The average trends are shown in Figures 5.4-5.6. Observing the graphs,

housing prices and net income display similar trends without significant deviances in the pre-treatment period between the treatment and the control group. We assume the parallel trend assumption holds. When observing the graph of the moving-out risk, the trend fluctuates for one period in the pre-treatment period. It could be due to a year-specific shock, based on the apparent effect on both listed and non-listed areas, however, in opposite directions. We will continue to assume that the assumption holds.



Figure 5.4: Average Housing Prices, 2010-2021

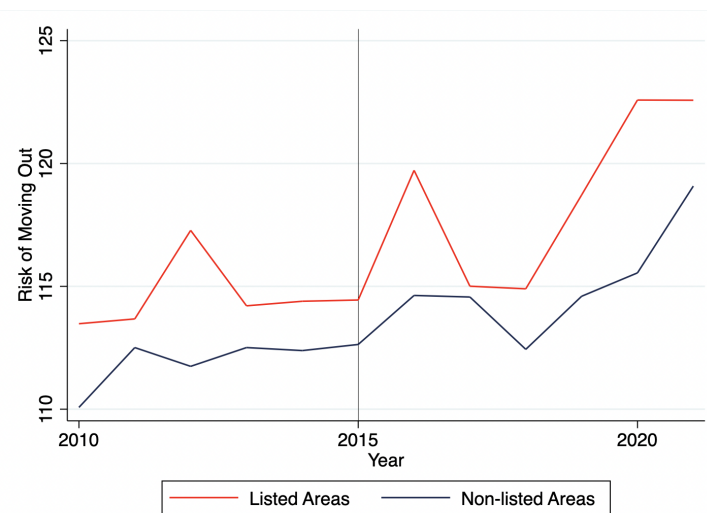


Figure 5.5: Average Risk of Moving Out, 2010-2021

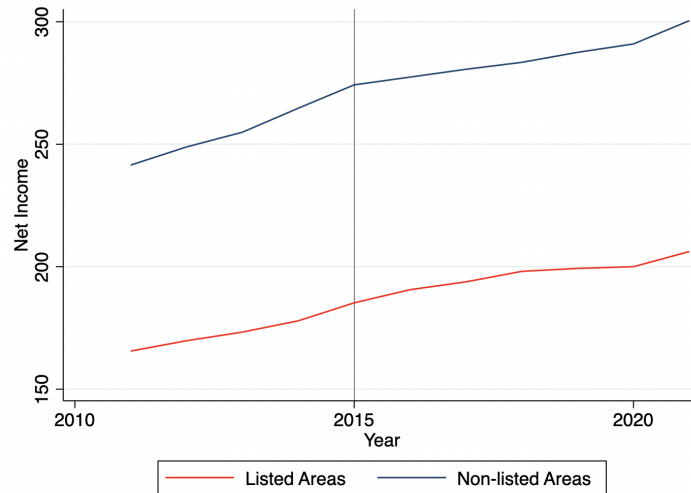


Figure 5.6: Average Net Income, 2010-2021

The assumption of *no anticipation effects* states that the treatment should have no causal effect before its implementation. In other words, there should be no anticipation of the treatment. The decision to list vulnerable areas as working material for the Swedish police was declared in 2014 (The Swedish Police Authority, 2014). At the same time, the internal work of producing the list was initiated and was first released to the public in 2015. Before 2015, there was no indication to the public that such a list existed, nor was it publicly known that it was under construction. Search interest for vulnerable areas on the internet could be used to reflect the public interest in the matter. Figure 2.2 shows that the search interest was low or non-existing in the years prior to 2015. The term “vulnerable area” has been used before 2015 in other less-defined contexts, which could explain the negligible interest in the term before 2015. However, based on this reasoning, we believe the assumption of no anticipation effects holds.

The assumption of *no spillover effects* states that the treatment given to the treatment group does not affect the control group in any way. It is also known as the *Stable Unit Treatment Value Assumption (SUTVA)* and implies that each observation’s outcome is unrelated to the outcome of any other observation. The areas listed as vulnerable by the police are mapped out in detail and do not change over the treatment periods. The names of the areas relate closely to the mapped-out area and can not be interpreted as non-listed areas. Neighboring areas are therefore not mentioned in relation to the list and do not risk receiving any spillover effects from the listing. To account for any possible

existing spillover effects, we have chosen to include, rather than exclude RegSOs into vulnerable areas to capture the potential spillover effects. In conclusion, there are close to no RegSOs in the control group that are included in a vulnerable area and vice versa, limiting the risk of spillover effects from the treatment group to the control group.

To estimate the average treatment effect, the most standard specification would be:

$$Y_{r dt} = \beta_0 + \beta_1 treatment_r + \beta_2 post2015_t + \beta_3 (treatment_r * post2015_t) + \alpha_r + \delta_t + \tau_{rt} + \mathbf{X}_{crt} + \epsilon_{rt} \quad (5.2)$$

where $Y_{r dt}$ is one of the outcomes of interest on either RegSO or district level in year t , $treatment_r$ is a dummy variable equal to one if RegSO r is assigned to a vulnerable area, $post2015_t$ is a dummy variable equal to one if the observation lies in the post-treatment period and $treatment_r * post2015_t$ represents the DD variable. α_r are RegSO fixed effects, δ_t are time fixed effects, τ_{rt} are RegSO-specific linear time trends, X_{crt} is a vector of our chosen control variables on RegSO and city area level, and ϵ_{rt} is the unobserved error term.

Including RegSO- (unit) and time-fixed effects will allow us to control for unobservable characteristics that vary over units and over time, respectively, which can not be captured by the confounding variables. The police base their listing of vulnerable areas on certain characteristics of areas that are not random, which might affect the outcome variables and the probability of receiving treatment, potentially biasing the results. For example, the police might target RegSOs as a function of their underlying cultural characteristics or geographic differences. Hence, RegSO-fixed effects are included to control for unobserved, unit-specific, and time-invariant confounders. Time-fixed effects capture unobservable factors that change over time but remain constant for all RegSOs. Time-fixed effects account for, e.g., inflation levels or economic shocks varying over the years but affecting all units in the sample. In addition to the RegSO- and time-fixed effects, we include RegSO-specific linear time trends to account for differences in trends between the treatment and the control group. The time trend is an interaction term between time-fixed effects and RegSO-fixed effects and isolates the timing of the listing to be an exogenous factor. Standard errors are clustered at treatment level.⁶

⁶Clustering standard errors relaxes the i.i.d assumption (observations are independent and identically

To test hypotheses **I**, **II**, and **III**, respectively, we specify equation 5.2 further and estimate the following equations:

$$\begin{aligned} \text{Housing prices}_{dt} = & \beta_0 + \beta_1 \text{treatment}_r + \beta_2 \text{post2015}_t + \beta_3 (\text{treatment}_r * \text{post2015}_t) \\ & + \alpha_r + \delta_t + \tau_{rt} + \mathbf{X}_{crt} + \epsilon_{rt} \end{aligned} \quad (5.3)$$

$$\begin{aligned} \text{Risk of moving out}_{rt} = & \beta_0 + \beta_1 \text{treatment}_r + \beta_2 \text{post2015}_t + \beta_3 (\text{treatment}_r * \text{post2015}_t) \\ & + \alpha_r + \delta_t + \tau_{rt} + \mathbf{X}_{crt} + \epsilon_{rt} \end{aligned} \quad (5.4)$$

$$\begin{aligned} \text{Net income}_{rt} = & \beta_0 + \beta_1 \text{treatment}_r + \beta_2 \text{post2015}_t + \beta_3 (\text{treatment}_r * \text{post2015}_t) \\ & + \alpha_r + \delta_t + \tau_{rt} + \mathbf{X}_{crt} + \epsilon_{rt} \end{aligned} \quad (5.5)$$

where X_{crt} in equation 5.3 and 5.4 include net income, youth population, foreign background, single-parent household, unemployment, tenancy, living area and grade on RegSO level, and crime on city area level. In equation 5.5, net income is excluded as control variable. Parameter β_3 represents the DD estimator and our coefficient of interest, i.e., the treatment effect. Following our hypotheses, we expect β_3 to take on a negative sign in equations 5.3 and 5.5 and a positive sign in equation 5.4.

5.2.2 Event Study

In addition to the static DD, we conduct an event study to investigate the dynamic evolution of the estimated treatment effect. Visualizing the dynamic evolution of the treatment effect allows us to explore the development of the treatment effect over time: if the effect appears immediately or gradually, and whether the effect is constant or varies in intensity over the post-treatment period, i.e., increases for the years when an updated list is published. The event study also allows us to identify possible pre-trends before treatment, not apparent to the eye in the visual representation in figures 5.4-5.6. We include all five time periods before (2010-2014) and all six time periods after treatment (2016-2021). We use the following specification:

distributed) required for OLS estimation. It allows the model errors to correlate within clusters but be independent between clusters. By clustering the standard errors, we account for this relation and avoid misleading small standard errors and subsequently narrow confidence intervals, large t-statistics, and low p-values (Cameron and Miller, 2015).

$$Y_{rdt} = \beta_0 + \sum_{j=2}^5 \beta_{T-j} D_{T-j} + \sum_{k=1}^6 \beta_{T+k} D_{T+k} + \alpha_r + \delta_t + \mathbf{X}_{crt} + \epsilon_{rt} \quad (5.6)$$

where D_{T-j} and D_{T+k} are year dummies for the years in the pre- and post treatment period for all treated units, respectively. The series of lags is equal to 5, and the series of leads is equal to 6, considered relative to the event of interest, where $T=2015$. The reference period is, by default, set one period prior to treatment where $j=1$. In this case, 2014 is the omitted baseline year. As in previous specifications α_r and δ_t are state- and time-fixed effects, \mathbf{X}_{crt} represents the set of controls, and ϵ_{rt} the unobserved error term.

6 Empirical Results

6.1 Static Difference-in-Difference

Table 6.1 displays the estimates of equation 5.3, the static DD on the outcome variable *housing prices (SEK/m²)*. In columns (1) and (2), estimates for the whole sample are presented, followed by estimates for Stockholm, Gothenburg, and Malmö, respectively. We separate the results of the three cities to investigate the heterogeneity between the cities further. Columns (1), (3), (5), and (7) include RegSO and time-fixed effects, whereas columns (2), (4), (6), and (8) additionally include the RegSO-specific linear time trend. Our coefficient of interest is β_3 , the DD estimator (*Treatment year*Listed*).

By observing the results for the whole sample, it can be seen that housing prices, on average, decrease in the areas that become listed as vulnerable by the police. The coefficient of interest is negative and statistically significant at the 1% level, both when excluding and including the RegSO-specific linear time trend. In terms of magnitude, the housing price decreases by 2 177 SEK/m², compared to the overall mean of 38 615 SEK/m², for listed neighborhoods. Including the linear time trend increases the magnitude of the result. The results display a decrease by 3 381 SEK/m² for listed areas, giving additional strength to the result.

For Stockholm and Gothenburg, all results are negative and statistically significant at the 1% level, both when excluding and including the linear time trend. Including

the time trend slightly decreases the magnitude of the effect for both Stockholm and Gothenburg. The result in column (3) for Stockholm shows that housing price decreases on average by 3 249 SEK/m², compared to the overall mean of 53 541 SEK/m².

When including the linear time trend, i.e., allowing for varying time trends between our groups, some of the estimated effect is captured. The results then show that housing prices decrease on average by 1 807 SEK/m². We obtain the most substantial treatment effect in Gothenburg. Including the time trend decreases the magnitude only slightly, indicating a more robust result. The housing price decreases on average by 4 303 SEK/m² when excluding the time trend and 4 096 SEK/m² including the time trend, compared to the overall mean of 35 290 SEK/m².

For Malmö, we obtain a contrasting result. When excluding the linear time trend, housing prices increase by 2 819 SEK/m² on average for listed areas, compared to the mean of 22 150 SEK/m². The result is significant at the 10% level. Including the linear time trend keeps the treatment effect positive. However, it decreases the magnitude drastically, and the result becomes statistically insignificant. The change of magnitude and the statistical insignificance when including the linear time trend could indicate a less reliable estimate for Malmö. The estimates should be interpreted more cautiously.

Table 6.1: Regression Results: Housing Prices

	Difference-in-Difference							
	(1) All Cities	(2) All Cities	(3) Stockholm	(4) Stockholm	(5) Gothenburg	(6) Gothenburg	(7) Malmö	(8) Malmö
Listed	26,984*** (5,673)	-2,516,006*** (252,565)	-16,265 (17,227)	886,702* (472,567)	-7,638 (5,614)	29,865 (282,381)	7,596 (5,568)	1,987,613*** (208,359)
Treatment year	17,916*** (1,520)	5,120*** (855.8)	27,115*** (1,891)	21,375*** (1,860)	23,701*** (1,134)	22,060*** (963.3)	6,308** (2,500)	8,787*** (923.9)
Treatment year*Listed (DD)	-2,177*** (591.5)	-3,381*** (723.4)	-3,249*** (728.1)	-1,807*** (698.0)	-4,313*** (454.8)	-4,096*** (780.7)	2,819* (1,692)	372.3 (240.4)
Youth population (%)	-47,775*** (15,520)	-43,346*** (14,424)	31,32 (22,673)	-11,646 (13,718)	-10,014 (12,258)	-2,564 (11,848)	-21,525 (26,570)	-26,351** (13,284)
Foreign background (%)	26.73 (91.51)	259.6*** (96.76)	29.87 (139.6)	36.09 (68.57)	-95.12 (74.50)	-5.827 (65.44)	87.61 (160.6)	-28.37 (78.00)
Net income	131.6*** (25.81)	99.89*** (16.25)	51.69* (27.34)	12.99 (13.47)	13.18 (19.77)	31.63* (17.40)	90.47*** (34.30)	14.10 (18.03)
Unemployment (%)	-1,120*** (192.2)	-522.5*** (140.2)	-1,220*** (270.5)	-227.4* (124.1)	-361.4*** (118.2)	150.8 (133.6)	-293.4 (255.6)	43.03 (112.8)
Living area (m ²)	-62.28 (194.1)	-163.5 (144.2)	879.5*** (274.0)	-1.075 (131.4)	-188.4 (133.1)	-243.8** (120.8)	-434.0 (288.7)	-109.8 (125.5)
Single-parent household (%)	-275.4 (413.2)	-54.63 (314.3)	-311.4 (613.4)	-177.3 (267.4)	-352.4 (301.3)	-174.9 (254.8)	1,014** (492.9)	451.9* (241.0)
Tenancy (%)	-20.51 (56.19)	-55.78 (60.38)	166.5*** (57.14)	68.57** (29.91)	-117.9*** (42.20)	-87.14* (52.73)	-44.92 (49.60)	14.55 (17.08)
Grade	-4.890 (4.177)	2.769 (3.110)	-11.50 (8.551)	2.783 (5.140)	-3.427 (3.047)	-2.979 (2.452)	-10.13** (4.796)	-2.448 (2.300)
Log crime	5,720*** (1,181)	1,511** (717.6)	-5,626*** (2,060)	-1,526** (695.7)	317.0 (1,050)	2,246*** (823.2)	-6,921*** (1,823)	-2,271* (1,289)
Constant	-23,118** (10,925)	-8,529 (8,173)		35,834*** (8,211)	42,539*** (11,024)		30,598* (16,794)	24,637*** (7,932)
Observations	3,454	3,454	1,218	1,218	1,415	1,415	821	821
Number of RegSOs	354	354	126	126	144	144	84	84
R-squared	0.879	0.951	0.952	0.989	0.953	0.972	0.852	0.973
RegSO linear time trend	No	Yes	No	Yes	No	Yes	No	Yes
Mean dep. var	38,615	38,615	53,541	53,541	35,290	35,290	22,150	22,150
Std. dev. dep. var	20,818	20,818	21,773	21,773	15,323	15,323	9,562	9,562

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6.2 displays the estimates of equation 5.4 on the outcome variable *risk of moving out*. The table follows the same structure as table 6.1. When observing the results for the whole sample, there is a slightly negative result, indicating that the risk of people moving out decreases when an area gets listed by the police. Including the RegSO-specific linear time trend, however, decreases the magnitude to almost zero. In Stockholm, a small positive effect can be observed, which increases in magnitude when allowing for different time trends between the groups. A similar result can be seen in Gothenburg, where the magnitude of the treatment effect increases when including the time trend. However, we do not obtain any significant treatment effect for any of these estimates. In other words, we cannot confidently say there is a significant treatment effect of listing areas as vulnerable on the risk of people moving out from these areas, neither positive nor negative.

The results are different for Malmö. We obtain a negative but statistically insignificant result when excluding the linear time trend. However, a negative and significant result on the 1% level appears when including the linear time trend. The result indicates that listing an area as vulnerable decreases the risk of people moving out by 9.89 percentage points, on average, compared to the mean of 118.89 for listed areas in Malmö. I.e., neighborhoods in Malmö experience, on average, approximately 19% higher out-migration than what is expected. Based on the results, we conclude that this share decreases to approximately 9% for vulnerable areas after the implementation of the list.

Table 6.2: Regression Results: Risk of Moving Out

	Difference-in-Difference							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Cities	All Cities	Stockholm	Stockholm	Gothenburg	Gothenburg	Malmö	Malmö
Listed	-82.01*** (13.78)	2,712** (1,083)	34.95 (50.13)	13,056** (6,237)	21.76 (24.48)	701.4 (2,945)	-114.3*** (34.91)	-6,010** (2,698)
Treatment year	2.327 (3.357)	14.17*** (3.494)	2.570 (6.414)	65.17*** (22.05)	0.329 (4.352)	3.813 (6.688)	9.106 (8.764)	-2.016 (7.811)
Treatment year*Listed (DD)	-2.141 (1.753)	-0.0652 (3.168)	0.342 (2.431)	0.468 (4.074)	0.547 (2.865)	4.998 (5.059)	-4.190 (2.921)	-9.892*** (3.506)
Youth population (%)	9.926 (40.31)	-16.96 (50.76)	-56.54 (41.65)	-105.1 (76.60)	-24.80 (56.05)	57.76 (77.97)	5.038 (102.2)	-49.58 (95.47)
Foreign background (%)	0.894*** (0.221)	0.601* (0.319)	0.562** (0.286)	0.142 (0.455)	0.926*** (0.300)	0.593 (0.490)	1.236** (0.555)	1.279* (0.677)
Net income	-0.115** (0.0495)	0.0262 (0.0735)	-0.112 (0.0797)	-0.0714 (0.130)	-0.0549 (0.0664)	-0.00652 (0.0801)	-0.0847 (0.150)	0.281* (0.169)
Unemployment (%)	2.547*** (0.499)	1.493*** (0.505)	1.703* (0.998)	0.899 (1.035)	1.087 (0.767)	0.569 (0.827)	2.504*** (0.945)	1.756* (0.935)
Living area (m ²)	1.648*** (0.462)	2.801*** (0.542)	1.189* (0.714)	2.590*** (0.696)	2.190*** (0.754)	3.734*** (0.947)	1.445* (0.821)	1.784 (1.108)
Single-parent household (%)	0.864 (1.243)	0.494 (1.545)	3.600* (1.855)	0.929 (2.234)	1.370 (1.804)	0.893 (1.972)	-2.966 (2.268)	-0.943 (3.060)
Tenancy (%)	0.400*** (0.155)	0.143 (0.145)	0.214* (0.124)	0.0535 (0.189)	0.264 (0.200)	0.0681 (0.324)	0.500 (0.389)	0.315 (0.272)
Grade	-4.17e-05 (0.0130)	0.00717 (0.0143)	-0.00906 (0.0322)	-0.0174 (0.0349)	0.00303 (0.0127)	0.0145 (0.0151)	0.00175 (0.0354)	0.0190 (0.0360)
Log crime	-4.634** (2.196)	-2.489 (2.589)	-3.127 (2.914)	-3.740 (4.323)	5.309 (4.190)	0.752 (4.883)	15.66 (10.01)	-0.640 (9.475)
Constant	54.88** (25.74)	-8.939 (31.73)		-5.568 (77.60)	-45.32 (56.11)		-5.020 (65.64)	-46.51 (66.31)
Observations	3,412	3,412	1,208	1,208	1,399	1,399	805	805
Number of RegSOs	349	349	125	125	142	142	82	82
R-squared	0.112	0.322	0.079	0.278	0.065	0.250	0.319	0.489
RegSO linear time trend	No	Yes	No	Yes	No	Yes	No	Yes
Mean dep. var	113.15	113.15	109.49	109.49	113.04	113.04	118.89	118.89
Std. dev. dep. var	24.55	24.55	19.11	19.11	25.68	25.68	28.47	28.47

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Large outliers are excluded from the sample

Table 6.3 displays the estimates of equation 5.5 on the outcome variable *net income*. We observe a negative treatment effect on net income, which is statistically

significant on the 5% level for the whole sample. In terms of magnitude, when excluding the RegSO-specific linear time trend, we find that listing an area as vulnerable decreases the net income on average by 3 018 SEK/year, compared to the overall mean net income of 261 350 SEK/year. Including the time trend decreases the magnitude of the effect somewhat while still maintaining statistical significance, where the average decrease of net income amounts to 1 280 SEK/year.

For Stockholm, we obtain a negative but insignificant result on net income when excluding the time trend. When including the time trend, a significant result on the 10% level is observed. The median net income then decreases on average by 2 477 SEK/year for listed areas, compared to the mean of 298 120 SEK/year. For Gothenburg, we obtain a significant result on the 10% level when excluding the time trend. The net income decreases on average by 2 674 SEK/year, compared to the mean of 246 590 SEK/year, when an area becomes listed. However, when accounting for varying time trends, the effect decreases substantially and becomes insignificant, which adds doubt to the estimate. The result for Gothenburg should hence be interpreted more cautiously.

For Malmö, we obtain a significant result on the 1% level when not accounting for the linear time trend. The median net income decreases on average by 6 072 SEK/year in Malmö when an area becomes listed, compared to the mean of 231 910 SEK/year. Similar to Gothenburg, the effect decreases, and the estimate becomes insignificant when including the time trend. The effect is still negative but should, as in the case of Gothenburg, be interpreted with caution.

Table 6.3: Regression Results: Net Income

	Difference-in-Difference							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Cities	All Cities	Stockholm	Stockholm	Gothenburg	Gothenburg	Malmö	Malmö
Listed	40.77** (17.90)	2,066*** (355.5)	48.87 (40.17)	10,667*** (1,809)	263.8*** (26.87)	-4,684*** (711.6)	-16.56 (20.35)	87.90 (875.7)
Treatment year	59.35*** (1.359)	46.26*** (1.024)	63.77*** (2.054)	85.46*** (6.964)	54.74*** (1.711)	40.30*** (2.224)	52.52*** (2.917)	47.64*** (0.924)
Treatment year*Listed (DD)	-3.018*** (1.077)	-1.280** (0.624)	-2.992 (2.056)	-2.477* (1.269)	-2.674** (1.192)	-0.236 (0.867)	-6.072*** (1.739)	-1.098 (1.226)
Youth population (%)	226.0*** (42.80)	147.2*** (27.45)	367.8*** (64.96)	310.2*** (63.88)	98.99*** (37.35)	37.64 (32.37)	161.8*** (53.56)	138.6*** (42.84)
Foreign background (%)	-1.327*** (0.228)	-0.820*** (0.257)	-1.845*** (0.499)	-1.609*** (0.491)	-0.725*** (0.237)	-0.194 (0.223)	-1.070*** (0.228)	-0.927*** (0.242)
Unemployment (%)	-2.759*** (0.308)	-0.581*** (0.191)	-2.182** (0.944)	0.408 (0.478)	-2.317*** (0.407)	-0.597* (0.306)	-2.688*** (0.527)	-0.497** (0.243)
Living area (m ²)	1.042* (0.558)	0.764** (0.384)	2.546** (1.023)	2.092*** (0.775)	-0.0454 (0.384)	-0.361 (0.423)	0.754 (0.807)	0.814 (0.499)
Single-parent household (%)	-3.381*** (0.825)	-2.156*** (0.515)	-2.851* (1.546)	-1.920** (0.955)	-1.707** (0.841)	-1.509** (0.662)	-2.665** (1.096)	-1.933** (0.801)
Tenancy (%)	-0.342** (0.148)	-0.314*** (0.116)	-0.302 (0.194)	-0.219 (0.157)	-0.615*** (0.181)	-0.669*** (0.168)	-0.115 (0.150)	-0.0682 (0.0979)
Grade	0.00641 (0.00784)	-0.00144 (0.00511)	0.00710 (0.0207)	-0.00414 (0.0137)	0.00203 (0.00946)	-0.00276 (0.00638)	0.00715 (0.0141)	-2.75e-05 (0.00786)
Log crime	3.039* (1.828)	-0.935 (1.279)	-0.550 (2.775)	-3.024 (2.287)	1.783 (2.794)	1.281 (2.177)	1.370 (5.363)	6.507** (3.295)
Constant	180.0*** (19.19)	186.9*** (13.04)	136.1*** (51.04)	171.7*** (30.13)			192.0*** (41.12)	167.8*** (25.80)
Observations	3,456	3,456	1,218	1,218	1,417	1,417	821	821
Number of RegSOs	354	354	126	126	144	144	84	84
R-squared	0.913	0.962	0.927	0.966	0.934	0.968	0.894	0.965
RegSO linear time trend	No	Yes	No	Yes	No	Yes	No	Yes
Mean dep. var	261.35	261.35	298.12	298.12	246.59	246.59	231.91	231.91
Std. dev. dep. var	66.07	66.07	65.02	65.02	56.03	56.03	58.49	58.49

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6.2 Event Study

Figures 6.1 - 6.3 display the event study results, i.e., the evolution of the treatment effect, from specification 5.6. Figures presenting the results for each respective city can be found in Appendix E.

Figure 6.1 presents the result of the event study on housing prices. A negative reaction on housing prices can be seen immediately from the listing in 2015. The effect is present throughout the whole post-treatment period. The dynamic treatment result shows that the effect is more substantial and significant in the first three years after treatment. From 2018 forward, the effect remains negative but decreases in magnitude and becomes insignificant. Observing the pre-treatment period, there are no signs of pre-trends, further strengthening the results.

When observing the evolution of treatment effects for the cities respectively, the

results on housing prices in Gothenburg indicate an immediate, consistent, and long-term negative treatment effect. The magnitude of the effect varies but remains significant during the whole treatment period. In Stockholm, the effect on housing prices appears in 2016-2017 and remains but decreases in magnitude in 2018. The magnitude of the effect increases again in 2019-2020, indicating a lasting negative treatment effect in Stockholm. In Malmö, the results are highly insignificant and can not be interpreted much further.

By observing the dynamic treatment effect on the *risk of moving out* in Figure 6.2, we do not obtain any significant estimates in the treatment period. The effect is negligible and related to high uncertainty when observing the confidence intervals. The values vary between positive and negative signs obstructing the possibility of observing any clear patterns of the evolution of treatment effect over time. The results are similar when observing the evolution of the treatment effect for the three cities respectively. The event study further strengthens the results obtained from the static DD.

When observing the event study results for *net income* in Figure 6.3, some questions arise. The treatment effect is negative immediately when the treatment occurs in 2015. However, after 2015, the treatment effect is overall positive for the following years, contradicting the results from the static DD. The results in themselves are interesting. However, what raises confusion is the discrepancy between the event study results and the results obtained from the static DD regression, which indicated an overall negative treatment effect on income. Observing the pre-treatment period, we can see significant and positive results for the treatment effect. It indicates a risk of pre-trends in the income variable, which might explain the discrepancy between the static DD results and the event study results. The results should be discussed with these indications in mind. Similar results can be found when observing the dynamic treatment effect on income in Stockholm and Gothenburg. The effect in Malmö shows a negative but insignificant treatment effect for the whole post-treatment period.

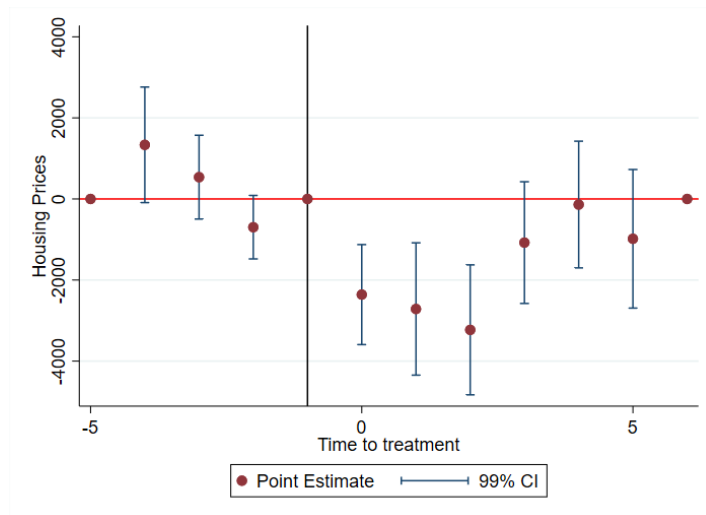


Figure 6.1: Event Study Housing Prices

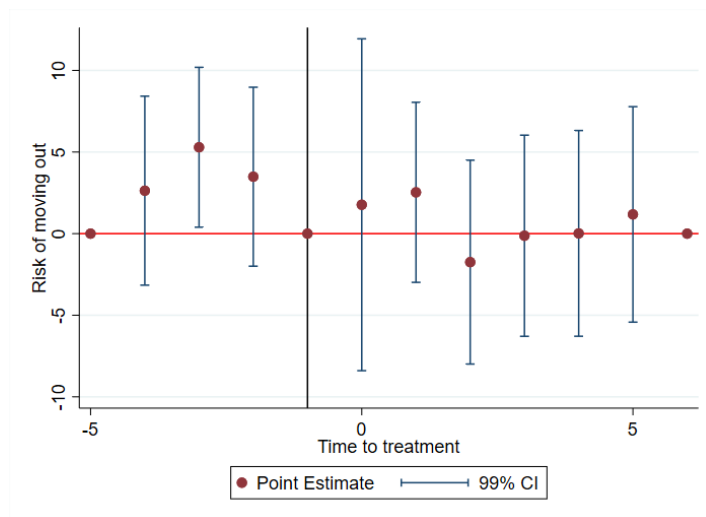


Figure 6.2: Event Study Risk of Moving Out

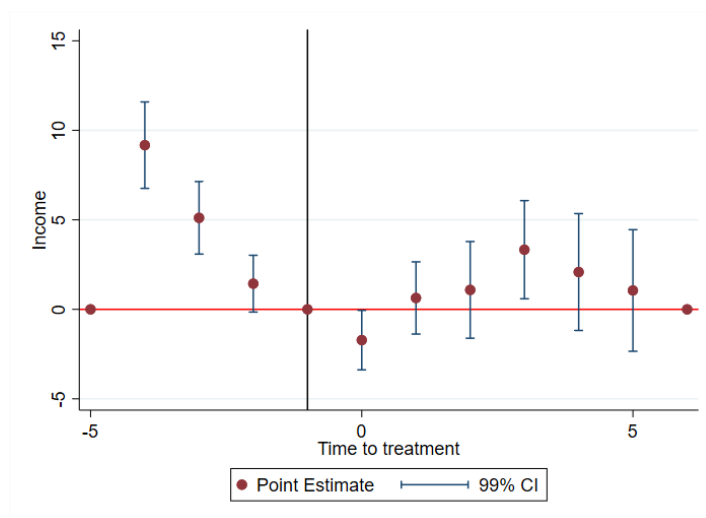


Figure 6.3: Event Study Net Income

6.3 Mechanisms

To further explore the mechanisms behind the static DD results, we will extend our specification to include a triple difference-in-difference estimator (DDD). To do so, we interact the DD estimator with an additional variable. Doing this will allow us to further deepen our understanding of the treatment effect and its driving factors. Thus far, we have considered all vulnerable areas to be exposed to equal treatment. As mentioned previously, vulnerable areas are divided into three categories based on the severity of the issues in the area. Now, the three categories will be considered as varying treatment intensity, where vulnerable areas are considered the lowest intensity of treatment and particularly vulnerable areas the highest. The DDD will investigate differences in treatment effect depending on whether an area is categorized as a vulnerable-, risk-, or particularly vulnerable area.

To perform the specification, we remove the neighborhoods where treatment intensity changes over the treatment period, i.e., the areas classified within different categories between 2015-2021. Doing so gives us a consistent treatment group. We remove three vulnerable areas that change categories over the years to achieve this setting.⁷ These three areas comprise 11 RegSOs in total, meaning we have 37 RegSOs in the treatment group and 308 RegSOs in the control group. Risk areas are no longer included in the treatment group, i.e., the treatment group now only consists of vulnerable- and particularly vulnerable areas.⁸

The DDD will be performed using the following specification:

$$\begin{aligned}
 Y_{r dt} = & \beta_0 + \beta_1 treatment_r + \beta_2 post2015_t + \beta_3(treatment_r * post2015_t) + \beta_4 PVA \\
 & + \beta_5(treatment_r * PVA) + \beta_6(PVA * post2015_t) + \beta_7(PVA * treatment_r * post2015_t) \\
 & + \alpha_r + \delta_t + \mathbf{X}_{crt} + \tau_{rt} + \epsilon_{rt}
 \end{aligned}
 \tag{6.1}$$

where PVA is a dummy equal to one if the observation is assigned to a *particularly vulnerable area* and β_7 is the parameter of interest, the DDD estimator, representing the

⁷The three areas excluded are: Gårdsten and Tynnered/Grevgården/Opaltorget in Gothenburg and Holma/Kroksbäck/Bellevue in Malmö.

⁸Due to the small sample and variation of vulnerable- versus particularly vulnerable areas in the three cities, the DDD will only be performed on the whole sample.

average treatment effect of being listed as a particularly vulnerable area.

The results from the DDD are found in table 6.4. From the static DD in Table 6.1 it can be seen that housing prices, on average, decrease when an area becomes listed by the police. Observing the treatment effect on housing prices obtained by the DDD, we can further extend this statement by concluding that being listed as a particularly vulnerable area is associated with an even greater negative effect than being listed as a vulnerable area. The effect is significant at the 1% level, both when excluding and including the time trend.

The results on the risk of moving out from the static DD did not provide us with any significant results. However, when observing the effect of being listed as a particularly vulnerable area, we can see a negative and significant effect on the 1% level on the outcome variable, risk of moving out, excluding and including linear time trends. The result in Table 6.4 shows that being listed as particularly vulnerable decreases the risk of moving out from an area compared to if the area is being listed as vulnerable.

The results from the static DD on the net income show that income, on average, decreases when an area becomes listed as vulnerable by the police. The treatment effect of being listed as a particularly vulnerable area is still negative but insignificant when we do not account for different time trends between the RegSOs. However, the effect drastically changes when including the time trend. The result is then positive and significant at the 1% level, indicating that the average treatment effect of being listed as a particularly vulnerable area increases the median net income/year.

Table 6.4: Regression Results: Treatment Intensity

	Housing Prices		Risk of Moving Out		Net Income	
	(1) All Cities	(2) All Cities	(1) All Cities	(2) All Cities	(1) All Cities	(2) All Cities
Listed	15,759*** (5,480)	-1,775,673*** (359,195)	-59.18*** (13.72)	1,241 (1,143)	25.80 (17.44)	1,335*** (432.1)
Treatment year	18,352*** (1,520)	5,587*** (830.8)	2.314 (3.432)	14.48*** (3.499)	59.50*** (1.377)	46.25*** (1.044)
PVA	29,232*** (2,546)	-3,246,803*** (316,733)	-52.97*** (6.461)	8,531*** (847.4)	11.00* (6.419)	-2,862*** (630.4)
PVA*Listed	-16,641*** (3,928)	1,857,384*** (562,297)	30.53*** (10.02)	-8,141*** (1,715)	5.682 (8.869)	3,662*** (1,117)
Treatment year*Listed	-632.3 (457.0)	1,102 (1,048)	-1.090 (2.772)	0.622 (3.509)	-0.564 (1.437)	-1.196 (0.969)
PVA*Treatment year	3,889*** (502.4)	849.5* (490.4)	16.96*** (1.118)	31.04*** (1.234)	-3.132*** (0.926)	-6.546*** (0.642)
PVA*Treatment year*Listed (DDD)	-6,793*** (820.2)	-7,326*** (1,283)	-19.93*** (3.662)	-35.34*** (4.218)	-1.065 (2.536)	6.696*** (1.312)
Youth population (%)	-45,978*** (15,777)	-37,480** (14,758)	-1.902 (40.47)	-27.84 (50.59)	240.6*** (43.19)	156.1*** (28.66)
Foreign background (%)	-8.603 (90.40)	272.4*** (97.67)	0.852*** (0.225)	0.614* (0.323)	-1.355*** (0.241)	-0.815*** (0.263)
Net income	130.2*** (26.19)	92.00*** (16.07)	-0.108** (0.0506)	0.0207 (0.0723)		
Unemployment (%)	-1,276*** (169.5)	-616.3*** (140.2)	2.526*** (0.456)	1.391*** (0.472)	-2.711*** (0.344)	-0.533*** (0.204)
Living area (m ²)	-40.10 (192.4)	-140.4 (146.2)	1.549*** (0.430)	2.616*** (0.479)	1.155** (0.569)	0.823** (0.398)
Single-parent household (%)	-236.1 (423.3)	-188.7 (294.7)	1.103 (1.240)	0.869 (1.490)	-3.403*** (0.831)	-2.277*** (0.543)
Tenancy (%)	-4.378 (55.87)	-46.03 (62.20)	0.449*** (0.158)	0.132 (0.139)	-0.351** (0.151)	-0.311*** (0.119)
Grade	-4.407 (4.211)	3.465 (3.099)	0.000601 (0.0130)	0.00888 (0.0143)	0.00795 (0.00806)	-0.00125 (0.00516)
Log crime	5,809*** (1,212)	1,322* (718.4)	-4.494** (2.254)	-1.917 (2.600)	2.638 (1.897)	-1.141 (1.310)
Constant	-22,772** (10,855)	-8,120 (8,260)	58.27** (24.99)	-3.269 (30.90)	176.1*** (19.90)	184.3*** (13.53)
Observations	3,344	3,344	3,302	3,302	3,346	3,346
Number of RegSOs	343	343	338	338	343	343
R-squared	0.882	0.953	0.120	0.343	0.915	0.962
RegSO linear time trend	No	Yes	No	Yes	No	Yes
Mean dep. var	39,193	39,193	113.19	113.19	263.70	263.70
Std. dev. dep. var	20,819	20,819	24.71	24.71	65.53	65.53

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6.4 Robustness Checks

To obtain a treatment group, we made qualitative assessments of which RegSOs to include in each vulnerable neighborhood. In four cases, only a small part of a RegSO is included in the vulnerable area whilst a substantial part of the RegSO is outside the vulnerable

area.⁹ Including these in a vulnerable area would potentially generate a misrepresented treatment group since we would include parts that are not on the police’s list of vulnerable areas. For our main regression analysis, we, therefore, decided to exclude them from the treatment group and instead include them in the control group. By including them in the control group, there might exist a potential risk of obtaining spillover effects from the treatment- to the control group. We have previously assumed that the assumption of no spillover effect overall holds. To strengthen the assumption, we remove the four mentioned RegSOs from our sample and reproduce the static DD regressions 5.3-5.5. The results from the robustness test can be found in Appendix D. Dropping the ambiguous RegSOs does not change the treatment effect significantly of any of our outcome variables. We can therefore conclude that our main results are robust and that the assumption of no spillover effect holds.

7 Discussion

Our research presents evidence of a causal negative relationship between listing areas as vulnerable and housing prices. The effect is significant and consistent using a difference-in-difference method, an event study, and a triple difference-in-difference estimation. The results align with the theoretical framework and our first hypothesis. Furthermore, it aligns with previous findings regarding perceived crime risk and decreasing housing prices, found by Linden and Rockoff (2008), Pope (2008), Wentland, Waller, and Brastow (2014), and Kim and Lee (2018).

What could be potential explanations for the effect, and why is it important to consider the impact on housing prices? Our results show that the negative effect of publicly listing neighborhoods as vulnerable on housing prices is immediate from the initial year of listing and decreasing in magnitude over time. In Stockholm and Gothenburg, however, the negative effect on housing prices appears to increase once more in 2020, indicating a potential long-term effect for the two cities, respectively. Our results hence align with the theoretical framework, stating that negative publicity and the stereotypical representation induced by the list could be stigmatizing and potentially contribute to negative processes in these areas, affecting housing prices. Furthermore,

⁹These RegSOs are; Hässelby Villastad (Stockholm), Jättesten Östra & Brunnsbo torg (Gothenburg), and Kroksbäck Väst (Malmö).

public disclosure of the list can be seen as a negative neighborhood externality, adversely impacting housing prices.

The immediate, significant, and negative impact on housing prices for the initial years is likely attributable to the shock of the publication, alongside the negatively portrayed picture of the situation in the areas at the time. Listing areas as vulnerable was still a relatively new phenomenon, and the debate regarding its consequences had just recently been initiated. Such circumstances may have, in turn, engendered uncertainty regarding the future of listed areas, generating an immediate effect on demand for housing in the areas. The effect can be seen as particularly strong after the publication of the list in 2017. This year, eight new areas were added to the list. The image portrayed in the media and the general perception among the public was that the issue with gang violence and criminal networks was increasing. The Swedish National Police Chief Dan Eliasson commented on the development of the situation as being “acute”, and one of the largest newspapers in Sweden, *Aftonbladet*, described the image the police portrayed with the list over the current situation as “pitch black.” (Bäckström Lerneby, 2017).

Considering this reasoning, the diminished and insignificant effect on housing prices in 2019 becomes particularly interesting. An updated list was published this year and would reasonably increase public awareness and concerns. However, in 2019 one area listed as particularly vulnerable in Gothenburg was downgraded in severity, and two areas in other parts of Sweden were excluded from the list entirely. It was the first time areas had been removed from the list, indicating positive progress and development of the situation. During the press conference of the list’s publication, the positive trends in the vulnerable areas were communicated and highlighted by the police (Pettersson, 2019). The positive message could have moderated the negative effect of the listing on housing prices. The indication of safer neighborhoods for residents and a more stable future might have encouraged consumers to invest in housing in these areas, driving up prices and mitigating the effect.

From the evolution of treatment, we find the effect of the publication to vary between the years. We conclude that the change is seemingly related to the development of the situation in the neighborhoods in relation to the previous publication and hence what kind of medial focus the list receives. In 2021, two areas were excluded from the

list, while three new ones were added. The Head of the Police Intelligence Service, Linda Staaf, commented on the situation, concluding that there was an overall positive trend in development, with some areas experiencing a more negative trend (Hansson, 2021). However, since the investigation of the dynamics of the treatment effect in this thesis is restricted to 2020, we can not further explore the potential effects of the listing in 2021. Additionally, the publication of an updated list awaits in 2023. The topic has been, and still is, highly debated as a result of the increase in deadly violence in the past year. Exploring the development of the effect on housing prices between 2020-2023 would hence be of great interest due to the ambiguous picture portrayed of the situation by the media in 2021 and the future effect of the revised list in 2023.

Furthermore, as suspected, being listed as particularly vulnerable has an even more significant impact on housing prices. The particularly vulnerable areas are subject to considerably more negative publicity than risk areas and vulnerable areas, impacting the demand to invest in housing to an even greater extent. The results show that Gothenburg is most negatively affected by the introduction of the police's list out of the three cities. It is also the city with the largest number of particularly vulnerable areas than any other city on the list. Gothenburg has had, at most, seven particularly vulnerable areas, while Stockholm has had only two. The amount of particularly vulnerable areas is making Gothenburg stand out, both from the list and in media reporting. The result that the effect is more prominent in particularly vulnerable areas could therefore explain the significantly larger negative effect on housing prices in Gothenburg.

Surprisingly, we find housing prices to increase in vulnerable areas in Malmö, even though three out of four listed areas are considered particularly vulnerable by the police. However, one should keep in mind that the results were insignificant. The vulnerable areas of Malmö significantly differ compared to the vulnerable areas of Stockholm and Gothenburg. The contrasting result could potentially stem from these differences. The vulnerable areas are more centrally located and integrated with the rest of the city center of Malmö. These areas might, therefore, not react to the list's stigmatizing effect in the same way, and housing prices in the vulnerable areas of Malmö might hence be more inelastic to these kinds of shocks.

Finally, it is essential to assess the consequences of these results. A lowered

demand to live in listed areas, reflected by the decrease in housing prices, is a potential risk factor. Diminishing demand could lead to a lower willingness to, e.g., invest in new construction or renovation in the neighborhoods, resulting in an additional decline in the physical condition of buildings and properties, further decreasing the demand. Diminishing housing prices due to the stigma imposed by the listing is also economically unfavorable for property owners, who risk suffering substantial financial losses from their investments. Furthermore, the decrease in property value obstructs the possibility for owners wishing to use their property as a security to access credits or finance new investments, endangering property owners' financial position.

Even though theory suggests that neighborhood characteristics are determinants of moving intentions, and previous research presents evidence that negatively portraying a neighborhood leads to an increased out-moving rate (Ham, Permentier, and Bolt, 2009; Permentier, 2013; Andersen, 2008; Fell et al., 2021), we find no evidence that the risk of residents moving out from a vulnerable neighborhood increases due to the listing. Our second hypothesis can hence not be given any validity.

The insignificant effect on the risk of residents moving out from listed areas could have several explanations. Increased police presence in neighborhoods could increase the sensation of safety, leading them to remain in the area. Furthermore, if a decrease in housing prices can be seen as a decrease in demand for living in an area, the non-significant effect on the risk of moving out is interesting. It could be a reasonable effect in the Swedish context where the inability to move could stem from difficulties in finding other living accommodations due to, e.g., long housing queues for tenancies or a challenging financial situation. Lastly, an explanation could simply be that listing areas as vulnerable does not affect the residents living in the area and their intentions to move.

The results indicate a slightly higher, yet insignificant, risk of residents moving out in Stockholm and Gothenburg. On the contrary, listing areas as vulnerable in Malmö decreases the risk of residents moving out of these neighborhoods. The results from Malmö once again indicate that the city differs. An intuitive explanation for the results in Malmö could be that problematic neighborhoods and the stigmatization around them have been a more present issue in Malmö than in the other cities. As with the effect on housing prices, the residents of Malmö are therefore less affected by this sort of

“shock”.

When examining the effect of being listed as particularly vulnerable, compared to vulnerable, we obtain a decreased risk of residents moving out. The result is interesting and raises questions that move beyond economic theory. What could be the potential driving factors behind these results? The listing of vulnerable areas, and the attention the areas receive, could lead to positive effects. Shifting focus from what causes the issues to how to combat them, such as increased police presence and community resources, could lead to an increased willingness to remain. The listing could also increase cohesion among residents, making them more prone to remain in their neighborhood. Furthermore, connected to our previous discussion regarding worsened financial outcomes for property owners in vulnerable neighborhoods, another possible explanation could be that property owners wish to move from the neighborhood. Still, due to a worsened financial position, it is not possible, leading them to stay.

Conclusions based on the list’s effect on the net income should be made with caution. Although the static difference-in-difference results show significant negative results, the event study indicates a problem with pre-trends, as well as the seemingly overall conflicting results, making them less robust and harder to interpret. We discuss the results keeping this in mind.

The overall negative relationship aligns with our third hypothesis. Findings from previous research stating that career opportunities could be affected by the place of residence and its reputation (Bunel, Petit, and L’Horty, 2015) is interesting and could be a potential driver to our result. The stigmatizing of areas could, therefore, not just affect the area in itself but might also harm the residents of the area. The stigma could be assumed to infect the whole society, including employers, obstructing the possibility of finding a job due to your address. Although listing areas as vulnerable might not affect those already in the workforce, it might worsen the situation for individuals outside the workforce. Because of the high unemployment level in vulnerable neighborhoods, this is especially alarming.

The results do not show any indication of an increased risk of residents moving out of the stigmatized neighborhoods restricting us from concluding that the effect on income relies on out-migration from vulnerable areas, as suggested by Friedrichs (1991)

and Andersen (2008). The magnitude of the negative effect on net income is reasonably small, which is essential to keep in mind. The overall decrease in net income corresponds to 1,15%/year, compared to the average value. In Malmö, however, the effect is more significant, corresponding to a decrease of 2,6%/year.

Finally, we want to address two limitations to be aware of. The first regards the crime statistics that, for the scope of a master's thesis, are difficult to solve due to time- and budgetary limitations but could be improved for further research. We use crime statistics to measure criminal activity. The variable has, however, some limitations. Data on the number of reported offenses is dependent on police presence as well as individuals' willingness to report crimes (Kardell, 2023). Police presence differs in different neighborhoods, and the city center is over-represented in the statistics for all three cities. Moreover, in some areas, people choose not to report crimes they have been exposed to, potentially underestimating the statistics (ibid.). Another source of improvement for future research is the geographical level on which the data is collected. If it would be possible to obtain data on the exact areas mapped by the police, it could further improve the precision of the estimates.

8 Conclusions

This thesis measures the impact of the public disclosure of the Swedish police's list of vulnerable areas on three economic variables, housing prices, the risk of people moving out of neighborhoods, and net income levels. To do so, we have used the introduction of the policy instrument as a treatment to conduct a difference-in-difference analysis with the listed areas as the treatment group and non-listed areas as the control group. We find a negative relationship between the police's list of vulnerable areas and housing prices, indicating a stigmatizing effect. Furthermore, we find no evidence of an increased risk of residents moving away when neighborhoods are listed as vulnerable by the police. Listing vulnerable areas also negatively affects the net income; however, these results are not robust and should be interpreted with caution. The research covers the three largest cities in Sweden, Stockholm, Gothenburg, and Malmö.

Suggestions for further research would be to enlarge the sample by addressing vulnerable areas outside Stockholm, Gothenburg, and Malmö. An extension of the

research would enable us to see whether a similar effect is present in other areas than the big cities. Future research should be made to continue to evaluate the policy instrument and its stigmatizing effect and further deepen the knowledge of potential risks for long-term adverse economic effects in listed areas.

Finally, this study fills the research gap on how the police's list of vulnerable areas in Sweden economically affects the neighborhoods in question. The knowledge adds to the debate on publicly disclosing vulnerable areas and its consequences. The findings of this study is applicable to policymakers in Sweden as well as in other countries who are labeling neighborhoods in a similar way or consider doing so in the future. Lastly, the obtained results provide incentives to further evaluate the policy instrument in the Swedish context to ensure that it solely affects the development of society in a positive manner.

Bibliography

- Andersen, Hans (2008). “Why do residents want to leave deprived neighbourhoods? The importance of residents’ subjective evaluations of their neighbourhood and its reputation”. In: *Journal of Housing and the Built Environment* 23, pp. 79–101.
- Bilinski, Alyssa and Laura A Hatfield (2020). “Nothing to see here? Non-inferiority approaches to parallel trends and other model assumptions”. In: arXiv: [1805.03273](https://arxiv.org/abs/1805.03273) [stat.ME].
- Boehm, Thomas P. and Keith R. Ihlanfeld (1986). “Residential Mobility and Neighborhood Quality”. In: *Journal of Regional Science* 26.2, pp. 411–424.
- Bunel, Mathieu, Pascale Petit, and Yannick L’Horty (Jan. 2015). “Discrimination based on place of residence and access to employment”. In: *Urban Studies* 53.
- Bäckström Lerneby, Johanna (June 21, 2017). “Polisens nya rapport: 61 utsatta områden i Sverige”. In: *Aftonbladet*. URL: <https://www.aftonbladet.se/nyheter/krim/a/LVMpJ/polisens-nya-rapport-61-utsatta-omraden-i-sverige>. (Accessed: 06/05/2023).
- Callaway, Brantly and Pedro H.C. Sant Anna (2021). “Difference-in-Differences with multiple time periods”. In: *Journal of Econometrics* 225.2. Themed Issue: Treatment Effect 1, pp. 200–230.
- Cameron Colin, A. and Douglas L. Miller (2015). “A Practitioner’s Guide to Cluster-Robust Inference”. In: *Journal of Human Resources* 50.2, pp. 317–372.
- Can, Ayse (1990). “The Measurement of Neighborhood Dynamics in Urban House Prices.” In: *Economic Geography* 66.3, pp. 254–272.
- (1992). “Specification and estimation of hedonic housing price models”. In: *Regional Science and Urban Economics* 22.3, pp. 453–474.
- Ding, Chengri and Gerrit-Jan Knaap (2002). “Property Values in Inner-City Neighborhoods: The Effects of Homeownership, Housing Investment, and Economic Development”. In: *Housing Policy Debate* 13, pp. 701–727.
- Fell, Terence et al. (2021). “Citizen Science in Sweden’s Stigmatized Neighborhoods”. In: *Sustainability* 13, p. 10205.
- Friedrichs, Jürgen (1991). “Middle-class Leakage in Large New Housing Estates: Empirical Findings and Policy Implications”. In: *Journal of Architectural and Planning Research* 8.4, pp. 287–295.
- Goodman-Bacon, Andrew (2021). “Difference-in-differences with variation in treatment timing”. In: *Journal of Econometrics* 225.2. Themed Issue: Treatment Effect 1, pp. 254–277.

- Greenberg, Michael R. (1999). “Improving neighborhood quality: A hierarchy of needs”. In: *Housing Policy Debate* 10.3, pp. 601–624.
- Grove, Walter (1975). “The Labelling Perspective: An Overview”. In: *The Labelling of Deviance: Evaluating a Perspective*, pp. 3–20.
- Gulis, Gabriel, Mariam Safi, and Ditte Linde (2022). “Rapid health impact assessment of a Danish policy document: One Denmark without Parallel Societies: No Ghettos in 2030”. In: *Journal of Public Health* 30.
- Ham, Maarten van, Matthieu Permentier, and Gideon Bolt (2009). “Neighbourhood Reputation and the Intention to Leave the Neighbourhood”. In: *Environment and Planning A* 41, pp. 2162–2180.
- Hansson, Johanna (Oct. 14, 2021). “Tre nya utsatta områden – polisen uppdaterar lista”. In: *Expressen*. URL: <https://www.expressen.se/nyheter/tre-nya-utsatta-omraden-polisen-uppdaterar-lista/> (visited on 05/06/2023).
- Iqbal, A and Ceccato (2015). “Does crime in parks affect apartment prices?” In: *Journal of Scandinavian Studies in Criminology and Crime Prevention* 16, pp. 97–121.
- Jensen Qvotrup, Sune and Ann-Dorte Christensen (2012). “Territorial stigmatization and local belonging”. In: *City* 16, pp. 74–92.
- Johansson, Lisa (2019). “Forskaren om Miljonprogrammet: Blev inte som det var tänkt”. In: *Dagens Nyheter*. URL: <https://www.svt.se/nyheter/lokalt/sodertalje/miljonprogrammets-missar-forskaren-det-blev-inte-som-det-var-tankt>. (Accessed: 27/03/2023).
- Josefson, Axel (2023). *Personal Communication [Interview over mail 2023-04-14]*.
- Kain, J.F. and J.M. Quigley (1970). “Evaluating the Quality of the Residential Environment”. In: *Environment and Planning A* 2.1, pp. 23–32.
- Kardell, Johan (2023). *Personal Communication [Interview 2023-02-23]*.
- Kim, Seonghoon and Kwan Ok Lee (2018). “Potential crime risk and housing market responses”. In: *Journal of Urban Economics* 108.C, pp. 1–17.
- Larsen, Troels (2014). “Copenhagen’s West End a ‘Paradise Lost’: The Political Production of Territorial Stigmatization in Denmark”. In: *Environment and Planning A* 46, pp. 1386–1402.
- Linden, Leigh and Jonah E. Rockoff (2008). “Estimates of the Impact of Crime Risk on Property Values from Megan’s Laws”. In: *American Economic Review* 98.3, pp. 1103–27.
- Mastrorocco, Nicola and Luigi Minale (2018). “News media and crime perceptions: Evidence from a natural experiment”. In: *Journal of Public Economics* 165.C, pp. 230–255.
- Morenoff, Jeffrey, Robert Sampson, and Stephen Raudenbush (2001). “Neighborhood Inequality, Collective Efficacy, and the Spatial Dynamics of Urban Violence”. In: *Criminology* 39, pp. 517–558.

- Mäklarstatistik, Svensk (2023). *Om Oss*. URL: <https://www.maklarstatistik.se/om-oss/>. (Accessed: 08/03/2023).
- Permentier, Matthieu (2013). “Neighbourhood Reputations, Moving Behaviour and Neighbourhood Dynamics”. In: *Understanding Neighbourhood Dynamics: New Insights for Neighbourhood Effects Research*. Ed. by Maarten van Ham et al. Dordrecht: Springer Netherlands, pp. 161–182. ISBN: 978-94-007-4854-5.
- Pettersson, Mia (June 3, 2019). “Polisen presenterar ny lista över utsatta områden”. In: *Göteborgs Posten*. URL: <https://www.gp.se/nyheter/g%C3%B6teborg/polisen-presenterar-ny-lista-%C3%B6ver-utsatta-omr%C3%A5den-1.15429020>. (Accessed: 06/05/2023).
- Pope, Jaren C. (2008). “Fear of crime and housing prices: Household reactions to sex offender registries”. In: *Journal of Urban Economics* 64.3, pp. 601–614.
- Puur, Mia (2020). “The Grid of Sweden - A Micro-unit Analysis of Vulnerable Neighborhoods”. In: *Malmö Universitet*.
- Rabe, Birgitta and Mark Taylor (2010). “Residential Mobility, Quality of Neighbourhood and Life Course Events”. In: *Journal of the Royal Statistical Society Series A* 173, pp. 531–555.
- Salonen, Tapio (2023). “Att identifiera utsatta bostadsområden. En jämförande analys mellan polisens lista och segregationsbarometern.” In: *SBV Working Paper Series* 23:1.
- Slater, Tom (2018). “The invention of the ‘sink estate’: Consequential categorisation and the UK housing crisis”. In: *The Sociological Review* 66.4, pp. 877–897.
- Statistics Sweden (2023). *Om statistiken - Integration och flyttmönster*. URL: <https://scb.se/hitta-statistik/temaomraden/integration/regeringsuppdraget-registerdata-for-integration/sa-har-ar-statistiken-om-integration-uppyggd/om-statistiken---integration-och-flyttmonster/>. (Accessed: 10/03/2023).
- Stockholmskällan (2022). *Miljonprogrammet*. URL: <https://stockholmskallan.stockholm.se/teman/staden-vaxer/miljonprogrammet/>. (Accessed: 23/03/2023).
- The Swedish National Audit Office [Riksrevisionen] (2020). “Rätt insats på rätt plats - polisens arbete i utsatta områden.” In: URL: https://www.riksrevisionen.se/download/18.7546977617592429b913d517/1604927340756/RiR2020_2020Anpassad.pdf.
- The Swedish National Board of Housing, Building and Planning [Boverket] (2023). *Om Segregationsbarometern*. URL: <https://segregationsbarometern.boverket.se/om-segregationsbarometern/>. (Accessed: 21/04/2023).
- The Swedish National Council for Crime Prevention, [Brottsförebyggande Rådet] (2021). *Dödligt skjutvapenvåld i Sverige och andra Europeiska länder. En jämförande*

- studie av nivåer, trender och våldsmetoder. Rapport 2021:8.* Stockholm: Brottsförebyggande rådet.
- The Swedish Police Authority (2014). *En nationell översikt av kriminella nätverk med stor påverkan i lokalsamhället.*
- (2015). *Utsatta områden - sociala risker, kollektiv förmåga och oönskade händelser.*
- (2017). *Utsatta områden - Social ordning, kriminell struktur och utmaningar för polisen.*
- (2021). *Lägesbild över utsatta områden - Regeringsuppdrag 2021.*
- Tissot, Sylvie (2018). “Categorizing Neighborhoods: The Invention of ‘Sensitive Areas’ in France and ‘Historic Districts’ in the United States”. In: *International Journal of Urban and Regional Research* 42.1, pp. 150–158.
- Vannutelli, Silvia (2022). “From Lapdogs to Watchdogs: Random Auditor Assignment and Municipal Fiscal Performance”. In: *NBER Working Papers* 30644.
- Wacquant, Loic, Tom Slater, and Virgilio Pereira (2014). “Territorial Stigmatization in Action”. In: *Environment and Planning A* 46, pp. 1270–1280.
- Wentland, Scott, Bennie Waller, and Raymond Brastow (2014). “Estimating the Effect of Crime Risk on Property Values and Time on Market: Evidence from Megan’s Law in Virginia”. In: *Real Estate Economics* 42.1, pp. 223–251.
- Wong, Woei-Chyuan et al. (2019). “Estimating the impact of crime risk on housing prices in Malaysia”. In: *International Journal of Housing Markets and Analysis.*

A Appendix - Lists of Vulnerable Areas and Geographical Division

Table A.1: Full List of Vulnerable Areas in Stockholm, Gothenburg and Malmö for 2015, 2017, 2019 and 2021

2015	2017	2019	2021
PVA	PVA	PVA	PVA
Bergsjön, Gothenburg Biskopsgården, Gothenburg Gårdsten, Gothenburg Hammarkullen, Gothenburg Hjällbo, Gothenburg Husby, Stockholm Lövgärdet, Gothenburg Rinkeby/Tensta, Stockholm Rosengård, Malmö Södra Sofielund, Malmö	Bergsjön, Gothenburg Biskopsgården, Gothenburg Gårdsten, Gothenburg Hammarkullen, Gothenburg Hjällbo, Gothenburg Husby, Stockholm Lövgärdet, Gothenburg Rinkeby/Tensta, Stockholm Rosengård, Malmö Södra Sofielund, Malmö Nydal/Hermodsdal/Lindängen, Malmö Tynnered/Grevgården/Opalatorget, Gothenburg	Bergsjön, Gothenburg Biskopsgården, Gothenburg Gårdsten, Gothenburg Hjällbo, Gothenburg Husby, Stockholm Lövgärdet, Gothenburg Rinkeby/Tensta, Stockholm Rosengård, Malmö Södra Sofielund, Malmö Nydal/Hermodsdal/Lindängen, Malmö Tynnered/Grevgården/Opalatorget, Gothenburg	Bergsjön, Gothenburg Biskopsgården, Gothenburg Gårdsten, Gothenburg Hjällbo, Gothenburg Husby, Stockholm Lövgärdet, Gothenburg Rinkeby/Tensta, Stockholm Rosengård, Malmö Södra Sofielund, Malmö Nydal/Hermodsdal/Lindängen, Malmö
RA	RA	RA	RA
None	Holma/Kroksbäck/Bellevuegården, Malmö	Holma/Kroksbäck/ Bellevuegården, Malmö Gårdsten, Göteborg	Tynnered/Grevgården/Opalatorget, Gothenburg Holma/Kroksbäck/Bellevuegården, Malmö
VA	VA	VA	VA
Tynnered/Grevgården/Opalatorget, Gothenburg Holma/Kroksbäck/Bellevue, Malmö Bredäng, Stockholm Hagsätra/Rågsved, Stockholm Hisings Backa, Gothenburg Hasselby/Vällingby, Stockholm Rannebergen, Gothenburg Älvsjö/Solberga, Stockholm Östberga, Stockholm Värberg, Stockholm	Bredäng, Stockholm Hagsätra/Rågsved, Stockholm Hisings Backa, Gothenburg Hasselby/Vällingby, Stockholm Rannebergen, Gothenburg Älvsjö/Solberga, Stockholm Östberga, Stockholm Värberg, Stockholm	Bredäng, Stockholm Hagsätra/Rågsved, Stockholm Hisings Backa, Gothenburg Hasselby/Vällingby, Stockholm Rannebergen, Gothenburg Älvsjö/Solberga, Stockholm Östberga, Stockholm Värberg, Stockholm	Gårdsten, Göteborg Bredäng, Stockholm Hagsätra/Rågsved, Stockholm Hisings Backa, Gothenburg Hasselby/Vällingby, Stockholm Älvsjö/Solberga, Stockholm Östberga, Stockholm Värberg, Stockholm

Table A.2: Vulnerable Areas and Belonging RegSOs - Stockholm

Police VA	RegSO
Husby	Husby
Rinkeby/Tensta	Rinkeby Tensta
Bredäng	Bredäng
Hagsätra/Rågsved	Hagsätra Rågsved
Hässelby/Vällingby	Hässelby Gård Hässelby Strand Grimsta
Älvsjö/Solberga	Solberga
Östberga	Östberga
Vårberg	Vårberg

Table A.3: Vulnerable Areas and Belonging RegSOs - Malmö

Police VA	RegSO
Rosengård söder om Amiralsgatan	Örtagården norr Örtagården syd-Herrgården syd Persborg-Törnrosen Herrgården norr
Södra Sofielund	Södra Sofielund Sofielund norr
Holma/Kroksbäck/Bellevuegården	Holma Holma-Kroksbäck Bellevuegården öst Bellevuegården väst
Nydala/Hermodsdal/Lindängen	Nydala norr Hermodsdal-Gullviksborg Gullviksborg-Hermodsdal syd Lindängen Almvik norr-Lindängen norr Söderkulla

Table A.4: Vulnerable Areas and Belonging RegSOs - Gothenburg

Police VA	RegSO
Bergsjön	Bergsjön södra Bergsjön centrala Bergsjön nordvästra Bergsjön Rymdtorget Bergsjön sydöstra
Biskopsgården	Länsmansgården norra Länsmansgården södra Norra Biskopsgården Södra Biskopsgården östra Södra Biskopsgården västra Svartedalen
Gårdsten	Gårdsten nordöstra Gårdsten sydvästra
Hammarkullen	Hammarkullen centrala Hammarkullen yttre
Hjällbo	Hjällbo västra Hjällbo östra
Hisings Backa	Backa centrala Backa östra Brunnsbo norra Backa Röd Skälltorp Selma Lagerlöfs torg Skälltorp Bäckebo
Lövgärdet	Lövgärdet
Rannebergen	Rannebergen norra Rannebergen södra
Tynnered/Grevgården/Opaltorget	Grevegården Kannebäck Ängås

Table A.5: City Area-, RegSO-, and District Division, Stockholm

City area	RegSO	District	
Skärholmen	Skärholmen	SKÄRHOLMEN	
	Vårberg		
	Bredäng		
	Sätra		
Enskede - Årsta - Vantör	Bandhagen	VANTÖR	
	Hagsätra		
	Högdalen		
	Rågsved		
	Stureby		
	Örby		
	Enskede Gård	ENSKEDE	
	Enskedefältet		
	Gamla Enskede		
	Årsta		
Johanneshov	BRÄNNKYRKA		
Östberga			
Kungsholmen	Kungsholm	KUNGSHOLMEN	
	Kristineberg	STOCKHOLMS SANKT GÖRAN	
	Fredhäll		
	Östra Sankt Görän		
	Marieberg		
	Stadshagen		
	Stora Essingen	ESSINGE	
	Lilla Essingen		
	Östermalm	Hedvig Eleonora	STOCKHOLMS HEDVIG ELEONORA
		Oscars kyrka	STOCKHOLMS OSCAR
Gärdet		STOCKHOLMS ENGELBREKT	
Djurgården			
Engelbrekts kyrka			
Hjorthagen-Värtahamnen			
Tekniska Högskolan			
Universitetet			
Bromma	Abrahamsberg	BROMMA	

	Beckomberga	
	Blackeberg	
	Bromma kyrka	
	Bällsta	
	Eneby	
	Mariehäll	
	Norra Ängby	
	Riksby-Åkeshov	
	Södra Ängby	
	Ulvunda Industriområde	
	Åkeslund	
	Alvik	VÄSTERLED
	Höglandet	
	Nockeby	
	Nockebyhov-Olovslund	
	Smedslätten	
	Stora Mossen	
	Traneberg	
	Ulvunda	
	Ålsten	
	Äppelviken	
Södermalm & Gamla Stan	Reimersholme-Långholmen	HÖGALID
	Södra Högalid	
	Mellersta Högalid	
	Norra Högalid	
	Västra Katarina	STOCKHOLMS KATARINA
	Östra Katarina	
	Mariatorget	STOCKHOLMS MARIA MAGDALENA
	Södra Station	
	Södra Sofia	STOCKHOLMS SOFIA
	Norra Sofia	
	Södra Hammarbyhamnen	
	Storkyrkan	STOCKHOLMS DOMKYRKODISTRIKT
Norrmalm & City	Klara-Jacob	
	Norra Adolf Fredrik	STOCKHOLMS ADOLF FREDRIK

	Södra Adolf Fredrik	
	Gustav Vasa	STOCKHOLMS GUSTAV VASA
	Norra Johannes	STOCKHOLMS SANKT JOHANNES
	Södra Johannes	
	Västra Matteus	STOCKHOLMS SANKT MATTEUS
	Östra Matteus	
Farsta	Farsta Östra Farsta Strand Västra Farsta Strand-Farstanäset Fagersjö Gubbängen, Hökarängen Larsboda Sköndal Svedmyra Tallkrogen	FARSTA
Hägersten - Älvsjö	Aspudden Gröndal Hägersten Hägerstensåsen Liljeholmen Midsommarkransen Mälarhöjden Västberga	HÄGERSTEN
	Fruängen Herrängen Liseberg Långbro Långsjö Solberga Västertorp Älvsjö Örby Slott	BRÄNNKYRKA
Skarpnäck	Bagarmossen Björkhagen	SKARPNÄCK

	Enskededalen	
	Hammarbyhöjden	
	Kärrtorp	
	Sydvästra Skarpnäcks gård-Orhem	
	Östra Skarpnäcks gård-Flaten-Skrubba	
	Norra Skarpnäcks Gård	
Rinkeby-Kista	Akalla	KISTA
	Husby	
	Kista	
	Rinkeby	SPÅNGA
Spånga-Tensta	Bromsten	
	Flysta	
	Solhem-Lunda	
	Sundby	
	Tensta	
Hässelby-Vällingby	Hässelby Gård	HÄSSELBY
	Hässelby Strand	
	Hässelby Villastad	
	Kälvesta	VÄLLINGBY
	Nälsta	
	Råcksta	
	Vinsta	
	Vällingby	
	Grimsta	

Table A.6: City Area-, RegSO-, and District Division, Gothenburg

City area	RegSO	District
Angered	Bergum	BERGUM
	Linnarhult-Gunnilse	ANGERED
	Hammarkullen centrala	
	Hammarkullen yttre	
	Hjällbo västra	
	Hjällbo östra	
	Eriksbo	
	Rannebergen norra	GUNNARED
	Rannebergen södra	
	Angered centrum-Agnesberg	

	Lövgärdet	
	Gårdsten nordöstra	
	Gårdsten sydvästra	
Östra Göteborg	Bergsjön nordvästra	BERGSJÖN
	Bergsjön centrala	
	Bergsjön Rymdtorget	
	Bergsjön sydöstra	
	Bergsjön södra	
	Kortedala södra	KORTEDALA
	Kortedala sydöstra	
	Kortedala nordvästra	
	Kortedala nordöstra	
	Gamlestaden Kviberg	NYLÖSE
	Gamlestaden västra	
	Utby	
Örgryte-Härlanda	Kålltorp Munkebackstorget	HÄRLANDA
	Kålltorp södra	
	Kålltorp Vikkär	
	Torpa	
	Bagaregården	
	Björkekärr Rosendal	BJÖRKEKÄRR
	Björkekärr Östra Sjukhuset	
	Lunden västra	GÖTEBORGS SANKT PAULI
	Olskroken	
	Redbergslid	
	Lunden Danska vägen	
	Kallebäck västra	ÖRGRYTE
	Kallebäck östra	
	Björkekärr Delsjön	
	Kärralund	
	Skår	
	Överås	
	Lunden östra-Härlanda	
Centrum	Krokslätt Mossen	JOHANNEBERG
	Krokslätt norra	
	Krokslätt södra	
	Johanneberg Chalmers	

	Johanneberg västra	
	Olofshöjd	
	Landala norra	
	Landala södra	
	Guldheden mellersta	ANNEDAL
	Guldheden norra	
	Guldheden södra	
	Heden västra	GÖTEBORGS VASA
	Heden östra	
	Lorensberg-Vasastaden övre	
	Vasastaden västra	GÖTEBORGS DOMKYRKODISTRIKT
	Inom Vallgraven	
	Stampen västra	
	Stampen östra	
Majorna-Linné	Annedal-Änggården	ANNEDAL
	Olivedal Kommendantsängan	
	Haga	HAGA
	Olivedal Järntorget	GÖTEBORGS OSCAR FREDRIK
	Olivedal nordvästra	
	Sanna	GÖTEBORGS KARL JOHAN
	Kungsladugård Kungsladugårdsgatan	
	Kungsladugård Älvsborgsgatan	
	Majorna Gråberget	
	Majorna Hängmattan	
	Majorna Såggatan	
	Stigberget	MASTHUGGET
	Masthugget Masthuggsterassen	
	Masthugget övre Bangatan	
	Masthugget övre Vegagatan	
Askim-Frölunda-Högsbo	Kaverös	HÖGSBO
	Flatås västra	
	Högsbo-Flatås östra	
	Högsbohöjd norra	
	Högsbohöjd södra	
	Högsbotorp västra	

	Högsbotorp östra	
	Järnbrott	
	Askim norra	ASKIM
	Askim södra	
	Hovås	
	Billdal Brottkärr	
	Billdal Lindås	
	Billdal Skintebo	
	Ruddalen	VÄSTRA FRÖLUNDA
	Tofta	
	Frölunda torg östra	
	Frölunda torg västra	
Västra Göteborg	Södra Skärgården	STYRSÖ
	Näset	NÄSET
	Kannebäck	TYNNERED
	Bratthammar	
	Önnered	
	Skattegården	
	Ängås	
	Grevegården	
	Guldringen	
	Fiskebäck södra	ÄLVSBERG
	Fiskebäck Tranered	
	Långedrag	
	Hagen	
	Grimmered	
Norra Hisingen	Kärre centrum	SÄVE
	Kärre Gerrebacka	
	Rödbo-Säve	
	Skogome	
	Brunnsbo norra	BRUNNSBO
	Brunnsbo torg	
	Backa centrala	BACKA
	Backa Röd	
	Backa östra	
	Skälltorp Selma Lagerlöfs torg	
	Skälltorp Bäckebo	BÄCKEBOL
	Skälltorp Åketorp	

	Tuve Norumshöjd	TUVE
	Tuve västra	
	Tuve östra	
Lundby	Eriksberg	LUNDBY
	Kyrkbyn Bräcke	
	Kyrkbyn östra	
	Kärrdalen	
	Slättadamm	
	Rambergsstaden västra	
	Kvillebäcken Backaplan	BRÄMAREGÅRDEN
	Kvillebäcken Björlandavägen	
	Kvillebäcken Wieselgrensplatsen	
	Rambergsstaden mellersta	
	Rambergsstaden östra	
	Lindholmen	
Västra Hisingen	Hjuvik	TORSLANDA
	Nolered Amhult-Arendal	
	Nolered norra	
	Björlanda	BJÖRLANDA
	Jättesten västra	LUNDBY
	Jättesten östra	
	Svartedalen	BISKOPSGÅRDEN
	Norra Biskopsgården	
	Länsmansgården norra	
	Länsmansgården södra	
	Södra Biskopsgården västra	
	Södra Biskopsgården östra	

Table A.7: City Area-, RegSO-, and District Division, Malmö

City area	RegSO	District
Norr	Kirseberg syd	KIRSEBERG
	Kisebergsstaden-Rostorp	
	Håkanstorp-Bulltofta-Valdemarsro	
	Sege väst	
	Sege öst	
	Östervärn-Ellstorp	

	Rörsjöstaden	MALMÖ SANKT PAULI
	Slussen	
	Sorgenfri norr	
	Värnhem Västra Sorgenfri	
	Davidshall-Lugnet	
	Hamnen-Stortorget	MALMÖ SANKT PETRI
	Malmöhus	
	Västra Hamnen Sydöst	
	Västra Hamnen norr	
	Västra Hamnen Nordväst	
	Västra Hamnen väst	
	Gamla staden öst	
	Rådman svängen	MALMÖ SANKT JOHANNES
Söder	Oxie Norr	OXIE
	Oxie syd	
	Alm vik norr-Lindängen norr	FOSIE
	Alm vik syd-Lindängen syd	
	Gullviksborg-Hermodsdal syd	
	Hermodsdal-Gullviksborg	
	Gullvik	
	Lindängen	
	Nydala norr	
	Fosieby-Kastanjegården	
	Heleneholm-Almhög	ERIKSFÄLT
	Eriksfält	
	Söderkulla	
	Augustenborg	SOFIELUND
	Hindby	VÄSTRA SKRÄVLINGE
Öster	Herrgården norr	
	Västra kattarp	
	Emilstorp - Östra Kyrkogården - Apelgården	
	Kryddgården	
	Jägersro - Almgården - Höja väst	
	Persborg Törnrosen	
	Örtagråden Norr	

	Örtagården Syd - Herrgården Syd	
	Riseberga	HUSIE
	Videdal	
	Virentofta-Östra Skrävlinge-Toftanäs	
	Jägersro öst - Stenkällan	
	Fortuna hemgården-Kvarnby-Södra Sallerup	
Väster	Stadion-Borgmästaregården	ERIKSFÄLT
	Ärtholmen-Södertorp-Gröndal	
	Hyllievång syd	HYLLIE
	Hyllievång norr	
	Kroksbäck väst	
	Holma-Kroksbäck	
	Bellevuegården väst	
	Bellevuegården öst	
	Tygelsjö by omland	TYGELSJÖ
	Bunkeflostrand väst	BUNKEFLO
	Bunkeflostrand öst	
	Vintrie-Skumparp	
	Bunkeflostrand syd.	VÄSTRA KLAGSTORP
	Bellevue-Nya Bellevue	LIMHAMN
	Annetorp-Kalkbrotte	
	Elinelund-Djupadal	
	Djupadal-Rosenvång	
	Gamla Limhamn	
	Limhamns hamnområde	
	Sibbarp	
	Ön Norr	
	Kulladal	KULLADAL
	Holma	
	Svågertorp-Lindeborg	
	Lorensborg	MALMÖ SANKT JOHANNES
Innerstaden	Dammfri	
	Mellanheden-Solbacken	
	Kronborg-Pildammsparken-Teatern	
	Fågelbacken	
	Annelund-Lönngården	SOFIELUND
	Östra Sorgenfri norr	

Östra Sorgenfri syd	
Möllevången	MÖLLEVÅNGEN
Möllevången syd	
Möllevången väst	
Möllevången öst	
Sofielund norr	
Södra Sofielund	
Västra Sorgenfri öst	
Södervärn-Allmänna sjukhuset-Flensburg	
Ribersborg	SLOTTSTADEN
Rönneholm	
Västervång-Fridhem	
Hästhagen-Kronprinsen	MALMÖ SANKT PETRI

B Appendix - Selected Crimes

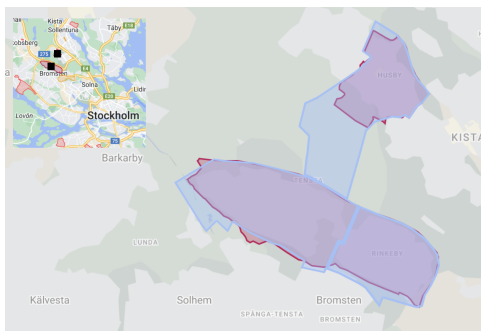
The table presents the selected categories of crime included in the variable "Crime".

Reported offences of the following chapters and acts in the Criminal Code:

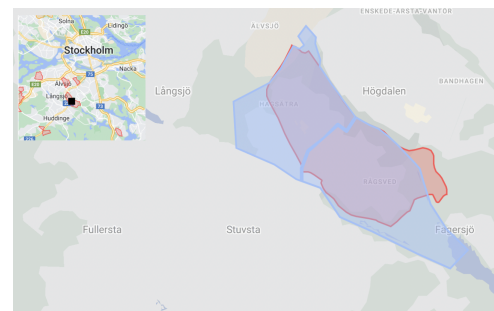
Ch. 3 - Crimes against life and health
Ch. 4, §4 - Unlawful coercion, §5 - Unlawful threat (non-internet related)
Ch. 8 - Theft, robbery or other theft offences
Ch. 9 - Fraud and other misconduct
Ch. 12 - Crimes of vandalism
Ch. 13 - Crimes of public danger
Ch. 17 - Crimes against public activity
The narcotics punishment act
The act on penalties for money laundering offences
The act on penalties for smuggling
The act on excise duty control
The narcotic drugs control act
The alcohol act
The act on flammable and explosive goods
The weapons act
The act on prohibition of knives and other objects
The gambling act
The act on criminal responsibility for public incitement (acts of terrorism)

C Appendix - Maps of Vulnerable Areas

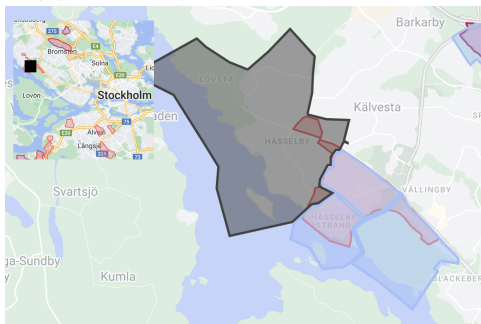
The following section provides images of the vulnerable areas mapped out by the Swedish police (red, purple, and orange areas) and the RegSOs we have assigned as vulnerable (blue areas). Black areas are RegSOs we have chosen not to include in the Vulnerable Areas. Some RegSOs (blue areas) cover parts that are not included in a vulnerable area; however, these mostly consist of forest or industry, i.e., uninhabited areas.



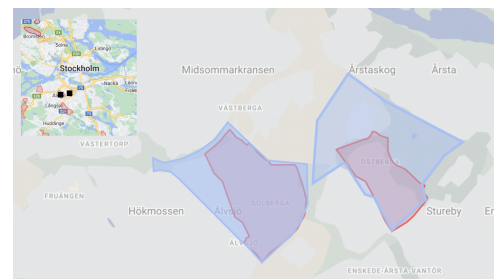
(a) Rinkeby/Tensta, and Bredäng



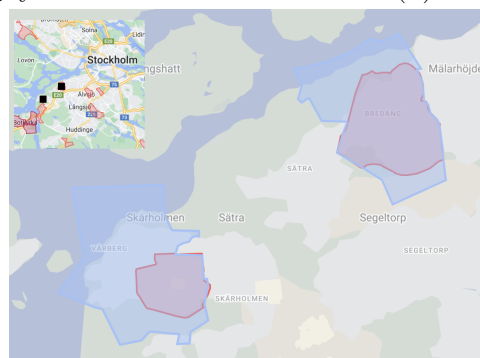
(b) Hagsätra/Rågsved



(c) Hässelby/Vällingby

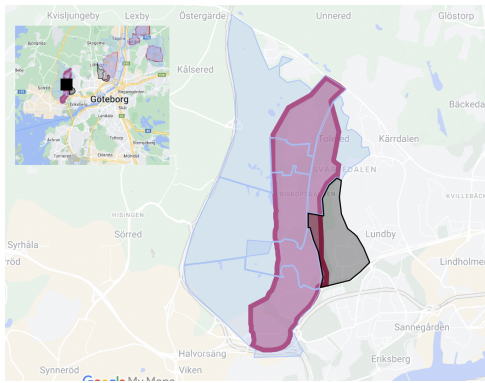


(d) Älvsjö/Solberga and Östberga

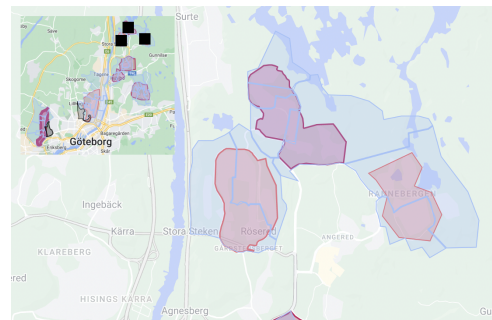


(e) Värberg and Bredäng

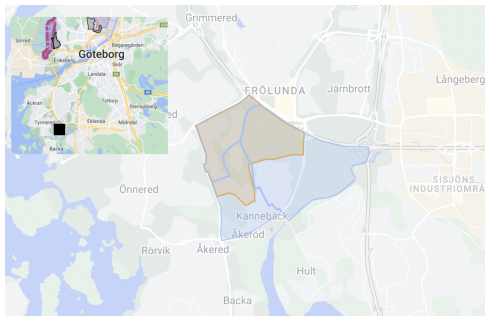
Figure C.1: Maps of Vulnerable Areas in Stockholm



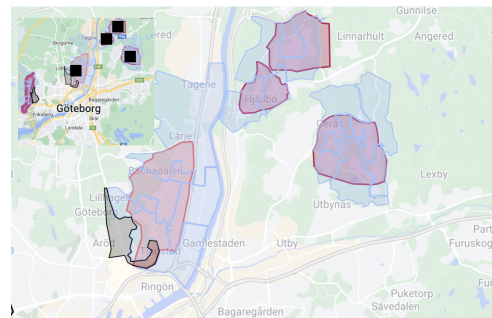
(a) Biskopsgården



(b) Gårdsten, Lövgärdet and Rannebergen

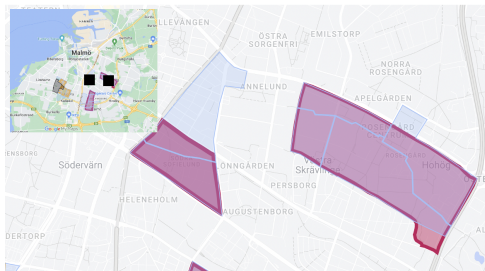


(c) Tynnered/Grevegården/Opalstorget

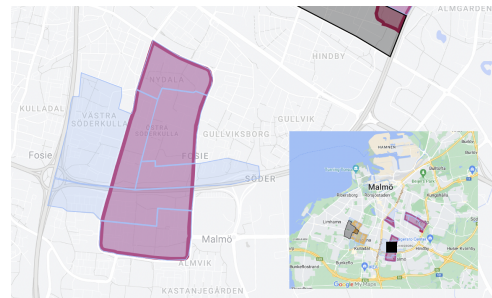


(d) Hisings Backa, Hjällbo, Hammarkullen and Bergsjön

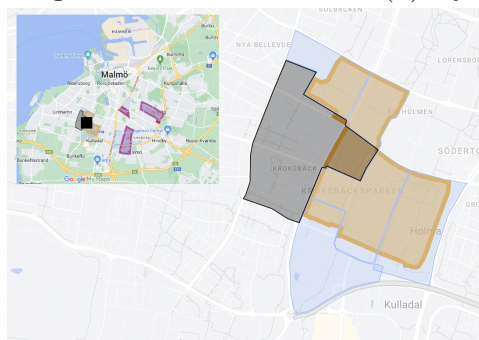
Figure C.2: Maps of Vulnerable Areas in Gothenburg



(a) Södra Sofielund and Rosengård



(b) Nydala/Hermodsdal/Lindängen



(c) Holma/Kroksbäck/Bellevuegården

Figure C.3: Maps of Vulnerable Areas in Malmö

D Appendix - Robustness Check

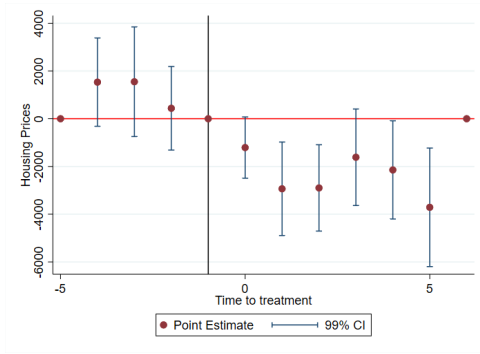
Table D.1: Robustness Check - Dropping Ambiguous RegSOs

	Housing Prices		Risk of Moving Out		Net Income	
	(1) All Cities	(2) All Cities	(3) All Cities	(4) All Cities	(5) All Cities	(6) All Cities
Listed	27,175*** (5,745)	-2,519,924*** (254,408)	-82.14*** (13.85)	2,777** (1,086)	41.14** (18.05)	2,030*** (357.6)
Treatment year	17,834*** (1,531)	5,157*** (857.8)	1.973 (3.394)	13.91*** (3.516)	59.50*** (1.363)	46.24*** (1.032)
Treatment year*Listed (DD)	-2,135*** (595.0)	-3,367*** (725.3)	-2.032 (1.752)	0.100 (3.167)	-3.049*** (1.081)	-1.320** (0.626)
Youth population (%)	-505.2*** (156.5)	-424.2*** (144.5)	0.0513 (0.409)	-0.172 (0.511)	2.285*** (0.428)	1.496*** (0.275)
Foreign background (%)	32.68 (92.06)	264.6*** (97.26)	0.905*** (0.225)	0.648** (0.320)	-1.352***	-0.835***
Net income	132.9*** (26.08)	99.01*** (16.29)	-0.109** (0.0498)	0.0329 (0.0737)	(0.232)	(0.258)
Unemployment (%)	-1,123*** (192.6)	-523.5*** (140.7)	2.588*** (0.501)	1.536*** (0.507)	-2.757*** (0.310)	-0.579*** (0.191)
Living area (m ²)	-37.50 (193.4)	-166.2 (144.4)	1.673*** (0.464)	2.774*** (0.543)	0.992* (0.556)	0.756* (0.387)
Single-parent household (%)	-265.9 (417.2)	-87.47 (315.6)	0.940 (1.255)	0.543 (1.551)	-3.448*** (0.830)	-2.173*** (0.518)
Tenancy (%)	-18.05 (56.39)	-57.71 (60.59)	0.407*** (0.155)	0.131 (0.145)	-0.340** (0.147)	-0.307*** (0.114)
Grade	-5.658 (4.181)	2.302 (3.109)	-0.00179 (0.0129)	0.00599 (0.0143)	0.00707 (0.00784)	-0.00110 (0.00512)
Log crime	5,863*** (1,188)	1,498** (723.5)	-4.304* (2.209)	-1.945 (2.601)	2.954 (1.842)	-1.064 (1.290)
Constant	-24,432** (10,906)	-8,315 (8,183)	52.06** (25.97)	-12.40 (32.02)	182.7*** (19.00)	187.8*** (13.14)
Observations	3,414	3,414	3,372	3,372	3,416	3,416
Number of RegSOs	350	350	345	345	350	350
R-squared	0.879	0.951	0.111	0.322	0.913	0.962
RegSO linear time trend	No	Yes	No	Yes	No	Yes
Mean dep. var	38,713	38,713	113.33	113.33	261.53	261.53
Std. dev. dep. var	20,871	20,871	24.56	24.56	66.27	66.27

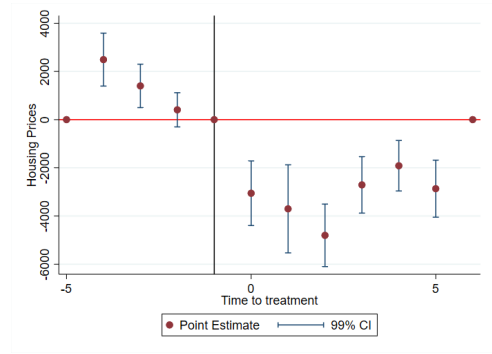
Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

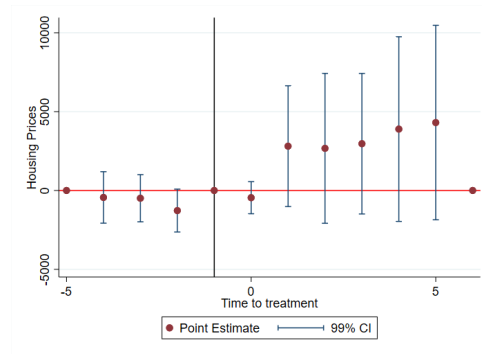
E Appendix - Event Study: Stockholm, Gothenburg, Malmö



(a) Stockholm

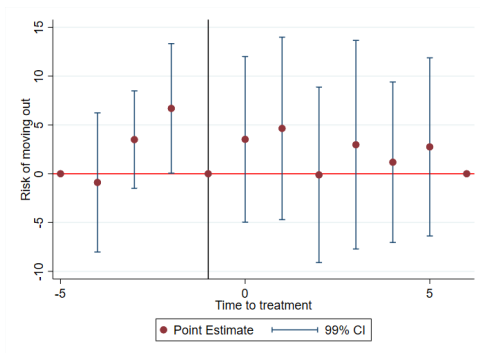


(b) Gothenburg

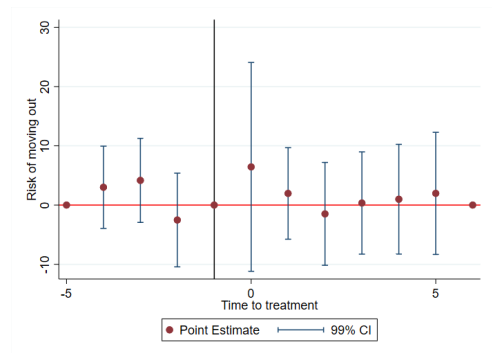


(c) Malmö

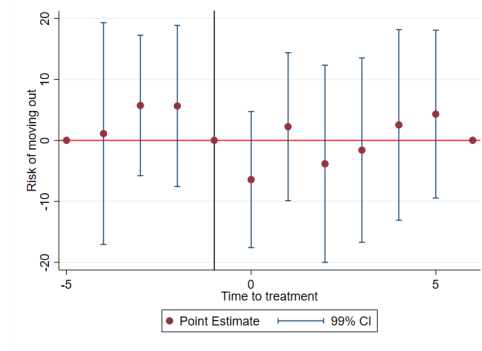
Figure E.1: Event Study Housing Prices



(a) Stockholm

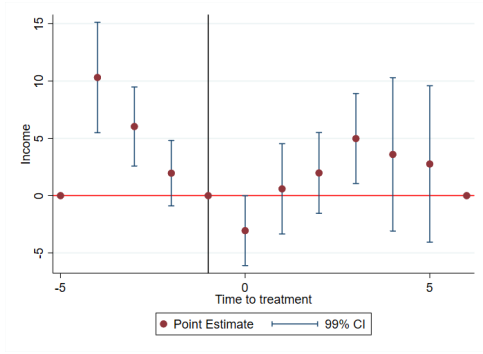


(b) Gothenburg

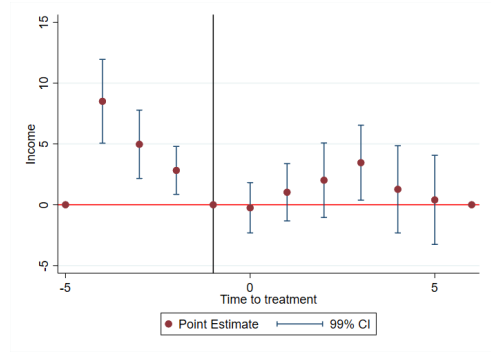


(c) Malmö

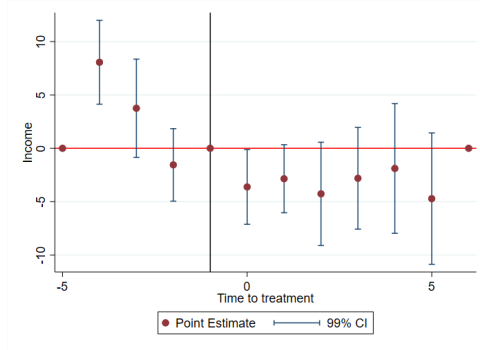
Figure E.2: Event Study Risk of Moving Out



(a) Stockholm



(b) Gothenburg



(c) Malmö

Figure E.3: Event Study Net Income