ECO 102: Topics in Economics
Ecole Polytechnique, Spring 2022
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TD 3 (part 2): Tipping model and segregation indices

In this TD we will review the tipping model with some practice questions. Then we will build segregation indices and understand what factors influence them within cities. As usual, download the folder TD_2_3.zip, write your answers directly in the Tex script and type your Stata commands in a do file.

Exercises

1. The tipping model:

   (a) Explain in words how urban segregation may be driven by demand factors, supply factors, or a combination of both.
   Answer: Demand factors that people want to live with the people they want to live and the supply factor is the limitation of housing resources.

   (b) Graph the Schelling model for: 61 Whites $i \in [|0, 60|]$ and 41 Blacks $j \in [|0, 40|]$ who contemplate living in a city and whose tolerance level of the other kind is defined by $T_i^W = 1 - i/60$ for Whites and by $T_j^B = 5 - j/8$ for Blacks and use your graph to explain the segregation paradox in this model.
   Answer:

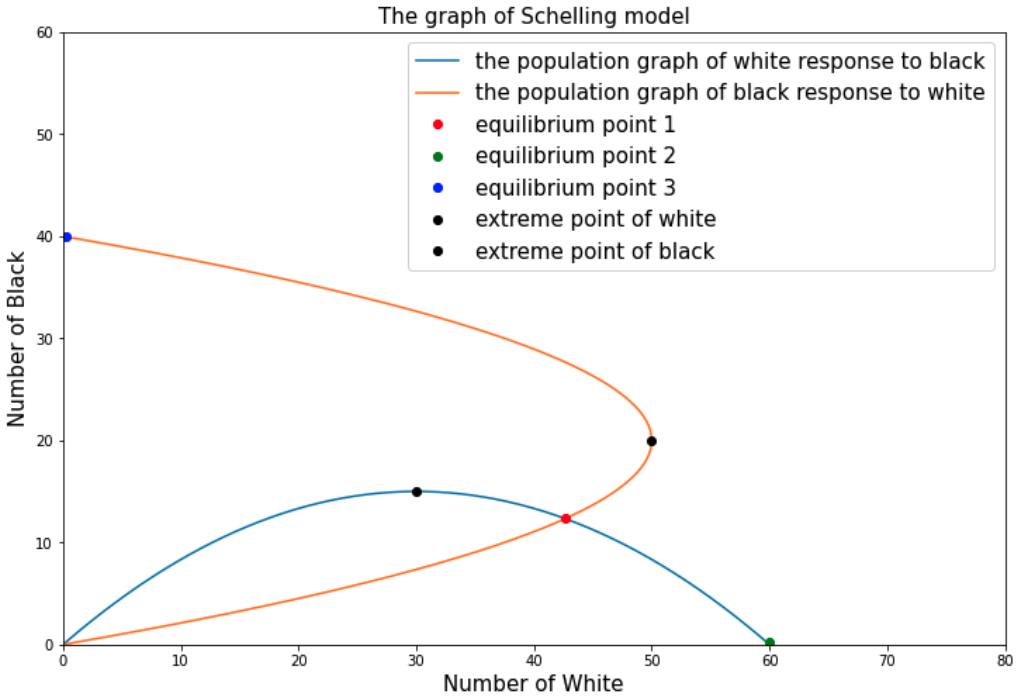

Figure 1: The graph of Schelling model

we fisrt compute the function of black against white from the tolerant function of white, therefore we have
$T_i^W = 1 - i/60 = \frac{B}{W}$
$B(W) = W * (1 - \frac{W}{60})$

we apply the same method we have the white against black.
$T_i^B = 5 - i/8 = \frac{W}{B}$
$W(B) = B * (5 - \frac{B}{8})$

From the graph we can see the stable equilibrium points are 2 and 3, the equilibrium point 1 is not stable since if there is one increase in black or white which would cause the movement of the other group. Therefore the segregation paradox is even though you have the people who is willing to live with another group but the model drives a city that to a single group segregation.

(c) Assuming now that there is a stock of 50 houses in the city, describe the set of stable mixed equilibria and describe the tipping process toward an all-Black equilibrium.
Answer: The stable mixed equilibria is the black line that showed on the graph. With the constrain of the housing supply, the zone between the green and orange line is the status that both white and black feel comfortable with and no one is the willing move out. Therefore with the constrain this reach a kind of stable equilibria.

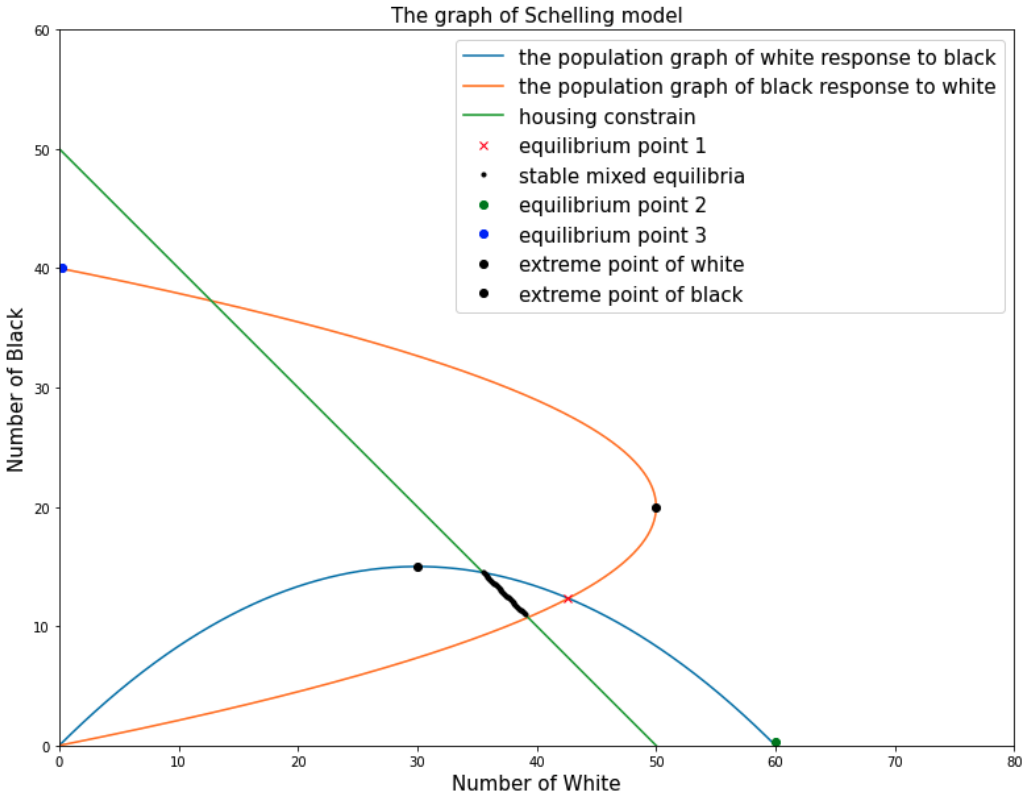

Figure 2: The graph of Schelling model with the housing supply constrain

2. Prepare data

(a) Set your working directory using the Stata command *cd*. Load data into Stata - how is the dataset structured? Hint: use the Stata command *isid*. Identify the block and

track identifier.

(b) Which variable identifies population at the census block level? Generate a new variable called *pop_block* equal to population at the census block level. Keep only observations with census block population above 0.

(c) Compare population at the block and tract level. Generate a variable that sums total population in the dataset called *tot_pop*. Then generate a variable called *pop_tract* that sums population for each tract. Keep only one observation per tract on *pop_tract*. Hint: tag one observation per tract using the Stata *egen* function, and then keep only one observation per tract.

(d) Count the total number of blocks in each tract and generate a new variable, *N_block* with this information. Hint: use *_N* to identify the maximum number of observations per tract. Obtain summary statistics for *pop_tract*, *pop_block* and *N_block*, and export them in a tex file. Use the Stata command *estpost*.

Table 1: Summary statistics of the population of block and tract

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
pop_block	161.546	203.485	1	6062	23477
pop_tract	3781.277	1180.843	4	9344	1003
N_block	31.752	16.392	1	112	23477

3. Building segregation indices

(a) We will build an index for each main ethnic group. Notice that population data for each ethnic group is identified with the first few letters of the ethnic group name. Define a global to call the following ethnic groups: blacks, whites and latinos

(b) Compute a city dissimilarity index at the census block level for each ethnic group. For each ethnic group,

- generate a variable equal to population at the block level
- generate a variable equal to total population over all tracts (call this variable *tot_'y'_pop*, where *'y'* stands for the ethnic group)
- use these variables and the ones prepared earlier (that are for the entire population, independent of ethnic groups), to calculate the dissimilarity index based on the formula described in class
- Call this variable *diss_'y'_block*, where *'y'* stands for the ethnic group

Export summary statistics (mean and number of observations) of the dissimilarity index (*diss_'y'_block*) and of *tot_'y'_pop* to a tex file.

	Mean	N
tot_whi_pop	1,086,908.00	23,477.00
tot_bla_pop	347,380.00	23,477.00
tot_lat_pop	1,838,822.00	23,477.00
diss_whi_block	0.62	23,477.00
diss_bla_block	0.58	23,477.00
diss_lat_block	0.56	23,477.00
s	(1)	
N	23477	

t statistics in parentheses

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

Table 2: Summary statistics of diss_'y'_block

(c) Compute a city dissimilarity index at the census tract level for each ethnic group. Do the same as earlier, using the *by(tract_ID)* option. Call this variable *diss_'y'_tract* where *'y'* stands for the ethnic group. Remember to only keep one observation per tract. Export summary statistics (mean and number of observations) of the dissimilarity index (*diss_'y'_tract*) and of *tot_'y'_pop* to a tex file.

	Mean	N
whi_pop_tract	1,083.66	1,003.00
bla_pop_tract	346.34	1,003.00
lat_pop_tract	1,833.32	1,003.00
diss_whi_tract	0.58	23,477.00
diss_bla_tract	0.53	23,477.00
diss_lat_tract	0.51	23,477.00

Table 3: Summary statistics of *diss_'y'_tract* and of *tot_'y'_pop*

(d) Compute a tract dissimilarity index at the census block level for each ethnic group. Export summary statistics of this dissimilarity index to a tex file.

	Sum	Mean	SD	Min	Max	N
diss_whi_block_tract	20	0.02	0.03	0	0	1,003
diss_bla_block_tract	24	0.02	0.04	0	0	1,003
diss_lat_block_tract	20	0.02	0.03	0	0	1,003

Table 4: Summary statistics of the dissimilarity index

4. Statistical analysis: what makes tracts more segregated?

(a) Generate a variable equal to the fraction of whites within each tract, called *whi_frac_tract*.

(b) Compare the dissimilarity index at the tract level for whites (*diss_whi_block_tract*) with *whi_frac_tract* using a binned scatter plot. Hint: use the Stata function *binscatter* and remeber to only use one observation per tract. What does the graph tell you? Export the graph to Overleaf.

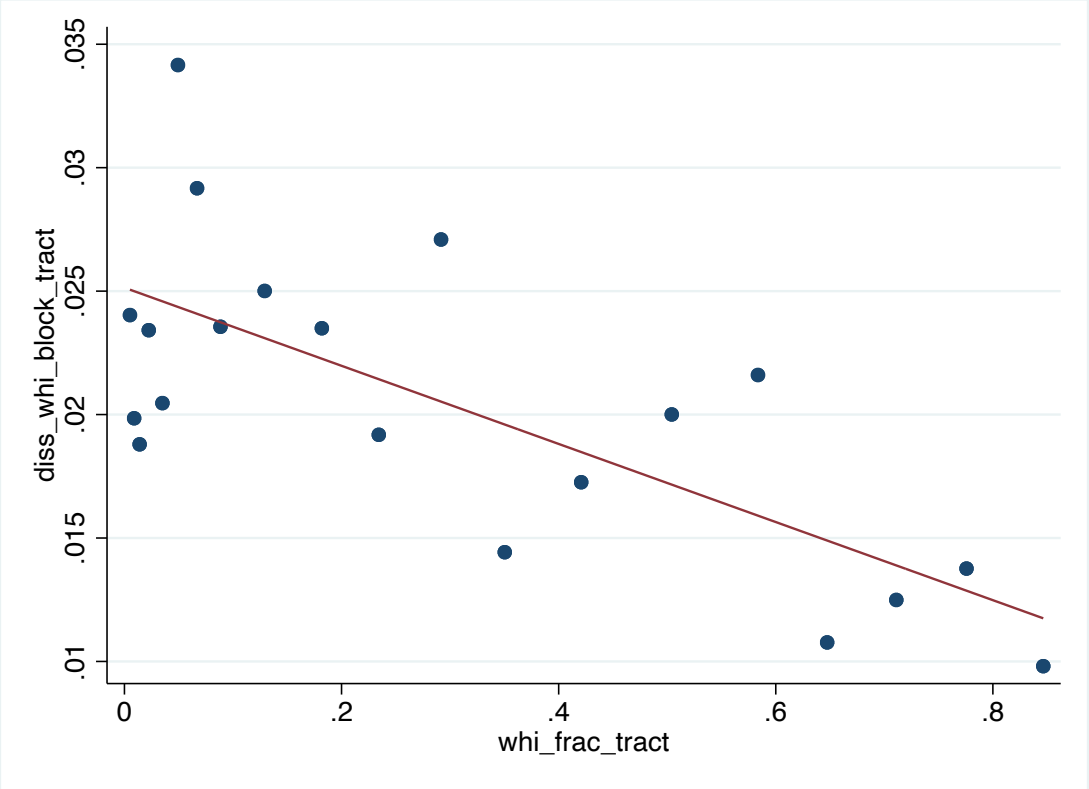

Figure 3: The graph of Schelling model

(c) Do a regression using the same variables. How can you interpret the results?
Answer: the coefficient of the regression decreased.

(d) Control for the log of population at the tract level. What happens to the regression coefficient? Control for the standard deviation of population at the tract level. What happens?

(e) Export the 3 regression outputs together into a tex file and into Overleaf.

	(1)	(2)	(3)
whi_frac_tract	-0.016***	-0.010***	-0.009***
	(0.003)	(0.003)	(0.003)
log_pop_tract		0.007***	0.006***
		(0.001)	(0.001)
sd_pop_tract			0.000***
			(0.000)
Constant	0.025***	-0.011***	-0.012***
	(0.001)	(0.003)	(0.003)
Observations	1003	1003	1001

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: The merged of the 3 regressions