# **Consumer Preferences for Migrant and Native Workers:**

Evidence from a Large-Scale Experiment<sup>\*</sup>

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#### Abstract

We conduct an experiment with 56,000 Danish households (over 2 percent of the population), who receive an advertisement from a Danish company offering basic cleaning services. We vary the price and the available operators, who differ in their ethnicity but meet identical quality standards. We find that, on average, demand for a migrant operator is 45 percent lower than demand for a native, but the gap is sensitive to price. It grows larger as the price increases since the demand for a migrant falls more steeply than the demand for a native. This is consistent with consumers having a lower willingness to pay for migrant workers than equivalent native workers. The results shed light on an important source of labor-market discrimination.

**JEL codes**: C93, J23, J61, J71.

**Keywords**: migrants, discrimination, experiment, consumer preferences, labormarket integration.

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# 1 Introduction

Migration flows are an increasingly divisive issue across the world, causing deep cleavages within and between countries, and threatening the stability of international relations. The long-debated construction of a wall between Mexico and the US, and the newly growing tensions among European countries on how to handle migration into the European Union are among the most vivid examples of such cleavages. In any electoral campaign, openness to migrants is a controversial topic and political parties supporting more restrictive migration policies have been gaining strength in many countries (Otto and Steinhardt, 2014; Barone et al., 2016; Halla et al., 2017; Edo et al., 2019; Dustmann et al., 2018; Guriev and Papaioannou, 2022; Alesina and Tabellini, 2022).

While anti-migration sentiments grow, however, entire sectors of the economy rely heavily on migrant workers, who are willing to accept lower wages and skill downgrading (Card et al., 2012; Dustmann et al., 2013; Docquier et al., 2014; D'Amuri and Peri, 2014). This suggests the existence of a trade-off between preferences for native labor on the one hand, and the lower labor costs associated with migrants on the other hand. Our objective is to investigate this trade-off by shedding new light on *consumer preferences for native vs. migrant workers*, a key source of labor-market discrimination.

We use a large-scale experiment conducted with over 2 percent of the Danish population to induce exogenous variation in the price of native and migrant workers – holding constant their quality and the task to be performed – and we study the ensuing effects on consumer demand.<sup>1</sup> Specifically, we advertise the services of a Danish company offering basic cleaning services to 56,000 Danish households and we randomly vary the ethnicity of the available operator (native vs. migrant), as well as the hourly price.<sup>2</sup> This design allows us to provide consumers with a signal of quality that is *identical and equally reliable* for the two workers, who are presented as operators of the same Danish company with the same quality standards and customer ratings. The fact that the services provided

<sup>&</sup>lt;sup>1</sup>Throughout the paper, the term "migrant" refers to workers with a migrant background (i.e., those who migrated to Denmark from other countries, as well as their descendants).

<sup>&</sup>lt;sup>2</sup>The background of the two workers is signaled by their names as in much of the existing literature (Bertrand and Duflo, 2017). In particular, we follow recent studies on Denmark (e.g., Hedegaard and Tyran, 2018) and choose a common name among people belonging to the largest non-European migrant group in the country (migrants from middle-Eastern Muslim countries).

are very basic further reduces potential disparities in perceived quality. Using this setup, we investigate how the demand for the two workers changes as we exogenously vary their price.<sup>3</sup> Furthermore, to investigate the role of worker quality in driving consumer choices, we exogenously change the operators' customer ratings and test how this affects demand.

We find that, on average, the demand for a migrant is 45 percent lower than the demand for a native. The gap, however, is sensitive to the price level, with the demand for the migrant decreasing steeply when the price increases while the demand for the native is less sensitive to price variations. Specifically, for an hourly pay close to the bottom of the earnings distribution in similar occupations (approximately 18 USD an hour), the demand for the migrant is similar to the demand for the native. When the price increases to the  $25^{th}$  percentile of the earnings distribution (approximately 24 USD an hour), the demand for the migrant is only one-fifth of the demand for the native. By means of a simple theoretical framework with heterogeneous consumers, we show that the results are consistent with customers having, on average, a lower willingness to pay and a higher price elasticity of demand for migrants than for equivalent natives. This indicates that migrants and natives are imperfect substitutes in the eye of consumers, shedding new light on this important source of labor-market discrimination.

We also run an additional test by giving one group of consumers an explicit choice *at the lowest price* between the two workers, by indicating both of them as available operators on the leaflet.<sup>4</sup> Upon doing that, we find that the vast majority of consumers who call back choose the native. Coupled with the results above and in light of our theoretical framework, this corroborates the conclusion that consumers have a strong preference for native labor and a lower willingness to pay for equivalent migrants, on average. The fact that, as the price falls, the demand for the migrant approaches the demand for the native (our headline result above) does not mean that consumers become indifferent between the two. Rather, it indicates that, as the price falls, the p

<sup>&</sup>lt;sup>3</sup>As the rest of the literature, we measure demand using callback rates.

<sup>&</sup>lt;sup>4</sup>We indicate that both workers are active in the local area and we provide their direct phone numbers to measure callbacks.

all consumers who receive the leaflet and need a cleaner should be willing to hire both workers). However, if consumers are given an explicit choice between the two worker types, they overwhelmingly prefer the native *even at the low price*. This treatment also helps to dispel the possibility that a low price is a negative signal of quality for the native but not for the migrant. That would be hard to reconcile with the fact that, when consumers are given a choice between the two workers *at the lowest price*, they overwhelmingly prefer the native.

Finally, we experimentally vary the customer ratings to investigate the role of worker quality in driving consumer choices. Upon doing that, we find suggestive evidence that the native is preferred to the migrant *even when the migrant has a higher quality*. Although lower statistical power prevents us from drawing strong conclusions, this indicates that concerns about differences are unlikely to be the main driver of consumer choices between migrant and native workers. Crucially, we show that this is not due to our rating system providing weak signals to consumers. On the contrary, when we repeat the experiment with *two native workers* (and migrant background no longer plays a role), as a robustness test, the worker with a higher rating is preferred by *all* the consumers who call back. This is strong evidence that our leaflets convey clear and salient signals of worker quality, and it contributes to suggest that quality concerns are unlikely to drive the large differences in demand we observe.

This paper makes important contributions to the literature on discrimination and ethnic disparities in the labor market (e.g., Lang and Manove, 2011; Kline and Walters, 2021; Kline et al., 2022). Specifically, we use a large-scale experiment to shed light on the role of *consumer preferences*, which have attracted increasing attention as a potential source of discrimination (Holzer and Ihlanfeldt, 1998; Leonard et al., 2010; Doleac and Stein, 2013; Hurst et al., 2021). Thanks to our design, we are able to overcome the fundamental challenge of *exogenously varying prices* and we can study the trade-offs that consumers are willing to make.<sup>5</sup> Our work also relates to a growing literature on discrimination in

<sup>&</sup>lt;sup>5</sup>In a similar spirit, Hedegaard and Tyran (2018) run an experiment with juveniles to investigate a different question. They study workers' willingness to forego earnings in order to avoid a co-worker with a migrant background. Our interest is in the employer-employee (customer-worker) relationship, which is a crucial source of discrimination in the labor market and has been at the core of the literature. Furthermore, by working outside the lab in a natural setting, we can convincingly exclude experimenter demand effects

the housing market (Laouénan and Rathelot, 2022; Christensen et al., 2022).

We also make a contribution to the literature that uses audit studies and mail-out interventions to investigate discrimination (see early work by Bertrand and Mullainathan, 2004, recent surveys by Rich, 2014; Bertrand and Duflo, 2017; Neumark, 2018; Baert, 2018, and more recent work by Deming et al., 2016; Kessler et al., 2019; Kline et al., 2022). Through an innovative design that presents the native and the migrant as *employees* of the same native firm with common quality standards, the same training, and equal customer ratings, we provide a precise and identical signal of quality for both of them. Though our objective is not to exclude the possibility of statistical discrimination, we show that, even when quality signals are clear and equally reliable for equivalent native and migrant workers, consumers express an overwhelming preference for natives.<sup>6</sup> We also go a step further and exploit experimental variation in worker quality to study how quality differences affect the hiring of migrants vs. natives.<sup>7</sup> Finally, we focus on a much broader population than most mail-out interventions. While existing studies commonly target selected groups (e.g., hiring managers in firms), we work with the general population of consumers in Denmark.

Third, we contribute to the literature that examines the consequences of migration for the labor markets of receiving countries (e.g., Peri, 2016; Llull, 2017; Akcigit et al., 2017). A common finding in this literature is that migrant inflows tend to worsen employment outcomes for previous migrants, but not for natives, indicating that the two are not perfect substitutes (e.g., Cortes, 2008; Ottaviano and Peri, 2012; Dustmann et al., 2013; Foged and Peri, 2016; Clemens et al., 2018). We corroborate this result by showing that even when a migrant and a native are employed by the same firm, perform the same tasks, and meet the same quality standards, they are perceived as imperfect substitutes by customers.

Fourth, a related and growing literature investigates the impacts of migrant inflows

and social desirability bias.

<sup>&</sup>lt;sup>6</sup>Related to this, a recent paper by Bohren et al. (2022) highlights that statistical discrimination may be based on wrong beliefs. That possibility does not affect our conclusions and addressing it explicitly is beyond the scope of this paper. By offering precise information on quality that is common to both workers, however, our work goes in the direction of attenuating such problems.

<sup>&</sup>lt;sup>7</sup>In this respect, we follow the recommendation advanced by Neumark (2012) and make variation in quality an explicit part of our design.

on attitudes towards migration and political outcomes in receiving countries (e.g., Hainmueller and Hopkins, 2014; 2015; Barone et al., 2016; Tabellini, 2020; Caselli et al., 2020; 2021; Alesina et al., 2021; Bursztyn et al., 2021; Fouka et al., 2022; Calderon et al., 2022; Caselli et al., 2023).<sup>8</sup> We contribute to the debate by shedding new light on the trade-offs consumers are willing to make between workers' origins and the cost of hiring them.

# 2 Experimental design

We deliver leaflets advertising the cleaning services of a Danish company to a random sample of 56,000 Danish households across rural and urban areas (described in the next section). This amounts to over 2 percent of Denmark's population and more than 10 percent of the population in the municipalities we cover. We exogenously vary three features of the leaflets while keeping the rest constant. First, we vary the *ethnicity* of the available operator between a native and a migrant background (signaled by first names, as discussed below).<sup>9</sup> Second, we vary the hourly *price* charged by the workers between a low and a high price (for simplicity and due to budget limitations, we focus on two prices). Third, we vary the *quality* of the workers as signaled by the ratings of previous customers. The differences in the callback rates between the two workers is our primary outcome of interest. In this section, we discuss the different aspects of the experimental design. A detailed description of all the variants of the leaflet is provided in Appendix B.

## 2.1 The leaflets

Our leaflets advertise the services of a Danish company that provides a range of homecleaning services (including garden and window cleaning). These services are commonly

<sup>&</sup>lt;sup>8</sup>The drivers of voters' attitudes are complex and an extensive review is beyond the scope of this article. A common concern, which has attracted the attention of the literature, is that migrants may be a burden on the public finances of receiving countries (e.g., Dustmann and Frattini, 2014; Agersnap et al., 2020).

<sup>&</sup>lt;sup>9</sup>We choose two male names since our power calculations indicated that we could not run the analysis on both genders with the available sample size. Given that migrants are predominantly male and that male migrants typically face greater integration challenges (Nielsen et al., 2004; Dahl and Krog, 2018), this was an optimal choice. It is also important to note that in Denmark it is not uncommon for male cleaners to deliver the services offered in the experiment (Mailand and Larsen, 2020). It will be interesting, nonetheless, to extend the study to female workers in the future.

used by Danish households (Mailand and Larsen, 2020). The company was created for experimental purposes, an approach that replicates the one used by the vast literature relying on fictitious job applicants to study discrimination by firms (see the discussion below on how we minimized potential costs for customers).

In order to propose different workers to different households, the company indicates that only a certain worker operates in the area where the household is located. The direct phone number for that worker is provided on the leaflet. In certain treatment arms (described below), the leaflet indicates that two workers are available in the area (both the native and the migrant). Their phone numbers are both included in the leaflet and the household can choose which of the two to call.<sup>10</sup> In order to capture differences in callback rates between urban and rural areas, we use different phone numbers in different areas.

We next discuss key features of the leaflets that are necessary to attain our objectives. Two sample leaflets are shown in Appendix B. Figure B1 shows a leaflet with only one operator. Figure B2 shows a leaflet with two operators. The original version of both leaflets (in Danish) is also included for completeness (Figure B3 and B4).

#### 2.2 Quality assurance

Presenting both workers as employees of the same Danish company helps us to ensure that they *meet the same quality standards* in the eye of customers. We take several steps to ensure this is attained.

First, on the leaflet the company explicitly says that all its workers have undergone careful training and they are all able to perform the tasks *competently, effectively, and within the agreed time*. This reinforces the message that they are all equally productive. The statement is strengthened by the fact that the services offered (which are listed on the leaflet) are rather basic (e.g., vacuuming, cleaning floors, mowing lawns), leaving limited room for quality differences among workers who have received the same training. Such

<sup>&</sup>lt;sup>10</sup>To control for order effects, in one-half of these leaflets the name of the migrant appears before the name of the native. In the other half, the order is reversed.

tasks also require simple instructions, excluding the possibility that language barriers may play an important role.<sup>11</sup> The leaflet also says that if the customer is not satisfied, full reimbursement will be offered (the Danish expression says "full satisfaction or no payment required"). This is a common feature of such advertisements and it helps us to boost demand (and increase statistical power).

A potential concern is that customers who are allocated different operators may make different inferences about the overall quality of the company, attaching different values to the information provided. To overcome this problem, the leaflet provides the names of *all* the operators of the company (four in total), but only the phone number of the one that is available in the area. This ensures that both customers who are allocated the native and those who are allocated the migrant have the same overall impression of the company (since the composition of its labor force is the same). For the sake of balance, the personnel of the company is shown to be 50% migrant and 50% female, as indicated by the names listed (e.g., see Figure B1).

Finally, the leaflet provides a direct signal of worker quality by reporting ratings from previous customers. These are displayed using a star-rating system on a scale from 0 to 5, like those commonly found online (e.g., Google and Amazon both use such a system). In most of the leaflets, the reported rating for the two workers is 4.9 (the next section describes how we exogenously vary it in certain treatments). The rating is accompanied by an indication of how many reviews were submitted by customers. The number we report is large (above 150) and similar for the two workers we are comparing.<sup>12</sup> The

<sup>&</sup>lt;sup>11</sup>Since all the workers are explicitly described as being able to operate effectively in the local context, this should not be a concern. Furthermore, in a country like Denmark, where the vast majority of the population masters more than enough knowledge of English to provide instructions to a worker performing basic cleaning services, this should not pose a challenge. This concern is further assuaged by the fact that our leaflets show a large number of prior customer ratings for both workers, indicating a long career in the country, which typically comes with mastering the local language. We deliberately chose not to say in the leaflet that all workers have good knowledge of Danish in order to avoid stressing unnecessarily the fact that one operator may be a foreigner. Such a statement would have been unnatural and is typically not found in such leaflets.

<sup>&</sup>lt;sup>12</sup>One concern may be that different types of workers attract different types of customers, with the migrant attracting mostly other migrants. This may have adverse implications for the value perspective customers attach to the quality signal. Using publicly available information on the registered owners of the phone lines that placed the calls received in the experiment, we find evidence against this hypothesis since the ratio of native-sounding to migrant-sounding names *among the callers* is not statistically different between the calls for the native and the migrant. We also do not find significant differences in the share of callers for whom information is publicly available between those who call the native and those who

leaflet also shows quotes from two previous customers (a man and a woman) who report satisfaction with the services provided by the operator. Both have native names on all the leaflets in order to signal that a typical customer is a native regardless of the background of the operator. Crucially, we know from one of our robustness checks that the rating system is salient in informing consumer choices (see the discussion below). In a similar fashion, Laouénan and Rathelot (2022) take advantage of the star-rating system used on the Airbnb platform to identify the mechanisms underlying discrimination against ethnic-minority hosts.

## 2.3 Changing workers' price

The leaflets indicate an hourly price, which we vary exogenously between a low value of 120 Danish Kroner (DKK) per hour, approximately equal to 18 USD (at the time of the study), and a high price of 160 DKK (24 USD). To induce a sufficient number of calls and have adequate statistical power, and to make the service affordable to as large a share of households as possible, both prices had to be in the lower part of the price distribution for services of this kind. A natural choice was to set the low price close to the minimum wage, as established by collective agreements in Denmark.<sup>13</sup> A sensible choice for the high price was the mid-point between the median and the bottom (i.e., the  $25^{th}$  percentile) of the distribution of hourly earnings for workers in comparable occupations. We further corroborated this choice by comparing our chosen prices with advertisements for similar services available online.<sup>14</sup>

One potential concern with our strategy is that, as we go from the high to the low price, we may appeal to a wider group of consumers from lower income groups, who may have different attitudes towards migrants (and perhaps be more open to hiring them). In this respect, it should be remarked that both prices are affordable for the vast majority of consumers. In Denmark, the lowest decile of the distribution of disposable income was 11,200 DKK per month at the time of the experiment (nearly 1,700 USD).<sup>15</sup> Hence, one

call the migrant.

 $<sup>^{13}\</sup>mathrm{Denmark}$  does not have a national minimum wage.

 $<sup>^{14}</sup>$ For instance, on *www.happyhelper.dk*.

 $<sup>^{15}</sup> www.dst.dk/en/Statistik/emner/arbejde-indkomst-og-formue/indkomster.$ 

hour of cleaning services at the high price (160 DKK) amounts to only 1.4% of monthly disposable income for the poorest households (a single earner with income equal to the bottom decile's upper bound), while one hour of cleaning services at the low price (120 DKK) amounts to approximately 1% of disposable income for those households.<sup>16</sup> In light of this, it is reasonable to conclude that upon going from our high to our low price we did not appeal to radically different income groups. Furthermore, the existing literature does not support the idea that workers from lower income groups are typically more open to migrants (e.g., Hainmueller and Hopkins, 2014; 2015). If anything, since migrants tend to compete with workers that have the lowest skill levels, one may expect the opposite.

## 2.4 Changing workers' quality

We use the star-rating system described above as a tool to induce exogenous variation in worker quality. For this purpose, we use the leaflets in which the company indicates *two* operators who are available in the area and gives customers a choice between the two (see Appendix B for additional details). By showing different ratings for the two workers, we can test how this affects demand, holding the price constant at the low level of 120 DKK.<sup>17</sup> In one variant of the leaflet, the native has a higher rating (4.9/5)than the migrant (3.6/5). In a second variant, the same ratings are swapped. We also have a third variant in which the two workers have the same rating, which we use as an additional test of consumer preferences at a given price and quality level. Finally, in a fourth variant of this treatment, we use two popular *native* names ("Peter" and "Jens") and give them the high and low rating, respectively. This is a robustness check to test whether our customer ratings are salient. Our objective is to test this in a neutral setting where potential discrimination based on origins is not at play.

<sup>&</sup>lt;sup>16</sup>For dual-earner households, even those whose two earners are both in the bottom decile of the income distribution, those values are typically below 1%.

<sup>&</sup>lt;sup>17</sup>We focus on the low price to maximize callbacks and, most importantly, to test the hypothesis that, even at the low price, consumers have a preference for natives if given an explicit choice (as discussed above). Due to budget limitations, we could not experiment with both prices in this treatment arm.

## 2.5 Signaling migrant background

To signal the origins of a worker, we follow a large literature relying on first names. We obtain data from the Danish statistical office (*Statistics Denmark*) on the most common names among Danish residents with and without a migrant background. We focus on the largest non-European migrant group in the country, people from middle-Eastern Muslim countries. In doing so, we follow the existing literature on discrimination against migrants in the Danish labor market. This includes recent experimental work by Hedegaard and Tyran (2018), who investigate ethnic prejudice in the workplace among juveniles. Like them, we use Danish-sounding and Muslim-sounding names. Based on these criteria, the names we identify are *Peter* and *Mohammad*.<sup>18</sup>

# 3 Sampling and outcome variable

## **3.1** Sampling and randomization

We distribute the leaflets to 56,000 households, which constitute over 2% of all the households in Denmark.<sup>19</sup> We randomly assign different versions of the leaflet to different areas of Copenhagen (local administrative units called "roder") and different towns across the neighboring region of Sjælland.<sup>20</sup> This allows us to explore heterogeneity between urban and rural areas.<sup>21</sup> The leaflets are distributed by a professional distribution company that delivers them to all the households residing within a given geographic area. Randomization is conducted by area, rather than at the individual household level, to avoid contamination across treatments.

<sup>&</sup>lt;sup>18</sup>Dahl and Krog (2018) also use Danish-sounding and Muslim-sounding names to investigate ethnic discrimination in the recruitment process in Denmark. Both Peter and Mohammad are among the names they use.

<sup>&</sup>lt;sup>19</sup>The total number was 2,728,132 in January 2020: https://www.dst.dk/en/Statistik/emner/befolkningog-valg/husstande-familier-boern/husstande.

<sup>&</sup>lt;sup>20</sup>To trace calls from Copenhagen vs. Sjælland, the leaflets indicated different phone numbers for the same worker in different areas. Since the two geographical areas are clearly distinct, there was no risk of contamination. It should be noted that we cannot distinguish calls from different areas within the same treatment arm.

<sup>&</sup>lt;sup>21</sup>Though it would have been ideal to target rural areas further away from Copenhagen, where attitudes to migrants may differ more substantially (as discussed below), this was not possible due to budget limitations.

The towns we target have at least 1,200 and up to 5,000 inhabitants. This is to ensure that a town could be covered in its entirety (a logistically more feasible approach than giving the distribution company a precise list of addresses), while allowing us to cover a sufficiently large number of towns. Close to one third of the population in Sjælland lives in towns of such size.

The randomization method explicitly seeks balance across a set of available covariates between towns and neighborhoods across different treatment groups.<sup>22</sup> All the data used for the randomization are obtained from Statistics Denmark.

## **3.2** Measuring demand

The main outcome of interest is the callback rate for different types of workers under different conditions. We measure this using two channels. First, each experimental manipulation is associated with a different phone number and we monitor the different phone lines over a period of about 2 months following the distribution of the leaflets.<sup>23</sup> Second, we set up a website where customers can review basic information about the company as well as leave messages and express their interest. The website did not contain information about prices and worker quality, since this information differed between leaflets. In order to detect which leaflet customers received (and which worker they were interested)

<sup>&</sup>lt;sup>22</sup>The randomisation protocol among the 391 areas of Copenhagen is run in two stages. First, given the possibility of distributing 40,000 leaflets and the estimated average number of households in each area, we randomly select 48 areas with probabilities proportional to their population size. This first step leads to the selection of a total number of households approximately equal to the number of leaflets. Second, we randomly assign these 48 areas to 8 different treatment arms, 4 of which are further divided into 2 different leaflet variants, as detailed below. The random assignment of the areas across the treatment arms seeks balance on the basis of population size, share of men, and average age. The randomisation protocol among the towns in Sjælland is run in a similar way, but we first restrict the sampling to towns that have at least 1,200 and up to 5,000 inhabitants. This leaves us with 50 eligible towns. Given the possibility of distributing 16,000 leaflets and the estimated average number of households in each town, we randomly select 15 towns with probabilities proportional to their population size. Then, we randomly assign these 15 towns to 4 different treatment arms. The random assignment of the towns across the treatment arms seeks balance on the basis of population size, average age, employment rate, and share of university graduates, due to the availability of a larger set of covariates.

<sup>&</sup>lt;sup>23</sup>The leaflets were distributed in mid-January 2020 and COVID-related restrictions on economic activities were imposed on March 13, 2020. Our main results cover the period from January 23 to March 12, 2020. However, when we run the analysis over the full period we originally planned to cover (up to May 15, as indicated in our pre-registered plan), our results do not change (see Table A3 in Appendix A). Similarly, stopping the analysis at the time when the very first case of COVID-19 was detected in Denmark (February 27) does not change our conclusions.

in hiring), we asked them to quote a unique discount code included in the leaflet upon contacting us via the website. This allows us to attribute the contacts we receive via the website to requests for a specific worker. All customers who wrote through the website except one quoted the code. In most of the analysis, we aggregate the contacts received by phone and via the website.<sup>24</sup>

Upon receiving the calls, we used an automated voicemail message saying that the worker was unavailable and would call back if some availability opened up in the following days. A similar message was sent by email to the customers who expressed an interest via the website. This allowed us to minimize the time cost for respondents who may have called back in the absence of that message.<sup>25</sup>

Finally, when counting the calls, we need to account for the possibility that the same customer may call multiple times and, in the case of leaflets with two phone numbers, that the same number may call both of them. In most of the analysis, we will use the most conservative approach and count multiple calls from the same number as one contact. We also drop contacts from numbers that called both workers on the same leaflets, as they do not indicate a clear-cut preference. In the next section, we will test the robustness of our results to modifying this approach.

## 4 **Results**

In this section, we present the results of the experiment. First, we show how the demand for the migrant vs. the native varies with the *price*. Second, we show how the demand for the migrant vs. the native varies with their relative *quality*.

<sup>&</sup>lt;sup>24</sup>One may hypothesize that a call may have different purposes for different workers. For instance, while the customers who called the native may have done so with the intention of hiring him, those who called the migrant may have done so with the intention of asking for additional information. Thanks to the messages we received via the website, we can investigate this hypothesis and find little evidence supporting it. The contents of the messages reveal that customers contacted both workers with similar requests.

<sup>&</sup>lt;sup>25</sup>Our approach follows common practices in the existing literature on mail-out interventions, where the nature of the design prevents the experimenter from explicitly asking participants for their consent. Prominent scholars, such as John List, have argued that if the research benefits society, and confers anonymity and just treatment to all subjects, the lack of informed consent is defensible (Couture and List, 2008).

The graphs below show the difference in the number of callbacks between the two workers as a fraction of the number of callbacks for the native. This provides an immediate indication of the gap. In addition, Table 1 shows the raw callback rate (no. callbacks/no. leaflets) under the different experimental manipulations and tests the difference in callback rates between the migrant and the native worker. For each comparison, the notes of Table 1 refer to the specific treatment manipulation used (also detailed in Appendix B).

## 4.1 Price variation

Our first result is that, on average, demand for the migrant is significantly lower than demand for the native. Across all the treatments in which the two have the same customer rating, the migrant received 45% fewer calls than the native, as shown in Figure 1.<sup>26</sup> The gap is similar across geographical areas. Although one might expect a difference between urban and rural areas – possibly linked to the fact that people in urban settings are used to a larger presence of migrants and may therefore have different attitudes – one should bear in mind that the rural areas we cover are close to Copenhagen (for budgetary and logistical reasons), and many of their residents commute to the city for work. This makes the two geographies rather homogeneous.

Our second result is that the gap in demand between native and migrant labor is sensitive to price (Figure 2). At the low price (120 DKK per hour, approx. 18 USD at the time of the experiment) the demand for the migrant is very close to (and not statistically different from) the demand for the native. At the high price (160 DKK per hour, approx. 24 USD), the demand for the migrant is only one-fifth of the demand for the native.<sup>27</sup> The differences in demand for the migrant and the native are statistically

<sup>&</sup>lt;sup>26</sup>The native received 73 calls while the migrant received only 40 calls. This corresponds to callback rates of 0.41 and 0.22 percent, respectively, relative to the total number of leaflets (Table 1). While these figures may seem low, it is important to bear in mind that the advertisement was unsolicited and it was likely mixed up with other publicity of the same kind households receive. A low callback rate is therefore to be expected and it is not directly comparable to the callback rates of existing audit studies, especially those targeting firms with open vacancies. This underscores the importance of working with a large-scale sample as we do and the value of our design.

<sup>&</sup>lt;sup>27</sup>As shown in Table 1, at the low price, the callback rate for the native and the migrant are 0.37 and 0.34 percent (33 vs. 31 calls), respectively, a minor difference, which is not statistically significant. At the





Notes: The figure shows percentage differences in callback rates for the migrant relative to the native by area. Whiskers indicate 95% confidence intervals based on standard errors calculated using the delta method. **Urban** includes callbacks to leaflets distributed in Copenhagen. **Rural** includes callbacks to leaflets distributed in both workers in all leaflets and we pool the two prices. Only leaflets with one worker per leaflet are considered (leaflets 1-8, as detailed in Appendix B). Callbacks are calculated on the basis of the third column (no multiple calls) of Table B2, i.e., only one callback per contact is recorded and contacts that express multiple preferences for different workers are excluded.

different across the two price levels.

The gap emerges as a result of the demand for the migrant falling substantially (by over two-thirds) as we go from the low to the high price, while the demand for the native does not change significantly (see Panel B in Table 1, and Figure A1). The theoretical model in the next section offers a formal interpretation of this finding by showing that it is consistent with consumers having a lower willingness to pay for migrant workers than for equivalent native workers, on average. At the high price, the proportion of consumers

high price, the callback rate for the native is 0.44 percent and the callback rate for the migrant is 0.10 percent (40 vs. 9 calls), and the gap is statistically significant.

Figure 2: Demand for a migrant worker *relative to a native* at different prices (holding worker quality constant)



Notes: The figure shows percentage differences in callback rates for the migrant relative to the native by price. Whiskers indicate 95% confidence intervals based on standard errors calculated using the delta method. **Low** includes callbacks to leaflets with the low hourly price (DKK 120). **High** includes callbacks to leaflets with the high hourly price (DKK 160). The customer rating is the same for both workers in all leaflets and we pool urban and rural areas. Only leaflets with one worker per leaflet are considered (leaflets 1-8, as detailed in Appendix B). Callbacks are calculated on the basis of the third column (no multiple calls) of Table B2, i.e., only one callback per contact is recorded and contacts that express multiple preferences for different workers are excluded.

with a sufficiently high willingness to pay to hire a native (rather than not hiring at all) is larger than the proportion of consumers with a sufficiently high willingness to pay to hire a migrant. At the low price, even consumers with a low willingness to pay for a migrant are persuaded to hire one and the gap disappears.<sup>28</sup>

<sup>&</sup>lt;sup>28</sup>This explanation is further supported by the fact that the low price in the experiment proxies the minimum prices found in the industry. It is indeed reasonable to expect that close to the bottom of the price distribution in this sector any consumer who has a concrete intention to hire a cleaner should be willing to hire one. Of course, the vast majority of consumers who receive the advertisement may simply not be interested in hiring a cleaner and may effectively have a willingness to pay close to 0. This, and the fact that many leaflets may never be read since they get mixed up with other promotional mail people receive, explains why the demand we record is only a small fraction of the number of consumers

## 4.2 Quality variation

We now turn to the treatments in which we keep the price fixed (at 120 DKK, the low price) and manipulate the performance rating of the two workers. As explained above, we carry out this part of the experiment by including the two workers on the same leaflet and giving customers the possibility to choose between them (two phone numbers are provided). In one version of the treatment we assign a higher rating to the migrant (4.9/5 vs. 3.6/5 for the native). Viceversa, in the other treatment the native has the higher rating. To verify consistency with the previous part of the analysis (where we only had one worker per leaflet and all workers had the same customer rating), we also have a version with both workers on the leaflet and equal ratings.

We find that customers prefer the native independently of whether the native has a higher or a lower customer rating than the migrant (left- and right-bar in Figure 3). These results, however, are only suggestive due to the low number of calls received in this treatment arm.<sup>29</sup> They are nonetheless valuable as they underscore an important point: considerations about worker productivity seem unlikely to be the main driver of the choice between hiring a native or a migrant worker. Other factors (e.g., preferences) are likely to be playing an important role, but identifying them precisely is beyond the scope of the paper. It is also worth remarking that these results are not an artifact of the star rating in our leaflets providing a weak signal to consumers. A robustness test discussed below will show that when we gave consumers a choice between *two native workers* with different ratings, their decision was *entirely* driven by differences in quality as conveyed by the rating system.

Finally, when the two workers on the leaflet have the *same* rating (middle bar in Figure 3), we still detect an overwhelming preference for the native. This is consistent with the results in the previous section and helps us to refine the interpretation of the findings discussed above. The fact that the demand for the migrant and for the native is at

in our study even at such low prices. The difference in callbacks between the two workers is nonetheless striking and supports our conclusions.

<sup>&</sup>lt;sup>29</sup>This is due to the fact that having a lower rating for one of the workers decreases the average rating across the company and dampens demand. Due to stringent budget limitations, we could not increase the number of leaflets distributed for this part of the analysis, which would have helped us to counter the lower overall demand.

similar levels at the low price does not mean that consumers are indifferent between the two worker types when the price is low. It means that many people who would not hire a migrant for 160 DKK choose to do so for 120 DKK. However, *if given a choice between the two workers*, the most preferred option is by far the native even at the low price. The next section presents a simple theoretical framework that formalizes the interpretation of these results.



50 0 -50 -50 -100 -100 -100 -100 -100 -100 -100 -100 -100 -100 -100 -100 Migrant < Native Quality

(holding the price constant)

Notes: The figure shows percentage differences in callback rates for the migrant relative to the native by quality level (i.e., past performance measured through customer ratings). Whiskers indicate 95% confidence intervals based on standard errors calculated using the delta method. **Migrant** < **Native** includes callbacks to leaflets where the customer rating of the migrant is lower than the one of the native. **Migrant** = **Native** includes callbacks to leaflets where the two workers have the same customer rating. **Migrant** > **Native** includes callbacks to leaflets where the customer rating of the migrant is higher than the one of the native. Only leaflets where customers have a choice between *two* operators can be used for this analysis (leaflets 9-14, as detailed in Appendix B). Callbacks are calculated on the basis of the third column (no multiple calls) of Table B2, i.e., only one callback per contact is recorded and contacts that express multiple preferences for different workers are excluded.

A. Pooling both prices, s	same worker quality			
	Migrant	Native	Difference	S.E.
All areas	0.0022	0.0041	-0.0018***	0.0006
Urban	0.0016	0.0030	-0.0014**	0.0007
Rural	0.0030	0.0054	-0.0024**	0.0010
B. Different prices, same	e worker quality			
	Migrant	Native	Difference	S.E.
Low Price	0.0034	0.0037	-0.0002	0.0009
High Price	0.0010	0.0044	-0.0034***	0.0008
C. Same price, different	worker quality			
	Migrant	Native	Difference	S.E.
Migrant < Native	0.0000	0.0008	-0.0008**	0.0004
Migrant = Native	0.0006	0.0022	-0.0016**	0.0007
Migrant > Native	0.0000	0.0006	-0.0006*	0.0003
D. Same price, different	quality between two	natives (robustness)	)	
	Native 1	Native 2	Difference	S.E.
Native $1 > Native 2$	0.0026	0.0000	$0.0026^{\star\star\star}$	0.0007

**Table 1:** Differences in callback rates between migrant and native

Notes: The table shows callback rates (number of callbacks divided by number of leaflets), the difference in callback rates between the two workers and its standard error. Callbacks are calculated on the basis of the third column (no multiple calls) of Table B2, i.e., only one callback per contact is recorded and contacts that express multiple preferences for different workers are excluded. In all treatments, the number of leaflets distributed (N) is split equally between the two workers. Panel A pools both prices and only considers leaflets with one operator available in the area (leaflets 1-8, as detailed in Appendix B). Urban includes callbacks to leaflets distributed in Copenhagen (N = 20,000). Rural includes callbacks to leaflets distributed outside Copenhagen (N = 16,000). All areas includes callbacks to leaflets from both areas (N = 36,000). Panel B separates leaflets by price and only considers leaflets with one available operator (leaflets 1-8). Low Price includes callbacks to leaflets with the low price (DKK 120; leaflets 1, 3, 5, 7; N = 18,000). High Price includes callbacks to leaflets with the high price (DKK 160; leaflets 2, 4, 6, 8; N = 18,000). Panel C considers the leaflets where customers have a choice between two operators whose quality can differ. Migrant = Native includes leaflets where the two workers have the same customer rating (leaflets 9-10; N = 10,000). Migrant > Native includes leaflets where the customer rating of the migrant is higher than the one of the native (leaflets 11-12; N = 10,000). Migrant < Native includes leaflets where the customer rating of the migrant is lower than the one of the native (leaflets 13-14; N = 10,000). Panel D (Native 1 > Native 2) is a robustness check based on a leaflet with two natives whose ratings differ (leaflets 15-16; N = 10,000). \*\*\*, \*\* and \* indicate coefficients significantly different from zero at 1, 5 and 10% level respectively.

# 5 Discussion through a stylized theoretical framework

In this section, we present and numerically simulate a simple theoretical framework that can help us to interpret our results. The model describes the decision of a consumer that receives the experimental leaflet and has to choose between *hiring* and *not hiring* the worker.<sup>30</sup>

We posit that consumers are heterogeneous in their willingness to pay for cleaning services.<sup>31</sup> Specifically, let  $\theta_i^N$  and  $\theta_i^M$  be consumer *i*'s willingness to pay for a native (N) and a migrant (M) respectively, such that:<sup>32</sup>

$$log(\theta_i^N) \sim \mathcal{N}(\mu_N, \sigma^2),$$
 (1)

$$log(\theta_i^M) \sim \mathcal{N}(\mu_M, \sigma^2).$$
 (2)

In this simple framework, a consumer hires a worker if her willingness to pay is higher than the price shown on the leaflet:

$$\theta_i^N > P_N \Rightarrow Hire \ the \ Native$$
(3)

$$\theta_i^M > P_M \Rightarrow Hire \ the \ Migrant$$
(4)

and does not hire otherwise.

Total demand is capped by the number of leaflets we distribute. This is important for the interpretation of our results, as it implies that even if the price went to 0, demand would be finite and it would converge to a maximum.<sup>33</sup> As the price increases, a decreasing fraction of consumers have a willingness to pay that is sufficiently high to hire. As a

<sup>&</sup>lt;sup>30</sup>For simplicity, in the exposition we focus on the choice faced by consumers who received the basic leaflet with only one of the two workers. The conclusions extend to the case with both workers on the leaflet.

<sup>&</sup>lt;sup>31</sup>This could be formally derived from a standard utility framework, but imposing additional structure is not necessary for our purposes.

<sup>&</sup>lt;sup>32</sup>Different distributional assumptions would deliver similar results, as long as they capture the intuitive idea that the density decreases as the willingness to pay increases.

<sup>&</sup>lt;sup>33</sup>This maximum does not have to be 100% of the number of leaflets since even an extremely low price could be higher than what most consumers are willing to pay if they are not interested in cleaning services (our advertisement, like any other of this kind, was unsolicited).

result, aggregate demand drops.

We simulate the model between a low and a high price under the hypothesis that  $\mu_N > \mu_M$ . That is, the average willingness to pay for natives is higher than the average willingness to pay for migrants.<sup>34</sup> Our objective is to investigate whether the patterns we observe in the experimental data are consistent with this hypothesis. The results of the simulation are shown in Figure 4 where we plot the demand for the native and for the migrant at increasing prices relative to the demand for the native at the lowest price.<sup>35</sup>

The simulation shows results that are consistent with the evidence from our experiment. At the high price, demand for the migrant is a fraction of the demand for the native. As the price falls, the gap in demand narrows and eventually disappears. The reason is that, as the price falls, more and more consumers have  $\theta > P$  but the change is more pronounced with respect to the migrant since willingness to pay for the native is higher on average.

The results of the simulation are also consistent with the finding that upon giving consumers a choice between the two workers (when jointly shown on the leaflet), the majority prefer the native. In this theoretical framework, for that to be the case one would simply require that for the majority of consumers  $\theta_i^N > \theta_i^M$ , a result that follows naturally from assuming  $\mu_N > \mu_M$ .

Rather than offering a formal proof of the mechanism, the simulated results should be interpreted as proof of concept that a simple framework with heterogeneous consumers can explain the patterns we observe in our experimental data and that those patterns are consistent with *consumers having a higher willingness to pay for the native, on average, relative to a migrant.* 

<sup>&</sup>lt;sup>34</sup>For simplicity, we assume  $\theta_i^N$  and  $\theta_i^M$  to be independently distributed across individuals, but the conclusions would not change if we let them be correlated.

<sup>&</sup>lt;sup>35</sup>We run a granular simulation with 1000 price increments and 50 consumers at each price, over a pricerange that represents the distance between the low and the high price in the experiment. Our conclusions do not depend on the range chosen, as our key observation that the two demand curves diverge as the price increases is unaffected.



Figure 4: Simulated Demand for the Native and the Migrant

(relative to demand for the native at the low price)

Notes: Each point on the graph shows the percentage of consumers with willingness to pay  $\theta_i^N > P$  (demand for the native) and  $\theta_i^M > P$  (demand for the migrant) at each price P, relative to the demand for the native worker at the low price. Simulation with 50 consumers and 1001 prices, i.e., 1000 price increments. Parameters:  $\mu_N = 1$  and  $\mu_M = -1$ ,  $\sigma^2 = 1$ .

# 6 Robustness checks and additional mechanisms

## 6.1 Do customers pay attention to the star rating?

The performance-rating system plays an important role in our experiment, as it allows us to signal quality and either hold it constant or vary it exogenously. Our approach follows in the footsteps of Hedegaard and Tyran (2018), who reveal past performance as a signal of current productivity. It also resembles the use of the Airbnb star-rating system in Laouénan and Rathelot (2022), who study ethnic discrimination in the rental market.

In order to test whether respondents take the rating into account and how salient the information is for their decisions, in one of the treatments we gave customers a choice between *two native workers*, one of whom has a higher star rating (4.9/5) than the other (3.6/5).<sup>36</sup> In this case, where the ethnic background of the worker does not play a role, we find that consumer demand is overwhelmingly in favor of the worker with a higher star rating (Table 1). In fact, the lower-rated worker is not strictly preferred by *any* customer (i.e., the only calls he receives are from numbers that also call the other worker). This is a very strong indication that the star-rating system was effective in conveying information about worker quality that was salient in people's decisions.

## 6.2 Is the low price too low for a native?

An alternative explanation for the fact that demand for the native does not increase as the price drops is that a very low price may convey a negative signal when associated with native workers, whose reference prices may be typically higher, while it is perceived as "normal" for a migrant.

We have direct, albeit suggestive, evidence from our experiment pointing against this hypothesis. If a low price conveyed a negative signal about the native but not about the migrant, we should observe that when both workers are on the leaflet, have the same

<sup>&</sup>lt;sup>36</sup>For the first native, we used the same name as in the core experiment (Peter). For the second native, we picked another one of the most common Danish male names (Jens). As in the other treatments with two workers on the leaflet, we randomized the order of the two workers to avoid order effects.

ratings, and the price is low (middle bar, Figure 3), demand should favor the migrant. Instead, despite the limitations due to the small number of calls recorded, we still detect a clear and overwhelming majority of consumers preferring the native to the migrant.

Additional evidence countering this hypothesis comes from our market research conducted prior to the experiment, which indicated that both migrants and natives operate in the price range we used in the experiment. Finally, it is important to underscore that our experiment offers the services of a *formal* company. This dispels the concern that a low price may sound more reasonable for a migrant because migrants are more likely to work informally (i.e., not pay taxes and social security contributions).<sup>37</sup>

### 6.3 Robustness to different methods of counting calls

We also check the robustness of our results to the method we use to deal with multiple calls from the same number. Indeed, one could count every call separately and independently of the number calling (total) or count multiple calls from the same number as just one call (no multiple calls). In the case of the treatments with two names on the same leaflet, one could include all calls or only count calls from numbers directed to just one of the two workers (single preference only). The total number of calls we obtain when we apply each of these methods (plus the number of contacts received via the website) is shown in Table B2 in Appendix B.

As mentioned above, the main results presented so far are all based on the more conservative method. That is, we count multiple calls from the same number as one. In addition, for leaflets with two names, we drop the calls from numbers that contact both workers (i.e., we only use single-preference contacts), as those do not indicate a clear-cut preference. When we include all the calls as a robustness check, however, our conclusions do not change (Table A2 in Appendix A). We confirm the existence of a sizeable gap between the demand for the migrant and the native, which shrinks when the price is low. We also confirm that, even when the quality of the migrant is higher, the demand for

<sup>&</sup>lt;sup>37</sup>This concern is further assuaged by the fact that Denmark is a country where informality is low (Medina and Schneider, 2018) and that informal work is most commonly carried out by family or friends, rather than private companies (Mailand and Larsen, 2020).

him remains below the demand for the native (though the results become less precise, as expected since we introduce less clear-cut preferences from customers that call both workers on the leaflet).

## 6.4 Exploratory evidence on the impact of attention discrimination

Finally, one hypothesis advanced in the literature is that migrants may be subject to attention discrimination from customers – a mechanism whereby knowledge of minority status negatively impacts customers' level of attention to information (e.g., about skills) and leads to discrimination (Bartoš et al., 2016; Bertrand and Duflo, 2017).<sup>38</sup>

Testing this channel is not a core objective of our design, but we can explore a feature of our experiment to provide some exploratory evidence in this regard. Some respondents used the company's website rather than a phone call to express a preference for either worker. The site requires respondents who are interested in contacting the workers to fill out a contact form, where they have to indicate a discount code (used to identify which leaflet they received), as well as the name of the preferred worker. One can argue, therefore, that respondents who went through the website needed to pay greater attention to the information provided and had a chance to reflect more carefully on their choice, which was made more salient by having to fill out the form. This could potentially mitigate the problem of attention discrimination.<sup>39</sup> Yet, when we run the analysis based only on the emails received via the website, all the main results are confirmed, despite the loss of precision due to the smaller number of contacts (Table A1 in Appendix A).

<sup>&</sup>lt;sup>38</sup>Because migrants are considered less productive, customers do not make the costly effort of paying attention once they detect the worker's migrant background (Bartoš et al., 2016).

<sup>&</sup>lt;sup>39</sup>One could also hypothesize that migrants are subject to a *more* careful scrutiny since consumers have less information about minority groups. This should have, if anything, a positive effect on the demand for the migrant in our setting by increasing consumers' alertness to the fact that the migrant is rated as highly as the native. If this was the case, the gap between the demand for the migrant and the native would be even larger in the absence of this mechanism.

# 7 Conclusions

While anti-migration sentiments sweep through the world (Hainmueller and Hopkins, 2014; European Commission, 2018; Alesina and Tabellini, 2022), large sectors of the economy in many countries rely on the availability of low-paid migrant workers. This apparent contradiction may be rationalized by the existence of a trade-off between consumer and employer preferences for native labor on the one hand, and the lower labor costs associated with migrants. We shed light on this trade-off by investigating consumer preferences for migrant vs. native labor through a large-scale experiment conducted with over 2 percent of the Danish population. Our design allows us to measure how consumer demand varies as we exogenously change prices while holding the quality of the two workers constant.

We find that the demand for a migrant is significantly lower than the demand for an equally-skilled native (about one-half), on average, but it is more sensitive to price. When the price is sufficiently low, the demand for a migrant is as high as the demand for a native. We show through a theoretical framework that this is consistent with the average consumer having a higher willingness to pay for the native than for the migrant. We also show that, when given an explicit choice between a migrant and a native at a given price, consumers overwhelmingly prefer the native. Finally, by exogenously varying the quality of the two workers, we obtain suggestive evidence that considerations about productivity are *not* the primary driver of demand being in favor of the native. Even when the migrant is clearly and saliently shown to be of higher quality, demand is overwhelmingly for the native.

Our results bear important implications for public policy as they reveal that natives and migrants are *imperfect substitutes* in the eye of consumers. This poses major challenges for labor-market integration. Going forward, it will be important to investigate consumer and employer biases in greater detail, and study how they can be reduced by means of policy interventions. Recent experimental work tests the effectiveness of information campaigns to correct misperceptions of migrants and change attitudes towards immigration (Hopkins et al., 2019; Grigorieff et al., 2020; Haaland and Roth, 2020; Facchini et al., 2022). Related

work on the rental market by Laouénan and Rathelot (2022) shows that providing richer information about the quality of a listing on the Airbnb platform can reduce the ethnic price gap in rentals. Our results highlight the importance of testing interventions that may impact employer and consumer choices.

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# **ONLINE APPENDIX**

# A Additional Figures and Tables



Figure A1: Callback rates by worker background and price

Notes: The figure shows the callback rates for the native and the migrant worker by price. Whiskers indicate 95% confidence intervals. *Low Price* includes callbacks to leaflets with the low price (DKK 120). *High Price* includes callbacks to leaflets with the high price (DKK 160). The customer rating is the same for both workers in all leaflets and we pool the urban and rural areas. Only leaflets with one worker per leaflet are considered (leaflets 1-8). Callbacks are calculated on the basis of the third column (no multiple calls) of Table B2, i.e., only one callback per contact is recorded and contacts that express multiple preferences for different workers are excluded.

A. Pooling both prices, s	same worker quality			
	Migrant	Native	Difference	S.E.
All areas	0.0004	0.0011	-0.0006**	0.0003
Urban	0.0003	0.0008	-0.0005	0.0003
Rural	0.0006	0.0014	-0.0008	0.0005
B. Different prices, same	worker quality			
	Migrant	Native	Difference	S.E.
Low Price	0.0008	0.0010	-0.0002	0.0004
High Price	0.0001	0.0011	-0.0010***	0.0004
C. Same price, different	worker quality			
	Migrant	Native	Difference	S.E.
Migrant < Native	0.0000	0.0004	-0.0004	0.0003
Migrant = Native	0.0002	0.0002	0.0000	0.0003
Migrant > Native	0.0000	0.0000	0.0000	0.0000
D. Same price, different	quality between two	natives (robustness)	)	
	Native 1	Native 2	Difference	S.E.
Native $1 > Native 2$	0.0008	0.0000	0.0008**	0.0004

 Table A1: Differences in callback rates

 (Only contacts by email)

Notes: The table shows callback rates (number of callbacks divided by number of leaflets), the difference in callback rates between the two workers and its standard error. Callbacks are calculated on the basis of the fourth column (emails only) of Table B2, i.e., only emails are recorded. In all treatments, the number of leaflets distributed (N) is split equally between the two workers. Panel A pools both prices and only considers leaflets with one operator available in the area (leaflets 1-8, as detailed in Appendix B). Urban includes callbacks to leaflets distributed in Copenhagen (N = 20,000). Rural includes callbacks to leaflets distributed outside Copenhagen (N = 16,000). All areas includes callbacks to leaflets from both areas (N = 36,000). Panel B separates leaflets by price and only considers leaflets with one available operator (leaflets 1-8). Low Price includes callbacks to leaflets with the low price (DKK 120; leaflets 1, 3, 5, 7; N = 18,000). High Price includes callbacks to leaflets with the high price (DKK 160; leaflets 2, 4, 6, 8; N = 18,000). Panel C considers the leaflets where customers have a choice between two operators whose quality can differ. Migrant = Native includes leaflets where the two workers have the same customer rating (leaflets 9-10; N = 10,000). *Migrant* > *Native* includes leaflets where the customer rating of the migrant is higher than the one of the native (leaflets 11-12; N = 10,000). Migrant < Native includes leaflets where the customer rating of the migrant is lower than the one of the native (leaflets 13-14; N = 10,000). Panel D (Native 1 > Native 2) is a robustness check based on a leaflet with two natives whose ratings differ (leaflets 15-16; N = 10,000). \*\*\*, \*\* and \* indicate coefficients significantly different from zero at 1, 5 and 10% level respectively.

A. Pooling both prices, s	same worker quality			
	Migrant	Native	Difference	S.E.
All areas	0.0037	0.0055	-0.0018**	0.0007
Urban	0.0030	0.0038	-0.0008	0.0008
Rural	0.0046	0.0076	-0.0030**	0.0012
B. Different prices, same	worker quality			
	Migrant	Native	Difference	S.E.
Low Price	0.0061	0.0052	0.0009	0.0011
High Price	0.0013	0.0058	-0.0044***	0.0009
C. Same price, different	worker quality			
	Migrant	Native	Difference	S.E.
Migrant < Native	0.0008	0.0018	-0.0010	0.0007
Migrant = Native	0.0018	0.0038	-0.0020*	0.0011
Migrant > Native	0.0006	0.0010	-0.0004	0.0006
D. Same price, different	quality between two	natives (robustness)		
	Native 1	Native 2	Difference	S.E.
Native $1 > Native 2$	0.0054	0.0018	$0.0036^{\star\star\star}$	0.0012

	Table A2:	Differences in callback ra	ates
(	(including m	ultiple calls from same cust	omer)

Notes: The table shows callback rates (number of callbacks divided by number of leaflets), the difference in callback rates between the two workers and its standard error. Callbacks are calculated on the basis of the second column (total) of Table B2, i.e., multiple callbacks per contact might be recorded. In all treatments, the number of leaflets distributed (N) is split equally between the two workers. Panel A pools both prices and only considers leaflets with one operator available in the area (leaflets 1-8, as detailed in Appendix B). Urban includes callbacks to leaflets distributed in Copenhagen (N = 20,000). **Rural** includes callbacks to leaflets distributed outside Copenhagen (N = 16,000). All areas includes callbacks to leaflets from both areas (N = 36,000). Panel B separates leaflets by price and only considers leaflets with one available operator (leaflets 1-8). Low Price includes callbacks to leaflets with the low price (DKK 120; leaflets 1, 3, 5, 7; N = 18,000). High Price includes callbacks to leaflets with the high price (DKK 160; leaflets 2, 4, 6, 8; N = 18,000). Panel C considers the leaflets where customers have a choice between two operators whose quality can differ. *Migrant = Native* includes leaflets where the two workers have the same customer rating (leaflets 9-10; N = 10,000). Migrant > Native includes leaflets where the customer rating of the migrant is higher than the one of the native (leaflets 11-12; N = 10,000). Migrant < Native includes leaflets where the customer rating of the migrant is lower than the one of the native (leaflets 13-14; N = 10,000). Panel D (Native 1 > Native 2) is a robustness check based on a leaflet with two natives whose ratings differ (leaflets 15-16; N = 10,000). \*\*\*, \*\* and \* indicate coefficients significantly different from zero at 1, 5 and 10% level respectively.

A. Pooling both prices, s	same worker quality			
	Migrant	Native	Difference	S.E.
All areas	0.0031	0.0053	-0.0022***	0.0007
Urban	0.0021	0.0040	-0.0019**	0.0008
Rural	0.0044	0.0070	-0.0026**	0.0012
B. Different prices, same	e worker quality			
	Migrant	Native	Difference	S.E.
Low Price	0.0051	0.0044	0.0007	0.0010
High Price	0.0011	0.0062	-0.0051***	0.0009
C. Same price, different	worker quality			
	Migrant	Native	Difference	S.E.
Migrant < Native	0.0000	0.0014	-0.0014***	0.0005
Migrant = Native	0.0010	0.0036	-0.0026***	0.0010
Migrant > Native	0.0000	0.0008	-0.0008**	0.0004
D. Same price, different	quality between two	natives (robustness)	)	
	Native 1	Native 2	Difference	S.E.
Native $1 > Native 2$	0.0028	0.0000	$0.0028^{\star\star\star}$	0.0007

**Table A3:** Differences in callback rates between migrant and native (including calls received during the Covid-19 epidemic)

Notes: The table shows callback rates (number of callbacks divided by number of leaflets), the difference in callback rates between the two workers and its standard error. Callbacks are calculated on the basis of the third column (no multiple calls) of Table B2, i.e., only one callback per contact is recorded and contacts that express multiple preferences for different workers are excluded. Callbacks received during the Covid-19 epidemic (from March 13 to May 15) are included in the analysis. In all treatments, the number of leaflets distributed (N) is split equally between the two workers. <u>Panel A</u> pools both prices and only considers leaflets with one operator available in the area (leaflets 1-8, as detailed in Appendix B). Urban includes callbacks to leaflets distributed in Copenhagen (N = 20,000). Rural includes callbacks to leaflets distributed outside Copenhagen (N = 16,000). All areas includes callbacks to leaflets from both areas (N = 36,000). Panel B separates leaflets by price and only considers leaflets with one available operator (leaflets 1-8). Low Price includes callbacks to leaflets with the low price (DKK 120; leaflets 1, 3, 5, 7; N = 18,000). High Price includes callbacks to leaflets with the high price (DKK 160; leaflets 2, 4, 6, 8; N = 18,000). Panel C considers the leaflets where customers have a choice between two operators whose quality can differ. *Migrant = Native* includes leaflets where the two workers have the same customer rating (leaflets 9-10; N = 10,000). Migrant > Native includes leaflets where the customer rating of the migrant is higher than the one of the native (leaflets 11-12; N = 10,000). Migrant < Native includes leaflets where the customer rating of the migrant is lower than the one of the native (leaflets 13-14; N = 10,000). Panel D (Native 1 > Native 2) is a robustness check based on a leaflet with two natives whose ratings differ (leaflets 15-16; N = 10,000). \*\*\*, \*\* and \* indicate coefficients significantly different from zero at 1, 5 and 10% level respectively.

## **B** Leaflet variants in detail

The experimental manipulations we executed (name of the worker, price, whether one or two workers are indicated on the leaflet, different star ratings, and name order) give rise to 16 different variants of the leaflet. Each variant was assigned to a distinct geographical area as discussed in the article.

The 16 variants can be divided into two groups. The first 8 focus on identifying the effect of changing the price of the worker ("Price" treatment). The second 8 hold the price fixed and focus on identifying the effect of changing the quality of the worker by changing the star rating ("Quality" treatment). Due to budget constraints, and since the main focus of the analysis is on the first part, the leaflets in the second part were all distributed in Copenhagen and their total number was lower.

Table B1 summarizes the information in this appendix and indicates how many leaflets were distributed for each variant. Table B2 indicates how many calls were received for each variant.

All the following details were pre-registered before the experiment (AEA RCT Registry ID: AEARCTR-0005301).

## **B.1** Leaflets 1-8 (the "Price" treatment)

The "Price" treatment consists of 8 types of leaflets. They indicate the phone number of a *single worker* who is available in the area (either the migrant or the native). The star rating is held constant at 4.9 for both.

Leaflets 1-4 are distributed in urban areas (neighborhoods of Copenhagen) and are obtained from the combination of two workers (native vs. migrant) and two prices (high and low). Leaflets 5-8 are distributed in rural areas and are identical to the first four except for the phone numbers they display (which is necessary to distinguish calls from urban and rural areas).

## **B.2** Leaflets 9-16 (the "Quality" treatment)

The "Quality" treatment consists of an additional 8 types of leaflets, which are all sent to urban areas (for cost-related reasons). These leaflets differ from the first 8 insofar as they offer customers a choice between *two workers* (customers are presented with the phone numbers of two operators active in their area and they can choose which one, if any, they would like to call). The two workers may differ in their quality, as signaled by the ratings of previous customers.

In Leaflet 9, the native and the migrant worker have the same quality rating (4.9). In Leaflet 11, the migrant has higher quality than the native (4.9 vs. 3.6). In Leaflet 13, the native has higher quality than the migrant (4.9 vs. 3.6). Leaflet 15 is identical to leaflet 13, but it replaces the migrant with another native ("Jens"). In this leaflet, Peter has a higher rating than Jens (4.9 vs. 3.6). This serves as a robustness check to measure the impact of the customer rating independently of workers' origins. Leaflets 10, 12, 14, and 16 are identical to 9, 11, 13, and 15 respectively, except for the fact that they swap the order in which the names of the workers appear (to exclude order effects).

Leaflet Variant	Number	Urban/Rural	Price (DKK)	Worker 1 (Stars)	Worker 2 (Stars)
1	5,000	Urban	120	Migrant (4.9)	
2	5,000	Urban	160	Migrant $(4.9)$	
3	5,000	Urban	120	Native $(4.9)$	
4	5,000	Urban	160	Native $(4.9)$	
5	4,000	Rural	120	Migrant $(4.9)$	
6	4,000	Rural	160	Migrant $(4.9)$	
7	4,000	Rural	120	Native $(4.9)$	
8	4,000	Rural	160	Native $(4.9)$	
9	2,500	Urban	120	Migrant $(4.9)$	Native $(4.9)$
10	2,500	Urban	120	Native $(4.9)$	Migrant $(4.9)$
11	2,500	Urban	120	Migrant $(4.9)$	Native $(3.6)$
12	2,500	Urban	120	Native $(3.6)$	Migrant $(4.9)$
13	2,500	Urban	120	Native $(4.9)$	Migrant $(3.6)$
14	2,500	Urban	120	Migrant $(3.6)$	Native $(4.9)$
15	2,500	Urban	120	Native $1(4.9)$	Native $2(3.6)$
16	2,500	Urban	120	Native $2(3.6)$	Native $1$ $(4.9)$

**Table B1:** Number of leaflets and other information by leaflet type

Notes: The table shows the number of leaflets by treatment, whether the leaflets were sent to Copenhagen (Yes) or outside (No), the price advertised, the name(s) of worker(s) that could be employed, and their ratings (capturing their quality) in parentheses. The name used for Native 1 is Peter, for the Migrant is Mohammad, and for Native 2 is Jens.

Leaflet Variant	Callbacks Total	Callbacks No multiple calls	Callbacks Emails only
1	22	9	2
2	8	7	1
3	14	13	5
4	24	17	3
5	33	22	5
6	4	2	0
7	33	20	4
8	28	23	7
9	9	3	1
10	19	11	1
11	3	0	0
12	5	3	0
13	9	4	2
14	4	0	0
15	27	13	4
16	9	0	0

Table B2: Number of callbacks (calls and emails) by leaflet type

Notes: The table shows the number of callbacks (calls and emails) by treatment. The second column (total) shows the total number of callbacks. The third column (no multiple calls) eliminates multiple calls received from the same number, i.e., it records just one callback per contact, and excludes contacts that express multiple preferences for different workers, i.e., it includes only calls from numbers with a strong preference for just one worker (single preference only). The fourth column (emails only) records only messages arrived to the company's email address via the contact form on its website.

# Rengøring i Hjemmet DK Let US do the work while YOU enjoy your free time

## Figure B1: Leaflet for Treatment 1 (English translation)

We are specialised in:

- **Cleaning services** floor cleaning, vacuuming, window cleaning, etc.
- Garden work lawn mowing, hedge trimming, pruning, etc.
- Other tasks tidying up, car cleaning, etc.

## Our four operators are carefully trained to complete the given tasks competently, efficiently and within the agreed time!

## MOHAMMAD is our operator in your area

"Mohammad is convenient, polite, and efficient" - Birgitte, 43 "Great work on time, Mohammad!" - Ole, 52

# Call MOHAMMAD: [PHONE NUM] 120 DKK per hour incl. VAT

Remember to use the craftsman tax deduction!

(Please indicate the code [CODE] when you contact us to get the special price above)

## Full satisfaction or no payment

www.rengoeringihjemmet.dk

<sup>1</sup> Based on previous customer ratings; 5 is the maximum score; number of customer ratings in parenthesis



Figure B2: Leaflet for Treatment 9 (English translation)

We are specialised in:

- **Cleaning services** floor cleaning, vacuuming, window cleaning, etc.
- Garden work lawn mowing, hedge trimming, pruning, etc.
- Other tasks tidying up, car cleaning, etc.

Our four operators are carefully trained to complete the given tasks competently, efficiently and within the agreed time!

MOHAMMAD and PETER are our operators in your area "Mohammad is convenient, polite, and efficient" - Birgitte, 43 "Great work on time, Peter!" - Ole, 52

# Call MOHAMMAD: [PHONE NUM] Call PETER: [PHONE NUM] 120 DKK per hour incl. VAT

Remember to use the craftsman tax deduction!

(Please indicate the code [CODE] when you contact us to get the special price above)

#### Full satisfaction or no payment

www.rengoeringihjemmet.dk

<sup>1</sup> Based on previous customer ratings; 5 is the maximum score; number of customer ratings in parenthesis.

## Figure B3: Leaflet for Treatment 1 (Original)



Vi er specialister i:

- **Rengøring** gulvvask, støvsugning, vinduespudsning, mm.
- Havearbejde plæne- og hækklipning, beskæring, mm.
- Andre opgaver oprydning, bilrengøring, mm.

Vores fire operatører er omhyggeligt trænet og udfører opgaven kompetent, effektivt og inden for den aftalte tid!

## MOHAMMAD er vores operatør i dit område

"Mohammad er behagelig, høflig og effektiv" - Birgitte, 43 "Flot arbejde til aftalt tid, Mohammad!" - Ole, 52

# Ring til MOHAMMAD: [TLF. NUMMER] 120 kr. / time inkl. moms

Husk at benytte håndværkerfradraget!

(Angiv kode [KODE] ved henvendelse for at opnå ovennævnte tilbudspris)

### Fuld tilfredshed eller ingen betaling

www.rengoeringihjemmet.dk

<sup>1</sup> Baseret på tidligere kundevurderinger; 5 er den maksimale score; antal kundevurderinger i parentes.

## Figure B4: Leaflet for Treatment 9 (Original)



Vi er specialister i:

- **Rengøring** gulvvask, støvsugning, vinduespudsning, mm.
- Havearbejde plæne- og hækklipning, beskæring, mm.
- Andre opgaver oprydning, bilrengøring, mm.

Vores fire operatører er omhyggeligt trænet og udfører opgaven kompetent, effektivt og inden for den aftalte tid!

MOHAMMAD og PETER er vores operatører i dit område "Mohammad er behagelig, høflig og effektiv" - Birgitte, 43 "Flot arbejde til aftalt tid, Peter!" - Ole, 52

Ring til MOHAMMAD: [TLF. NUMMER] Ring til PETER: [TLF. NUMMER] 120 kr. / time inkl. moms

Husk at benytte håndværkerfradraget!

(Angiv kode [KODE] ved henvendelse for at opnå ovennævnte tilbudspris)

## Fuld tilfredshed eller ingen betaling

www.rengoeringihjemmet.dk

<sup>1</sup> Baseret på tidligere kundevurderinger; 5 er den maksimale score; antal kundevurderinger i parentes.