Comparison of voting behavior based on income in Oulu and Uusimaa major voting areas

Denis Davydov
MAT12005 Dataprojekti
28.09.2020

1. Introduction

Elections are an event that concerns every citizen of the country in some way or another. Because of that political parties' PR efforts and public outreach are heavily data driven. Family status, financial situation, religious upbringing are just some of the more obvious variables that may shape the election strategy of different parties.

This report compares voting results in Uusimaa and Oulu. Furthermore, it explores the relationship between income and voting behavior in those voting areas. Oulu and Uusimaa were chosen based on their rurality index (Taajama-aste) and size. Oulu is statistically significatntly more rural than Uusimaa. This allows for interesting comparisons.

2. Methods

2.1. Data

Data used in this analysis comes from two data sets downloaded from Statistics Finland (Tilastokeskus). First file (income2017.csv) is a tax report for 2017 for each municipal area of Finland. It contains following columns:

Alue, Tulot, Mediaanitulot, Ansiotulot, Pääomatulot, Valtionvero, Kunnallisvero, Verot, Tulot_minus_verot

Variables in this data set are very inter-correlated, making it redundant to do analysis on all of them. Therefore, the analysis will be focused on Median income (Mediaanitulot) as the main variable. Median income is the only variable from this data set that prevents outliers in the data from skewing the results.

The other file (ek2019.csv) contains information on support for different political parties in a given area. Each column is tied to a political party and contains percentage support for it in a given area. Doing analysis for every party present in the ek2019 data set is unnecessary – a lot of smaller parties have no support in many areas. This analysis will be focused on analysis of parties with parliamentary representation. Those are:

Suomen Sosiaalidemokraattinen puolue (SDP), Kansallinen Kokoomus (KOK), Perussuomalaiset (PS), Suomen Keskusta (KESK), Vihreä liitto (VIHR), Vasemmistoliitto (VAS), Suomen ruotsalainen Kansanpuolue (RKP), Suomen Kristillisdemokraatit (KD)

2.2. Statistical methods

Normality was tested for all the variables using Shapiro-Wilk's and visual inspection. Most variables were normally distributed. On graphical inspection all the variables seemed sufficiently normally distributed. The sample are also large enough to reasonably assume normal distribution. The variances of the variables were similar in size. Oulu and Uusimaa voting areas are assumed to be independent groups.

The average support in municipalities for each party was compared between Oulu and Uusimaa major voting areas using t-tests. The average median income was compared between Oulu and Uusimaa major voting areas using a t-test. The support for each party was modeled with ANCOVA to check for interaction between median income and major voting area that has an effect on voting behavior.

3. Findings

The t-tests for the average support in municipalities for each party in Oulu and Uusimaa showed differences between voting behavior. The support was larger in Uusimaa for parties SDP (t = -6.7711, df = 38.759, p-value = 4.561e-08), KOK (t = -6.1452, df = 30.568, p-value = 8.606e-07), VIHR (t = -7.3365, df = 38.267, p-value = 8.31e-09), RKP (t = -4.3976, df = 24.001, p-value = 0.0001922). The support was larger in Oulu for parties PS (t = 3.2488, df = 34.766, p-value = 0.002572), KESK (t = 13.56, df = 49.606, p-value < 2.2e-16), VAS (t = 6.0361, df = 51.548, p-value = 1.738e-07). There was no difference in voting support between Oulu and Uusimaa for the party KD (t = -0.25482, df = 54.556, p-value = 0.7998). The average supports per party are plotted in Figure 1.

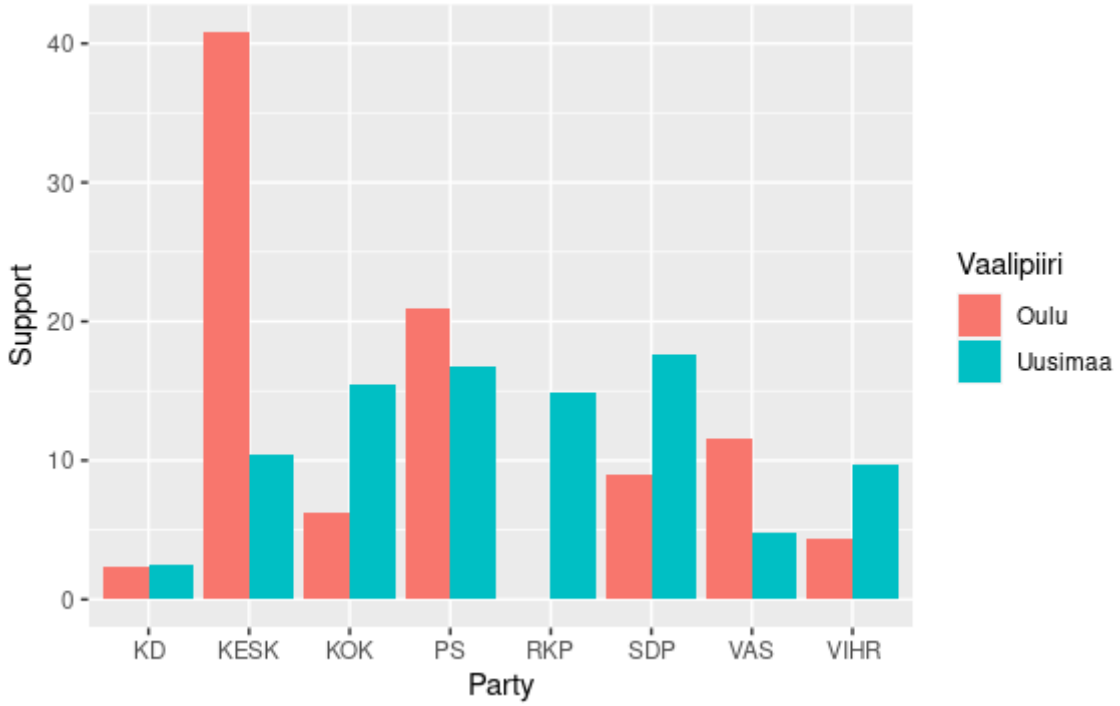

Figure 1: The municipal average support for parties in Oulu and Uusimaa major voting areas.

The t-test for the average median income in municipalities in Oulu and Uusimaa showed a difference (t = -8.3715, df = 43.207, p-value = 1.369e-10). Median income was larger in Uusimaa (Figure 2).

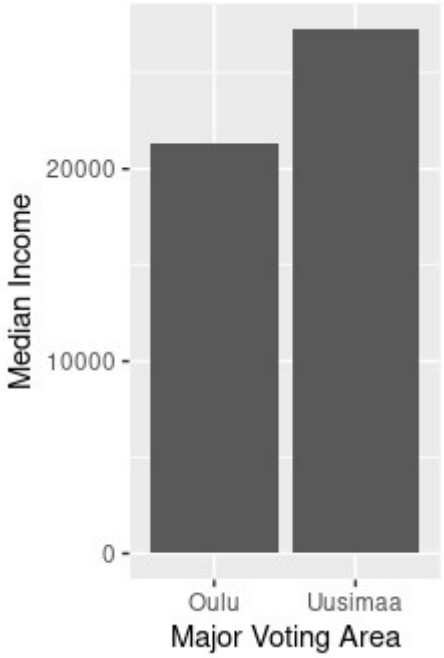

Figure 2: The municipal average median income in the major voting areas.

ANCOVA tests were conducted to investigate the effect of median income, major voting area and their interaction on party support. Median income had a statistically significant effect on support of parties KOK (F(1, 59)=120.726, p=6.711e-16), VIHR (F(1, 59)=34.4985, p=2.095e-07), and KESK (F(1, 59)=17.4513, p=9.869e-05). The interaction between median income and major voting area was significant for parties SDP (F(1, 59)=4.6633, p = 0.03489), and KOK (F(1, 59)=12.662, p = 0.000744). ANCOVA tests were used to model voting behavior for each party. These models are plotted in Figure 3 (below).

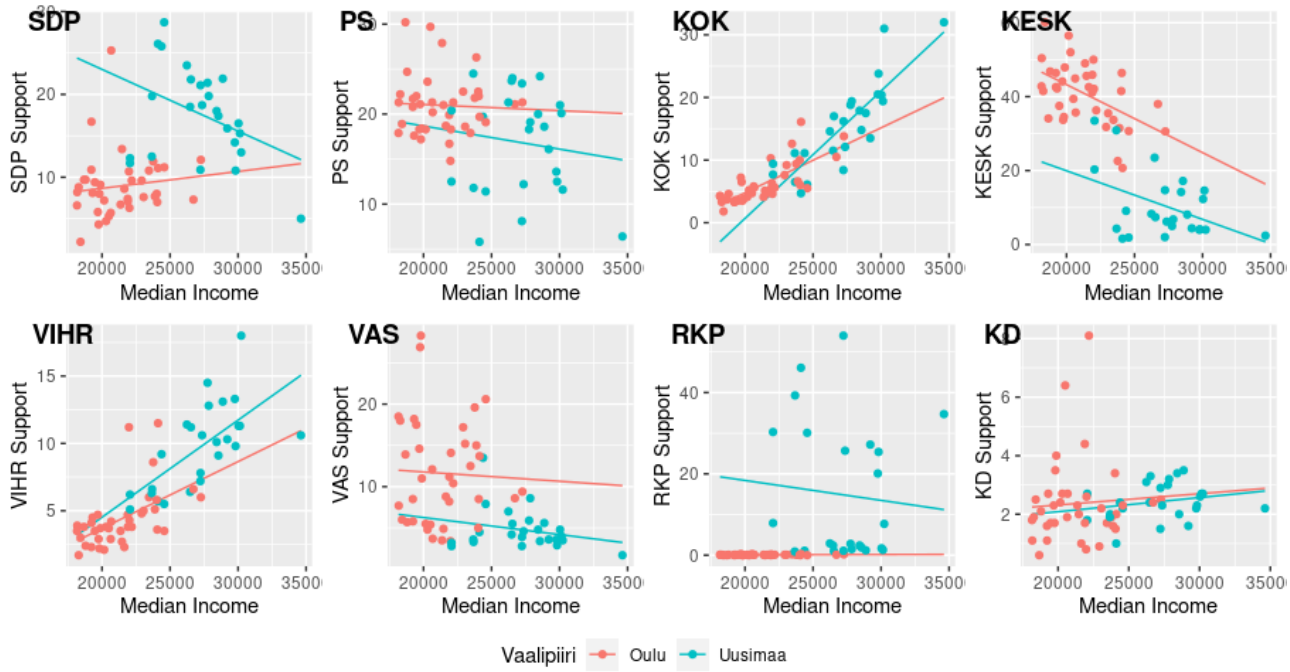

Figure 3: ANCOVA models for the parties with parliamentary representation. The dots represent municipalities in the data set, with (Median income, Support) as coordinates.

4. Discussion

In this report the difference in voting behavior between Oulu and Uusimaa was investigated. SDP, KOK, VIHR and RKP are more supported in municipalities in Uusimaa major voting area. KD shows no statistically significant difference in support between Oulu and Uusimaa.

Median income is larger in Uusimaa than in Oulu on average. According to the models KOK, KESK and VIHR support is significantly affected by the median income. For KESK and VIHR the major voting area has no effect on the relationship between support of these parties and median income. However, the support for KOK is linked with median income in different ways based on the major voting area. The support for KOK grows faster with Median income in Uusimaa.
SDP shows that there is a difference in relationshp between median income and party support based on major voting area. In Uusimaa SDP support is inversely linked to median income. But in Oulu, there is in no observed relationship between median income and support for SDP.

References

Statistics Finland (Tilastokeskus), Election Statistics, Data downloaded on 24 April 2019

Statistics Finland (Tilastokeskus), Taxable income, The data was downloaded on 24 April 2019

Statistics Finland (Tilastokeskus), Kuntien avainluvut, The data was downloaded on 17 September 2020