Households' response to changes in the ethnic composition of neighbourhoods: Exploring reference-dependence and asymmetric preference structures

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Conference paper STRC 2013

STRC | **13th Swiss Transport Research Conference**
Monte Verità / Ascona, April 24-26,2013

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April 2013

Abstract

When choosing their neighbourhood of residence, people often take account of the ethnic composition of its inhabitants, and in particular, the levels of concentrations of own co-nationals and other foreign groups. Relating to their experience, households tend to value alternative neighbourhoods based on the ethnic characteristics of their current residential location, showing sensitivities to changes in the levels of co-ethnics or ethnic minorities from this reference point. They could thus exhibit different valuations for increases and decreases in the presence of their co-ethnics or other ethnic groups, while such asymmetries could also vary across different population segments. Connecting this idea with prospect theory, this study uses a pivoted choice experiment to explore the reference-dependence and asymmetric preferences structure for ethnic composition of neighbourhoods. Focusing on heterogeneity in such asymmetries across households with different socio-economic characteristics, it aims to explore the effects of such factors on willingness-to-pay (WTP) measures. In our empirical example applied to the Swiss city of Lugano, we find evidence of preferences for living with co-nationals in most population sub-groups, along with an aversion to living with other ethnic groups. We also highlight the presence of important asymmetries between the sensitivities to increases and decreases in these factors, where such asymmetries vary according to the ethnic attribute under inspection as well as origins and educational attainment of individuals. Connecting this analysis with the mainstream segregation literature our findings indicate that people might react to Shelling's tipping points not because they are strongly averse to members of other ethnic groups, but because they are averse to being a minority in their neighbourhood of residence.

Keywords

residential location choice - reference-dependence - asymmetric preferences - ethnic residential segregation – heterogeneity

1. Introduction

Residential location choices have a major impact on the development of urban areas. Diverse socio-economic segments of inhabitants which choose to live in certain residential locations create specific demands for infrastructure and services which shape the path of change in their neighbourhood. One of the multiple socio-economic dimensions of particular interest across European cities in last decades is the ethnic composition of neighbourhoods and its impact on a variety of socio-economic and urban elements. According to the ethnic segregation literature, the presence of co-ethnic neighbours and the presence of ethnic minorities in a neighbourhood are potential key drivers of residential location choice for immigrants as well as natives. In fact, it is widely observed that these two characteristics have an impact on residential location choices (Aslund, 2005; Bolt and Van Kempen, 2003; Schaake et al., 2010; Van der Laan Bouma-Doff, 2007; Zavodny, 1999; Zorlu and Mulder, 2008) and that there is potentially a strong size effect, i.e. this impact can be stronger or weaker depending on the existing level of ethnic concentrations in a specific neighbourhood or urban context (Van der Laan Bouma-Doff, 2007). In this sense, ethnic preferences could be negligible in contexts where the concentration levels are low, but quite important for environments where a strong ethnic segregation dominates the urban scene. This connects directly to Schelling's (1972) idea of tipping points in residential segregation dynamics, where ethnic preferences become dominant over other location choice drivers as soon as ethnic concentrations in the neighbourhood reach certain levels, thus making households want to move out of such neighbourhoods into "ethnically" more desirable ones. Such tipping points in the levels of ethnic concentrations have been studied in many contexts and for different ethnic communities (see for example Card et al., 2008; Clark, 1991; Easterly, 2009).

However, another important question arises in this context: given a certain ethnic concentration level in a specific neighbourhood, how do people react to increases and decreases in the presence of their ethnic community members or changes in the number of foreign neighbours? It is known (see e.g. de Borger and Fosgerau, 2008; Hess et al., 2008) that individuals often evaluate alternatives and their characteristics with respect to some reference point, being sensitive to changes from their reference rather than to states. Moreover, sensitivities could differ depending on whether we look at positive or negative deviations from the reference values, leading to asymmetries in preferences around this starting point. In the residential location choice domain, the utilities of various alternative residential locations might be dependent on the experienced levels of co-ethnics or ethnic minorities in the current neighbourhood of residence, whereas the increases in current ethnic concentrations could be evaluated differently than decreases. For example, people might have a strong dislike for increases of ethnic minorities in the neighbourhood, while valuing their

decrease to a lesser extent or even being indifferent to it. Similarly, given the positive preference for residential proximity to co-ethnics, people might strongly dislike decreases in the rate of co-ethnics, while being less sensitive, and thus valuing less positively, any increases. Such preference asymmetries are a key component of the prospect theory framework of Kahneman and Tversky (1979) and evidence thereof can be found in different contexts, notably in the form of loss aversion, i.e. higher valuation for (monetary) losses than for gains which is often found in situations of decision making under risk. Accounting for reference-dependence and asymmetries in preferences in the choice modelling domain can not only result in gains in the model fit, but can also give important insight into the loss aversion effects in choice behaviour. The impact of such effects on welfare measures has been demonstrated across applications stemming from a range of disciplines, from transport (e.g. Hess et al., 2008; Masiero and Hensher, 2010, 2011) to marketing (e.g. Hardie et al., 1993; Klapper et al., 2005). In the residential location choice literature on the other hand, only a handful of studies have looked into these issues (e.g. Habib and Miller, 2009), and, to the best of our knowledge, asymmetric preferences have not yet been explored in the context of residential choice behaviour focusing on ethnic segregation drives.

Following the study by Ibraimovic and Masiero (2013) which proposes a residential location choice model for analysing the preferences for ethnic neighbourhood attributes, this paper extends such analysis by adding attitudinal components in order to question households' responses to changes in ethnic concentration in neighbourhoods. The main objective of the study is to examine households' response to shifts from the ethnic concentration values in their neighbourhood of residence. In particular, it investigates the reference-dependence and asymmetric responses to changes in the ethnic neighbourhood composition, with the underlying hypothesis of loss aversion (Kahneman and Tversky, 1979). In this case, loss aversion would correspond to the tendency of individuals to prefer avoiding decreases in a desirable ethnic variable, to acquiring gains from its increases. In such analysis, the issue of heterogeneity in tastes for different ethnic attributes is essential and is addressed in detail in the model structure. Exploring whether the asymmetries vary across different population groups has indeed been shown to be crucial for revealing the existence and assessing the impact of preference asymmetries in the choice modelling literature (see for example Klapper et al., 2005; Nicolau, 2012). Since the ethnic clustering patterns stem from residential location decisions of heterogeneous population segments, different degrees of households' taste asymmetries are expected. Finally, implications on monetary valuations (i.e. willingness-to-pay measures) are assessed, providing important indications for policy guidance over the potential developments in future ethnic settlement patterns and development of neighbourhoods with different ethnic mix.

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For the empirical analysis, the study uses a dataset collected from a specifically designed Stated Preference (SP) experiment of neighbourhood choice. The benefit of using a pivoted SP choice experiment is twofold. Firstly, it permits the adequate representation of the urban context under analysis, thus adapting the study and results to the existing ethnic characteristics of different residential areas, as well as representing housing choice situations similar to ones that inhabitants face in the real housing market. Secondly, it permits the analysis of asymmetries in preferences for different residential location choice drivers giving an insight into the impacts of potential changes from the present neighbourhood situation and characteristics. Such asymmetric preferences might also have a large impact on willingness to pay (WTP) and willingness to accept (WTA) measures, where the former relates to paying for improvements in a desirable attribute (or reductions in an undesirable one) and the latter relates to requiring monetary incentives to accept reductions in a desirable attribute (or increases in an undesirable attribute). Accounting for these effects leads to more accurate estimates of monetary values attached to different location attributes especially when considering the aspect of population heterogeneity. Such elements are essential for policy guidance, giving insight over reactions to changes in ethnic concentrations, thus permitting the analysis of potential developments in future segregation dynamics.

The geographical setting of the study is the highly ethnically mixed urban environment of the city of Lugano, Switzerland. Lugano is well suited for such an analysis, having closely to 40% of foreign residents coming from more than 100 different nations world-wide. The observed spatial distribution of foreigners across Lugano neighbourhoods suggests two distinct ethnic concentration patterns, namely a spatial grouping of single nationality groups and a spatial division of foreign communities and the native Swiss population. Both of these clustering patterns are represented in the stated choice experiment. In particular, two ethnic variables describing the concentration of co-national neighbours and the share of foreigners are considered. This permitted the testing of various hypotheses through the empirical modelling of spatial concentrations. Firstly, the existence of self-segregation preferences as well as preferences regarding the foreign population in the neighbourhood of residence are examined. Secondly, the asymmetries in such preferences are investigated. Thirdly, the heterogeneity among individuals belonging to different population segments (i.e. diverse ethnic communities and socio-economic profiles) is modelled.

The paper is structured as follows. In Section 2, we present the data, providing a description of the stated choice experiment of neighbourhood choice as well as descriptive statistics of the sampled population. This is followed in Section 3 by an outline of the theoretical framework of discrete choice models and a discussion of our different model specifications. The results are presented in Section 4 while conclusions and suggestions for further research are discussed in Section 5.

2.   Data

The main dataset used for the empirical analysis was collected through a neighbourhood stated choice study conducted in the Swiss city of Lugano in 2010, using a face-to-face computer aided questionnaire. For full details on the survey see Ibraimovic and Masiero (2013). The spatial units of the analysis are city neighbourhoods which represent the choice alternatives in the survey. A secondary data source, containing information about the present neighbourhood of residence and socio-economic characteristics of households was gathered from a previously conducted household survey. Both surveys were completed as a part of a broader research project[1] aimed at analysing residential location decisions of different nationality groups residing in Lugano and their propensity towards ethnic concentration.

2.1   Stated preference experiment of neighbourhood choice

The survey presented respondents with multiple tasks, each time looking at a future hypothetical situation where their neighbourhood of residence changes its ethnical composition in terms of the concentration of co-nationals and the share of foreigners. Respondents were then asked to choose from three alternatives: stay in the present neighbourhood of residence (representing the reference alternative) or move to one of the two unlabelled hypothetical neighbourhoods (neighbourhood A and neighbourhood B). The attribute levels of the hypothetical neighbourhoods were pivoted around the reference alternative values, with changes in ethnic concentrations, rent prices and travel time to work according to an orthogonal experimental design.[2] The dwelling did not change in its characteristics across alternatives; thus this is equivalent to moving the existing residence to a new neighbourhood.

The inclusion of a reference alternative added to the credibility of the experiment, permitting respondents to recognise a familiar situation and thus answer more realistically to the presented choice tasks. Moreover, given that the attribute values of hypothetical alternatives were designed as positive and negative percentage changes around the reference point, separate coefficients for increases and decreases in the relative attribute values could be

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[1] "Effects of Neighbourhood Choice on Housing Markets: a model based on the interaction between microsimulations and revealed/stated preference modelling" funded by the Swiss National Science Foundation.

[2] For a review on stated preferences experimental design techniques applied to choice modelling see Louviere et al. (2000) and Hensher et al. (2005).

defined (cf. Hess et al., 2008), allowing us to model sensitivities for increases in such attribute levels as well as decreases.

We present you the characteristics of your present neighbourhood and those of two other neighbourhoods in the city of Lugano, in 10 years time. Imagine that you can choose to live in the dwelling same as yours, situated in one of these neighbourhoods.			
	YOUR HOUSE	"YOUR HOUSE"	"YOUR HOUSE"
	Present neighbourhood	Neighbourhood A	Neighbourhood B
% residents of your same nationality (of all resident in Lugano)	13	18,2	13
% NON Swiss residents in the neighbourhood	40	40	50
Travel time to work (in minutes)	15	7,5	11,25
Monthly rent (in CHF)	1500	1800	1800
Choice 1: _In which of these neighbourhoods would you want to live?_	I choose to stay in the present neighbourhood ☑	I choose to move to neighbourhood A ☐	I choose to move to neighbourhood B ☐
Choice 2: _If you could choose only between the neighbourhood A and neighbourhood B, which one would you choose?_		I choose to move to neighbourhood A ☐	I choose to move to neighbourhood B ☑
BACK		CHOICE TASK NUMBER ONE	NEXT

Figure 1. Stated preference choice situation example.

The figure illustrates an example of the stated preferences choice situation presented to respondents in a computer assisted interview. Each respondent was asked to respond to 12 or 13 different choice tasks, which varied in values of attributes describing the three alternative neighbourhoods.

Given the main effects fractional factorial design, the experiment resulted in 25 different choice situations divided into two blocks, the first block containing 12 and the second 13 choice situations, each appearing as in Fig. 1. Values of the attributes describing hypothetical alternatives varied across each choice situation, while the attributes of the reference alternative were kept constant for each respondent representing the values of his/hers current residential location. The four selected attributes describing the alternative neighbourhoods were 1) the concentration of co-nationals, 2) the share of foreigners, 3) the monthly dwelling rent, and 4) the travel time to work. It is important to note that while the concentration of co-nationals is a comparison with the city-wide concentration, the share of foreigners relates to the neighbourhood alone. For each attribute, five different levels were used, namely the reference value (corresponding to the attribute value of the respondents' actual neighbourhood of residence) and +/- percentage deviations from the reference value, as described in Table 1. Each respondent was presented with one of the two blocks from the design, gathering a database with a total of 1,665 valid choice observations from 133 respondents.

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Table 1. Stated preferences experiment: description and sample statistics

Attributes	Description	Levels (pivot around reference)
Concentration of co-nationals (%)	Number of co-nationals in the neighbourhood over the total number of co-nationals in the city.	0%, -/+40%, -/+80%
Share of foreigners (%)	Number of non-Swiss residents over the total number of residents in the neighbourhood.	0%, -/+25%, -/+50%
Travel time to work (MIN)	Travel time to work by the habitually used mode type.	0%, -/+25%, -/+50%
Dwelling monthly rent (CHF)	The monthly rent of the dwelling.	0%, -/+10%, -/+20%

Sample statistics	Average	Std.	Min.	Max.
Concentration of co-nationals (%)	10.2	5.9	3	48
Share of foreigners (%)	42.5	7.7	16.3	57
Dwelling monthly rent (CHF)	1,485	450	650	2,800
Travel time to work (MIN)	13.9	10	0	60

Descriptive statistics of neighbourhood attribute values obtained from the population sample presented in Table 1 are consistent with the mid-sized urban environment and are in line with the housing market and the ethnic distribution patterns in the city of Lugano. In fact, a high variability of ethnic concentration across city neighbourhoods, in terms of the concentration of groups with a single nationality (ranging from 3% to 48%), as well as in terms of the share of foreigners (ranging from 16.3% to 57%), can be noted. The average monthly rent of CHF 1,485 corresponds to the market rent price of a two bedroom apartment, while the average travel time to work of 13.9 minutes is in line with the urban dimensions of the city.

2.2 Composition and socio-economic characteristics of the population sample

The target population for this study consisted of all residents in the city of Lugano and in seven neighbouring communes, which in 2008 comprised a population of 78,025 inhabitants. In order to represent all ethnicities residing in the area of study, the population was stratified by groups of nationalities and neighbourhoods of residence. The population sample which completed the choice experiment was composed of 133 families including all ten different nationality groups. The first six groups represented single nationalities, namely Swiss, Italians, Germans, Portuguese, Ex-Yugoslavians and Turks. Given a high number of countries with only a few nationals residing in the city, clustering of nationalities was used for the last four groups, splitting the population into "rest of the EU, USA and Australia"; "Eastern Europe and Asia"; "South America"; "Africa and the Middle East". For the same reason,

some less represented nationality groups comprising a major variety of ethnic communities, thus being of particular interest to the scope of the analysis, were oversampled.[3]

Table 2. Figures of inhabitants per nationality group in Lugano (year 2008)[a]

Nationality group	Number of inhabitants	As % of inhabitants	As % of foreigners
Swiss	**46,855**	**60.05%**	-
Advantaged foreigners	**19,579**	**25.09%**	**62.81%**
Italy	16,554	21.22%	53.11%
Rest of EU, USA and Australia	2,097	2.69%	6.73%
Germany	928	1.19%	2.98%
Disadvantaged foreigners	**11,591**	**14.86%**	**37.19%**
Ex-Yugoslavia	5,278	6.76%	16.93%
East Europe and Asia	1,830	2.35%	5.87%
Portugal	1,806	2.31%	5.79%
South America	1,092	1.40%	3.50%
Africa and Middle East	881	1.13%	2.83%
Turkey	704	0.90%	2.26%
Total number of foreigners	**31,170**	**39.95%**	**100.00%**
Total number on inhabitants	**78,025**	**100.00%**	-

[a] Source: Population Movement (MovPop) geocoded database from the Population Control Department of Canton Ticino, year 2008.

Foreign communities, in the Swiss context, show substantial differences in their socio-economic as well as spatial concentration patterns, exhibiting different degrees in cultural and linguistic distance to the native population. According to such characteristics, they can be divided into two categories: the "advantaged foreigner population" represented by immigrants from Western countries (mainly EU, USA and Australia) and the "disadvantaged foreigner population" comprising immigrants from third countries and some poorer European states (as indicated in Table 2). The spatial distribution of the foreign population groups as well as of the natives across city neighbourhoods shows patterns of residential separation, with advantaged foreigners living predominantly in more attractive neighbourhoods together with wealthier Swiss households, and disadvantaged foreigner communities residing in majority within large residential neighbourhoods around the city centre. Such diverse concentration patterns indicate that different population clusters are likely to exhibit different behaviour in their ethnic preferences and residential location choices. We thus aim to explore the role that the origin and thus belonging to one of these three population groups plays in explaining the heterogeneity in households' residential behaviour, their segregation preferences and the relative asymmetries in sensitivities to changes in ethnic concentrations in their

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[3] No implications on the model results stem from such a sampling strategy, since the sampling criteria did not concern the choice variable (i.e. the categorical response variable), but exogenous individual-specific variables (for more details see Manski and Lerman, 1977; Manski and McFadden, 1981).

neighbourhood of residence. Other than considering the differences in origins, in our analysis of heterogeneity we also test the impact of other socio-economic characteristics that could influence households' residential choice behaviour. In particular, we investigate the existence of different propensities towards the segregation with co-ethnics, i.e. the self-segregation preferences, across the resulting population clusters as well as their tastes for living in a multi-ethnic residential environment.

Table 3. Stated preferences sample socio-economic descriptive statistics

Variable (average values)	All sample	Swiss	Advantaged foreigners	Disadvantaged foreigners
Age	42.74	53.60	48.44	37.93
Years in Switzerland	25.26	-	31.13	18.10
Years in dwelling	10.19	13.39	13.14	8.21
Years in neighbourhood	11.84	14.94	14.08	10.24
Italian level (1-6)	4.77	5.76	5.00	4.46
Education level (1-6)	4.56	4.44	4.63	4.56
Income level (1-7)	2.50	2.44	2.69	2.43

The socio-economic description of the population sample is presented in Table 3. With an average age of 54, natives are the eldest category, as compared to 48 and 37 average years of age respectively for the advantaged and disadvantaged foreigner groups. Disadvantaged foreigners are the most recent immigrants, although their period of residence in Switzerland is still relatively high corresponding to 18 years on average. They are also the most mobile category, having on average lived for about 8 and 10 years in the same dwelling and neighbourhood, compared to 13 and 14 years for the other two categories. Concerning the official language level (categorical variable denoting the proficiency in the Italian language, ranging from 1: no knowledge to 6: mother tongue) as well as the income level (categorical variable denoting annual household income, ranging from 1: less than CHF 20,000 to 7: more than CHF 500,000), the disadvantaged foreigner group obtains the lowest values among the three groups; however, this sample group on average shows a slightly higher education level (categorical variable ranging from 1: none to 6; academic degree) than the native population and slightly lower level compared to the advantaged foreigners group. [4]

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[4] It is to be noted that the sample contains mainly respondents with a relatively high education level which is typical for SP choice experiments.

3. Methodology and model specification

3.1 The base choice model

text Within the random utility framework (cf. McFadden, 1974), a decision maker *n* chooses the alternative *i* which maximises his/her utility,

$$U_{nj} = V_{nj} + \varepsilon_{nj}$$

where V_{nj} is the systematic part of the utility function for alternative *j* (out of *J*) and ε_{nj} is the IID random term distributed according to a Type 1 Extreme Value distribution in the a simple multinomial logit (MNL) model. With the further general assumption of a linear in attributes specification, the systematic part of the utility function of alternative *j* is given by:

$$V_{nj} = \alpha_j + \sum_{k=1}^{K} \beta_k x_{njsk}$$

where α_j are alternative specific constants (ASCs) for *J-1* alternatives, *x* are the *K* attributes describing the alternatives (such as the rent price or ethnic neighbourhood description) and β_k are the coefficients to be estimated representing the sensitivities to the different attributes. In the context of our analysis, the utility function of each alternative – i.e. present neighbourhood and two hypothetical alternative neighbourhoods: neighbourhood A and neighbourhood B - is specified as follows in the base model (referred to as M1 in the model results section):

$$V_{(Ref)} = ASC_{Ref} + \beta_{n(NatCon)} NatCon + \beta_{n(ForgCon)} ForgCon + \beta_{n(Time)} Time$$
$$+ \beta_{n(Cost)} Cost$$

$$V_{(A)} = ASC_A + \beta_{n(NatCon)} NatCon + \beta_{n(ForgCon)} ForgCon + \beta_{n(Time)} Time + \beta_{n(Cost)} Cost$$

$$V_{(B)} = \beta_{n(NatCon)} NatCon + \beta_{n(ForgCon)} ForgCon + \beta_{n(Time)} Time + \beta_{n(Cost)} Cost$$

where, $\beta_{n(NatCon)}$, $\beta_{n(ForgCon)}$, $\beta_{n(Time)}$, $\beta_{n(Cost)}$ are the coefficients associated with the four attributes, i.e. concentration of co-nationals (NatCon), share of foreigners (ForgCon), travel time to work (Time), and monthly dwelling rent (Cost), while two alternative specific constants are estimated for the reference alternative (ASC_Ref) and the hypothetical neighbourhood A (ASC_A).

3.2   Model with heterogeneity specification

Moving beyond the base model, the heterogeneity in preferences that might exist between respondents according to their socio-economic and demographic characteristics is introduced by using separate coefficients for given attributes in separate subsets of the sample population (Train, 2003). In this way, the choice behaviour of different population clusters can be investigated and the impact of individual characteristics on sensitivities to different attributes can be tested. In particular, we estimate separate coefficients for different population clusters segmented on the basis of origin, education level and income. A range of other individual specific variables were tested in the preliminary analysis, however their impact was not significant at conventional values. The resulting model is referred to as M2 in the model results section.

The first set of interaction terms concerns the concentration of co-nationals and the origins of respondents, distinguishing between disadvantaged foreigners and advantaged foreigner groups together with native households[5], as well as education level where respondents are classified into the highly educated category (with academic degree) and that with lower or medium education level. Accordingly, we obtain four groups for this coefficient. Secondly, the heterogeneity in preferences for foreigners' concentration in the neighbourhood is assessed through interactions between the respective variable and the origin[6] of respondents, distinguishing between the disadvantaged foreigner group, the advantaged foreigner group, and the native population (Swiss), thus giving us three groups for this coefficient. Finally, different sensitivities to the housing cost are accommodated through separate coefficients for higher (than average) income and lower (than average) income households.

3.3   Reference-dependence and asymmetric preferences model specification

As a final step, we incorporate aspects of Prospect Theory by allowing for reference-dependence and asymmetric responses to positive and negative deviations in attribute values with respect to the reference point, here represented by the present neighbourhood of residence. Under this framework, the sensitivities to increases and decreases from the reference value are expected to be asymmetric, with the general assumption of loss aversion, meaning that a greater value is attributed to the loss in the value of a desirable attribute than to

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[5] Advantaged foreigners and Swiss are found to have similar behavior in this regard and are thus clustered together.

[6] A preliminary analysis showed that education level did not have a significant impact on this variable.

the gain given by its increase. In deriving the asymmetric preferences model, the linear model can be expanded in order to represent the increases and decreases in attribute values, with the systematic part of the utility function taking the following form:

$$V_{nj} = \alpha_j + \sum_{k=1}^{K}\left(\beta_{k(inc)}x_{njk(inc)} + \beta_{k(dec)}x_{njk(dec)}\right)$$

where $x_{njk(inc)} = max\left(x_{njk} - x_{nk(Ref)}, 0\right)$ and $x_{njk(dec)} = max\left(x_{nk(Ref)} - x_{njj}, 0\right)$, with $x_{nk(Ref)}$ giving the reference value for attribute k and respondent n.

We now estimate a separate coefficient for each decrease and increase in the attributes value relative to the reference alternative. Consequently, the utility function of the reference alternative will only contain the alternative specific constant (ASC$_{Ref}$) and the variable YearsN indicating the number of years lived in the present neighbourhood of residence. The system of utility functions of the model allowing for the asymmetric preferences (referred to as M3 in the model results section) is thus specified as follows:

$$V_{(Ref)} = ASC_{Ref} + \beta_{(YearsN)}YearsN$$

$$V_{(A)} = ASC_A$$

$$+\beta_{(NatCon,inc)} * max\left(NatCon_A - NatCon_{Ref}, 0\right) + \beta_{(NatCon,dec)} * max\left(NatCon_{Ref} - NatCon_A, 0\right)$$

$$+\beta_{(ForgCon,inc)} * max\left(ForgCon_A - ForgCon_{Ref}, 0\right) + \beta_{(ForgCon,dec)} * max\left(ForgCon_{Ref} - ForgCon_A, 0\right)$$

$$+\beta_{(Time,inc)} * max\left(Time_A - Time_{Ref}, 0\right) + \beta_{(Time,dec)} * max\left(Time_{Ref} - Time_A, 0\right)$$

$$+\beta_{(Cost,inc)} * max\left(Cost_A - Cost_{Ref}, 0\right) + \beta_{(Cost,dec)} * max\left(Cost_{Ref} - Cost_A, 0\right)$$

$$V_{(B)} =$$

$$\beta_{(NatCon,inc)} * max\left(NatCon_B - NatCon_{Ref}, 0\right) + \beta_{(NatCon,dec)} * max\left(NatCon_{Ref} - NatCon_B, 0\right)$$

$$+\beta_{(ForgCon,inc)} * max\left(ForgCon_B - ForgCon_{Ref}, 0\right) + \beta_{(ForgCon,dec)} * max\left(ForgCon_{Ref} - ForgCon_B, 0\right)$$

$$+\beta_{(Time,inc)} * max\left(Time_B - Time_{Ref}, 0\right) + \beta_{(Time,dec)} * max\left(Time_{Ref} - Time_B, 0\right)$$

$$+\beta_{(Cost,inc)} * max\left(Cost_B - Cost_{Ref}, 0\right) + \beta_{(Cost,dec)} * max\left(Cost_{Ref} - Cost_B, 0\right)$$

All models were coded and estimated in OX (Doornik, 2000), using maximum likelihood estimation and recognising the repeated choice nature of the data through a panel specification of the sandwich matrix for computing standard errors.

4.   Model results

text As outlined in Section 3, our analysis made use of three models, namely two base models with unique coefficient specification for each of the neighbourhood attributes, and the third model focusing on asymmetric preferences to gains and losses from the reference alternative, i.e. the present neighbourhood of residence. We firstly present the base models explaining the ethnic and non-ethnic preferences in the neighbourhood choice decisions, i.e. the simple MNL model (M1) and the model accounting for the heterogeneity in preferences among households belonging to different ethnic communities and having different socio-economic characteristics (M2). We then continue discussing the third model (M3) which explores the hypothesis on asymmetries for increases and decreases in values of ethnic neighbourhood attributes.

4.1   Investigating the preferences for ethnic neighbourhood composition: "*I like co-nationals and dislike foreigners*"

Table 4 reports the estimation results of the two base models M1 and M2. The coefficient estimates reflect the effects of attributes on the utility of the alternatives (and by extension their probability of being chosen from the available choice set). A positive/negative coefficient sign estimated for an attribute - in our case the variable associated with a specific residential location - indicates the increase/decrease in the utility of the concerned alternative and can thus be interpreted as marginal utility/disutility of such attribute for the decision maker. We firstly focus on and discuss the results of the two ethnic neighbourhood variables (the presence of co-national neighbours and the share of foreigners in the neighbourhood) which represent the main interest of the study. Following this, we present our findings on the other two location choice drivers (the rental rates and the travel time to work) along with the analysis of trade-offs and *willingness-to-pay* (WTP) measures among the ethnic and non-ethnic location characteristics.

Our first observation is the improvement in log-likelihood values for model M2 over model M1 by 50.09 units for only six additional parameters, where this improvement is highly significant with a χ^2_6 p-value of 0 for the associated likelihood ratio test. This highlights the presence of heterogeneity in preferences as included in model M2, in relation to origins and education levels of individuals. For model M1, the coefficient estimates for the neighbourhood attributes are all significant and of the expected sign. In fact, a significantly positive coefficient for the concentration of co-national neighbours indicates that households value the residential proximity to their own community of origin. As a result, neighbourhoods with a higher share of co-national neighbours have a higher probability of being chosen. Conversely, a negative and statistically significant coefficient associated with the share of foreigners in the neighbourhood shows that households tend to avoid neighbourhoods with

high concentrations of immigrant populations. These results are in line with the international evidence which states that, on one side, neighbourhoods with a high presence of co-nationals attract households from the same origin (see for example Aslund, 2005; Zorlu and Mulder, 2008), while, on the other side, neighbourhoods with a high immigrant share, which might be perceived as poor and disadvantaged, might drive back households from choosing them as their place of residence (Charles, 2000; Ellen, 2000; Van der Laan Bouma-Doff, 2007).

Nevertheless, when looking at model M2, differences in ethnic preferences for households belonging to different immigrant categories can be noted. The country of origin and the educational level of households are two main variables which contribute to explaining such dissimilarities in tastes. With respect to the self-segregation preferences, i.e. preferences for co-national neighbours, the results show differences among households belonging to disadvantaged, advantaged and native population segments. Moreover, among the disadvantaged foreigners group, dissimilar tastes exist for highly educated households when compared to the ones with a lower education level. In fact, households belonging to the disadvantaged foreigner communities with a lower education degree show preferences for residential proximity to their co-national community, as indicated by the positive and statistically significant coefficient estimate. However, this does not hold for the highly educated households belonging to the same group: the negative sign of the coefficient (even if not strongly significant) shows that they indeed dislike self-segregating with their group of origin, preferring to live in neighbourhoods with a lower density of their co-nationals. Such result might indicate their tendency for social and residential mobility towards the mainstream hosting society. The advantaged foreigner groups and native Swiss households also show preferences for a higher presence of their ethnic community, highlighted by a positive and significant coefficient estimate. The estimated coefficient for this population segment is equal for higher and lower education households, meaning that education does not play a role in shaping ethnic preferences for these population segments in the way that they do for the disadvantaged foreigner households. However, when comparing the propensities for living with co-nationals, the self-concentration preferences of advantaged foreigner households and natives are twice as strong as the ones of disadvantaged foreigner households. Such findings might indicate that the voluntary segregation preferences of the advantaged foreigner groups and the native population could be indirectly influencing the residential concentrations of disadvantaged foreigner communities in specific neighbourhoods.

When considering the coefficient associated with the share of foreigners in the neighbourhood of residence, the results of model M2 also indicate differences in preferences according to a household's origin, although education no longer plays a significant role. On one hand, the disadvantaged foreigner group as well as Swiss households hold negative preferences towards high shares of foreigners, where such preferences are far stronger for native households,

indicating their greater aversion to living with foreign neighbours. Advantaged foreigners on the other hand are seemingly indifferent to such neighbourhood characteristic as shown by their statistically non-significant coefficient estimate.

Looking next at the non-ethnic location attributes (the rent price and the travel time to work) used in the SP experiment as control variables for impact and importance analysis among ethnic and non-ethnic residential location choice drivers, both attributes show the expected negative sign and are statistically significant in both models. Additionally, model M2 indicates differences in cost sensitivity across lower and higher income segments, the first one being more cost sensitive as expected. However, no significant interactions among the individual-specific variables considered in the analysis were found for the travel time to work variable. Finally, the positive and significant alternative specific constant for the reference alternative (ASC_{Ref}) indicates that, all else being equal, households prefer to stay in their present neighbourhood of residence, a preference which increases with the increase of the years lived in the neighbourhood (according to the positive estimate of the coefficient associated with the variable YearsN). The alternative specific constant associated with the hypothetical neighbourhood A (ASC_A) is not significantly different from zero, indicating that the two hypothetical neighbourhood alternatives (A and B) are equally considered by respondents, all else being equal, without any clear order effect of reading from left to right.

Table 4. Results of base multinomial logit (MNL) models[a]

	Model 1 (base)		Model 2 (heterogeneity)	
	Coeff.	robust *t*-ratio	Coeff.	robust *t*-ratio
Concentration of co-nationals	0.0181	(3.02)		
Disadvantaged low education			0.0234	(3.37)
Disadvantaged high education			-0.0231	(-1.42)
Advantaged and Swiss high/low educ.			0.0442	(3.66)
Share of foreigners	-0.0082	(-2.47)		
Disadvantaged			-0.0097	(-2.14)
Advantaged			0.0055	(1.16)
Swiss			-0.0309	(-2.55)
Travel time to work	-0.0468	(-4.81)	-0.0486	(-5.13)
Monthly dwelling rent	-0.0050	(-9.34)		
Lower income			-0.0071	(-7.57)
Higher income			-0.0037	(-6.14)
YearsN[b]			0.0304	(2.23)
ASC_{Ref}	1.0656	(7.70)	0.7549	(3.38)
ASC_A	0.0078	(0.12)	0.0057	(0.08)
Model statistics				
Number of Observations		1,665		1,665
Log-L at zero coefficients		-1829.19		-1829.19
Log-L at convergence		-1412.74		-1362.65
Number of Parameters		6		12
Adjusted ρ^2		0.2244		0.2485

[a] Dependent variable is represented by the choice among three alternative neighbourhoods: present neighbourhood of residence, hypothetical neighbourhood A and hypothetical neighbourhood B.
[b] YearsN = Variable indicating the number of years lived in the present neighbourhood of residence.

We next assess the importance of the various location choice drivers by deriving *willingness-to-pay* (WTP) and *willingness-to-accept* (WTA) measures for each of these attributes (Table 5). The WTP/WTA measures in the discrete model framework are simply defined as the ratio between the attribute coefficient under observation and the cost coefficient. Such measures give us an indication of the monetary value that respondents associate to a certain increase in the value of a desirable attribute, and on other hand, the monetary compensation that they would request for an increase in the value of an undesirable attribute.

Table 5. WTP/WTA[a] measures in CHF[b] (of the monthly dwelling rent): Base models (M1 and M2)

	Model 1			Model 2 (heterogeneity)		
	WTP	WTA		WTP		WTA
			Lower Income	Higher Income	Lower Income	Higher Income
Concentration of co-nationals (% increase)	3.63	-				
Disadvantaged low educ.			3.28	6.35	-	-
Disadvantaged high educ.			-	-	3.24	6.28
Advantaged and Swiss high and low educ.			6.19	11.1	-	-
Share of foreigners (% increase)	-	1.64				
Disadvantaged			-	-	1.35	2.62
Advantaged			0.77	1.5	-	-
Swiss			-	-	4.33	8.38
Value of travel time savings (per minute on single trip)		9.38	-	-	6.8	13.18

[a] WTP = Willingness-to-pay; WTA = Willingness-to-accept
[b] Exchange rate CHF/USD = 1.02; CHF/EUR = 0.83 (on 10 July 2012)

In terms of the WTP/WTA measures derived from the model M1, the relative importance of the concentration of co-nationals (CHF 3.63) is higher than that of the share of foreigners (CHF 1.64), meaning that the impact of the presence of co-national neighbours on the residential location choice is larger than that of the share of foreigners. Moreover, a positive value is associated with the increase in the concentration of co-nationals. In particular, respondents are willing to pay an additional CHF 36.3 in monthly rent for a 10% increase in the concentration of their co-national neighbours. The opposite holds for the share of foreigners, which is negatively valued by respondents, requiring a monthly compensation of CHF 16.4 for a 10% increase in the share of foreign neighbours. Finally, the value of travel time savings equates to a monthly increase in rent by CHF 9.38 for each minute saved in of commuting time on a single trip. Assuming twenty return commute trips per month, this would equate to a value of CHF14.07 for a one hour saving in travel time, which is not too dissimilar from the official values reported by Axhausen et al. (2008) for Switzerland, with CHF18.93/hr for public transport and CHF19.04/hr for car. The lower values can be explained by the higher share of disadvantaged households in the data.

While model M1 presents generic WTPs/WTAs for the whole population sample, model M2 accommodates heterogeneity in preferences, allowing us to derive different WTPs/WTAs for different population segments. Concerning the value associated with the presence of co-

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nationals, the results indicate that only highly educated individuals belonging to disadvantaged ethnic groups dislike living with their co-nationals, thus requiring a compensation of CHF 32.4 and CHF 62.8 for a 10% increase in such attributes for households in the lower income and higher income class respectively. On the other hand, advantaged foreigners and Swiss nationals as well as disadvantaged foreigners of lower education value co-national neighbours, where the WTP measure for advantaged foreigners and Swiss nationals is nearly double that of disadvantaged foreigners of lower education level. The second ethnic attribute denoting the presence of foreigners in the neighbourhood is negatively valued by the disadvantaged foreigner groups and Swiss natives, with the WTA measure being more than three times higher for Swiss nationals (CHF 43.3 and 83.8 for 10% increase for lower income and higher income respectively) than for disadvantaged foreigners (CHF 13.5 and 26.2). The advantaged foreigner group, on the other hand, shows a slight preference for foreign neighbours; however this result is supported only by a low statistical significance. The value of travel time savings differs across the lower and higher income classes, where it is nearly twice as high for the higher income (CHF 13.18 per minute) when compared to the lower income class (CHF 6.8 per minute).

4.2 Testing the asymmetric preference structure and loss aversion hypothesis: "*I don't want to be alone in my neighbourhood*"

We next discuss the results of the third model (M3), which allows for different sensitivities to increases and decreases in attribute values with respect to the reference point. The reference point varies across respondents and is represented by the attribute values of the present neighbourhood of residence for each respondent. We follow the findings from the earlier stages of the analysis by allowing for heterogeneity in preferences in the same manner as the model M2.

Table 6 shows the M3 model results.[7] The adjusted ρ^2 measure indicates that model M3 outperforms both base models (M1 and M2), supporting the notion that there exist asymmetries in the preference structure. With regards to the first ethnic variable, similar results as in model M2 are found, where the concentration of co-national neighbours is generally valued positively. However, model M3 shows different valuations of increases and decreases from the existing concentration of co-nationals in the neighbourhood. In this sense, the most interesting finding of the study is that only the coefficient estimates for decreases are statistically different from zero. This would suggest that people only react to decreases in the share of their co-national neighbours, while they are indifferent to any increases. Such results

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[7] It is to be noted that a backward exclusion of variables has been implemented in the preliminary analysis in order to select significant and meaningful coefficient values.

would constitute a partial deviation from the "traditional" *loss aversion hypothesis* as formulated by Kahneman and Tversky (1979), in which the individuals tend to exhibit preferences for both decreases and increases, yet are more sensitive to losses than to gains.

A possible interpretation is that even if individuals do not exhibit (strong) self-segregation preferences, they show high adversity to reside in a neighbourhood where they would constitute a large minority among other ethnic groups. This is in line with the mainstream literature on ethnic segregation which states that the majority of ethnic groups do not exhibit strong self-segregation preferences, but are intensely sensitive to "flight" of their co-ethnics out of their neighbourhood or reluctant to choose a neighbourhood with low presence of co-ethnics (Farley et al., 1978; Clark, 1991, 1992; Charles, 2000). This could provide a possible explanation to the results of Shelling's model of segregation dynamics which shows how weak ethnic preferences are able to generate strong residential segregation outcomes (Shelling, 1971). In fact, people could react to tipping points not because they are strongly averse to members of other ethnic groups, but because they are averse to being the minority in their neighbourhood of residence.

Indeed, according to the segregation literature, the dominant groups (natives in the EU and whites in a US context) are likely to show the strongest aversion to being minority groups and thus "lose" their actual dominant status in the neighbourhood (Farley et al., 1978; Charles, 2000). For ethnic minority groups, the motivation underlying preferences for co-ethnic neighbours might be a response to anticipated discriminatory practices and hostility by the dominant ethnic group (Krysan and Farley, 2002). Thus, living in the proximity of co-ethnics could sometimes constitute a "safe haven" against hostility and discrimination (Van der Laan Bouma-Doff, 2007). These arguments are also supported by Farley et al. (1993) and Charles (2001, referred to in Van der Laan Bouma-Doff, 2007), who found that "areas perceived as open to minorities, that is, neighbourhoods with a higher minority percentage and with lower perceived hostility to minorities, are far more often regarded as being more desirable to minorities than to whites" (Van der Laan Bouma-Doff, 2007).

Given this premise, we continue our analysis in considering the heterogeneity in residential location choice behaviour. The signs of coefficient estimates for different population segments indicate that among all different household segments, disadvantaged immigrants of high educational level are the only group that does not show a negative valuation for neighbourhoods with a lower presence of their co-nationals. In fact, all other groups, from disadvantaged foreigners with lower education to advantaged foreigners and natives, dislike decreases in the share of co-nationals. The magnitude of this disutility varies across different population segments, where it is more than twice as strong for the advantaged and Swiss households of higher education level when compared to other nationalities with lower educational attainment. This means that, as discussed before, advantaged foreigners and

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natives place a higher value on residential proximity to their co-nationals. Conversely, disadvantaged foreigners of higher education disregard the presence of co-nationals and prefer higher share of natives in their neighbourhood as a sign of wanting to reach major socio-economic integration within the mainstream society.

The second ethnic variable, i.e. the share of foreigners in the neighbourhood, also presents interesting results and confirms the findings presented above. The coefficients associated with this variable indicate that some population segments consider as important increases in this attribute, while others care only about decreases, although the coefficients associated with increases are of low statistical significance. In particular, disadvantaged foreigners and Swiss households tend to dislike increases in the share of foreigners (even with a low statistical significance level), while advantaged foreigners tend to value such increases. For decreases in this variable instead, only disadvantaged foreigners and Swiss nationals significantly value a diminishing share of foreigners. However, this preference is nearly three times stronger for Swiss nationals than for disadvantaged immigrants, meaning that Swiss preferred neighbourhoods are those in which the share of their co-nationals is dominating.

Table 6. Results of asymmetric preferences model[a]

	Deviation from reference value	Model 3 (asymmetries)	
		Coeff.	robust *t*-ratio
Concentration of co-nationals			
Disadvantaged high education	Decreases	0.0342	(0.84)
Advantaged and Swiss higher education	Decreases	-0.1096	(-1.50)
All nationalities lower education	Decreases	-0.0460	(-2.97)
Share of foreigners			
Disadvantaged and Swiss	Increases	-0.0079	(-0.90)
Disadvantaged	Decreases	0.0151	(1.90)
Advantaged	Increases	0.0169	(1.55)
Swiss	Decreases	0.0428	(2.15)
Travel time to work			
All sample	Increases	-0.0723	(-2.81)
All sample	Decreases	0.0369	(1.74)
Monthly dwelling rent			
All sample	Increases	-0.0053	(-5.93)
Lower income	Decreases	0.0078	(7.25)
Higher income	Decreases	0.0032	(3.85)
YearsN [b]		0.0333	(2.41)
ASC_{Ref}		0.6472	(2.82)
ASC_A		0.0060	(0.09)
Model statistics			
Number of Observations			1,665
Log-L at zero coefficients			-1829.19
Log-L at convergence			-1351.75
Number of Parameters			15
Adjusted ρ^2			0.2528

[a] Dependent variable is represented by the choice among three alternative neighbourhoods: present neighbourhood of residence, hypothetical neighbourhood A and hypothetical neighbourhood B.
[b] YearsN = Variable indicating the number of years lived in the present neighbourhood of residence.

Increases in the travel time to work are valued negatively, as expected, while decreases in travel time are valued positively. However, there is strong asymmetry, with respondents being twice as averse to increases than the way in which they favour decreases. Concerning the monthly dwelling rent, increases are valued equally negatively by all population segments, irrespective of their income level, however, while decreases are valued more than twice as much for the low income segment when compared to the higher income one.

Table 7. WTP/WTA[a] measures in CHF[b] (of the monthly dwelling rent): Asymmetric model (M3)

		WTP[a] All Incomes		WTA[a] Lower Income		WTA[a] Higher Income	
1% deviation from ref. value		Coeff.	*t*-ratio	Coeff.	*t*-ratio	Coeff.	*t*-ratio
Concentration of co-nationals							
Disadvantaged high educ.	Decreases	6.51	(0.86)	-	-	-	-
Advantaged and Swiss higher educ.	Decreases	-	-	14.14	(1.48)	34.77	(3.47)
All nationalities lower educ.	Decreases	-	-	5.93	(2.62)	14.58	(5.57)
Share of foreigners							
Disadvantaged and Swiss	Increases	-	-	1.02	(0.89)	2.52	(2.16)
Disadvantaged	Decreases	2.87	(1.85)	-	-	-	-
Advantaged	Increases	3.22	(1.54)	-	-	-	-
Swiss	Decreases	8.13	(2.07)	-	-	-	-
Value of travel time savings	Increases	-	-	9.33	(2.41)	22.95	(5.36)
Value of travel time savings	Decreases	7.02	(1.69)	-	-	-	-

[a] WTP = Willingness-to-pay; WTA = Willingness-to-accept
[b] Exchange rate CHF/USD = 1.02; CHF/EUR = 0.83 (on 10 July 2012)

Using the results of model M3, WTP and WTA measures are computed for decreases and increases of attribute values based on their significance level (Table 7), relating to changes in monthly rent. All population segments except the disadvantaged foreigners with high education level dislike decreases in the concentration of co-nationals, thus requiring a compensation for lower levels of co-national neighbours (i.e. WTA). Advantaged foreigners and Swiss respondents with a high education level and higher income exhibit the highest WTA measure (CHF 34.77), more than double compared to the residents with the lower education level (CHF 5.93 and CHF 14.58 for lower and higher income segments respectively). Increases in the concentration of co-nationals, as discussed above, do not matter given the insignificant coefficient estimate in model M3.

With regards to the share of foreigners however, different population segments are sensitive to increases while others value decreases of this attribute. In particular, disadvantaged foreigners and Swiss citizens of higher income dislike increases in the share of foreigners, requiring a compensation for a higher presence of foreign citizens in the neighbourhood. On the other hand, these two population segments also value decreases in the share of foreigners and are willing to pay a premium for neighbourhoods with lower levels of foreigners. However, the WTP of Swiss citizens (CHF 8.13) is nearly three times as high as that of disadvantaged foreigners (CHF 2.87), meaning that natives are more averse to the presence of

foreigners than the other foreign groups. The only segment that favours foreign neighbours are advantaged foreigners; however their WTP for increase in the share of foreigners is not strongly significant.

Overall, the monetary measures corresponding to the two ethnic variables show a higher sensitivity of respondents for changes in the concentration of co-nationals than for the share of foreigners. Moreover, model results show a major concern by households for decreases when compared to increases in the concentration of co-nationals, indicating a major sensitivity for lower levels of concentration compared to their present neighbourhood of residence. The value attributed to a percentage change in the concentration of co-nationals is comparable on average to the value of one minute of travel time savings (per journey). Finally, we can note higher monetary valuations for all attributes discussed above for the higher income segment when compared to the lower income segment given the lower sensitivity of this population segment to the cost of housing.

5.   Conclusions

When choosing their neighbourhood of residence, people often consider the ethnic composition of its inhabitants, and in particular, levels of concentrations of own co-nationals as well as foreign groups. Relating to their experience, households tend to value alternative neighbourhoods based on the ethnic characteristics of their current residential location, showing sensitivities to changes in the levels of co-ethnics or ethnic minorities from this reference point. This study uses a pivoted choice experiment to explore the reference-dependence and asymmetries in sensitivities to increases and decreases in ethnic concentration values for households with different socio-economic characteristics. Three models are estimated on data gathered from a pivoted stated preference experiment conducted in the Swiss city of Lugano: i) a base MNL model, ii) a base model allowing for heterogeneity in preferences for different population segments and iii) a model allowing for asymmetric preferences structure for positive and negative departures from the reference values.

In line with findings by Ibraimovic and Masiero (2013), the results of two base models indicate that households place a positive value on proximity to their community of origin and are willing to accept longer commuting times or higher dwelling rents in order to live in a neighbourhood with a larger concentration of co-nationals. Conversely, the share of foreign population in the neighbourhood is valued negatively, with households requiring a shorter commuting time or lower dwelling rents as compensation for a higher share of foreign neighbours. These findings however vary substantially across different population segments. Moreover, when asymmetries in preferences are considered, our results suggest that the sensitivities to increases and decreases in these factors are not of the same magnitude. In fact, only decreases in the concentration of co-national neighbours affect the utility of a neighbourhood, while households are indifferent to increases in concentration rates. With respect to the presence of other foreign neighbours, some segments are sensitive to increases while others are sensitive to decreases. Such results constitute a partial deviation from the "traditional" *loss aversion hypothesis* as formulated by Kahneman and Tversky (1979), in which individuals tend to exhibit preferences for both decreases and increases, yet are more sensitive to losses than to gains.

Given relatively moderate ethnic concentration levels across the city neighbourhoods, such findings might indicate that ethnic communities do not seek a larger degree of residential segregation, but that they also "do not wish to be alone" among other ethnic communities. Thus, it would not be self-segregation preferences, but a fear of staying alone which pushes people to search the proximity to co-ethnics. In fact, as suggested by the mainstream literature on ethnic segregation, the majority of ethnic groups do not exhibit strong self-segregation preferences, but are intensely sensitive to "flight" of their co-ethnics out of their

neighbourhood or reluctant to choose a neighbourhood with low presence of co-ethnics (Farley et al., 1978; Clark, 1991, 1992; Charles, 2000). This could provide a possible explanation to the results of Shelling's model of segregation dynamics which shows how weak ethnic preferences are able to generate strong residential segregation outcomes (Shelling, 1971). People could react to tipping points not because they are strongly averse to members of other ethnic groups, but because they are averse to being the minority in their neighbourhood of residence. Thus, even weak ethnic preferences could generate segregation by triggering the "flight" in case of a decrease of co-ethnics, while an increase in co-ethnics would not have been perceived as important and would not have similar consequences on the self-segregation dynamics.

A further result of this analysis discusses implications of heterogeneity in preferences among different population segments which could imply different effects on concentration dynamics. In particular, Swiss nationals and advantaged foreigners of higher education and income level are particularly sensitive to decreases in the concentration of co-national neighbours, when compared to disadvantaged foreign groups. On the other hand, disadvantaged foreigners of high education level are the only group that do not react negatively to decrease in the presence of co-nationals, showing that ethnic ties do not constitute a relevant driver for their residential location choice decisions. With regards to the share of foreigners, Swiss nationals and disadvantaged foreign groups dislike increases and value decreases in the presence of other foreign inhabitants in the neighbourhood. However, while disadvantaged foreigners attribute nearly the same value to increases and decreases in the share of foreigners, native residents value decreases nearly three times as much. The advantaged foreigner group is the only one not valuing such attributes negatively. Finally the result suggest that these asymmetries in preferences structure have fairly strong impacts on WTP/WTA measures, especially relating to the concentration of co-nationals.

Linking these results with the mainstream literature findings in the field of residential segregation, two main motivations underlying such preferences could be suggested. On one hand, as argued above, households could prefer co-nationals because they do not want to be a minority in their neighbourhood. For natives it might be a question of social and decisional power, while for foreigners, it might regard the perceived discrimination and hostility, where "segregated neighbourhoods function as a safe haven for marginalized ethnic minorities" (Van der Laan Bouma-Doff, 2007). On the other hand, households might stereotype neighbourhoods with high shares of foreigners. In fact, many studies suggests that not only natives (in the EU) or whites (in the US), but also other minority ethnic groups might perceive high levels of ethnic concentration as potentially harmful (Ellen, 2000; Van der Laan Bouma-Doff, 2007; Bobo and Zubrinsky, 1996; Charles, 2000). In line with our results, such preferences are generally strongest for the natives or whites.

Even though the present study offers interesting findings in terms of households' responses to changes in ethnic neighbourhood concentration levels, the analysis could be further extended in two main directions. Firstly, considering different reference points (see, e.g. Stathopoulos and Hess, 2012) would allow us to assess potential variations in preference asymmetries depending on a) different levels of ethnic concentrations, b) different urban dimensions and c) diverse urban settings. Secondly, the analysis could benefit from the inclusion of other attitudinal factors (see, e.g. the expanded behavioural framework described in Ben-Akiva et al., 1999; 2002a; 2002b) related to ethnicity of neighbours in order to better explain the impact of such factors on residential choice behaviour of different population segments.

Acknowledgements

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