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Authors

Pawel Adrjan, Mária Balgová, Simon Jäger, Jonas Jessen, Jason Sockin

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RFBerlin
ROCKWOOL Foundation Berlin –
Institute for the Economy
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Gormannstrasse 22, 10119 Berlin
Tel: +49 (0) 151 143 444 67
E-mail: info@rfberlin.com
Web: www.rfberlin.com

Job Ads as Signals:

Evidence from a Priced Amenity and Worker Beliefs*

Pawel Adrjan† Mária Balgová‡ Simon Jäger§ Jonas Jessen¶ Jason Sockin‖

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Abstract

Discrete choice experiments are widely used to estimate workers' willingness to pay (WTP) for job amenities under the assumption that varying an attribute does not change workers' beliefs about other job attributes. We test this assumption by embedding an amenity with a known market price—a popular monthly public transport pass—in a large-scale discrete choice experiment with German workers. Many workers, including public transport users, overvalue the ticket by more than 100%, despite WTP for other attributes aligning with the literature. A complementary belief-elicitation experiment shows that advertising an amenity, such as the pass but also common amenities like work from home, causally shifts beliefs about unlisted attributes of the job. Posted wages similarly signal unlisted attributes so that wage variation, the money metric for WTP calculation, is itself contaminated by belief spillovers—such as higher pay signaling heightened stress. These spillovers imply that discrete choice estimates capture perceived bundles rather than isolated attributes, and distort current estimates of non-wage compensation and monopsony power.

JEL: *J31, J32, J42, C83, C90, D83*

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†Indeed Hiring Lab and Regent's Park College, University of Oxford, padrjan@indeed.com

‡Bank of England, IZA, maria.balgova@bankofengland.co.uk

§Princeton University and NBER, simon.jaeger@princeton.edu

¶WZB, IAB, CESifo, and IZA, jonas.jessen@wzb.eu

‖Cornell University, IZA, and CESifo, jas2243@cornell.edu

1 Introduction

Economists have long recognized that jobs are bundles of wages and non-wage amenities (Smith, 1776, Book I, Ch. X, Part I), with non-wage amenities making up a substantial share of the overall value of a job (Maestas et al., 2023; Mas, 2025). When a worker chooses a job, they weigh not only pay but also amenities such as flexibility, dignity, or the ability to work remotely (Dube et al., 2022; Mas and Pallais, 2017; Wiswall and Zafar, 2017). Despite their importance, non-wage amenities are notoriously hard to price. A large literature estimates hedonic compensating differentials in observed job matches (Rosen, 1974, 1986), though with a mixed track record (see, e.g., Brown, 1980). A key innovation in recent years has been the proliferation of stated-choice (and actual-choice) experiments, in which respondents select among hypothetical (and actual) jobs that experimentally vary in attributes and pay (see, e.g., Maestas et al., 2023; Wiswall and Zafar, 2017, and an overview in Table 1). Their appeal lies in combining experimental control over workers' choice sets and the offered amenities with behavioral realism: by randomly varying wages and amenities, discrete choice experiments allow researchers to directly identify the trade-offs workers are willing to make between wages and job attributes, thereby recovering estimates of willingness to pay (WTP) for unpriced amenities (Mas, 2025).

Yet, despite these advantages, the use of discrete choice experiments to infer WTP for job attributes requires that experimentally varying one attribute leaves workers' beliefs about all unlisted attributes unchanged.[1] When an experimenter varies one attribute, e.g., the option to work from home or generous parental leave, the resulting difference in choice probabilities is interpreted as reflecting the worker's WTP for that specific attribute alone. In reality, however, jobs are bundles of correlated amenities chosen endogenously and interdependently by employers (Mas, 2025). Empirically, employers that offer one attractive amenity tend to offer others (Sockin, 2022), and employers offering better amenities tend to pay higher wages (Audoly et al., 2024; Pierce, 2001; Roussille and Scuderi, 2025; Sockin, 2022), though some have found otherwise (see, e.g., Humlum et al., 2025).

Jobs, moreover, resemble experience goods (Jovanovic, 1979) and many features cannot be observed before accepting a role; in turn, job advertisements may function as signals about the broader employment package, conveying information beyond those explicitly listed. As a consequence, workers might infer a job offering remote work to feature greater autonomy and trust, or interpret generous parental leave as evidence of a family-friendly culture and amenities. Experimentally varying one amenity could shift workers' beliefs about many unlisted ones, potentially biasing estimates of WTP.[2] This inference problem parallels insights from the signaling and employer learning literature, where non-productive worker traits can convey productivity-relevant

[1] This constitutes an assumption of "information equivalence" (Dafoe et al., 2018). It is distinct from, and not ensured by, separability of preferences over the listed attributes: even where the utility from each presented attribute is approximately independent of the others (as interaction tests suggest, e.g., Maestas et al., 2023), the coefficient on a presented attribute still absorbs the value of whatever unlisted attributes the worker infers from it.

[2] In the extreme, the observed variation in choices may *only* reflect workers' perceptions of correlated attributes rather than valuation of the experimentally-varied attribute. A potential example of this comes from Cole and Taska (2023) who document that workers would be willing to pay on average 4.4% of their wage for a retirement plan without any employer contribution.

information about the worker (Altonji and Pierret, 2001; Arrow, 1973; Farber and Gibbons, 1996; Spence, 1973), and audit studies, which document that randomly varying a single applicant characteristic – typically a name signaling race or gender – systematically shifts employer callback decisions, plausibly because that characteristic is read as a signal of a broader set of correlated, unobserved traits (Bertrand and Mullainathan, 2004; Kline et al., 2022). Other parallels can be found in the literature on consumption and marketing. Classic work on advertising experience goods establishes that ads can convey information beyond their literal content when quality is hard to observe before purchase (Milgrom and Roberts, 1986; Nelson, 1970, 1974)—a natural analogue for jobs, which are themselves experience goods. Recent work casts advertisement as a memory *cue* that shapes valuation of, and demand for, goods (Bordalo et al., 2025), suggesting that what an ad brings to mind can drive choices.

To test the proposition that job ads function as signals, we field two complementary experimental designs. The first is a large-scale discrete choice experiment that follows the methodology now standard in the literature (Maestas et al., 2023; Mas and Pallais, 2017; Wiswall and Zafar, 2017): 6,000 representatively-sampled German workers each make ten pairwise choices between hypothetical job offers that randomly vary in the wage and up to seven non-wage attributes. As in leading implementations, respondents select the job title most relevant to their own occupation and the job ads are designed to resemble real online job postings. Our innovation within this otherwise standard design is to embed an amenity with a known market price, the *Deutschlandticket*, which is a monthly public transport pass priced at €63 per month at time of our survey. Since its inception in May 2023, employers have increasingly begun to offer their workers a Deutschlandticket, with about 8 percent of German job postings advertising a free or subsidized ticket as of the first quarter of 2026 (Appendix Figure A.2.1). Given a number of unique features of the Deutschlandticket, outlined in detail in Section 2, its market price functions as an objective upper bound for any worker's true WTP for the Deutschlandticket out of their disposable income—and thus offers a direct benchmark for assessing implied WTP estimates. The second, complementary design is a belief-elicitation experiment that measures how amenities and posted wages in a job advertisement shift workers' beliefs about unlisted employer characteristics such as workplace culture, additional fringe benefits, and coworker composition.

Even though we observe that WTP estimates for all other amenities align closely with prior findings in the literature, we find that workers who know *exactly* how much the Deutschlandticket costs reveal a WTP for the Deutschlandticket that is roughly twice its market price—ruling out misperception in market price as the primary factor inflating WTP.[3] Whereas the cost of the Deutschlandticket translates into roughly €100 per month in pre-tax wages—a benchmark we construct conservatively, resolving ambiguities in the ticket's tax treatment in the direction that raises the bound and thus works against our finding (see Appendix C for an in-depth discussion of the tax treatment of the Deutschlandticket)—their WTP is upwards of €200 per month in pre-tax wages. For our representative sample as a whole, the implied WTP for the Deutschlandticket amounts to 2.9% of pre-tax annual income, compared with an actual cost equivalent of 2.5% in

[3]As further evidence against this channel, we embedded in our experiment a treatment arm that displays the market price in the instructions of the job choice task. It had little discernible effect on stated WTP for the Deutschlandticket.

pre-tax income. While the closeness of these two numbers would suggest perhaps modest bias from the discrete choice framework, that the Deutschlandticket has less than universal take-up (around 17% of the German population (VDV, 2026), so a majority does not purchase the pass at its current price) implies that the sample average—at 2.9%—is the amalgamation of many workers not willing to pay the market price and thus hold a true WTP that is (possibly much) lower than the price.

As our estimates for the unpriced amenities in our experiment closely match those in an exhaustive body of prior work (see Table 1), we contend that the overvaluation we document for our priced amenity reflects a general feature of stated-choice designs rather than a peculiarity of our setting. Despite producing inflated estimates, the discrete choice experiment does appear to detect qualitatively plausible heterogeneity in dimensions we had pre-registered. Workers who live in cities, who use public transport, and who explicitly mention the Deutschlandticket as an advantage of the advertised job, report substantially greater WTP for the pass.

Our belief elicitation experiment provides direct evidence of the existence of the signaling channel: for every amenity we test, its inclusion in a job advertisement causally shifts workers' beliefs about unlisted employer characteristics. Concretely, for the Deutschlandticket—the amenity for which we can benchmark the WTP overvaluation—randomly presenting a worker with the transport pass in a job ad shifts beliefs along non-pecuniary dimensions, such as the firm's commitment to sustainability and the share of women it employs, as well as concrete amenities, such as the provision of a company pension. The effects are broader still for work from home, an amenity that has received particular attention since the pandemic (Barrero et al., 2023; Bick et al., 2023; Cullen et al., 2025): listing work from home shifts every one of the ten unlisted belief dimensions we measure, with workers inferring a more pleasant atmosphere, a family-friendly employer, flatter hierarchies, and reduced stress. Open-ended free-text responses confirm that these inferences arise spontaneously and are causally affected by the treatment (drawing on causal inference methods for text in Modarressi et al., 2025, and Egami et al., 2022, to implement the analysis of open-ended texts advanced by Haaland et al., 2025).

We find that nearly any amenity (including the Deutschlandticket) increasingly instills the belief that the job has a good workplace atmosphere, while scheduling-based amenities, such as work from home, a flexible schedule, or additional days of paid vacation, increasingly dispel the belief that the job entails a stressful work environment. Amenities not only shift beliefs over unlisted amenities, but also workers' wage expectations when the ad omits posting a wage—as many do.[4] The spillover beliefs onto wages suggest an interesting bifurcation: workers seem to believe non-pecuniary amenities accompany greater pay, whereas pecuniary amenities come alongside a compensating differential. This finding adds to a growing body of evidence that wages and non-pecuniary amenities are positively correlated in the data (Audoly et al., 2024; Pierce, 2001; Roussille and Scuderi, 2025; Sockin, 2022), though pecuniary amenities may come with such a trade-off, e.g., health insurance (Clemens et al., 2018).[5] This suggests workers may

[4] Just under 50% of job ads in the United States include pay information; the corresponding figure is 13% for Germany (Indeed Hiring Lab, 2026).

[5] Audoly et al. (2024) show that job attributes described in job ads are meaningful (though not perfect) predictors of latent measures for employer attractiveness.

have internalized these empirical patterns across employers—inferring that employers offering attractive non-pecuniary attributes, such as work from home, are also likely to pay comparatively well (Cullen et al., 2025). Because listing one amenity changes perceptions of the job along unlisted dimensions (including the wage), these belief spillovers have direct implications for estimating WTP: each decision in the discrete choice framework conflates the value of the listed amenity with perceived changes in the broader bundle.

Spillovers in beliefs over the rest of the employment package are not confined to the presence of amenities. The posted wage—the reaction to which underpins all WTP calculations—also signals aspects of the amenity bundle, implying that spillovers also contaminate the wage metric used to infer amenity valuations from choice behavior.[6] Higher posted wages causally lead workers to believe that jobs offer a more positive workplace culture, but also that it is more stressful—consistent with higher-paying jobs tending to be better-resourced yet more demanding with regards to deadlines and multitasking (Nagler et al., 2025) and workers expecting jobs with permanent contracts to pay more than they actually do (Andresen et al., 2026). The bias in WTP estimates thus operates on both sides of the ratio — the numerator, because listed amenities signal unlisted ones, and the denominator, because wage variation in ads signals unlisted amenity variation — further calling into question the interpretation of any individual amenity valuation from choice settings.

Our findings have direct consequences for how researchers measure the value of non-wage amenities. If WTP for each amenity is inflated because it captures the perceived value of a correlated bundle, then summing WTP estimates across amenities—as is common when quantifying the non-wage component of total compensation—will systematically overstate the importance of non-wage amenities relative to pay. The bias is not uniform: it will be largest for amenities that are the strongest signals of overall job quality, and may even reverse sign for amenities that signal offsetting disamenities, such as free meals at the office signaling an expectation of long hours (see Mas and Pallais, 2020). As a result, the bias affects not just the magnitude of WTP estimates but also their relative size and sign too, making it more difficult to judge whether a job feature is an amenity or a disamenity, such as in the example of schedule flexibility (Adams et al., 2023) or having a company doctor (Beerli et al., 2025). The direction and magnitude of the bias for any given amenity depends on how workers perceive its correlation with unlisted attributes—a quantity our belief-elicitation experiment is designed to measure—and how much value workers place on those unlisted attributes. That listed amenities and wages contaminate WTP estimates through belief spillovers implies the broader proposition that job ads function as signals of the full employment package. This is consistent with evidence from the directed search literature that workers use non-wage job ad content to direct their applications (Audoly et al., 2024; Banfi and Villena-Roldan, 2019; Burn et al., 2022; Escudero et al., 2024; Jalal, 2026).[7]

Precisely because wage variation in job ads signals changes in the amenity bundle, our findings

[6] This is consistent with evidence in Belot et al. (2022) who show in a field experiment that randomly assigning higher wages to otherwise identical vacancies leads external raters to perceive jobs to have better working conditions overall.

[7] Jalal (2026) also shows that job seekers only imperfectly predict the posted wage when it is omitted from an ad, consistent with evidence on imperfect information about outside options (Jäger et al., 2024).

also have implications for the estimation of labor market power. A large literature estimates the elasticity of labor supply to the firm according to workers' responses to wage variation—whether in stated-choice experiments, real vacancy data, or quasi-experimental designs—and infers from these labor supply elasticities the degree of monopsony power (see, e.g., Kline, 2025; Manning, 2021). If a higher wage is interpreted by workers as a signal of better amenities, the observed labor supply response will conflate the pure wage effect with the perceived amenity improvement, overstating workers' sensitivity to wages per se. The implied degree of monopsony power would in turn be understated. Moreover, because the signaling content of a wage change may differ depending on whether the worker is being recruited or is considering leaving, recruitment elasticities and separation elasticities will generally diverge even absent other search frictions.

Our results also suggest practical lessons for the design of stated-choice experiments. A pre-registered treatment arm in which respondents are prompted to assume that all unlisted attributes of the two jobs are identical has no discernible effect on WTP estimates—consistent with the finding of Dafoe et al. (2018) that information equivalence is difficult to restore by instruction alone. Simple verbal prompts cannot override the inferences workers naturally draw from the content of job ads. More promising approaches include eliciting beliefs about correlated features directly, as in our structured or free-response designs, to identify the attributes contributing to the omitted variable bias, and then designing control treatments around the most salient inferences. Importantly, our findings are not confined to stated-choice designs as the signaling mechanism we document plausibly extends to actual job choice—not just because stated choices predict real choices closely (Maestas et al., 2023; Mas and Pallais, 2017; Wiswall and Zafar, 2017), but also because workers likely do not have full information over the employment packages they must consider (Ash et al., 2025; Menzio and Shi, 2011; Sockin and Sojourner, 2023). The issue is not that stated-choice experiments are unrealistic, but that WTP estimates for individual amenities, whether from stated or actual choices, should be interpreted as capturing the value of a perceived bundle rather than an isolated attribute.

2 Deriving WTP from a Discrete Choice Experiment

Estimates from the Literature Stated choice experiments have become the dominant method of eliciting workers' willingness to pay for a wide range of job attributes. In Table 1, we provide an overview of the estimated WTP for amenities and disamenities from the literature. These range from tangible benefits such as work schedules, health insurance, and paid leave to broader features of the workplace, such as autonomy or hostility, to the identity of coworkers. Their increasingly frequent prevalence in the literature highlights that this method has become central for valuing non-wage attributes. Importantly, the amenities that have been considered are typically not traded (or tradeable) and hence no market price is available. The amenities, if any, that come closest to having a well-defined monetary value are ones that are pecuniary in nature, such as health insurance, a pension, or paid time off; however, the WTP for such amenities will depend on many individual-specific factors, such as one's risk aversion, discount factor, or tolerance for uncertainty, as well as economy-wide factors, such as scarcity in provision

across employers, which hinders bounding arguments for WTP.

We also observe from the literature that the interval of the estimated WTP for a specific job attribute can be wide. (See Appendix Tables B.1.2 and B.1.3 for each individual estimate from the literature for the amenities and disamenities, respectively, recorded in Table 1). For example, to be able to fully work from home has been estimated to have a WTP ranging from 2% to 25% of the average wage, as has the willingness to pay to avoid being laid off—specifically, a 10 percentage point increase in the probability of losing one's job—ranged from 10% to 28%. Some of these differences can be explained by variation in the wording in the studies, experiment design, and differences between respondent samples (Mas and Pallais, 2017), or in the definition of the amenities themselves, e.g., the difference between avoiding a night shift compared with avoiding a morning shift (Desiere and Walter, 2025); additionally, such variation may stem from workers drawing different signals over (unlisted) job attributes based on the available information or framing.

Eliciting WTP The first module of the experiment focuses on estimating respondents' willingness to pay for different amenities. We recruited a representative sample of 6,000 individuals from the German working-age population who were employed at the time of the survey. They were recruited through the online survey provider Bilendi, and the survey was administered in January and February of 2026. Each respondent was first asked to provide a number of demographic details, including, age, gender, employment status (part-time or full-time), state, and type of region (i.e., large city, smaller town, or rural). For descriptive statistics of the sample, see Appendix Table B.1.1.

In designing our experiment, we take a number of steps to try and mimic authentic job search for each participant. First, rather than asking workers to choose between jobs for a nondescript or general position, we tailor the ads to the specific job title that is most relevant to the worker. Workers were asked to type in their current occupation, and our autocomplete algorithm matched their entry to one of the 500 most common job titles in Germany as per Indeed vacancy data. Respondents are incentivized with the promise of information on the wage structure for that job title. We use this occupation across all parts of the experiment whenever the respondent is presented with a job ad.

Second, we ask respondents about their current pay and calibrate the wages displayed in the hypothetical jobs based on the full-time equivalent. The wage in each ad is drawn randomly from a uniform distribution ranging from –20% to +30% of the worker's stated full-time equivalent monthly earnings.

Third, we design each hypothetical job ad to have a similar structure to job ads as they would appear on Indeed.[8] The job title is included as part of the survey question ("Compare the two following job ads for a position as paralegal"), and the job ads include a blurred-out space where the employer name would be in a real job ad—to give the impression that each ad

[8]Although we do not include a location in the advertisement—as is typical for job postings on Indeed but not in stated choice experiments—that only two respondents mention a large German city (i.e, one of the 80 cities with populations of 100,000 or more) in their free responses suggests workers generally believe the two vacancies are situated in the same labor market.

is associated with a given employer yet preclude workers from drawing associations with real German employers. We vary the length of the blurred space to reinforce the ads are for openings with different employers.[9] Below that, we list the wage and pay frequency as well as the hours per week, which is held fixed at 40 hours, as it would appear in a real ad. From there, we list the number of paid vacation days and any additional amenities. We keep the structure of the ad as a list of what amenities are offered, rather than an exhaustive table of which amenities are offered and which are not—as employers would be unlikely in a real job posting to advertise that they do not offer a given amenity.

We choose amenities that would be broadly applicable for any work setting: number of vacation days, subsidized lunch, flexible work time (*Gleitzeit*), training opportunities, and a Deutschlandticket.[10] For the subset of respondents who stated that it is, in general, possible to work from home in their occupation, we randomly present three-fifths of them with ads that have the option for a hybrid work-from-home or full work-from-home arrangement (in lieu of a subsidized lunch); the other two-fifths are presented with ads draw from the same amenity bundle as the rest of the sample, for whom work from home is not possible in their line of work.

Each respondent is asked to make 10 pairwise decisions between two hypothetical jobs that randomly vary in their wage, a free Deutschlandticket, and the other amenities considered. To ensure that workers are prepared for this comparison and understand each alternative, we begin the experiment by listing all the possible amenities and explaining that the job ads correspond to individualized vacancies based on real job postings. A sample of these pairwise decisions is presented in Appendix Figure A.1.1. In this example, the left-hand side job ("job A") offers 20 days of paid leave, the possibility to work from home two days a week, a free Deutschlandticket, training opportunities, and a flexible work schedule. The right-hand side job ("job B") offers a larger allowance of paid leave (30 days), a free Deutschlandticket, and training opportunities, but does not mention other amenities. It also pays an additional €700 in the wage each month. For each pairwise comparison p, we record whether worker i chooses job A, $1(\text{Job A chosen})_{i,p}$.

We consider a number of alternative specifications and sensitivity checks. Embedded in the experiment is an attention check, which allows us to consider a highly-attentive sub-sample. We also observe how much time each person spent completing the experiment, allowing us to exclude participants who were exceptionally quick in responding.

We also include two separate treatment arms, both regarding information provided in the introduction to the experiment. For the first, we randomize whether we explicitly state the market price of the Deutschlandticket. This will allow us to test whether respondents who were given this information value the ticket closer to its market price. For the second, we randomly include the prompt *"Please assume that the jobs are identical, apart from the attributes shown."* This is standard guidance in many discrete choice experiments, and we aim to test whether it has a causal impact on respondents' amenity valuations.

[9] There were four randomized settings for the blurred-out section: a short continuous segment, a medium-short continuous segment, a medium-long bipartite, and a long tripartite. A sample of each is presented in Appendix Figure A.1.2. As shown in Appendix Figure A.4.1, differences in the length of the blurred-out section of the employer name do not systematically shift workers' beliefs.

[10] *Gleitzeit* is a flexible working-time arrangement, common in Germany, that lets employees vary their start and end times each day around a fixed band of required core hours.

Why the Deutschlandticket? Introduced in May 2023, the Deutschlandticket allows unlimited travel on nearly all local and regional public transport across Germany for a fixed subscription fee.[11] At the time our experiment was fielded, the subscription fee was €63 per month. At the end of 2025, i.e. shortly before we fielded our survey, around 14.6 million people (17% of the population) held a Deutschlandticket according to the Association of German Transport Companies (VDV, 2026). Of these, 74 percent were directly purchased, 15 percent were tickets purchased through an employer, and 11 percent were tickets provided through a university to students. Since its inception, German employers have increasingly advertised a free or subsidized Deutschlandticket in their job ads: As of the first quarter of 2026, about 8% of German job postings advertised a Deutschlandticket (for a quarterly time series, see Appendix Figure A.2.1).[12] Employers can receive a 5% discount on the subscription price.

To the best of our knowledge, the Deutschlandticket is unlike any other amenity considered previously in a stated choice framework. That is because, due to its peculiar nature, its market price we believe offers a credible and objective *upper bound* for how much any worker would be willing to pay for it.

The Deutschlandticket is

— *non-rival*. Any one individual having a Deutschlandticket does not preclude any other individual from having it as well. In turn, there is no competitive fringe or bidding that can affect the price.

— *plentiful*. There is limitless supply of the Deutschlandticket, so every person could have one. In turn, there are no effects of scarcity on the price.

— *uniform*. Whether an individual obtains the Deutschlandticket through their own enrollment or through their employer, it is the same good, offering all of the same consumption opportunities.[13] In turn, neither additional nor fewer features can affect the price.

— *salient and fixed-price*. The price is set by the German government for all of Germany. In turn, the price does not change to equilibrate employer supply and worker demand. The price is also public information and announced in advance. For instance, there was media coverage when it was announced in September 2025. In turn, workers can know the price before conducting their job search and bargaining with employers.[14]

[11] The Deutschlandticket covers, with few exceptions, all local and regional buses, trams, metros, S-Bahn, and regional train services (RB/RE) across Germany.

[12] The Deutschlandticket did not simply replace commuting subsidies that existed prior. Prior to the Deutschlandticket being introduced, about 3% of job postings advertised a "Jobticket", which was an earlier version of a subscription-based model for public transport (Appendix Figure A.2.1).

[13] This inherently renders the Deutschlandticket different from many other amenities, for instance, offering free coffee—as this could entail, when offered by the employer, differences in the amount consumed, quality, ambiance, etc. The one respect in which the channels differ is contractual flexibility: private enrollment can be paused month to month. This difference only pushes willingness to pay for the employer-provided ticket weakly *below* the market price.

[14] From 2027 on, the price is set to adjust annually to keep pace with wage- and energy-related inflation (see https://urban-mobility-observatory.transport.ec.europa.eu/news-events/news/germany-extends-deutschlandticket-nationwide-public-transport-pass-2030-2025-12-12_en). At the time of our survey, workers could thus reasonably know the price through 2030—ruling out that workers may price in uncertainty over possibly outsized increases in the near future.

— *publicly available.* Regardless of whether one's employer offers a Deutschlandticket, an individual can register for a Deutschlandticket at any point on their own and pay the monthly subscription fee. In turn, if an employer attempted to charge a worker more than the subscription fee for a Deutschlandticket, the worker could readily obtain it on their own for €63.

For all of these reasons, a worker would seemingly never agree to pay more than €63 to receive a Deutschlandticket through their employer. A worker may, of course, be willing to pay less than €63—for instance, if they do not use public transport regularly and commute by other modes of transport. Therefore, by incorporating the Deutschlandticket in a stated choice experiment, we can test whether this commonly-deployed method for pricing an unpriced feature produces (upward) bias, by seeing if any worker reports a willingness to pay for the Deutschlandticket that is above its market price.

Tax treatment of the Deutschlandticket A worker who buys the Deutschlandticket in the marketplace forgoes €63 of post-tax income. In pre-tax currency, this corresponds to €63/(1−τ_i), where τ_i denotes worker i's marginal tax and contribution rate—the right benchmark for stated WTP if an employer-provided ticket were entirely untaxed. The Deutschlandticket is not entirely untaxed, however: for a share of workers, it offsets the *Entfernungspauschale* (the commuter allowance) euro for euro.[15] We construct a conservative, worker-specific benchmark that combines the general income tax and social security contribution schedule with income-class-specific shares of workers on whom the commuter allowance offset effectively bites. Appendix C details the construction, the underlying legal provisions, and the data sources.

Incorporating the tax treatment yields an average upper bound of €97.5 per month in our sample, corresponding to about 2.5% of gross monthly income (see Appendix Figure C.1). We construct this benchmark conservatively—resolving ambiguities in the tax treatment in the direction that raises the bound—so that it works against, rather than for, our finding of overvaluation.

3 Deriving WTP and the Role of Unlisted Amenities

3.1 Standard WTP Calculation in Discrete Choice Experiments

Having recorded the pairwise choices of the respondents, we closely follow the estimation procedure outlined in Maestas et al. (2023) for estimating the willingness to pay for each unpriced attribute. Let $w_{i,c,p}$ indicate the wage that worker i is offered for job alternative $c \in \{A, B\}$ for the pairwise decision $p \in \{1...10\}$, and $a'_{i,c,p}$ the vector of non-wage job attributes. We assume that the utility of each job alternative $V_{i,c,p}$ is represented by a linear indirect utility function,

$$V_{i,c,p} = \alpha + a'_{i,c,p}\beta_i + \delta_i ln(w_{i,c,p}) + \varepsilon_{i,c,p} \tag{1}$$

[15] There is also a route under which the Deutschlandticket, when provided by the employer and the cost deducted from the employee's salary (*Entgeltumwandlung*), is taxed at a flat rate. We focus on the route that yields the *higher* pre-tax benchmark—the conservative choice for our hypothesis, since a higher upper bound sets a higher bar that stated WTP must clear before the ticket can be deemed overvalued—as we describe in Appendix C.

The coefficients on log wages and each job attribute are allowed to vary for each individual i, and we assume the errors $\varepsilon_{i,c,p}$ are distributed as i.i.d. Extreme Value Type I random variables. Under this assumption, the probability that a worker selects the job offering the bundle $\{w_{i,A,p}, a'_{i,A,p}\}$ as opposed an alternative job with bundle $\{w_{i,B,p}, a'_{i,B,p}\}$ is given by

$$Pr(V_{i,A,p} > V_{i,B,p}) = \frac{exp\Big[(a'_{i,A,p} - a'_{i,B,p})\beta_i + \delta_i(ln(w_{i,A,p}) - ln(w_{i,B,p}))\Big]}{1 + exp\Big[(a'_{i,A,p} - a'_{i,B,p})\beta_i + \delta_i(ln(w_{i,A,p}) - ln(w_{i,B,p}))\Big]}.$$

Simplifying the model by removing individual heterogeneity in the utility derived from wages $\delta_i = \delta$ and non-wage attributes $\beta_i = \beta$ allows the parameters to be recovered through a logit specification. Estimating logit models separately for varying demographic groups g produces group-level coefficients β_g and δ_g for comparison.

With these parameters, we can derive a willingness to pay estimate for each job attribute a. Define WTP_i^a as the corresponding wage decrease that would make individual i indifferent between not having attribute a at wage level w_i and having attribute a but experiencing a reduction in the wage to $w_i - WTP_i^a$. From the linear indirect utility function, WTP_i^a solves

$$\delta_i ln(w_i) = \beta_i^a + \delta_i ln(w_i - WTP_i^a).$$

Rearranging, we have

$$WTP_i^a = w_i \times \Big[1 - exp(\frac{-\beta_i^a}{\delta_i})\Big]. \tag{2}$$

3.2 WTP Bias from Correlated Amenities

The standard WTP calculation assumes that workers evaluate each job attribute independently, so that the coefficient β_r on amenity r isolates the utility from that amenity alone. In practice, however, jobs are bundles of correlated amenities, and workers may use the attributes they observe to form beliefs about those they do not. We formalize how this inference biases WTP estimates.

Consider a worker who observes the posted wage w_j and a single listed amenity A_{jr}, but not the remaining amenities A_{jk}, $k \neq r$. The worker forms beliefs about each unobserved amenity through its conditional mean $m_k(A_{jr}) \equiv \mathbb{E}[A_{jk} \mid A_{jr}]$.[16] Because the indirect utility function is linear in each amenity (as generally posited in the literature and as in Section 3.1 above), only these conditional means enter the worker's expected utility valuation of the job,

$$\mathbb{E}[V_j \mid A_{jr}, w_j] = \alpha + \delta \ln w_j + \beta_r A_{jr} + \sum_{k \neq r} \beta_k \, m_k(A_{jr})$$

[16] We write m_k as a conditional expectation, but it denotes the worker's *subjective* belief about the unobserved amenity, and the derivation is agnostic about how that belief is formed. Bayesian updating from the true joint distribution is the leading case; equally admissible are non-standard, associative processes under which m_k, and hence γ_{kr}, may depart from the objective conditional mean (see our discussion in 5.6).

.[17] Put differently, no other feature of the joint distribution of correlated amenities matters for the worker's expected utility of the advertised job.

In our experiment, amenities appear in job ads as randomized present-or-absent indicators, so the listed amenity is binary, $A_{jr} \in \{0, 1\}$. A function evaluated at only two points is affine in its argument, and so $m_k(A_{jr})$ is—by construction, and without any assumption on the joint distribution of amenities—linear in A_{jr}. Substituting into expected utility collapses the unobserved-amenity terms into an intercept shift and a slope, leaving

$$\mathbb{E}[V_j \mid A_{jr}, w_j] = \tilde{\alpha} + \delta \ln w_j + \beta_r^* A_{jr}, \qquad \beta_r^* = \beta_r + \sum_{k \neq r} \beta_k \gamma_{kr},$$

where the spillover weight is the difference in the worker's beliefs across the two states of the listed amenity,

$$\gamma_{kr} = \mathbb{E}[A_{jk} \mid A_{jr} = 1] - \mathbb{E}[A_{jk} \mid A_{jr} = 0] = \frac{\mathrm{Cov}(A_{jk}, A_{jr})}{\mathrm{Var}(A_{jr})}.$$

Intuitively, γ_{kr} is the amount by which seeing amenity r listed shifts the worker's expectation of amenity k. The second equality is the familiar identity that, for a binary regressor, the population regression slope equals the difference in conditional means.

The estimated coefficient β_r^* thus captures not only the worker's true valuation of amenity r (β_r) but also a weighted sum of their preferences over the other amenities (β_k), with weights given by the spillover terms γ_{kr}, i.e., the regression coefficients of each unobserved amenity on the observed one—precisely the structure of omitted-variable bias, with beliefs about unlisted amenities playing the role of omitted regressors. When amenities are independent, such that $\gamma_{kr} = 0$ for all $k \neq r$, then $\beta_r^* = \beta_r$, so the standard estimator recovers the true WTP. When valued amenities are correlated, it does not.

How The Bias Passes Through to WTP Using β_r^* in place of β_r in equation (2) gives

$$WTP_r^* = w\big[\,1 - \exp(-\beta_r^*/\delta)\,\big].$$

The direction of the bias follows the sign of $\beta_k \gamma_{kr}$, summed over the unlisted amenities. If attractive amenities tend to co-occur and workers value them positively, then $\beta_k \gamma_{kr} > 0$ for most k, and WTP is inflated relative to the true valuation of amenity r. If instead the presence of an amenity signals a correlated disamenity, e.g., free gourmet food at the office signaling an expectation of long hours, then $\beta_k \gamma_{kr} < 0$ along that dimension, and WTP can be biased downward.

The weight γ_{kr} is a purely descriptive quantity: how much more likely an unlisted amenity is to be present in ads that list amenity r, relative to those that do not. Empirically, we capture this association through our belief-elicitation framework, i.e., the causal effect of listing an amenity on workers' beliefs about unlisted ones (Section 5). In addition, as an external

[17] Another implication of the linearity assumption is that the worker's beliefs about unobserved amenities based on amenity A_{jr} are orthogonal to the presence of other observed amenities.

empirical benchmark that need not correspond with workers' inferences, we measure the actual co-occurrence of attributes across job postings on Indeed.

The contamination is not confined to the numerator. The wage coefficient δ is identified from workers' responses to wage variation; but if a higher posted wage itself signals a more generous amenity bundle, then δ absorbs those perceived changes alongside the pure marginal utility of income; in turn, both β_r^* and δ are contaminated by belief spillovers. The net direction of the bias in WTP_r^* is then ambiguous absent direct measurement of the spillovers—which is what our beliefs-elicitation experiment is designed to measure. Appendix D exposits the wage-denominator channel and extends the decomposition to continuous amenities.

4 Willingness to Pay for the Deutschlandticket

We first estimate the willingness to pay for each job attribute following the methodology outlined in Section 2 for the full sample of respondents. The results, presented in Figure 1, demonstrate that workers perceive these attributes as amenities (as opposed to dis-amenities) since we observe a positive willingness to pay for each one.[18]

We estimate that the average worker would forego 10.1% of their wage if their employer offered five additional days of paid vacation, 2.8% for a subsidized lunch, 2.9% for training opportunities, 6.5% for a flexible work schedule, 8.2% for a hybrid work arrangement, and 12.4% to be able to fully work from home. Notably, these estimates fall close to the averages across the existing literature recorded in Table 1. For training opportunities, five additional days vacation, and full work from home, our estimate is within one-half percentage point; a subsidized lunch, one percentage point; a flexible schedule, one-and-one-half percentage points; and hybrid work from home, two percentage points. Of course, since the number of existing papers from the literature that have estimated a WTP for each of these amenities is limited, these averages are noisy and imprecise. Nevertheless, the fact that our estimates are of comparable magnitudes suggests that the takeaways from our experiment are representative for stated choice experiments more broadly, not just for our sample of German workers.

Turning to the focal amenity, the average worker reveals a WTP for the Deutschlandticket of 2.9% of their wage—€1,387 per year, given the sample's average annual wage of €47,884. This exceeds the ticket's post-tax cost (€756) by 83%, and exceeds even our deliberately conservative pre-tax upper bound by nearly one-fifth (2.9% versus 2.5% of the wage). Stated average WTP thus surpasses the ticket's market price, a prediction we had pre-registered.

The average, however, understates how far valuations depart from the market price. Only around 17% of the population holds a Deutschlandticket (VDV, 2026), so a majority value it below its 63-euro price; for the experiment to nonetheless place average WTP above a conservative upper bound, a substantial share of workers must overvalue the ticket substantially.

Who (Over-)Values the Ticket Most. We pre-registered that WTP for the ticket should rise with workers' access to and use of public transit, and find that it does. We anticipated that

[18] The estimates are not sensitive to assuming errors follow a logistic distribution, as they are nearly identical under a logit, probit, or linear probability model (Appendix Figure A.3.3).

differences in WTP would correlate with differences in access and utilization.[19] Estimating WTP separately by urbanicity, workers in cities do report the highest WTP at €181 per month (3.9%), those in rural areas the lowest at €77 (1.8%), and those in towns in between at €120 (2.7%); we reject equality of rural WTP with either group, in levels and in log points (Figure 2; percent-of-wage estimates in Appendix Figure A.3.4).[20] A complementary (though exploratory) split on revealed relevance points the same way: among the one-half of respondents asked to list a job's advantages and disadvantages, those who spontaneously name the Deutschlandticket report a WTP of €191 (4.6%) against €115 (2.6%) for those who do not, a difference significant at conventional levels (p-value of 0.022 for monthly euros and 0.008 for log wages). The experiment thus recovers preference variation aligned with who actually values the pass—evidence that the inflated levels coexist with sensible relative magnitudes rather than reflecting noise. The same estimates sharpen the puzzle: city and transit-relevant workers exceed the conservative upper bound by wide margins, while even rural workers—those empirically least reliant on public transit—hold a far-from-negligible WTP.

Can Inattention Rationalize the Upward Bias in WTP? The overvaluation we document does not stem from workers misperceiving what the ticket costs. We pre-registered a test of this channel, randomizing whether each worker was shown the Deutschlandticket's market price when the choice task was introduced, and separately asking every worker to state the price at the end of the survey.

Since we asked workers at the end of survey for the price of the Deutschlandticket, we can observe the distribution of workers' beliefs about the price, and whether informing the worker of the market price shifted said beliefs. In panel (a) of Figure 3, the histogram of responses for the price of the Deutschlandticket for both sets of workers—those who were informed about the price and those who were not—are plotted. The modal response in both arms is the true market price of €63, and both distributions are clustered between €59 (the market price the previous year) and €69. Narrowing in on the true market price, we can see that the intervention did improve the accuracy of workers' beliefs—as the treated arm was roughly 15 percentage points more likely to state €63.

To better understand whether inaccurate beliefs over the price of the Deutschlandticket can explain the inflated WTP estimates, we partition each randomization arm into those who know the €63 price and those who do not, and then estimate a separate WTP for each randomization arm as a whole and each of these four subgroups. The results, presented in panel (b) of Figure 3, seem to rule out unfamiliarity with the Deutschlandticket as a driving mechanism for the upward bias. Looking at workers with precise knowledge of the price, they exhibit a WTP that is more than double the pre-tax equivalent of the Deutschlandticket. Further, if anything, workers who cannot correctly state the price exhibit significantly lower WTP estimates compared with those who can. Taken together, as the overvaluation relative to the market price is *smaller* among

[19] Consistent with this hypothesis, offerings of the Deutschlandticket in job ads is strongly correlated with population density (Appendix Figure A.2.2). Take-up of the pass in rural areas is non-zero (Gaus and Link, 2025), suggesting it has use in rural areas but the price is prohibitive for many.

[20] When estimated in levels, calculation of WTP follows $WTP_i^a = \beta_i^a / \delta_i$.

uninformed respondents, inattentiveness or lack of information cannot rationalize the upward bias in estimating WTP for the Deutschlandticket.

It is also possible that respondents exhibit an inflated WTP for the Deutschlandticket because they are inattentive participants. We rule this out through an attention check, as is oft employed in discrete choice settings (Maestas et al., 2023). Because our sample of German workers are highly attentive, with 96.2% passing the attention check, our estimates change little when respondents who fail the attention check are excluded (Appendix Figure A.3.5). Thus, inattentiveness to the ads and their content in the pairwise comparisons for the discrete choice framework cannot rationalize the overvaluation we document.

Can Complexity Rationalize the Upward Bias in WTP? By having workers compare, many times, two job ads that may differ along many dimensions, it is possible workers reveal a WTP for the Deutschlandticket through their revealed actions that is considerably inflated due to the complexity of the comparisons required. Especially given that some of the amenities that are listed are inherently not priced, respondents may never before have considered how much they value a flexible schedule—and how having a flexible schedule, or lack there of, trades off with training opportunities or additional days' vacation. To the extent that workers face cognitive constraints in the discrete choice experiment, facing such a complex environment could lead workers to overreact to a listed amenity (Ba et al., 2024).

Presumably though, the task of choosing between two job ads is less cognitively taxing the more similar the two ads are (see, e.g., Shubatt and Yang, 2024). Put differently, the more dissimilar the amenity bundles of the two ads, the more complex are the imputations required to determine and price the tradeoffs therein. Since amenities were randomized across ads, pairwise comparisons vary in the number of amenity imbalances between them.[21] To test for whether cognitive constraints are a possible mechanism behind our WTP estimates, we estimate WTP for each amenity separately by whether there is 1, 2-3, or 4-6 amenities that are dissimilar between the two ads. The results are displayed in Appendix Figure A.3.6.

If complexity induces upward bias in WTP, we would expect WTP to rise monotonically with the number of differences. However, whether it is only the Deutschlandticket that differs between the two ads or multiple amenities that are not in alignment, the WTP for the Deutschlandticket is around 3% and statistically indistinguishable. This suggests complexity of the comparisons is not behind the upward bias in WTP we document. Turning to the estimates for the other amenities, if anything, further points to a narrative of signaling unlisted amenities. For four amenities (training opportunities, flexible schedule, hybrid work from home, and subsidized lunch), the WTP when such amenities are the only difference between the two ads *is* significantly greater than that observed when multiple amenities differ—consistent with workers loading (positive) inferences onto the sole amenity that differs.

Taking Stock Across our pre-registered tests, the discrete choice experiment documents substantial overvaluations of the Deutschlandticket: stated WTP exceeds a conservative upper

[21] The distribution of pairwise amenity differences is: 0 (1.9%), 1 (11.5%), 2-3 (60.2%), and 4-6 (26.5%).

bound, persists among workers who know the exact price surviving controls for inattention, and for the complexity of the comparison. At the same time, the experiment recovers preference variation that tracks who actually values the pass, so inflated levels coexist with sensible relative magnitudes. With the existing evidence speaking against misperception, inattention, or complexity as key drivers of the overvaluation, belief spillovers remain the leading explanation which we turn to next.

5 Spillover Beliefs from What is Posted in the Ad

While job ads can be informative by, for instance, specifying particular skill requirements and tasks or highlighting specific fringe benefits, they are by no means exhaustive. Job ads inherently balance brevity—to keep the job seeker engaged—and comprehensiveness—to offer relevant information, while also balancing screening, to weed out candidates, and signaling, to entice applications. Given their signaling function, to the extent that information that is unflattering may be omitted entirely,[22] workers may struggle to understand the dis-amenities of the workplace (Sockin and Sojourner, 2023). Consequently, job ads are an incomplete summary for the complete bundle of amenities.

5.1 Beliefs Over Unlisted Amenities from Listed Amenities

To fill the vacuum of information regarding unlisted job attributes (which may include the wage), workers may draw inference over what is not stated from that which is.[23] Such beliefs may draw on amenity correlations that exist in the real world. For instance, compared with similar ads that do not mention a Deutschlandticket, those that do are more likely to explicitly offer other amenities, e.g., remote work, a flexible schedule, a company pension, professional development, employee discounts, and more vacation days, as well as describe other attributes of the job that workers may consider amenities, e.g., family-friendly benefits and a commitment to sustainability (Appendix Table B.2.1). The same can be said for ads that offer full or hybrid work from home (Appendix Table B.2.2).

Experimental Approach In our discrete choice experiment, we randomly varied seven amenities: vacation days, training opportunities, subsidized lunch, flexible schedule, hybrid work from home, full work from home, and a free Deutschlandticket. To gauge whether mentioning any of these amenities in a job ad shifts workers' beliefs about other, unlisted amenities, we

[22] It is not obvious that an employer would never want to include unflattering information in an ad, as doing so may offer the job seeker a more realistic job preview—which is associated with greater offer acceptance rates and reduced turnover (Ash et al., 2025; Wanous, 1973).

[23] For instance, Burn et al. (2022) show that job-ad language related to age-related stereotypes deters older workers from applying—meaning job seekers may plausibly infer the company employs a younger workforce and draw on any such associations that may imply about the workplace. Likewise, Kuhn and Shen (2023) and Card et al. (2025) provide evidence that gender preferences in job ads shape applicant flows and hiring outcomes by gender.

include in our experiment three complementary approaches to understanding belief spillovers.[24] For each approach, the job ads are randomly selected from those the worker was presented with in the discrete choice module.

In the first question, we present each worker with a single job ad, where it is randomized which, and how many, amenities are listed. We ask the worker the probability that the job features a given job attribute, for which we consider 10 broadly applicable features. These 10 attributes span four broad (and partly overlapping) domains: workplace climate and job demands (stress, pleasant atmosphere, and team events), values and organizational practices of the employer (family friendly, promotes sustainability, and flat hierarchies), coworker composition (young and dynamic, and high female share), and fringe benefits (pension, and discounts). We prompt the worker for their perceptions over 5 of the 10 attributes—chosen and ordered randomly—to mitigate any possible fatigue-related bias. To measure perceived probabilities, the worker selects from a 5-point Likert scale with explicitly associated probabilities: 'very unlikely' (0–20%), 'unlikely' (20–40%), 'equally likely' (40–60%), 'likely' (60–80%), and 'very likely' (80–100%). This approach pins down belief spillovers in a structured manner.

In the second question, we present the respondent with a pair of hypothetical job ads and ask them which job is more likely to feature a given job attribute. This setup mirrors the framework for WTP elicitation, but instead captures the signaling value from the content of job ads. For the attributes in question, we randomly select 5 of the same 10 features from the first question. Because the results align with those of the first question, we relegate the results of the second approach to the Appendix.

For the third question, we again present the respondent with a single job ad but now ask the respondent to provide a free-response impression of the advertised job. Respondents are randomly presented one of two possible versions of this question: either what are advantages and disadvantages of the job, or what is their general impression about the position (without any further prompts). This approach captures belief spillovers in an unstructured fashion by eliciting top-of-mind associations workers make about the job based on what is listed in the ad. Using modern natural language processing tools, we identify what themes arise in these free responses and report results in Section 5.4 below.

To analyze the results from the first approach, let $B_{i,b}$ represent the 5-item Likert response that worker i reports for their belief regarding unlisted amenity b. The treatment—which was randomized by respondent—is whether each amenity a was included in the set of amenities A_i that was listed in the job ad, which we capture through the indicator $1(a \in A_i)$. We then estimate,

$$B_{i,b} = \sum_a \psi_a 1(a \in A_i) + \gamma X_i + \epsilon_{i,b}, \tag{3}$$

where X_i is a vector of worker characteristics. Under this framework, the coefficient ψ_a captures the causal effect that mentioning amenity a has on unmentioned belief b.

[24] To ensure our results are not the product of framing, i.e., the order of the questions, we randomize their order and in each regression, control for the order in which they were presented to the worker.

Effects on Structured Beliefs For ease of exposition, we present in Figure 4 the results for two of the amenities, our focal amenity of interest, the Deutschlandticket, and work from home, which has received increased attention since the Covid-19 pandemic (e.g., Barrero et al., 2023; Bick et al., 2023; Cullen et al., 2025); we relegate the results for the other five amenities in the discrete choice experiment to Appendix Figure A.4.2. Regardless of which amenity we consider though, the takeaway is clear: the incidence of one amenity shifts beliefs over other components of the amenity bundle.

Looking first at the Deutschlandticket, we observe that when a worker is randomly presented an ad that includes it, their beliefs over pecuniary and non-pecuniary aspects of the workplace adjust. While workers are 7 percentage points more likely to believe the employer offers discounts to their employees and 3 percentage points more likely to believe there will be a company pension, they are also 2 and 5 percentage points more likely to believe the firm employs a high share of women and cares about issues related to sustainability, respectively.[25] While other beliefs may shift somewhat, we cannot statistically reject that they are unchanged.

Turning to work from home, the shift in beliefs is remarkable, in that *every* unlisted amenity we consider is shifted in response to an employer advertising work from home. For all ten dimensions, the shift is in the direction of an improved amenity bundle with, for instance, a pleasant atmosphere that is family-friendly alongside a pension and reduced stress. The magnitude of the shifts are non-trivial at 3–7 percentage points, with the largest shifts in percentage terms occurring for the employer is family friendly, cares about sustainability, and offers a young and dynamic workplace.[26]

For the other amenities, we briefly summarize the effects here and point interested readers to Appendix Figure A.4.2. For a subsidized lunch, the largest shift is in employee discounts (11 percentage points), followed by the workplace being a good and pleasant atmosphere. For a flexible schedule, workers are 6 percentage points more likely to believe the employer is family-friendly, with smaller but significant improvements in all other dimensions, including less stress. For hybrid work from home, workers increasingly believe the employer offers team events, cares about sustainability, and is young and dynamic. For training opportunities, the most pronounced shift is in team events (5 percentage points). Last, for additional days' vacation, workers increasingly believe the employer is family-friendly and offers a good, pleasant atmosphere.

While measuring these unlisted beliefs assists with filling in the spillover matrix γ_{kr} of equation (**??**), as we lack the "true" isolated WTP for each spillover belief k and the numerosity of the amenity bundle exceeds the ten attributes we consider, quantifying the extent of the omitted variable bias on each amenity r is beyond the scope of our experiment. That said, a few thought exercises may be informative in this regard. As a first, suppose workers on average held a WTP of 1% for each of the ten unlisted amenities; this would add 0.22 percentage point to the WTP of the Deutschlandticket. As a second, suppose workers had zero WTP for any of the spillover

[25] Recognizing that we simultaneously test a null hypothesis for each unlisted amenity, we present in Appendix Table B.3.2 the p-values for rejecting each null hypothesis when adjusting for multiple hypothesis testing following the Bonferroni-Holm method. These four effects remain significant at the 1% level.

[26] Each effect with a magnitude of at least 3 percentage points remains significant at the 5% level after adjusting for multiple hypothesis testing (Appendix Table B.3.2).

beliefs except a company pension, which they value at the 22% average observed in the literature (Table 1); this would add 0.61 percentage point to the WTP of the Deutschlandticket.

The effects on beliefs from the second approach—in which we offered each worker a pairwise comparison of job ads, randomized each ad's amenities, and asked about unlisted beliefs—only serve to bolster these results. As the results are qualitatively similar to those observed under the single-ad exercise, we relegate the estimates for each amenity to Appendix Figure A.4.3. A worker is 40 percentage points more likely to believe the employer advertising work from home is more family-friendly than an employer who does not, and 28 percentage points more likely when an employer advertises a flexible schedule. Workers are 21 percentage points more likely to believe the employer advertising training opportunities offers a pension, and 23 percentage points more likely to believe the employer advertising a Deutschlandticket cares about sustainability. Last, when it comes to a good and pleasant atmosphere or being young and dynamic, the presence of *any* amenity increases the likelihood the worker believes that to be the case for the advertising employer.

Can the Right Instructions Wash Away These Correlations? A simple corrective for possibly eliminating these spillover beliefs would be to instruct workers to shut down such spillovers. This would involve telling workers to assume all else is the same between the two jobs, which would be akin to some version of implementing covariate control (Dafoe et al., 2018), but over background information that is not explicitly presented. Indeed, this has become common practice in the literature involving discrete choice experiments (e.g., Folke and Rickne, 2022; Maestas et al., 2023; Wiswall and Zafar, 2017).

While this may work in theory, we explicitly test whether this is the case in practice. In the stated choice framework, we embed a randomized bifurcation: one-half of participants were instructed in the introductory prompt to assume all else is identical about the two jobs, while the other half was not. When we calculate the difference in WTP between these two treatment arms for each amenity, none of the differences are statistically significant (Appendix Table B.3.1) and we fail to reject the joint null hypothesis with p-values above 0.9. This contrasts with settings where simple attentional cues successfully debias inference (Graeber, 2023), suggesting that belief spillovers in job choice are not a mere failure to notice unlisted attributes but reflect workers' substantive priors about how amenities co-occur. We interpret this evidence as definitive that this nudge of a corrective is an ineffective remedy for addressing spillovers in beliefs.

5.2 Differences in Belief Updating Track WTP Differences

We next assess whether the inflated WTP estimates reflect unobserved signals of other amenities by linking, within each worker, their valuation of an amenity to the beliefs they hold about its unlisted correlates. Because the same worker completes both the discrete choice exercise and the beliefs elicitation, we can relate each worker's revealed valuations to their stated beliefs. Two features of the design sharpen the interpretation of this link. First, because WTP is recovered from revealed choices whereas beliefs are vocalized, a within-person correlation between the two is unlikely to be driven by simple survey-response consistency or narrow framing artifacts. Second,

because each worker makes all discrete choice decisions before the belief elicitation, we can safely rule out the possibility that the belief questions prime the WTP estimates.

Linking beliefs to WTP requires a WTP estimate for each individual worker, which we approximate with two complementary approaches.[27] The first approach, channeling the two-step classification-estimation algorithm of Bonhomme et al. (2019), assumes there are 20 latent types t in the data, each with their own set of parameters $(\delta_t,\ \beta_t)$, and calculates posterior probabilities that each worker i is of each type $t, p_i(t)$. Each worker's WTP for an amenity is then calculated as the posterior mean over the latent types. The distribution of WTP for the Deutschlandticket and full work from home under this approach are presented in panel (a) of Appendix Figures A.3.7 and A.3.8, respectively.

The second approach allows for individual-level coefficients on amenities (β_i) by estimating a mixed logit specification (Hole, 2007; Train, 2009). We estimate the model using maximum simulated likelihood, assuming a normal distribution for individual-specific coefficients β_i and a uniform preference over wages, δ. The distribution of WTP_i for the Deutschlandticket and full work from home under this approach are presented in panel (b) of Appendix Figures A.3.7 and A.3.8, respectively.

If positive beliefs over omitted variables inflate WTP estimates, we should observe a positive relationship between the signal a worker derives from a given amenity and their WTP for this amenity. We test for this pattern in the pairwise beliefs elicitation module by estimating, separately for each belief b, the interaction between respondents' beliefs when presented with amenity A and their WTP for amenity A. We estimate:

$$C^b_{i,p} = \psi^b_A \Delta_{A,p} \times WTP_{i,A} + \sum_a \rho^b_a \Delta_{a,p} + \xi^b WTP_{i,A} + \varepsilon^b_{i,p}, \tag{4}$$

where $C^b_{i,p}$ is an indicator equal to 1 if worker i chooses job A as being more likely to offer belief b for pairwise comparison p, $\Delta_{a,p}$ is the difference in amenity a between job A and job B within pair p, and $WTP_{i,A}$ is worker i's WTP for the focal amenity A, where the focal amenity A is either the Deutschlandticket or full work from home. The coefficient ψ^b_A captures the interaction effect between the valuation of the focal amenity and its signaling value; we include the worker's WTP for the focal amenity, $WTP_{i,A}$, as a standalone covariate. For ease of exposition, we partition workers into terciles according to $WTP_{i,A}$, consider workers in the lower tercile and upper tercile, and use an indicator 1(Upper tercile $WTP_{i,A}$) in lieu of $WTP_{i,A}$.[28]

We find that workers who place a higher value on an amenity update their beliefs about its unlisted correlates more strongly when it is advertised. Because the results are similar under the two approaches, we present the coefficients of interest ψ^b_A under the latent-types model in Figure

[27] To obtain each worker's WTP for the Deutschlandticket, ideally one would observe each worker making pairwise comparisons between job ads numerous times such that each parameter in equation (1) could be identified with a high degree of precision. As each worker only records a limited number of choices—as is standard in the literature (e.g., Maestas et al., 2023; Nagler et al., 2024), and asking workers to have done more may have increased fatigue and reduced attention—we cannot accomplish this directly and take the two approaches to approximate each individual worker's WTP described below.

[28] The takeaways are unchanged (Appendix Figure A.4.4) if we were to use the full sample of workers and estimate equation (4) as written.

5 and relegate those under the random-coefficients model to Appendix Figure A.4.5. From these results, we can conclude that workers who exhibit a greater WTP for an amenity are more likely to update positively (most of) their beliefs over unlisted attributes when said amenity is listed in the job ad. The difference can be quite marked: for the Deutschlandticket (panel a), high-WTP workers are 16 percentage points more likely to believe the employer promotes sustainability and 14 percentage points more likely to host team events compared with low-WTP workers; for full work from home (panel b), high-WTP workers are a marked 28 percentage points more likely to believe the employer is family-friendly.[29] To the extent that workers value these unlisted attributes—sustainability, team events, and family friendliness—these disparities in beliefs will translate, through omitted variable bias, into disparities in WTP.

5.3 Beliefs Over Unlisted Amenities from the Posted Wage

Workers' beliefs over unlisted amenities may be altered not only by the other amenities listed in the ad, but also by the posted wage. To the extent that workers have expectations over the types of jobs and workplaces that offer comparatively high wages, observing different wage levels, even for the same vacancy, will instill different beliefs over the amenity bundle. Although workers broadly sort towards ads with greater posted wages (Belot et al., 2022; Jalal, 2026), if workers do believe improved amenities come alongside higher wages (Andresen et al., 2026), in a fashion consistent with empirical associations (Ouimet and Tate, 2023; Sockin, 2022), then some of this sorting behavior may reflect an amenity-driven response rather than a response to the higher pay itself.

When eliciting workers' beliefs over unlisted amenities, both in a structured and an unstructured framework, the wage was randomly varied across ads. We can estimate the causal effect that the posted wage has on beliefs by estimating how beliefs vary between workers who were presented with ads of varying wages. In panel (a) of Figure 7, we observe that workers update their beliefs about the job opportunity and its unlisted amenities *broadly positively*.[30] When the job pays more, workers perceive the employer as increasingly likely to offer team events, a company pension, and prioritize sustainability (panel a), as well as exude a more positive sentiment with increased discussion of compensation and development (panel b).[31] Not all amenities though update positively. When the job pays more, workers increasingly believe the job will be stressful—consistent with correlations in the data (Nagler et al., 2025). Interestingly, workers are less likely to think there is a high share of women at the employer when the posted wage is greater, possibly reflecting workers internalizing that women sort towards lower-paying employers (Morchio and Moser, 2024).

What are the implications of these non-zero cross-correlations that arise when we exogenously shift the posted wage? Since job seekers' responses to wages necessarily conflate responses to pay and responses to perceived amenities, then labor supply elasticities to the firm will inher-

[29] These estimates remain significant at the 1% level after accounting for simultaneously testing multiple hypotheses (Appendix Table B.3.3).

[30] We draw a similar conclusion in the pairwise elicitation of structured beliefs (Appendix Figure A.4.9).

[31] Under the structured beliefs framework, these four effects remain significant at the 1% level after adjusting for multiple hypothesis testing (Appendix Table B.3.2).

ently reflect this duality. As such, the wage-only elasticity will fall below empirically estimated elasticities—leading to distorted estimates of monopsony power. This channel is consistent with Dube et al. (2022) who show measures of monopsony power are biased when wages and amenities are complements yet amenities are overlooked. We caveat though that it may not be possible to separate the two if workers make inferences about employers in response to a shift in pay. Taking the perspective that jobs are experience goods (Jovanovic, 1979; Menzio and Shi, 2011), in which amenities are realized once in—and over the duration of—the match, this would imply the signaling value of, and thus workers' responses to, wages differ ex ante during search and interim while on the job. In turn, recruitment labor supply elasticities should be greater than separation elasticities; and as such, the separation elasticity will be an imperfect proxy for the recruitment elasticity in estimating monopsony power (Manning, 2003).

5.4 Effects on Unstructured Beliefs

While the structured beliefs module demonstrates shifts in workers' perceptions of the job, the ten structured beliefs we elicit may not capture all dimensions along which workers update when reading a job ad. To allow respondents to reveal their inferences in their own words, we included an open-ended module in which workers were shown a single job ad—with the wage and amenities again randomized—and asked either to describe the advantages and disadvantages of the position, or to state their general impressions of the job (following Ferrario and Stantcheva, 2022; Haaland et al., 2025).

Illuminating Anecdotes Before turning to a systematic topic analysis of respondents' free-response text, we present a handful of illustrative examples showing how workers describe the jobs they are shown. The examples demonstrate that workers spontaneously draw rich inferences over what is explicitly advertised, such as pay and flexibility, but also what is not, such as stress, workplace culture, and employer type—precisely the kind of spillover beliefs onto other aspects of the amenity bundle that our structured elicitation module was designed to capture.

A first set of responses illustrates how workers use the posted wage and listed amenities to infer stress and performance expectations. One respondent, presented with a relatively high salary of €5,000, wrote: *"It's probably stressful at times given the salary, and quite a lot is expected of employees."* Another respondent, also presented with a relatively high posted salary, inferred that there would be *"high performance pressure due to the good pay"*, but also that it is like a *"young company, cannot afford to have employees take paid vacation."* Another respondent, in response to a comparatively low wage, elicited a different inference, writing *"relatively low salary, therefore either a greedy boss or a family business = high pressure."* Notably, in these anecdotal cases, both high- and low-wage offerings induce inferences regarding stress, albeit through different channels.

It is not just the posted wage however that can generate inferences over stress and working conditions. The *absence* of amenities can as well. In addition to believing the hiring company was a *"traditional company"*, one respondent wrote *"few vacation days suggest possible understaffing and a lot of stress."* Another respondent drew a complex set of inferences from the ad lacking the

combination of full work from home and a flexible schedule. Regarding the former, the respondent wrote they would anticipate the workplace to be *"a more stressful environment because you don't have the option to work exclusively from home — meaning office communication would be more important"*; as to the latter, they added *"since there are no flexible hours, more people would be in the office at the same time each day and good teamwork would matter a lot."*

A second set of responses illustrates how the presence of amenities shapes perceptions of employer type and workplace culture. For one respondent, the listing of amenities elicited perceptions of the employer being *"a young, family-friendly company"*, with the respondent further speaking to the company's culture, writing the firm *"cares about and values its employees."* One respondent drew inferences with regards to the size of the firm that would list such an advertisement given the fringe benefits offered, writing *"a small company probably couldn't afford such advantageous benefits!"* When fewer amenities were listed, the inferences respondents had were the reverse. One respondent believed the offer to be *"the bare minimum these days,"* characterizing the employer as *"more of a traditional law firm, probably with older partners."* Another respondent believed the hiring firm to be *"a conservative employer with rigid structures."*

These anecdotes illustrate the signaling mechanism of what is—and what is not—in a job ad for the individual: workers do not evaluate amenities in isolation but use them to construct a broader narrative about the employer. The systematic analysis that follows confirms these patterns at scale.

Thematic Scoring Building on Modarressi et al. (2025), we construct a latent set of causal themes using a procedure that combines machine-driven discovery and human judgment based on prompting a large language model (LLM, specifically ChatGPT 5.4-mini).[32] We prompt the LLM to generate a list of themes (including detailed descriptions) that best capture "major differences across [treatment] groups" that "do not take into account differences that are directly caused by the presence of some characteristic on the job ad", but do capture "inferences that may be made about how jobs differ based on the job posting." We consolidate and refine some slightly varying themes and definitions into a uniformized set of six. Of the six themes, the LLM constructs three that are clearly not the direct byproduct of the ad—workplace climate, job strain, and sentiment—and three that are more natural byproducts of some of the amenities when listed—compensation, development, and flexibility. We interpret effects on the former as spillover beliefs and effects on the latter as validation of the exercise. Their descriptions are available in Table 2.

For each theme, the respondent's free-response prompt is scored on an integral scale from 0 to 3 for each theme, with a greater score indicating increased relevance to the given description. The six themes are neither exhaustive nor mutually exclusive, meaning each free response can score positively on all, some, or none of the themes. The distribution of scores for each theme is presented in the last four columns of Table 2. Not all themes are mentioned with the same propensity: whereas compensation and flexibility are frequently discussed—perhaps unsurprising

[32] Our findings are not qualitatively sensitive to the specific large language model employed, e.g., Gemma 3 or Llama 3.3; and quantitatively, if anything, the effects may be larger under these other models (Appendix Figure A.4.6).

given the inclusion of pay and flexibility-related amenities—development, strain, and climate are less common albeit still present. As for sentiment, about 18% of respondents convey a particularly positive outlook for the advertised job.

We estimate the causal effect each amenity has on the themes in respondents' open-ended responses by estimating equation (3) with the LLM score for each theme as the dependent variable. Reassuringly, as shown in Appendix Figure A.4.8, respondents are significantly more likely to mention: (i) compensation when presented with a pecuniary amenity (additional vacation days, subsidized lunch, or a Deutschlandticket), (ii) development when presented with training opportunities, and (iii) flexibility when presented with a flexible schedule, hybrid work from home, or full work from home.[33] Moreover, every amenity has a positive effect on sentiment, consistent with each attribute reflecting an amenity as opposed to a dis-amenity. (As these estimates are linearly additive, offering more amenities amplifies positive sentiment).

Consistent with spillover beliefs onto unlisted amenities, we observe in Figure 6 shifts in respondents' perceptions of workplace climate and job strain—neither of which is explicitly alluded to in any job ad—when other amenities are listed.[34] Nearly all amenities, with the exception of hybrid work from home, induce workers to believe the employer offers better culture, which includes aspects such as team atmosphere, fairness, leadership, collegiality, support, and family friendliness (Table 2). The effects are comparable in magnitude across amenities, with full work from home eliciting the largest response. Similarly for job strain, consistent with the structured beliefs design, workers are less likely to describe the job as seeming stressful, demanding, or overtime-heavy (Table 2) when amenities are listed in the ad. This is especially the case when the schedule-related amenities of vacation days, flexible schedule, hybrid work from home, or full work from home are listed. Such cross-domain spillovers—where listing one amenity shifts how respondents *spontaneously* discuss unrelated job features—provide converging evidence that workers treat job ads as signals about the full employment package, including along dimensions completely unmentioned in the ad.

The posted wage shifts these same free-response themes. Higher advertised pay raises workers' discussion of compensation and development and lifts overall sentiment, while also raising perceived strain—mirroring the structured-belief results in Section 5.3 (panel (b) of Figure 7).

5.5 Beliefs Over Wages from Listed Amenities

While greater wages can act as a signal for both amenities (e.g., caring about sustainability) and dis-amenities (e.g., stress), presumably such signaling may occur bilaterally. That is, when the wage is absent from the ad, the amenities that are listed could plausibly act as a barometer for what the worker can expect with regards to the wage. Given that posted wages are frequently absent from job ads (Batra et al., 2023) and workers may have especially diffuse beliefs over the

[33] While there are some negative effects on these three themes from the presence of other amenities, it is important to note that this does not necessarily reflect negative updating with regards to quality but more specifically a lower likelihood of mentioning—which is consistent with the discussion of one theme crowding out another, as workers disclose what is top of mind.

[34] Estimates are similar, albeit noisier, when only respondents prompted for impressions of the job—as opposed to advantages and disadvantages of the job—are included (Appendix Figure A.4.7).

actual pay ranges when not displayed (Jalal, 2026), job seekers may lean on the amenities that are listed to glean pay.

To test for this spillover channel, we include a fourth and final question at the end of the beliefs elicitation experiment. We present the respondent again with a pair of job ads, this time without any wage information in either ad. We ask the worker which ad they believes offers a higher wage and by what percent they believe that wage to be higher. The options include: 0–5%, 5–10%, 10–20%, 20–30%, or more than 30%. (The worker can also report the two pay similarly). Since the amenities that are listed are assigned randomly across the two ads, we can discern the causal effect each amenity has on wage expectations. The results for each of the seven amenities are depicted in Figure 8.

Evidently, workers' beliefs about pay are partly governed by the amenities that are advertised. All but one of the amenities demonstrate a significant effect on the perceived wage—and not all amenities induce workers to raise the expected wage. Some, such as work from home, a flexible schedule, and regular training opportunities, cause workers to believe the job pays more—each on the order of around 0.5-1.25 percentage points. This may reflect workers internalizing real-world correlations, e.g., a pay premium among work-from-home opportunities (Cullen et al., 2025). Others, such as five additional vacation days and the Deutschlandticket, cause workers to revise down the wage they would expect to receive—on the order of about 0.5 percentage point. This dichotomy seems to suggest that workers perceive compensating wage differentials when the amenity is pecuniary in nature, and augmenting wage differentials when the amenity is non-pecuniary in nature. We hope future work will explore this bifurcation further.

5.6 Do Workers' Beliefs Align With Real-World Correlations?

While we have established that workers embody beliefs over how amenities are cross-correlated, it remains an open question whether these beliefs are accurate. To that end, we revisit the Indeed data. For each job posting, we first document whether each unlisted structured belief b is described in the text of the ad. Second, we record whether each listed amenity a is also in the job ad. Third, we estimate through fixed effects models the extent to which the incidence of each belief b differs with the presence of each amenity a. The results for the Deutschlandticket and work from home are presented in Appendix Tables B.2.1 and B.2.2, respectively.[35]

If workers were Bayesian, in that their beliefs reflect the distributions observed in the labor market, then they would increasingly believe two amenities are correlated when the two amenities are increasingly offered together in job ads.[36] Appendix Figure A.2.3 plots, for the Deutschlandticket (panel a) and work from home (panel b), the frequency with which two amenities are offered together (x-axis) against the causal effect the amenity has on workers' beliefs (y-axis). The 45-degree line captures workers' beliefs corresponding one-to-one with real-world correlations.

Broadly speaking, as the estimates do not lie along the 45-degree line, beliefs do not seem to accurately reflect the data. While the correlation is positive for the Deutschlandticket, it is

[35]In the analysis of job ad text, we replace the female employment share, which is not commonly mentioned in job ads, by an indicator for mentions of women in leadership.

[36]We caveat that incidence in job advertisements need not reflect incidence across workplaces.

slightly negative for work from home. workers' beliefs do, however, generally agree in sign with the cross-correlations in job ads—indicating workers appear to recognize that employers who list amenities tend to offer additional amenities.

Given that workers' beliefs deviate from real-world correlations, it remains an open question from where beliefs over amenities stem. To the extent that beliefs are formed associatively—through cued recall rather than statistical inference (Bordalo et al., 2020; Enke et al., 2024; Graeber, 2023; Mullainathan, 2002)—a key question is what the recall process draws on? Workers may encode associations from their own past jobs (experience-based priors, Bastianello and Imas, 2026), from employers' public stances (Adrjan et al., 2023), from word-of-mouth through social networks (Hampole et al., 2026), or from crowd-sourced reviews (Sockin and Sojourner, 2023; Sockin et al., 2026). Future work that investigates how workers' beliefs over amenities evolve over the life cycle—and whether it is governed by associative recall—would be especially insightful.

6 Conclusion

Our paper provides evidence that job advertisements function as signals about the full employment package, with consequences for how researchers measure the value of non-wage amenities and labor market power. By embedding an amenity with a known market price—the Deutschlandticket—in a large-scale discrete choice experiment, we document that stated willingness to pay substantially exceeds the amenity's market value, even though WTP estimates for all other amenities align with the prior literature. A complementary belief-elicitation experiment identifies a general mechanism: listing any amenity in a job ad causally shifts workers' beliefs about unlisted employer characteristics, including workplace culture, management quality, and coworker composition. Posted wages similarly signal the amenity bundle, contaminating the wage-based metric that underpins all WTP calculations.

Our findings clarify what discrete choice experiments measure. Even when stated choices closely predict actual job choices (Maestas et al., 2023; Mas and Pallais, 2017; Wiswall and Zafar, 2017), the resulting WTP estimates do not isolate the value of individual amenities. Because workers recognize that amenities tend to co-occur, experimentally varying one feature of a job shifts, perhaps rationally, perceptions of many others. The WTP that researchers recover is the value of a perceived bundle, not of an isolated attribute. At an extreme, the estimated WTP could reflect only the value of correlated, unlisted amenities rather than the experimentally varied attribute itself.

This reinterpretation carries practical implications. Summing individual amenity WTPs to quantify the non-wage share of total compensation as is common in the literature will systematically overstate its importance. Additionally, labor supply elasticities estimated from wage variation in job ads or choice experiments will conflate pure wage responses with perceived amenity changes, overstating workers' sensitivity to wages and hence understating monopsony power. The divergence between what wage variation signals during recruitment and during ongoing employment (where, however, wage changes and changes in the amenity bundle may also covary) suggests that hiring and separation elasticities will generally differ, even absent other

search frictions.

Our results also point to directions for future work. First, while we document that workers' belief updating is directionally consistent with actual amenity correlations in job posting data, a fuller characterization of the belief updating process and the mapping between perceived and real-world bundling may allow researchers to sign and potentially correct the bias in WTP estimates. Second, extending the belief-elicitation approach to actual job choice settings—where the signaling mechanism plausibly operates with equal or greater force—would test whether the patterns we identify in stated-choice experiments carry over to real labor market decisions. Third, our finding that explicitly prompting respondents to assume all unlisted attributes are identical has no effect on WTP estimates, consistent with Dafoe et al. (2018), suggests that restoring information equivalence in survey experiments goes beyond on modifying instructions—and may even not be possible. Developing experimental designs that can credibly isolate the value of individual amenities—or, alternatively, embracing the bundle interpretation and designing experiments accordingly—remains an open challenge.

Finally, if workers draw inferences about unlisted amenities from what employers choose to advertise, including whether or not to post a wage, this creates scope for strategic communication by firms. Employers may advertise amenities not only to attract workers who value them directly, but also to signal broader job quality and shape applicant pools. Understanding how firms optimize over the informational content of job ads, and how this interacts with the signaling channel we document, is a natural next step.

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Table 1: Existing Willingness to Pay Estimates for Job Attributes

Amenity	**WTP**	**Papers**
Permanent contract	32.4	Andresen et al. (2026), Datta (2025), Non et al. (2022)
Holiday & sick pay	31.3	Datta (2025)
Retirement plan	22.2	Cole and Taska (2023), Franco and Rodríguez-Valencia (2023)
Horizontal corporate culture	12.8	Aum et al. (2025)
WFH (full)	12.7	Curull-Sentís et al. (2025), Datta (2025), Schouwer and Kesternich (2024), Lewandowski et al. (2025), Mas and Pallais (2017), Van Landeghem et al. (2024), Maestas et al. (2023), Nagler et al. (2024)
Health insurance	12.6	Eriksson and Kristensen (2014), Feld et al. (2022), Franco and Rodríguez-Valencia (2023)
Future career prospect	12.1	Aum et al. (2025), Collis and Effenterre (2025)
Autonomy	11.9	Datta (2025), Non et al. (2022), Maestas et al. (2023)
Sitting	11.2	Maestas et al. (2023)
Meaningful work	10.5	Schouwer and Kesternich (2024), Non et al. (2022), Van Landeghem et al. (2024), Maestas et al. (2023)
WFH (hybrid)	10.2	Andresen et al. (2026), Collis and Effenterre (2025), Datta (2025), Lewandowski et al. (2025), Van Landeghem et al. (2024), Vij et al. (2023), Nagler et al. (2024)
Good atmosphere	9.0	Collis and Effenterre (2025), Curull-Sentís et al. (2025), Ward (2022), Dube et al. (2022), Folke and Rickne (2022)
Flexibility	8.2	Andresen et al. (2026), Curull-Sentís et al. (2025), Datta (2025), Eriksson and Kristensen (2014), Schouwer and Kesternich (2024), Mas and Pallais (2017), Nagler et al. (2025), Van Landeghem et al. (2024), Dube et al. (2022), Folke and Rickne (2022), Maestas et al. (2023)
Teamwork	7.7	Aum et al. (2025), Collis and Effenterre (2025), Non et al. (2022), Dube et al. (2022), Maestas et al. (2023)
Moderate physical activity	7.4	Dube et al. (2022), Maestas et al. (2023)
Flexible hours worked	5.1	Schouwer and Kesternich (2024), Wiswall and Zafar (2017), Dube et al. (2022)
Free meals	3.7	Feld et al. (2022)
Skill development	2.5	Eriksson and Kristensen (2014), Dube et al. (2022), Folke and Rickne (2022), Maestas et al. (2023)
Vacation day	1.9	Nagler et al. (2025), Dube et al. (2022), Maestas et al. (2023)
Free daycare	1.5	Feld et al. (2022)
Gender parity	1.0	Högn et al. (2026), Schuh (2024)
Share of male employees	0.1	Wiswall and Zafar (2017)
Disamenity	**WTP (to Avoid)**	**Papers**
Low skill development	24.0	Folke and Rickne (2022)
Sexual harrasment	23.3	Adams and Walia (2025), Collis and Effenterre (2025), Curull-Sentís et al. (2025), Folke and Rickne (2022)
Shift work	22.0	Andresen et al. (2026), Desiere and Walter (2025)
10% chance of losing job	17.9	Van Landeghem et al. (2024), Wiswall and Zafar (2017)
Working overtime	13.8	Aum et al. (2025), Non et al. (2022)
Manager conflict	11.8	Curull-Sentís et al. (2025), Dube et al. (2022), Folke and Rickne (2022)
Deadlines	9.6	Nagler et al. (2025)
Multitasking	7.0	Nagler et al. (2025)
Working on weekends	6.1	Feld et al. (2022)
Commuting	3.9	Andresen et al. (2026), Curull-Sentís et al. (2025), Feld et al. (2022), Poudel and Singleton (2024), Van Landeghem et al. (2024), Dube et al. (2022), Nagler et al. (2024)
Performance pay	1.0	Non et al. (2022)

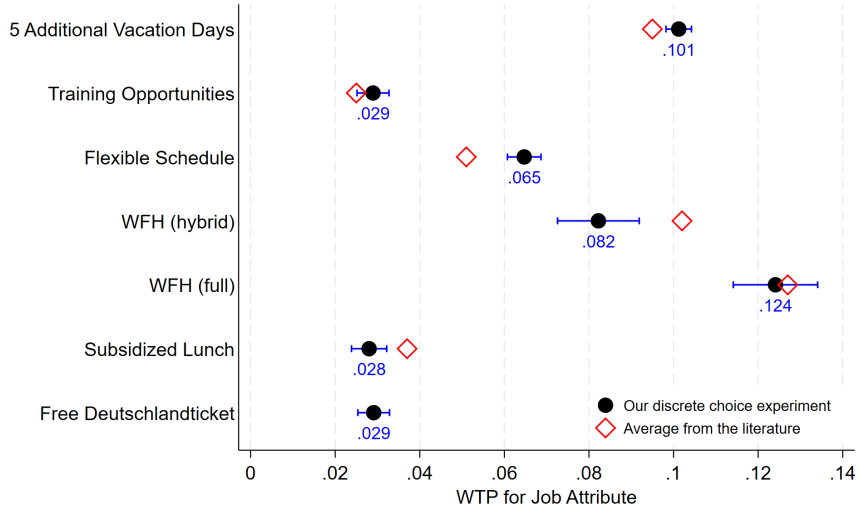
Notes: This table summarizes the average WTP estimate for job attributes as a percent of the wage based on stated choice experiments in the literature. *Gender parity* is defined as 50% share of women in the workplace, and any change from this share is interpreted as a decline in diversity.

Table 2: Themes in Free-Text Responses

		LLM Score			
Theme	Description	0	1	2	3
Climate	Team atmosphere, fairness, leadership, collegiality, support, family-friendliness Higher score = better employer culture	4,959 (82.7%)	581 (9.7%)	281 (4.7%)	179 (3.0%)
Compensation	Attractiveness of the compensation / pay package Higher score = better appreciation of pay	3,658 (61.0%)	1,095 (18.3%)	818 (13.6%)	429 (7.2%)
Development	Expectations of learning, training, advancement, responsibility, professional challenge Higher score = more growth expected	5,218 (87.0%)	240 (4.0%)	457 (7.6%)	85 (1.4%)
Flexibility	Expectations of flexible hours, self-organization, independence Higher score = more flexibility expected	4,328 (72.2%)	399 (6.7%)	590 (9.8%)	683 (11.4%)
Sentiment	Broad positive-to-negative evaluation of the job or employer Higher score = more positive	2,452 (40.9%)	2,445 (40.8%)	866 (14.4%)	237 (4.0%)
Strain	Whether the role seems stressful, demanding, or overtime-heavy Higher score = more strain inferred	5,076 (84.6%)	414 (6.9%)	252 (4.2%)	258 (4.3%)

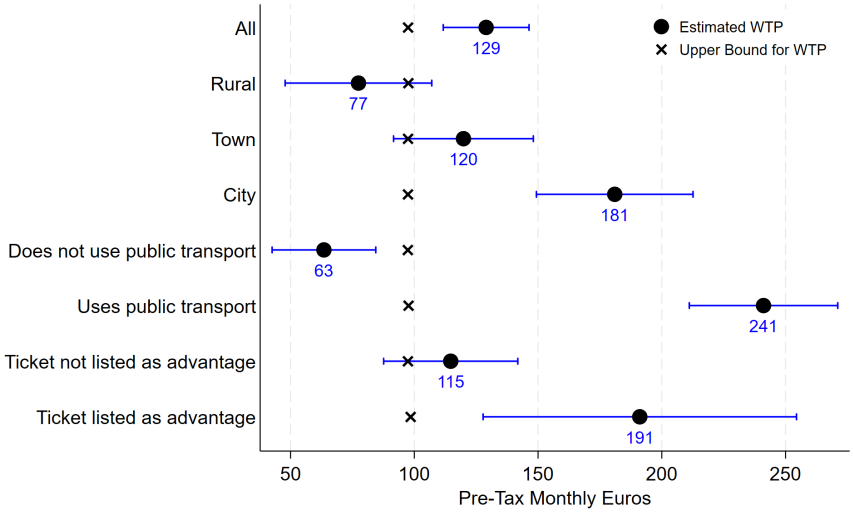
Notes: These six themes reflect the synthesized output from feeding the following prompt to ChatGPT 5-4: "Below is a list of documents that belong to two or more groups. Look at all the documents, and describe the main systematic differences in themes between documents in the groups, in about ten sentences. These differences could concern topics, tone and style of language, sentiment, or any other major differences across groups. However, do not take into account differences that are directly caused by the presence of some characteristic on the job ad. For instance, if a text mentions that a job offer is more attractive because it offers a higher salary or some specific amenity, disregard this difference. However, do take into account inferences that may be made about how jobs differ based on the job posting: for instance, whether a higher salary or flextime indicate that the job is more or less stressful. Keeping these instructions in mind, provide up to six themes that help distinguish between the groups in the previously provided documents, based on their systematic differences. Each theme is one aspect of the text, such as a topic, sentiment, or characteristic. The themes should all be different (mutually exclusive), and also cover all the differences between groups as well as possible (exhaustive with respect to differences). For each of the themes, create a scale to score each document. Specifically, these themes and scales could be of the following type: (a) Topics. Score each document on a scale from 0 to 3. (b) Language. Score from 0 to 3. (c) Sentiment. Score from -1 to +1. If there are other types of themes or scales that are fitting for the application, please also use those. All of the themes should be titled and described in English. Your output should take the same JSON form as in the following examples." The distribution of LLM score for each theme is recorded in the last four columns, with percent shares recorded in parentheses. Sample size is 6,000 for each theme.

Figure 1: WTP for Job Amenities from Discrete Choice Experiment



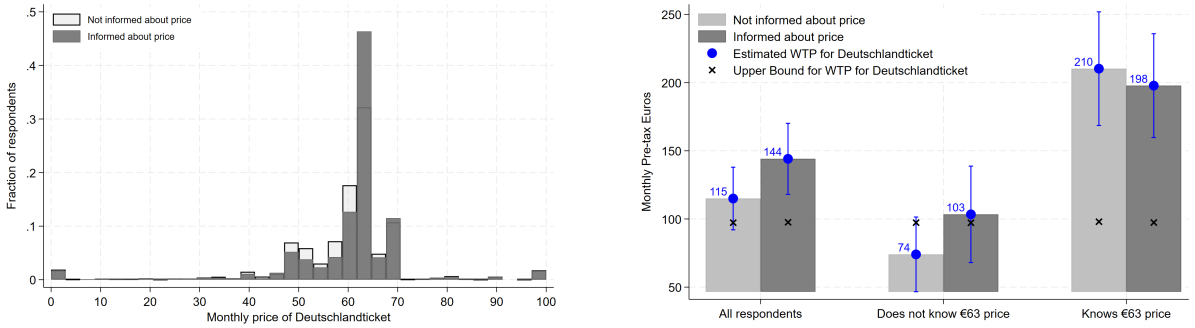
Notes: This figure presents the willingness to pay (WTP) estimates for each of the seven non-wage amenities that are randomly varied across hypothetical jobs. Standard errors are clustered by worker. Horizontal lines denote 95% confidence intervals. For the average WTP from the literature for each amenity, see Table 1.

Figure 2: Heterogeneity in Willingness to Pay for the Deutschlandticket



Notes: This figure depicts the willingness to pay (WTP) estimates in monthly euros for the Deutschlandticket from the stated choice experiment for different sub-samples. Horizontal lines denote 95% confidence intervals. Conservative upper bound for WTP differs slightly for each subsample for tax reasons (see Appendix C).

Figure 3: Knowledge of Deutschlandticket Price and Heterogeneity in WTP

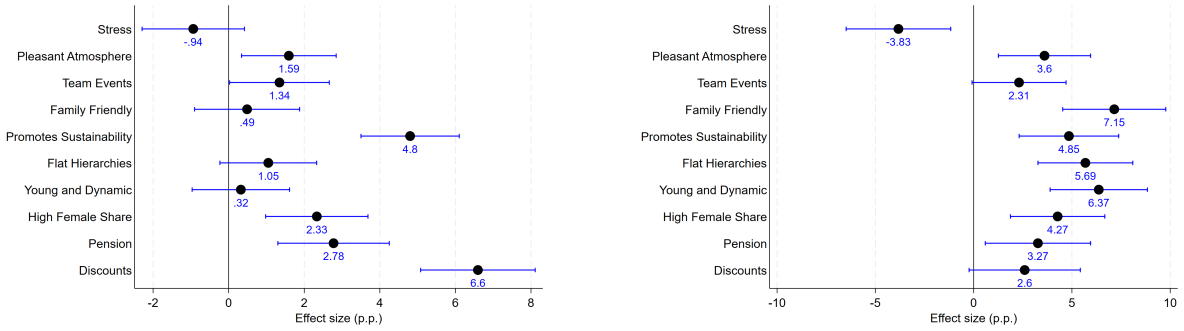


(a) Distribution of price beliefs

(b) WTP by beliefs and treatment arm

Notes: Panel (a) plots the distribution of workers' beliefs over the €63 price of the Deutschlandticket by whether the worker was randomly assigned to be presented the price of the Deutschlandticket in job ads. For purposes of exposition, values are censored at 100. Panel (b) depicts the willingness to pay (WTP) estimates in monthly euros for the Deutschlandticket from the stated choice experiment by whether respondents were randomly assigned to be presented the price of the Deutschlandticket and whether they correctly state the market price of the Deutschlandticket at €63. Standard errors are clustered by individual. Vertical lines in panel (b) denote 95% confidence intervals. Conservative upper bound for WTP differs slightly for each subsample for tax reasons (see Appendix C).

Figure 4: Structured Beliefs Over Unlisted Amenities by Which Amenity is Listed

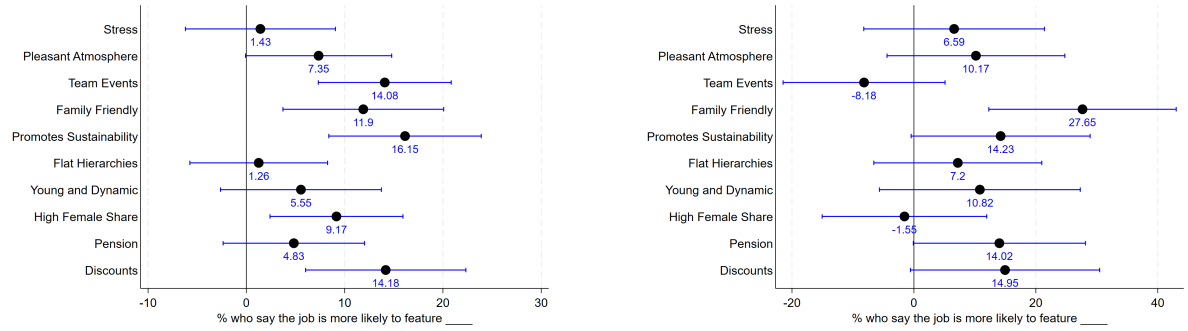


(a) Deutschlandticket listed

(b) Work from home listed

Notes: This figure presents the estimated effect of listing the Deutschlandticket (panel a) or full work from home (panel b) is listed in a job ad on workers' beliefs about ten unlisted employer characteristics, based on the single-ad structured belief elicitation. The dependent variable is the worker's 5-item Likert-scale response (expressed in percentage points as the midpoint of each range) regarding the probability that the employer offers a given characteristic. Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

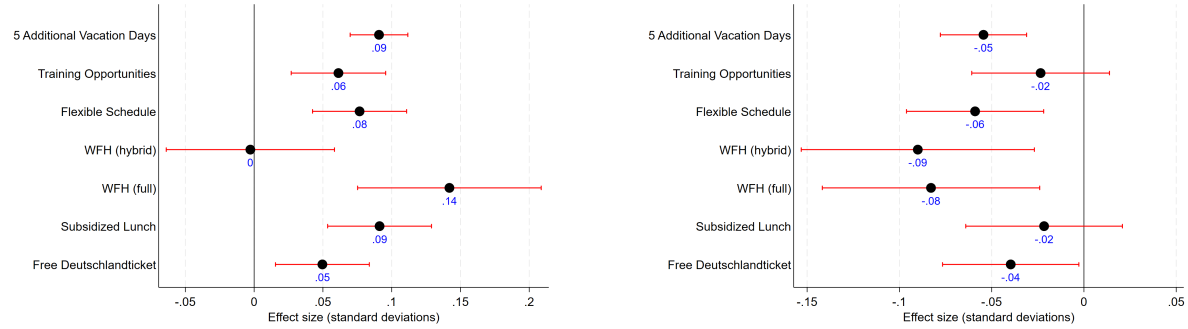
Figure 5: Heterogeneity in Structured Beliefs Over Unlisted Amenities Between Bottom Tercile and Top Tercile of WTP from the Discrete Choice Experiment



(a) 1(DT) $\times$ β_i^{DT} (b) 1(WFH) $\times$ β_i^{WFH}

Notes: This figure presents the estimated effect of listing the Deutschlandticket (panel a) or full work from home (panel b) in a job ad on workers' beliefs about ten unlisted employer characteristics by heterogeneity in the indirect utility each worker gains from having the Deutschlandticket (β_i^{DT}) or work from home (β_i^{WFH}), respectively. Beliefs over unlisted amenities are derived from the pairwise comparison framework for structured belief elicitation. The dependent variable is the worker's 5-item Likert-scale response regarding the probability that the employer offers a given characteristic (expressed in percentage points). Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

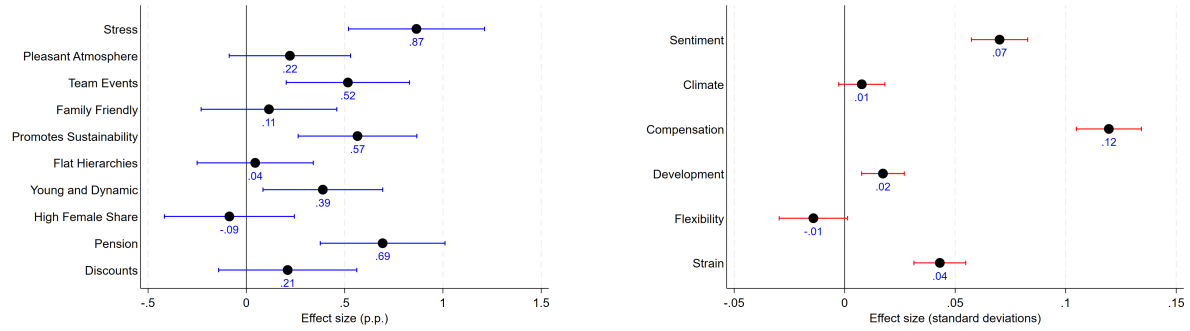
Figure 6: Themes in Free Responses by Which Amenities are Listed



(a) Workplace climate (b) Job strain

Notes: Each panel displays OLS coefficients from regressions of the LLM score for the standardized theme of workplace climate (panel a) and job strain (panel b) is mentioned in the free-response text among respondents who were prompted to describe their impressions or the advantages and disadvantages of the job, on which amenities are in the job ad. Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, which free-response prompt (impressions of the job or advantages-disadvantages), and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

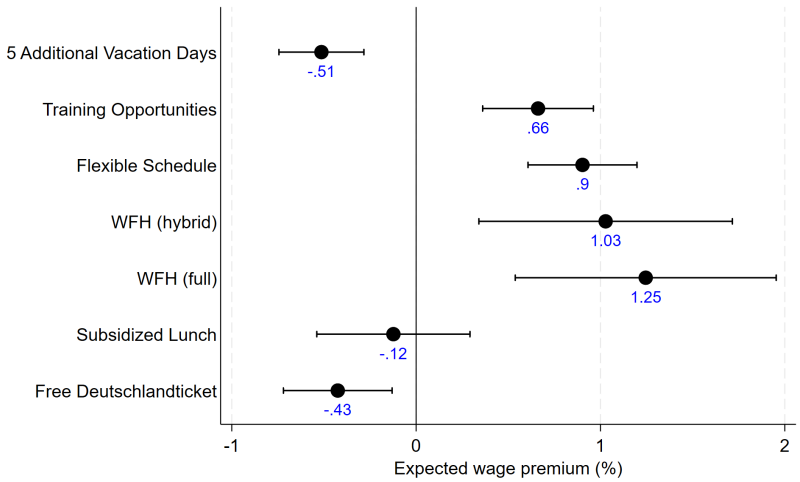
Figure 7: Beliefs Over Unlisted Amenities from Posted Wage



(a) Structured Beliefs (b) Free Responses

Notes: This figure presents the estimated effect of the posted wage on workers' beliefs about ten unlisted employer characteristics, based on the single-ad structured belief elicitation described in Section 5.3. The coefficients correspond to effects of 10-log-point increase in wages between ads. In panel (a), the dependent variable is the worker's 5-item Likert-scale response (expressed in percentage points as the midpoint of each range) regarding the probability that the employer offers a given characteristic. In panel (b), the dependent variable is the LLM score for each standardized theme. Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

Figure 8: Beliefs Over Unlisted Wage of the Job by Which Amenities are Listed



Notes: This figure presents the estimated effect of listing each amenity in a job ad on workers' expected wage for the position, based on the wage-elicitation design described in Section 5.5. Workers were shown a job ad without a posted salary and asked to state the expected wage premium relative to an otherwise identical ad with no listed amenities. Each coefficient is expressed as a percentage-point change in the expected wage premium. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

Online Appendix of:

Job Ads as Signals: Evidence from a Priced Amenity and Worker Beliefs

Pawel Adrjan, Mária Balgová, Simon Jäger,
Jonas Jessen, and Jason Sockin

A Appendix Figures

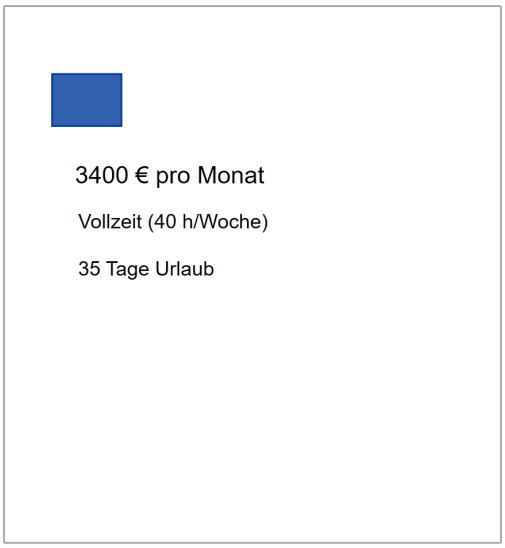
A.1 Summary Information

Figure A.1.1: Example of Pairwise Job Comparison

Notes: The figure shows a typical comparison of two hypothetical job ads for a specific occupation (paralegal in this case) that differ in a number of amenities and pay.

Figure A.1.2: Example Job Ad for Each Employer Blur

(a) Short name



(b) Medium-short name

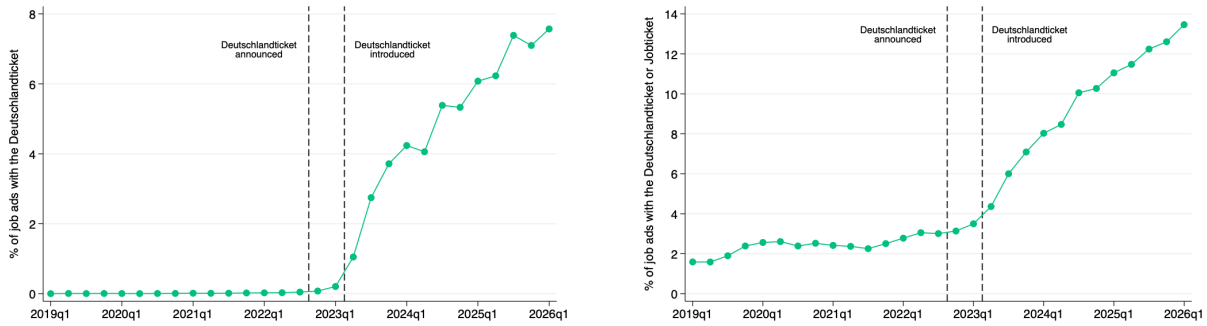
(c) Medium-long name

(d) Long name

Notes: The figure shows a typical ad for each of the four randomized employer blurs. Panel (a) includes a short continuous segment, panel (b) a medium-short continuous segment, panel (c) a medium-long bipartite, and panel (d) a long tripartite.

A.2 Indeed Data

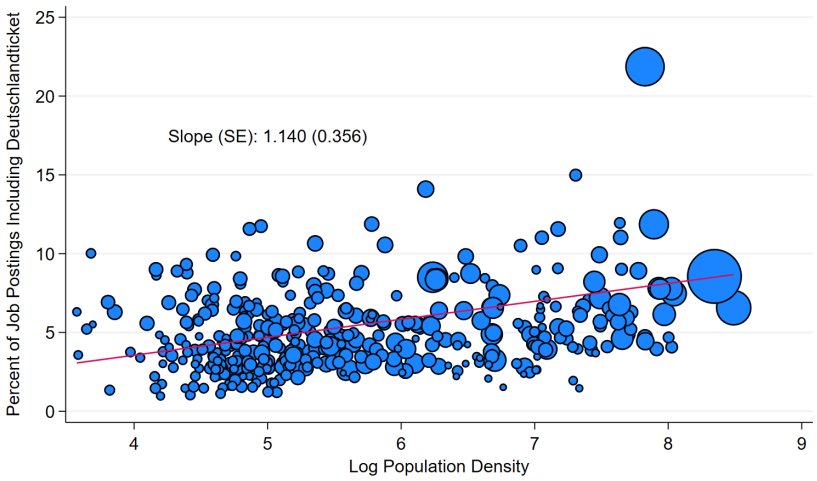
Figure A.2.1: Share of Job Ads that Offer a Deutschlandticket or Jobticket



(a) Deutschlandticket (b) Deutschlandticket or Jobticket

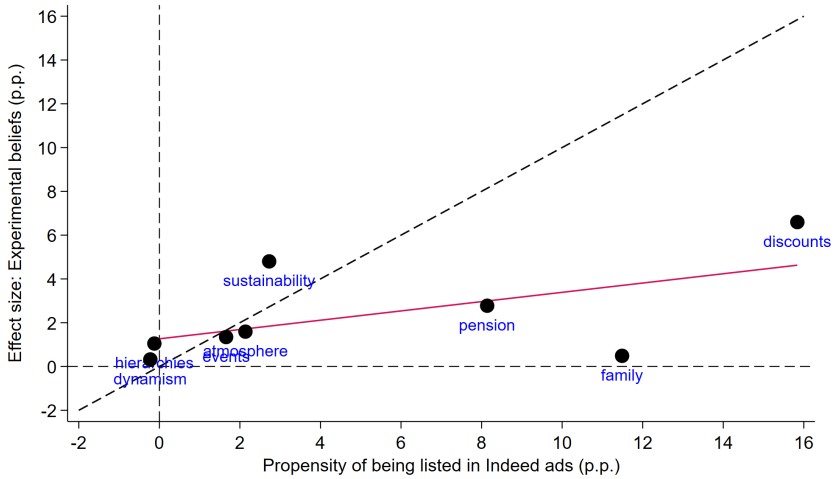
Notes: This figure shows the trend in the share of job ads on Indeed in Germany that mentioned a Deutschlandticket or Jobticket. Panel (a) shows ads that only mention the Deutschlandticket. Panel (b) shows ads that mention either the Deutschlandticket or Jobticket. These words are sometimes used interchangeably in job descriptions, but the Jobticket can also refer to a less valuable regional or local transport ticket.

Figure A.2.2: Population Density and Share of Job Postings with Deutschlandticket

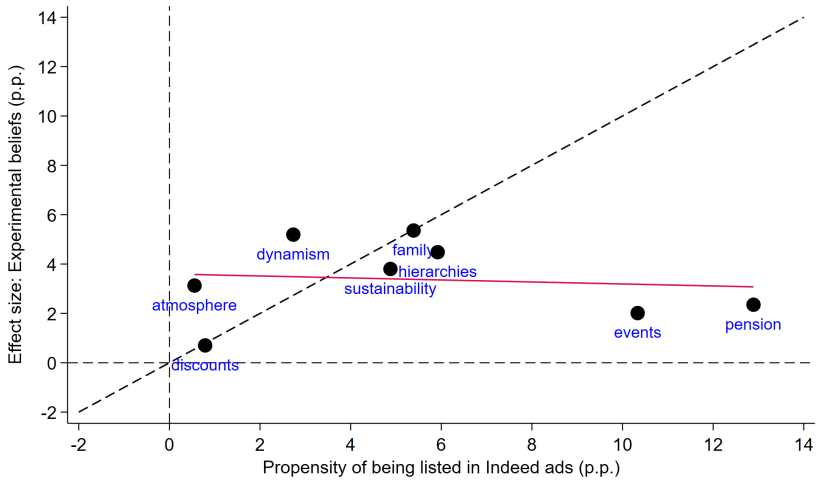


Notes: This figure shows the correlation between county population density and the share of job ads on Indeed that offer a Deutschlandticket.

Figure A.2.3: Correlations in Job Ads and Causal Effects on Unlisted Beliefs



(a) Deutschlandticket

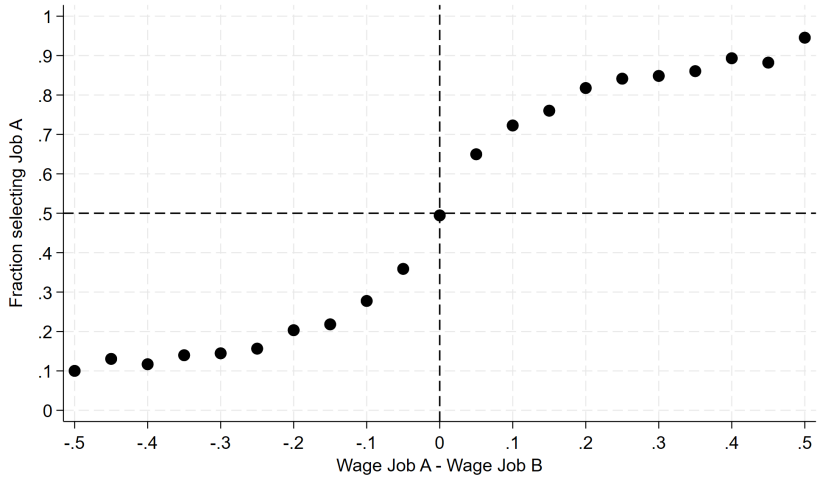


(b) Work from home

Notes: This figure compares, for each of nine unlisted employer or job characteristics covered by the structured belief elicitation experiment, the propensity for that characteristic to appear in Indeed job postings alongside (a) the Deutschlandticket or (b) remote or hybrid work (x-axis) with the causal effect on workers' beliefs about that characteristic of randomly listing the amenity in our experiment (y-axis). The x-axis values are the coefficients from regressing an indicator for whether each characteristic appears in a German job posting on Indeed in 2024 on an indicator for whether (a) the Deutschlandticket or (b) remote or hybrid work is listed, controlling for county-by-quarter and job-title fixed effects (see Appendix Tables B.2.1 and B.2.2). The y-axis values reflect the percentage-point shifts in worker beliefs estimated from equation (3), shown in panels (a) and (b) of Figure 4, respectively. The solid line is the least-squares fit through the plotted points, and the dashed-diagonal line represents the 45-degree line.

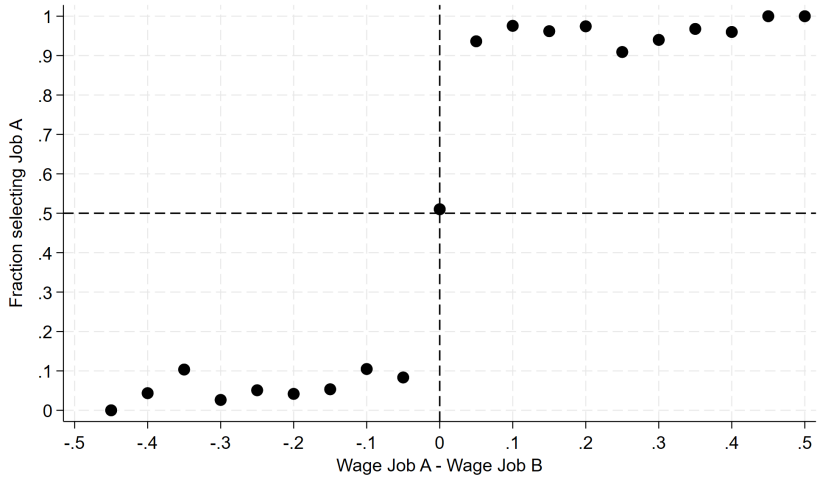
A.3 Discrete Choice Experiment

Figure A.3.1: Fraction who Choose Job A and Wage Premium Offered by Job A



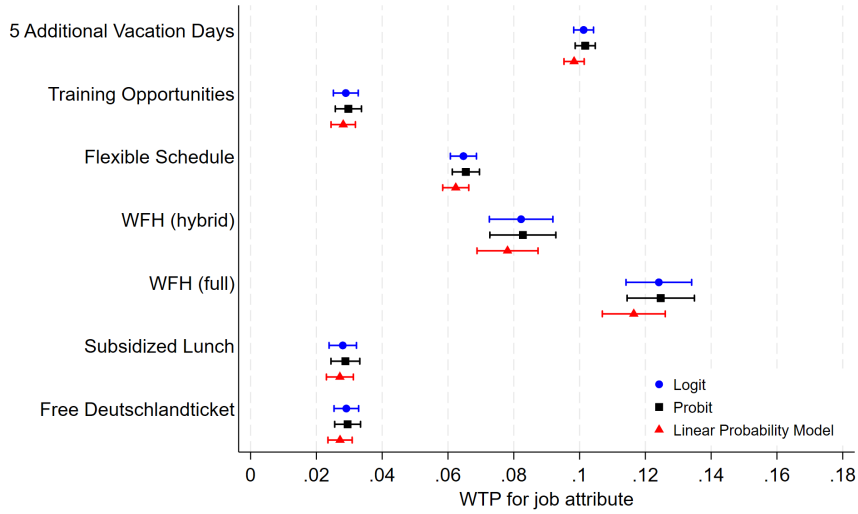
Notes: This figure displays the fraction of respondents who select job A against the log wage difference between job A and job B across pairwise comparisons, binned by decile of the wage difference. The dashed vertical line indicates equal wages; the dashed horizontal line indicates a 50 percent choice share.

Figure A.3.2: Fraction who Choose Job A and Wage Premium Offered by Job A, When Amenities Are Identical in the Two Ads



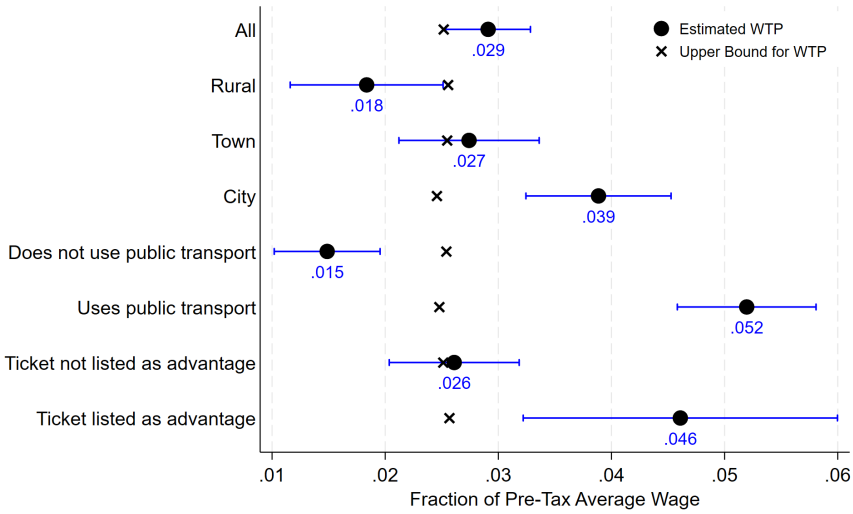
Notes: This figure displays the fraction of respondents who select job A against the log wage difference between job A and job B across pairwise comparisons when there are no differences in listed amenities between the ads, binned by decile of the wage difference. The dashed vertical line indicates equal wages; the dashed horizontal line indicates a 50 percent choice share.

Figure A.3.3: WTP for Job Amenities by Estimation Strategy



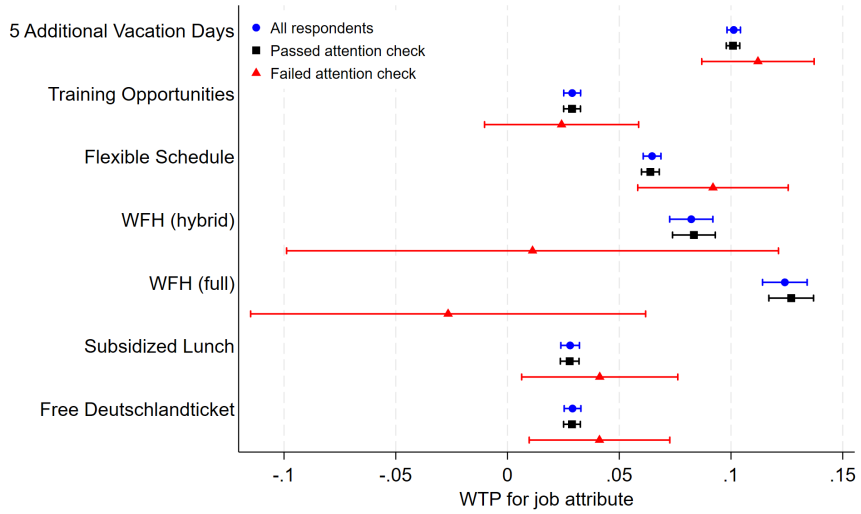
Notes: This figure presents the willingness to pay (WTP) estimates for each of the seven non-wage amenities that are randomly varied across hypothetical jobs according to a logit model, a probit model, or a linear probability model. Standard errors are clustered by worker. Horizontal lines denote 95% confidence intervals.

Figure A.3.4: Heterogeneity in WTP for the Deutschlandticket as a Percent of the Wage



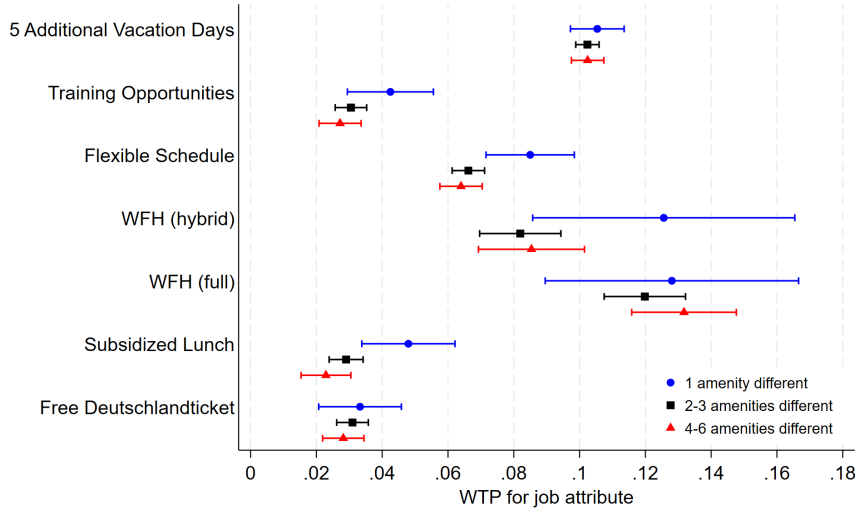
Notes: This figure depicts the willingness to pay (WTP) estimates for the Deutschlandticket from the stated choice experiment for different sub-samples as a percent of the wage. Horizontal lines denote 95% confidence intervals. Conservative upper bound for WTP differs slightly for each subsample for tax reasons (see Appendix C).

Figure A.3.5: WTP for Job Amenities by Whether Respondent Passed Attention Check



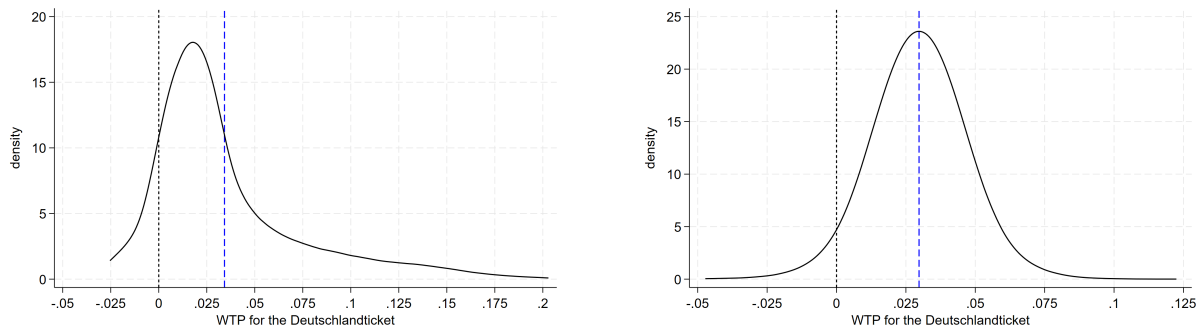
Notes: This figure presents the willingness to pay (WTP) estimates for each of the seven non-wage amenities that are randomly varied across hypothetical jobs, splitting the sample by whether the respondent failed or passed our attention check. Standard errors are clustered by worker. Horizontal lines denote 95% confidence intervals.

Figure A.3.6: WTP for Job Amenities by Number of Differences in Listed Amenities Between the Pair of Ads



Notes: This figure presents the willingness to pay (WTP) estimates for each of the seven non-wage amenities that are randomly varied across hypothetical jobs, splitting the sample by whether there is 1, 2–3, or 4–6 amenities different between the two ads. Standard errors are clustered by worker. Horizontal lines denote 95% confidence intervals.

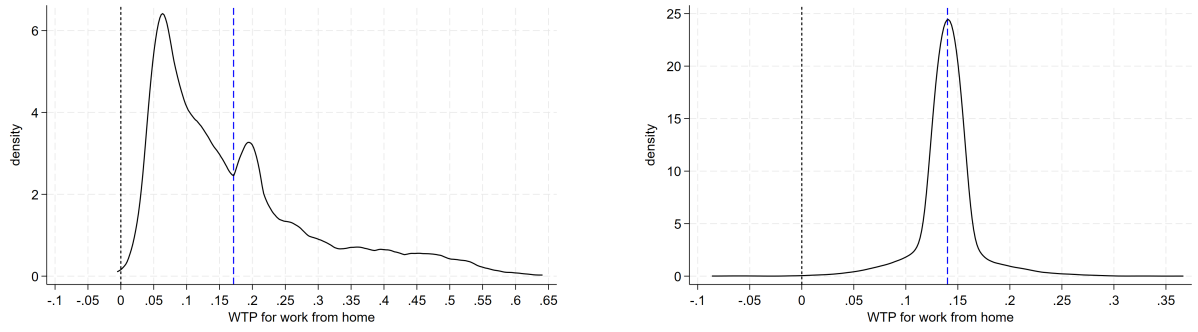
Figure A.3.7: Distribution of Individuals' WTP for the Deutschlandticket



(a) Latent types (b) Random coefficients

Notes: This figure plots the distribution of individual WTP for the Deutschlandticket under two approaches. In panel (a), we allow for 20 latent worker types in the data, and calculate individual WTP as a mixture over posterior probabilities. In panel (b), we estimate a mixed logit with random coefficients on amenities β_i and a common preference for wages δ. β_i is normally distributed by assumption. Dashed vertical lines denote the sample average.

Figure A.3.8: Distribution of Individuals' WTP for Work from Home

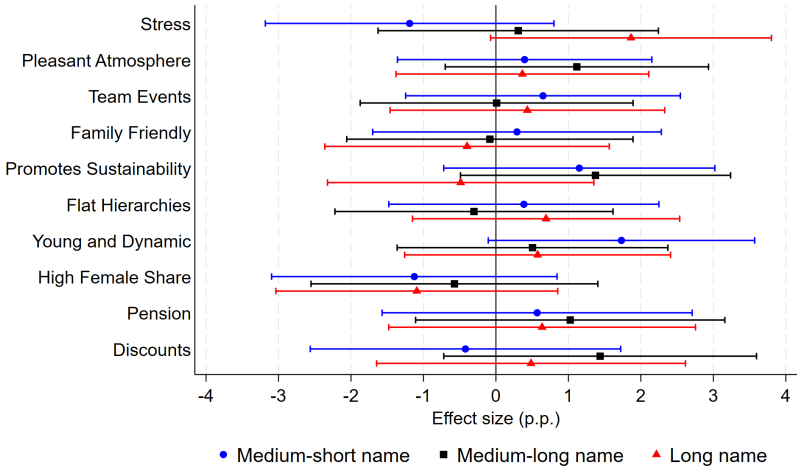


(a) Latent types (b) Random coefficients

Notes: This figure plots the distribution of individual WTP for full work from home under two approaches. In panel (a), we allow for 20 latent worker types in the data, and calculate individual WTP as a mixture over posterior probabilities. In panel (b), we estimate a mixed logit with random coefficients on amenities β_i and a common preference for wages δ. β_i is normally distributed by assumption. Dashed vertical lines denote the sample average.

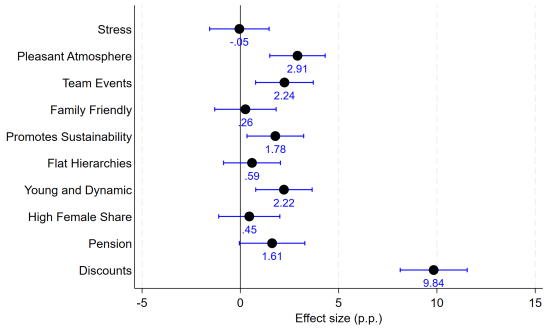
A.4 Belief Elicitation

Figure A.4.1: Structured Beliefs Over Unlisted Amenities by Length of Blurred Employer

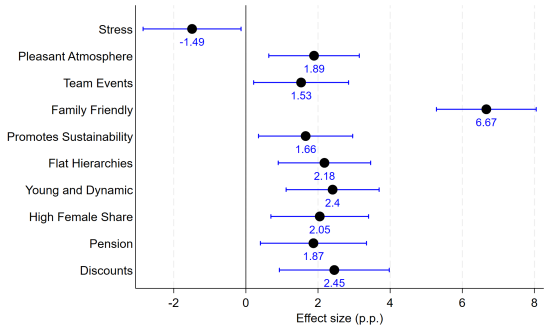


Notes: This figure presents the estimated effect of listing an increasingly longer segment of blurred text as the employer in a job ad on workers' beliefs about ten unlisted employer characteristics, based on the single-ad structured belief elicitation. The dependent variable is the worker's 5-item Likert-scale response (expressed in percentage points as the midpoint of each range) regarding the probability that the employer offers a given characteristic. Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

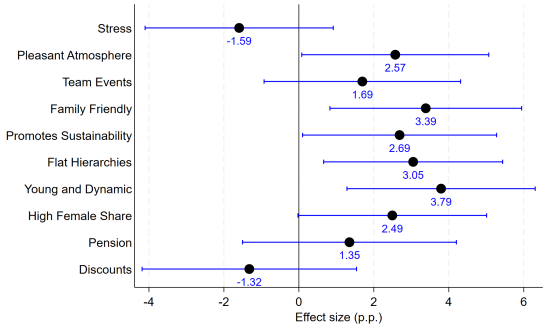
Figure A.4.2: Structured Beliefs Over Unlisted Amenities by Which Amenity Listed, Cont.



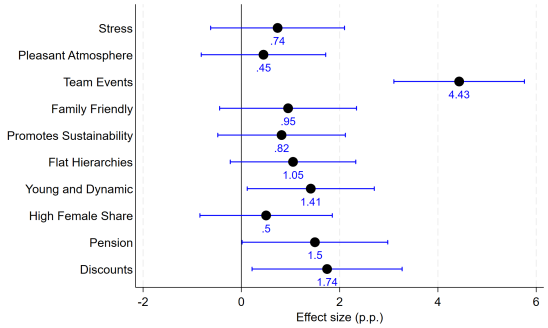
(a) Subsidized lunch listed



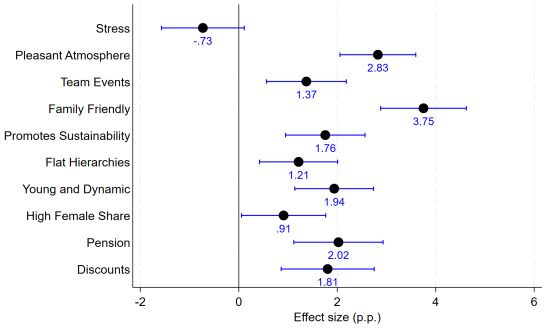
(b) Flexible schedule listed



(c) Hybrid work from home listed



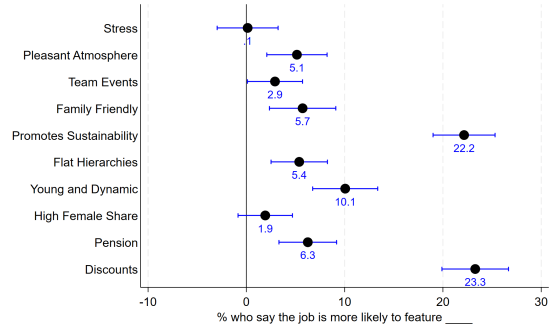
(d) Training opportunities listed



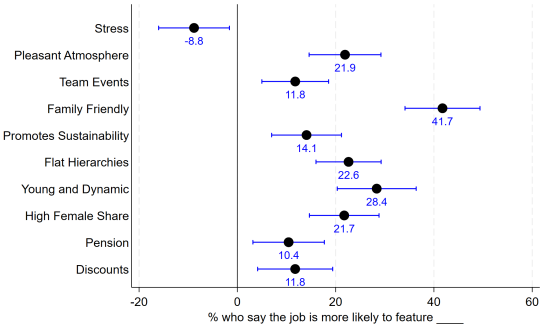
(e) Five additional vacation days listed

Notes: This figure presents the estimated effect of listing the given amenity in a job ad on workers' beliefs about ten unlisted employer characteristics, based on the single-ad structured belief elicitation. The dependent variable is the worker's 5-item Likert-scale response (expressed in percentage points as the midpoint of each range) regarding the probability that the employer offers a given characteristic. Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

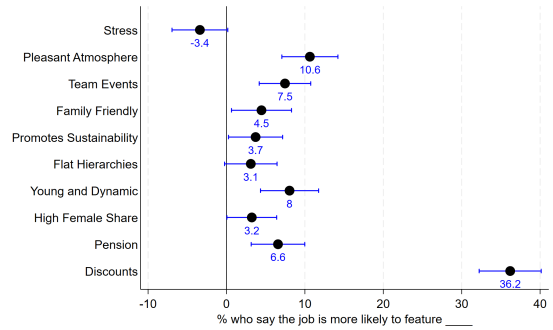
Figure A.4.3: Structured Beliefs Over Unlisted Amenities by Which Amenity Listed, Pairwise Comparison of Job Ads



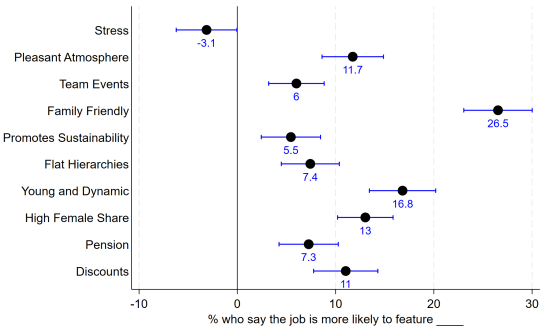
(a) Deutschlandticket



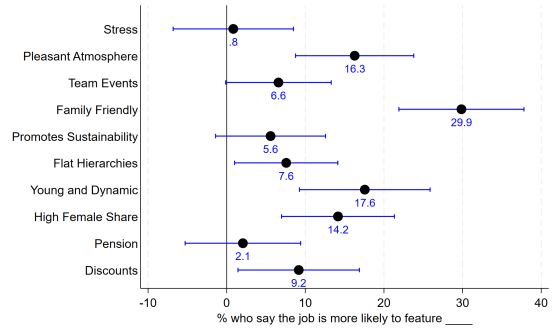
(b) Work from home



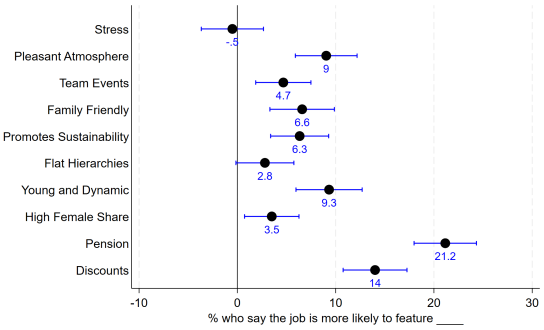
(c) Subsidized lunch listed



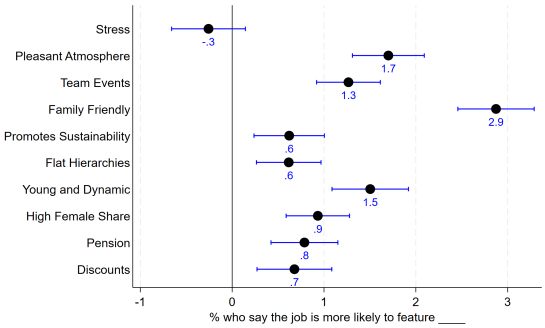
(d) Flexible schedule listed



(e) Hybrid work from home listed



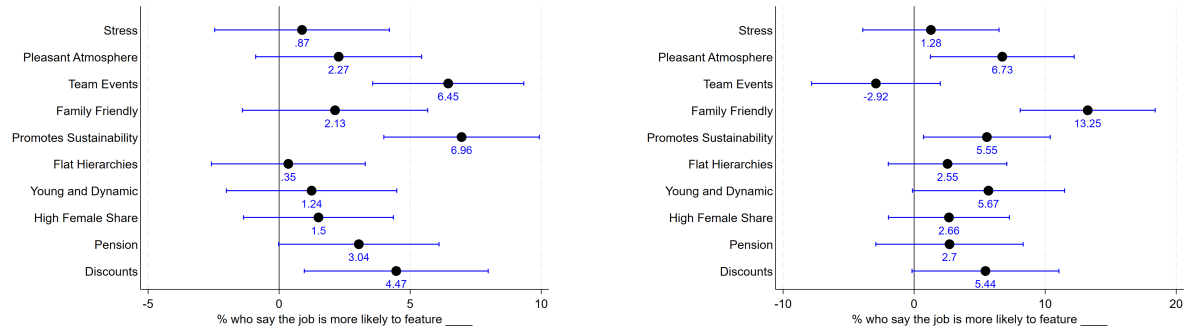
(f) Training opportunities listed



(g) Five additional vacation days listed

Notes: This figure presents the estimated effect of listing the given amenity in a job ad on workers' beliefs about ten unlisted employer characteristics, based on the pairwise comparison of ads structured belief elicitation. The dependent variable is the worker's 5-item Likert-scale response regarding the probability that the employer offers a given characteristic (expressed in percentage points). Standard errors are robust. Horizontal lines denote 95% confidence intervals.

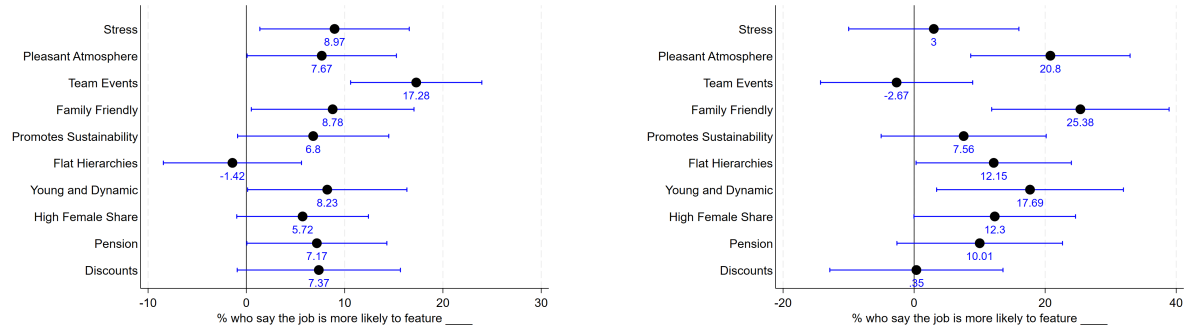
Figure A.4.4: Heterogeneity in Structured Beliefs Over Unlisted Amenities by WTP from the Discrete Choice Experiment, Continuous Interaction



(a) 1(DT) $\times \beta_i^{DT}$ (b) 1(WFH) $\times \beta_i^{WFH}$

Notes: This figure presents the estimated effect of listing the Deutschlandticket (panel a) or work from home (panel b) in a job ad on workers' beliefs about ten unlisted employer characteristics by heterogeneity in the indirect utility each worker gains from having the Deutschlandticket (β_i^{DT}) or work from home (β_i^{WFH}), respectively. Beliefs over unlisted amenities are derived from the pairwise comparison framework for structured belief elicitation. The dependent variable is the worker's 5-item Likert-scale response regarding the probability that the employer offers a given characteristic (expressed in percentage points). Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

Figure A.4.5: Heterogeneity in Structured Beliefs Between Bottom Tercile and Top Tercile of WTP from the Discrete Choice Experiment, Random Coefficients Approach



(a) 1(DT) $\times \beta_i^{DT}$ (b) 1(WFH) $\times \beta_i^{WFH}$

Notes: This figure presents the estimated effect of listing the Deutschlandticket (panel a) or work from home (panel b) in a job ad on workers' beliefs about ten unlisted employer characteristics by heterogeneity in the indirect utility each worker gains from having the Deutschlandticket (β_i^{DT}) or work from home (β_i^{WFH}), respectively. Beliefs over unlisted amenities are derived from the pairwise comparison framework for structured belief elicitation. The dependent variable is the worker's 5-item Likert-scale response regarding the probability that the employer offers a given characteristic (expressed in percentage points). Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

Figure A.4.6: Themes in Free Responses by Which Amenities are Listed Under Alternative Large Language Models

(a) Workplace climate (b) Job strain

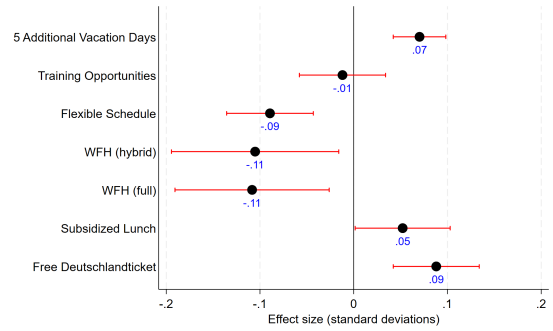
Notes: Each panel displays OLS coefficients from regressions of the LLM score for the standardized theme of workplace climate (panel a) and job strain (panel b) is mentioned in the free-response text among respondents who were prompted to describe their impressions or the advantages and disadvantages of the job, on which amenities are listed in the job ad, for three different large language models: ChatGPT 5.4-mini (the benchmark, OpenAI), Gemma 3 (Google), and Llama 3.3 (Meta). Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, which free-response prompt (impressions of the job or advantages-disadvantages), and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

Figure A.4.7: Themes in Free Responses by Which Amenity is Listed, Excluding Respondents who Received the Advantages-Disadvantages Prompt

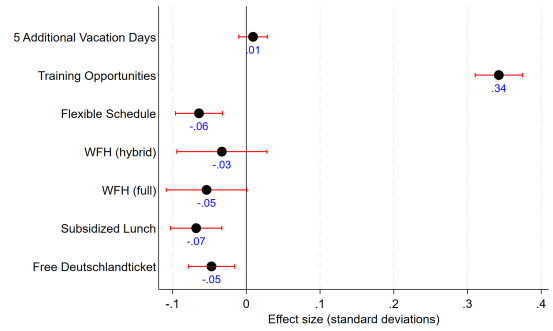
(a) Climate (b) Strain

Notes: Each panel displays OLS coefficients from regressions of indicators for the standardized theme of workplace climate (panel a) and job strain (panel b) is mentioned in the free-response text only among respondents who were prompted to describe their impressions of the job, on whether the given amenity is listed in the job ad. Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

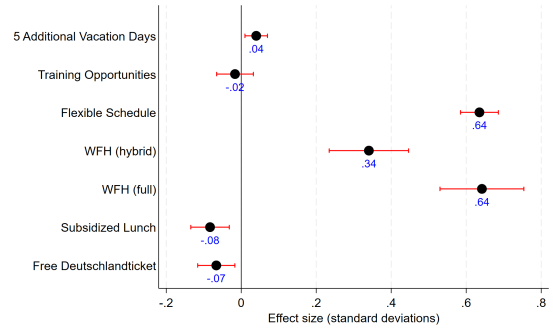
Figure A.4.8: Remaining Themes in Free Responses by Which Amenities are Listed



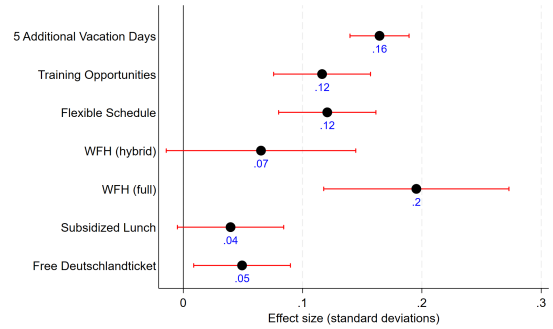
(a) Compensation



(b) Development



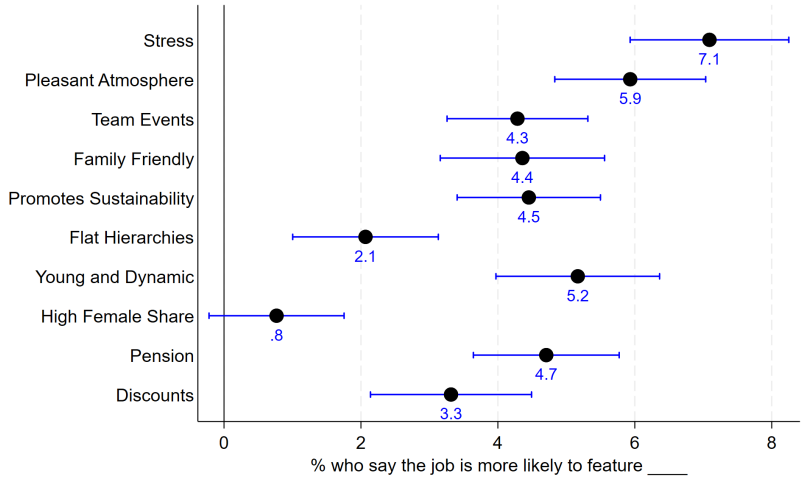
(c) Flexibility



(d) Sentiment

Notes: Each panel displays OLS coefficients from regressions of the LLM score for the standardized theme of compensation (panel a), development (panel b), flexibility (panel c), and sentiment (panel d) characterizes the free-response text among respondents who were prompted to describe their impressions or the advantages and disadvantages of the job, on which amenities are in the job ad. Additional covariates include fixed effects for monthly income bin, whether work from home is possible in worker's current job, which free-response prompt (impressions of the job or advantages-disadvantages), and the order of the belief elicitation modules. Standard errors are robust. Horizontal lines denote 95% confidence intervals.

Figure A.4.9: Beliefs Over Unlisted Amenities from Posted Wage, Pairwise Comparison



Notes: This figure presents the estimated effect of the posted wage (log) on workers' beliefs about ten unlisted employer characteristics, based on the pairwise comparison belief elicitation described in Section 6. The coefficients correspond to effects of 10-log-point increase in wages between ads. Effects are reported in percentage-point changes in perceived probability per log-point increase in the posted wage. Horizontal lines denote 95% confidence intervals.

B Appendix Tables

B.1 Summary Information

Table B.1.1: Summary Statistics for Representative Sample of Workers

Variable	Obs	Mean	Std. Dev.	P25	P75
Female	6000	.448	.497	0	1
Age in years	6000	45.529	12.272	36	56
Monthly income (euro)	6000	3987.881	3668.941	2400	4600
Higher schooling degree (Abitur)	6000	.393	.488	0	1
Living with partner	6000	.629	.483	0	1
East Germany (incl. Berlin)	6000	.312	.463	0	1
Living in larger city	6000	.356	.479	0	1
Living in smaller town	6000	.386	.487	0	1
Living in rural area	6000	.254	.435	0	1
Possible to work from home in job	6000	.526	.499	0	1
Using public transport for work/ privately	6000	.378	.485	0	1
Know price of Deutschlandticket (+/- 10 Euro)	6000	.785	.411	1	1

Notes: This table presents summary statistics for our sample of 6,000 workers.

Table B.1.2: Existing Willingness to Pay Estimates for Job Amenities

Amenity	Description	WTP	Paper
Autonomy	Decide how to do and what to do	22.2	Non et al. (2022)
Autonomy	Decide how to do, not what to do	11.5	Non et al. (2022)
Autonomy	Choose Tasks (UK)	11.2	Datta (2025)
Autonomy	Choose Tasks (US)	10.7	Datta (2025)
Autonomy	Choose how to work	3.7	Maestas et al. (2023)
Flexibility	Set own schedule	19.2	Van Landeghem et al. (2024)
Flexibility	Flexible Hours (UK)	14.9	Datta (2025)
Flexibility	Flexible Hours (US)	14.2	Datta (2025)
Flexibility	Avoiding no Flexibility	10.0	Folke and Rickne (2022)
Flexibility	Set own schedule	8.8	Maestas et al. (2023)
Flexibility	Set own schedule	8.0	Curull-Sentís et al. (2025)
Flexibility	Schedule flexibility	7.1	Schouwer and Kesternich (2024)
Flexibility	Employee flexibility for timing of work	6.4	Andresen et al. (2026)
Flexibility	High flexibility	6.3	Eriksson and Kristensen (2014)
Flexibility	Set own schedule	5.4	Nagler et al. (2025)
Flexibility	Set own schedule	3.2	Mas and Pallais (2017)
Flexibility	Set own schedule	2.0	Folke and Rickne (2022)
Flexibility	Control over hours (1sd increase)	0.8	Dube et al. (2022)
Flexible hours worked	Part-time work (20h)	10.6	Schouwer and Kesternich (2024)
Flexible hours worked	Part-time option available	5.1	Wiswall and Zafar (2017)
Flexible hours worked	Hours workerd (1sd increase)	3.7	Dube et al. (2022)
Flexible hours worked	Hours per week of work	1.1	Wiswall and Zafar (2017)
Free daycare	Daycare provided at workplace	1.5	Feld et al. (2022)
Free meals	Meals provided at workplace	3.7	Feld et al. (2022)
Future career prospect	Professional growth	15.0	Collis and Effenterre (2025)
Future career prospect	Future career prospect	9.2	Aum et al. (2025)
Gender parity	Gender diversity (from 10 % to 25%)	1.6	Högn et al. (2026)
Gender parity	Gender diversity (from 10 % to 40%)	1.4	Högn et al. (2026)
Gender parity	From 50% to 0% female	0.8	Schuh (2024)
Gender parity	From 50% to 100% female	0.3	Schuh (2024)
Good atmosphere	Good atmosphere	17.0	Curull-Sentís et al. (2025)
Good atmosphere	Inclusion	14.3	Collis and Effenterre (2025)
Good atmosphere	Happiness score, 1 sd (US)	11.2	Ward (2022)
Good atmosphere	Happiness score, 1 sd (Canada)	10.0	Ward (2022)
Good atmosphere	Happiness score, 1 sd (UK)	9.3	Ward (2022)
Good atmosphere	Good atmosphere	8.0	Folke and Rickne (2022)
Good atmosphere	Self-expression (1sd increase)	1.8	Dube et al. (2022)
Good atmosphere	Fraction of friends (1sd increase)	0.1	Dube et al. (2022)
Health insurance	Health insurance	32.1	Franco and Rodríguez-Valencia (2023)
Health insurance	Large health package	3.0	Eriksson and Kristensen (2014)
Health insurance	Health insurance (covers self)	2.6	Feld et al. (2022)
Holiday & sick pay	Holiday & Sick Pay (UK)	35.2	Datta (2025)
Holiday & sick pay	Holiday & Sick Pay (US)	27.3	Datta (2025)
Horizontal corporate culture	Horizontal corporate culture	12.8	Aum et al. (2025)
Meaningful work	Always	19.9	Van Landeghem et al. (2024)
Meaningful work	From time to time	17.5	Van Landeghem et al. (2024)
Meaningful work	For profit focus on CSR	12.2	Non et al. (2022)
Meaningful work	For-profit focus on innovation	9.6	Non et al. (2022)
Meaningful work	Work meaning	6.9	Schouwer and Kesternich (2024)
Meaningful work	Non-profit	4.5	Non et al. (2022)
Meaningful work	Frequent opp. to serve	2.8	Maestas et al. (2023)
Moderate physical activity	Moderate physical activity	14.5	Maestas et al. (2023)
Moderate physical activity	Physical intensity (1sd increase)	0.3	Dube et al. (2022)
Permanent contract	Permanent (UK)	55.4	Datta (2025)

Continued on next page

Amenity	Description	WTP	Paper
Permanent contract	Permanent (US)	44.1	Datta (2025)
Permanent contract	Permanent contract	16.1	Andresen et al. (2026)
Permanent contract	Permanent contract	14.1	Non et al. (2022)
Retirement plan	Employer match + subsidy	47.3	Franco and Rodríguez-Valencia (2023)
Retirement plan	Employer match	35.3	Franco and Rodríguez-Valencia (2023)
Retirement plan	Employer match	4.4	Cole and Taska (2023)
Retirement plan	Retirement plan	1.8	Cole and Taska (2023)
Share of male employees	Percent of men at jobs	0.1	Wiswall and Zafar (2017)
Sitting	Sitting	11.2	Maestas et al. (2023)
Skill development	Training opportunities	5.0	Maestas et al. (2023)
Skill development	High Skill Development	3.0	Folke and Rickne (2022)
Skill development	2 weeks of training a year	1.7	Eriksson and Kristensen (2014)
Skill development	Learning transferrable skills (1sd increase)	0.5	Dube et al. (2022)
Teamwork	Multidisciplinary teams	15.8	Non et al. (2022)
Teamwork	Horizontal corporate culture	12.8	Aum et al. (2025)
Teamwork	Monodisciplinary teams	8.6	Non et al. (2022)
Teamwork	Work by self	8.6	Maestas et al. (2023)
Teamwork	Team-based, evaluate own	6.3	Maestas et al. (2023)
Teamwork	Reliance on coworkers (1sd increase)	0.9	Dube et al. (2022)
Teamwork	Teamwork	0.6	Collis and Effenterre (2025)
Vacation day	Paid days off (ref 25 days) 30 days	2.5	Nagler et al. (2025)
Vacation day	Paid time off (1sd increase)	2.3	Dube et al. (2022)
Vacation day	Paid days off (ref 25 days) 35 days	1.7	Nagler et al. (2025)
Vacation day	10 days PTO	1.7	Maestas et al. (2023)
Vacation day	20 days PTO	1.2	Maestas et al. (2023)
WFH (full)	Work Home- 100% (US)	25.6	Datta (2025)
WFH (full)	Work Home- 100% (UK)	22.6	Datta (2025)
WFH (full)	WFH as much as I want	19.7	Van Landeghem et al. (2024)
WFH (full)	Telework	18.0	Curull-Sentís et al. (2025)
WFH (full)	Work from home	8.9	Mas and Pallais (2017)
WFH (full)	Working from home up to 5 days	7.7	Nagler et al. (2024)
WFH (full)	WFH	6.2	Schouwer and Kesternich (2024)
WFH (full)	Telecommute	4.1	Maestas et al. (2023)
WFH (full)	5 WFH days per week (fully remote)	1.9	Lewandowski et al. (2025)
WFH (hybrid)	WFH at least 2 days	17.6	Van Landeghem et al. (2024)
WFH (hybrid)	WFH at least 1 day	15.0	Van Landeghem et al. (2024)
WFH (hybrid)	Work Home- 50% (US)	14.3	Datta (2025)
WFH (hybrid)	Work Home- 50% (UK)	14.0	Datta (2025)
WFH (hybrid)	Partly WFH	10.5	Andresen et al. (2026)
WFH (hybrid)	Work remotely some days	8.1	Vij et al. (2023)
WFH (hybrid)	Hybrid WFH	6.6	Collis and Effenterre (2025)
WFH (hybrid)	2-3 WFH days per week (hybrid)	6.1	Lewandowski et al. (2025)
WFH (hybrid)	Working from home up to 2 days	5.4	Nagler et al. (2024)
WFH (hybrid)	Work remotely some hours	4.4	Vij et al. (2023)

Notes: WTP is given as a percent of the wage based on stated choice experiments.

Table B.1.3: Existing Willingness to Pay Estimates for Job Disamenities

Disamenity	Description	WTP (to Avoid)	Paper
10% chance of losing job	Percent chance of being fired	28.3	Wiswall and Zafar (2017)
10% chance of losing job	10/100	15.7	Van Landeghem et al. (2024)
10% chance of losing job	20/100	9.7	Van Landeghem et al. (2024)
Commuting	Travel Time	8.0	Poudel and Singleton (2024)
Commuting	Commute +15 min (baseline = reported commute)	7.7	Van Landeghem et al. (2024)
Commuting	Commute -15 min (baseline = reported commute)	6.0	Van Landeghem et al. (2024)
Commuting	Commute >60	5.8	Curull-Sentís et al. (2025)
Commuting	Commute 45-60	5.1	Curull-Sentís et al. (2025)
Commuting	Avoid commuting time (ref: 15 min) 60 min	4.9	Nagler et al. (2024)
Commuting	Avoid commuting time (ref: 15 min) 45 min	4.4	Nagler et al. (2024)
Commuting	Avoid commuting time (ref: 15 min) 30 min	3.4	Nagler et al. (2024)
Commuting	commute 30-45	3.3	Curull-Sentís et al. (2025)
Commuting	Commute time (30 min each way)	2.8	Andresen et al. (2026)
Commuting	Commute time (1sd increase)	2.0	Dube et al. (2022)
Commuting	Commute time (60 mins)	1.5	Feld et al. (2022)
Commuting	Commute time (90 mins)	1.4	Feld et al. (2022)
Commuting	Commute time (120 mins)	1.3	Feld et al. (2022)
Commuting	Commute 15-30	1.3	Curull-Sentís et al. (2025)
Deadlines	Deadlines	9.6	Nagler et al. (2025)
Low skill development	Avoiding Low Skill Development	24.0	Folke and Rickne (2022)
Manager conflict	Manager Conflict	33.0	Curull-Sentís et al. (2025)
Manager conflict	Manager Conflict	10.0	Folke and Rickne (2022)
Manager conflict	Supervisor fairness (1sd decrease)	2.3	Dube et al. (2022)
Manager conflict	Supervisor respect (1sd decrease)	2.1	Dube et al. (2022)
Multitasking	Multitasking	7.0	Nagler et al. (2025)
Performance pay	Individual pay for perfomance	1.3	Non et al. (2022)
Performance pay	Team pay for performance	0.8	Non et al. (2022)
Sexual harrasment	Avoid Sexuall Harassment	43.0	Curull-Sentís et al. (2025)
Sexual harrasment	Free of harassment	30.9	Collis and Effenterre (2025)
Sexual harrasment	Safe workplace	10.3	Adams and Walia (2025)
Sexual harrasment	Avoid Sexual Harassment	9.0	Folke and Rickne (2022)
Shift work	Rotating shifts - unpredictable schedule	38.1	Desiere and Walter (2025)
Shift work	Night shift	36.2	Desiere and Walter (2025)
Shift work	Evening shift	23.7	Desiere and Walter (2025)
Shift work	Rotating shifts - predictable schedule	22.4	Desiere and Walter (2025)
Shift work	Evening and/or weekend shifts	7.7	Andresen et al. (2026)
Shift work	Morning shift	3.8	Desiere and Walter (2025)
Working on weekends	Working on weekends	6.1	Feld et al. (2022)
Working overtime	No regular overtime required	18.2	Non et al. (2022)
Working overtime	No overtime requirement	9.4	Aum et al. (2025)

Notes: WTP is given as a percent of the wage based on stated choice experiments.

B.2 Indeed Data

Table B.2.1: Differences in the Attributes of Job Postings with the Deutschlandticket — Unlisted Amenities Included in the Belief Elicitation Experiment

	Employee discounts	Team events	Company pension	Good atmosphere	Sustain-ability	Women in leadership	Family-friendly employer	Young & dynamic	Flat hierarchies
Deutschlandticket	0.158***	0.017	0.081***	0.021	0.027***	0.016	0.115***	-0.002	-0.001
	(0.027)	(0.022)	(0.030)	(0.022)	(0.010)	(0.013)	(0.024)	(0.010)	(0.014)
Mean of dep. var.	0.252	0.203	0.276	0.222	0.073	0.003	0.111	0.060	0.160
County × quarter FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Job title FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.17	0.08	0.10	0.06	0.08	0.05	0.11	0.07	0.08
N	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838

Notes: The table displays the coefficients on the Deutschlandticket or Jobticket indicator from separate regressions of each of nine job amenities or employer characteristics on the presence of a Deutschlandticket or Jobticket in a job advertisement. Amenities are identified using predefined sets of keywords and phrases. The amenities, which mimic those used in our belief elicitation experiment, are: employee discounts (e.g., corporate-benefits programs, partner discounts), team events, company pension, good atmosphere (positive workplace culture and feel-good language about the working environment), commitment to sustainability (environmental responsibility, CSR, green initiatives, carbon neutrality), whether women in leadership are highlighted (explicit mention of female executives, women's networks, or women's advancement programs), family-friendly employer (explicit family-friendly framing, parental-leave support beyond the statutory minimum, childcare subsidies, and family-oriented flexibility), young and dynamic (modern, fast-paced, youthful culture), and flat hierarchies (non-hierarchical structures, short decision paths, direct access to leadership, agile or startup-style organization). Each specification includes county-quarter and job title fixed effects. Whether the job is stressful is excluded, as it does not tend to feature in job ads. Standard errors are clustered by firm. Data is for 2024. Significance levels: * < 10% ** < 5% *** < 1%.

Table B.2.2: Differences in the Attributes of Job Postings with Remote or Hybrid Work — Unlisted Amenities Included in the Belief Elicitation Experiment

	Employee discounts	Team events	Company pension	Good atmosphere	Sustain-ability	Women in leadership	Family-friendly employer	Young & dynamic	Flat hierarchies
WFH	0.008	0.103***	0.129***	0.006	0.049***	0.002*	0.054***	0.027***	0.059***
	(0.009)	(0.011)	(0.012)	(0.012)	(0.010)	(0.001)	(0.007)	(0.005)	(0.011)
Mean of dep. var.	0.252	0.203	0.276	0.222	0.073	0.003	0.111	0.060	0.160
County × quarter FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Job title FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.16	0.08	0.11	0.06	0.08	0.05	0.10	0.07	0.08
N	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838	3,591,838

Notes: The table displays the coefficients on the work-from-home indicator from separate regressions of each of nine job amenities or employer characteristics on the presence of working from home (remote or hybrid work) in a job advertisement. Amenities are identified using predefined sets of keywords and phrases. The amenities, which mimic those used in our belief elicitation experiment, are: employee discounts (e.g., corporate-benefits programs, partner discounts), team events, company pension, good atmosphere (positive workplace culture and feel-good language about the working environment), commitment to sustainability (environmental responsibility, CSR, green initiatives, carbon neutrality), whether women in leadership are highlighted (explicit mention of female executives, women's networks, or women's advancement programs), family-friendly employer (explicit family-friendly framing, parental-leave support beyond the statutory minimum, childcare subsidies, and family-oriented flexibility), young and dynamic (modern, fast-paced, youthful culture), and flat hierarchies (non-hierarchical structures, short decision paths, direct access to leadership, agile or startup-style organization). Each specification includes county-quarter and job title fixed effects. Whether the job is stressful is excluded, as it does not tend to feature in job ads. Standard errors are clustered by firm. Data is for 2024. Significance levels: * < 10% ** < 5% *** < 1%.

B.3 Sensitivity Checks

Table B.3.1: Difference in WTP by Whether Prompted to Assume "All Else Same"

	Monthly wage in logs	Monthly wage in euros
$WTP^{Prompted}_{vacation} - WTP^{Not}_{vacation}$	-0.002	-7.955
	(0.003)	(17.633)
$WTP^{Prompted}_{training} - WTP^{Not}_{training}$	-0.003	-6.438
	(0.004)	(18.167)
$WTP^{Prompted}_{flex} - WTP^{Not}_{flex}$	-0.001	-6.441
	(0.004)	(20.991)
$WTP^{Prompted}_{lunch} - WTP^{Not}_{lunch}$	-0.003	-6.414
	(0.004)	(19.322)
$WTP^{Prompted}_{WFHhybrid} - WTP^{Not}_{WFHhybrid}$	0.007	44.359
	(0.010)	(51.722)
$WTP^{Prompted}_{WFHfull} - WTP^{Not}_{WFHfull}$	-0.002	1.087
	(0.010)	(56.449)
$WTP^{Prompted}_{ticket} - WTP^{Not}_{ticket}$	0.001	7.069
	(0.004)	(17.672)
Observations	59,864	59,864
P-value of estimates are equal	0.912	0.968

Notes: This table presents the willingness to pay (WTP) estimates for each of the four non-wage amenities that are randomly varied across hypothetical jobs. Estimation sample includes all respondents. Standard errors are clustered by individual. Significance levels: * 10%, ** 5%, *** 1%.

Table B.3.2: Beliefs over Structured Beliefs in Single Ad Framework, Accounting for Simultaneously Testing Multiple Hypotheses

	Employee Discounts	Team Events	Company Pension	Job is Stressful	Good, Pleasant Atmosphere	Employer Cares About Sustainability	High Share of Women	Family Friendly Employer	Young & Dynamic Employer	Flat Hierarchies
Panel A. Deutschlandticket										
Robust standard error	0.000	0.048	0.000	0.174	0.013	0.000	0.001	0.513	0.639	0.109
Bonferroni-Holm method	0.000	0.239	0.002	0.523	0.077	0.000	0.006	1.000	1.000	0.437
Panel B. Work from home										
Robust standard error	0.072	0.064	0.017	0.005	0.003	0.000	0.001	0.000	0.000	0.000
Bonferroni-Holm method	0.129	0.129	0.050	0.020	0.014	0.001	0.003	0.000	0.000	0.000
Panel C. Log wage										
Robust standard error	0.251	0.001	0.000	0.000	0.162	0.000	0.615	0.502	0.012	0.757
Bonferroni-Holm method	1.000	0.008	0.000	0.000	0.810	0.002	1.000	1.000	0.073	1.000

Notes: This table presents the p-values for rejecting the null hypothesis that there is zero effect of the Deutschlandticket (Panel A), working from home (Panel B), or the log wage (Panel C) on unlisted beliefs about the job under the benchmark approach of robust standard errors and when accounting for multiple hypothesis testing using the Bonferroni-Holm method. The estimates for Panel A correspond to panel (a) of Figure 4, Panel B to panel (b) of Figure 4, and Panel C to panel (a) of Figure 7.

Table B.3.3: Beliefs over Structured Beliefs in Pairwise Comparison Framework, Accounting for Simultaneously Testing Multiple Hypotheses

	Employee Discounts	Team Events	Company Pension	Job is Stressful	Good, Pleasant Atmosphere	Employer Cares About Sustainability	High Share of Women	Family Friendly Employer	Young & Dynamic Employer	Flat Hierarchies
Panel A. $1(DT) \times WTP_{i,DT}$										
Robust standard error	0.001	0.000	0.188	0.714	0.053	0.000	0.008	0.004	0.183	0.725
Bonferroni-Holm method	0.005	0.000	0.733	1.000	0.263	0.000	0.047	0.031	0.733	1.000
Panel B. $1(WFH) \times WTP_{i,WFH}$										
Robust standard error	0.043	0.224	0.054	0.385	0.187	0.063	0.841	0.000	0.168	0.303
Bonferroni-Holm method	0.390	1.000	0.429	1.000	1.000	0.443	1.000	0.003	1.000	1.000

Notes: This table presents the p-values for rejecting the null hypothesis that the coefficient ψ_A^b from equation (4) is zero when the focal amenity A is the Deutschlandticket (Panel A) or is full work from home (Panel B), under the benchmark approach of robust standard errors and when accounting for multiple hypothesis testing using the Bonferroni-Holm method. The estimates for Panel A correspond to panel (a) of Figure 5 and Panel B to panel (b) of Figure 5.

C Constructing Pre-Tax Euro Equivalent of the Deutschlandticket

This appendix details the construction of the worker-specific pre-tax euro equivalent of the *Deutschlandticket* market price introduced in Section 2, documents the underlying legal provisions, and reports its full distribution in our sample.

German tax law offers two routes by which an employer can provide a *Deutschlandticket*: the ticket can be generally untaxed though subject to reductions in the commuter allowance *Entfernungspauschale*, or, if deduced from the salary (*Entgeltumwandlung*), it can be subject to a flat-rate *Pauschalversteuerung* of 25% under § 40 Abs. 2 Satz 2 Nr. 2 EStG, without reducing the commuter allowance.

We choose the more conservative benchmark for our hypothesis and construct the benchmark under the first route, but below also describe the second route for completeness.

Route 1: Taxation and Entfernungspauschale offset Under this route, the employer's subsidy is nominally exempt from both income tax (§ 3 Nr. 15 EStG) and employee social security contributions (§ 1 Abs. 1 SvEV). But the same provision offsets the exempt amount euro for euro against the employee's deductible commuter allowance. The offset only bites for workers whose itemized *Werbungskosten* (itemized expenses) exceed the *Arbeitnehmer-Pauschbetrag* of €1,230 (§ 9a EStG) and who actually file an income tax return—for the remainder, the subsidy is tax-free. Let $s_{c(i)}$ denote the probability, in worker i's annual-gross-wage class c, that the offset binds.

The net value of the ticket to worker i is a probability-weighted average of two cases. When the offset binds, the worker still receives €63 of in-kind benefit but pays €63 $\times$ τ_i^{ESt} in additional income tax through the lost *Entfernungspauschale*, where τ_i^{ESt} is the marginal income-tax-plus-solidarity-surcharge rate—leaving a net value of €63 $\times$ $(1 - \tau_i^{\text{ESt}})$. When the offset does not bind, the net value is the full €63. Taking expectations over the two cases,

$$\text{Net value}_i \;=\; 63 \cdot \left(1 - s_{c(i)}\, \tau_i^{\text{ESt}}\right). \tag{C..1}$$

The pre-tax euro equivalent V_i is then the gross wage increase that would deliver the same take-home value—i.e., the V_i satisfying $V_i\,(1 - \tau_i^{\text{total}}) = \text{Net value}_i$, which gives

$$V_i \;=\; \frac{63 \cdot \left(1 - s_{c(i)}\, \tau_i^{\text{ESt}}\right)}{1 - \tau_i^{\text{total}}}. \tag{C..2}$$

Binding-offset share s_c We draw s_c directly from Annex 3 of Bundestag Drucksache 21/1145, the Federal Government's response to a parliamentary inquiry (Deutscher Bundestag, 2025). Annex 3 reports, for each available year of the *Lohn- und Einkommensteuerstatistik*, a table titled *Pendlerpauschale nach Größenklassen des Bruttolohns* that cross-tabulates, by annual gross-wage class, the total number of wage-tax cases reporting a *Bruttolohn* against the number of cases with *erhöhte Werbungskosten und Entfernungspauschale*—i.e., filers whose itemized *Werbungskosten* including the commuter allowance exceed the *Arbeitnehmer-Pauschbetrag*. We use the

2021 tabulation, the most recent year available, and define

$$s_c = \frac{\#\text{ wage-tax cases with itemized deductions and commuter allowance in class } c}{\#\text{ wage-tax cases in class } c}.$$

The denominator covers all taxable employees in class c who reported a *Bruttolohn*—including both those who file an annual return and those whose wage tax is final through employer withholding—so the shares capture the non-filing and below-*Pauschbetrag* margins jointly. The shares are reported in Table C.1. We assign each respondent the share corresponding to the average annual gross earnings they choose between in our experiment (which, in turn, is based on their current labor earnings).

Implementation We compute τ_i^{total} and τ_i^{ESt} worker by worker from the 2026 § 32a EStG schedule, applying the *Grundtarif* for unmarried respondents and the *Splittingtarif* for married respondents, with employee social security contributions subject to the relevant *Beitragsbemessungsgrenzen*. Our parameterization follows the GETTSIM (GErman Taxes and Transfers SIMulator) package, a validated open-source implementation of the German tax-and-transfer system (von Gaudecker *et al.*, 2026). Rates are obtained by numerical differentiation of the total deduction function at each respondent's reported gross wage using a forward difference of €50 per month; for married respondents, the derivative is taken with respect to the respondent's own earnings, holding imputed spouse earnings fixed. Taxable income for a respondent with monthly gross earnings w_i is $zvE_i = \max\{0,\, 12w_i - 1{,}230 - 36 - SV_i\}$, deducting the *Arbeitnehmer-Pauschbetrag* (§ 9a EStG), the *Sonderausgaben-Pauschbetrag* (§ 10c EStG), and annual employee social security contributions SV_i (comprising health insurance, long-term care insurance, pension insurance, and unemployment insurance at their 2026 statutory rates, subject to the relevant BBGs). We impute monthly spouse earnings as $w_i^{sp} = \max\{0,\, \text{hh\_income}_i - \text{monthly\_income}_i\}$ for married respondents—so spouse earnings are set to zero whenever reported monthly household income does not exceed the respondent's own reported labor income. For respondents with children, we apply the *Günstigerprüfung* (§ 31 EStG), selecting between the *Kinderfreibetrag* and the *Kindergeld* the treatment that minimizes the household's combined tax-and-transfer burden.

Quantitative picture Figure C.1 reports the distribution of V_i across our survey respondents. The mean pre-tax euro equivalent is €97.46 per month (SE 0.08). The mean gross-up factor is 1.5469 (SE 0.0013), i.e., the pre-tax benchmark is, on average, 54.69% higher than the €63 market price of the Deutschlandticket. Expressed as a share of gross earnings, the average benchmark corresponds to 0.0251, i.e., about 2.5% of respondents' gross earnings.

Route 2: Pauschalversteuerung at 25% (§ 40 Abs. 2 Satz 2 Nr. 2 EStG) Under an alternative route, the Deutschlandticket gets taxed at a flat-rate taxation of 25%, without an offset of the commuter allowance:

$$V_i = \frac{63 \cdot \big(1 - 0.25\big)}{1 - \tau_i^{\text{total}}}. \tag{C..3}$$

Under this scenario, the average V_i of the ticket is €83.01, i.e., lower than the average V_i of €97.46 that Route 1 delivered.

However, a key consideration is that this route is open when the ticket is technically a conversion of the employee's salary (*Entgeltumwandlung*), so it reduces the salary of the employee and is thus substantially more expensive from the employee's perspective (see, e.g., "*Option 2*" here and "*Variante 3*" here). In some cases, employers may cover the flat tax under this route. However, the first-order effect of the salary conversion, i.e., the fact that the employee pays for the ticket by reducing their salary, dominates.

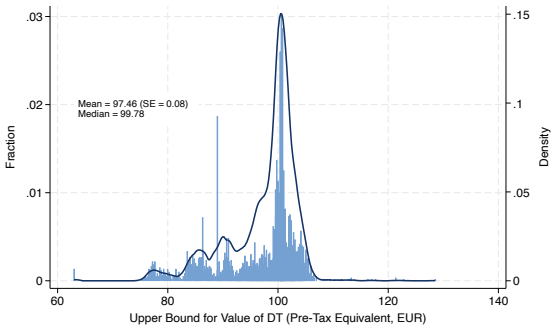
Since our paper argues that a substantial share of respondents overvaluate the Deutschlandticket, we err on the side of being conservative and set the benchmark as Route 1.

Table C.1: Share of Employees with Binding Commuter Allowance Offset, by Annual Gross Wage Class, 2021

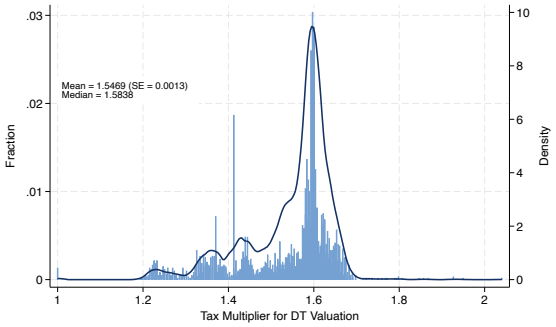
Annual gross wage class (€)	Wage-tax cases in class	. . . of which with erhöhte WK und Entfernungspausch.	Share s_c
under 5,000	5,802,094	59,169	0.010
5,000–10,000	3,341,472	181,067	0.054
10,000–20,000	6,668,970	1,137,524	0.171
20,000–30,000	6,934,036	2,085,086	0.301
30,000–40,000	6,922,457	2,826,360	0.408
40,000–50,000	5,400,865	2,530,793	0.469
50,000–60,000	3,323,843	1,740,222	0.524
60,000–70,000	2,053,653	1,133,177	0.552
70,000–80,000	1,290,535	741,578	0.575
80,000–90,000	794,659	455,381	0.573
90,000–100,000	533,424	298,624	0.560
100,000–150,000	1,003,828	536,654	0.535
150,000–200,000	248,043	123,950	0.500
200,000–250,000	98,229	45,958	0.468
250,000–500,000	109,242	49,720	0.455
500,000–1,000,000	18,947	8,894	0.469
$\geq$ 1,000,000	5,773	2,796	0.484

Notes: Shares are constructed from the table *Lohn- und Einkommensteuerstatistik 2021—Pendlerpauschale nach Größenklassen des Bruttolohns*, Annex 3 of Bundestag Drucksache 21/1145 (Deutscher Bundestag, 2025). "Wage-tax cases in class" are cases with a reported Bruttolohn in the income tax record in each gross-wage class (*Anzahl der Steuerfälle insgesamt*). ". . . of which with erhöhte WK und Entfernungspauschale" counts the subset of cases with itemized Werbungskosten including the commuter allowance exceeding the *Arbeitnehmer-Pauschbetrag* (*Anzahl der Steuerfälle mit erhöhten Werbungskosten und Entfernungspauschale*). The share s_c is the ratio of the two and captures both the non-filing and below-Pauschbetrag margins in a single number.

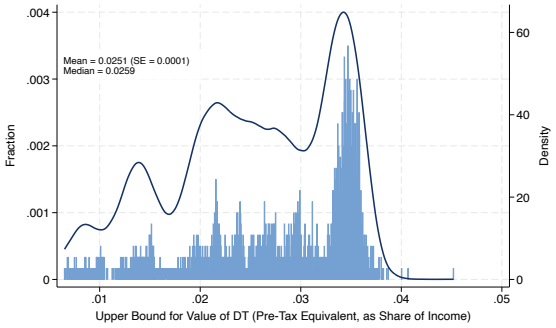
Figure C.1: Pre-Tax Euro Equivalent of the *Deutschlandticket*



(a) V_i (EUR/month)



(b) Gross-up factor $V_i/63$



(c) V_i/w_i (share of gross earnings)

Notes: Histograms and kernel densities of the worker-specific pre-tax euro equivalent $V_i = 63 \cdot (1 - s_{c(i)}\,\tau_i^{\mathrm{ESt}})/(1 - \tau_i^{\mathrm{total}})$ of the *Deutschlandticket*. Panel (a) reports V_i in euros per month; panel (b) reports the gross-up factor $V_i/63$; panel (c) reports V_i as a share of monthly gross earnings w_i. Mean and median are annotated in each panel.

D Belief Spillovers Beyond the Binary Case

Section 3.2 states the belief-spillover bias as an exact, distribution-free identity for the binary listed amenities of our experiment. This appendix collects two extensions: the same decomposition for continuous amenities and the parallel contamination of the wage coefficient.

D.1 Continuous Amenities: Normality and Ellipticity

A linear conditional mean suffices. For a continuous listed amenity the affine-by-construction argument of Section 3.2 is unavailable, and the decomposition instead requires that the conditional mean be linear in the observed amenity,

$$\mathbb{E}[A_{jk} \mid A_{jr}] = \mu_k + \gamma_{kr}\,(A_{jr} - \mu_r), \qquad \gamma_{kr} \equiv \frac{\mathrm{Cov}(A_{jk}, A_{jr})}{\mathrm{Var}(A_{jr})}.$$

Under this condition, substituting into expected utility reproduces the main-text decomposition $\beta_r^* = \beta_r + \sum_{k \neq r} \beta_k \gamma_{kr}$ verbatim, now with γ_{kr} the population regression slope rather than a difference in conditional means. Joint normality of the amenity vector delivers a linear conditional mean, as does the broader elliptical family (e.g., the multivariate t and Laplace).[37]

D.2 The Wage Denominator

The same reasoning applies when the conditioning variable is the posted wage rather than a listed amenity. If a greater wage signals to the worker a more generous amenity bundle, the worker revises their beliefs about unlisted amenities positively with the wage; in turn, the estimated wage coefficient absorbs those revisions,

$$\delta^* = \delta + \sum_k \beta_k \gamma_{kw}, \qquad \gamma_{kw} \equiv \frac{\mathrm{Cov}(A_{jk}, \ln w)}{\mathrm{Var}(\ln w)},$$

reflecting the slope of the worker's belief about amenity k with respect to the log wage. The summation runs over every amenity, including amenity r itself: when the worker conditions on the wage rather than on a listed amenity, all amenities are unobserved and inferred from what the wage signals. Because the wage is continuous, this term—unlike the binary numerator—is not distribution-free. It provides an exact decomposition under a linear-conditional-mean condition; more generally, γ_{kw} summarizes this relationship as the slope from a best linear projection of the worker's belief on the log wage.

[37] The regression function is affine with slope $\mathrm{Cov}(A_{jk}, A_{jr})/\mathrm{Var}(A_{jr})$ wherever second moments exist; ellipticity is itself only sufficient, since any distribution with a linear conditional mean suffices.

Supplementary References

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