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Do Preferences for Urban Amenities Really Differ by Skill?

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Do preferences for urban amenities really differ by skill?

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Abstract

City-level policies often aim at attracting skilled workers by improving urban amenities. However, due to endogeneity problems, studies relying on revealed preferences have difficulties in providing evidence for the basic premise that skilled workers place a higher value on urban amenities than less skilled individuals. Therefore, we use a stated-preference experiment to directly examine preferences for urban amenities. In a custom survey, we elicit hypothetical job choices between two cities that differ in wages and a set of urban amenities. We find that amenities are important determinants of city choice, with respondents willing to forgo a significant fraction of their wage to live in a city with better amenities. Most strikingly, we do not find any preference heterogeneity between workers differing by education or creative class membership. Instead, we uncover large heterogeneities mainly along family-related mobility constraints and unobserved dimensions. Our results imply that there is not much scope for amenity-oriented policies to improve the local skill mix. Rather, the urban skill bias reflects the incapability of less skilled individuals to afford living in and moving to their preferred places, resulting in significant welfare losses.

Keywords: Urban amenities, regional policy, internal migration, skill selective migration
JEL codes: R12, R22, R58

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1 Introduction

A key factor for the success of cities is the local availability of skilled workers (e.g. Rauch, 1993; Glaeser, 2000; Moretti, 2004), as such workers contribute to knowledge generation and spillovers, foster complementary investments in capital and technology and raise local consumption (e.g. Shapiro, 2006; Dumais et al., 2002).[1] How cities manage to attract skills is thus highly relevant for local policy makers and has also sparked a vivid academic debate about whether policies should mainly aim at attracting jobs or skilled workers (Storper and Scott, 2009). A basic premise of supply-oriented policies is that certain amenities are particularly valuable to skilled workers and may thus serve as pull factors for attracting skilled workers. One related strand of the literature highlights the importance of consumption and leisure opportunities such as restaurants and nightlife in attracting skilled labour (e.g. Glaeser et al., 2001; Clark et al., 2002; Glaeser and Gottlieb, 2006; Carlino and Saiz, 2019; Couture and Handbury, 2020). An alternative strand of literature around Florida's creative class highlights the importance of tolerant and vibrant places for attracting individuals working in creative occupations (e.g. Florida, 2002, 2003; Florida et al., 2008).

In order to shed light on the role of urban amenities for city choice and the extent to which these preferences differ across skill groups, this paper is the first to use a stated-preference choice experiment. For this, we pose a variety of randomized choice scenarios where a representative sample of the German working population has to decide between job offers in two hypothetical cities. Each choice scenario consists of two alternative job offers that only differ in earnings and a set of urban amenities, while all other aspects, including moving costs and rents, are held constant between both job offers. For the identification of underlying preferences, this experimental setting has major advantages compared to studies that assess the role of urban amenities for spatial skill sorting based on revealed preferences.[2] In particular, our experimental survey technique circumvents two major threats to identification that this literature struggles with: reversed causality and skill-specific moving costs.[3] In fact, this is why Glaeser et al. (2018) propose survey techniques to elicit preference information for cities.

Reversed causality, i.e. the rising demand for urban amenities in case of a rising share of high-

[1] These benefits are not limited to the high-skilled workforce, but there are significant positive effects on the productivity and wages of less skilled workers as well (Black and Henderson, 1999). Consistent with this, Moretti (2010) and Moretti and Thulin (2013) find that local multipliers of new jobs are larger for high-skilled jobs.

[2] These studies typically infer the importance of amenities for city choice from observed population growth and differential wage and rent growth across places, as there exists a trade-off between wages, rents, and amenities (Rosen, 1979; Roback, 1982). In line with this, real wage differences between cities are associated with observable measures of quality of life (e.g. Albouy, 2016).

[3] In addition, unobservable city characteristics may distort estimates from revealed-preference approaches, especially because some of the determinants which drive allocation choices are closely correlated.

skilled people, has been widely acknowledged in the literature (e.g. Diamond, 2016; Couture and Handbury, 2020) and is also confirmed by papers that show the positive effect of a rising share of college graduates on the provision of urban amenities (e.g. Shapiro, 2006; Bayer et al., 2007). Hence, early institutions and industry structure may create long term interdependencies between a city's skill level and its quality of life (Acemoglu et al., 2002; Nunn, 2009; Bauer et al., 2015). These path dependencies render the determination of the true relationship between the skill structure and the provision of amenities nearly impossible. Attempts to solve these identification problems based on instrumental variable approaches suffer from commonly recognized problems of typical regional instruments (e.g. Bayer et al., 2009; Falck et al., 2011; Couture and Handbury, 2020), and tend to be infeasible when one needs valid instruments for a whole range of amenities.

Secondly, revealed-preference approaches usually assume frictionless migration. Yet, moving is associated with important monetary and non-monetary costs. These costs have been shown to be higher for low-skilled than for high-skilled people as the latter face lower financial constraints, suffer less from a lack of information, and tend to be less attached to their hometowns due to earlier moves for educational reasons (Bound and Holzer, 2000; Gregg et al., 2004; Kosar et al., 2021). Even if urban amenities were equally attractive for both skill groups, this cost differential alone would result in a positive correlation between urban amenities and local talent. To overcome this issue, Bayer et al. (2009) incorporate skill-specific moving costs into a revealed choice model and apply an instrumental variable approach in order to estimate the causal effect of air quality on the willingness to move to a city. While this method is a compelling approach to tackle the identification issues, it only allows to identify the effect of a single amenity for which an appropriate instrument is found.

Our experimental design allows for three new contributions to the literature. First, based on more than 15,000 reported decisions, we are able to identify the causal effect of a set of urban amenities on geographic sorting because we overcome the identification problems of revealed-preference approaches discussed above. Our approach addresses both the risk of reverse causality and skill-specific relocation costs, as well as the existence of other factors that might bias the relationship of interest. We thus contribute to the debate on the relevance of urban amenities for city choice. In particular, the hypothetical city choices differ by cultural amenities, social diversity, urban ecology, infrastructure and housing, family friendliness and economic dynamism. Hence, we are able to shed light on the relative importance of different types of urban amenities that have been widely debated in the literature. Second, the choice experiment allows us to test whether amenity preferences differ between high-skilled and low-skilled individuals when all other skill-specific confounders are taken

into account. Such differences would be the prerequisite for attracting human capital to cities by improving urban amenities. We also test for heterogeneous preferences by creative class membership, an occupation-based alternative measure of human capital that has been used widely. Finally, we provide new insights into the heterogeneity of the underlying amenity preference distribution beyond the skill dimension by using information on individual background characteristics from the survey.

We find that amenities are an important determinant of city choice, with respondents willing to forgo between 2% to 8% of their wage to live in a city with a high rather than low amenity quality, depending on the specific amenity. Economic dynamism and family friendliness turn out to be the most important urban amenities, but respondents also attach a high value to cultural amenities. Most strikingly, we do not find any significant preference heterogeneity between college and non-college educated individuals. Nor does the willingness to pay differ significantly between individuals belonging to the creative class and those who do not.

Our analysis contributes to several strands of the economic literature. First, we add to the debate on the relative importance of certain types of amenities. While our results support the relevance of local consumption opportunities, evidence on the relevance of tolerance and openness is less conclusive, hence putting doubt on a main factor for spatial skill sorting discussed by the creative class literature. Our analysis also adds to the general debate on heterogeneity in amenity preferences in migration choices. While we do not find skill levels to be a relevant dimension of preference heterogeneity, we confirm family-related mobility constraints to affect choice decisions (Nivalainen, 2004; Whisler et al., 2008; Chen and Rosenthal, 2008; Couture and Handbury, 2020).

Secondly, we add to the unresolved debate about the effectiveness of supply-oriented as opposed to demand-oriented approaches for attracting human capital to a city. The proponents of demand-oriented policies emphasize the importance of providing attractive conditions for firm location in the first place (e.g. Berry and Glaeser, 2005; Moretti, 2013; Diamond, 2016). Related measures such as discretionary tax breaks or subsidies have been studied extensively (e.g. Greenstone et al., 2010).[4] Evidence on the effectiveness of supply-oriented measures such as subsidizing cultural activities is rather scarce.[5] Our results indicate that the effectiveness of such policies likely rests on differential constraints on mobility and affordability of cost of living rather than differential preferences, as the

[4]Greenstone et al. (2010) compare counties that narrowly won a bid to attract a large manufacturing plant to the new plant's runner-up choice and find large positive effects on local productivity and wages in the winning county.

[5]As an exception, Buettner and Janeba (2016) show that subsidizing theatres is effective in attracting highly educated people, albeit this result may reflect both differential preferences in location choice or differences in mobility between skill groups.

majority of respondents in our choice experiment, irrespective of the skill level, is willing to sacrifice comparable proportions of their wages to live in an amenity-rich city.

Hence, our results also have welfare implications related to the increasing economic divergence between affluent and less prosperous places that is partly driven by the skill-intensity of the local workforce. According to Diamond (2016) and Diamond and Moretti (2021), the relative real consumption premium of living in a prosperous region is higher for high-skilled than for low-skilled workers.[6] This finding, joint with the new insight that preferences for urban amenities are astonishingly similar across skill groups, indicates that observable skill sorting must be due to the incapability of less skilled individuals to move to and afford living in amenity-rich places. This, in turn, implies significant welfare losses.

Lastly, we contribute to a growing literature that studies stated preferences to gain insights into individual behaviour (see for example Barsky et al. (1997) for evidence on risk tolerance and time preferences; Benjamin et al. (2012) for measures of subjective well-being; Hainmueller and Hopkins (2015) for attitudes towards immigration; or Wiswall and Zafar (2018) for gender differences in the preferences for job characteristics). We are the first to apply the stated-preference approach to the valuation of urban amenities.

The article is structured as follows. The next section introduces the representative online panel we use and discusses the design of our choice experiment and the operationalization of the included amenities. Section 3 lays out our empirical strategy based on a random utility framework and latent class logit models. Section 4 reports our willingness to pay estimates for urban amenities. Finally, Section 5 discusses the implications of our results and concludes.

2 Data and Experiment Design

2.1 The Payback Online Panel (POP)

Our survey sample is drawn randomly from the Payback Online Panel, which is the largest offline sampled representative online panel in Germany. It is a probability based sample of 31 million customers from Germany's largest bonus point program, covering almost half of all German households and spanning all social strata. In terms of socio-demographic characteristics, Payback cardholders are identical to non-users. In addition, we use survey weights based on data from the Federal Statis-

[6] Diamond and Moretti (2021) show that college graduates attain roughly the same real consumption levels in cities with a high cost of living (due to higher wages in those places) as in less expensive cities, while for non-college graduates they find a significant negative relationship between real consumption and cost of living.

tical Office and KANTAR that correct for differences between the sample and the target population.[7] Another distinctive advantage compared to other online-based surveys is that the recruitment for the panel is based on the offline address data of the payback bonus program, which ensures that selection along participation is less of an issue than in other online datasets. For the panel invitations, Payback uses the demographic data of all cardholders to create a sample that is representative of the overall German population. Each respondent is verified by postal contact and paid for his or her participation in the online survey.[8] Because of these unique benefits, the response rate of the panel is comparatively high, at almost 50%. In addition, Payback panel members may participate in a maximum of 20 surveys per year to ensure that they do not become overly experienced in answering surveys. For our survey, we use a stratified random draw of the POP of individuals between 18 and 45 years old in the active German labour force. We concentrate on this segment of the population as the job and city choice is most relevant for them. In order to gain detailed insights into preference heterogeneity by education, our sample is disproportionately stratified. We collect two sub-samples, one for persons with and one for persons without tertiary education, which are representative for the respective subgroup of the population. In this way, roughly 45 % of the 2,200 respondents in our survey are college educated.

2.2 The Survey Experiment

The survey contains three blocks. In the first block, we collect a wide range of data on the demographic characteristics, the employment and family status, the highest educational degree, the occupation, the self-assessed ability to move between cities, and the current place of residence of the respondents. This enables us to analyse rich patterns of preference heterogeneity for urban amenities. A second block is dedicated to the choice experiment which is described in detail below. A final block contains in-depth questions about people's motives for the stated preferences which we use to uncover broader insights on the patterns of preference heterogeneity for urban amenities. In addition, we collect in the last block sensitive information on household income. Since the relatively complex questions in the choice experiment require a quiet environment for thinking about the trade-offs in the decision scenarios rather than a hasty click on the go, we excluded the possibility to answer the survey on a smartphone.

[7] Due to the good data quality, the panel has been used for several studies in the social sciences and economics (e.g. Neuner and Wratil, 2020; Wegwarth et al., 2020; Riehm et al., 2020).

[8] The payout for a 10 minute survey like ours consists of 100 bonus points in the Payback program, which is equivalent to one euro.

Choice Experiment Design. At the core of our survey is a choice experiment which we pre-registered with the AEA RCT registry (RCT ID: AEARCTR-0005574). The experiment consists of seven randomized choice scenarios per survey participant. A respondent has to choose between two hypothetical job offers in two different cities that differ by a combination of earnings and the quality of urban amenities, see Figure A1 in the Appendix. All other aspects of the job offer are kept identical, as stated to the respondents at the beginning of the experiment. This also implies equal rents and prices of living across cities such that the wage differences between both job offers should be interpreted in real terms. One of the main advantages of this stated-preference approach compared to the revealed-preference literature is that the amenity and real wage trade-offs faced by individuals are not confounded by unobservable factors. In addition, we tell respondents that the chosen city is both, place of residence and place of work, and we thus abstract from commuting. In the revealed-preference literature, commuting actually further complicates the identification of the true causal effect of urban amenities, as these studies typically need to assume a correspondence between residence and place of work. The possibility to abstract from commuting is hence another advantage of the experimental setting.

We explicitly state that the choice is between two hypothetical cities with at least 50,000 inhabitants with no reference to real cities.[9] In this way, the amenity measures clearly relate to similarly sized cities without a bias from unknown city perceptions. In addition, we do not include the option of staying in the respondent's current home city to counter the risk of an implicit comparison of the alternatives with a subjective (and thus indeterminate) reference.

The urban amenities chosen for the hypothetical job offers should be relevant and easily tangible at the same time. While it may seem ideal to elicit preferences for a large number of specific amenities (e.g. theatres, parks, playgrounds etc.), the number of choice attributes must be limited to a cognitively manageable level. Scenarios with many attributes typically strain the attention of the survey participants (e.g. Lancsar and Louviere, 2008; Watson et al., 2017). Following the corresponding recommendations, we restrict the set of urban amenities to six readily understandable main categories which are explained to the respondents on an introduction page. This introductory screen includes a full description of the amenities and was displayed for at least 30 seconds to ensure that respondents absorb the information. For instance, we explain to respondents that "cultural amenities" refer to the supply and variety offered locally in terms of concerts, theatres, museums,

[9] We chose this restriction to abstract from the choice between urban and rural environments. The threshold of 50,000 is based on the minimum requirement of the European Urban Audit to classify a city as medium-sized (Feldmann, 2008).

sports events, restaurants, and bars. Providing such a definition for each amenity ensures that respondents develop a similar mindset for the different types of amenities.

Each amenity attribute has three possible levels. The first attribute is the hypothetical income of the respondent, which can either be the respondent's last monthly wage or be a 3 % or 5% higher wage.[10] This anchoring to actual wages ensures that scenarios are closer to a real job offer choice. Regarding the place-based amenities, respondents were informed that the quality of these urban attributes have been assessed by an expert rating to be either of low, medium or high quality.

Randomisation. Ideally, each respondent would evaluate each possible scenario such that we had complete information about preferences on all combinations of attribute-levels in our sample. However, with seven different decision attributes and three different levels per attribute, the total number of possible decision scenarios for the experiment is 2,309,391 and thus far exceeding the possibility of including all hypothetical scenarios in the survey. Therefore, we limit the amount of decision scenarios to a reasonable number that still guarantees that we can estimate the implicit willingness to pay for each of the amenities. Since not all possible scenarios are equally informative, the number of combinations examined can be greatly reduced by imposing some assumptions. In addition, a high number of uninformative scenarios would increase the variance of the estimates. Hence, eliminating non-informative scenarios is also relevant to obtain more accurate estimates, with the drawback that additional assumptions may introduce bias to the estimates if the assumptions are at odds with respondents' actual choice behaviour (see Walker et al., 2018, for a discussion of the robustness of deisgns with misspecified prior parameters). These considerations are related to a large literature on D-efficient choice experiment designs that aim to maximize the variation of attributes in experiments to reduce the standard errors of willingness to pay estimates. However, this type of design (e.g. Kuhfeld et al., 1994; Street and Burgess, 2007) requires a fully pre-specified econometric model and good prior information on the likely parameter values of all model parameters to work well. This stands in contrast to another literature on conjoint experiments in political science that often apply unrestricted attribute randomization to minimize bias in choice coefficients at the cost of higher standard errors (Hainmueller et al., 2014). Our approach lies in the middle. On the one hand, we do not pre-specify the econometric model and all parameters beforehand, since we are the first to apply a choice experiment to our specific question and no good pre-specified model is available.

[10]These wage-levels were determined based on a small pre-test of 50 respondents. For the pre-test we included wage differences of up to 10 % to represent the inter-city wage of differential in German cities more closely. However at the 10 % difference only few respondents choose the alternative with lower wages, which led us to lower this maximum difference in the survey.

On the other hand, we do not use fully unrestricted randomization, as this would increase the risk that some amenity valuations can not be precisely measured. However, all of our restrictions are motivated by findings in the literature on stated-preference experiments. In particular, our design is most related to random designs with partial restrictions that Walker et al. (2018) found to be robust for a larger range of true willingness to pay parameters than D-efficient designs.

In particular, we assume that only differences in the individual amenity and wage attributes themselves and their two-level interactions have a significant influence on decisions, which greatly reduces the amount of scenarios. In this case, additional interaction effects between three or more attributes are not measurable, but these are often of only minor importance (Louviere et al., 2000). Therefore, our design of the choice scenarios is based on a resolution four orthogonal array (L243.3.20) of the possible attribute combinations, which contains only 243 alternatives (Grömping, 2018). If all possible unique combinations of the 243 alternatives are considered, there are 29,403 possible decision scenarios.

We impose three further restrictions on the design. First, we exclude strictly dominated choices from the set of decision scenarios. To do so, we assume that there is a clear preference ordering for wages and all amenity attributes except for social diversity. This means that for these six attributes a higher level is at least not perceived to be worse than a lower level. In the case of social diversity, we allow preferences to go in both directions as there might be preferences for both lower and higher levels of social diversity in the population. We identify and eliminate dominated choices, i.e. choice scenarios where the attribute "social diversity" is the same in both alternatives and where all other attributes in one city are at least as good as in the other one. This reduces the number of scenarios to 27,846.

Second, for otherwise identical scenarios with equal wages for both job offers, we only keep those scenarios for which this is the actual monthly wage. This means that we assume that the wage level is irrelevant for the preference for amenities if the wage is identical in both alternatives. Of several otherwise identical scenarios with the same wage in both alternatives, we therefore keep only one. This reduces the number of scenarios to 17,961.

Third, to reduce the cognitive load, we only retain choices where at least 3, but at most 4 factors are different in the two alternatives, further reducing the number of scenarios to the final set of 6,435. This last restriction serves a different purpose than the others. While other restrictions aim to reduce the standard errors of our willingness to pay estimates at the cost of some minor bias against fully randomized choices, this restriction potentially acts in the opposite direction. It

reduces the potential bias of answers as respondents are better able to make meaningful choices if they can fully grasp the differences between alternatives and only have to compare a limited number of attributes.

2.3 Choice of Urban Amenities

The amenity categories are chosen to represent a wide range of factors that are typically included in qualify of life measures such as European Union (2013) and, in most cases, also coincide with urban amenities that have been discussed in the revealed-preference literature on urban amenities and city choice. In particular, we include the following six amenity categories: cultural offerings, social diversity, urban ecology, infrastructure, economic dynamism and family friendliness. An overview of the sub-categories related to each main category can be found in Table 1, including references to studies that use similar concepts to operationalize these amenities.

Table 1: Main amenities included in the choice scenarios and related attributes

Main Attribute	**Sub-attributes**	**Example for Related Literature**
Cultural offerings	Concerts and other cultural events	Florida (2002), Clark et al. (2002)
	Theatres and museums	Falck (2011), Büttner & Janeba (2016)
	Restaurants, bars and cafés	Glaeser & Gottlieb (2006), Buch et al. (2017)
	Local sporting events and clubs	Clark et al. (2002)
Social Diversity	Diversity of inhabitants in terms of origin	Florida (2002), Vossen et al. (2019)
	Diversity of inhabitants in terms of religion	Florida (2000)
	Diversity of inhabitants in terms of sexual orientation	Florida (2000), Vossen et al. (2019)
	Diversity of inhabitants in terms of lifestyles	Tönnies (1887), Simmel (1903)
Urban Ecology	Air quality	Bayer et al. (2009), Carlsson and Johansson-Stenman (2000)
	Urban green spaces	Backman & Nilsson (2016), Kim & Jin (2018), Panduro et al. (2018)
	Proximity to natural recreation areas	Niedomysl & Hansen (2010), Backman & Nilsson (2016)
Infrastructure	Cycle path network	Buch et al. (2017)
	Local public transport	Glaeser et al. (2008), Buch et al. (2017)
	Connection to the interregional transport network	Buch et al. (2017)
	Availability of housing	Dieleman et al. (2000)
Economic Dynamism	Employment growth	Arntz (2010), Niedomysl & Hansen (2010)
	Jobs in research and development	Lee & Kim (2019), Florida(2002)
	Number of new firms founded	Florida (2002)
Family Friendliness	Availability of childcare	Arntz (2010)
	Quality of schools	Black (1999), Arntz (2010)
	Availability of playgrounds	Arntz (2010)

The first attribute refers to cultural offerings, which we deliberately define very broadly. Since our measure includes restaurants and cafés as well as sports clubs and events, it reflects Florida's 2002 notion on the importance of 'street level culture' for the individualistic life styles of the creative class. Several studies confirm a positive correlation between the regional share of creative people and cultural amenities (e.g. Boschma and Fritsch, 2009; Asheim and Hansen, 2009). Yet, critics doubt the causal nature of this link due to reversed causation (e.g Markusen, 2006). To tackle this issue, Falck et al. (2011) use the presence of a baroque opera house as an instrument for cultural activities and find a higher share of high-skilled people in proximity to these opera houses. Yet,

the validity of this identification strategy has been criticized. Finding appropriate instruments that are unrelated to demand characteristics proves generally difficult (Bauer et al., 2015). Including cultural offerings in our experiment hence allows for testing a major premise of the creative class literature. Moreover, cultural amenities have also been discussed by other strands of the literature that emphasize the role of cultural leisure activities and the consumer city for attracting high-skilled people (Clark et al., 2002; Glaeser et al., 2001).

Our second attribute, social diversity, is closely related to a literature that stresses the importance of diversity and, more specifically, a tolerant urban environment for creative individuals. The basic argument of this literature goes back to urban sociology (Tönnies, 1887; Simmel, 1903; Jacobs, 1961) and has been picked up in a more recent regional economics literature by Florida (2000, 2002). The underlying idea is that a diverse population composition allows for an easier integration of new-comers and a freer self-expression of talented people. This is due to the generally higher acceptance of non-conformist behaviour in socially diverse places. In fact, a number of studies find that indicators of openness are positively related to the location of high-skilled and creative people (e.g. Florida et al., 2008; Haisch and Klöpper, 2015), albeit its impact tends to be limited (Martin-Brelot et al., 2010; Vossen et al., 2019). In line with this literature, we define socially diverse cities to be diverse with respect to the origin, religious affiliation, sexual orientation and general lifestyles of its inhabitants. In fact, openness to gay and lesbian people has been identified to be a key proxy for regional openness and tolerance (Florida, 2002).

Urban ecology, our third attribute, relates to the quality of the natural environment within cities such as air quality and urban parks, but does not include climate conditions that have been discussed extensively by Glaeser and coauthors (e.g. Glaeser and Tobio, 2007). We exclude climate conditions because they are not subject to any policy choices. Moreover, climate differences within Germany are much less pronounced than within the US and, hence, unlikely to play a major role in location choices. However, the value attached to other natural amenities such as air quality and urban parks has been shown in several studies applying either hedonic price analyses or contingent valuation methods.[11] These studies also tend to suggest higher valuations for such amenities among high-skilled, high-income groups (e.g. Carlsson and Johansson-Stenman, 2000; Kim and Jin, 2018; Panduro et al., 2018) or directly link the share of highly educated people to city characteristics such as recreational areas (Backman and Nilsson, 2018). We hence include air quality, urban parks and the proximity to natural recreation areas as the factors that we associate with urban ecology in our

[11] Contingent valuation methods have been criticized extensively for potentially overstating the willingness to pay (Glaeser et al., 2018).

experimental setting.

Fourth, we use a broadly defined infrastructure amenity that captures transport-related characteristics as well as housing availability. With the latter, we deliberately abstract from housing prices and only capture an indicator of the duration and effort needed until suitable accommodation is found.[12] In line with this, local housing market factors such as the share of social rental housing have been shown to positively affect residential mobility in urban areas (Dieleman et al., 2000; Vlist et al., 2002).Regarding the quality of the transportation network, Buch et al. (2017) find that the accessibility to the international transport network are more relevant for location choices of high-skilled people.

Our fifth attribute is a general non-wage measure of economic dynamism of a city which we capture by employment growth, local jobs in R&D and the number of new firm foundations. One the one hand, the indicator thus captures employment options of workers in that region that have been found to be an important location factor (Arntz, 2010). Moreover, the emphasis of the creative class literature on the importance of local technology firms, regional innovativeness and a pre-existing pool of talents (e.g. Florida, 2002) justifies its consideration in the stated-preference experiment.

Lastly, we also include an attribute for the family friendliness of a city to account for the potentially different preferences of parents and non-parents. A family friendly place is considered to have better childcare availabilities, a high quality of local schools and more playgrounds. The role of childcare availability for the location choice of high-educated people has been shown by Arntz (2010), while good schools have been discussed extensively for the US context (e.g. Glaeser et al., 2001; Florida et al., 2011). In line with this, Bayer et al. (2007) show that the willingness to pay for good schools increases in education and income.

While we try to ensure that people associate similar sub-factors with the six urban amenities by providing information on the introductory page, note that people might still put a different weight on these sub-factors. For this reason, we pose some additional questions about the relative perceived importance of the underlying sub-factors after the experiment. For this, respondents were asked to allocate a fixed budget of relevance points to the sub-aspects for each main attribute according to their perceived subjective weight for each sub-factor in the stated choices. As an example, a respondent could put most weighting points for cultural amenities on theatres, some on restaurants

[12]We refrained from including housing prices or local cost of living as an additional choice factor in the experiment because a second price variable would complicate the choice decision for the respondents and the derivation of the willingness to pay for urban amenities. In this case, the relevant real income difference between two alternatives would not only depend on the wage and rent differences themselves, but also on the share that individuals are willing to pay for housing.

and museums, but no weighting points on sports events. This additional information hence allows to unravel the relative importance of specific sub-attributes (e.g. theatres vs. restaurants) for the willingness to pay for a broad amenity category. Moreover, we can test whether these sub-factor weights differ between college and non-college educated individuals.

2.4 Descriptive Statistics

In order to consider accurate responses only, we first discarded 17 cases with speedsters (with a response time of less than four minutes for the entire survey). Second, we excluded 94 respondents who clicked through more than five questions in a row. Third, we did not include two cases with an implausible combination of wages and hours of work. After these quality improvement measures, the total number of respondents reduces to 2,125.

Table A1 in the Appendix provides an overview of the sample characteristics for the college and non-college educated sub-samples. In total, 963 college graduates participated in the survey and provide 6,741 stated city choices, while the 1,162 non-college graduates contribute 8,134 city choices to the analysis. Compared to non-college graduates, college graduates in our sample are more often full-time employed, earn higher wages, are more likely to live in a large city and are more likely to be married, but also more likely to be childless. Moreover, the self-assessed difficulty to move, which we surveyed on a 5 point scale from "very easy" to "very difficult", indicates somewhat distinct barriers to mobility, see also Figure A5 in the Appendix. Only 5% of the respondents find it very easy to move, thus contradicting the classic assumption in the hedonic pricing literature of frictionless labour mobility. The largest part of nearly 40% find it "rather difficult" to move and almost 17% even consider it "very difficult" to move place of residence. College graduates less often indicate to find it "very difficult" to move, but differences across education groups are actually less strong than expected given the ample evidence for lower migration costs among high-skilled individuals. Differences by educational attainment turn out to be more severe for female respondents. Moreover, and in line with the literature, respondents above 30 years and women seem to face higher difficulties to move than younger and male respondents, irrespective of the education level.

Table 2 gives first insights into the relative importance of amenities by skill groups. For each amenity, we list how often the city was chosen when an amenity was set to the highest level, independent of the other amenities and the second alternative. Hence, if the specific amenity attribute or the wage had no impact on the choice, the probability that the city is chosen should be roughly 50%. However, for both college and non-college graduates and for all amenities as well as for the

wage attribute of the job offer, the choice probabilities exceed 50% at a significance level of 1%. Cities that offer wage increases by 5% were chosen in more than 60% of the cases. Cities with high economic dynamism were opted for in 58% of the cases while the other amenities have all about the same choice rates. Also note that we find surprisingly little differences between college and non-college graduates.

Table 2: Popularity of amenity by education

	Wage	Culture	Diversity	Infrastructure	Family Fr	Ecology	Econ Dyn
Non-College	0.62	0.53	0.53	0.53	0.55	0.52	0.58
College	0.61	0.54	0.53	0.55	0.56	0.53	0.58

NOTE.- Share of respondents choosing an alternative if the value of the factor is high, independent of values for all other factors and the values in the second alternative. Separately for college and non-college respondents. Using representative survey weights.

The survey also provides insights into the importance of the sub-factors for the individual choice decision, see Table 3. In general, people perceive restaurants, bars and cafés as the most important sub-factor of cultural amenities. Theatres and museums turn out to be least important. Contrary to the expectations, college graduates only report a marginally higher relevance of theatres or museums than non-college graduates. When it comes to social diversity, diversity in terms of lifystyles appears to be most important to respondents, followed by diversity in terms of origin and sexual orientation. Among all sub-factors associated with the quality of the infrastructure, the availability of housing received the highest weight, followed by public transport and interregional connectedness. Among the sub-factors of family friendliness, school quality was perceived most important, while among the ecological quality all sub-factors are similarly important. When it comes to local economic dynamism, people value employment growth the most.

As a robust finding for all urban amenities, differences between college and non-college graduates are small to negligible, albeit not always insignificant. While this is surprising given the discussion in the literature regarding preference heterogeneity, especially in terms of cultural amenities and social diversity, this finding is an advantage for the subsequent analysis of the willingness to pay for urban amenities as it ensures that the factors associated with our main attributes are by and large comparable across both groups. Hence, a lack of difference in the willingness to pay for cultural amenities between college and non-college graduates is unlikely to mask differences in what people associate with this amenity.

Table 3: Importance of sub-factors by education

	Total	Non-College	College	Difference
		Culture		
Concerts, other cultural events	0.22	0.22	0.22	0.00
Theaters and museums	0.16	0.16	0.18	-0.02***
Restaurants, bars, cafés	0.41	0.41	0.40	0.01
Sports events and clubs	0.21	0.21	0.20	0.01
		Social Diversity		
Origin	0.26	0.25	0.27	-0.01
Religion	0.19	0.20	0.18	0.02*
Sexual orientation	0.21	0.22	0.19	0.03**
Lifestyle	0.34	0.33	0.37	-0.04***
		Infrastructure		
Biking and road network	0.17	0.16	0.18	-0.02*
Local public transport	0.26	0.27	0.26	0.01
Connection to interreg. transport network	0.22	0.22	0.23	-0.01
Availability of living space	0.35	0.36	0.34	0.02*
		Family Friendliness		
Availability of childcare	0.32	0.31	0.34	-0.03***
Schol quality	0.40	0.40	0.39	0.01
Availability of playgrounds	0.28	0.29	0.27	0.02**
		Ecology		
Air quality	0.36	0.36	0.36	0.00
Green urban spaces	0.35	0.35	0.34	0.01
Proximity to local recreation areas	0.29	0.29	0.30	-0.01
		Economic Dynamism		
Employment growth	0.44	0.44	0.42	0.02**
Jobs in research and development	0.32	0.31	0.34	-0.03**
Number of business foundations	0.25	0.25	0.24	0.01

NOTE.- Average indicated relative importance of sub-factors by education and t-test of differences. Using representative survey weights. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3 Latent Class Logit Estimation

In order to estimate the willingness to pay (WTP) for urban amenities from our extensive data on hypothetical choices between cities, we mainly rely on a latent class logit model. The main advantage of this model is that it incorporates a discrete representation of unobserved preference heterogeneity between respondents. In particular, the model groups individual respondents into C different preference classes based on their choice behaviour and provides different parameter values for each class. Thus, it allows for an easily interpretable representation of unobserved preference heterogeneity.

Similar to most decision models, the latent class logit is based on a Random Utility Framework (RUM) to represent the decisions of individuals (Thurstone, 1927; McFadden, 1974). On each choice

occasion t, a decision maker i chooses an alternative j if her utility is larger than the utility of any other alternative. The utility of person i choosing alternative j for choice t is given by

$$U_{ijt} = \beta_c' x_{ijt} + \varepsilon_{ijt} \,, \tag{1}$$

where x_{ijt} is a vector of different city characteristics and wages for the hypothetical job offer. Correspondingly, β_c is a vector of coefficients which can be interpreted as the marginal utility of the respective observed attributes x_{ijt}. The distinctive feature of the model is that the parameters β_c are allowed to differ between the C classes of respondents. Lastly, ε_{ijt} is an i.i.d extreme value distributed random term that represents factors influencing utility which have not been observed by the researcher but are known to the decision maker.

Conditional on knowing the class membership of respondent i the probability of observing her choice sequence is given by

$$P_i(\beta_c) = \prod_{t=1}^{T} \prod_{j=1}^{J} \left(\frac{\exp(\beta_c x_{ijt})}{\sum_{k=1}^{J} \exp(\beta_c x_{ikt})} \right)^{d_{ijt}} \,, \tag{2}$$

where d_{ijt} is a dummy that takes on the value one if i chooses alternative j in choice occasion t. Hence, if we knew the preference class composition of the sample, we could simply maximize the probability to observe our data $\prod_{i=1}^{N} P_i(\beta_c)$ to get an estimate for β_c for the C preference classes.

However, since we do not know what preference class each respondent belongs to, we need to evaluate their decisions for each possible value of β_c. Thus, the probability of observing the choice sequence of individual i becomes a weighted average of equation 2 over the population shares $\pi_c = f(\beta_C \mid \vartheta)$ of respondents in class c:

$$P_i(\vartheta) = \sum_{c=1}^{C} \pi_c \prod_{t=1}^{T} \prod_{j=1}^{J} \left(\frac{\exp(\beta_c x_{ijt})}{\sum_{k=1}^{J} \exp(\beta_c x_{ikt})} \right)^{d_{ijt}} \,. \tag{3}$$

Consequently, the probability to observe the choices in the data is a finite mixture of C conditional logit probabilities. The resulting choice model is a discrete version of the mixed logit model (e.g. McFadden and Train, 2000) which is flexible enough to approximate any random utility model given the right choice of variables and mixing distribution $f(\beta_C \mid \vartheta)$.[13] Note that for the case of $C = 1$,

[13] While many applications of mixed-logit models assume continuous mixing distributions (e.g. Basile et al., 2008; Dahlberg et al., 2012; Griffith et al., 2014), using a discrete representation of preference heterogeneity has some advantages. First, no direct assumption on the type of continuous distribution is required. Second, there are easily interpretable coefficient estimates for each preference class and class membership can directly be linked to individual characteristics. Greene and Hensher (2003) and Hess et al. (2011) compare mixed logit models with discrete and continuous mixing distributions and highlight the advantages and disadvantages of each model.

i.e., perfect choice homogeneity, the model reduces to a simple conditional logit model.

Computing the sum of the natural logarithm over all N individual choice sequence probabilities yields the log likelihood

$$LL(\Theta, B) = \sum_{i=1}^{N} \ln \left(\sum_{c=1}^{C} \pi_{ic} \prod_{t=1}^{T} \prod_{j=1}^{J} \left(\frac{\exp(\beta_c x_{ijt})}{\sum_{k=1}^{J} \exp(\beta_c x_{ikt})} \right)^{d_{ijt}} \right) . \tag{4}$$

We use both Bhat's (1997) Expectation-Maximization (EM) algorithm and standard gradient-based methods to maximize this log likelihood function following Yoo (2019). Since the estimates from the computationally fast expectation maximization algorithm are used as the starting point in the classical maximization routines, both methods lead to the same results and we can use the classical gradient-based approach (see Train, 2008, for an illustration) to obtain standard errors for our EM estimates. As the number of classes C is still an open parameter, we compare the Bayesian information criterium (BIC) of models with different numbers of classes and choose the model with the lowest BIC.

The final estimates of the model enables us to calculate the implicit willingness to pay for decision attributes in each of the C classes very easily. These willingness to pay measures are simply the class-specific coefficients of the respective attributes divided by the class-specific wage coefficient. Intuitively speaking, these ratios correspond to the increase in the probability to choose a city if the amenity improves by one category relative to the increase in the probability to choose a city if the wage increases by 1%. It is thus the appreciation of an amenity in percent of the wage. Accordingly, we use the delta-method to compute the standard errors for the WTP parameter.

While, in principle, it is possible to incorporate individual information into the class membership distribution (see for example Yoo, 2019), we instead keep the probability π_{ic} that an individual i belongs to a class c as a fully free parameter and then estimate the class allocation for each individual in our data. Hence, the class memberships of individual respondents are fully endogenously determined from their choice behaviour. Subsequently, we use the predicted probability to belong to each class to estimate how membership to a specific class relates to a set of individual characteristics z_i with cross-validated lasso regressions. This allows us to estimate ex-post which personal characteristics are associated with specific choice behaviours.

3.1 Empirical Model

For our empirical model we rely on a similar specification of the latent utility term $U_{ijt} = \beta_c x_{ijt}$ from equation 4 for most of our estimates. This specification is given by

$$U_{ijt} = \beta_w \text{WAGE}_{ijt} + \sum_{k=2}^{3} \beta_{ck} D_{\text{CULTURE},k,ijt} + \sum_{k=2}^{3} \beta_{dk} D_{\text{DIVERSITY},k,ijt} + \sum_{k=2}^{3} \beta_{ik} D_{\text{INFRASTRUCTURE},k,ijt} + \sum_{k=2}^{3} \beta_{ek} D_{\text{ECOLOGY},k,ijt} + \sum_{k=2}^{3} \beta_{fk} D_{\text{FAMILY},k,ijt} + \sum_{m=2}^{3} \beta_{yk} D_{\text{DYNAMISM},k,ijt}. \quad (5)$$

Note that we use dummies for each quality category of every attribute to model the difference of a high or medium level of an amenity against a baseline of low quality. Thus, in the final logit model, these two coefficients represent the change in the probability to choose a city if the quality of the amenity increases from low to medium or from low to high respectively. The specification thus allows for non-monotone amenity preferences.

In contrast, we only use a single linear term for the wage increases in percentage terms for the sake of simplicity. While it would also be possible to use a representation of the wage that allows for non-monotonous preferences with respect to wage, this simpler specification makes calculating the willingness to pay for the other attributes more straightforward. Nevertheless, we use a specification with separate coefficients for the different wage levels to assess whether this simplification is justified. The very linear form of this more detailed wage specification in estimated models, see Figure A2 in the Appendix, hints that the linearity assumption is an unproblematic constraint.

Since one of our main research questions is on the effectiveness of using amenity-based policies to improve a cities' skill-structure, we estimate each of our models separately for individuals with and without college education.

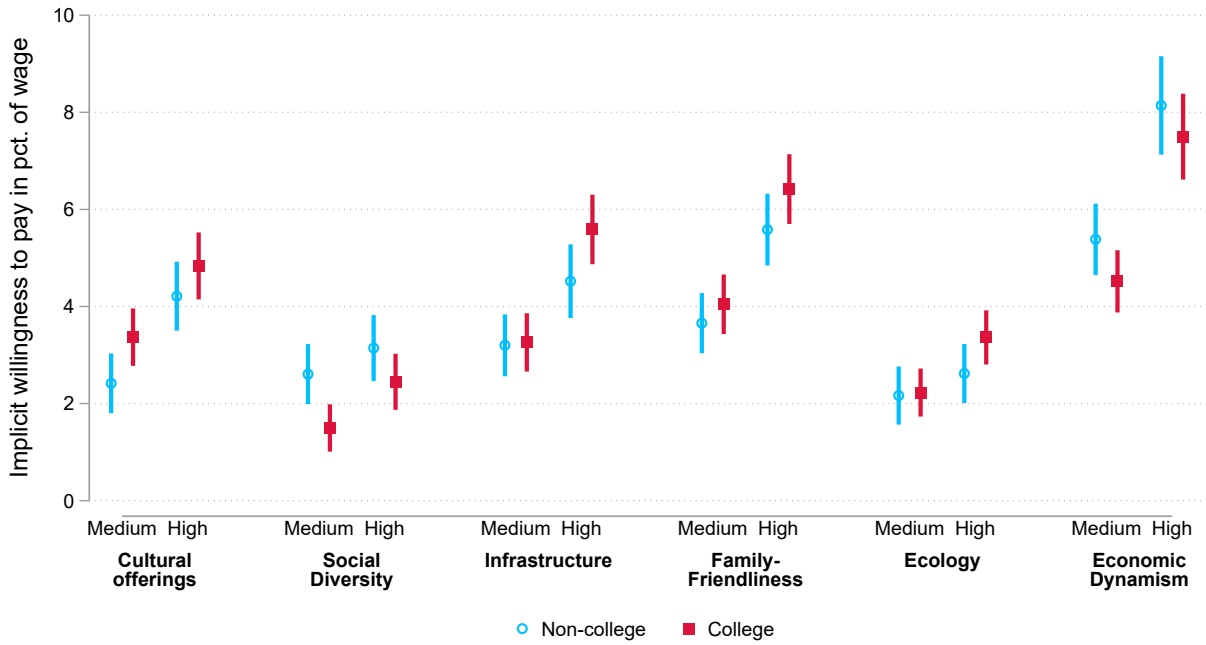
Moreover, even though we allow for two-level interactions of the attributes to play a role for latent utility in our experiment design, we do not include them in our baseline specification. While including the full set of interaction terms would result in a large amount of coefficients with little informative value due to correlations, we test for the significance of selected interaction effects which appear plausible. Especially due to the different nature of the factor economic dynamism, interaction effects seem meaningful. However, as can be seen in Figure A4 in the Appendix, the coefficients are (except for one) not significantly different from zero.

4 Preferences for urban amenities

4.1 Baseline conditional logit specification

As a first step, we estimate simple conditional logit models separately college and non-college respondents and abstract from any heterogeneity with-in the groups. This baseline represents a simplification of our main latent class logit model to a single preference class and gives us an initial overview on the importance of single attributes, the magnitude of the willingnesses to pay, and significant mean differences across both groups of educational attainment.

Figure 1: Baseline conditional logit estimates of WTP



NOTE.- Baseline conditional logit estimates of the willingness to pay for quality increases from low to medium (or low to high) for different amenity attributes for both a college and a non-college sample of individuals. The WTP for each attribute is reported with its 95 % confidence interval. Each WTP is given by the choice coefficient of the respective amenity divided by the coefficient of the wage. The standard errors of the WTPs are constructed using the delta method. Survey weights to are used for both specifications.

The resulting WTPs are depicted in Figure 1, with the corresponding estimates provided in Table A2 in the Appendix. We report all WTP estimates separately for individuals with a college degree (red square) and those without a college degree (blue hollow circle). We observe that respondents are willing to give up a positive amount of pay for each of the six amenities. The willingness to pay estimates for increases from low to medium quality range from 2% to 6% of wages irrespective of education, and 2% to 8% for increases from low to high.

Interestingly, the willingness to pay in percent of wages is not significantly different between

college and non-college graduates for none of the amenities. At most, the willingness to pay for social diversity is lower for college-educated individuals. This is in stark contrast to the creative class literature that highlights the correlation between tolerance of a place and its human capital share. Our estimates indicate that the positive correlation between the share of high-skilled and local tolerance found in previous studies based on revealed preferences such as (e.g. Florida et al., 2008) is unlikely to capture a causal effect.

Interestingly, the most important attribute for both groups turns out to be economic dynamism. Survey participants in both groups are willing to trade off 8% of their earnings to live in a city with high compared to low economic dynamism. One explanation for this is that economic dynamism affects people's expected future income stream when staying in the chosen place and, thus, reduces risks involved in accepting the job offer. Put differently, high economic dynamism serves as an insurance against potential future job losses. If people were perfectly mobile and had no cost of moving, no such insurance would be necessary. The high relevance of economic dynamism hence seems to mirror that most people are actually quite immobile, see Figure A5 in the Appendix, and thus expect their future income stream to depend on local economic growth. In addition, thriving places may also offer more job opportunities to co-moving partners.

The second most valued amenity is family friendliness which according to the sub-factor analysis (see Table 3) is mainly relating to school quality and the availability of childcare. Both of these factors are relevant for (especially female) labour supply and thus expected household income in the chosen city. Infrastructure, including the connectedness of cities as well as the available housing stock, is also valued at almost up to 6% of wages. Thus, employment-related attributes and attributes that are cost relevant for essential goods such as housing or childcare seem to be most important for the relocation decisions of respondents.

However, cultural amenities also turn out to be relevant for city choices: participants are willing to forego up to 5% of their wage to live in a place with great cultural offerings compared to a place with poor cultural offerings. In contrast, the general openness and tolerance of the place as captured by social diversity as well as the ecological amenities seem to be less important, but are still worth about 2% of wages for increases from low to medium quality.

As expected, the marginal utility of further quality improvements (from medium to high) is decreasing for all attributes. For example, for ecological amenities increases from low to medium and from low to high quality are not statistically different from each other. This indicates that the respondents' willingness to pay for further quality improvements is limited, as a medium quality

seems to be perceived as sufficient. Similar but less pronounced diminishing returns are observable for all other attributes.

4.2 Willingness to pay for a latent class logit specification

Next, we allow for preference heterogeneity by estimating a latent class logit model, again separately by educational attainment. By minimizing the BIC (see Section 3), we define the optimal number of classes to be $C = 3$ for both groups. In fact, we find remarkably similar preference classes for college and non-college graduates. Figure 2 shows the willingnesses to pay by class and college education. The WTPs are not significantly different between college and non-college respondents for any class and any amenity. Moreover, the share of respondents assigned to the three classes are almost identical across education groups.

Class 1 (50% of the non-college graduates and 46% of the college graduates) has a similarly high willingnesses to pay for all amenities, with WTPs ranging from 2% to around 10%. In particular, respondents assigned to this preference class are willing to pay up to 8% of their wage to live in a city with high cultural amenities compared to a city with low cultural amenities, however, they are willing to pay even more for infrastructure and family friendliness (each 10%). For this preference class, economic dynamism is among the least important city characteristics.

Class 2 (34% and 41% respectively) has a strong preference for economic dynamism, but also positive WTPs for other urban amenities, albeit slightly lower than Class 1. Hence, the main difference between Class 1 and 2 seems to be the extremely high value attached to economic dynamism. While college graduates in this preference class are willing to forego 25%, non-college graduates are even willing to sacrifice 40% of their wages for a city with high economic dynamism.[14] The difference between the estimates is not statistically significant at conventional levels. While these WTPs appear huge at first sight, remember that economic dynamism can be considered as an indicator of the expected future income stream not only of the individual itself, but of the entire household if there are partners involved. Hence, if highly dynamic places offer better prospects of having a stable full-time employment with growing wages in the future, and this might also apply to someone's partner, differences in expected future income between places of poor or high economic dynamism may actually be large. Since we did not set any restrictions on how long people have to stick to the chosen job, there may well be respondents who value the option of entering a thriving place very high, speculating to improve income prospects after moving to this place. Differences between

[14]These values are found when assuming linearity in the preference for wage; an assumption which is found to be plausible for all classes, see Figure A2 in the Appendix.

college and non-college graduates for the other amenities are again small. At most, college graduates in Class 2 prefer slightly less social diversity compared to non-college graduates in the same class.

Class 3 (16% and 13% respectively) has low amenity valuations and in most cases is not willing to sacrifice any wage for higher amenity levels. The WTP is significantly positive only for infrastructure, family friendliness and economic dynamism, but the amounts are fairly small and always below 2% of the wage. Although we cannot unambiguously rule out that this third class is not a true preference class but captures respondents who simply picked the alternative with the higher wage to complete the survey faster,[15] there are two reasons to believe that this is not the case. First, on average, respondents in Class 3 did not spend less time on answering the choice experiment than respondents belonging to the other classes. Second, choosing the option with the higher wage level differs from the characteristic choice pattern of survey speeders, who typically choose the same alternative A or B in any given choice scenario.

We also checked whether differences between classes reflect differences in the relevance that respondents ascribe to the sub-factors of the amenity categories. However, this does not seem to be the case. The weights that respondents put on the different sub-factors are very similar across classes, both for college and non-college graduates (see Table A3 in the Appendix).

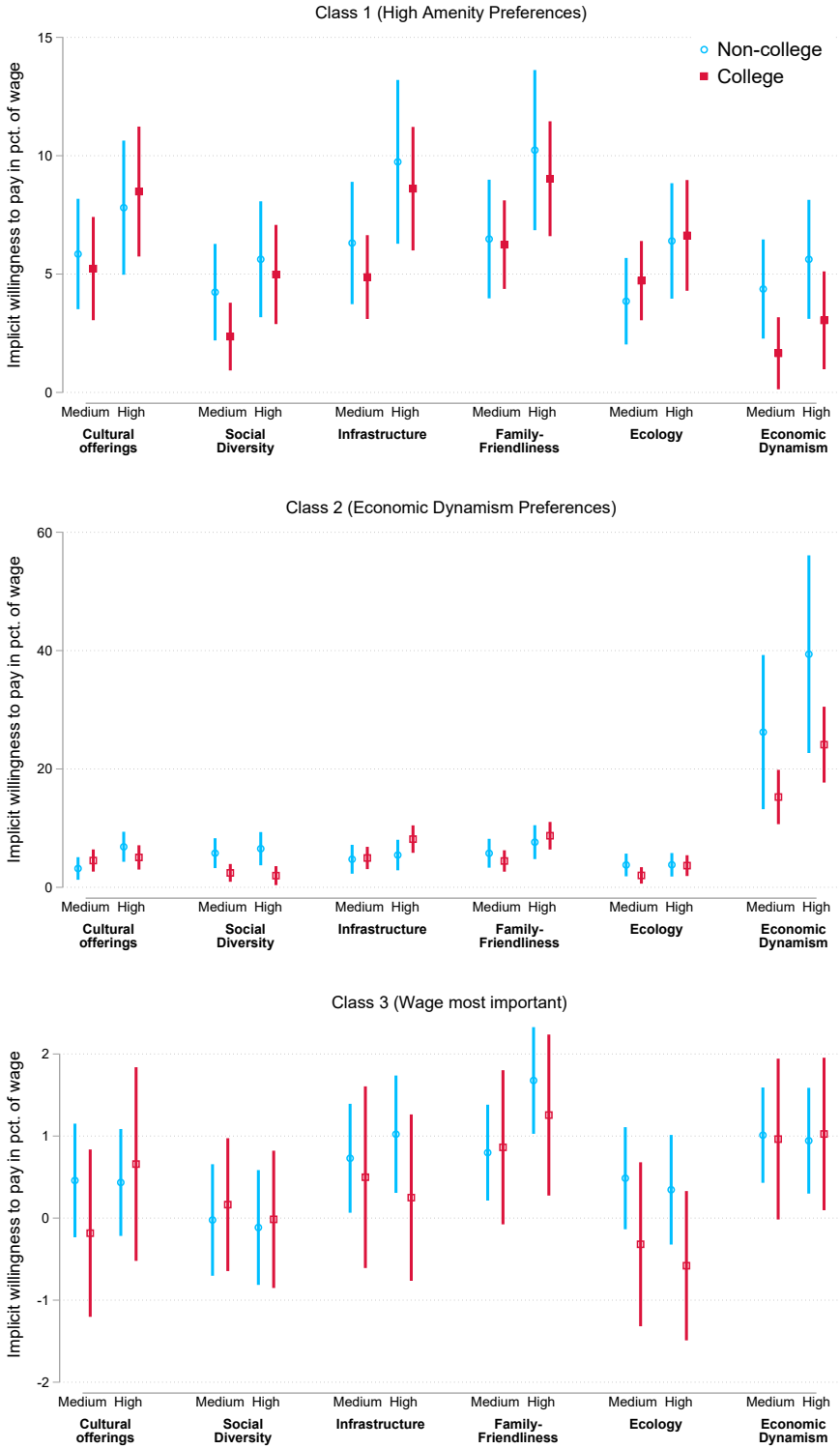
4.3 Preference Heterogeneity by Personal Characteristics

These patterns beg the question: who is sorting into these three different classes? To shed some light on this, we make use of the large set of information on personal characteristics, such as age, family status, number and age of children, difficulty to move, employment status etc. Using the probabilities to belong to Class 1, 2 or 3 as dependent variables, we estimate a lasso regression for each class separately. Table 4 reports the post-lasso OLS estimates on the maintained regressors. Since we find similar results for college and non-college individuals, we display the results for the lasso regression after a joint (college and non-college) latent class estimation. We report the results based on the separate latent class estimations in the Appendix (Tables A4 and A5). Our conclusion, however, is not affected by this.

The (adjusted) R^2 is fairly small for all models, suggesting that the class allocation is largely based on unobservable characteristics. Especially for Class 3, our data provides a poor fit, with an R^2 of only 2%. We only find that individuals who put a high value on wages find it very easy to move, are more often foreigners and less often in marginal employment or unemployed. Hence, to

[15] If this is the case, one of the advantages of a Latent Class Logit model is that erratic behaviour can be absorbed by a separate preference class rather than contaminating the main results in other classes.

Figure 2: Latent class logit estimates of WTP



	Class 1	Class 2	Class 3
No College	0.50	0.34	0.16
College	0.46	0.41	0.13

NOTE.- Latent class logit estimates of the willingness to pay for quality increases from low to medium (or low to high) for different amenity attributes for both a college and a non-college sample of individuals. Each panel reports the WTPs for a different endogenous preference class. The WTP for each attribute is reported with its 95 % confidence interval. For the latent class regression, no command is available yet that allows for the inclusion of weights. Below: Share of individuals assigned to each class.

some extent, this group might be described as pure income maximizers.

The probability to belong to the group of respondents with a strong preference for economic dynamism (Class 2) increases with mobility constraints. These respondents report more difficulties to move, and have characteristics that likely increase mobility costs such as having a partner, having children and, moreover, children below the age of six. Hence, for this group, moving is costly and the expected future income opportunities depend more on local economic development. Consequently, being locked in a poor, deteriorating city may be extremely costly in the long run for this group. In addition, females are more likely to be members of this group, corroborating the reasoning that employment opportunities of a partner are often taken into account when choosing a city with high economic dynamism. In contrast, those with strong preferences for amenities but little interest in economic dynamism (Class 1) are more often not married and have no (young) child, hence reducing the cost of moving and reducing the need to move to a place with positive long run prospects. We conclude that the difference in preferences for economic dynamism between Class 1 and Class 2 is mainly driven by difficulties to move due to private reasons. The great importance attributed to partnership and children is in accordance with the previous literature on amenity preferences and migration patterns (e.g. Nivalainen, 2004; Whisler et al., 2008; Chen and Rosenthal, 2008; Couture and Handbury, 2020). Interestingly, age is not among the important factors driving preference heterogeneity, suggesting that age does not impact these decisions itself but should rather be seen as a proxy for other private circumstances.

We also include a dummy indicator of education in the lasso regressions. However, this regressor is not kept for the regression on the probability to belong to any class. Thus, education is not found to be a relevant factor along which preference heterogeneity occurs. This surprising lack of association between higher education and amenity preferences is consistent across different models and approaches. Thus, although we find that urban amenities are indeed important for city choices, there appears little scope for amenity-based policies to have a significant effect on the local skill structure.

4.4 Creative Class

For now, we have followed the human capital approach and distinguished between individuals with and without college degree. We now turn to an alternative specification proposed by Florida (2002), who groups individuals according to their occupation into those belonging to the creative class and those who do not. To do so, we translate self-reported occupations in the survey into the

Table 4: Correlations of personal characteristics with posterior class probability

	Class 1		Class 2		Class 3	
Gender						
Female	-0.06**	(0.02)	0.05**	(0.02)		
Missing	0.31***	(0.08)	-0.12*	(0.05)		
Wage category - Ref: Below 1500 euros						
1500 to below 3200 euros	-0.01	(0.02)	-0.00	(0.02)		
3200 to belo 4500 euros	-0.05	(0.03)	0.01	(0.04)		
4500 euros and above	0.04	(0.04)	-0.05	(0.04)		
Missing	-0.04	(0.03)	-0.02	(0.03)		
Difficulty to move - Ref: very easy						
Rather easy	0.01	(0.05)	0.10*	(0.04)	-0.11*	(0.05)
Neither nor	-0.02	(0.05)	0.12**	(0.04)	-0.10*	(0.04)
Rather difficult	0.00	(0.05)	0.14***	(0.04)	-0.14***	(0.04)
Very difficult	-0.05	(0.05)	0.18***	(0.04)	-0.13**	(0.04)
Missing	0.03	(0.12)	0.11	(0.07)	-0.16	(0.09)
Partnership - Ref: Single						
In partnership	-0.03	(0.03)	0.06*	(0.02)		
Married	-0.09***	(0.03)	0.12***	(0.03)		
Missing	0.05	(0.08)	0.03	(0.08)		
Number of children - Ref: No child						
One child	-0.08*	(0.03)	0.11**	(0.03)		
Two or more children	-0.11***	(0.03)	0.14***	(0.04)		
Missing	0.03	(0.10)	-0.08	(0.09)		
Young child - Ref: All children above six						
Child below 6 years	-0.09***	(0.03)	0.10**	(0.03)		
Employment type - Ref: unlimited contract						
limited empl. contract	-0.02	(0.03)	0.03	(0.03)		
civil servant	-0.05	(0.03)	0.10**	(0.04)		
self-employed/freelancer	0.08	(0.04)	-0.03	(0.04)		
Missing	0.05	(0.06)	0.03	(0.06)		
Current residence - Ref: No large city						
Large city	0.06	(0.03)	-0.05	(0.03)		
Missing	0.00	(0.04)	0.14	(0.12)		
Age category - Ref: 18-24 years						
25-34 years			0.02	(0.03)		
35-45years			-0.00	(0.04)		
Citizenship - Ref: German since birth						
Foreign			-0.06*	(0.03)	0.05*	(0.03)
Missing			0.08	(0.08)	-0.07	(0.06)
Employment status - Ref: Working full-time						
working part-time			-0.02	(0.03)	-0.02	(0.02)
marginal empl., not employed etc.			0.03	(0.03)	-0.06**	(0.02)
partial retirement, parental leave etc.			-0.01	(0.06)	0.01	(0.05)
Former East Germany						
East			-0.03	(0.02)		
Missing			-0.13	(0.12)		
Creative Core						
Creative Core			0.02	(0.03)		
Missing			-0.01	(0.02)		
Constant	0.61***	(0.05)	0.12*	(0.05)	0.26***	(0.04)
Observations	2125		2125		2125	
Adjusted R2	0.11		0.14		0.02	

NOTE.- OLS estimates of three separate Post-lasso regressions. Dependent variable: probability to belong to a certain class as determined by the latent class logit model. The penalty term minimizing the mean error is found via 10-fold cross-validation. Using representative survey weights. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

occupational titles as in the German Classification of Occupations (KldB 2010, three digit). These are subsequently assigned into the creative core (those in artistic, cultural and innovative jobs), creative professionals (those in business-related services and health care) or none of them. We conduct the equivalent analyses as above and, again, do not find differences in amenity valuations between individuals who belong to the creative class and those who do not (see Figure A3 in the Appendix). In particular, the WTPs for culture and social diversity remain at a low level which is not higher than the level for individuals in non-creative professions. Similarly, the two indicators of being a creative professional or being a creative core are used in the lasso estimation. As can be seen in Table 4, the creative core dummy is included in one regression with a small and insignificant estimate while the creative professional dummy is never included. This is consistent with Möller and Tubadji, 2009, who do not find evidence that the creative class in Germany follows a liberal milieu in it's destination choices.

4.5 Threats to our main conclusion

Our main conclusion from the stated-preference experiment is the absence of differential preferences for amenities by skill groups or by creative class status. However, there might be a number of threats to interpreting our results in that way. In this section, we discuss these threats and argue why they are not expected to question this main result.

First of all, one might argue that stated-preference experiments could suffer from framing effects and thus not capture the true level of the WTP for a specific characteristic.[16] A major consideration for this type of concern is that the trade-offs associated with the experiment are complex and the hypothetical setting may not fully capture all relevant factors. However, there is no reason to belief that such biases are skill-specific. In contrast, these limitations of the experimental setting are likely to affect high-skilled and less-skilled respondents to a similar extent. Hence, comparing stated preferences of college and non-college graduates should still yield valid insights into the actual similarity of underlying preferences, and thus not be a threat to our main conclusion.

A second threat could be that college graduates and non-college graduates associate different things with the urban amenity categories that may not be comparable. For example, when evaluating the importance of cultural amenities, non-graduates might think of sports events while college graduates might think of museums. Yet, as shown in Table 3, this does not seem to be the case. The relative importance of the sub-factors turns out to be extremely similar. Of course, even our

[16] For example synonymous names of the attributes might have different implications for the respondents.

extensive list of sub-factors is not exhaustive. Still, we consider it most unlikely that, by chance, we missed out the sub-factor with strong preference heterogeneity while including only those with a strong preference homogeneity. Hence, different associations with urban amenities by educational attainment do not provide a threat to our main conclusion.

Third, although we designed our experiment in a setting without cost-of-living differentials between the two hypothetical job offers, respondents might nevertheless associate high amenity places with higher costs-of living. As a result, we would see a downward bias in the stated WTPs. Since low-skilled individuals earn lower wages and are hence able to consume a lower share of urban amenities (Diamond and Moretti, 2021), the downward bias would be even more severe for low-skilled workers than for high-skilled workers. Thus, if there was a skill-specific affordability bias, the WTPs for low-skilled would be biased downward relative to those of high-skilled workers, hence working in favour of preference heterogeneity between skill groups. Yet, despite such a potential bias, we find no evidence of preference heterogeneity. Consequently, a potential affordability bias is not driving our main conclusion.

Lastly, there may be biases for specific amenity attributes. Economic dynamism, for instance, might be associated not only with economic prospects in terms of future income chances, but may also be considered as an indicator of the general prospect of the city to be a thriving place also in terms of future amenity endowments. In fact, the attraction that the creative class literature attests to innovative places is closely linked to the idea that the attraction of a corresponding pool of creative people to innovative places also increases the general quality of life in the future. While this would translate into an overestimation of the impact of economic dynamism on the location choice and introduce an unintended correlation between this and the other amenities, it is, again, not expected to affect the two skill groups differently. If at all, we would expect this overestimation to be more severe for high-skilled workers, but the stated WTPs for economic dynamism are slightly higher for low- than for high-skilled workers.

In summary, we are confident that the absence of differential preferences for amenities by skill groups is not due to any of these possible threats to identification.

5 Conclusion

Urban amenities have been discussed extensively in the literature as one key factor to attract human capital to places and to improve the skill mix of the local labour force in order to gain from increased local spending capacities, knowledge spillovers and an improved attractiveness for innovative firms.

Such a quality-of-life-oriented perspective on local economic development rests on the notion that urban amenities disproportionately induce high-skilled individuals to move to these places as they are considered to have higher valuations of certain types of amenities. Albeit the literature does not agree on the type of amenity that is most relevant for this spatial skill sorting, there appears to be some general consensus that there is a relevant heterogeneity in preferences regarding urban amenities between groups differing either by educational attainment or by type of occupation, i.e. depending on whether someone performs a creative job or not.

Yet, existing studies based on revealed preferences struggle with many identification issues. Due to reversed causality, long-run path dependencies, skill-specific mobility costs, but also skill-specific cost-of living differentials, identifying a causal effect for a whole set of urban amenities is almost impossible. We shed new light on the role of urban amenities for spatial skill sorting based on a stated-preference experiment. Drawing upon a sample of hypothetical job choices between two cities that differ in wages and a set of urban amenities, we estimated the willingnesses to pay for several amenities that have been discussed in the related literature and test for preference heterogeneity along educational attainment.

Our key finding, that is robust to different specification choices, is that there is no preference heterogeneity between college and non-college graduates, nor do we find evidence for preference heterogeneity between the creative and non-creative class. In fact, preferences turn out to be surprisingly similar for these groups. Valuations for all urban amenities are positive and large. Individuals are willing to forgo up to 8 % of their wage to live in a city with a high compared to a low level of quality in a particular urban attribute. In particular, we find willingnesses to pay of 5-6% for cultural amenities, family friendliness as well as the local infrastructure, thus pointing to the relevance of local public goods and consumption opportunities. Contrary to the creative class literature, however, the openness and tolerance of a city as captured by social diversity, turns out to be least important. At the other end of the spectrum, we find that individuals are willing to forgo 8% of wages in order to live in a thriving place with high employment growth, high levels of firm foundations and a high R&D intensity. Such economic dynamism is likely considered as an insurance against future income shocks and, in line with this interpretation, turns out to be most relevant for individuals with family-related mobility constraints.

Digging deeper into the underlying preference heterogeneity by using a latent class logit estimation, we identify that irrespective of educational attainment, individuals can be assigned into three groups with a distinct preference pattern. While 15% appear to be pure income maximizers

for whom urban amenities are irrelevant for city choice, urban amenities are relevant and similarly important choice factors for the other two groups. However, these groups differ in the value they attach to economic dynamism. Those attaching a high-value to local economic prospects turn out to have family-related mobility constraints, while those attaching less value to economic dynamism tend to be single and childless, and are thus less dependent on local economic prospects. The characteristics underlying the assignment to one of thee three preference classes are identified based on Post-lasso regressions. While we find a number of relevant characteristics, the overall explanatory power of a large set of individual covariates turns out to be rather small. Hence, much preference heterogeneity is found along unobserved dimensions.

Finally, we discuss several potential threats to our main result of no preference heterogeneity between education groups. However, none of these threats seem to really challenge our findings. For instance, we find no evidence that college and non-college graduates associate different characteristics with certain amenity categories.

Hence, from a policy perspective, our results imply that there is less scope for amenity-based city policies to improve their skill composition than the previous literature suggests. However, if mobility and financial constraints are more binding for low-skilled individuals, and because amenity-rich places tend to have higher costs-of-living, investing in urban amenities might still be a means of attracting a higher share of skilled workers to the local labour force. Since this channel is exclusively based on the incapability of low-skilled individuals to move to and to afford living in their preferred places, however, this option comes at the expense of a welfare loss. This resembles concerns about the impact of gentrification on inner city sorting, i.e. the displacement of less affluent individuals from neighbourhoods due to rising housing prices following an influx of wealthier residents induced by a gain in attractiveness and economic prospects of a neighbourhood. (e.g. Guerrieri et al., 2013; Edlund et al., 2015; Lees et al., 2013).

Recent research also points to the increasing importance of the welfare consequences of affordability gaps between education groups in a cross-city context. For instance, Diamond and Moretti (2021) find evidence of strong differences across education groups in real private consumption, showing that lower-skilled individuals in expensive cities experience strong relative consumption losses compared to more affordable cities. Our results suggest that less educated individuals do not deliberately accept these losses because of their different valuation of urban amenities, but that this observation reflects skill-specific constraints.

Therefore, to prevent a widening welfare gap between college graduates and non-graduates, our

results point to the necessity of mobility aids as well as housing policies that ensure affordable housing for all educational groups in amenity-rich places.

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A Additional Table and Figures

Figure A1: Screenshot of a hypothetical choice

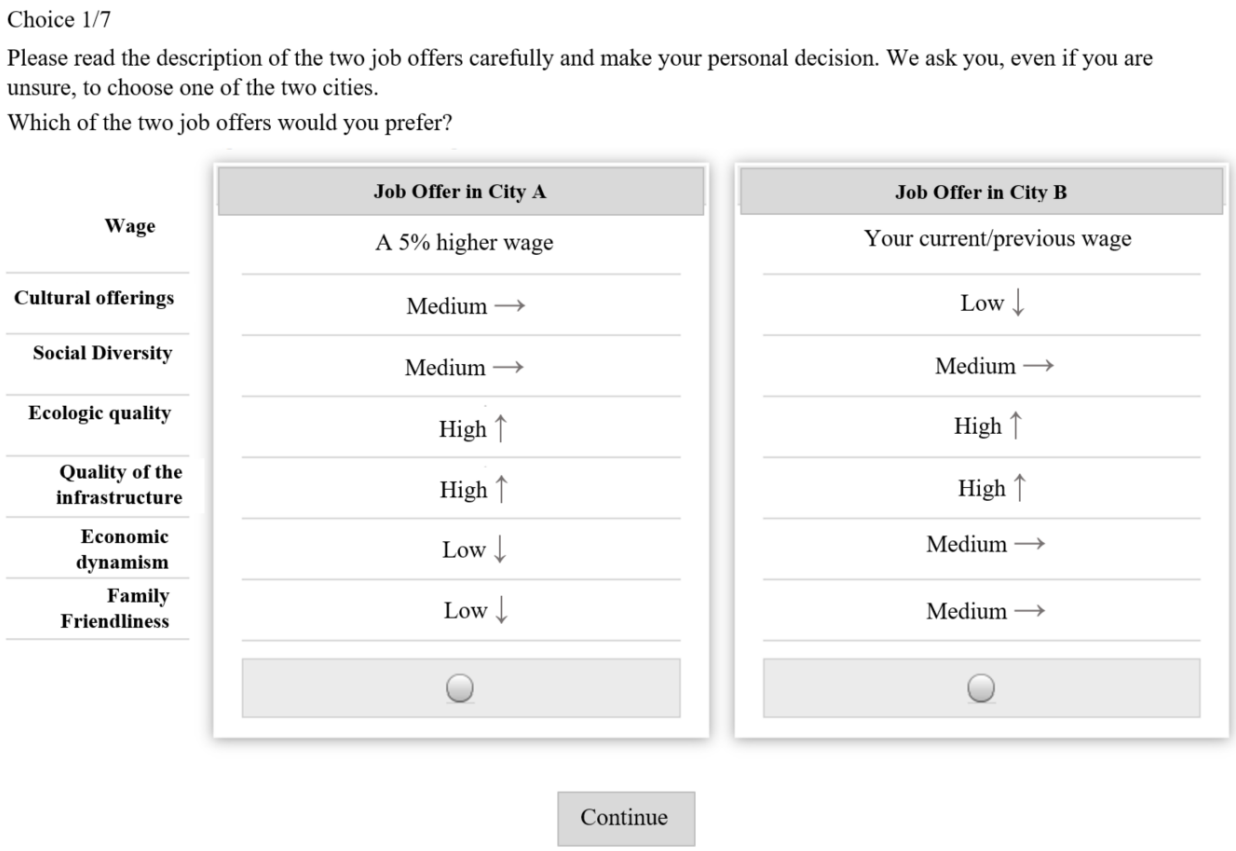
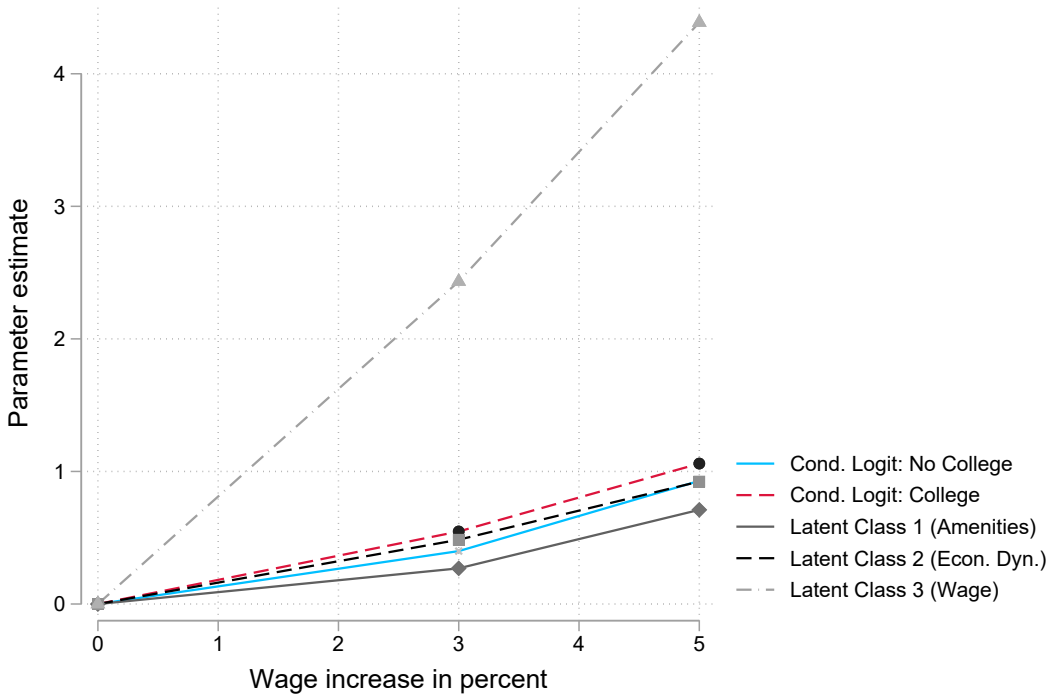
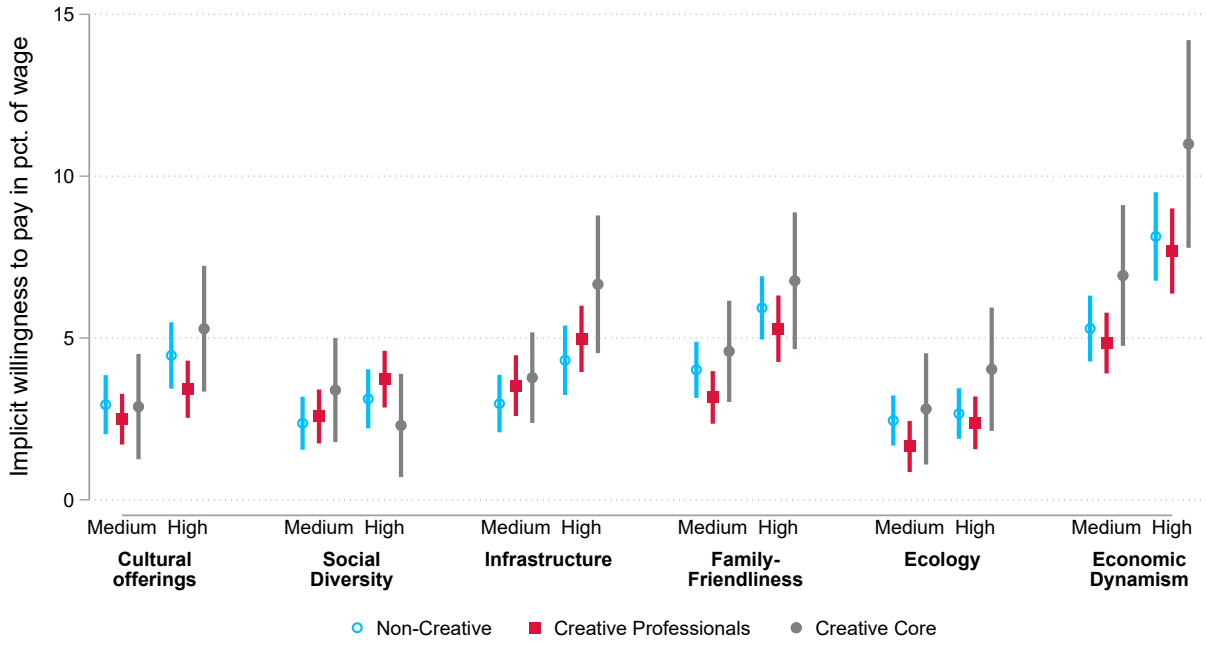


Figure A2: Estimated coefficients on categorical wages



NOTE.- Parameter estimates for earning a 3% or a 5% higher wage than the current wage. For both the conditional logit and the latent class logit model, assuming a linear wage effect seems plausible for college and non-college workers and for all three classes.

Figure A3: Conditional logit estimates of WTP by Creative Class



NOTE.- Conditional logit estimates of the willingness to pay for quality increases from low to medium (or low to high) for different amenity attributes for individuals in occupations belonging to the creative core, to the creative professionals or to none of them. The WTP for each attribute is reported with its 95 % confidence interval. Using representative survey weights.

Table A1: Descriptives

	Non-College		College		Total	
	N	**%**	**N**	**%**	**N**	**%**
Observations	8134	54.7	6741	45.3	14875	100
Individuals	1162	54.7	963	45.3	2125	100
Age						
18 to 24 years	159	13.7	35	3.6	194	9.1
25 to 30 years	240	20.7	213	22.1	453	21.3
30 to 34 years	229	19.7	240	24.9	469	22.1
35 to 39 years	241	20.7	278	28.9	519	24.4
40 to 44 years	293	25.2	197	20.5	490	23.1
Sex						
Male	668	57.5	494	51.3	1,162	54.7
Female	491	42.3	468	48.6	959	45.1
Diverse	3	0.3	1	0.1	4	0.2
Diffculty to move						
Very easy	60	5.2	47	4.9	107	5.0
Rather easy	168	14.5	173	18.0	341	16.1
Neither nor	301	26.0	226	23.5	527	24.9
Rather difficult	423	36.5	369	38.4	792	37.4
Very difficult	207	17.9	146	15.2	353	16.7
East/West Germany						
West	852	77.5	753	81.5	1,605	79.3
East	247	22.5	171	18.5	418	20.7
Place of Residence						
No large city	1,060	96.0	815	87.6	1,875	92.2
Large city	44	4.0	115	12.4	159	7.8
Income category						
Below 1500euros	349	32.6	120	13.5	469	23.9
1500 to below 3200 euros	643	60.1	531	59.7	1,174	59.9
3200 to below 4500 euros	57	5.3	155	17.4	212	10.8
4500 euros and above	21	2.0	84	9.4	105	5.4
Employment Situation						
Working full-time	769	66.2	720	74.8	1,489	70.1
Working part-time	180	15.5	121	12.6	301	14.2
Marginal empl., not employed etc.	186	16.0	89	9.2	275	12.9
Partial retirement, parental leave etc.	27	2.3	33	3.4	60	2.8
Partner						
No partnership	339	29.5	214	22.4	553	26.2
In partnership	338	29.4	289	30.2	627	29.8
Married	473	41.1	454	47.4	927	44.0
Number of children						
No child	756	65.6	675	70.6	1,431	67.9
One child	196	17.0	129	13.5	325	15.4
Two or more children	200	17.4	152	15.9	352	16.7
Young children						
No child below 6	959	82.5	746	77.5	1,705	80.2
Child below 6 years	203	17.5	217	22.5	420	19.8
Creative Professional						
No Creative Professional	587	65.5	489	61.7	1,076	63.7
Creative Professional	309	34.5	303	38.3	612	36.3
Creative Core						
No Creative Core	720	80.4	683	86.2	1,403	83.1
Creative Core	176	19.6	109	13.8	285	16.9

NOTE.- Absolute and relative frequency of personal characteristics in sample.

Table A2: Conditional logit estimates

	Wage linear		Wage categorical	
	(1) Non-college	(2) College	(3) Non-college	(4) College
Wage in % of actual wage				
Linear	0.18***	0.21***		
	(0.01)	(0.01)		
Medium			0.40***	0.55***
			(0.05)	(0.05)
High			0.93***	1.06***
			(0.06)	(0.05)
Culture				
Medium	0.44***	0.71***	0.44***	0.71***
	(0.07)	(0.07)	(0.07)	(0.07)
High	0.77***	1.01***	0.77***	1.02***
	(0.07)	(0.08)	(0.07)	(0.08)
Social Diversity				
Medium	0.47***	0.31***	0.48***	0.31***
	(0.06)	(0.06)	(0.06)	(0.06)
High	0.57***	0.51***	0.57***	0.51***
	(0.07)	(0.07)	(0.07)	(0.07)
Infrastructure				
Medium	0.58***	0.68***	0.58***	0.68***
	(0.06)	(0.07)	(0.06)	(0.07)
High	0.82***	1.17***	0.82***	1.17***
	(0.07)	(0.08)	(0.07)	(0.08)
Family Friendliness				
Medium	0.66***	0.85***	0.66***	0.85***
	(0.07)	(0.07)	(0.07)	(0.07)
High	1.02***	1.34***	1.02***	1.35***
	(0.07)	(0.07)	(0.07)	(0.07)
Ecology				
Medium	0.39***	0.47***	0.40***	0.47***
	(0.06)	(0.06)	(0.06)	(0.06)
High	0.48***	0.70***	0.48***	0.70***
	(0.06)	(0.06)	(0.06)	(0.06)
Economic Dynamism				
Medium	0.98***	0.95***	0.99***	0.95***
	(0.07)	(0.07)	(0.07)	(0.07)
High	1.48***	1.57***	1.49***	1.57***
	(0.08)	(0.09)	(0.08)	(0.09)
Observations	16198	13440	16198	13440

NOTE.- Conditional logit estimates for college and non-college respondents. Wage assumed to be linear (left) or categorical (right). Using representative survey weights. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Importance of sub-factors by education and class

	No College			College		
	Class 1	Class 2	Class 3	Class 1	Class 2	Class 3
			Culture			
Concerts, other cultural events	0.23	0.23	0.22	0.23	0.22	0.22
Theaters and museums	0.16	0.14	0.17	0.19	0.17	0.15
Resturants, bars, cafés	0.41	0.41	0.40	0.41	0.38	0.41
Sports events and clubs	0.20	0.22	0.20	0.17	0.23	0.21
			Social Diversity			
Origin	0.24	0.25	0.26	0.27	0.27	0.25
Religion	0.18	0.21	0.18	0.16	0.18	0.19
Sexual orientation	0.25	0.19	0.20	0.20	0.16	0.23
Lifestyle	0.33	0.34	0.36	0.37	0.39	0.33
			Infrastructure			
Biking and road network	0.16	0.18	0.17	0.16	0.19	0.16
Local public transport	0.27	0.25	0.26	0.27	0.25	0.26
Connection to interreg. transport network	0.22	0.21	0.23	0.23	0.21	0.22
Availability of living space	0.35	0.35	0.35	0.33	0.34	0.36
			Family Friendliness			
Availability of childcare	0.32	0.32	0.34	0.32	0.35	0.32
Schol quality	0.40	0.39	0.40	0.40	0.39	0.40
Availability of playgrounds	0.28	0.30	0.27	0.27	0.26	0.28
			Ecology			
Air quality	0.35	0.36	0.36	0.35	0.37	0.36
Green urban spaces	0.34	0.34	0.34	0.35	0.33	0.34
Proximity to local recreation areas	0.30	0.30	0.30	0.30	0.31	0.30
			Economic Dynamism			
Employment growth	0.43	0.45	0.43	0.42	0.42	0.44
Jobs in research and development	0.31	0.30	0.34	0.34	0.34	0.31
Number of business foundations	0.26	0.25	0.24	0.24	0.25	0.25
Observations	535	438	1136	417	425	1267

NOTE.- Average indicated relative importance of sub-factors by education and class membership. Using representative survey weights.

Table A4: Correlations of personal characteristics with posterior class probability - No-college graduates

	Class 1		Class 2		Class 3	
Gender - Ref: Male						
Female	-0.08***	(0.03)	0.07**	(0.02)		
Missing	0.29**	(0.10)	-0.11	(0.07)		
Wage category - Ref: Below 1500 euros						
1500 to below 3200 euros	-0.03	(0.03)				
3200 to below 4500 euros	-0.17***	(0.05)				
4500 euros and above	0.09	(0.07)				
Missing	-0.07	(0.04)				
Difficulty to move - Ref: Very easy						
Rather easy	0.02	(0.06)	0.09	(0.05)	-0.14*	(0.06)
Neither nor	-0.02	(0.06)	0.11*	(0.05)	-0.11*	(0.06)
Rather difficult	0.02	(0.06)	0.12**	(0.05)	-0.16**	(0.05)
Very difficult	-0.05	(0.06)	0.18***	(0.05)	-0.16**	(0.06)
Missing	-0.05	(0.11)	0.17**	(0.06)	-0.14	(0.13)
Partnership - Ref: Single						
In partnership	-0.02	(0.03)	0.06*	(0.03)		
Married	-0.09**	(0.03)	0.12***	(0.03)		
Missing	0.09	(0.09)	0.02	(0.09)		
Number of children - Ref: No child						
One child	-0.06	(0.04)	0.08*	(0.04)		
Two or more children	-0.10**	(0.04)	0.12**	(0.04)		
Missing	0.06	(0.11)	-0.12	(0.08)		
Young child - Ref: All children above six						
Child below 6 years	-0.09**	(0.04)	0.09*	(0.04)		
Employment type - Ref: Unlimited contract						
Limited empl. contract	-0.05	(0.04)	0.05	(0.04)		
Civil servant	-0.09	(0.06)	0.15*	(0.07)		
Self-employed/freelancer	0.09	(0.05)	-0.06	(0.05)		
Missing	0.10	(0.07)	-0.00	(0.07)		
Current residence - Ref: No large city						
Large city	0.08	(0.05)	-0.09*	(0.04)		
Missing	0.03	(0.05)	-0.04	(0.05)		
Citizenship - Ref: German citizenship						
Foreign			-0.05	(0.04)	0.07	(0.04)
Missing			-0.13*	(0.05)	-0.21***	(0.06)
Employment status - Ref: Working full-time						
Working part-time					-0.02	(0.03)
Marginal empl., not employed etc.					-0.07**	(0.02)
Partial retirement, parental leave etc.					0.04	(0.07)
Creative Professional						
Creative Professional					0.05*	(0.02)
Missing					0.04	(0.02)
Constant	0.65***	(0.06)	0.08	(0.05)	0.27***	(0.05)
Observations	1162		1162		1162	
Adjusted R2	0.10		0.14		0.02	

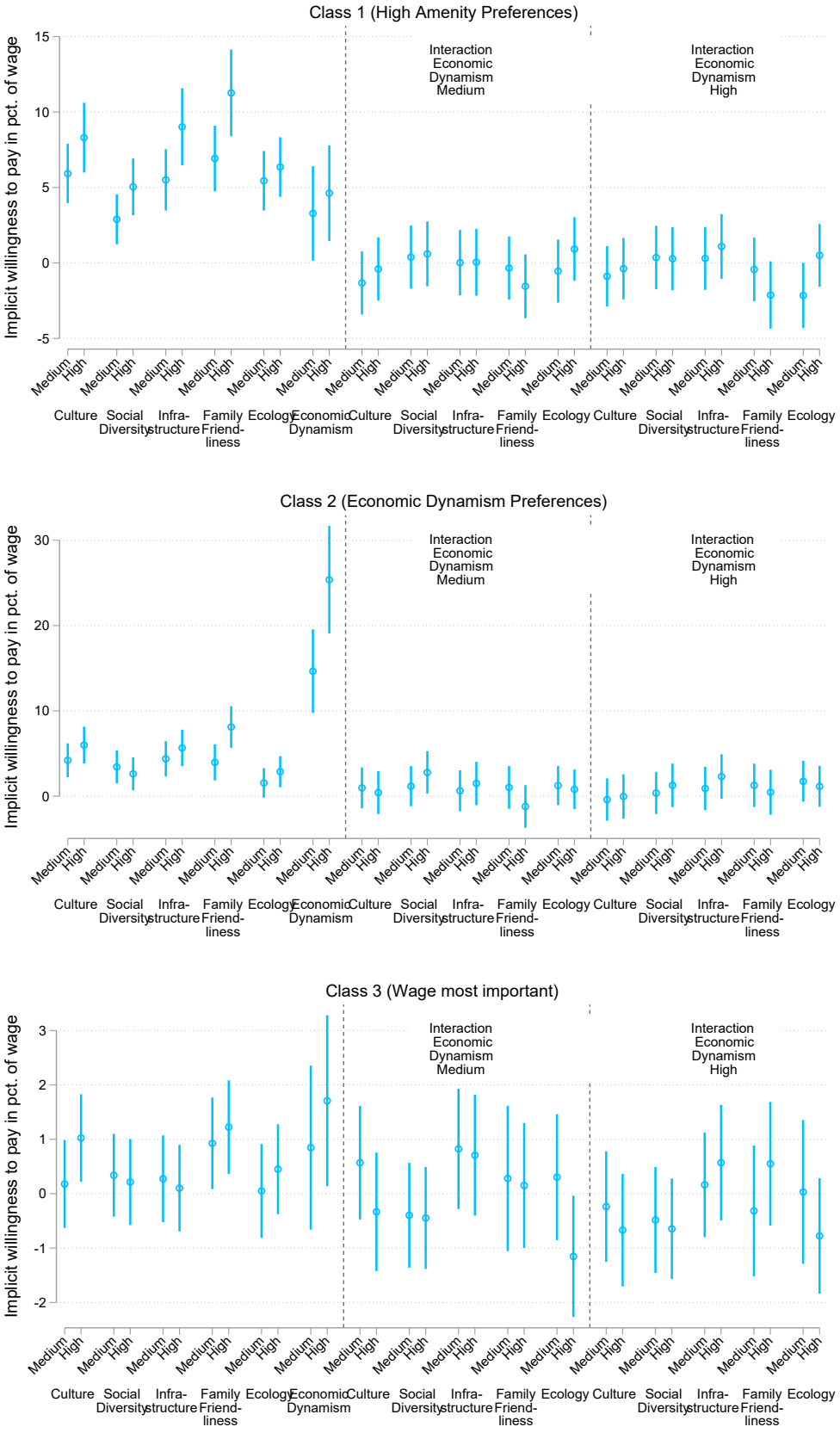
NOTE.- OLS estimates of three separate Post-lasso regressions. Dependent variable: probability to belong to a certain class as determined by the latent class logit model separately for non-college individuals. The penalty term minimizing the mean error is found via 10-fold cross-validation. Using representative survey weights. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A5: Correlations of personal characteristics with posterior class probability - College graduates

	Class 1		Class 2		Class 3	
Difficulty to move - Ref: Very easy						
Rather easy	-0.00	(0.06)	0.10	(0.05)		
Neither nor	-0.05	(0.06)	0.14**	(0.05)		
Rather difficult	-0.03	(0.06)	0.15**	(0.05)		
Very difficult	-0.04	(0.06)	0.13*	(0.06)		
Missing	0.28	(0.30)	-0.08	(0.29)		
Partnership - Ref: Single						
In partnership	-0.09**	(0.03)	0.09**	(0.03)		
Married	-0.11***	(0.03)	0.09**	(0.03)		
Missing	-0.17	(0.12)	0.18	(0.11)		
Number of children - Ref: No child						
One child	-0.14**	(0.05)	0.19***	(0.05)		
Two or more children	-0.14**	(0.05)	0.21***	(0.06)		
Missing	0.11	(0.12)	-0.07	(0.12)		
Young child - Ref: All children above six						
Child below 6 years	-0.08	(0.04)	0.09	(0.05)		
Citizenship - Ref: German Citizenship						
Foreign	0.05	(0.03)	-0.05	(0.03)		
Missing	-0.08	(0.08)	0.13	(0.07)		
Employment type - Ref: Unlimited contract						
Limited empl. contract	0.06	(0.03)	-0.04	(0.03)		
Civil servant	-0.03	(0.04)	0.06	(0.04)		
Self-employed/freelancer	0.05	(0.04)	0.03	(0.04)		
Missing	-0.09	(0.10)	-0.06	(0.09)		
Current residence - Ref: No large city						
Large city	0.07	(0.03)	-0.06	(0.03)		
Missing	0.04	(0.06)	-0.03	(0.07)		
Wage category - Ref: Below 1500 euros						
1500 to below 3200 euros			-0.04	(0.04)		
3200 to below 4500 euros			-0.06	(0.05)		
4500 euros and above			-0.09	(0.05)		
Missing			-0.03	(0.05)		
Employment status - Ref: Working full-time						
Working part-time			-0.02	(0.04)		
Marginal empl., not employed etc.			0.04	(0.04)		
Partial retirement, parental leave etc.			0.05	(0.05)		
Creative Professional						
Creative Professional			0.02	(0.03)		
Missing			0.07*	(0.03)		
Creative Core						
Creative Core			0.00	(0.04)		
Missing			0.00	(.)		
Constant	0.60***	(0.06)	0.17**	(0.06)	0.13***	(0.01)
Observations	963		963		963	
Adjusted R2	0.12		0.17		0.00	

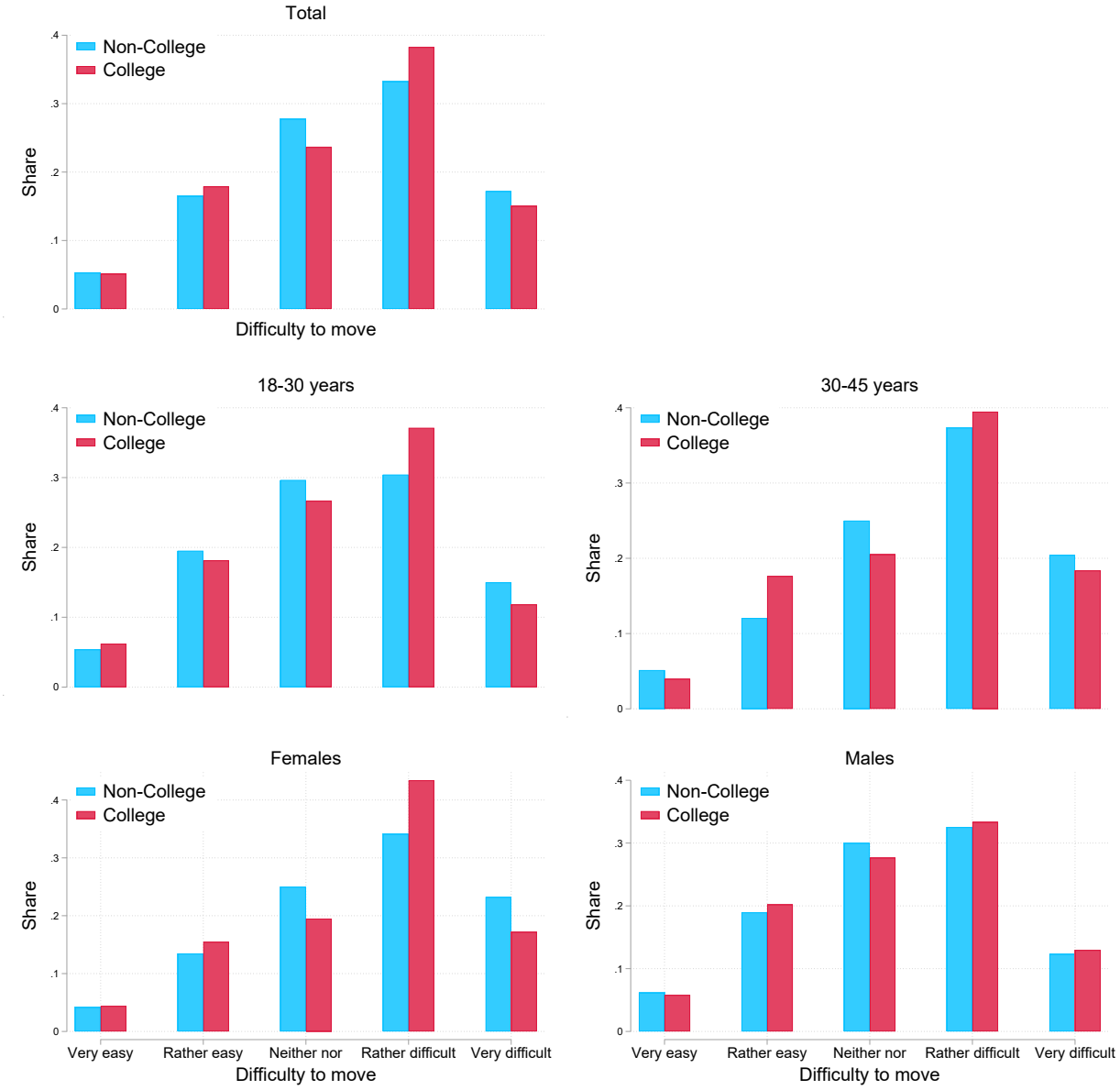
NOTE.- OLS estimates of three separate Post-lasso regressions. Dependent variable: probability to belong to a certain class as determined by the latent class logit model separately for college individuals. The penalty term minimizing the mean error is found via 10-fold cross-validation. Using representative survey weights. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Figure A4: Latent class logit estimates of WTP - Interaction effects with economic dynamism



NOTE.- Latent class logit estimates of the willingness to pay for quality increases from low to medium (or low to high) for different amenity attributes when economic dynamism is low, medium or high. Each panel reports the WTPs for a different endogenous preference class. The WTP for each attribute is reported with its 95 % confidence interval.

Figure A5: Self-reported difficulty to move by education, age and sex



NOTE.- Share of respondents by difficulty to move. Using representative survey weights.

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