Health and Financial Literacy: Does the socioeconomic status of the city affect the volume of requests for municipal tax discounts?

Yuval Arbel,[1*] Israel Rachevski,[2] Yeela S. Kerner,[3] Miriam Kerner[4],[5]

[1] Western Galilee College, Sir Harry Salomon School of Economics and Management. Email1: YuvalAr@wgalil.ac.il; Email2: Yuval.arbel@gmail.com

[2] Western Galilee College, Sir Harry Salomon School of Economics and Management. Email: israelr@wgalil.ac.il

[3] Bar-Ilan University Department of Psychology. Email: yeelasima@gmail.com

[4] Technion, Israel Institute of technology, the Bruce and Ruth Rapoport Faculty of Medicine. Email1: Kerneram@technion.ac.il Email2: Kerneram@netvision.net.il

[5] Emek Medical Center, Department of Dermatology

*Corresponding Author

Abstract

This study examines the correlation between municipal tax discount applications and the socio-economic status (SES) of 28 settlements in northern Israel, utilizing household data from 2011 to 2023. Employing quadratic regression to allow for non-linear relationships, the findings indicate that in settlements with low to medium SES rankings (3-5), municipalities should enhance support and education to improve residents' medical and financial literacy, addressing the underutilization of available benefits. However, these municipalities often face resource constraints that limit their capacity to assist. In contrast, higher SES settlements benefit from residents' increased literacy, facilitating successful applications. The study suggests government intervention, such as engaging student volunteers, to bolster medical literacy and support in lower SES areas, ensuring broader access to rights and services.

Keywords: Financial Literacy; Medical Literacy; Municipal Tax Discounts; Socio Economics Status; Urban and Regional Economics.

Date: February 11, 2026

Acknowledgements: The authors are grateful to Yifat Arbel & Amichai Kerner for helpful comments.

1. Introduction

Health and financial literacy, essential for informed decision-making, significantly affect life outcomes, particularly for marginalized populations. Socioeconomic status (SES) plays a key role, with higher education and income linked to better health and financial outcomes, while lower SES often creates barriers to accessing essential information (Brooks et al., 2012; Shaw et al., 2016; Cohen et al., 2023; CDC, 2024). Individuals from lower-income backgrounds face challenges in health literacy, worsening disparities (Cohen et al., 2023; Hu & Morgan, 2024), and often lack financial literacy, limiting their ability to navigate financial systems and access resources like municipal tax discounts.[1]

In that context, Shemer (1997) found that in Jerusalem, a higher percentage of housing units in West Jerusalem, predominantly inhabited by the higher-SES Jewish population, received municipal tax discounts compared to East Jerusalem, home to the lower-SES Arab population (further discussion on municipal tax collection in Jerusalem can be found in Arbel et al. (2017, 2018, 2019). This disparity may stem from two opposing forces:

On the one hand, the lower a municipality's socioeconomic status, the fewer absolute resources it has per resident, resulting in greater harm to its residents. Specifically, in such situations, the municipality lacks adequate resources to assist with tasks like filling out application forms for municipal tax discounts or exemptions, by employing social workers for instance.

On the other hand, municipalities with higher socioeconomic status tend to have residents with higher levels of medical and financial literacy. This literacy encompasses a range of skills and knowledge, including a clear understanding of their rights, the ability to navigate complex bureaucratic systems, and the competence to apply for various benefits and services. Moreover,

[1] Medical literacy is linked to the comprehension that individuals with chronic illnesses or health conditions may qualify for municipal tax exemptions or discounts.

these individuals are often better equipped to advocate for themselves, effectively challenging decisions or rejections related to their applications. This enhanced capacity not only empowers them to access available resources but also contributes to a more equitable distribution of benefits within the community.

This study aims to examine the relationship between municipal tax discount applications and the socio-economic ranking of settlements. It hypothesizes that higher income and socio-economic status are associated with better utilization of information about health and financial benefits. A distinctive aspect of this research is its use of quadratic regression, which relaxes two assumptions of the linear model: monotonic change and constant slope. The quadratic structure of the model allows for an analysis of which of the two opposing forces prevail: the lack of resources to assist the disadvantaged population or the population's level of medical and financial literacy.

The analysis is based on data from 28 settlements in northern Israel, including household-level information collected from 2011 to 2023. On average, the study examines 336 assets and 73 discount applications per settlement. The findings reveal a U-shaped relationship between the number of discount applications and the settlements' SES. This trend is further supported by curve fitting, where the dependent variable is the percentage of discount applications relative to the number of real estate assets in each settlement.

The remainder of this article is structured as follows: Section 2 presents the descriptive statistics of the variables used in the empirical model. Section 3 outlines the methodology, including the empirical models, while Section 4 discusses the estimation results. Section 5 offers a robustness test, and the final section concludes with a summary.

2. Descriptive Statistics

Table 1 summarizes the descriptive statistics for the variables used in the empirical model. The dataset includes 349 observations from 28 settlements in northern Israel from Mate Asher regional municipality between 2011 and 2023. The dependent variable, "Count Applicants," indicates the number of applications for municipal tax discounts, with an average of 73 applications and a standard deviation of 34. The number of applications ranges from a minimum of 2 to a maximum of 172.

The spatial description of Mate Asher municipality is given in Appendix Figures A1-A3.

- **Figure A1**: Mate Asher – Location in Israel

  This map provides a national-level view of Mate Asher Municipality's geographic placement within Israel, helping contextualize its regional significance in the northern part of the country.

- **Figure A2**: 3D Topographical-style Map of Mate Asher Municipality

  This map presents the terrain and elevation features of Mate Asher using a simulated 3D topographic style. It highlights the physical landscape that influences settlement patterns, infrastructure development, and municipal planning.

- **Figure A3**: 3D Historical Development Map of Mate Asher Municipality with Integrated Geographic Coordinates

  This map illustrates the spatial expansion of settlements within Mate Asher from 1950 to 2023, overlaid on a simulated terrain. The geographic axes reflect the actual latitude (32.9963° N) and longitude (35.1511° E), providing spatial context relevant to the study's analysis of socioeconomic patterns and municipal tax discount dynamics.

Returning to Table 1, regarding the total number of real estate assets ("Count Real Estate"), the sample mean is 336, with a standard deviation of 145. The minimum and maximum values are 53 and 931, respectively. Additionally, the ratio of "Count Applicants" to "Count Real Estate" reveals that, on average, 22.15% of asset owners applied for a municipal discount, with a standard deviation of 8.15%. This ratio ranges from a minimum of 2.33% to a maximum of 44.64%.

Figure 1 illustrates the histogram of CLUSTER2021, depicting the Socioeconomic Status (SES) ranking of a settlement on a scale from 1 (lowest) to 10 (highest). The median and modal is 7.00, while the mean is 6.91, with a skewness of −1.765844, indicating a left-tailed distribution. A normality test strongly rejects the null hypothesis of a normal distribution, as the calculated adjusted Chi-square value of 96.49 significantly exceeds the 1% critical Chi-square value of 9.21 for two degrees of freedom, considering both skewness and kurtosis.

3. Methodology

Consider the following model:

$$Count\ Applicants = \alpha_1 CLUSTER2021\_sq + \alpha_2 CLUSTER2021 + \alpha_3 Count\ Real\ Estate + \\ + \alpha_4 (Year - 2011) + \alpha_5 + \mu \qquad (1)$$

Where $Count\ Applicants$ is the dependent variable, $CLUSTER2021\_sq$, $CLUSTER2021$, $Count\ Real\ Estate$ and $(Year - 2011)$ are the independent variables, $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$ are parameters and μ_1 is the random disturbance term.

Poisson regression is employed to model the counts of an event's occurrences (e.g., Wooldridge, 2009: 595–600). Applications of the Poisson distribution include diverse events such as the pattern of hits by buzz bombs launched on London during World War II (Clarke 1946), the

number of soldiers killed by horse kicks in the Prussian army (Von Bortkiewicz 1898), and telephone calls resulting in a wrong number (Thorndike 1926). It has also been used to model disease incidence, most commonly over time but sometimes in spatial contexts.

An alternative form of the empirical model is represented by the following equation:

$$Percent = \beta_1 CLUSTER2021\_sq + \beta_2 CLUSTER2021 + \beta_3(Year - 2011) + \beta_4 + \mu_2 \quad (2)$$

In this equation, $Percent$ serves as the dependent variable, while $CLUSTER2021\_sq$, $CLUSTER2021$,and $(Year - 2011)$ are the independent variables. The coefficients $\beta_1, \beta_2, \beta_3, \beta_4$ are parameters, and μ_2 represents the random disturbance term. Since Percent is defined as the ratio of Count Applicants to Count Real Estate, incorporating Count Real Estate as an independent variable becomes unnecessary, unlike in equation (1).

According to Chiang and Wainwright (2005, pp. 229-231), the general form of a quadratic function is $y = ax^2 + bx + c$, where $(a \neq 0)$, and its second derivative is $2a$. Since this second derivative always has the same sign as the coefficient a, the function forms a U-shaped curve with a global minimum at $(\frac{-b}{2a}, \frac{-b^2+4ac}{4a})$ when a > 0, and an inverted U-shaped curve with a global maximum at the same point when a < 0.

In this study, y represents the number of discount applicants $(Count\ Applicants)$ in equation (1) and $Percent$ in equation (2); x^2corresponds to $CLUSTER2021\_sq$, and x represents $CLUSTER2021$, with coefficients $a = \alpha_1$; $b = \alpha_2$ and $c = \alpha_5$ (equation (1)) and $a = \beta_1$; $b = \beta_2$ and $c = \beta_4$ (equation (2)). Compared to the linear model, the quadratic model captures more complex relationships. Since an increase in applications is expected with the socioeconomic status (SES) of the settlement, the quadratic model offers flexibility by not assuming a strictly monotonic relationship between SES and the number of applications.

Finally, note that the variable $(Year - 2011) = 0,1,2,\cdots,12$ in equations (1) and (2) captures the linear time trend of the discount applications. To relax the linearity assumption and permit non-linear relationships, an alternative version of the empirical models replaces $(Year - 2011)$ with dummy variables $DUM\_Year2011, DUM\_Year2012; \cdots; DUM\_Year2023$ where each dummy variable equals 1 if $(Year - 2011) = 0,1,2,\cdots,12$ and zero otherwise.

4. Results

Table 2 presents the outcomes derived from Poisson regression analyses. Column (1) displays the outcomes based on equation (1), while Column (2) presents the results when the variable $(Year - 2011)$ is substituted with dummy variables $DUM\_Year2011, DUM\_Year2012; \cdots; DUM\_Year2023$. All coefficients have been exponentiated, and robust *p*-values are provided in parentheses.

As is evident from the Table, the baseline number of projected discount applications is 40-41, where each additional real-estate property is expected to raise the number of discount applications by 0.2% (p<0.01). Consequently, with the sample mean of 336 real estate properties, the anticipated growth rate with respect to the baseline is 95.68% and the anticipated number of discount applications is 80.[2] Moreover, based on the estimation outcomes derived from equation (1), the number of applications is projected to increase annually by 1.2% (p=0.0146). Given the sample mean duration of 6.21 years, this suggests a cumulative increase over the period by

[2] The calculation is $1.002^{336} - 1 = 95.68\%$ and $41 \times 1.002^{336} = 80.23$.

7.689%.[3] Combining the two effects, namely the average number yields an expected number of 86 discount applications.[4]

Figure 2 illustrates the projected number of discount applications relative to the socio-economic status (SES) of the settlement. This visualization is derived from the data presented in column (2) of Table 2. The graph reveals a U-shaped trend, with the expected number of applications decreasing from 71 at SES 3 to a low of 67 at SES 5, and then increasing to a peak of 88 at SES 9. The U-shaped curve fit is corroborated by the data presented in Table 2, where the *p*-values for the coefficients of CLUSTER2021_sq and CLUSTER2021 range from 0.00832 to 0.00951 and from 0.0298 to 0.0324, respectively.

The findings can be seen as the result of two opposing forces. On one hand, as socioeconomic status (SES) rankings rise, municipalities show a declining willingness to assist individuals—whether by informing them of their rights or helping with application processes. On the other hand, higher SES levels are associated with improved medical and financial literacy. The latter force encompasses three key components: 1) awareness of one's rights (e.g., eligibility for property tax discounts), 2) the capability to exercise those rights (e.g., submitting an application), and 3) the ability to defend those rights if the municipality rejects the application for technical reasons.

Interestingly, Shemer (2017) revealed that 39% of housing units in West Jerusalem, predominantly inhabited by the Jewish population, received municipal tax discounts, compared to only 26% in East Jerusalem, predominantly inhabited by the Arab population.[5] This disparity may

[3] The calculation is $1.012^{6.21} - 1 = 7.689\%$

[4] The calculation is $41 \times 1.002^{336} \times 1.012^{6.21} = 86.4$

[5] For an analysis of the disparity between West and East Jerusalem, see, for example, Alperovich and Deutsch (1996). Further discussion on municipal taxation in Jerusalem can be found in Arbel et al. (2017, 2018, 2019).

reflect information gaps between the two geographic areas. In that context, the Affirmative Fair Housing Marketing Plan (AFHMP) in the United States aims to ensure that individuals with similar income levels in a given housing market have equitable access to a comparable range of housing options, regardless of race, religion, color, national origin, sex, disability, or familial status. The primary responsibility of a real estate agent is to provide potential buyers with information about available properties and facilitate their physical access to those homes. However, Galster and Ross (2007) found no evidence linking reductions in sales market discrimination to fair housing enforcement activities, indicating that real estate agents may not have felt compelled to conceal discriminatory practices.

5. Robustness Test

To assess the robustness of the results, Table 3 presents findings where the dependent variable is substituted with *Percent*—defined as the ratio of the number of applications to the number of assets in each settlement. Column (1) utilizes the empirical model specified by equation (2), which incorporates a linear time variable. Column (2) applies the full model, which accounts for a non-linear time trend by including time dummy variables. Lastly, Column (3) provides the stepwise estimation of the full model from Column (2), systematically excluding variables with insignificant coefficients based on a 5% significance threshold (e.g., Wooldridge, 2009: 678).

According to Table 3, the baseline projected *Percent* variable ranges from 30.1% (p=1.96×10^{-8}) to 31.8% (p=1.75×10^{-10}). This suggests that, in the baseline year (2011), the expected percentage of discount applications relative to the total number of assets in a settlement with the lowest socio-economic status, graded as zero, falls between 30.1% and 31.8%. When a linear time trend is applied, the projected annual growth in discount applications is 0.261% (p = 0.0259). However, when time dummy variables are included, the findings indicate a projected

increase of 3.06% (p = 0.0436) to 4.97% (p = 0.0327) in 2021 and 4.02% (p = 0.0893) in 2022 compared to the baseline year of 2011. This period coincides with the tail end of the COVID-19 pandemic, which may explain the rise in discount applications. Finally, as shown in the calculation at the bottom of the table, the minimum percentage of applications occurs at SES = 5, ranging from 18.04% to 20% of the total number of assets in 2011.

Figure 3 depicts the projected *Percent* variable, defined as the ratio of discount applications to the number of assets, in relation to the socio-economic status (SES) of the settlement. Derived from the data in column (3) of Table 2, once again the graph demonstrates a U-shaped trend. The Percent variable decreases from 22.42% at SES 3 to a minimum of 20.28% at SES 5 before rising to a maximum of 26.26% at SES 9. This U-shaped relationship is further supported by the data in Table 3, where the p-values for the coefficients of CLUSTER2021_sq and CLUSTER2021 range from 0.00362 to 0.00388 and from 0.00814 to 0.00905, respectively.

6. Discussion

The findings of this study reveal a nuanced, U-shaped relationship between the socioeconomic status (SES) of settlements and the volume of municipal tax discount applications. This pattern suggests that both low- and high-SES areas exhibit higher application rates, albeit for different reasons. In low-SES settlements, the need for financial relief is more acute, yet institutional support is often lacking. In contrast, high-SES areas benefit from residents' greater financial and health literacy, enabling them to navigate bureaucratic systems more effectively.

This dual dynamic highlight a critical policy gap: mid-SES settlements may be underserved, lacking both sufficient municipal resources and resident capacity to access available benefits. These insights underscore the importance of targeted interventions that consider both structural and individual-level barriers to benefit utilization.

Importantly, the issue of equitable access to municipal services is not confined to Israel. Globally, urbanization is accelerating, and informal settlements are expanding, particularly in developing regions. These areas often lack formal infrastructure, legal recognition, and access to public services, including tax relief programs. The challenges identified in this study—limited literacy, bureaucratic complexity, and resource constraints—are magnified in informal contexts, making this research highly relevant to international urban policy discussions.

Future research should explore how these dynamics manifest in informal settlements, where the absence of formal governance structures may exacerbate disparities in access to financial and health-related benefits. Comparative studies across countries or regions could help determine whether the U-shaped relationship observed here is context-specific or indicative of broader socioeconomic patterns. Additionally, qualitative research could provide deeper insights into residents' experiences and perceptions, complementing the quantitative findings presented in this study.

Finally, evaluating the effectiveness of policy interventions—such as digital platforms, community outreach, or volunteer-based assistance programs—could offer practical solutions to improve benefit accessibility. As urban populations continue to grow and diversify, ensuring equitable access to municipal services will remain a pressing challenge for policymakers worldwide.

Relevant literature supports these observations. For example, UN-Habitat (2020) highlights the rapid growth of informal settlements and the need for inclusive urban planning. Studies such as Mitlin and Satterthwaite (2013) emphasize the importance of community-driven approaches in addressing urban poverty. Moreover, research by Lall, Henderson, and Venables

(2017) discusses the role of infrastructure and governance in shaping urban development outcomes.

Building on the socioeconomic findings of this study, it is essential to consider how municipal tax policies intersect with broader territorial and legal dynamics in Israel. Scholars Sandy Kedar and Oren Yiftachel have extensively documented how land use, planning, and legal frameworks have historically served as tools for spatial control and ethno-national stratification. In *Emptied Lands* (Amara, Kedar, & Yiftachel, 2018), the authors explore how Bedouin communities in the Negev have been systematically dispossessed through legal and planning mechanisms. Similarly, in *Between Rights and Denials* (Roded, Yiftachel, & Kedar, 2016), they argue that Bedouin indigeneity is often denied through bureaucratic and legal structures that prioritize Jewish settlement expansion. These insights suggest that municipal tax discounts may not only reflect socioeconomic disparities but also reinforce patterns of territorial exclusion and privilege.

Kedar and Yiftachel's earlier work (2000) on agricultural land policy highlights how historical and legal processes have shaped land distribution in Israel, often favoring Jewish populations in rural and peri-urban areas. Kedar (2014) emphasizes the role of legal geography in expanding state control over space, while Yiftachel (1995) frames planning as a form of political control in deeply divided societies. These frameworks are crucial for understanding how municipal governance—including tax relief—can perpetuate spatial inequalities. In this context, the concept of "ethnocracy" (Yiftachel, 2006) becomes particularly relevant, as it describes a regime where state institutions, including municipal bodies, systematically prioritize one ethnic group's interests. Thus, the patterns observed in this study may be part of a larger territorial logic that governs access to municipal benefits and services.

Beyond the socioeconomic dynamics explored in this study, the findings resonate with broader debates in settler municipal politics, particularly in the context of territorial governance and resource allocation. Scholars such as Sandy Kedar and Oren Yiftachel have emphasized how planning policies and municipal practices in Israel often serve as instruments of territorial transformation, reinforcing ethno-national hierarchies and spatial segregation. Kedar (2016) argues, "land law has been a central tool" in Israel, while Yiftachel (2006) describes the Israeli planning system as "ethnocratic," systematical settlements. In peri-urban and rural areas, municipal tax policies—including discounts and exemptions—can reflect and reinforce these dynamics. In our case study of northern Israel, while the analysis focuses on socioeconomic status, it is important to recognize that the distribution of municipal resources, including tax relief, may also be shaped by political considerations related to settlement type, demographic composition, and strategic planning priorities. For example, some settlements may receive preferential treatment due to their alignment with national settlement agendas, while others—particularly Arab or mixed communities—may face systemic underinvestment. This intersection of socioeconomic and political factors suggests that municipal tax discount patterns are not merely a reflection of literacy or need, but also of broader territorial logics embedded in Israeli planning and governance structures.

7. Summary and Conclusions

The objective of this study is to reveal the relationship between discount applications to municipal tax and the socio-economic ranking of the settlements. One would anticipate a better exploitation of information regarding health and financial benefits following a higher level of income and socio-economic status. A unique feature of this study is the use of the quadratic

regression. This methodology relaxes two assumptions associated with the linear model: 1) the monotonic change and 2) constant slope.

The study is based on information collected from 28 settlements located in northern Israel, encompassing household-level information gathered between 2011 and 2023. On average, it analyzes 336 assets and 73 discount applications. The findings indicate a U-shaped relationship between the number of discount applications and the settlement's SES. This U-shaped trend is further corroborated by a curve fit where the dependent variable is the percentage of discount applications relative to the number of real estate assets in each settlement.

In conclusion, the findings highlight several key points: 1) In cities with low to medium socioeconomic status (SES) rankings (4 and 5), municipalities should actively provide support and education to enhance medical and financial literacy, thereby addressing the market failure associated with unutilized rights. 2) In cities with low SES rankings (3-5), municipalities face diminishing capacity to assist due to limited resources, such as a reduced need for social workers. Conversely, cities with higher SES rankings demonstrate that improved financial and medical literacy significantly enhances residents' ability to complete applications. Therefore, government intervention is essential to promote medical literacy in low-SES cities. One effective approach could be leveraging student volunteers to assist residents in completing applications, ensuring broader access to rights and services.

In this context, the urban economics literature highlights the conflict of interest between local and federal governments (e.g., White, 1986; Mills & Hamilton, 1994; McDonald & McMillen, 2011). While local governments focus primarily on the residents within their jurisdictions, federal governments are expected to address the needs of the entire population at the state or national level.

8. Abbreviations

SES=Socioeconomic Status

9. Declarations

- **Ethical Approval**: Not Applicable. This research does not require an IRB approval since it does not involve any experiment or manipulation of subjects.
- **Consent to Participate**: Not applicable. Each row in the dataset used in the study contains information about a different settlement.
- **Consent to Publish**: Not Applicable. Not applicable. Each row in the dataset used in the study contains information about a different settlement.
- **Authors Contributions:**

  Yuval Arbel contributed to the study conception and design, data collection and analysis, the first draft and comments on previous versions of the manuscript.

  Israel Rachevski contributed to the study conception and design, data collection and analysis, the first draft and comments on previous versions of the manuscript.

  Yeela S. Kerner contributed to the study conception and design, data collection and analysis, the first draft and comments on previous versions of the manuscript.

  Miryam Kerner contributed to the study conception and design, data collection and analysis, the first draft and comments on previous versions of the manuscript.
- **Funding**: None of the authors received any direct or indirect funding for this manuscript.
- **Competing Interests**: None of the authors have potential conflicts of interest, financially or non-financially, directly or indirectly related to this work.
- **Availability of data and materials**: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

10. References

Alperovich, G. & Deutsch J. (1996) Urban structure with two coexisting and almost completely segregated populations: The case of East and West Jerusalem, *Regional Science and Urban Economics*, 26 (2): 171-187. Available at: https://doi.org/10.1016/0166-0462(95)02124-8

Amara, A., Kedar, A., & Yiftachel, O. (2018). *Emptied lands: A legal geography of Bedouin rights in the Negev*. Stanford University Press. https://cris.bgu.ac.il/en/publications/emptied-lands-a-legal-geography-of-bedouin-rights-in-the-negev

Arbel, Y., Fialkoff, C., & Kerner, A. (2017) Removal of renter's illusion: Property tax compliance among renters and owner-occupiers, Regional Science and Urban Economics, 66: 150-174. Available at: https://doi.org/10.1016/j.regsciurbeco.2017.05.008

Arbel, Y., Fialkoff, C., & Kerner, A. (2018). Public policy for reducing tax evasion: implications of the Yule–Simpson paradox. *Applied Economics Letters*, *26*(13), 1092–1099. Available at: https://doi.org/10.1080/13504851.2018.1537471

Arbel, Y., Fialkoff, C., & Kerner, A. (2019). Can the Laffer curve become a policy tool for reducing tax evasion? Stratification of property tax collection by land use, Journal of Urban Management, 8(1): 57-74, Available at: https://doi.org/10.1016/j.jum.2018.09.001.

Brooks L. Yosh Halberstam & Justin Phillips (2012) Spending within Limits: Evidence from Municipal Fiscal Restraints. *The Federal Reserve Board*, available at: FRB: Finance and Economics Discussion Series: Screen Reader Version - Spending within Limits: Evidence from Municipal Fiscal Restraints *

Cameron, A. C., and Trivedi, P. K. (2013). *Regression Analysis of Count Data*. 2nd ed. New York: Cambridge University Press.

Center for Disease Control and Prevention (CDC), Division of Heart Disease and Stroke Prevention. Socio Economics Factors (Last updated in May 2024). Available at: Socioeconomic Factors | CDC

Center for Disease Control and Prevention, Preventing Chronic Disease. Chronic Disease Disparities by County Economic Status and Metropolitan Classification, Behavioral Risk Factor Surveillance System, 2013 (Last updated in May 2019). Available at: Chronic Disease Disparities by County Economic Status and Metropolitan Classification, Behavioral Risk Factor Surveillance System, 2013

Chiang A, Wainwright K (2005) *Fundamental Methods of Mathematical Econ*omics (Fourth Edition edition). McGraw Hills

Clarke, R. D. (1946). An application of the Poisson distribution. *Journal of the Institute of Actuaries* 72: 481.

Cohen, S.A., Nash, C.C., Byrne, E.N. *et al.* Income and rural–urban status moderate the association between income inequality and life expectancy in US census tracts. *Journal of Health, Population and Nutrition* **42**, 24 (2023). https://doi.org/10.1186/s41043-023-00366-6

Galster, George, and Stephen L. Ross. 2007. Fair Housing Enforcement and Changes in Discrimination between 1989 and 2000. In Fragile Rights within Cities: Government, Housing, and Fairness, Ed. J. Goering. Lanham, MD: Rowman & Littlefield.

Hu, E.H. and Paul L. Morgan, P.L. (2024). Explaining Achievement Gaps: The Role of Socioeconomic Factors. Washington D.C.: Thomas B. Fordham Institute. Available at: Explaining Achievement Gaps: The Role of Socioeconomic Factors

Kedar, A. (2014). Introduction. In A. Kedar, A. Akbar, & I. Braverman (Eds.), *The expanding spaces of law: A timely legal geography* (pp. 1–20). Stanford University Press. https://www.sup.org/books/title/?id=21038

Kedar, A. (2016). Dignity takings and dispossession in Israel. *Law & Social Inquiry*, 41(4), 866–887. https://doi.org/10.1111/lsi.12191

Kedar, A., & Yiftachel, O. (2000). The agricultural land in Israel toward the end of the millennium: Historical, legal and social aspects. In *[Edited volume on distributive justice]*. https://www.researchgate.net/profile/Oren-Yiftachel

Lall, S. V., Henderson, J. V., & Venables, A. J. (2017). Africa's Cities: Opening Doors to the World. World Bank Publications. https://openknowledge.worldbank.org/server/api/core/bitstreams/0eca07e8-d7e8-5b57-a041-f3f016efb612/content

McDonald J.F. & McMillen D. P. (2011) *Urban Economics and Real Estate*: *Theory and Policy* John Wiley & Sons Incorporated. Printed in the United States of America.

Mills E. & Hamilton B. (1994). *Urban Economics*, Fifth Edition. A Pearson Education Company, Upper Saddle River, NJ 07458. Printed in the United States of America.

Mitlin, D., & Satterthwaite, D. (2013). Urban Poverty in the Global South. Routledge. https://books.google.co.il/books/about/Urban_Poverty_in_the_Global_South.html?id=pZfr6wOczb4C&redir_esc=y

Roded, B., Yiftachel, O., & Kedar, A. (2016). Between rights and denials: Bedouin indigeneity in the Negev/Naqab. *Environment and Planning A*, 48(11), 2129–2148. https://www.researchgate.net/publication/305517773_Between_rights_and_denials_Bedouin_indigeneity_in_the_NegevNaqab

Ross, S. L. (2008). Understanding racial segregation: What is known about the effect of housing discrimination. *Economics Working Papers*, *200815*. Available at: https://www.degruyter.com/document/doi/10.9783/9780812200089.288/pdf?licenseType=restricted

Shaw KM, Theis KA, Self-Brown S, Roblin DW, Barker L. (2016) Chronic Disease Disparities by County Economic Status and Metropolitan Classification, Behavioral Risk Factor Surveillance System, 2013. *Preventive Chronic Disease* 2016;13:160088. Available at: http://dx.doi.org/10.5888/pcd13.160088

Shemer D. (2017). Fight for Your Right (To Pay Tax). Jerusalem Institute for Policy Research, Available at: https://jerusaleminstitute.org.il/en/blog/fight-for-your-right-to-pay-tax/ (Last accessed on November 18, 2024).

Thorndike, F. (1926). Applications of Poisson's probability summation. Bell System Technical Journal 5: 604–624.

UN-Habitat. (2020). World Cities Report 2020: The Value of Sustainable Urbanization. Available at: https://unhabitat.org/wcr/2020/

Von Bortkiewicz, L. (1898). Das Gesetz der Kleinen Zahlen. Leipzig: Teubner

White, M. J. (1986). Property taxes and urban housing abandonment. *Journal of Urban economics*, *20*(3), 312-330.

Wooldridge, J.M. (2009) *Introductory Econometrics: A Modern Approach*. Southwestern CENGAGE Learning. Printed in Canada.

Yiftachel, O. (1995). Planning as control: Policy and resistance in deeply divided societies. *Progress in Planning*, 44(2), 115–184. https://doi.org/10.1016/0305-9006(95)00014-5

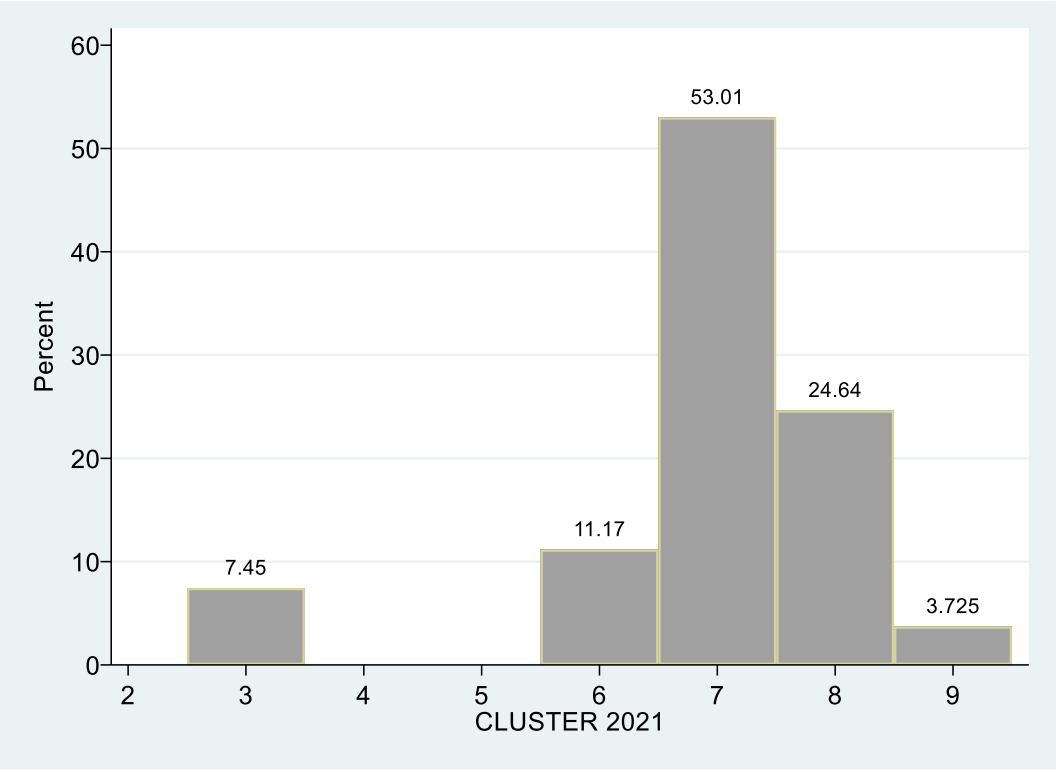
Yiftachel, O. (2006). *Ethnocracy: Land and the politics of identity Israel/Palestine*. University of Pennsylvania Press. https://www.upenn.edu/pennpress/book/14183.html

Table 1: Descriptive Statistics

Variable	Description	Mean	Std.	Min	Max
Count Applicants	Number of Application for Municipal Tax Discounts	73	34	2	172
Count Real Estate	Number of Real Estate Assets	336	145	53	931
Percent	Count Applicants ÷ Count Real Estate	0.2215	0.0815	0.0233	0.4464
CLUSTER 2021	SES Ranking of a settlement on a scale of between 1 (the lowest) to 10 (the highest)	6.91	1.30	3	9
$(Year - 2011)$	$0,1,2,\cdots,12$ for $Year = 2011,2012,2013,\cdots,2023$	6.21	3.68	0	12

Notes: The sample refers to 349 observations and 28 settlements in the northern part of Israel spanning from 2011 to 2023.

Figure 1: Histogram of CLUSTER2021



Notes: The graph displays the histogram of the SES rankings of the settlements. The median and modal is 7.00, while the mean is 6.91, with a skewness of −1.765844, indicating a left-tailed distribution. A normality test strongly rejects the null hypothesis of a normal distribution, as the calculated adjusted Chi-square value of 96.49 significantly exceeds the 1% critical Chi-square value of 9.21 for two degrees of freedom, considering both skewness and kurtosis.

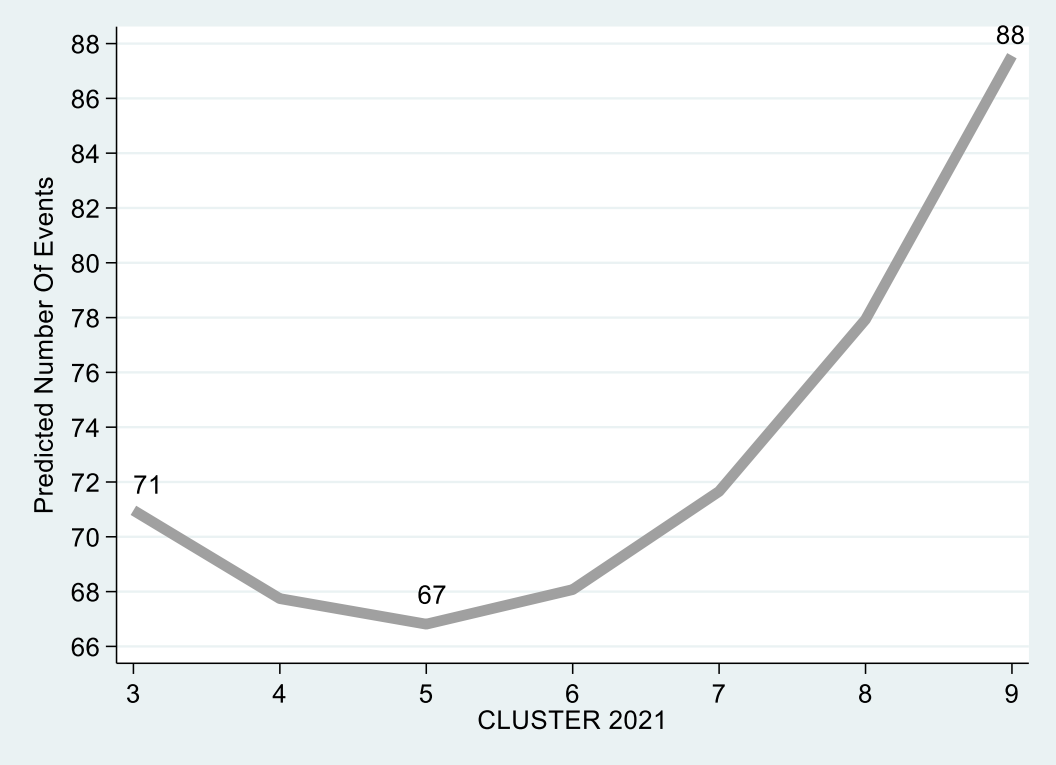
Table 2: Poisson Regressions

VARIABLES	(1) count applicants	(2) count applicants
CLUSTER 2021 square	1.016***	1.016***
	(0.00951)	(0.00832)
CLUSTER 2021	0.851**	0.852**
	(0.0324)	(0.0298)
count real-estate properties	1.002***	1.002***
	(<0.01)	(<0.01)
(Year−2011)	1.012**	–
	(0.0146)	–
Dum Year 2012	–	1.002
	–	(0.986)
Dum Year 2013	–	1.048
	–	(0.605)
Dum Year 2014	–	1.079
	–	(0.403)
Dum Year 2015	–	1.110
	–	(0.265)
Dum Year 2016	–	1.112
	–	(0.262)
Dum Year 2017	–	1.114
	–	(0.254)
Dum Year 2018	–	1.061
	–	(0.529)
Dum Year 2019	–	1.094
	–	(0.342)
Dum Year 2020	–	1.135
	–	(0.174)
Dum Year 2021	–	1.250**
	–	(0.0146)
Dum Year 2022	–	1.191*
	–	(0.0654)
Dum Year 2023	–	1.100
	–	(0.350)
Constant	41.45***	40.03***
	(<0.01)	(<0.01)
Observations	349	349
Pseudo R-Square	0.384	0.389
LR-Chi2	251	327.1

VARIABLES	(1) count applicants	(2) count applicants
d.f.	4	15

Notes: The coefficients of the variables are presented in their exponentiated form. Robust P-Values are given in parentheses. *p<0.1; **p<0.05; ***p<0.01

Figure 2: Anticipated Number of Discount Applicants vs. Socio-economic Ranking



Notes: Based on the outcomes obtained from Column (2) in Table 2 at the sample mean. Clusters 4 and 5 are out of sample.

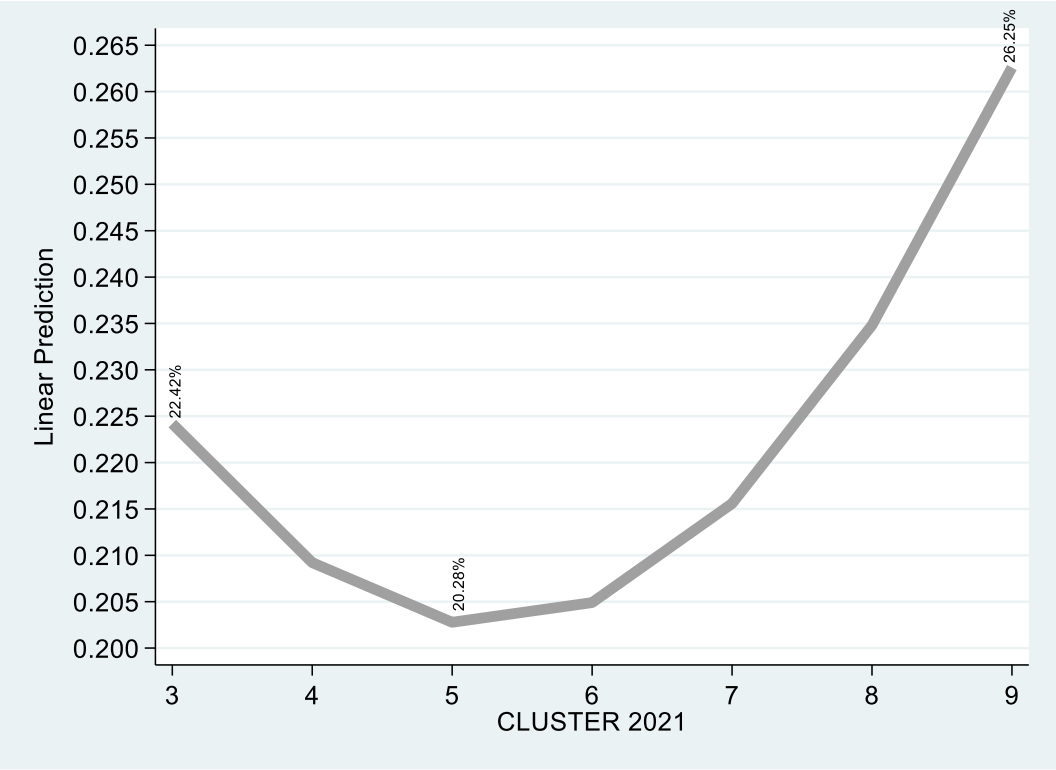
Table 3: Regression Analysis

	(1)	(2)	(3)
VARIABLES	Full Model Percent	Full Model Percent	Stepwise Model Percent
CLUSTER 2021 square	0.00431***	0.00433***	0.00428***
	(0.00362)	(0.00388)	(0.00371)
CLUSTER 2021	–0.0454***	–0.0457***	–0.0449***
	(0.00814)	(0.00856)	(0.00905)
(Year–2011)	0.00261**	–	–
	(0.0259)	–	–
Dum Year 2012	–	0.00691	–
	–	(0.781)	–
Dum Year 2013	–	0.0170	–
	–	(0.467)	–
Dum Year 2014	–	0.0195	–
	–	(0.403)	–
Dum Year 2015	–	0.0225	–
	–	(0.347)	–
Dum Year 2016	–	0.0185	–
	–	(0.444)	–
Dum Year 2017	–	0.0181	–
	–	(0.455)	–
Dum Year 2018	–	0.00799	–
	–	(0.735)	–
Dum Year 2019	–	0.0154	–
	–	(0.513)	–
Dum Year 2020	–	0.0260	–
	–	(0.267)	–
Dum Year 2021	–	0.0497**	0.0306**
	–	(0.0327)	(0.0436)
Dum Year 2022	–	0.0402*	–
	–	(0.0893)	–
Dum Year 2023	–	0.0311	–
	–	(0.188)	–
Constant	0.306***	0.301***	0.318***
	(7.15×10^{-10})	(1.96×10^{-8})	(1.75×10^{-10})
Minimum Point			
$\frac{-b}{2a}$	$\frac{-(-0.0454)}{2\times0.00431}=5.26$	$\frac{-(-0.0457)}{2\times0.00433}=5.277$	$\frac{-(-0.0449)}{2\times0.004288}=5.235$
$\frac{-b^2+4ac}{4a}$	$\frac{-(-0.0454)^2+4\times0.00431\times0.306}{4\times0.00431}=$ 0.1864	$\frac{-(-0.0457)^2+4\times0.00433\times0.301}{4\times0.00433}=$ 0.1804	$\frac{-(-0.0449)^2+4\times0.00428\times0.318}{4\times0.00428}=$ 0.20

	(1)	(2)	(3)
VARIABLES	Full Model Percent	Full Model Percent	Stepwise Model Percent
Observations	349	349	349
Cities	28	28	28
F-Value	5.303	1.468	4.942
d.f. numerator	3	14	3
d.f. denominator	345	334	345

Notes: Robust P-Values are given in parentheses. *p<0.1; **p<0.05; ***p<0.01

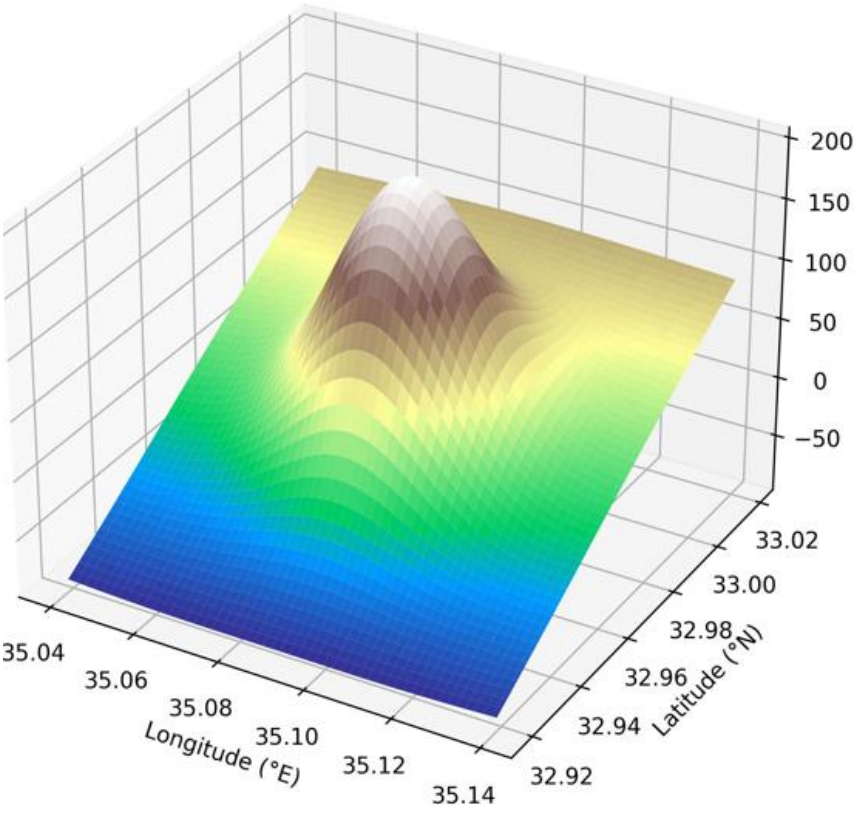
Figure 3 : Percentage of discount applicants in relation to the number of real-estate properties vs. socio-economic ranking



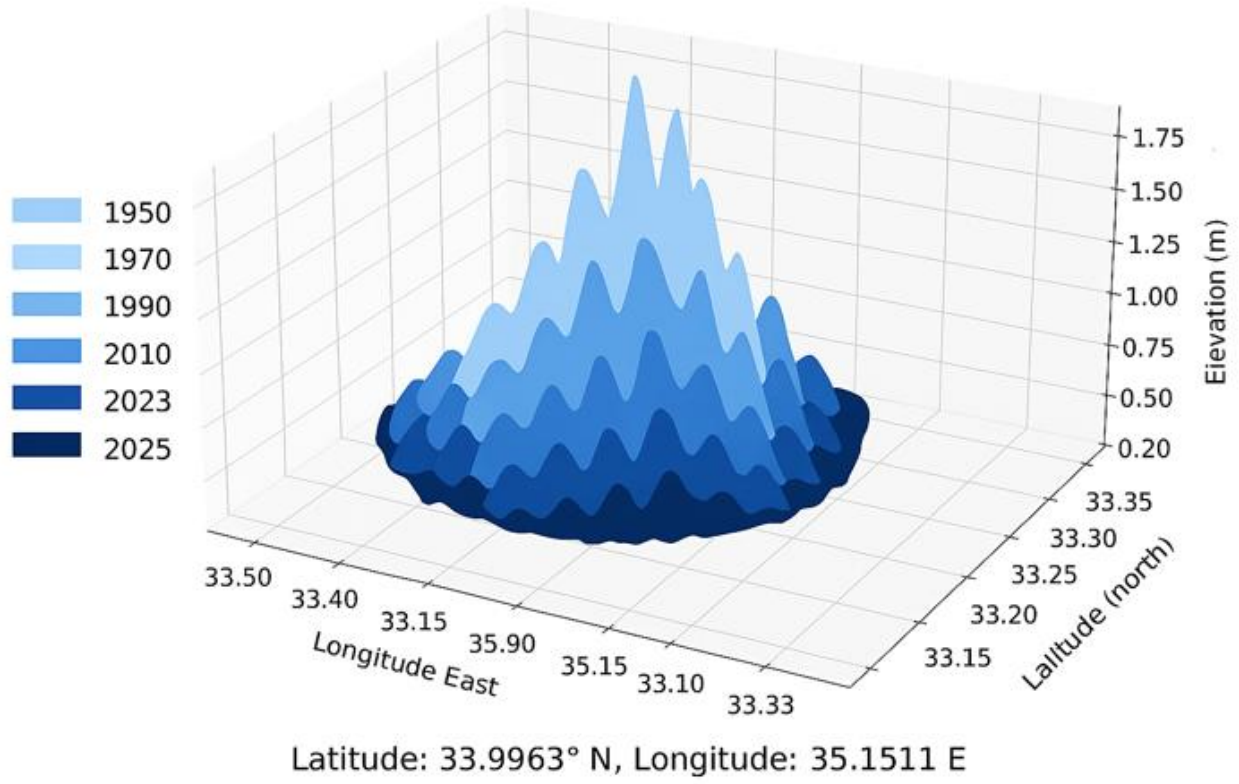
Notes: Based on the outcomes obtained from Column (3) in Table 2. Clusters 4 and 5 (the black dots) are out of sample.

Appendix Figure A1: Mate Asher: Location in Israel

Appendix Figure A2: 3D Topographical-style Map of Mate Asher Municipality



Appendix Figure A3: 3D Historical Development Map of Mate Asher Municipality with Integrated Geographic Coordinates.



This map illustrates the spatial expansion of settlements within Mate Asher from 1950 to 2023, overlaid on a simulated terrain. The geographic axes reflect the actual latitude (32.9963° N) and longitude (35.1511° E), providing spatial context relevant to the study's analysis of socioeconomic patterns.