Doing Business Far from Home: Multinational Firms and Labor Market Outcomes in Saudi Arabia[*]

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Abstract

We study the labor market outcomes at foreign firms in a host country with deep-seated cultural norms that differ substantially from their home countries' norms. We analyze unique employer-employee matched data of the private sector in Saudi Arabia and find that, relative to domestic firms, foreign firms pay higher wages but hire a smaller share of Saudi and female workers. Moreover, the differences in worker shares cannot be fully rationalized by wage differentials. To better understand these findings, we develop a tractable model to quantitatively assess the role of productivity and amenities in determining wage and employment outcomes. We estimate a foreign wage premium ranging from 13% to 21% depending on worker demographics. In addition, we find that workers enjoy better amenities at foreign firms overall, with the exception of female workers. Workers at foreign firms coming from countries that are culturally close to the host country face lower wage premiums but higher amenities. Worker sorting patterns are primarily driven by differences in amenities rather than productivity. Our results demonstrate amenities are quantitatively important in understanding the labor market outcomes of foreign firms in a setting in which home and host country cultural norms depart.

1   Introduction

While economists have recognized the labor market outcome differences between foreign multinationals and domestic firms, little is understood about the behavior of foreign multinationals in settings with deep-seated cultural norms that differ substantially from their home country norms. In this paper, we analyze the behavior of firms and workers in a setting in which home and host country differ in deep-seated cultural norms that could potentially affect the hiring and compensation decisions of firms toward local workers. We draw on data from Saudi Arabia as a relevant case because of its historically sizable foreign direct investment (FDI)[1] and because its conservative norms related to religion and gender affect both labor supply and demand.

We use a novel employer-employee matched dataset of Saudi firms in the private sector. We obtain administrative data from 2009 to 2016 from the General Organization for Social Insurance (GOSI) and extract a firm ownership variable from Bureau van Dijk's Orbis database. The two databases are linked by a common commercial registration number. To our knowledge, we are the first to construct a dataset that unifies both employer-employee matched data and foreign ownership information for the private sector in Saudi Arabia.

We document a set of distinct facts related to the labor market outcome differences between foreign and domestic firms. First, consistent with findings in other settings, foreign firms offer higher wages and are larger in employment size relative to domestic firms, which suggests that foreign firms are more productive than domestic firms on average. Second, unique in this setting, foreign firms hire a smaller share of Saudi and female workers by 19 and 11 percentage points, respectively. The result on female share difference is surprising given the higher average female labor force participation (FLFP) in foreign firms' home countries. Importantly, female workers sort out of foreign firms even though foreign firms pay comparable wage differentials to female workers (18%) and male workers (16%). This implies that wage differentials may not fully rationalize the worker sorting patterns observed in this setting.

To account for these empirical findings, we provide a simple model that builds on the framework by Setzler and Tintelnot (2021). We extend their model to allow for richer worker and firm heterogeneities. In particular, workers are heterogeneous in their demographics and skills, and firms are heterogeneous in their productivity, skill complementarity, and *amenities* (Card et al. 2018, Lamadon et al. 2022). As an important feature of our model, amenities shift workers' preferences over different firms such that a worker may prefer one firm over another even when wages are the same, which allows for flexible worker sorting across firms conditional on wages. We estimate model parameters using the state-of-the-art approach proposed by Lamadon et al. (2022), in which we obtain estimates of productivity and amenities at the firm level. The model allows us to quantify the extent to which productivity and amenities determine wage, employment, and worker sorting patterns.

Our estimated model delivers four new insights on the differences between foreign and domestic

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[1]Figure B1 in Appendix B shows the level of FDI inflow and inflow as a percentage of GDP for Gulf Corporation Council (GCC) countries. Saudi Arabia's FDI inflow was higher than other countries in the region over the period we study (2009-2016).

firms, above and beyond our reduced-form results. First, we document a foreign wage premium ranging from 13% to 21% depending on worker demographics. The positive wage premium is driven by foreign firms being more productive on average. Second, we find that the average worker enjoys better amenities at foreign firms, with the exception of female workers. Amenities tend to be disproportionately higher for more skilled workers, which possibly compensates for their lower wage premiums. Third, analysis of heterogeneity by foreign firms' country of origin reveal that workers face lower wage premiums but higher amenities at foreign firms from culturally close countries—countries that share similar language, religion, and FLFP—relative to foreign firms from other countries, a pattern that is robust even when we control for the productivity of the home country measured by log GDP per capita. This suggests that differences in norms reflected in cultural proximity may be an important factor in explaining the variations in productivity and amenities by foreign firm home country. Lastly, we consider multiple counterfactual scenarios in which foreign and domestic firms assimilate productivity or amenities. While both productivity and amenity differences are essential in rationalizing the observed labor market outcome differences, worker sorting patterns are primarily driven by differences in amenities rather than productivity. To our knowledge, we are the first to quantitatively demonstrate the importance of amenities in explaining foreign firm behavior by providing amenity estimates consistent with the data and by performing counterfactual analyses.

To better understand the findings, we argue that differing deep-seated cultural norms operate as frictions that may systematically affect productivity and amenities of firms from different countries, which in turn drive the observed differences in labor market outcomes. On the one hand, differing cultural norms may translate into stringent selection into FDI, in which foreign firms from culturally distant countries are expected to be disproportionately more productive to overcome the higher fixed costs (Helpman et al. (2004)), thus paying higher wage premiums. On the other hand, differing deep-seated cultural norms may generate frictions that affect both amenity supply (i.e., foreign firms under-provide desired amenities for workers) and demand (i.e., workers face disamenities working at foreign firms). We validate our arguments with qualitative evidence from surveys and field studies. The qualitative evidence not only suggests that amenities are relevant considerations for workers but also is consistent with the differences in amenities between foreign and domestic firms that we find. Moreover, it provides support for our proposed mechanisms that differing deep-seated cultural norms generate frictions in forms of information asymmetry and communication frictions that affect foreign firm operations. Our results point to the plausible mechanism that differing deep-seated cultural norms affect both productivity and amenities. More importantly, accounting for amenities matters qualitatively and quantitatively for understanding the labor market outcomes of foreign firms in a setting in which home and host country cultural norms depart.

Our paper contributes to the literature on the effects of FDI on labor market outcomes. Past research has estimated foreign wage premiums in different settings in the range from close to zero to as high as 15%.[2] Our estimates of 13% to 21% are close to the upper bound, which can be explained

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[2]For example, Heyman et al. (2007) estimate a 2% foreign wage premium in Sweden. Balsvik (2011) finds a small foreign wage premium of 0.3% in Norway. Hijzen et al. (2013) analyze data from four countries and document foreign

by stringent selection into FDI because of differing deep-seated cultural norms in this setting. Our analysis is closely related to recent work by Alfaro-Urena et al. (2019) and Setzler and Tintelnot (2021), who quantify the effects of foreign firms on labor market outcomes in Costa Rica and the U.S., respectively, and demonstrate mechanisms through the lens of a structural model. Moreover, they collect survey data and anecdotal evidence to argue that positive foreign wage premiums do not seem to compensate for worse amenities at foreign firms.[3] We build on their work by explicitly incorporating and estimating amenities within the scope of our quantitative model.[4] One key contribution of our paper is that we quantitatively demonstrate the importance of amenities in rationalizing observed employment and worker sorting outcomes through counterfactual analyses.

Our paper also contributes to recent efforts to understand firm behavior in settings with deep-seated cultural norms. Peck (2017) and Cortés et al. (2021) analyze the impact of localization policies in Saudi Arabia and document that Saudi employment is increased at the cost of higher exit rate, lower exporting probability, and decreased employment at surviving firms. Miller et al. (2020) show that firms in Saudi Arabia face binding gender integration costs that hinder female employment and that localization policies facilitate gender integration and increase female employment. Using new data on firm ownership information, we further this line of research by documenting the labor market outcome differences between foreign and domestic firms. We also contribute to the understanding of foreign firm behavior by proposing the plausible mechanism that differing deep-seated cultural norms shift firm productivity and amenities in systematic ways.[5] This has significant policy implications as local labor market policies likely have different effects on firms from different cultural backgrounds.

Our paper helps inform the discussion about the existence and extent of foreign cultural spillovers through FDI. This line of research documents mixed evidence on whether foreign cultural spillovers exist in different settings. On the one hand, foreign firms are able to shift local norms, particularly with regard to hiring local women. For example, using data on manufacturing firms in China, Tang and Zhang (2021) find that foreign firms from more gender-equal countries tend to hire more women and appoint more female managers. Similar findings are documented in other settings (Villarreal and Yu 2007, Jensen 2010, Kodama et al. 2018, Mun and Jung 2018, Siegel et al.

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wage premiums of 6%, 9%, 7%, and 15% for Germany, Portugal, the U.K., and Brazil, respectively. Alfaro-Urena et al. (2019) find a foreign wage premium of 9% in Costa Rica. Setzler and Tintelnot (2021) study the effects of multinational firms in the U.S. and find a foreign wage premium of around 7%.

[3] Alfaro-Urena et al. (2019) find from surveys that foreign firms have better monetary and in-kind benefits than domestic firms in Costa Rica. Setzler and Tintelnot (2021) find from anecdotal evidence that foreign firms in the U.S. tend to be more attractive.

[4] Recent research has recognized the importance of firm amenities in affecting labor market outcomes. Card et al. (2018) provide a tractable framework in which workers value non-wage amenities when choosing employers. Lamadon et al. (2022) estimate a model with rich heterogeneity in productivity and amenities and find that non-wage amenities are relevant for understanding imperfect competition, worker sorting, and policy implications in the U.S. labor market.

[5] Recent research has documented that differing cultural norms affect foreign firm behavior in other settings. For example, Guillouet et al. (2021) argue that knowledge about local language is necessary in conducting multinational business in Myanmar, and language barriers are likely to negatively affect the productivity of local workers when interacting with their foreign employers. Fujiy et al. (2022) find that larger cultural proximity between a pair of firms reduces prices and fosters trade at both the intensive and extensive margins among domestic firm-to-firm trades in one Indian state. Bloom et al. (2012) show that trust affects decentralization decisions and productivity of multinational firms in the United States, Europe, and Asia.

2019). On the other hand, the process of cultural transmission can be slow or muted depending on the strength of local norms or firm-specific characteristics such as the age of the foreign affiliates and the degree of control by the headquarters (Kodama et al. 2018, González 2020). While we find evidence supporting that foreign firms hire a smaller share of women relative to domestic firms, we highlight two competing channels that drive the results. Productivity differences induce foreign firms to hire a larger share of women, whereas amenity differences make domestic firms more attractive to women. The latter dominates, and women sort out of foreign firms as a result. Our analysis suggests that the existence of foreign culture spillovers hinges on how foreign firms attract workers, and the degree of such spillovers depends on the relative strengths of different underlying mechanisms.

The rest of the paper is organized as follows. Section 2 provides relevant background on the research setting, describes the data, and documents distinct facts on labor market differences between foreign and domestic firms. Section 3 develops a simple model that accounts for the empirical evidence. Section 4 describes the quantification strategy and estimation results. Section 5 quantifies the differences in productivity and amenities between foreign and domestic firms and the extent to which productivity and amenities drive observed wage and employment outcomes. Section 6 draws on the specific setting and discusses how differing deep-seated cultural norms rationalize the findings. Section 7 concludes.

2   Data and Research Setting

In this section, we present the unique features of the Saudi labor market and its deep-seated cultural norms that differ substantially from the norms in many foreign firms' home countries. We move on to describe our data sources, the construction of the analysis sample, and summary statistics. Lastly, we characterize the differences in labor market outcomes between foreign and domestic firms.

2.1   Labor Market Features

Because of Saudi Arabia's historic economic dependence on foreign labor, foreign expatriates account for the majority of the labor force in the private sector: less than 20% of all workers in the private sector are local. On the other hand, most Saudi workers are employed in the public sector, which may offer higher wages and better benefits. Moreover, Saudis are better educated than non-Saudis on average: 13% of Saudi workers in the private sector hold a college degree, whereas 4% of non-Saudi workers in the private sector have the same educational attainment.[6]

While foreign workers are overrepresented in the private sector, policies favor local workers. Over the last several decades, foreign workers have been regulated by the *kafala* sponsorship system, which stipulates that a foreign worker is bound to one employer for permission to work and enter

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[6]We obtain worker demographics from the GOSI data from 2009 to 2016, which we describe in detail in Section 2.3. Data on employment in the public sector are obtained from the General Authority for Statistics.

and exit the country. This system hinders foreign workers' ability to change jobs, though in practice job-to-job transitions remain feasible.[7] A localization program, *Nitaqat*, has further supported local workers in the private sector. Initiated in 2011, the *Nitaqat* program requires firms to hire a certain percentage of local workers. Firms are classified into groups by their industry and employment size and are graded based on the satisfaction of the localization quota. Firms that meet the requirements have access to favorable policies including recruitment assistance, visa approvals, and wage subsidies. By hiring Saudi workers, firms may also gain social resources such as insider knowledge on how to operate within a country with norms that differ from those of their home country. As part of the regulation, the minimum wage for local workers was raised from 1,500 SAR (400 USD) per month to 3,000 SAR (800 USD) per month. As a comparison, the minimum wage for foreign workers was 400 SAR (106 USD) per month throughout the same period. These labor market features imply that policies shift firms' tastes in favor of local workers, even though they are relatively scarce and are costly to firms.[8]

Although Saudi Arabia is a setting rich in labor market policies, it is not our goal to analyze the effects these labor market policies, which have been examined in the literature. For example, Peck (2017), Cortés et al. (2021), and Miller et al. (2020) study the effects of *Nitaqat* on various firm and worker outcomes. In addition, Naidu et al. (2016) study the effects of the relaxation of *kafala* on the earnings and mobility of migrant workers in the United Arab Emirates, a setting similar to Saudi Arabia. Nevertheless, these unique labor market features point to the stark differences between local and foreign workers. One may naturally expect different labor market outcomes by worker demographics, which we formally explore in the following sections.

2.2 Deep-Seated Cultural Norms

The Saudi labor market features deep-seated cultural norms, or deeply held traditions and beliefs, which are reflected in local practices, customs, and legal systems that affect both workers and firms. While social norms may sometimes be in flux, such as the perceptions of the acceptability of women working outside the home (Bursztyn et al. 2020), we focus on cultural norms that likely affect labor supply and demand. In Saudi Arabia, many traditions and beliefs stem primarily from its strong identity as a Muslim country. The estimated share of Muslims in Saudi Arabia is 97% as of 2009 (Lipka 2017). Muslim doctrines are strictly enforced in the daily lives of believers, and accommodations for most religious practices are expected in the workplace. For example, during the period of our data, in Saudi Arabia, Muslims were expected to perform the mandatory prayer, *Salah*, for 15 to 30 minutes, five times a day. Business activities were suspended during prayer times, and employers were supposed to plan their working schedules flexibly to accommodate these breaks. By law, full-time employees in Saudi Arabia work at most 48 hours per week. For Muslims,

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[7]The GOSI data show that around 20% of Saudis in the private sector changed jobs between 2009 and 2016, whereas only around 12% of non-Saudis changed jobs during the period.

[8]This implication reflects a deeply held belief that locals should be privileged in hiring over foreigners. Bursztyn et al. (2020) find evidence that Saudis agree with the beliefs on minimum wage for locals and privileging locals over foreigners in employment.

hours worked are significantly reduced during the holy month of *Ramadan* (when strict fasting takes place during daylight hours), during which Muslims cannot work more than 36 hours per week, but in practice working hours for non-Muslims may continue as normal.[9]

Besides the different norms for local Muslims relative to non-locals, we highlight differences related to mixed gender workplaces. Norms of gender segregation stemming from cultural tradition have historically limited women in the Saudi labor market. On average, the educational attainment of Saudi female workers is analogous to that of male workers.[10] However, during our sample period, the FLFP in Saudi Arabia was less than 25%, which is among the lowest in the world. In the private sector, female workers accounted for less than 15% of the labor force. The low FLFP during this period is partly a result of the historically restrictive gender norm that required a woman to have her male guardian's permission and support (which during this period also included transportation support as women were not allowed to drive), which limited job opportunities for female workers. In addition, gender segregation prevailed directly in the workplace, and firms needed to establish facilities to ensure that men and women were separated (see more in Evidence for Policy Design 2015, Miller et al. 2020).

Having provided examples of cultural norms, we clarify what we mean by *deep-seated* cultural norms. By deep-seated norms, we mean those that are so strong they are reinforced by mechanisms that induce firms to adapt rather than shift the norms. For example, through the *Nitaqat* localization policy, firms would lose their license if they do not comply with hiring a certain share of locals in conformity with the regulations. Businesses would not be allowed to hire any female workers if they do not provide the separate facilities for male and female workers required by law. Until 2011, employers were required to obtain a letter of permission from a female worker's male guardian in order to hire her (Bursztyn et al. 2020). While some of these legal requirements may have been overturned in later periods, many of the cultural norms that supported these regulations were still enforced by society. For instance, since women were not allowed to drive until 2018, male guardians would have been the ones to provide transportation for female workers to their place of work, even if a letter of approval was not required, and would have withheld this support if they did not agree.[11]

The deep-seated cultural norms in Saudi Arabia are in sharp contrast with the norms in foreign countries outside the Middle East and North Africa (MENA) region. Foreign firms from countries with differing culture norms are likely affected by the host country norms as reflected in their labor market outcomes. To be concrete, we display some initial evidence of how differing cultural norms

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[9]Other examples of the influences of local religious norms on business activities include the prohibition of usury and of the production or consumption of alcohol and pork.

[10]World Bank data show that approximately 31% of Saudi women hold at least a college degree, compared with 32% for men as of 2016.

[11]We note that many of the cultural norms mentioned above are expected to be enforced during the period of our study (2009-2016). However, a series of acts have been implemented since then to improve the rights of female and foreign workers. For example, Saudi Arabia allowed women to drive in 2018 (Macias-Alonso et al. 2023), and to travel abroad, register a divorce or a marriage, and apply for official documents without the consent of a male guardian in 2019. In 2021, Saudi Arabia amended the *kafala* system to allow workers to switch jobs without employers' permission.

Figure 1: Differing cultural norms and labor market outcomes

(a) Saudi shares
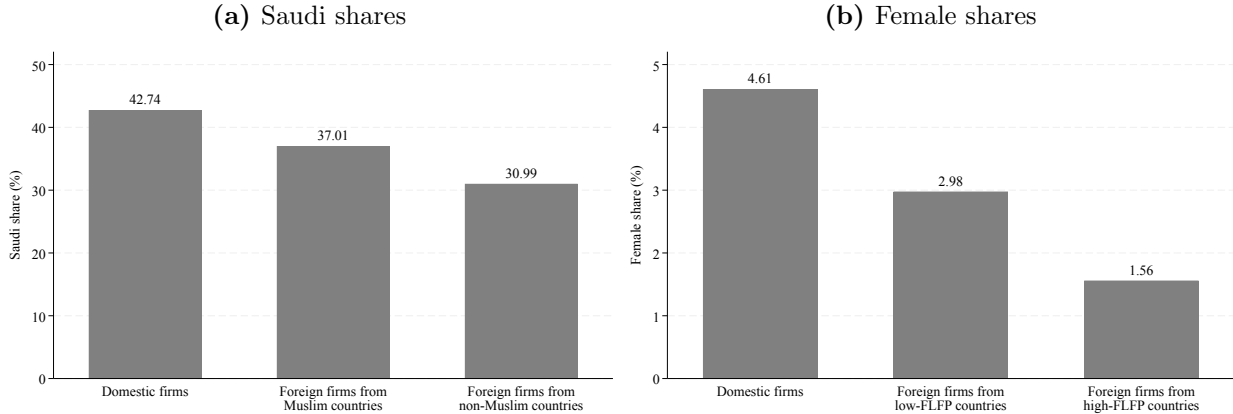
(b) Female shares

Notes: The figure shows the Saudi shares (Panel (a)) and female shares (Panel (b)) at firms by cultural proximity between home country and Saudi Arabia. Muslim countries are those with a greater than 50% Muslim share of population. Low-FLFP countries are those with a less than 50% FLFP. The full list of countries in each category can be found in Table B7 in Appendix B. Saudi shares and female shares are calculated from our analysis sample described in Section 2.3.

are correlated with observed labor market outcomes. In Figure 1, we plot the share of Saudi and female workers at firms by cultural proximity between home country and Saudi Arabia. As shown in Figure 1a, foreign firms have lower Saudi shares than domestic firms, and foreign firms from non-Muslim countries—countries that have a less than 50% Muslim share of population—have the lowest Saudi share. Similarly, as shown in Figure 1b, foreign firms have lower female shares than domestic firms, and foreign firms from high-FLFP countries—countries that have a greater than 50% FLFP—have the lowest female share.[12] In summary, foreign firms from culturally distant countries tend to hire a smaller share of Saudi and female workers. The results suggest that the potential effects of differing cultural norms are indeed reflected in the composition of workers at firms operating in the host country.

The important takeaways from this section are that deep-seated cultural norms of the host country likely affect labor supply and demand and that cultural norm differences across countries likely shift the behavior of firms in systematic ways as reflected in their labor market outcomes. We revisit these points in subsequent sections, in which we provide additional results and argue how differing deep-seated cultural norms rationalize the differences in labor market outcomes between foreign and domestic firms.

2.3 Data

Data Sources. The employer-employee matched dataset is provided by the GOSI of Saudi Arabia, which contains all private-sector firms that pay social insurance for their employees from 2009

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[12]As the majority of female workers are Saudi in our sample, we plot the share of female workers among Saudi workers in Figure B2 in Appendix B and observe a similar pattern. In Table B1 in Appendix B, we additionally list the Muslim share and FLFP for Saudi Arabia and selected foreign countries as well as the Saudi share and female share at firms from each listed country.

to 2016. We observe, for a specific firm, its unique firm ID, commercial registration number, and industry. On the worker side, we observe information on an employee's date of birth, gender, nationality, education, and full employment history, which consists of firm ID, location, occupation, start date, and end date, as well as monthly wages (in Saudi riyal) in a specific year. The whole sample contains around 15 million unique workers and 526,000 unique firms.[13]

We nest in another firm-level dataset from Bureau van Dijk's Orbis database. Orbis reports the ownership structure of the private companies, and we extract the Global Ultimate Owner (GUO) variables, which show the information of the entity that owns over 50% of a firm located in Saudi Arabia. We treat a firm as foreign owned if its GUO is not an entity in Saudi Arabia. As reported by Orbis, around 1,800 out of 900,000 active companies in Saudi Arabia are identified as foreign owned in 2019.

We treat the GOSI sample as the benchmark and merge with the ownership variables from Orbis, based on a common commercial registration number (CRN). More than 150,000 GOSI firms are matched with Orbis firms. For the firms that are matched, we show in Figure A2 in Appendix A that log employment data from the two sources are highly correlated. See Appendix A for detailed assessments of the quality of the merge.

To enrich our analysis of the GOSI-Orbis merged data, we supplement it with additional qualitative data obtained from surveys and field studies. The data were collected between 2016 and 2020 as part of a larger project on Saudi employer and job seeker matching. We include (1) original survey data of 1,000 Saudi undergraduate students and alumni on their career investments while in school, (2) data collected at a female-focused career fair on the attendance of job seekers and demographics (gender and nationality) of company representatives at 64 employer booths, and (3) secondary data from previous surveys and studies. We describe the qualitative data in detail in Appendix D.

Sample Restrictions. We impose several restrictions on the sample of firms. First, we only keep surviving firms, defined as firms that hired a positive number of employees throughout the period. By doing so, we do not consider the effects of firm entry or exit on wage and employment. Second, we only keep the GOSI firms that have a valid match with the Orbis data. These firms are expected to have an accurate measure of ownership. Third, we keep the market, defined as a location-industry pair, that has at least one foreign firm. This deals with the potential selection issue that foreign firms are more likely to enter certain locations and industries. Lastly, we drop firms that are missing in their location and industry.

We impose additional restrictions on workers and jobs. First, we focus our analyses on workers with full-time jobs—that is, workers whose monthly wage is no less than the minimum wage level (Song et al. 2019)—as firms may set wages differently for part-time workers relative to full-time workers. Second, we restrict our sample to the period between 2009 and 2012. As multiple labor

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[13]Figure A1 in Appendix A compares the private-sector employment data calculated from the GOSI with that from the General Authority for Statistics. The data on total employment by worker nationality and gender from the GOSI match the employment data from the General Authority for Statistics, although the GOSI data underestimate the number of non-Saudi men prior to 2013.

market policies, notably the increase in the minimum wage for Saudi workers, were implemented after 2013, by focusing on the sample prior to 2013, we thereby rule out potential confounding factors that threaten the identification of model parameters. In addition, reporting might be incomplete near the end of the sampling period, which could potentially bias our estimates. Therefore, it is reasonable to focus on a clean sample that is sufficient to recover model parameters and addresses the concerns mentioned above. Lastly, we keep individuals between ages 18 and 65 to focus on prime-age workers. The final analysis sample consists of over 1.5 million unique workers and around 14,000 unique firms, among which 200 are foreign owned.[14] Table A1 in Appendix A displays the summary statistics of our analysis sample at the worker and firm level.

Stayers and Movers Samples. We will leverage two distinct subsamples in the quantitative section below. The first is the stayers sample, which consists of workers who stayed in the same firm throughout the period. The stayers sample further restricts the firms to be those that have at least 10 stayers, in order to ensure sufficient variation within firms. The stayers sample contains around 376,000 unique workers and 3,200 unique firms. The second is the movers sample, which consists of workers who switched firms once during the period. The movers sample contains around 86,000 movers. Table A1 in Appendix A displays the summary statistics for the two subsamples.

2.4 Foreign Firms in Saudi Arabia

To explore the differences in various outcomes between foreign and domestic firms, we estimate a regression with a foreign indicator and other observed characteristics as controls. Specifically, at the employee level, we estimate

$$Y_{it} = \alpha_0 + \alpha_1 F_{j(i)t} + \beta_1 X_{it} + \beta_2 X_{j(i)t} + \gamma_{it} + e_{it}, \tag{1}$$

where Y_{it} is the log wage of worker i in year t and $F_{j(i)t}$ indicates whether firm j, at which worker i is employed in year t, is foreign owned. Hence, the coefficient on $F_{j(i)t}$, α_1, measures the foreign-domestic wage gap. The term X_{it} is a vector of controls at the worker level that contains age polynomials and education dummies, $X_{j(i)t}$ is a vector of controls at the firm level that contains log employment polynomials, and γ_{it} captures the fixed effects associated with occupation, market-year, and gender-nationality-year. We also estimate a firm-level counterpart of equation (1). Specifically, we let firm outcomes Y_{jt} be log employment variables, Saudi share, female share, or a dummy for being gender integrated—both men and women are present in the workplace—following Peck (2017). Note that log employment variables and worker shares are calculated for firms that have a positive number of workers with the given demographics. Those variables thus capture the outcomes of firms at the intensive margin. The dummy for gender-integrated firms, on the other hand, captures the extensive-margin outcome of whether or not a firm hires any female workers. Firm-level covariates

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[14]The total wage bill in the analysis sample is around 20 trillion SAR/month, whereas it is 50 trillion SAR/month in the original dataset. Despite the multiple sample restrictions, we are left with a sample that still represents a significant fraction of the Saudi private sector.

Table 1: Differences between foreign and domestic firms at firm and worker level

(a) Employment and worker composition

	Log employment				Saudi	Female	Gender
All	Saudis	Non-Saudis	Women	Men	share	share	integrated
1.34***	0.93***	1.17***	0.14	1.34***	-0.19***	-0.11***	0.10***
(0.12)	(0.11)	(0.12)	(0.14)	(0.12)	(0.02)	(0.02)	(0.03)
$[45, 985]$	$[41, 156]$	$[28, 698]$	$[11, 129]$	$[45, 301]$	$[41, 156]$	$[11, 129]$	$[45, 985]$

(b) Wage

All	Saudis	Non-Saudis	Women	Men
0.16***	0.12***	0.20***	0.18***	0.16***
(0.03)	(0.03)	(0.03)	(0.05)	(0.03)
$[1, 760, 040]$	$[1, 085, 759]$	$[674, 274]$	$[141, 836]$	$[1, 618, 176]$

Notes: The table reports α_1 from estimating equation (1) using the full analysis sample. Regressions for log employment control for market-year fixed effects. Regressions for Saudi share, female share, and gender-integrated dummy control for linear employment and market-year fixed effects. Regressions of log wage control for age polynomials, education dummies, and firm employment polynomials, as well as fixed effects associated with occupation, market-year, and gender-nationality-year. Standard errors are clustered at the firm level and are in parentheses. Number of observations are in brackets. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

include linear employment (omitted when the outcome variable is log employment) and market-year fixed effects.

Estimates of α_1 from equation (1) using different outcomes are shown in Table 1. At the firm level, foreign firms are larger in employment size relative to domestic firms on average. Broken down by worker nationality and gender, the results show that foreign firms also hire more Saudi, non-Saudi, and male workers, whereas they do not hire significantly more female workers. Regarding worker shares, foreign firms hire a smaller share of Saudi and female workers by 19 and 11 percentage points, respectively. However, foreign firms are more likely to be gender integrated relative to domestic firms. At the worker level, foreign firms tend to pay higher wages than domestic firms on average. Positive wage gaps between foreign and domestic firms are still present for workers of different nationality and gender.[15] We note that the positive wage gaps may partly come from high-earning workers sorting into foreign firms. While regression equation (1) does not explicitly account for worker sorting, we allow for flexible working sorting in the model, based on which we are able to quantify the extent to which worker sorting contributes to the foreign wage premium.

To examine the labor market outcomes of foreign firms from different culture, we estimate a version of equation (1), in which we split foreign firms into Muslim and non-Muslim foreign firms as well as low-FLFP and high-FLFP foreign firms. The results are reported in Tables B2 and B3 in Appendix B. We find that non-Muslim (high-FLFP) foreign firms on average are the largest

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[15]In Appendix B.1, we follow Card et al. (2013) and estimate foreign wage premiums using a mover design. Table B8 in Appendix B.1 suggests that the domestic-to-foreign movers enjoy a wage increase relative to domestic-to-domestic movers. This is further evidence that foreign wage premiums are positive in this setting.

in employment size, are the most likely to integrate both men and women, and pay the highest wages relative to Muslim (low-FLFP) foreign firms and domestic firms. Moreover, consistent with the patterns in Figure 1, the share of Saudi (female) workers is the smallest for non-Muslim (high-FLFP) foreign firms. We find systematic differences in labor market outcomes by cultural proximity even controlling for observables.

Results in Table 1 suggest that foreign firms are more productive. On the one hand, more productive foreign firms are likely to be larger in employment size and pay higher wages. On the other hand, specific to this setting, integrating both male and female workers in the workplace requires firms to incur fixed costs (Miller et al. 2020). More productive foreign firms are more able to overcome the fixed costs and hence are more likely to be gender integrated. As is typical in the literature, productivity is an important factor that drives the observed differences in employment and wage outcomes between foreign and domestic firms.

However, productivity alone may not be sufficient to rationalize the results in Table 1. Relative to domestic firms, foreign firms pay comparable higher wages to female and male workers, but they do not hire a significantly larger number or share of female workers. This finding implies that, at least for female and male workers, productivity may not fully explain the observed differences in employment and worker share between foreign and domestic firms. It is also possible that, for Saudi and non-Saudi workers, productivity is not enough to fully explain the observed differences in employment outcomes. Based on the discussion in Section 2.2, we propose that amenities are another important factor in determining the labor market outcomes. Amenities are non-pecuniary benefits associated with a job, which include job characteristics (such as flexible work hours, transportation support, and gender-segregated facilities), worker preferences (such as stigma), among others. In Section 3 below, we propose a model that allows us to quantitatively assess the role of productivity and amenities in explaining the observed differences in labor market outcomes.

3 Model

In this section, we describe a simple model that aims to rationalize the differences in labor market outcomes between foreign and domestic firms. We extend framework by Setzler and Tintelnot (2021) by explicitly accounting for amenities as in Lamadon et al. (2022). Amenities shift worker preferences over firms such that workers may prefer one firm over another on average even when wages are the same. This allows for flexible worker sorting across firms conditional on wages.

Setup. Consider an economy in which workers are indexed by $i \in \mathcal{I}$, firms are indexed by $j \in \mathcal{J}$, and time is indexed by t. Workers are distinguished by their demographics (e.g., nationality or gender) $d_i \in \mathcal{D}$ and skill $x_i \in \mathcal{X}$, both of which are time invariant. The total supply of (d, x) workers, denoted $\bar{L}(d, x)$, is fixed. Firms are distinguished by their (time-varying) worker-demographic-specific productivity $\phi_{jt}(d)$, (time-invariant) worker-demographic-specific skill complementarity $\psi_j(d)$, and (time-invariant) amenities $a_j(d, x)$, which are specific to (d, x) workers. All firms produce a homogeneous good, the price of which is normalized to one.

Preferences and Labor Supply. The indirect utility of worker i employed at firm j in year t is given by

$$V_{ijt} = \log W_{jt}(d_i, x_i) + a_j(d_i, x_i) + \beta(d_i)^{-1}\varepsilon_{ijt},$$

where $W_{jt}(d_i, x_i)$ is the wage that firm j offers to worker i with demographic d_i and skill x_i in year t. The term $a_j(d_i, x_i)$ is the amenities that worker i enjoys at firm j,[16] ε_{ijt} captures the worker's idiosyncratic taste over the firm and is drawn from an i.i.d. type-I extreme value distribution, and $\beta(d_i)$ governs the dispersion of the idiosyncratic utility draws. Note that the dispersion parameter may differ by worker demographics.

We assume that worker demographics and skills are observable to firms. However, firms do not observe workers' idiosyncratic utility draws but only know the distribution of these draws. Following McFadden (1981), the labor supply of (d, x) workers to firm j in year t is given by

$$L_{jt}(d, x) = \lambda_t(d, x)W_{jt}(d, x)^{\beta(d)} \exp\left(\beta(d)a_j(d, x)\right) \bar{L}(d, x), \tag{2}$$

where $\lambda_t(d, x) \equiv \left(\sum_{j' \in \mathcal{J}} W_{j't}(d, x)^{\beta(d)} \exp\left(\beta(d)a_{j'}(d, x)\right)\right)^{-1}$ captures the degree of competition for (d, x) workers among all firms in the economy. It is immediate from equation (2) that labor supply depends on both wage and amenities.

Technology and Wage Setting. Firms combine workers with different demographics and skills to produce the homogeneous good. Define the efficient unit of labor for demographic-d workers as

$$N_{jt}(d) = \int_{\mathcal{X}} \exp(\psi_j(d)x)L_{jt}(d, x)dx,$$

where, with a slight abuse of notation, $L_{jt}(d, x)$ is the demand for (d, x) workers. The term $\exp(\psi_j(d)x)$ is the efficiency of (d, x) workers at firm j, and $\psi_j(d)$ captures the skill complementarity. Note that skill complementarity may differ by worker demographics. The production function is constant returns to scale and linear in efficient units of labor,

$$Y_{jt} = \sum_{d \in \mathcal{D}} \Phi_{jt}(d)N_{jt}(d),$$

where $\Phi_{jt}(d)$ is the demographic-d labor augmenting productivity.[17] We assume that the process $\{\Phi_{jt}(d)\}$ is exogenous.

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[16]Our model does not distinguish between amenities that firms provide and amenities that workers value. Differential amenities may arise from firms providing different amenities or workers having heterogeneous preferences over the same amenities. Our qualitative evidence (see Appendix D) suggests that both channels exist in Saudi Arabia. On the one hand, firms differ in the amenities they provide, including flexible or short work hours, housing stipend, child care, and separate facilities for men and women, among others. On the other hand, workers have heterogenous preferences over amenities reflected by different rankings over a given set of amenities.

[17]Without loss of generality, one can normalize $\Phi_{jt}(1) = 1$ for all j, t and write

$$Y_{jt} = \Phi_{jt} \sum_{d \in \mathcal{D}} \tilde{\Phi}_{jt}(d)N_{jt}(d),$$

It is useful to define the total wage bill, $B_{jt}(d)$, for demographic-d workers at firm j in year t:

$$
\begin{aligned}
B_{jt}(d) &\equiv \int_{\mathcal{X}} W_{jt}(d,x) L_{jt}(d,x) dx \\
&= \Phi_{jt}(d)^{1+\beta(d)} \underbrace{\int_{\mathcal{X}} \left(\frac{\beta(d)}{1+\beta(d)} \exp(\psi_j(d)x) \right)^{1+\beta(d)} \exp\left(\beta(d) a_j(d,x)\right) \lambda_t(d,x) \bar{L}(d,x) dx}_{H_j(d)},
\end{aligned} \quad (3)
$$

where $H_j(d)$ captures the determinants of wage bill other than $\Phi_{jt}(d)$. On a stationary path, aggregate variables are time invariant, which implies that $H_j(d)$ is constant. Equation (3) implies that the pass-through of the firm productivity shock to the wage bill is $1 + \beta(d)$.

Firm j decides the wage and labor demand for (d,x) workers. The labor market is monopsonistic so that firms take into account the firm-specific upward sloping labor supply curve (equation (2)). Moreover, each firm is small relative to the economy so that an individual firm takes aggregate variable $\lambda_t(d,x)$ as given. In addition, assume that adjustments to wage and labor demand are frictionless, which implies that firms essentially make static decisions. We characterize firm j's optimization problem as follows:

$$
\max_{\{W_{jt}(d,x), L_{jt}(d,x)\}} \sum_{d \in \mathcal{D}} \Phi_{jt}(d) \int_{\mathcal{X}} \exp(\psi_j(d)x) L_{jt}(d,x) dx - \sum_{d \in \mathcal{D}} \int_{\mathcal{X}} W_{jt}(d,x) L_{jt}(d,x) dx,
$$

subject to (2). The optimal wage schedule is given by

$$
W_{jt}(d,x) = \frac{\beta(d)}{1+\beta(d)} \Phi_{jt}(d) \exp(\psi_j(d)x). \quad (4)
$$

All derivations are relegated to Appendix C. The wage for (d,x) workers at firm j is a markdown $\frac{\beta(d)}{1+\beta(d)}$ of workers' marginal product $\Phi_{jt}(d) \exp(\psi_j(d)x)$.

Equilibrium. We define the equilibrium as follows.

Definition 1. *An equilibrium is a set of wages $\{W_{jt}(d,x)\}$ and a set of labor allocations $\{L_{jt}(d,x)\}$ such that (2) and (4) hold and all markets clear.*

4 Quantification

In this section, we describe the quantification strategy based on the model in Section 3. Section 4.1 describes the identification of each parameter of interest. We adopt the identification methodology proposed by Lamadon et al. (2022), which allows us to identify parameters using internally constructed moment conditions. Section 4.2 discusses estimation results. Section 4.3 assesses the model fit and provides additional robustness results.

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where Φ_{jt} is total factor productivity (TFP), and $\tilde{\Phi}_{jt}(d) = \frac{\Phi_{jt}(d)}{\Phi_{jt}(1)}$ is the scaled demographic-d labor-augmenting productivity.

4.1 Identification

We start by describing the exogenous productivity process $\{\Phi_{jt}(d)\}$. Let $\phi_{jt}(d) = \log \Phi_{jt}(d)$. We assume that $\phi_{jt}(d)$ consists of a permanent component $\phi_j(d)$ and a residual time-varying component $\tilde{\phi}_{jt}(d)$ that follows a unit root process:

$$\phi_{jt}(d) = \phi_j(d) + \tilde{\phi}_{jt}(d), \quad \tilde{\phi}_{jt}(d) = \tilde{\phi}_{jt-1}(d) + \nu_{jt}(d),$$

where $\nu_{jt}(d)$ is a non-degenerate random variable (i.e., the variance of $\nu_{jt}(d)$ is positive). The processes for the wage and wage bill are determined given the productivity process. We allow for measurement error in observed wages and wage bills. Therefore, we can write the expressions for the wage and wage bill (in log) as follows:

$$w_{it} = \log \frac{\beta(d_i)}{1 + \beta(d_i)} + \phi_{j(i,t)t}(d_i) + \psi_{j(i,t)}(d_i)x_i + \epsilon_{it} \tag{5}$$

$$b_{jt}(d) = (1 + \beta(d))\phi_{jt}(d) + h_j(d) + \zeta_{jt}(d), \tag{6}$$

where we denote the lowercase letter x as the log of the corresponding uppercase letter X (i.e., $x = \log X$). The notation $j(i,t)$ denotes the firm at which worker i is employed in year t, ϵ_{it} is an i.i.d. measurement error in the observed wage for worker i in year t, and $\zeta_{jt}(d)$ is an i.i.d. measurement error in observed wage bill for demographic-d workers at firm j in year t. Again, it is clear from the two equations above that the pass-through of the firm productivity shock into the wage is one, whereas the pass-through of the firm productivity shock into the wage bill is $1 + \beta(d)$.

Identifying Labor Supply Elasticities from Stayers. We show that labor supply elasticities can be identified using within-firm variations in observed wages and wage bills for stayers (i.e., workers who worked at the same firm throughout the period we consider). Define the τ-step difference in the log wage as $\Delta^\tau w_{it} = w_{it} - w_{it-\tau}$. Using equation (5), we know that for a stayer i employed at firm j over the period $[t - \tau, t]$,

$$\Delta^\tau w_{it} = \sum_{s=t-\tau+1}^{t} \nu_{j(i,s)s}(d_i) + \Delta^\tau \epsilon_{it}.$$

Similarly, using equation (6), we can write the τ-step difference in the log wage bill as

$$\Delta^\tau b_{jt}(d) = (1 + \beta(d)) \sum_{s=t-\tau+1}^{t} \nu_{js}(d) + \Delta^\tau \zeta_{jt}(d).$$

Following Lamadon et al. (2022), we use the following moment condition to identify $\beta(d)$:

$$\mathbb{E}\left[Z_{it}(d) \left(\Delta^\tau w_{it} - \frac{1}{1 + \beta(d)} \Delta^\tau b_{j(i,t)t}(d) \right) \Big| d_i = d, \ stayers \right] = 0, \tag{7}$$

where $Z_{it}(d)$ is an instrument available as of year t. Intuitively, the estimated $\beta(d)$ would be high when there are relatively large changes in wage bills but relatively small changes in wages. In this case, large changes in wage bills are reflected in large changes in employment given the relatively small changes in wages, which implies that labor supply is elastic. In light of the assumptions on the productivity process and measurement errors, we choose $\tau = 3$ and $Z_{it}(d) = \Delta^1 b_{j(i,t-1)t-1}(d)$.[18] Note that moment condition (7) requires at least four periods of data.

Identifying Productivity Parameters from Movers. Given labor supply elasticities, we show that firm productivity parameters are identified using observed wages and wage bills for movers (i.e., workers who worked at different firms throughout the period we consider). Note from equation (5) that, for $d_i = d$ and $j(i,t) = j$,

$$
w_{it} = \log \frac{\beta(d)}{1 + \beta(d)} + \phi_j(d) + \psi_j(d)x_i + \sum_{s=1}^{t} \nu_{js}(d) + \epsilon_{it}
$$

$$
= \log \frac{\beta(d)}{1 + \beta(d)} + \phi_j(d) + \psi_j(d)x_i + \frac{\Delta^t b_{jt}(d)}{1 + \beta(d)} - \frac{\Delta^t \zeta_{jt}(d)}{1 + \beta(d)} + \epsilon_{it}.
$$

Define the wage component net of the markdown component and of the time-varying productivity component as w_{it}^p. We have

$$
w_{it}^p \equiv w_{it} - \log \frac{\beta(d)}{1 + \beta(d)} - \frac{\Delta^t b_{jt}(d)}{1 + \beta(d)} = \phi_j(d) + \psi_j(d)x_i - \frac{\Delta^t \zeta_{jt}(d)}{1 + \beta(d)} + \epsilon_{it}.
$$

Firm skill complementarity $\psi_j(d)$ can be identified from the following moment:

$$
\frac{\psi_j(d)}{\psi_{j'}(d)} = \frac{\mathbb{E}\left[w_{it}^p | j(i,t) = j, j(i,t+1) = j', d_i = d\right] - \mathbb{E}\left[w_{it+1}^p | j(i,t) = j', j(i,t+1) = j, d_i = d\right]}{\mathbb{E}\left[w_{it+1}^p | j(i,t) = j, j(i,t+1) = j', d_i = d\right] - \mathbb{E}\left[w_{it}^p | j(i,t) = j', j(i,t+1) = j, d_i = d\right]} \tag{8}
$$

under the condition that $\mathbb{E}\left[x_i | j(i,t) = j, j(i,t+1) = j'\right] \neq \mathbb{E}\left[x_i | j(i,t) = j', j(i,t+1) = j\right]$ for any firm pair (j, j'). Given the estimated $\psi_j(d)$, one could identify the permanent productivity component $\phi_j(d)$ using

$$
\mathbb{E}\left[\frac{w_{it+1}^p - \phi_{j(i,t+1)}(d)}{\psi_{j(i,t+1)}(d)} - \frac{w_{it}^p - \phi_{j(i,t)}(d)}{\psi_{j(i,t)}(d)} | d_i = d, \; movers\right] = 0. \tag{9}
$$

Several comments are in order. First, skill complementarity $\psi_j(d)$ is identified up to scale. In practice, we apply normalizations to the set of complementarity parameters. Second, as the

---

[18]To verify instrument validity, note that

$$
\mathbb{E}\left[Z_{it}(d)\left(\Delta^\tau w_{it} - \frac{1}{1 + \beta(d)}\Delta^\tau b_{j(i,t)t}(d)\right) | d_i = d, \; stayers\right]
$$

$$
= \mathbb{E}\left[\left((1 + \beta(d))\nu_{j(i,t-1)t-1}(d) + \Delta^1 \zeta_{j(i,t-1)t-1}(d)\right)\left(\Delta^\tau \epsilon_{it} - \frac{1}{1 + \beta(d)}\Delta^\tau \zeta_{j(i,t)t}(d)\right) | d_i = d, \; stayers\right].
$$

The expectation is equal to zero when $\tau \geq 3$ because of the independence assumptions discussed in the text.

number of parameters is unrestricted, identification suffers from incidental parameter bias in general (Lamadon et al. 2022). To get around the problem, we estimate ψ and ϕ at the group level. That is, productivity parameters are restricted to be the same within a group, and parameters are potentially different across different groups. This significantly reduces the number of parameters to be estimated while keeping sufficient moments from which parameters are still identified. We discuss implementation details in Section 4.2.

Identifying Remaining Parameters. Given identified parameters from previous steps, we can identify worker skill x_i from

$$x_i = \mathbb{E}\left[\frac{w_{it}^p - \phi_{j(i,t)}(d)}{\psi_{j(i,t)}(d)}|d_i = d, i\right].\tag{10}$$

Next, from (5), we can identify the time-varying component $\tilde{\phi}_{jt}(d)$ of the firm productivity process:

$$\tilde{\phi}_{jt}(d) = \mathbb{E}\left[w_{it} - \log\frac{\beta(d)}{1+\beta(d)} - \phi_j(d) - \psi_j(d)x_i|j(i,t) = j, d_i = d, t\right].\tag{11}$$

It is straightforward to compute $\phi_{jt}(d) = \phi_j(d) + \tilde{\phi}_{jt}(d)$. Productivity shocks can be backed out from $\nu_{jt}(d) = \Delta^1\tilde{\phi}_{jt}(d)$. It remains to identify amenities. Note that the employment share of (d, x) workers at firm j in year t is given by

$$Pr(j|d, x, t) = \lambda(d, x)W_{jt}(d, x)^{\beta(d)}\exp\left(\beta(d)a_j(d, x)\right).$$

Normalizing $\lambda(d, x)$, the degree of competition in the labor market for (d, x) workers, to be one, we obtain the moment that identifies amenities:

$$a_j(d, x) = \mathbb{E}\left[-\log\left(\frac{\beta(d)}{1+\beta(d)}\Phi_{jt}(d)\exp(\psi_j(d)x)\right) + \frac{1}{\beta(d)}\log Pr(j|d, x, t)|j, d, x\right].\tag{12}$$

4.2 Estimation

In this section, we describe estimation procedures in detail and discuss estimation results. Table 2 shows the estimated parameter values by worker demographics.

Labor Supply Elasticity. As discussed in the previous section, we estimate elasticity of labor supply $\beta(d)$ using the stayer sample and the moment condition (7) with $\tau = 3$ and $Z_{it} = \Delta^1 b_{j(i,t-1)t-1}(d)$. As shown in Table 2, our estimated labor supply elasticities fall within the range of firm labor supply elasticities of 2 to 6 that has been documented in the literature. This is evidence for the existence of firm labor market power in the private sector in Saudi Arabia. The upward-sloping labor supply curves imply that firms need to raise wages in order to hire an additional worker.

Table 2: Estimated parameters by worker demographics

		Worker demographics				
	Statistic	Saudi	Non-Saudi	Female	Male	Moment
Labor supply elasticity, $\beta(d)$	Estimate	2.46	3.28	5.63	2.86	(7)
Skill complementarity, $\psi_j(d)$	Mean	1.00	1.00	1.00	1.00	(8)
	Std. Dev.	0.35	0.47	0.40	0.41	
	Count	10	10	10	10	
Productivity perm. comp., $\phi_j(d)$	Mean	7.72	7.36	7.55	7.53	(9)
	Std. Dev.	0.67	0.64	0.74	0.42	
	Count	10	10	10	10	
Worker skill, x_i	Mean	0.72	0.94	0.57	0.80	(10)
	Std. Dev.	0.55	0.62	0.39	0.60	
	Count	680,632	842,185	88,353	1,434,467	
Productivity, $\phi_{jt}(d)$	Mean	7.42	7.13	7.26	7.42	(11)
	Std. Dev.	0.42	0.52	0.43	0.33	
	Count	44,699	43,335	12,242	55,158	
Amenity, $a_j(d, x)$	Mean	-11.85	-11.03	-9.20	-11.54	(12)
	Std. Dev.	0.81	0.77	0.58	0.79	
	Count	57,673	52,708	13,063	75,637	

Productivity. We estimate skill complementarity $\psi_j(d)$ and the permanent component $\phi_j(d)$ of the productivity process using the mover sample plus the moment conditions (8) and (9). Recall from the previous section that identification suffers from incidental parameter bias when the number of parameters is unrestricted. We get around the problem by estimating parameters at the group level. Specifically, we cluster firms into K groups based on their within-firm wage distributions using the K-means algorithm, and we only allow $\psi_j(d)$ and $\phi_j(d)$ to vary across these K groups. Formally, $\psi_j(d) = \psi_{k(j)}(d)$ and $\phi_j(d) = \phi_{k(j)}(d)$ where $k(j) \in \{1, \ldots, K\}$. Since skill complementarity parameters are identified only up to scale, we normalize $\frac{1}{K} \sum_{k=1}^{K} \psi_k(d) = 1$. We set $K = 10$.

In practice, $\psi_j(d)$ and $\phi_j(d)$ are jointly estimated through the moment condition (9). As noted by Lamadon et al. (2022), the moment condition suggests the validity of an instrumental approach in which a set of move type indicators serve as instruments. Formally, let $\mathbb{I}_i^{k \to k'}(d_i)$ be an indicator that equals one when worker i moves from firm j in group k to firm j' in group k'. We obtain the following moment that is equivalent to the moment condition (9):

$$\mathbb{E}\left[\mathbb{I}_i^{k \to k'}(d) \left(\frac{w_{it+1}^p - \phi_{k(j(i,t+1))}(d)}{\psi_{k(j(i,t+1))}(d)} - \frac{w_{it}^p - \phi_{k(j(i,t))}(d)}{\psi_{k(j(i,t))}(d)} \right) \bigg| d_i = d\right] = 0.$$

Note that there are $2K$ parameters and K^2 moments. Hence, $\{\psi_k(d)\}$ and $\{\phi_k(d)\}$ are over-identified. We estimate the parameters using the generalized method of moments (GMM) with equal weights across moments.

Worker Skill. We estimate worker skill x_i using the full sample and the moment condition (10). Since worker skill is an ordinal measure, we normalize the mean worker skill in the bottom skill decile to be zero for each worker demographic. As worker skills are observable to the agents in the model but not to the economists, we examine the sensibility of our estimates by checking their correlations with observed worker demographics and job characteristics. Specifically, we regress standardized x_i on age polynomials, a gender dummy, education dummies, nationality fixed effects, and occupation fixed effects. Table B4 in Appendix B suggests that estimated worker skills are reasonable. In our sample, holding all else equal, worker skill first increases then decreases with age, women are less skilled than men on average, and worker skill is positively correlated with education level. Furthermore, R-squares are generally below 0.5, which implies that a significant fraction of the variations in worker skills may be explained by unobserved characteristics.

Remaining Parameters. We estimate productivity $\phi_{jt}(d)$ using the full sample and the moment condition (11). Lastly, we estimate amenities $a_j(d, x)$ using the full sample and the moment condition (12). In practice, we discretize the distribution of worker skills into deciles and estimate amenities for each decile. With a slight abuse of notation, x also denotes the mean worker skill in a decile.

4.3   Model Fit and Robustness

Our model with the parameterization in Table 2 is able to match the key moments of the data. First, our model is able to match the empirical distributions of wage, employment, and wage bill, as shown in Figure B3 in Appendix B. The correlations between the predicted and observed log wages, log employment, and log wage bills are over 0.98. Second, our model is able to capture the differences in labor market outcomes between foreign and domestic firms discussed in Section 2.4, even though these outcomes are not directly targeted in estimation. Table B5 in Appendix B shows that the predicted differences between foreign and domestic firms match well with the results in Table 1.

We conduct multiple robustness checks to assess model fit under alternative specifications. In Table B6 in Appendix B, we report the correlations between outcomes predicted by the model and their data counterparts under each robust specification. First, we consider an alternative moment condition (described in Appendix B) to identify labor supply elasticities. We obtain similar estimates for labor supply elasticities. In addition, we consider $K = 15, 20$ clusters when grouping firms using the K-means algorithm. In both cases, the model fit is as good as our baseline specification. Lastly, we consider the 2013-2016 sample while applying all other sample restrictions discussed in Section 2.3. Although analyzing the sample is not our main focus, the model is able to match the data well, suggesting that our framework can be applied to other samples when needed.

Figure 2: Foreign wage premiums by worker skill deciles

(a) Saudis and non-Saudis

(b) Women and men
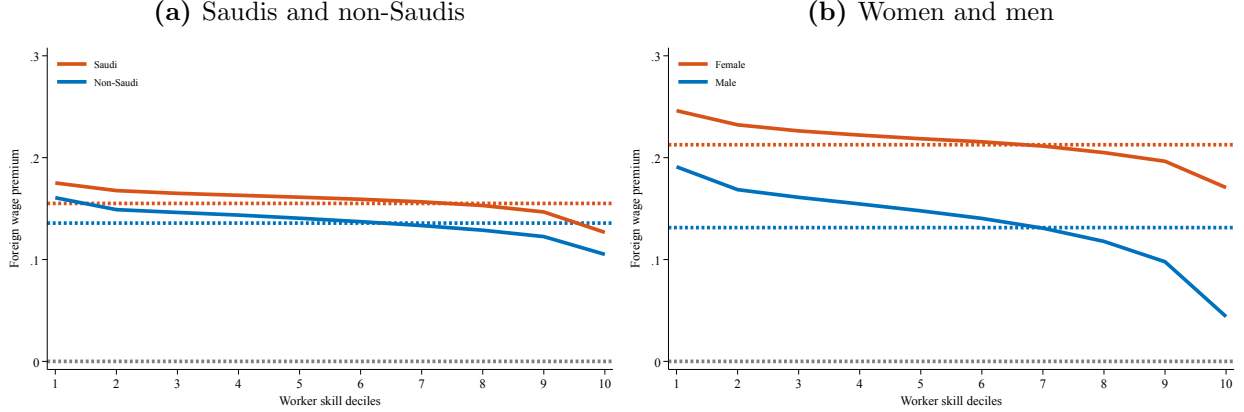
Notes: The figure reports the foreign wage premium for different worker demographics by skill deciles. Foreign wage premiums are calculated based on the definition described in the text. The horizontal dashed lines indicate the mean foreign wage premiums weighted by the population share in each decile.

5 Model Implications

In this section, we examine the differences between foreign and domestic firms through the lens of the model and analyze their implications on various labor market outcomes. We highlight the differences in labor market outcomes for workers with different demographic characteristics such as nationality and gender.

5.1 Foreign Wage Premiums

We begin by characterizing the differences in productivity and skill complementarity between foreign and domestic firms. Note that estimated productivity is at the firm-year level, and estimated skill complementarity is at the firm (cluster) level. To extract the common components within foreign and domestic firms, we consider the following decomposition of $\phi_{jt}(d)$ and $\psi_j(d)$:

$$\phi_{jt}(d) = \phi_{o(j)}(d) + \phi_{m(j)t}(d) + \tilde{\tilde{\phi}}_{jt}(d), \quad \psi_j(d) = \psi_{o(j)}(d) + \psi_{m(j)}(d) + \tilde{\tilde{\psi}}_j(d),$$

where $o(j) \in \{D, F\}$ denotes the ownership of firm j, which can be domestic (D) or foreign (F). The term $\phi_{m(j)t}(d)$ captures the common component of productivity in market $m(j)$ (recall that a market is defined as a location-industry pair) in year t, $\psi_{m(j)}(d)$ captures the common component of skill complementarity in market $m(j)$, and $\tilde{\tilde{\phi}}_{jt}(d)$ and $\tilde{\tilde{\psi}}_j(d)$ are residual components. We define the foreign wage premium for (d, x)-workers as

$$ForeignWagePremium(d, x) = \underbrace{\phi_F(d) - \phi_D(d)}_{\text{productivity difference}} + \underbrace{(\psi_F(d) - \psi_D(d))x}_{\text{skill premium}}.$$

The foreign wage premium for (d, x) workers is the sum of productivity difference $\phi_F(d) - \phi_D(d)$ and skill premium $(\psi_F(d) - \psi_D(d))x$.

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Figure [2] displays the foreign wage premiums for different worker demographics by skill deciles. We find that the foreign wage premiums are positive across all worker demographics and skill deciles. This is consistent with a wide array of literature that has documented positive foreign wage premiums in different settings. We find that the average foreign wage premium (across skill deciles) is around 16% for Saudi workers, 14% for non-Saudi workers, 21% for female workers, and 13% for male workers, as indicated by the horizontal dashed lines in Figure [2]. Positive foreign wage premiums are driven by foreign firms being more productive than domestic firms ($\phi_F(d) > \phi_D(d)$).[19] The skill premium determines the slope of the foreign wage premium profile. The foreign wage premium is decreasing in worker skill, which implies that foreign firms are not more skill-complementary than domestic firms ($\psi_F(d) < \psi_D(d)$). It is worth noting that this finding is different from what was found of multinationals in other settings (Setzler and Tintelnot 2021, Alfaro-Urena et al. 2019). One possible explanation is that foreign firms offer disproportionately better amenities to skilled workers to compensate for lower wage premiums. We will examine this possibility in the following section. While our data do not allow us to fully disentangle mechanisms for the decreasing skill premium we observe, we discuss in Section 6.1 that the pattern is plausible in a setting with differing deep-seated cultural norms.[20]

5.2 Amenity Differences

We consider a similar decomposition of firm-level amenities for (d, x) workers, $a_j(d, x)$, into an ownership component, $a_{o(j)}(d, x)$, a market component, $a_{m(j)}(d, x)$, and a residual component $\tilde{\tilde{a}}_j(d, x)$:

$$a_j(d, x) = a_{o(j)}(d, x) + a_{m(j)}(d, x) + \tilde{\tilde{a}}_j(d, x).$$

To back out each component, note that from equation (2), the log employment of (d, x) workers at firm j in year t can be written as

$$\log L_{jt}(d, x) = \underbrace{\beta(d) \left(\phi_{o(j)}(d) + \psi_{o(j)}(d)x + a_{o(j)}(d, x) \right)}_{\text{ownership component}} + \underbrace{\beta(d) \left(\phi_{m(j)t}(d) + \psi_{m(j)}(d)x + a_{m(j)}(d, x) \right)}_{\text{market component}}$$

$$+ \underbrace{\beta(d) \left(\tilde{\tilde{\phi}}_{jt}(d) + \tilde{\tilde{\psi}}_j(d)x + \tilde{\tilde{a}}_j(d, x) \right)}_{\text{residual component}} + \underbrace{\beta(d) \log \frac{\beta(d)}{1 + \beta(d)} + \log \left(\lambda(d, x) \bar{L}(d, x) \right)}_{\text{constant}}.$$

The log employment of (d, x) workers at firm j in year t is the sum of an ownership component, a market component, a residual component, and a constant. After estimating the components of productivity and skill complementarity in the previous step, we can back out the components of amenities.

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[19]Figure B4 in Appendix B shows the productivity distributions of foreign and domestic firms separately for different worker demographics. The figure suggests that foreign firms are more productive than domestic firms.

[20]Note that our estimated foreign wage premiums are relevant for private-sector firms in Saudi Arabia. Firms in the public sector have historically been viewed as competitive outside options by high-skill local workers. This implies that firms in the private sector may face a relatively smaller pool of skilled workers. Therefore, both foreign and

Figure 3: Amenity differences between foreign and domestic firms by worker skill deciles

(a) Saudis and non-Saudis

(b) Women and men
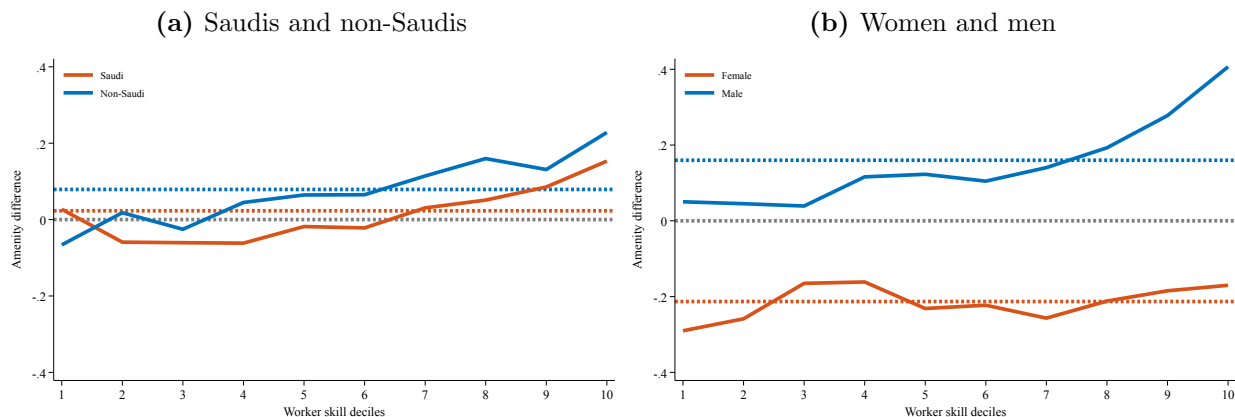
Notes: The figure reports the amenity differences between foreign and domestic firms for different worker demographics by skill deciles. Amenity differences are calculated based on the definition described in the text. The horizontal dashed lines indicate the mean amenity differences weighted by the population share in each decile.

Figure 3 displays the differences in the foreign and domestic components of amenities, $a_F(d, x) - a_D(d, x)$, for different worker demographics by skill deciles. To interpret the results in the figure, an estimate of 10%, for example, means that compared to domestic firms—at which mean amenities are normalized to zero—the mean amenities are 10% higher at foreign firms. We find that the amenity difference between foreign and domestic firms is around 2% for Saudi workers, 8% for non-Saudi workers, -21% for female workers, and 16% for male workers. Moreover, we find evidence that foreign firms offer skilled workers disproportionately better amenities, as indicated by the upward-sloping amenity difference profiles. Note that the amenity difference and wage difference of the same magnitude are equivalent in utility terms. In other words, the amenity difference affects workers' choices of employers as much as the wage difference of the same magnitude. The patterns in Figures 2 and 3 jointly imply that foreign firms may offer better amenities as an alternative to offering higher wage premiums in order to attract skilled workers.

5.3   Compensating Differentials

Our estimated productivity and amenity profiles suggest that foreign firms pay higher wages and provide better amenities to an average worker. This implies that the average worker is far from being indifferent between working at foreign firms or at domestic firms. However, because of idiosyncratic preferences, the marginal worker may value amenities differently from the average worker. In this section, we estimate how much the marginal worker values amenities, or the compensating differential. By definition, the marginal worker is indifferent between working at the foreign firm or at the domestic firm such that the foreign wage premium exactly offsets the amenity difference adjusted for the difference in idiosyncratic utility draws. Therefore, the foreign wage premium provides a measure of the compensating differential for the marginal worker, and given the wage level at the domestic firm, we are able to obtain the monetary value of amenities for those

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domestic firms may offer similar wages in order to attract skilled workers, resulting in lower foreign wage premiums.

Figure 4: Compensating differentials (in SAR/month) by worker skill deciles

(a) Saudis and non-Saudis

(b) Women and men
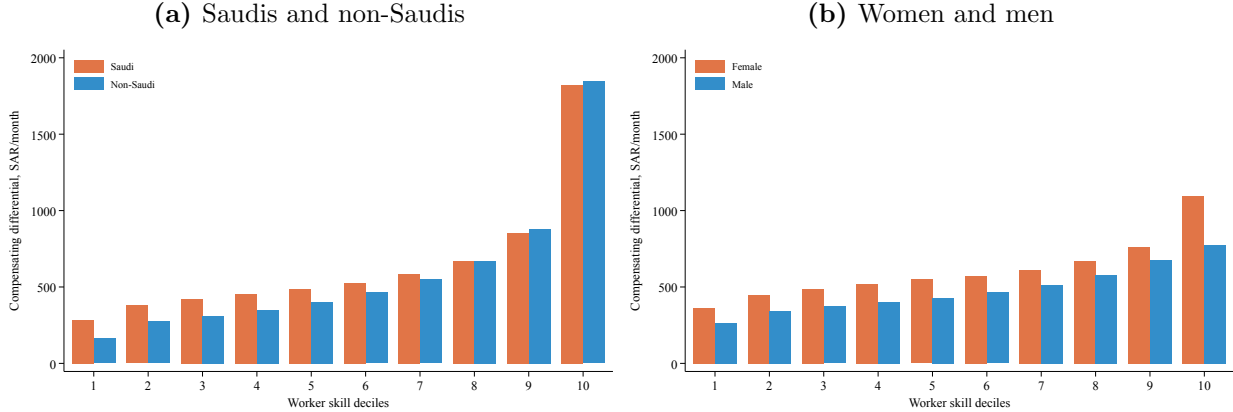
Notes: The figure reports the compensating differentials (in SAR/month) for the marginal worker who is indifferent between working at a foreign or domestic firm. Compensating differentials for (d, x) workers are calculated from the foreign wage premium multiplied by the mean wage level at domestic firms.

workers. Figure 4 displays the value of amenities in terms of SAR per month for the marginal worker by skill deciles. The value of amenities is increasing in skill, which implies that more skilled marginal workers are willing to forgo higher wages at foreign firms in exchange for better amenities at domestic firms.

5.4 Heterogeneous Foreign Wage Premiums and Amenity Differences

We have focused on the differences in labor market outcomes between the average foreign and domestic firm. It is likely that foreign firms are heterogeneous in their productivity and amenities. We are thus motivated to examine potential heterogeneity in foreign wage premiums and amenity differences for different types of foreign firms.

In the first set of analyses, we examine if foreign firms from countries that are culturally close to Saudi Arabia offer different wage premiums and amenities relative to other foreign firms. In practice, we estimate the components of productivity and amenities while splitting foreign ownership F into subcategories based on cultural proximity to Saudi Arabia. The results are reported in Table 3. The six columns report the estimates for foreign firms from (1) Gulf Cooperation Council (GCC) countries, (2) Middle Eastern and North African (MENA) countries, (3) countries with Arabic as one of the official languages, (4) Muslim-majority countries, defined as those with a greater than 50% Muslim population, (5) low-FLFP countries, defined as those with a less than 50% FLFP, and (6) Western countries consisting of European and North American countries. A clear pattern emerges: foreign firms from culturally close countries tend to offer lower wage premiums but better amenities compared with other foreign firms. The pattern is robust overall across different worker demographics. One caveat to interpretation is that the estimates may be driven by underlying factors other than culture. For example, foreign countries that are close to Saudi Arabia may also be relatively poor, which could systemically affect wage premiums and amenities. Moreover,

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Table 3: Heterogeneous foreign wage premiums and amenity differences

	(1)		(2)		(3)		(4)		(5)		(6)	
	GCC	Other	MENA	Other	Arabic	Other	Muslim	Other	Low FLFP	Other	Western	Other
Panel A: Foreign wage premiums												
Saudis	0.14	0.16	0.12	0.17	0.12	0.17	0.16	0.15	0.13	0.18	0.15	0.16
Non-Saudis	0.01	0.17	0.01	0.18	0.00	0.18	0.10	0.15	0.11	0.16	0.21	0.06
Women	0.21	0.22	0.20	0.22	0.20	0.22	0.17	0.27	0.17	0.29	0.30	0.17
Men	0.01	0.17	0.01	0.17	0.01	0.18	0.06	0.17	0.09	0.18	0.16	0.10
Panel B: Amenity differences												
Saudis	0.08	0.01	0.00	0.02	-0.01	0.03	-0.01	0.03	0.08	-0.04	0.02	0.02
Non-Saudis	0.22	0.04	0.16	0.06	0.14	0.06	0.07	0.08	0.09	0.06	0.01	0.14
Women	-0.13	-0.24	-0.16	-0.25	-0.16	-0.25	-0.12	-0.31	-0.13	-0.33	-0.35	-0.12
Men	0.32	0.12	0.22	0.14	0.20	0.15	0.18	0.15	0.19	0.13	0.14	0.17
No. foreign firms	31	165	60	136	64	132	69	127	86	110	100	96

Notes: The table reports the foreign wage premiums and amenity differences for different groups of foreign firms. Group-specific components are estimated following the procedures described in Section 5 while splitting foreign ownership F into different groups, as indicated by the columns. GCC: a dummy for Gulf Cooperation Council countries. MENA: a dummy for Middle Eastern and North African countries. Arabic: a dummy for countries that have Arabic as one of the official languages. Muslim: a dummy for countries whose Muslim share of population is over 50% in 2009. Low FLFP: a dummy for countries with a less than 50% FLFP in 2009. Western: a dummy for European and North American countries. The full list of countries in each category can be found in Table B7 in Appendix B. Estimates by worker skill deciles are plotted in Figures B5 to B10 in Appendix B.

splitting foreign firms into two groups may still mask potential heterogeneity at the country level.

To alleviate these concerns, we conduct a second set of analyses in which we allow components of productivity and amenities to differ by country, from which we estimate the foreign wage premiums and amenity differences at the country level. Specifically, we consider ownership $o \in \mathcal{O}$ to be a country $c \in \mathcal{C}$, where $\mathcal{C}$ denotes the set of all countries included in the sample. To gain insight from the country-specific estimates, we regress country-level estimates (productivity, skill complementarity, foreign wage premiums, and amenity differences) on log GDP per capita, which serves as a measure of the overall productivity of the foreign country. In addition, we regress the estimates on various cultural factors considered in the previous set of analyses separately while controlling for log GDP per capita. We report the regression coefficients of the key variables in Table 4.

We note several findings from Table 4. First, foreign firms from more productive foreign countries (in terms of log GDP per capita) tend to be more productive and offer higher wage premiums relative to other foreign firms, as shown in column (1). Amenity differences, on the other hand, are negatively correlated with log GDP per capita. Second, controlling for log GDP per capita, cultural proximity, as shown in columns (2) to (7), is negatively correlated with the productivity of the foreign firms or the wage premiums they pay but positively correlated with amenities, with a few exceptions.[21] Interestingly, proximity is positively correlated with skill complementarity for

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[21]Readers may wonder whether geography alone can account for the cross-country variations in cultural factors that we consider. In our setting, for historical reasons, geographically close countries (e.g., GCC or MENA countries) are also likely to share a common language (although with different dialects), religion (although with differing schools of

Table 4: Correlations between foreign-country-specific estimates and home characteristics

	(1) Log GDP per capita	(2) GCC	(3) MENA	(4) Arabic	(5) Muslim	(6) Low FLFP	(7) Western
Panel A: Productivity differences							
Saudis	0.12	-0.11	-0.20	-0.21	-0.32	-0.21	0.05
Non-Saudis	0.06	0.03	-0.05	0.09	-0.04	-0.19	0.00
Women	0.10	-0.57	-0.23	-0.23	-0.34	-0.49	0.94
Men	0.11	-0.03	-0.20	-0.17	-0.24	-0.18	0.08
Panel B: Skill complementarity differences							
Saudis	-0.03	0.05	0.02	0.01	0.07	0.06	-0.03
Non-Saudis	0.05	-0.15	-0.06	-0.06	-0.13	0.10	-0.13
Women	-0.06	0.36	0.16	0.16	0.12	0.20	-0.41
Men	0.02	-0.22	-0.01	0.08	-0.06	-0.07	-0.18
Panel C: Foreign wage premiums							
Saudis	0.09	-0.06	-0.17	-0.19	-0.25	-0.17	0.03
Non-Saudis	0.11	-0.08	-0.09	0.09	-0.15	-0.04	-0.11
Women	0.01	-0.25	0.03	0.03	-0.12	-0.24	0.56
Men	0.11	-0.19	-0.18	-0.09	-0.25	-0.18	-0.07
Panel D: Amenity differences							
Saudis	-0.09	0.18	0.16	0.17	0.23	0.29	-0.18
Non-Saudis	-0.07	0.09	0.01	-0.16	0.03	-0.16	0.07
Women	-0.11	0.26	0.16	0.16	0.29	0.33	-0.57
Men	-0.06	0.27	0.15	0.09	0.15	0.05	-0.05

Notes: The table reports the correlations between foreign-country-specific estimates and home characteristics. Foreign-country-specific components are estimated following the procedures described in Section 5 while letting ownership $o \in \{D, F\}$ be a country $c \in \mathcal{C}$. Column (1) reports the correlations with log GDP per capita in 2009. Columns (2) to (7) report the correlations with various home country characteristics, after controlling for log GDP per capita. GCC: a dummy for Gulf Cooperation Council countries. MENA: a dummy for Middle Eastern and North African countries. Arabic: a dummy for countries that have Arabic as one of the official languages. Muslim: a dummy for countries whose Muslim share of population is over 50% in 2009. Low FLFP: a dummy for countries with a less than 50% FLFP in 2009. Western: a dummy for European and North American countries. The full list of countries in each category can be found in Table B7 in Appendix B.

Saudi and female workers. Although these estimates are not causal, they suggest that home country characteristics are potential factors that drive the heterogeneous productivity and amenities of foreign firms. We discuss the implications of these findings in Section 6.

5.5 Counterfactual Exercises

Our results highlight the role of productivity and amenities in determining the differences in labor market outcomes between foreign and domestic firms. To quantify the effect of productivity and

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thought), and relatively low FLFP (although with some heterogeneity). However, our qualitative data point to cultural differences as the origins of frictions between foreign and domestic firms, as opposed to alternative explanations (see Appendix D). It is worth noting that separating culture from geography is possible in other settings in which culture and geography are less correlated.

Table 5: Counterfactual results

	(1)	(2)	(3)	(4)	(5)
	Baseline	$\phi_F(d) = \phi_D(d)$	$\psi_F(d) = \psi_D(d)$	$\phi_F(d) = \phi_D(d)$ $\psi_F(d) = \psi_D(d)$	$a_F(d,x) = a_D(d,x)$
Panel A: Foreign wage premiums					
Saudis	0.16	-0.02	0.18	0.00	0.16
Non-Saudis	0.14	-0.02	0.16	0.00	0.14
Women	0.21	-0.03	0.25	0.00	0.21
Men	0.13	-0.06	0.19	0.00	0.13
Panel B: Log employment differences					
Saudis	1.11	0.68	1.16	0.73	1.04
Non-Saudis	1.50	0.98	1.60	1.08	1.16
Women	0.13	-1.26	0.40	-0.98	1.26
Men	1.58	1.04	1.78	1.24	1.07
Panel C: Worker share differences					
Saudis	-0.18	-0.16	-0.19	-0.17	-0.13
Women	-0.08	-0.11	-0.07	-0.11	0.07

Notes: The table reports the foreign wage premiums, log employment differences, and worker share differences under different counterfactual scenarios. In each scenario, we impose the foreign components of productivity, skill complementarity, and amenities to be the same as their domestic counterparts, as indicated by the columns. Foreign wage premiums in Panel A are calculated based on the definition in Section 5.1. Log employment differences in Panel B are the differences in log total number of workers with certain demographic characteristics indicated by the rows between foreign and domestic firms, after controlling for market-year fixed effects. Saudi and female share differences in Panel C are the differences in the share of Saudi and female workers between foreign and domestic firm, after controlling for market-year fixed effects.

amenity differences, we now conduct counterfactual analyses and examine the changes in key outcomes when foreign and domestic firms assimilate productivity or amenities. To be concrete, we consider scenarios in which we impose the foreign components of productivity, skill complementarity, and amenities to be the same as their domestic counterparts while holding other components fixed. Specifically, we conduct four counterfactual exercises: foreign and domestic firms share the same (a) productivity ($\phi_F(d) = \phi_D(d)$), (b) skill complementarity ($\psi_F(d) = \psi_D(d)$), (c) productivity and skill complementarity, or (d) amenities ($a_F(d,x) = a_D(d,x)$). We report how foreign wage premiums, log employment differences, and worker share differences change in each exercise.

We note several key findings from the counterfactual exercises shown in Table 5. First, productivity differences account for the majority of the foreign wage premiums. As shown in column (2) of Panel A, foreign wage premiums drop significantly and become negative when foreign and domestic firms have the same productivity, whereas foreign wage premiums increase slightly when skill complementarity is the same, as shown in column (3) of Panel A. Second, both productivity and amenities are quantitatively important to rationalize the log employment differences between foreign and domestic firms. As shown in columns (4) and (5) of Panel B, failure to account for productivity or amenity differences between foreign and domestic firms would have produced biased

predictions on log employment differences. Third, amenities tend to matter more than productivity in driving worker share differences. As shown in column (4) of Panel C, assimilating productivity reduces the Saudi share difference by 1 percentage point and widens the female share difference by 3 percentage points. In contrast, assimilating amenities reduces the Saudi share difference by 5 percentage points and changes the female share difference by 15 percentage points from -8 percentage points to 7 percentage points, as shown in column (5) of Panel C. This implies that one would have predicted a less negative Saudi share difference and a positive female share difference without accounting for amenity differences between foreign and domestic firms. In summary, as one of our main contributions, the counterfactual analyses unveil that both productivity and amenities are quantitatively important in rationalizing the labor market outcome differences between foreign and domestic firms.

6 Discussion

We have shown that foreign firms offer higher wages as well as hire a smaller share of Saudi workers and female workers. Our model suggests that both productivity and amenity margins are essential to account for the empirical patterns. In this section, we discuss potential rationales behind the productivity and amenity differences documented in the previous section as a way to understand how foreign firms compensate for labor market frictions in settings in which host country norms greatly differ from home country norms.

6.1 Accounting for Productivity Differences

Productivity Differences. Our estimates suggest that foreign firms tend to be more productive than domestic firms on average (i.e., $\phi_F(d) > \phi_D(d)$), which is consistent with the theoretical and empirical evidence widely documented in the multinational firm literature that foreign firms overcome higher fixed costs in order to operate in a foreign country (Helpman et al. 2004). Consistent with this view, foreign firms coming from more productive countries are likely to be more productive in the host country as well. As shown in column (1) of Table 4, productivity is positively correlated with log GDP per capita in the home country, which is in line with what the theory would predict.

However, our study goes beyond existing literature by finding relatively larger productivity differences between foreign and domestic firms in Saudi Arabia compared to the 15% or lower foreign wage premiums documented in other contexts. This finding suggests that foreign firms operating in Saudi Arabia may face unique challenges related to deep-seated cultural norms that differ significantly from those of their home country. Adapting to these differences may require significant investments in setting up workplaces that satisfy cultural expectations, employee screening, training and monitoring, adjustments to marketing and sales strategies, navigating local regulations and policies, and building relationships and networks within the local business community.[22] As a

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[22]Firms' access to social resources and networks to exercise agency in the local labor market can be captured by firm

result, foreign firms in Saudi Arabia need to be more productive than domestic firms to overcome the higher fixed costs of operation and remain competitive in this setting, in contrast to other settings in which cultural norms between the home and host country are similar. In line with these arguments, Panel A of Table 4 shows that, after controlling for the home country's log GDP per capita, foreign firms coming from countries that are culturally distant from Saudi Arabia tend to be more productive.

Skill Premiums. We document no strong positive skill premiums across different worker demographics in this setting (i.e., $\psi_F(d) < \psi_D(d)$). This contrasts with the positive skill premiums documented in other settings (Setzler and Tintelnot 2021, Alfaro-Urena et al. 2019). In Section 5.2, we document that foreign firms provide disproportionately better amenities to skilled workers, which could be compensating for the lower wage premiums. We discuss the potential factors that affect amenities in the following section. In addition, we speculate that the differing cultural norms foreign firms face in this setting may negatively affect foreign firms' capabilities to capitalize on worker skills relative to domestic firms. First, foreign employers who are unfamiliar with the local language face communication frictions when interacting with local workers (Guillouet et al. 2021). Language barriers between foreign employers and local workers could impede knowledge transfer. One may expect that skilled workers are more severely affected by language barriers as they specialize in cognitive tasks that require frequent communication of complex ideas. Second, foreign employers who are not familiar with or have misperceptions about local cultural norms may struggle to fully accommodate the cultural needs of workers, which could lead to a negative impact on productivity and skill complementarity. Despite lacking direct evidence from our data, we find supporting evidence from surveys that asymmetric beliefs about cultural norms are relevant considerations for both employers and workers. Third, foreign firms are expected to overcome frictions arising from geographical barriers (for example, delays in international travel and differences in time zones) between multinationals' headquarters and their subsidiaries, whereas such barriers are usually absent for domestic firms (Keller and Yeaple 2013). As more skilled workers are more likely to be subject to these frictions, their productivity is more likely to be adversely affected, contributing to the lack of positive skill premiums. In Panel B of Table 4, we find evidence that supports the arguments above: skill complementarity for Saudis and women (who are mainly Saudis) tends to be higher when foreign employers speak Arabic or are culturally close to Saudi Arabia.

Alternative Explanations. Several alternative explanations might contribute to our results. First, it is possible that the observed differences in productivity between foreign and domestic firms are driven by variations in hours of work. Although we do not observe hours of work in our data, we do not find conclusive legislative or anecdotal evidence suggesting any systemic differences in hours of work between foreign and domestic firms. Second, it is possible that foreign firms

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social capital (Lin 2017). Recent research has recognized social capital as an important factor in the labor market and production. Jackson (2017) argues that social capital possesses the features of capital that can be useful in production. Recent work by González (2020) argues that relative to foreign firms, local firms may have an "insider's advantage" when hiring women into executive positions, thanks to their advantage in local social capital.

pay positive wage premiums on average because they are less attractive to workers in non-wage aspects (for example, worse amenities at foreign firms, stigma associated with working at foreign firms). However, as shown in Figure 3, foreign firms tend to provide better amenities overall, except for female workers. Third, that the foreign wage premium is decreasing in worker skills may be explained by public-sector firms being attractive outside options, especially for skilled workers. With a smaller pool of skilled workers available to firms in the private sector, both foreign and domestic firms may pay comparable wages to attract them, resulting in lower foreign wage premiums. However, we do not find direct evidence on wage competition between foreign and domestic firms. Therefore, we believe these alternative explanations do not rule out our proposed mechanism in which differing deep-seated cultural norms drive the observed productivity differences between foreign and domestic firms.

6.2 Accounting for Amenity Differences

We have shown that amenities are essential in rationalizing the differences in employment outcomes between foreign and domestic firms. In this section, we discuss potential considerations that affect firms' decision to differentiate amenities. Recall that foreign firms on average provide better amenities. It is possible that more productive foreign firms provide better amenities, as a complement to offering higher wages.[23] Firms who bring competitive production capabilities to the host country may also be able to provide competitive differing amenities. Expectations to provide desirable amenities conforming to cultural norms may be translated into higher costs to firms regardless of firm ownership. It is likely that more productive foreign firms can easily overcome the costs of setting up amenities.

On the other hand, foreign firms may be heterogeneous in their capabilities of providing desirable amenities. It is possible that more productive foreign firms may provide worse amenities and pay higher wages as compensation. In a setting with differing deep-seated cultural norms such as Saudi Arabia, amenities further include setting up gender-segregated workplaces for both male and female workers and becoming flexible in adjusting work schedules during daily prayer, Muslim holidays, and fasting season, among others. It might be that foreign firms, which are not familiar with local norms or are lacking in local knowledge, are at a disadvantage in providing better amenities because their home country norms differ greatly from the host country norms. Foreign firms may find it too costly to learn about, understand, and accommodate local norms, thereby providing fewer amenities. To provide amenities for female workers in particular, we may expect that norms about gender segregation at work and accommodation for socially determined norms for women to remain available to their households for child care, elder care, and other relevant customs present greater hurdles for unfamiliar foreign firms to surmount in order to accommodate those workers in the workplace.

We find evidence that supports heterogeneous amenities by foreign firm's country of origin in

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[23] Alfaro-Urena et al. (2019) find that multinationals in Costa Rica have better amenities than domestic firms in aspects such as paid extra hours, bonuses, paid vacation days or sick leave, social security contributions, and occupational hazard insurance.

Table 4. First, log GDP per capita is negatively correlated with amenities but positively correlated with foreign wage premiums. This finding aligns with the hypothesis that wages and amenities can be considered as potential substitutes from the perspective of firms. Second, controlling for log GDP per capita, foreign firms coming from countries that share similar cultural norms with Saudi Arabia tend to offer better amenities, which suggests that those firms may be better able to provide desirable amenities because of cultural proximity. Note that we are not able to disentangle different sources of amenities as we do not directly observe amenities in our administrative data. Nevertheless, our findings support the idea that heterogeneous amenities may be influenced by cultural norm differences between the foreign firms' home country and the host country.

6.3 Additional Qualitative Evidence to Guide Interpretation

We focus on the insights from qualitative data (surveys and field studies) that provide suggestive evidence of the kind and importance of amenities as well as how foreign and domestic firms differ in their amenities, especially for women. We use this additional qualitative evidence to guide our interpretation of the results and strengthen our proposed mechanism that differing deep-seated cultural norms affect firms' hiring decisions.

Amenities Are Relevant Considerations for Workers. While amenities are essential elements of our theory, they are relevant considerations for workers in practice. In our survey of 1,000 Saudi undergraduate students and alumni collected in 2017, respondents cite amenities such as short distance to work, short/flexible work hours, possibility for job promotion, and intellectually engaging work as suitable characteristics for their desired workplace. In addition, female workers give higher ranking to amenities such as separate facilities for men and women, onsite child care, and presence of female managers/recruiters relative to male workers, which suggests female and male workers have different preferences for different types of amenities. Similarly, GulfTalent, an online recruitment platform widely used by workers and employers in the Middle East, surveyed 2,440 Saudis who were at the early stages of their career in 2011. Among the characteristics of employers that survey respondents prefer, good training and development, interesting and challenging work, and good company image and reputation rank above good salary and benefits. Regarding religion, 11% of the respondents consider Islamic work or environment as an important factor when choosing an employer. This suggests that non-wage amenities including religious environment are important considerations for workers.

Foreign Firms Provide Better Amenities Overall. Foreign firms and domestic firms differ with respect to amenities, with foreign firms offering better amenities on average. The GulfTalent survey shows that 21 out of the top 50 most popular employers are foreign firms. Some respondents of the GulfTalent survey prefer multinational firms because of their better learning and development opportunities, ethics and professionalism, among others. More recently, Great Place to Work provides rankings of the best employers in Saudi Arabia in 2021 and 2022, and around 50% of the listed companies are foreign owned. A similar ranking of employers by popularity as of 2023

provided by Bayt.com, another online job matching platform in the MENA, shows that 5 out of the top 10 most popular employers in Saudi Arabia are foreign firms. Foreign firms have been more popular employers relative to domestic firms in Saudi Arabia. With better amenities (and higher wages), foreign firms are likely to be more attractive employers than domestic firms for workers on average, which is supported by company popularity rankings.

Foreign Firms Do Not Necessarily Provide Better Amenities for Female Workers. While foreign firms provide better amenities overall, our qualitative data point to the under-provision of amenities for female workers at foreign firms. First, using our data from a sample of 64 foreign and domestic firms at a female-focused career fair, in which we collected the attendance of job seekers and demographics (gender and nationality) of company representatives at each employer booth, we do not find significantly more daily attendees at the booths of multinational firms relative to domestic firms. Similarly, multinational firms did not have significantly more female workers representing the company at their booths compared to domestic firms. This suggests that multinational firms are not more attractive to female job seekers compared with domestic firms and that foreign firms do not distinguish themselves from domestic firms in female leadership, the type of amenity that women value in this setting, to signal cultural compatibility with female job seekers. Second, in the GulfTalent survey, male and female workers show different preferences for employers: 67% of men prefer multinational firms over domestic firms, whereas the share is 33% for women. When foreign firms pay higher wages, the pattern can be rationalized by foreign firms providing relatively fewer amenities to female workers, consistent with our finding.

Differing Deep-Seated Cultural Norms Generate Frictions. External surveys shed light on the existence of frictions originating from differing deep-seated cultural norms. Mababaya (2002) surveyed 45 managers and 189 customers from multinational firms in Saudi Arabia. We highlight two takeaways. First, Muslim respondents think it is important for foreign firms to understand local culture and religious values, but they worry that non-Muslim managers have limited local knowledge and thus lack the ability to comprehend these values and satisfy cultural needs. This implies that cultural norm differences facilitate asymmetric beliefs about local norms between foreign employers and local employees, which generate frictions. Second, evidence supports that there are potential communication frictions arising from differences in language. The survey indicates that the Arabic language is important in doing multinational business in Saudi Arabia, where foreign firms are motivated to hire enough Arabic-speaking employees to fulfill certain tasks. On the other hand, in the GulfTalent survey, 52% of the respondents cite good English as a competitive trait that employers look for in candidates, which implies that English-speaking abilities could mitigate communication frictions that arise while working at foreign firms.

6.4 Policy Implications and Extensions

We briefly comment on the implications of our results on policy design. From a normative perspective, our findings in Saudi Arabia complicate the expectation that multinational companies are

supportive of and even proactive in promoting gender equality in the host country. Policy makers should be aware of differing cultural norms as potential barriers to foreign firm cultural spillovers. From a positive perspective, our model provides a quantitative characterization of the importance of both productivity and amenities in determining labor market outcomes, which could potentially inform the design of labor market policies such as localization programs (*Nitaqat*) or female hiring programs, both of which have gathered increasing interest since the period of our sample. Policy makers could potentially identify the firms that are constrained in providing competitive wages or amenities and offer them incentives in order to satisfy local or female hiring requirements. Focusing on foreign firms, the government has recently instituted policies to encourage inward FDI (e.g., Vision 2030). Complementary policies that help foreign firms to overcome frictions arising from differing cultural norms may be beneficial. Examples of such policies include offering training to foreign employers and employees, subsidizing amenity provision, and providing extra incentives to hire local workers. Preferential policies in favor of foreign firms would help them meet the requirements of existing localization and female hiring programs, would help them survive, and may benefit domestic firms indirectly as well as the Saudi economy overall.

The analytical framework proposed in the paper may be extended in multiple ways to study a wider array of outcomes. First, we primarily focus on the labor market outcomes of full-time workers, but it is possible to incorporate part-time jobs into our framework as well. Given a significant fraction of part-time workers in the private sector in Saudi Arabia, it is likely that the option to substitute into part-time work affects the decisions of both firms and workers. With potentially different preferences for part-time workers, foreign and domestic firms may set wages and hire workers differently. Second, it is possible to consider endogenous productivity processes and amenities to study potential employer learning and adaptation.[24] Foreign firms that are unfamiliar with local norms may adapt to the environment by repeatedly interacting with local firms and workers over time. This may result in foreign firms having different trajectories of productivity and amenities relative to domestic firms over firms' life cycles. Lastly, it is possible to allow firms to endogenously choose whether to integrate both men and women in the workplace. We have found that foreign firms are more likely to be gender integrated than domestic firms in this setting. This can be rationalized by allowing for the extra fixed costs of gender integration, and more productive foreign firms are more capable of overcoming the extra fixed costs (Miller et al. 2020). The extensions mentioned above are beyond the scope of this paper but could potentially be fruitful directions for future research.

7   Conclusion

In this paper, we analyze how multinational firms make hiring and compensation decisions in a setting in which differing deep-seated cultural norms affect labor supply and demand. Using a

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[24]For example, Bayer et al. (2016) provide a tractable dynamic model of neighborhood choice with endogenous amenities, which resembles our study on workers' choice of employers in many aspects. To apply their framework to study endogenous amenities in our setting, one needs to consider the extension in which prices (wages) are endogenous and amenities are either chosen by forward-looking firms or determined in the aggregate in equilibrium.

unique dataset of the Saudi private sector, we find that foreign firms pay higher wages, are larger in employment size, and hire a smaller share of Saudi and female workers relative to domestic firms. Although productivity differences between foreign and domestic firms are an important factor, productivity alone is not sufficient to fully rationalize the empirical patterns we observe.

To account for these empirical patterns, we propose a simple model in which firms differ in both productivity and amenities. By quantitatively examining the importance of these factors, our model highlights the role of amenities in determining the difference in employment outcomes between foreign and domestic firms. In particular, we demonstrate through counterfactual analysis that worker share differences are primarily driven by differences in amenities rather than productivity. In addition, we find systematic evidence that foreign firms from countries with similar cultural norms are likely to be less productive but offer better amenities relative to foreign firms from countries that are culturally distant from the host country. We propose potential mechanisms to explain how differing cultural norms may affect foreign firms' productivity and amenities. We conclude that in a setting with differing deep-seated cultural norms, such as Saudi Arabia, accounting for the potential effects of cultural norms on firm productivity and amenities is important for relevant decision makers to understand the incentives and constraints foreign firms face when doing business far from home.

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APPENDIX

A   Data Appendix

The employer-employee matched dataset is provided by the General Organization for Social Insurance (GOSI) of Saudi Arabia, which contains all private-sector firms that pay social insurance for their employees from 2009 to 2016. We are able to observe, for a specific firm, its unique firm ID, commercial registration number, and industry. On the worker side, we observe information on an employee's date of birth, gender, nationality, education, and full employment history, which consists of firm ID, location, occupation, start date, and end date, as well as monthly wages (in Saudi riyal) in a specific year. The whole sample contains around 15 million unique workers and 526,000 unique firms. Figure A1 compares the private-sector employment data calculated from the GOSI with data from the General Authority for Statistics (GAS) of Saudi Arabia. Data on total employment by worker nationality and gender from the GOSI match the employment data from GAS, although the GOSI data underestimate the number of non-Saudi men prior to 2013.

Figure A1: Total number of employees in the private sector from GOSI and GAS
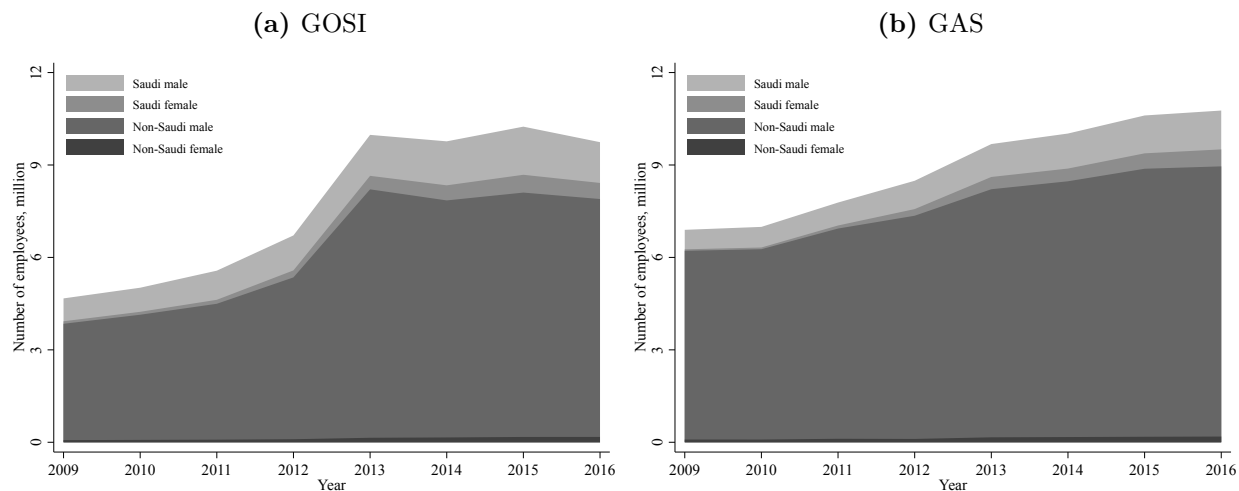
(a) GOSI

(b) GAS

We nest in another firm-level dataset from Bureau van Dijk's Orbis database. Orbis reports the ownership structure of the private companies, and we extract the Global Ultimate Owner (GUO) variables, which show the information of a company or individual that owns over 50% of a firm located in Saudi Arabia. We treat a firm as foreign owned if its GUO is not Saudi Arabia. As reported by Orbis, around 1,800 out of 900,000 active companies in Saudi Arabia are identified as foreign owned in 2019. We note one limitation of the Orbis dataset that we have access to. The dataset represents a cross section from 2019, which means we do not observe a historical panel of the GUO variables we are interested in. Specifically, if companies underwent ownership changes between 2009 and 2016, we can only access the most recent ownership information.

Next, we treat the GOSI sample as the benchmark and merge with the ownership variable from

Figure A2: Log number of employees in Orbis and GOSI
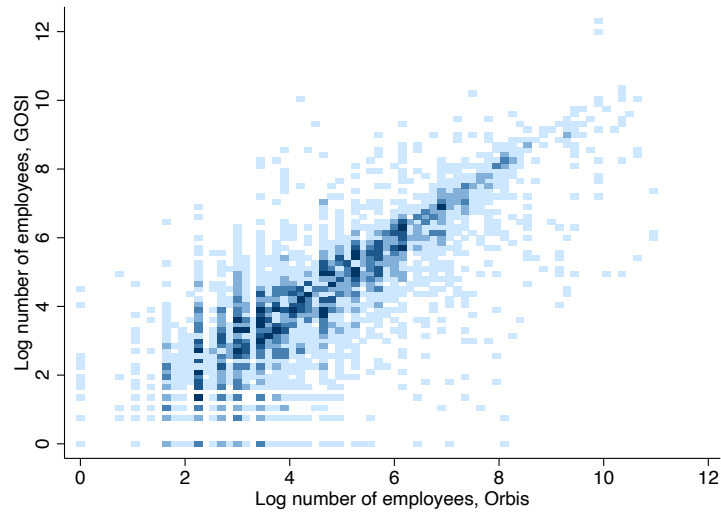
Orbis, based on the common commercial registration number (CRN). More than 150,000 GOSI firms are matched with Orbis firms. We perform several checks on the quality of the merge. First, we plot log firm employment size in Orbis against the log size in the GOSI. As shown in Figure A2, we see that the majority of matched firms have comparable sizes for two measures: most observations lie close to the 45-degree line, with larger firms having a better fit. The correlation between the two measures is 0.79. Second, we check the industry match from the two sources. We find that around 60% of the matched firms have the same industry classification at the uppermost level. This is significant given Orbis and GOSI adopt different industrial classification systems. Hence, we can reject that the merge between the two datasets is random.

Table A1: Descriptive statistics of the full sample and subsamples

	Full sample				Stayers sample				Movers sample			
	Saudi		Non-Saudi		Saudi		Non-Saudi		Saudi		Non-Saudi	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Panel A. Worker Statistics												
Log wage (SAR/month)	7.80	8.08	8.02	8.11	8.22	8.80	8.08	8.28	7.88	8.05	8.64	8.37
	(0.53)	(0.72)	(0.69)	(0.76)	(0.77)	(0.78)	(0.68)	(0.76)	(0.53)	(0.63)	(0.88)	(0.81)
Age	28	28	34	38	32	33	38	41	28	26	37	38
	(8)	(9)	(10)	(10)	(7)	(9)	(10)	(10)	(6)	(7)	(9)	(10)
College degree share (%)	30.18	6.50	30.30	12.30	32.54	5.60	26.23	9.31	32.59	5.53	36.59	15.77
Panel B. Firm Statistics												
Log employment	1.23	1.73	0.71	2.01	3.01	4.38	1.11	4.25	2.75	2.95	1.54	4.06
	(1.32)	(1.51)	(1.10)	(1.69)	(1.55)	(1.20)	(1.40)	(1.19)	(1.55)	(1.51)	(1.87)	(1.58)
Log wage bill (SAR/month)	9.03	9.64	8.81	9.99	11.24	12.74	9.34	12.57	10.75	11.01	9.98	12.51
	(1.48)	(1.76)	(1.33)	(2.00)	(1.53)	(1.34)	(1.56)	(1.41)	(1.59)	(1.74)	(2.03)	(1.79)
Panel C. Aggregate Statistics												
Total number of firms	13,895	13,895	13,895	13,895	3,186	3,186	3,186	3,186	8,054	8,054	8,054	8,054
Total number of workers	79,545	601,087	8,809	833,376	6,849	115,532	1,178	252,316	4,769	65,581	41	15,534
Total wage bill (thousand SAR/month)	466,783	7,649,617	76,224	10,596,377	34,730	1,050,973	5,119	1,422,942	31,596	560,994	730	205,715
Total number of observations	148,861	1,421,364	17,509	2,129,109	27,396	462,128	4,712	1,009,264	9,538	131,162	82	31,068

Notes: Standard deviations of the sample means are reported in parentheses.

B Additional Results

Figure B1: Inward FDI of GCC countries

(a) Inward FDI

(b) Inward FDI as percentage of GDP
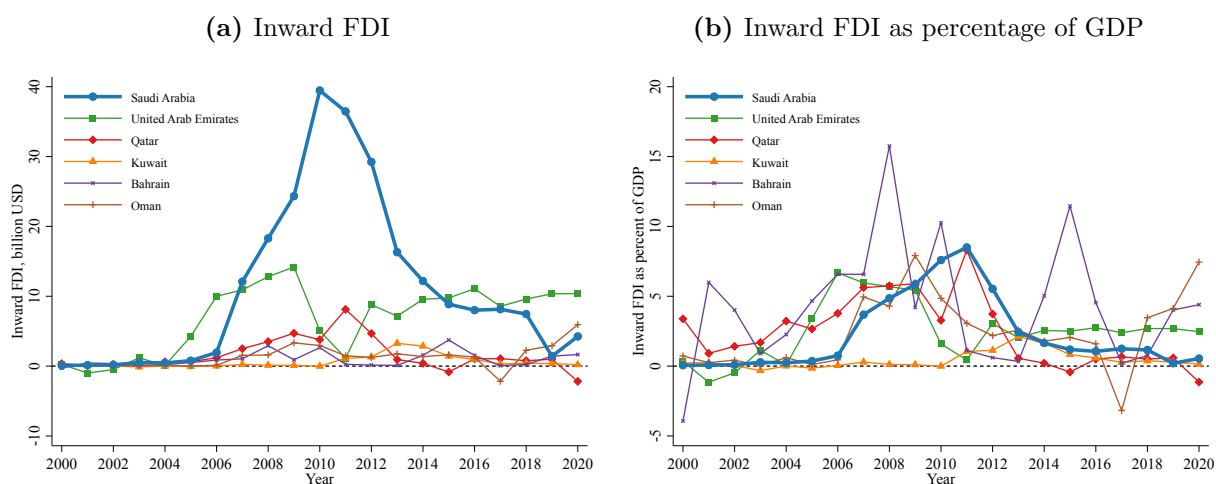
Source: UNCTAD.

Table B1: Profile of domestic and foreign firms by country of origin

	Characteristics of countries		Characteristics of firms in Saudi Arabia	
Country of origin	Muslim share	FLFP	Saudi share	Female share
Saudi Arabia	97.0	17.2	42.7	4.6
United States	0.8	58.1	40.4	2.4
United Arab Emirates	76.2	42.7	32.6	4.3
United Kingdom	2.7	55.5	38.1	1.6
France	6.0	50.8	19.7	0.7
Kuwait	95.0	45.1	50.6	5.7
Switzerland	4.3	61.7	28.3	1.4
Egypt	94.6	22.7	15.5	0.2
Lebanon	59.3	22.6	20.7	1.3
Germany	5.0	52.5	26.8	0.7
Bahrain	81.2	42.6	37.6	12.5

Notes: Saudi shares and female shares are calculated from our analysis sample. FLFP displays the female labor force participation in 2009 obtained from the World Bank. The table only reports Saudi Arabia and the top 10 foreign countries with the most number of firms in Saudi Arabia.

Figure B2: Differing cultural norms and labor market outcomes, female share of Saudi workers
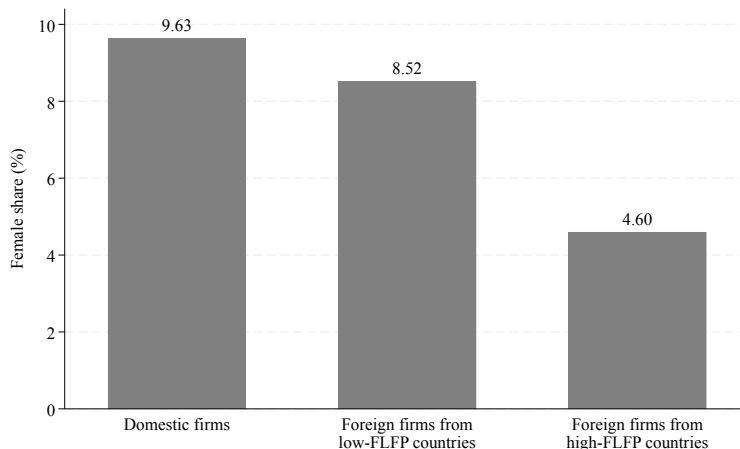
Notes: The figure shows the share of female workers among Saudi workers at firms by cultural proximity between home country and Saudi Arabia. Low-FLFP countries are those with a less than 50% FLFP. The full list of countries in each category can be found in Table B7 in Appendix B. The shares are calculated from our analysis sample described in Section 2.3.

Table B2: Differences between foreign and domestic firms at firm and worker level, Muslim and non-Muslim foreign firms

(a) Employment and worker composition

| | Log employment | | | | | Saudi | Female | Gender |
	All	Saudis	Non-Saudis	Women	Men	share	share	integrated
Muslim	0.86***	0.63***	0.75***	0.13	0.84***	-0.13***	-0.03	0.03
	(0.21)	(0.19)	(0.23)	(0.32)	(0.21)	(0.03)	(0.04)	(0.04)
Non-Muslim	1.59***	1.06***	1.38***	0.14	1.60***	-0.24***	-0.15***	0.13***
	(0.13)	(0.13)	(0.14)	(0.15)	(0.13)	(0.02)	(0.02)	(0.04)
Observations	[45,977]	[41,148]	[28,690]	[11,123]	[45,293]	[41,148]	[11,123]	[45,977]

(b) Wage

	All	Saudis	Non-Saudis	Women	Men
Muslim	0.04	0.04	0.02	0.11**	0.04
	(0.03)	(0.03)	(0.05)	(0.04)	(0.04)
Non-Muslim	0.20***	0.15***	0.25***	0.30***	0.20***
	(0.04)	(0.05)	(0.04)	(0.10)	(0.04)
Observations	[1,757,267]	[1,083,224]	[674,036]	[141,808]	[1,615,432]

Notes: The table reports α_1 from estimating equation (1) using the full analysis sample. Foreign firms are split into Muslim firms and non-Muslim firms. Muslim firms are those from countries with a greater than 50% Muslim share of population. Regressions for log employment control for market-year fixed effects. Regressions for Saudi share, female share, and gender-integrated dummy control for linear employment and market-year fixed effects. Regressions of log wage control for age polynomials, education dummies, and firm employment polynomials, as well as fixed effects associated with occupation, market-year, and gender-nationality-year. Standard errors are clustered at the firm level and are in parentheses. Number of observations are in brackets. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table B3: Differences between foreign and domestic firms at firm and worker level, low-FLFP and high-FLFP foreign firms

(a) Employment and worker composition

	Log employment					Saudi	Female	Gender
	All	Saudis	Non-Saudis	Women	Men	share	share	integrated
Low-FLFP	1.26***	0.88***	1.14***	0.25	1.25***	-0.20***	-0.05	0.01
	(0.20)	(0.19)	(0.21)	(0.29)	(0.20)	(0.03)	(0.03)	(0.04)
High-FLFP	1.52***	1.03***	1.28***	0.09	1.53***	-0.21***	-0.14***	0.18***
	(0.14)	(0.13)	(0.14)	(0.16)	(0.14)	(0.02)	(0.02)	(0.04)
Observations	$[45,935]$	$[41,110]$	$[28,660]$	$[11,112]$	$[45,251]$	$[41,110]$	$[11,112]$	$[45,935]$

(b) Wage

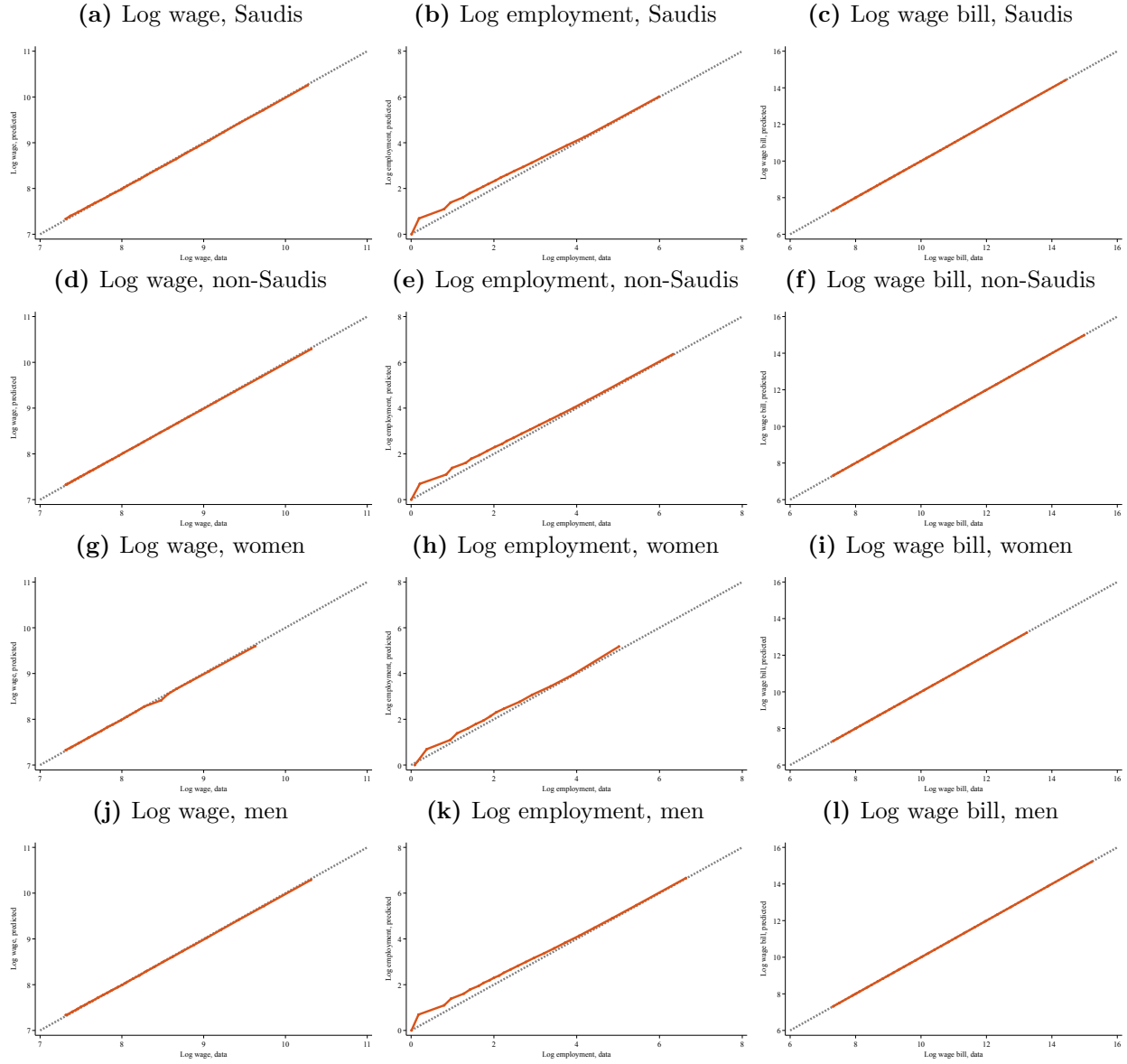|	All	Saudis	Non-Saudis	Women	Men
Low-FLFP	0.07**	0.03	0.09**	0.11***	0.07**
	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)
High-FLFP	0.24***	0.20***	0.28***	0.30**	0.24***
	(0.05)	(0.05)	(0.05)	(0.12)	(0.05)
Observations	$[1,755,420]$	$[1,082,387]$	$[673,026]$	$[141,738]$	$[1,613,655]$

Notes: The table reports α_1 from estimating equation (1) using the full analysis sample. Foreign firms are split into low-FLFP firms and high-FLFP firms. Low-FLFP firms are those from countries with a less than 50% FLFP. Regressions for log employment control for market-year fixed effects. Regressions for Saudi share, female share, and gender-integrated dummy control for linear employment and market-year fixed effects. Regressions of log wage control for age polynomials, education dummies, and firm employment polynomials, as well as fixed effects associated with occupation, market-year, and gender-nationality-year. Standard errors are clustered at the firm level and are in parentheses. Number of observations are in brackets. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Table B4: Accounting for worker skills

	(1) Saudis	(2) Non-Saudis	(3) Women	(4) Men
Age	0.07***	0.06***	0.02***	0.08***
	(0.00)	(0.00)	(0.00)	(0.00)
Age^2/100	-0.05***	-0.05***	-0.03***	-0.07***
	(0.00)	(0.00)	(0.00)	(0.00)
Female	-0.42***	-0.31***	-	-
	(0.00)	(0.02)	-	-
Illiterate	-	-	-	-
	-	-	-	-
Elementary	-0.00	0.02*	-0.09***	-0.00
	(0.01)	(0.01)	(0.02)	(0.01)
Secondary	0.11***	0.05***	-0.12***	0.09***
	(0.01)	(0.01)	(0.02)	(0.00)
High School	0.23***	0.04***	0.10***	0.19***
	(0.01)	(0.01)	(0.02)	(0.00)
Diploma	0.40***	0.13***	0.27***	0.31***
	(0.01)	(0.01)	(0.02)	(0.00)
Bachelor	0.76***	0.51***	0.47***	0.73***
	(0.01)	(0.01)	(0.02)	(0.01)
Master	1.44***	0.85***	1.22***	1.22***
	(0.02)	(0.01)	(0.04)	(0.01)
PhD	1.77***	0.88***	0.72***	1.43***
	(0.04)	(0.03)	(0.08)	(0.03)
Nationality FE	✗	✓	✓	✓
Occupation FE	✓	✓	✓	✓
Constant	-1.70***	-1.57***	-0.69***	-1.93***
	(0.01)	(0.02)	(0.04)	(0.01)
Observations	516,582	284,350	77,840	723,061
R^2	0.348	0.424	0.227	0.401

Notes: The table reports the results of regressing estimated worker skill on various worker demographics and job characteristics. Worker skills are standardized within each worker type. For each worker type indicated by the column, we regress standardized worker skill on age polynomials, female dummy, and education dummies, as well as fixed effects associated with nationality and occupation. Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure B3: Model fit, various worker and firm outcomes

(a) Log wage, Saudis

(b) Log employment, Saudis

(c) Log wage bill, Saudis

(d) Log wage, non-Saudis

(e) Log employment, non-Saudis

(f) Log wage bill, non-Saudis

(g) Log wage, women

(h) Log employment, women

(i) Log wage bill, women

(j) Log wage, men

(k) Log employment, men

(l) Log wage bill, men

Notes: The figure reports the binned scatter plots of model-predicted variables against their data counterparts. Each dot indicates the mean value of the outcome within a bin. We set the total number of bins to be 30. The 45-degree lines are indicated by the dashed gray lines.

Table B5: Differences between foreign and domestic firms at firm and worker level, model predictions

(a) Employment and worker composition

	Log employment				Saudi	Female	Gender
All	Saudis	Non-Saudis	Women	Men	share	share	integrated
1.38***	1.02***	1.31***	0.33	1.37***	-0.19***	-0.09***	0.10***
(0.13)	(0.12)	(0.13)	(0.21)	(0.13)	(0.02)	(0.01)	(0.03)
$[45,985]$	$[41,156]$	$[28,698]$	$[11,129]$	$[45,301]$	$[41,156]$	$[11,129]$	$[45,985]$

(b) Wage

All	Saudis	Non-Saudis	Women	Men
0.16***	0.12***	0.20***	0.18***	0.16***
(0.03)	(0.03)	(0.03)	(0.05)	(0.03)
$[1,760,040]$	$[1,085,759]$	$[674,274]$	$[141,836]$	$[1,618,176]$

Notes: The table reports α_1 from estimating equation (1) using the full analysis sample. Outcome variables are obtained from the model using the parameterization in Table 2. Regressions for log employment control for market-year fixed effects. Regressions for Saudi share, female share, and gender-integrated dummy control for linear employment and market-year fixed effects. Regressions of log wage control for age polynomials, education dummies, and firm employment polynomials, as well as fixed effects associated with occupation, market-year, and gender-nationality-year. Standard errors are clustered at the firm level and are in parentheses. Number of observations are in brackets. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table B6: Model fit under robust specifications

|	(1) Alternative moment	(2) $K = 15$	(3) $K = 20$	(4) 2013-2016 sample
Panel A: Saudis and non-Saudis				
$Corr(\log w_{it}, \log w_{it}^p)$	0.9906	0.9901	0.9901	0.9829
$Corr(\log L_{jt}, \log L_{jt}^p)$	0.9805	0.9823	0.9821	0.9794
$Corr(\log B_{jt}, \log B_{jt}^p)$	0.9997	0.9998	0.9998	0.9994
Panel B: Women and men				
$Corr(\log w_{it}, \log w_{it}^p)$	0.9898	0.9890	0.9888	0.9831
$Corr(\log L_{jt}, \log L_{jt}^p)$	0.9799	0.9802	0.9802	0.9785
$Corr(\log B_{jt}, \log B_{jt}^p)$	0.9999	0.9997	0.9997	0.9997

Notes: The table reports the correlations between outcomes predicted by the model and their data counterparts under different robust specifications. Variables generated from the model are indicated with the superscript p. Column (1) considers an alternative moment condition,

$$\mathbb{E}\left[\Delta^3 b_{j(i,t)t}(d)\left(\Delta^1 w_{it-1} - \frac{1}{1+\beta(d)}\Delta^1 b_{j(i,t-1)t-1}(d)\right)|n_i = n, \ stayers\right] = 0,$$

to identify labor supply elasticities. Estimated labor supply elasticity is 3.44 for Saudis, 2.99 for non-Saudis, 5.63 for female workers, and 2.86 for male workers. Columns (2) and (3) consider $K = 15$ and $K = 20$ clusters when grouping firms using the K-means algorithm. Column (4) considers the 2013-2016 sample while applying the remaining sample restrictions discussed in Section 2.3.

Figure B4: Density of productivity for foreign and domestic firms

(a) Saudis

(b) Non-Saudis

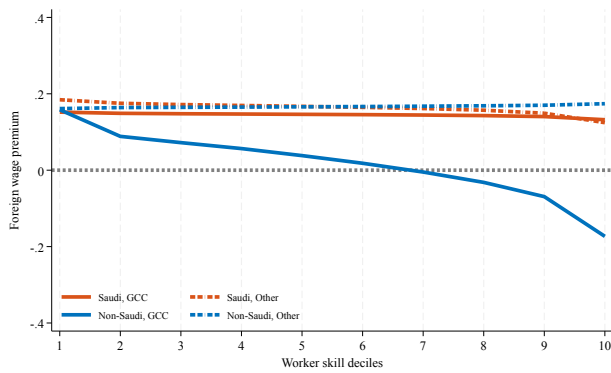
(c) Women

(d) Men
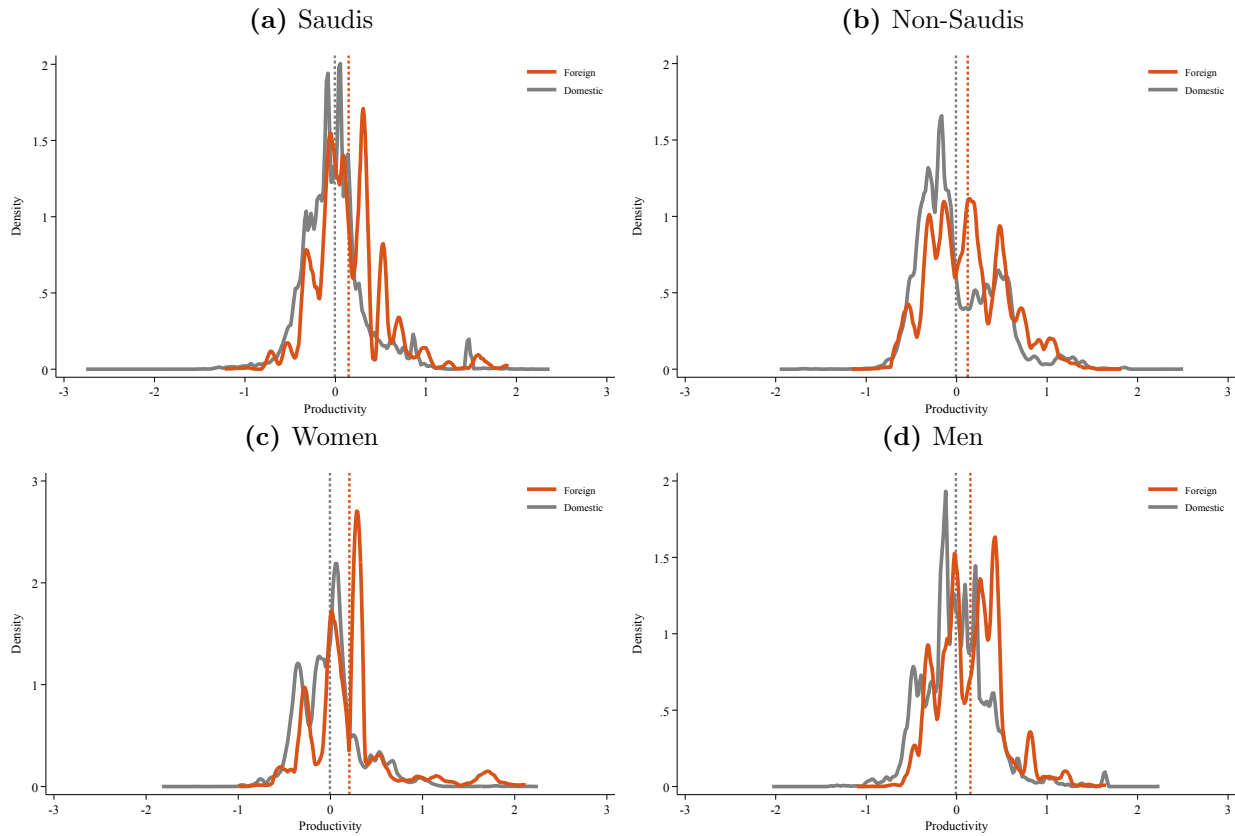
Notes: The figure reports the distributions of residualized productivity for foreign and domestic firms for different worker groups. Given a worker type n, we obtain residualized productivity by regressing estimated productivity $\phi_{jt}(d)$ at the firm-year level on market-year fixed effects. The vertical dashed lines indicate the mean residualized productivity for foreign and domestic firms.

Table B7: List of countries included in each category

Category	Countries included in the analysis sample (ISO-2, excluding SA)
GCC	AE, BH, KW
MENA	AE, BH, DZ, EG, IR, JO, KW, LB, SY, TN
Arabic	AE, BH, DZ, EG, JO, KW, LB, PS, SY, TN, YE
Muslim	AE, BH, DZ, EG, IR, JO, KW, LB, PS, SN, SY, TN, TR, YE
Low-FLFP	AE, BE, BH, DZ, EG, IN, IR, IT, JO, JP, KR, KW, LB, LU, PA, PS, SN, TN, TR, YE
Western	AT, BE, BM, CA, CH, DE, DK, ES, FR, GB, IE, IT, LU, NL, NO, SE, US
All	AE, AT, BE, BH, BM, CA, CH, CN, CW, CY, DE, DK, DZ, EG, ES, FR, GB, IE, IN, IR, IT, JO, JP, KR, KW, KY, LB, LU, NL, NO, PA, PS, SE, SG, SN, SY, TN, TR, US, VG, YE

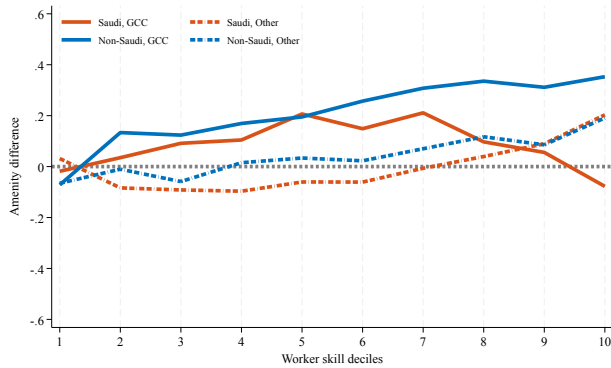**Figure B5:** Foreign wage premiums and amenity differences, GCC versus other foreign firms

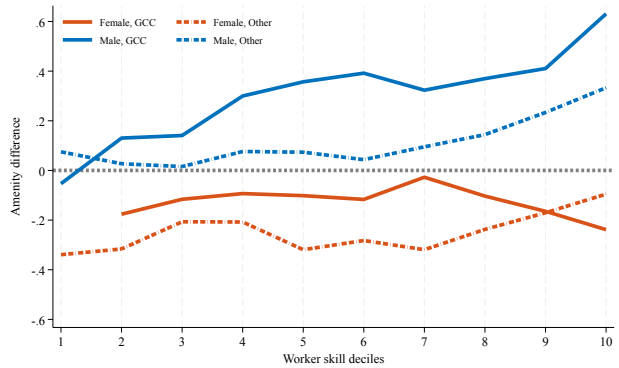**(a)** Foreign wage premiums, Saudis and non-Saudis

(b) Foreign wage premiums, women and men
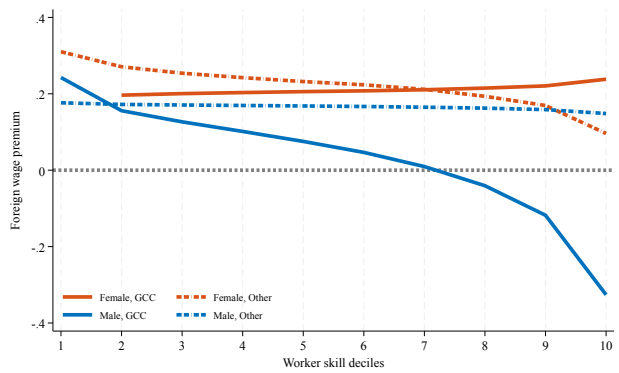
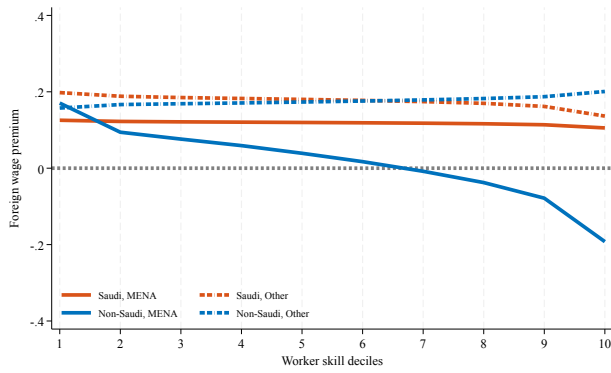**(c)** Amenity differences, Saudis and non-Saudis
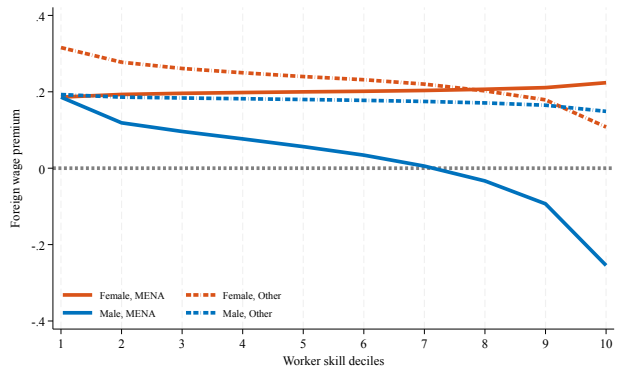
(d) Amenity differences, women and men

Notes: The figure reports the foreign wage premiums and amenity differences for workers with different demographics by skill deciles. We split foreign firms into firms from GCC countries and those from other foreign countries. Foreign wage premiums and amenity differences are calculated based on the definition in the text.

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Figure B6: Foreign wage premiums and amenity differences, MENA versus other foreign firms
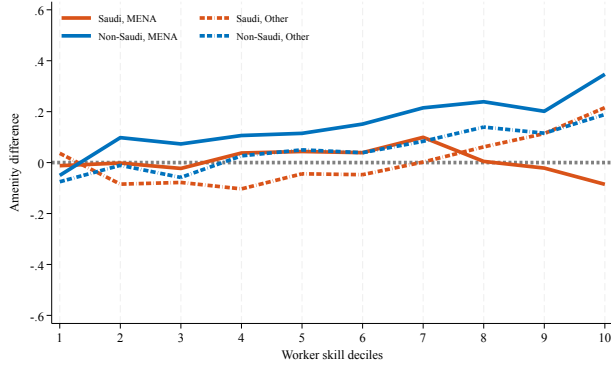
(a) Foreign wage premiums, Saudis and non-Saudis

(b) Foreign wage premiums, women and men

(c) Amenity differences, Saudis and non-Saudis

(d) Amenity differences, women and men

Notes: The figure reports the foreign wage premiums and amenity differences for workers with different demographics by skill deciles. We split foreign firms into firms from MENA countries and those from other foreign countries. Foreign wage premiums and amenity differences are calculated based on the definition in the text.
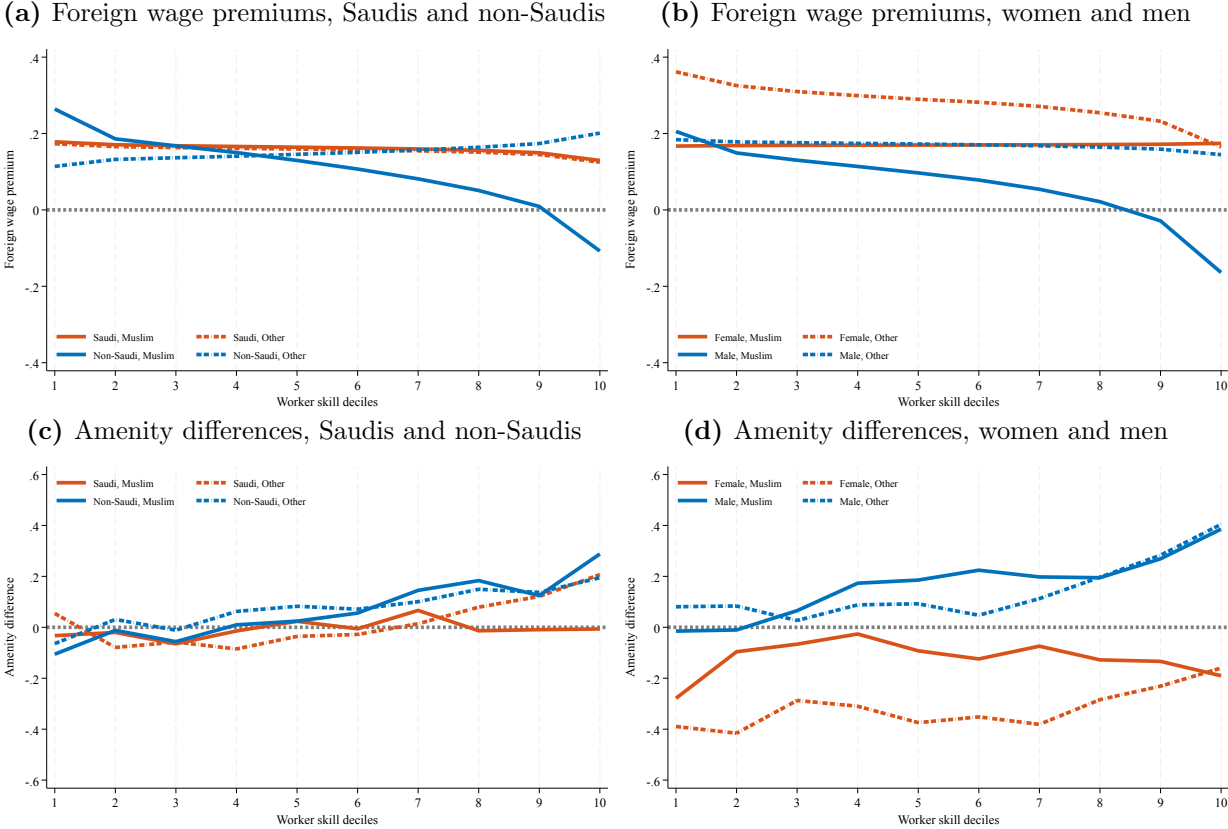
Figure B7: Foreign wage premiums and amenity differences, Arabic versus other foreign firms

(a) Foreign wage premiums, Saudis and non-Saudis

(b) Foreign wage premiums, women and men

(c) Amenity differences, Saudis and non-Saudis

(d) Amenity differences, women and men

Notes: The figure reports the foreign wage premiums and amenity differences for workers with different demographics by skill deciles. We split foreign firms into firms from Arabic-speaking countries—countries that have Arabic as one of the official languages—and those from other foreign countries. Foreign wage premiums and amenity differences are calculated based on the definition in the text.
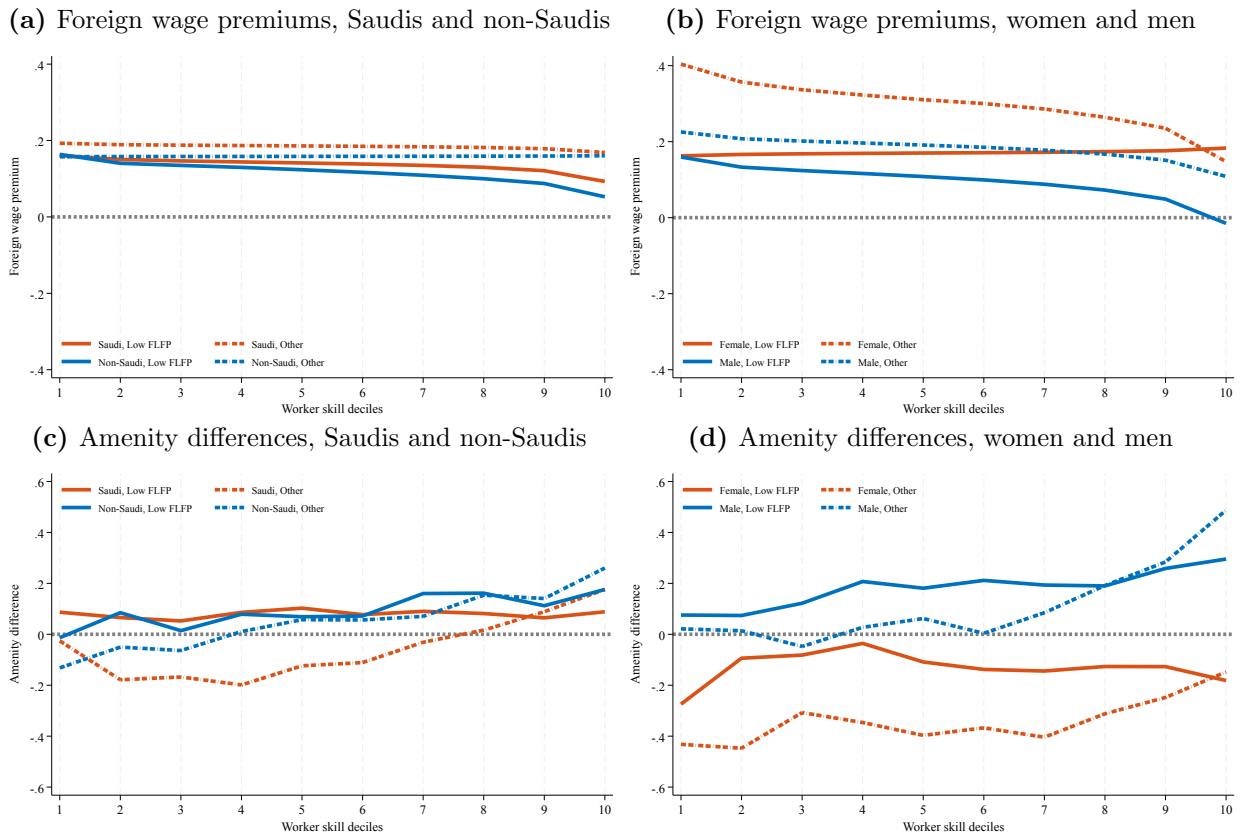
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Figure B8: Foreign wage premiums and amenity differences, Muslim versus other foreign firms

(a) Foreign wage premiums, Saudis and non-Saudis

(b) Foreign wage premiums, women and men

(c) Amenity differences, Saudis and non-Saudis

(d) Amenity differences, women and men

Notes: The figure reports the foreign wage premiums and amenity differences for workers with different demographics by skill deciles. We split foreign firms into firms from Muslim-majority countries—countries that have a greater than 50% Muslim population—and those from other foreign countries. Foreign wage premiums and amenity differences are calculated based on the definition in the text.
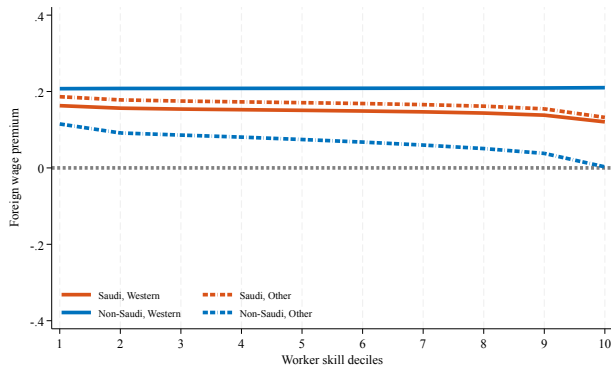
Figure B9: Foreign wage premiums and amenity differences, low-FLFP versus other foreign firms

(a) Foreign wage premiums, Saudis and non-Saudis

(b) Foreign wage premiums, women and men

(c) Amenity differences, Saudis and non-Saudis

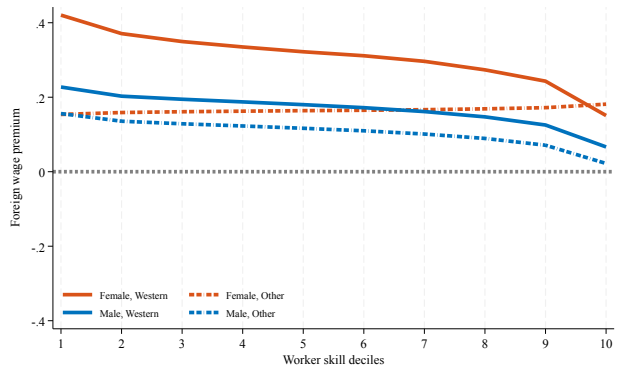**(d)** Amenity differences, women and men

Notes: The figure reports the foreign wage premiums and amenity differences for workers with different demographics by skill deciles. We split foreign firms into firms from low-FLFP countries—countries with a less than 50% FLFP—and those from other foreign countries. Foreign wage premiums and amenity differences are calculated based on the definition in the text.

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Figure B10: Foreign wage premiums and amenity differences, Western versus other foreign firms
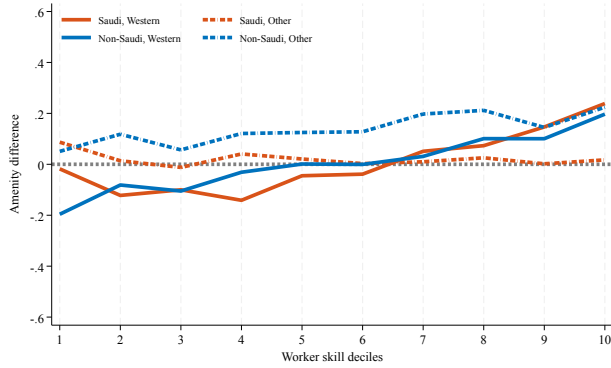
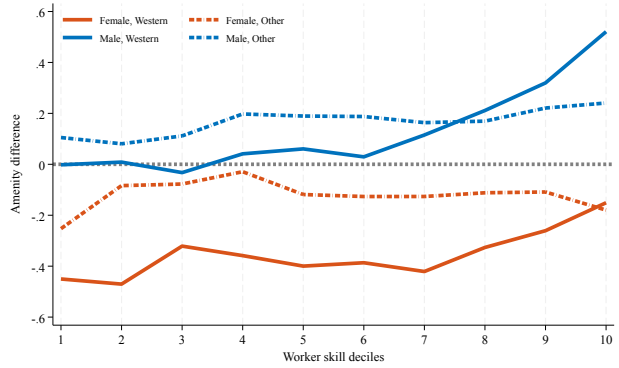**(a)** Foreign wage premiums, Saudis and non-Saudis

(b) Foreign wage premiums, women and men

(c) Amenity differences, Saudis and non-Saudis

(d) Amenity differences, women and men

Notes: The figure reports the foreign wage premiums and amenity differences for workers with different demographics by skill deciles. We split foreign firms into firms from Western countries—European and North American countries— and those from other foreign countries. Foreign wage premiums and amenity differences are calculated based on the definition in the text.

B.1 Evidence of Foreign Wage Premium from Mover Design

In this section, we estimate the foreign wage premium using the mover design proposed by Card et al. (2013). Foreign wage premiums can be estimated by comparing the wages of domestic-to-foreign movers with the wages of domestic-to-domestic movers. Consider the following regression:

$$\Delta \log w_{it} = \alpha_0 + \alpha^{DF} S_{it}^{DF} + \alpha^{FD} S_{it}^{FD} + \alpha^{FF} S_{it}^{FF} + \beta X_{it} + \gamma_{it} + \tilde{\gamma}_{it-1} + \epsilon_{it}, \tag{B1}$$

where the outcome variable is the change in log wage and S_{it}'s are dummies for different types of movers, with superscripts indicating the change in firm ownership (for example, DF means a worker moves from a domestic firm to a foreign firm). Dummies for the category of workers who move between two domestic firms are omitted, thereby making those workers serve as the control group. The term X_{it} is a vector of controls at the worker level, which contains age polynomials, and γ_{it} controls for occupation, market-year, and gender-nationality-year fixed effects. We also include $\tilde{\gamma}_{it-1}$ in order to control for occupation and market-year fixed effects before the job move.

Table B8: Foreign wage premiums from the mover design

	(1) All workers	(2) Saudis	(3) Non-Saudis	(4) Women	(5) Men
$D \rightarrow F$	0.09***	0.09***	0.08**	0.07**	0.09***
	(0.02)	(0.02)	(0.04)	(0.04)	(0.02)
$F \rightarrow D$	-0.05***	-0.04***	-0.08*	-0.10**	-0.05***
	(0.01)	(0.01)	(0.04)	(0.05)	(0.01)
$F \rightarrow F$	0.05*	0.07**	-0.04	-0.14	0.06**
	(0.03)	(0.03)	(0.10)	(0.10)	(0.03)
$D \rightarrow D$ (Omitted)					
Observations	85,802	70,289	15,408	4,681	81,002

Notes: The table reports the results from estimating equation (B1) using the sample of movers. Regressions control for age polynomials, gender-nationality-year fixed effects, and occupation and market-year fixed effects both before and after the job move. Standard errors are clustered at the firm level and are in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table B8 displays the results from estimating equation (B1). As shown in column (1), the foreign wage premium is 9% among all workers. A positive foreign wage premium remains for workers with a different nationality or gender, as shown in columns (2) to (5). Moreover, workers moving from foreign to domestic firms face a negative premium, which implies that foreign firms are more productive than domestic firms on average. Lastly, the estimates for DF and FD movers are slightly asymmetric, which implies that potential interactions between firms and workers may play a role in determining the wages before and after the move.

C Model Appendix

C.1 Model Solutions

In this section, we provide the derivations of equations in Section 3. Firm j's optimization problem is given by

$$\max_{\{W_{jt}(d,x),L_{jt}(d,x)\}} \sum_{n \in \mathcal{D}} \Phi_{jt}(d) \int_{\mathcal{X}} \exp(\psi_j(d)x) L_{jt}(d,x) dx - \sum_{n \in \mathcal{D}} \int_{\mathcal{X}} W_{jt}(d,x) L_{jt}(d,x) dx,$$

subject to (2). Substitute (2) into the objective and obtain the first-order condition with respect to $W_{jt}(d,x)$:

$$
\begin{aligned}
0 &= \Phi_{jt}(d) \exp(\psi_j(d)x) \frac{\partial L_{jt}(d,x)}{\partial W_{jt}(d,x)} - L_{jt}(d,x) - W_{jt}(d,x) \frac{\partial L_{jt}(d,x)}{\partial W_{jt}(d,x)} \\
&= \Phi_{jt}(d) \exp(\psi_j(d)x) \beta(d) \frac{L_{jt}(d,x)}{W_{jt}(d,x)} - L_{jt}(d,x) - \beta(d) L_{jt}(d,x) \\
&= \Phi_{jt}(d) \exp(\psi_j(d)x) \beta(d) \frac{1}{W_{jt}(d,x)} - 1 - \beta(d),
\end{aligned}
$$

where the second equation utilizes the fact that $\frac{\partial L_{jt}(d,x)}{\partial W_{jt}(d,x)} = \beta(d) \frac{L_{jt}(d,x)}{W_{jt}(d,x)}$, and the third equation eliminates $L_{jt}(d,x)$. Rearrange the equation above and obtain the optimal wage equation:

$$W_{jt}(d,x) = \frac{\beta(d)}{1+\beta(d)} \Phi_{jt}(d) \exp(\psi_j(d)x).$$

As firms facing upward-sloping labor supply curves have labor market power, the wage for (d,x) workers at firm j is a constant markdown $\frac{\beta(d)}{1+\beta(d)}$ of workers' marginal product $\Phi_{jt}(d) \exp(\psi_j(d)x)$.

D Qualitative Data

As part of a larger project on Saudi employer and job seeker matching, we collected qualitative data with surveys and field studies from 2016 to 2020. The qualitative data provide suggestive evidence of the kind and importance of amenities as well as how foreign and domestic firms differ in their amenities, especially for female workers. We use this additional qualitative evidence to guide our interpretation of the results and strengthen our proposed mechanism that differing deep-seated cultural norms influence firms' hiring decisions. Appendix D.1 describes the qualitative data and the empirical methodology, and Appendix D.2 summarizes the findings.

D.1 Description of Data and Methodology

Surveys.   We surveyed around 1,000 undergraduate students and alumni in Saudi Arabia recruited from universities, career fairs, and business meetings on their career investments while in school. In particular, we rely on the responses to one question that is the most relevant to our study: "What top characteristics describe a 'suitable workplace'?" Respondents were asked to rank 14 workplace characteristics. We obtain 488 observations that have a valid response to this question, of which 296 are women. We calculate the average ranking among respondents by demographics. The results are reported in Table D1 in Appendix D.2.

Field Studies.   We collected data at a female-focused career fair on the attendance of job seekers at each employer booth. Multiple times throughout the day, we counted the number of job seekers (mostly women) at each employer booth. We also counted the number of employees by demographics at employer booths. We aggregate the data into a daily frequency. Our sample includes 33 foreign employers and 31 domestic employers in the private sector. Using the sample, we regress various outcomes (total number of job seekers, an indicator for female employee presence, or total number of female employees conditional on having a positive number of women) on a dummy for being a foreign employer and day fixed effects. In Table D2 in Appendix D.2, we report the estimated coefficient on the foreign dummy, which captures the difference between foreign and domestic firms.

D.2 Summary of Findings

Amenities Are Relevant Considerations for Workers.   As shown in Table D1, our survey respondents cite amenities such as short distance to work, short/flexible work hours, possibility for job promotion, and intellectually engaging work as suitable characteristics for their desired workplace. In addition, columns (2) and (3) of Table D1 show that female workers give higher ranking to amenities such as separate facilities for men and women, onsite child care, and presence of female managers/recruiters relative to male workers, which suggests female and male workers have different preferences for different types of amenities.

Table D1: Average ranking of suitable workplace characteristics by worker demographics

	(1) All	(2) Women	(3) Men
High salary	3.82	4.27	3.13
Flexible work hours	4.29	4.23	4.38
Short distance to work	4.44	4.55	4.27
Possibility for job promotion	5.79	6.03	5.42
Intellectually engaging work	6.35	6.21	6.56
Short work hours	6.92	7.01	6.78
Offers housing stipend	7.13	7.70	6.26
Separate facilities for men and women	7.44	6.52	8.85
Offers child care	8.83	8.79	8.88
Presence of female managers	9.75	9.22	10.56
Physically engaging work	10.08	9.71	10.66
Presence of alumni from my college	10.11	10.36	9.73
Meeting with a female recruiter from the company/organization	10.64	10.44	10.93
Meeting with an alumni from my college as a recruiter from the company/organization	11.40	11.69	10.96
Observations	488	296	192

Notes: The data were obtained from the college student survey conducted by the authors. Workplace characteristics are ordered based on the average ranking among all respondents (column (1)).

Foreign Firms Do Not Necessarily Provide Better Amenities for Female Workers. Using our data on career fair attendance, we find that multinational firms did not have significantly more daily attendees compared to domestic firms, as shown in column (1) of Table D2. Similarly, multinational firms did not have significantly more female workers representing the company at the booth compared to domestic firms, as shown in columns (2) and (3) of Table D2. This suggests that multinational firms are not more attractive to female job seekers compared with domestic firms and that foreign firms do not distinguish themselves from domestic firms in female leadership, the type of amenity that women value in this setting, to signal cultural compatibility with female job seekers.

Table D2: Attendance differences between foreign and domestic firms at the career fair

	(1) Total number of job seekers	(2) Indicator for female employee presence	(3) Total number of female employees conditional on female employee presence
Foreign	0.20	0.03	-0.18
	(4.55)	(0.05)	(0.19)
Constant	21.33***	0.53***	2.02***
	(4.02)	(0.04)	(0.14)
Observations	192	192	104
Day fixed effects	✓	✓	✓

Notes: Standard errors are clustered at the firm level and are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.