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

Alessandra L. González
Duke University

Xianglong Kong
University of Chicago

December 17, 2024

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 country norms. Using employer-employee matched data of the private sector in Saudi Arabia, we find that foreign firms hire a smaller share of women but offer them disproportionately higher wages than domestic firms, suggesting that wage differentials alone do not fully explain worker share differences. To account for these findings, we develop a model incorporating both productivity and amenities to quantify their roles in determining labor market outcomes. Through the lens of our model, women experience disproportionately lower amenities at foreign firms relative to men, such that women sorting away from foreign firms is primarily driven by amenities rather than productivity. Finally, among foreign firms, workers at foreign firms from culturally similar countries to the host country experience greater amenities but lower wage premiums. Our results demonstrate amenities are quantitatively important in understanding the labor market outcomes of foreign firms in a setting where home and host country cultural norms depart.

*González: alessandra.gonzalez@duke.edu; Kong: xlkong@uchicago.edu. This research was sponsored in part by grants from the BFI Initiative for the Study of Gender in the Economy and a grant from the Harvard Kennedy School Evidence for Policy Design (EPoD) program and the Human Resources Development Fund (HRDF) of the Kingdom of Saudi Arabia. We are grateful to the EPoD-HRDF collaboration for use of the GOSI data. The qualitative data included in this study were collected with approval by the University of Chicago Institutional Review Board (IRB16-1512). We are grateful to the editor (Stefania Garetto), three anonymous referees, Patricia Cortés, Levi Crews, Jennifer Peck, Felix Tintelnot, and Daniel Yi Xu for comments that significantly improved the paper. We thank participants at the International Trade Working Group at the University of Chicago, the Academy of Management conference, the Macro History and Macro Finance seminar at the University of Bonn, Duke University, the Midwest International Trade and Theory conference, and the University of Wisconsin–Madison for feedback on earlier versions of the draft. All errors are our own.

1 Introduction

While economists have recognized the labor market outcome differences between foreign multinational enterprises (MNEs) 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 countries 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 utilize administrative employer-employee matched data from the General Organization for Social Insurance (GOSI) in Saudi Arabia, covering the universe of firms in the private sector from 2009 to 2016. This dataset is merged with firm ownership information from Bureau van Dijk's Orbis Historical database, allowing us to identify the country of ownership. To the best of our knowledge, this is the first dataset that combines both employer-employee matched data and ownership information for the private sector in Saudi Arabia.

Our first contribution is to document a set of distinct facts on the differences in labor market outcomes between foreign and domestic firms. First, foreign firms are larger in employment size relative to domestic firms. Moreover, foreign firms have a smaller share of female workers. The smaller female share at foreign firms is somewhat surprising given the higher average female labor force participation (FLFP) in foreign firms' home countries. Second, foreign firms offer higher wages on average, with the wage gap being larger for women than for men. We find similar patterns when analyzing differential wage growth of movers. Third, we examine heterogeneous labor market outcomes based on cultural similarity between Saudi Arabia and foreign countries, defined by established cultural norms. We find that foreign firms from culturally different countries have the smallest share of female workers, but they pay the highest wages. Part of these empirical patterns can be rationalized by foreign firms being more productive due to selection into FDI. However, the fact that women tend to sort away from foreign firms, despite the disproportionately higher wages offered to women relative to men, suggests that wage or productivity differences alone cannot fully explain the observed outcomes.

To account for these empirical findings, we extend the model in Setzler and Tintelnot (2021) to incorporate amenities, which summarize the non-wage attributes of a job. Amenities are particularly relevant in Saudi Arabia, where deep-seated cultural norms likely shape firms' preferences and abilities to attract, employ, and retain workers, and influence worker preferences as well. In the model, amenities shift workers' preferences over firms, which allows for flexible worker sorting across firms conditional on wages. We estimate firm-level productivity and amenities using the methodology by Lamadon et al. (2022). The estimated model allows us to quantify the extent to which productivity and amenities determine wage, employment, and worker sorting patterns.

[1] Figure A1 in Appendix A 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).

Through the lens of the model, we provide new insights on the differences between foreign and domestic firms. First, we estimate an average foreign wage premium of 30%, 10%, and 24% for Saudi women, Saudi men, and non-Saudi men, respectively.[2] The finding that Saudi women face a higher foreign wage premium relative to Saudi men aligns with the reduced-form results but stands in contrast to the lower female share at foreign firms. Second, the difference in estimated amenities between foreign and domestic firms is -18%, 4%, and -13% in wage equivalent terms, for Saudi women, Saudi men, and non-Saudi men, respectively. Note that women face disproportionately lower amenities at foreign firms relative to men. Third, counterfactual exercises in which foreign and domestic firms assimilate productivity or amenities show that both productivity and amenities are quantitatively important in rationalizing the observed labor market outcomes. In particular, women sorting away from foreign firms is primarily driven by differences in amenities rather than productivity. Fourth, heterogeneity analysis reveals that workers receive higher wage premiums but lower amenities at foreign firms from culturally different countries relative to those from culturally similar countries.

To better understand these findings, we argue that differing deep-seated cultural norms operate as frictions that systematically affect productivity and amenities of firms from different countries. On the one hand, differing deep-seated cultural norms may translate into stringent selection into FDI, where foreign firms from culturally different countries need to be more productive to overcome the higher fixed costs, thereby paying higher wage premiums. On the other hand, differing deep-seated cultural norms may limit labor market access and induce asymmetric information and belief, where foreign firms under-provide desired amenities or workers face disamenities at foreign firms. Qualitative evidence from surveys support our proposed mechanisms that differing deep-seated cultural norms generate frictions that affect foreign firm operations. Our results suggest that accounting for amenities helps explain foreign firm behavior in a setting with differing deep-seated cultural norms and guides the optimal design of incentives to attract foreign firms, encourage the hiring of locals and women, and improve the allocative efficiency of skills.

Our paper contributes to the research on the effects of FDI on labor market outcomes. Unlike previous research focused on the *extensive margin* of firms' decisions to become multinationals, this growing line of research focuses on the *intensive margin*: the outcomes of foreign firms already operating in the host country. We estimate positive foreign wage premiums in Saudi Arabia, consistent with the findings in other settings.[3] Following the literature, we explain the higher wages at foreign firms through productivity selection (Melitz 2003, Helpman et al. 2004), where variations in foreign wage premiums across countries can be explained by heterogeneous fixed costs due to differing deep-seated cultural norms. Our analysis is closely related to recent work by Setzler

[2]Note that non-Saudi women are under-represented at foreign firms in our sample. Therefore, we do not present the model estimates for non-Saudi women as their estimates are under-powered. We instead focus our discussion on the outcomes for Saudi women relative to Saudi men.

[3]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 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%.

and Tintelnot (2021) and Alfaro-Urena et al. (2019), who demonstrate mechanisms and quantify the labor market effects of foreign firms through the lens of a structural model. 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 to this literature is that we quantify the importance of amenities in rationalizing differences in labor market outcomes between foreign and domestic firms through counterfactual analysis.

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 productivity and amenities in systematic ways.[5] This carries distinct policy implications as local labor market policies likely have different effects on firms from various 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, in some settings, foreign firms have been found 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. 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

[4]Since the seminal work by Abowd et al. (1999), numerous research has focused on the effect of productivity on wage (i.e., the firm effect). Recent research has recognized the importance of amenities in affecting labor market outcomes. For example, 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. Using data on Brazilian labor market, Morchio and Moser (2024) estimate an equilibrium search model of endogenous wages and amenities and quantify their roles in explaining the gender pay gap, in line with our analysis on gender-based compensation and sorting. We instead focus on the differences across firms by ownership, highlighting the roles of differing deep-seated cultural norms in explaining these differences.

[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.

2020). While we find evidence to support that foreign firms hire a smaller share of women relative to domestic firms, we highlight productivity and amenities as two distinct drivers of the result. In particular, we show that when women sort away from foreign firms, it is primarily driven by differences in amenities. Our analysis suggests that the existence of foreign cultural spillovers hinges on how foreign firms attract workers, and the degree of such spillovers depends on the amenities workers experience.

The rest of the paper is organized as follows: Section 2 describes the data and discusses deep-seated cultural norms in Saudi Arabia. Section 3 characterizes the differences in labor market outcomes between foreign and domestic firms. Section 4 develops a simple model that accounts for the empirical evidence. Section 5 describes the quantification strategy and estimation results. Section 6 provides empirical insights on foreign firm behavior through the lens of the model and emphasizes the roles of differing deep-seated cultural norms in rationalizing the results. Section 7 concludes.

2 Data and Research Setting

We begin by describing our data and the construction of the analysis samples in Section 2.1. Section 2.2 then presents the salient features of the Saudi labor market. Section 2.3 discusses the deep-seated cultural norms and how they affect labor supply and demand. We conclude the section by providing some initial evidence on how labor market outcomes are correlated with cultural similarity between foreign firms' home country and the host country.

2.1 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 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 entire sample contains over 15 million unique workers and 526,000 unique firms.[6]

Our second main dataset is the Orbis Historical database from Bureau van Dijk. Orbis Historical tracks the ownership structure of the companies worldwide since 2007. We keep the sample of firms located in Saudi Arabia and extract their Global Ultimate Owner (GUO) variables, which contain the information of the entity that owns over 50% of a firm in each year. We treat a firm as foreign if its GUO is not an entity in Saudi Arabia. In addition, we leverage the entire ownership structure

[6]Figure A2 in Appendix A shows that the total employment by worker nationality and gender from our sample match the employment from the General Authority for Statistics. Our sample underestimates the number of non-Saudi men prior to 2013, possibly due to gradual compliance with the GOSI program for foreign expatriates (Evidence for Policy Design 2015). Note that this does not challenge our identification strategy, which relies on differential labor market outcomes and not on the level of total labor supply, as shown below.

from Orbis Historical to identify domestic MNEs—Saudi firms with foreign subsidiaries. In the rest of the paper, we treat domestic MNEs as a separate category from domestic non-MNEs, which we refer to as domestic firms when it does not cause confusion.

We merge the GOSI data with the Orbis data based on a common commercial registration number. 44% of the firm-year observations in GOSI have a match with Orbis, accounting for 73% of the worker-year observations.[7] For the firms that are matched, we show in Figure A3 in Appendix A that firm-level employment from the two sources are highly correlated, which assures the quality of the merge. The GOSI-Orbis merged dataset contains 438 unique foreign firms and 249 unique domestic MNEs.

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

Sample Restrictions. We impose several sample restrictions. First, we keep individuals between ages 18 and 60 to focus on prime-age workers. Second, we focus our analyses on workers with full-time jobs—workers whose monthly wage is no less than the minimum wage level—as firms may set wages differently for part-time workers relative to full-time workers (Song et al. 2019). Third, 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.[8] Lastly, we restrict our sample to the period between 2009 and 2012. Multiple labor market policies, notably the increase in the minimum wage for Saudi workers, have been implemented since 2013. By focusing on the sample prior to 2013, we thereby rule out potential confounding factors that threaten the identification of targeted parameters. In addition, reporting might be incomplete near the end of the sampling period, leading to measurement errors. We are thus motivated to focus on a clean subsample that is less affected by the confounders while still sufficient for econometric identification (Lamadon et al. 2022). In Table A1 in Appendix A, we show the stringency of each sample restriction as the share of observations that remain relative to the full sample. The final analysis sample consists of around 2.3 million unique workers and 74,000 unique firms, among which 192 are foreign firms and 133 are domestic MNEs. The total wage bill in the analysis sample is around 24.4 billion SAR/month, accounting for 51% of the total wage bill in the original dataset. Despite the multiple sample restrictions, our analysis sample still represents a significant fraction of the Saudi private sector. We show in Section

[7] Note that this points to one limitation of the Orbis data where relatively large firms are more likely to be selected into the sample. This implies that the ownership information is subject to attrition for relatively small GOSI firms. However, we believe that foreign firms, the main focus of our analyses, are less affected by attrition as they tend to be large on average. Nevertheless, we advise readers to be aware of sample selection by Orbis and caution in generalizing our results to relatively small firms.

[8] Note again that by imposing this sample restriction, we focus on relatively large firms among all firms in the Saudi private sector.

6.5 that our main results are robust to relaxing the sample restrictions on workers and firms. Table A2 in Appendix A displays additional summary statistics of our analysis sample.

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 587,000 unique workers and over 5,000 unique firms. The second is the movers sample, which consists of workers who changed employers once during the period. The movers sample contains around 175,000 movers. Table A2 in Appendix A displays the summary statistics for the two subsamples.

2.2 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. In addition, the FLFP in Saudi Arabia moved from 18% to 23% during our sample period, which is among the lowest in the world (World Bank 2024). In GOSI, the share of Saudis and women is only 19% and 7%, respectively. While Saudis and women are underrepresented in the private sector, they tend to have better educational attainment on average. In GOSI, 11% of Saudis hold a college degree, whereas the share is 4% for non-Saudis. 20% of women hold a college degree, whereas the share is 4% for men.

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 binds a foreign worker to one employer for permission to work as well as enter or exit the country. This system hinders foreign workers' ability to change jobs, though in practice job-to-job transitions remain feasible. In GOSI, only 19% of non-Saudis ever change employers, compared with 41% of Saudis. A localization program, *Nitaqat*, which requires firms to hire a certain percentage of local workers, has further supported local workers in the private sector. Firms are scored base on their satisfaction of a set of industry-size-specific localization quotas, and those with higher scores have access to favorable policies including recruitment assistance, visa approvals, and wage subsidies. As part of the regulation, the minimum monthly wage for local workers was raised from 1,500 SAR (400 USD) to 3,000 SAR (800 USD) in 2013. As a comparison, many foreign workers still received a monthly wage less than 1,500 SAR (400 USD) in 2013.

Although Saudi Arabia is a setting rich in labor market policies, it is not our goal to analyze the effects of these 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 among workers by nationality and gender. One may naturally expect different labor market outcomes by

worker demographics, which we formally explore in the following sections.

2.3 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 cultural 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 norms that persistently affect labor supply and demand.

Many cultural norms in Saudi Arabia stem from its strong identity as a Muslim country, where 97% of the population are Muslims (Lipka 2017). At least during the period of our data, Muslim doctrines are strictly enforced in the daily lives of believers, and accommodations for most religious practices are expected in the workplace. For example, 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 expected to plan their work schedules flexibly to accommodate these breaks. By law, full-time employees in Saudi Arabia work at most 48 hours per week (Saudi Labor Law 2005). For Muslims, 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.

Besides the different norms for Muslims relative to non-Muslims, we highlight the gender segregation norms that affect the hiring of women. Conservative gender norms prevail in the workplace and have historically limited job opportunities for women. For example, firms were expected to establish facilities to ensure that women and men were separated in the workplace (Miller et al. 2020). Women were also required to have their male guardians' permission and support in order to work. Firms may also provide transportation supports to women, who were not allowed to drive during our sample period (Evidence for Policy Design 2015, Macias-Alonso et al. 2023).

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. By law, businesses were not allowed to hire any women if they did not provide separate facilities for men and women. To hire a female employee, employers were required to obtain a letter of permission from her male guardian until 2011 (Bursztyn et al. 2020). Even if a letter of permission is not required, male guardians would have been the ones to provide transportation support for women, and they would have withheld the support if they did not agree. While some of these legal requirements may have been overturned in later periods, many of the cultural norms that supported these regulations are still enforced by society.[9]

[9] A series of policies have been implemented since 2018 to improve the rights of non-Saudis and women. In 2018, Saudi Arabia allowed women to drive (Macias-Alonso et al. 2023), travel abroad, register a divorce or a marriage, and apply for official documents without the consent of a male guardian. In 2021, Saudi Arabia amended the *kafala* system to allow non-Saudis to switch jobs without employers' permission (Sadek 2020).

Deep-Seated Cultural Norms and Amenities. Our attention to deep-seated cultural norms highlights the importance of non-pecuniary aspects of jobs, which we refer to as amenities. To fix ideas, we focus on the amenities directly influenced by deep-seated cultural norms. On the one hand, amenities reflect firms' preferences and capabilities in attracting, employing, and retaining different workers. It is costly for firms to attract scarce Saudis to meet localization requirements and accommodate cultural practices in the workplace. Firms may differ in their preferences and capacity to comply with these cultural regulations. On the other hand, amenities reflect workers' preferences and their ability to access and select employers. Non-Saudis and women may face higher costs to reach certain employers due to mobility restrictions stemming from cultural regulations. Muslims and women are likely to prioritize firms that cater to their cultural needs in the workplace.[10] Furthermore, the deep-seated nature of some cultural norms suggests that amenities are potentially resistant to change. Firms may need to make upfront investments to understand and adapt to differing cultural norms, and adjusting established amenities can be costly. Similarly, workers may find it difficult to shift these norms, reinforcing the stability of amenities. As discussed below, incorporating amenities and their interactions with cultural norms is crucial for understanding labor market outcomes in our setting.

Differing Deep-Seated Cultural Norms and Labor Market Outcomes. The deep-seated cultural norms in Saudi Arabia are in sharp contrast to the norms in other countries, especially for those outside the Middle East and North Africa (MENA) region. Differences in cultural norms across countries are likely reflected in the labor market outcomes of firms operating in the host country. To facilitate comparison, we define cultural similarity based on deep-seated cultural norms established above: a country is culturally similar to Saudi Arabia if its Muslim share of the population is greater than 50% or its FLFP is less than 30%.[11] In Figure 1, we show the share of Saudi and female workers at firms by cultural similarity. Foreign firms from culturally similar countries have comparable shares of Saudi and female workers relative to domestic firms, and foreign firms from culturally different countries have the lowest shares of both.[12] The results suggest that the effects of differing deep-seated cultural norms are indeed reflected in the composition of workers at firms operating in the host country.[13]

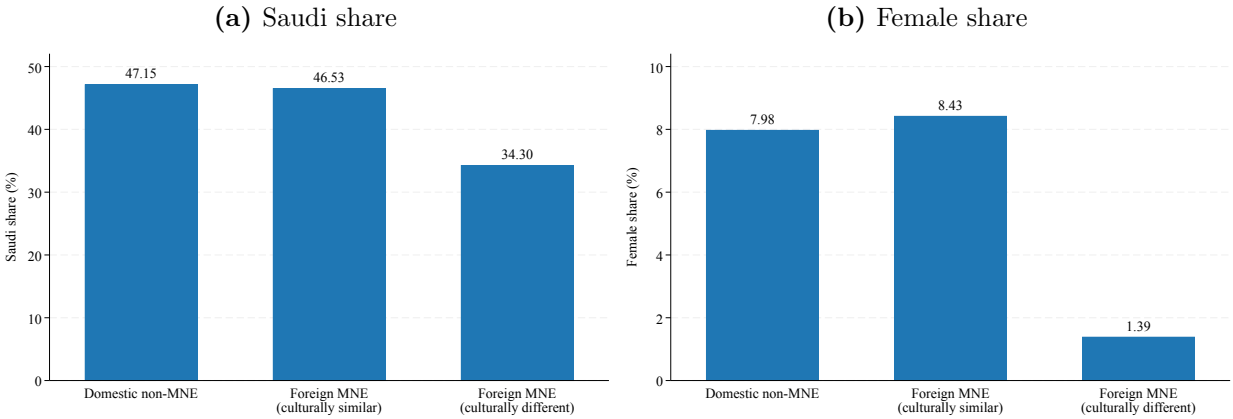
[10] Survey results confirm that amenities related to cultural norms are relevant considerations for firms and workers. In our survey of Saudi undergraduate students and alumni (Table A3 in Appendix A.1), respondents cite short distance to work and short/flexible work hours as desired amenities. In particular, women give higher ranking to amenities such as separate facilities for men and women, onsite child care, and presence of female managers/recruiters relative to men. In another survey conducted by GulfTalent, an online recruitment platform in the Middle East, 11% of respondents consider Islamic work or Islamic environment as an important factor when choosing an employer.

[11] Following González (2020), we pick 30% as the cutoff for FLFP since it is a culturally relevant benchmark among countries with similar gender norms.

[12] As the majority of women in our sample are Saudi, we plot the female share among Saudis in Figure B1 in Appendix B and observe a similar pattern.

[13] In Table B1 in Appendix B, we further present, for the top 10 foreign countries with the largest number of subsidiaries, their outcomes in Saudi Arabia and characteristics at home. Notably, culturally different countries account for 33% of Saudi Arabia's total FDI stock in 2016, while culturally similar countries, despite generally lower GDP per capita, contribute 38%. This suggests that cultural differences may create frictions, as seen in the patterns

Figure 1: Cultural similarity and labor market outcomes



Notes: The figure shows the share of Saudi and female workers at firms by cultural similarity, calculated using the full analysis sample. The countries included in each category are listed in Table B2 in Appendix B.

To summarize, Saudi Arabia's deep-seated cultural norms likely affect both labor supply and demand and highlight the importance of amenities. Differences in cultural norms across countries appear to systematically shift firm behavior, as reflected in the correlation between cultural similarity and labor market outcomes. We will revisit these points in the following sections, where we formally establish empirical patterns and demonstrate how differing deep-seated cultural norms help rationalize the labor market outcomes of firms with distinct cultural backgrounds.

3 Empirical Evidence on Foreign Firm Behavior

3.1 Employment and Worker Composition

To explore the differences in labor market outcomes between foreign and domestic firms, we consider a firm-level regression of employment or worker composition on ownership status indicators. Specifically, we estimate

$$Y_{jt} = \alpha + \sum_{o \in \mathcal{O}} \beta^o F_{o(j,t)} + \delta_{m(j)t} + e_{jt}, \tag{1}$$

where Y_{jt} represents the outcome of firm j in year t such as log employment, worker shares, or a dummy for being gender-integrated—both men and women are present in the workplace—following Peck (2017).[14] $F_{o(j,t)}$ is a dummy that indicates whether firm j has ownership o in year t. In our baseline specification, ownership o can be foreign, domestic MNE, or domestic non-MNE (omitted). $\delta_{m(j)t}$ captures market-year fixed effects, where a market is a location-industry pair.[15] When the

of FDI inflows.

[14]Note that log employment 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 being gender-integrated, on the other hand, captures the extensive-margin outcome of whether or not a firm hires any women.

[15]Locations refer to the 13 administrative regions in Saudi Arabia. Industries are classified according to 50 two-digit industry codes from the National Classification for Economic Activities of Saudi Arabia.

Table 1: Differences in employment and worker composition

	Log employment					Worker composition			
	All	Saudi female	Saudi male	Non-Saudi female	Non-Saudi male	Saudi share	Female share	Female share of Saudis	Gender integrated
Foreign MNE	2.03***	0.60***	1.44***	0.22*	1.60***	−0.09***	−0.04**	−0.05	0.10**
	(0.15)	(0.20)	(0.15)	(0.13)	(0.14)	(0.03)	(0.02)	(0.03)	(0.05)
	[467]	[146]	[438]	[45]	[454]	[438]	[163]	[146]	[467]
Foreign MNE (culturally different)	2.01***	0.25	1.34***	0.19	1.62***	−0.13***	−0.05***	−0.12***	0.04
	(0.18)	(0.19)	(0.18)	(0.16)	(0.17)	(0.03)	(0.01)	(0.04)	(0.06)
	[341]	[101]	[322]	[30]	[333]	[322]	[115]	[101]	[341]
Foreign MNE (culturally similar)	2.10***	1.37***	1.71***	0.27	1.53***	−0.02	−0.01	0.02	0.21***
	(0.29)	(0.41)	(0.29)	(0.23)	(0.27)	(0.03)	(0.03)	(0.05)	(0.06)
	[126]	[45]	[116]	[15]	[121]	[116]	[48]	[45]	[126]
Observations	178,135	41,773	147,209	6,307	78,137	157,601	43,814	41,773	178,135

Notes: The table reports estimated β from equation (1) for foreign firms using the full analysis sample. All regressions control for market-year fixed effects. Regressions for worker composition are weighted by employment. Standard errors are clustered at the firm level and are in parentheses. Number of observations associated with the regressor in the first column are in brackets. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

outcome is not log employment, we weight the regression by employment. The coefficient β^o captures the differences in labor market outcomes between firms with ownership o and domestic non-MNEs.

Estimated β^o from equation (1) for foreign firms with various labor market outcomes are shown in the first panel of Table 1. Foreign firms are larger in employment size on average. Broken down by worker nationality and gender, the results show that foreign firms also hire more workers in each demographic group. Regarding worker composition, foreign firms have a smaller Saudi share and female share, either among all workers or among Saudis. On the other hand, foreign firms are more likely to be gender-integrated.

To examine the outcomes of foreign firms from different cultures, we estimate a version of equation (1), in which we split foreign firms into culturally different and similar foreign firms relative to the host country. The results are reported in the second panel of Table 1. Consistent with the patterns in Figure 1, the share of Saudi and female workers is the smallest at culturally different foreign firms. Culturally similar foreign firms are more likely to be gender-integrated than culturally different foreign firms. The results suggest that systematic differences in worker composition by cultural proximity are still present even controlling for market-year fixed effects.[16]

[16]Differences in employment and worker composition may be driven by systematic variations in occupation composition across firms. For example, foreign firms may specialize in occupations that Saudi or female workers are less likely to hold. In Table B3 in Appendix B, we report the results from estimating equation (1), controlling for the share of workers in each major occupation category based on the International Standard Classification of Occupations (ISCO) for each firm-year. Our estimates in Table 1 are robust to additional occupation controls.

Table 2: Differences in wages

	All	Saudi female	Saudi male	Non-Saudi female	Non-Saudi male
Foreign MNE	0.24***	0.37***	0.15***	0.50***	0.29***
	(0.04)	(0.06)	(0.05)	(0.10)	(0.04)
	[103, 247]	[3, 702]	[35, 846]	[112]	[63, 587]
Foreign MNE	0.29***	0.53***	0.19***	0.50***	0.33***
(culturally different)	(0.05)	(0.13)	(0.07)	(0.16)	(0.04)
	[69, 422]	[907]	[22, 902]	[57]	[45, 556]
Foreign MNE	0.15**	0.31***	0.10	0.51***	0.17**
(culturally similar)	(0.07)	(0.08)	(0.08)	(0.10)	(0.07)
	[33, 825]	[2, 795]	[12, 944]	[55]	[18, 031]
Observations	5, 422, 623	320, 690	2, 169, 349	80, 502	2, 852, 082

Notes: The table reports estimated β from equation (2) for foreign firms using the full analysis sample. Regressions control for age polynomials, nationality-gender-education dummies, occupation dummies, and market-year fixed effects. Standard errors are clustered at the firm level and are in parentheses. Number of observations associated with the regressor in the first column are in brackets. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

3.2 Wages

We consider a regression similar to equation (1) at the worker level:

$$Y_{it} = \alpha + \sum_{o \in \mathcal{O}} \beta^o F_{o(j(i,t),t)} + \gamma X_{it} + \delta_{m(i,t)t} + e_{it}, \tag{2}$$

where Y_{it} is the log wage of worker i in year t, and $F_{o(j(i,t),t)}$ indicates whether firm j, at which worker i is employed in year t, has ownership o. X_{it} is a vector of worker-level controls that contains age polynomials, nationality-gender-education dummies, and occupation dummies. $\delta_{m(i,t)t}$ captures market-year fixed effects. To explore wage gap heterogeneities by worker demographics, we further interact $F_{j(i)t}$ with nationality-gender dummies. The results from estimating different versions of equation (2) are reported in Table 2.

We highlight two findings on wage gaps. First, foreign firms tend to pay higher wages on average. Positive wage gaps are still present for workers of different nationality and gender. Second, positive foreign-domestic wage gaps are mainly driven by the higher wages offered by culturally different foreign firms. The results show that cultural proximity likely correlates with wages, in addition to employment and worker composition.[17] Note that the positive wage gaps may partly be driven by high-earning workers sorting into foreign firms. In the following section, we offer further evidence by examining wage growth for movers across firms.

[17] In Table B4 in Appendix B, we report the results from estimating equation (2) with worker fixed effects. We find positive wage gaps, albeit with smaller magnitudes compared with Table 2, and that culturally different foreign firms tend to pay higher wages for Saudi workers.

Table 3: Differential wage growth from mover design

	All	Saudi female	Saudi male	Non-Saudi female	Non-Saudi male
D (non-MNE) → F (MNE)	0.16***	0.21***	0.14***	–	0.21**
	(0.05)	(0.06)	(0.05)	(–)	(0.10)
	[3,497]	[344]	[2,773]	[0]	[380]
D (non-MNE) → F (different)	0.19***	0.35**	0.19***	–	0.18
	(0.06)	(0.15)	(0.06)	(–)	(0.11)
	[2,130]	[104]	[1,721]	[0]	[305]
D (non-MNE) → F (similar)	0.09	0.15**	0.06	–	0.34**
	(0.08)	(0.07)	(0.09)	(–)	(0.15)
	[1,367]	[240]	[1,052]	[0]	[75]
D (non-MNE) → D (non-MNE): omitted					
Observations	174,813	11,508	132,460	462	30,383

Notes: The table reports selected $\tilde{\beta}^{oo'}$ from equation (3) using the movers sample. Standard errors are clustered at the firm level and are in parentheses. Number of observations associated with the regressor in the first column are in brackets. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

3.3 Mover Design

We complement our analysis of wage differences with a mover design proposed by Card et al. (2013). Consider the following regression:

$$\widetilde{\Delta \log W_{it}} = \tilde{\alpha} + \sum_{o \in \mathcal{O}} \sum_{o' \in \mathcal{O}} \tilde{\beta}^{oo'} S_{it}^{oo'} + \tilde{e}_{it}, \tag{3}$$

where the outcome variable is the change in residualized log wage.[18] $S_{it}^{oo'}$ is a dummy that indicates worker i moves from a firm with ownership o to another firm with ownership o' in year t. The dummy for movers within domestic non-MNEs is omitted. The coefficient of interest $\tilde{\beta}^{oo'}$ captures the differential wage growth for oo' movers relative to movers within domestic non-MNEs.[19] To explore heterogeneities by worker demographics, we further interact the full set of move-type dummies with nationality-gender dummies.

The results from estimating different versions of equation (3) are reported in Table 3. We find positive wage growth for workers moving from domestic non-MNEs to foreign firms relative to movers within domestic non-MNEs. We do not present the estimates for non-Saudi women since we observe no movers from domestic non-MNEs to foreign firms for this category of workers in our analysis sample. In addition, we find that for Saudi workers, moving to culturally different foreign firms generates higher wage growth compared with moving to culturally similar foreign firms. The results are consistent with Table 2, in which the higher wage growth is mainly driven by working at (moving to) culturally different foreign firms.

[18] For each worker demographic group, we residualize log wage on age polynomials and market-year fixed effects.

[19] The coefficient $\tilde{\beta}^{oo'}$ is identified if the parallel trend condition holds. That is, there is no significant differential wage growth prior to the job move for oo' movers and movers within domestic non-MNEs. As shown in Figure B2 in Appendix B, we do not find a significant differential pre-trend for workers moving from domestic non-MNEs to foreign firms, which supports our identification.

3.4 Additional Results and Discussion

Additional Results. First, to examine how the differences between foreign and domestic firms change over time, we estimate equations (1) and (2) while interacting ownership dummies with year dummies. Figures B3 and B4 in Appendix B plot the estimates using the baseline analysis sample, and Figures B5 and B6 in Appendix B plot the estimates using the 2013-2016 sample. We do not find systematic time trends for most of the outcomes by ownership and worker demographics, suggesting our estimates are stable over time. Second, to examine whether labor market outcomes differ for domestic MNEs, we additionally report the estimates for domestic MNEs in Tables B5, B6, and B7 in Appendix B. Similar to foreign firms, domestic MNEs are larger in employment size, have a smaller Saudi and female share, and are more likely to be gender-integrated. Moreover, domestic MNEs tend to pay higher wages, although the magnitudes tend to be smaller relative to foreign firms. The results suggest similarities for firms in a multinational network, but the nature of ownership may matter for heterogeneous labor market outcomes among multinationals.

Discussion. The empirical results suggest that foreign firms are more productive. More productive foreign firms are likely to be larger in employment size, become gender-integrated, and pay higher wages. Consistent with the findings in the multinational firms literature, productivity is a key factor driving the differences in employment and wage outcomes. However, productivity alone may not be sufficient to rationalize all empirical patterns. Foreign firms pay higher wages to women than men but hire a smaller female share. The contrast is more pronounced for foreign firms from culturally different countries, which offer the highest wages but hire the smallest female share. Based on the discussion in Section 2, we propose that amenities are crucial for understanding foreign firm behavior, especially on the sorting of women. In the following section, we develop a model that explicitly incorporates amenities, which allows us to quantitatively assess the roles of both productivity and amenities in determining labor market outcomes.

4 Model

In this section, we develop a simple model, which aims to rationalize the differences in labor market outcomes documented in Section 3. We extend the framework in 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. We relegate all derivations and additional details to Appendix C.1.

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 (nationality and gender) $d_i \in \mathcal{D}$ and skill $x_i \in \mathcal{X}$, both of which are assumed to be 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) worker-demographic-skill-specific amenities $a_j(d,x)$.[20] 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 experiences at firm j, 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. We allow the dispersion parameter to differ by worker demographics.

We assume 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

$$L_{jt}(d,x) = W_{jt}(d,x)^{\beta(d)} \exp\left(\beta(d) a_j(d,x)\right) \lambda_t(d,x) \bar{L}(d,x), \tag{4}$$

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 (4) that labor supply depends on both wages and amenities. Note that amenities capture the firm-specific non-wage factors that determine the probability of employment at a firm.

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

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

where $\psi_j(d)$ captures the skill complementarity, and $\exp(\psi_j(d)x)$ is the efficiency of (d,x) workers at firm j. With a slight abuse of notation, $L_{jt}(d,x)$ is also the demand for (d,x) workers. The production function is constant returns to scale and linear in the efficient unit of labor,

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

where $\exp(\phi_{jt}(d))$ is the demographic-d labor augmenting productivity.

[20] The assumption that amenities are exogenous and time-invariant is supported by the deep-seated nature of cultural norms discussed in Section 2.3. To reiterate, deep-seated cultural norms make it costly for both firms and workers to alter established amenities and preferences. Moreover, we focus on a relatively short period of time with arguably limited aggregate shifts in cultural norms, which implies that amenities are unlikely to be affected by changes in the aggregate.

Firm j chooses 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. Moreover, each firm is small relative to the economy so that an individual firm takes the 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:

$$\max_{\{W_{jt}(d,x),L_{jt}(d,x)\}} \sum_{d\in\mathcal{D}} \underbrace{\exp(\phi_{jt}(d)) \int_{\mathcal{X}} \exp(\psi_j(d)x) L_{jt}(d,x)\mathrm{d}x}_{Y_{jt}(d)} - \sum_{d\in\mathcal{D}} \underbrace{\int_{\mathcal{X}} W_{jt}(d,x) L_{jt}(d,x)\mathrm{d}x}_{B_{jt}(d)},$$

subject to (4). $B_{jt}(d)$ denotes the total wage bill for demographic-d workers at firm j in period t. The optimal wage schedule is given by

$$W_{jt}(d,x) = \frac{\beta(d)}{1+\beta(d)} \exp(\phi_{jt}(d) + \psi_j(d)x). \tag{5}$$

The wage for (d, x) workers at firm j is a markdown $\frac{\beta(d)}{1+\beta(d)}$ of their marginal product $\exp(\phi_{jt}(d) + \psi_j(d)x)$.

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* (4) *and* (5) *hold and all markets clear.*

The model delivers a structural relationship between the wage $W_{jt}(d,x)$ and the wage bill $B_{jt}(d)$ in a stationary equilibrium:

$$w_{jt}(d,x) = \log\frac{\beta(d)}{1+\beta(d)} + \frac{1}{1+\beta(d)} b_{jt}(d) - \frac{1}{1+\beta(d)} h_j(d) + \psi_j(d)x, \tag{6}$$

where we denote the lowercase letter as the log of the corresponding uppercase letter. $h_j(d)$ captures the determinants of the wage bill other than $\phi_{jt}(d)$ (equation (C3) in Appendix C.1). One desirable feature of equation (6) is that w is linear in b, h, and ψx. This facilitates identification of model parameters, as discussed in Section 5.

Model Limitations and Extensions. The analytical framework could be extended in multiple ways to study additional mechanisms. First, it might be desirable to allow for endogenous and time-varying amenities to study potential learning and adaptation. For example, firms may learn about cultural norms by staying active in the market or by hiring workers with local knowledge.[21] In addition, both firms and workers may update amenities or preferences over time. Second, it is

[21] 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.

possible to introduce interdependence in the hiring of workers with different types. This can be achieved by allowing for richer substitution patterns in the production function or fixed costs of integrating workers with different demographics (Miller et al. 2020). Our model may serve as a benchmark relative to these extensions, which are interesting avenues for future research.

5 Quantification

In this section, we describe the details of model quantification. Section 5.1 provides an overview of the identification and estimation strategies. In particular, we adopt the methodology in Lamadon et al. (2022), which allows us to identify parameters using internally constructed moment conditions. Section 5.2 then discusses estimation results and model fit.

5.1 Overview of Identification and Estimation Strategies

Productivity Processes. We assume that $\phi_{jt}(d)$ consists of a time-varying market component $\phi_{m(j)t}(d)$, a permanent firm component $\phi_j(d)$, and a time-varying firm component $\tilde{\phi}_{jt}(d)$ following a unit root process:

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

where $\nu_{jt}(d)$ is a non-degenerate productivity shock. In practice, we back out productivity shocks from changes in log wage bills net of the market-year effects (equation (C5) in Appendix C.1). In Figure C1 in Appendix C.2, we display the coefficients from a regression of estimated $\nu_{jt}(d)$ on its leads or lags and find weak serial correlation, consistent with the process being a unit root.

Labor Supply Elasticities. Labor supply elasticities can be identified using within-firm variations in observed wages and wage bills for stayers. Let the τ-step difference in log wage be $\Delta^\tau w_{it} = w_{it} - w_{it-\tau}$. From equation (6), we know that for a stayer i employed at firm j over the period $[t-\tau, t]$,

$$\Delta^\tau w_{it} = \frac{1}{1+\beta(d)} \Delta^\tau b_{j(i,t)t}(d) + \Delta^\tau \epsilon_{it},$$

where ϵ_{it} is the measurement error in observed wages. It is clear from the equation that the pass-through of wage bill shocks into wages is $\frac{1}{1+\beta(d)}$. The estimated $\beta(d)$ is high when wages are unresponsive to wage bill shocks, implying greater employment responses and elastic labor supply. The labor supply elasticity $\beta(d)$ is identified if the shock is uncorrelated with the error. In Figure C2 in Appendix C.2, we show for the case of $\tau = 1$ that there is no significant pre-trend in wage growth. This implies that workers do not experience a higher or lower wage growth prior to the shock, consistent with the error being exogenous.

In practice, we use a moment condition that exploits the exogeneity of ϵ_{it} to identify $\beta(d)$:

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

where $Z_{it}(d)$ is an instrument available as of year t. Following Lamadon et al. (2022), we choose $\tau = 3$ and $Z_{it}(d) = \Delta^1 b_{j(i,t-1)t-1}(d)$, which is the wage bill shock of firm $j(i,t-1)$ in year $t-1$. The moment condition is satisfied as the measurement errors in wages are independent of firm wage bill shocks. In robustness checks, we scale estimated $\beta(d)$ by a factor greater or less than one to examine the sensitivity of our main results to a more or less elastic labor supply.

Productivity Parameters. Given labor supply elasticities, firm productivity parameters are identified using variations in wages of movers. Denote the permanent component of wage as $w^p_{it} = \phi_{j(i,t)}(d_i) + \psi_{j(i,t)}(d_i)x_i$. Note that w^p_{it} can be written as follows:

$$w^p_{it} = \tilde{w}_{it} - \frac{1}{1+\beta(d_i)}\Delta^t \tilde{b}_{j(i,t)t}(d_i) - \epsilon_{it},$$

where we denote variables net of the market-year effects with a $\sim$ (equation (C6) in Appendix C.1). Following Bonhomme et al. (2019), the permanent productivity components $\phi_j(d)$ and $\psi_j(d)$ can be estimated from the following moment:

$$\mathbb{E}\left[\frac{w^p_{it+1} - \phi_{j(i,t+1)}(d)}{\psi_{j(i,t+1)}(d)} - \frac{w^p_{it} - \phi_{j(i,t)}(d)}{\psi_{j(i,t)}(d)}|d_i = d,\ movers\right] = 0, \tag{8}$$

under the condition that the average skill of workers moving in and out of the firm is not the same: $\mathbb{E}\left[x_i|j(i,t) = j, j(i,t+1) = j'\right] \neq \mathbb{E}\left[x_i|j(i,t) = j', j(i,t+1) = j\right]$. As the number of parameters in equation (8) is unrestricted, identification suffers from incidental parameter bias. We therefore adopt a two-step estimation procedure following Bonhomme et al. (2019). In the first step, we group firms based on their within-firm wage distribution using the K-means clustering algorithm.[22] In the second step, we estimate ϕ and ψ at the group level. This significantly reduces the number of parameters to be estimated while keeping sufficient variations from which parameters are still identified. We set the number of clusters $K = 10$ in the baseline specification and consider more clusters in robustness checks. In addition, since ψ is identified up to scale, we normalize the average

[22] Specifically, the wage distribution of a firm is characterized by 21 evenly spaced quantiles of the residualized log wage distribution. We initiate the algorithm with 100 random starting points and choose the resulting cluster with the best fit.

across clusters to be one without loss of generality.[23] Lastly, $\tilde{\phi}_{jt}(d)$ can be recovered from

$$\tilde{\phi}_{jt}(d) = \sum_{s=1}^{t} \nu_{js}(d) = \frac{1}{1+\beta(d)} \Delta^t \tilde{b}_{jt}(d). \tag{9}$$

Worker Skills. Given $\phi_j(d)$ and $\psi_j(d)$, we estimate worker skill x_i from

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

For each worker demographic, we discretize the distribution of worker skills into deciles. With a slight abuse of notation, x also denotes the mean worker skill in a decile.

Amenities. Amenities are estimated from matching the share of workers employed at a firm, conditional on wages. Assume that amenities $a_j(d,x)$ consists of a market component $a_{m(j)}(d)$ and a firm component $\tilde{a}_j(d,x)$ such that $a_j(d,x) = a_{m(j)}(d) + \tilde{a}_j(d,x)$. The log employment share of (d,x) workers at firm j in period t net of the market-year component is given by

$$\widetilde{\log Pr}(j|d,x,t) = \beta(d)\left(\phi_j(d) + \tilde{\phi}_{jt}(d) + \psi_j(d)x + \tilde{a}_j(d,x)\right).$$

We therefore estimate firm amenities from

$$\tilde{a}_j(d,x) = \mathbb{E}\left[\frac{1}{\beta(d)} \widetilde{\log Pr}(j|d,x,t) - \left(\phi_j(d) + \tilde{\phi}_{jt}(d) + \psi_j(d)x\right) | j,d,x \right]. \tag{11}$$

Note that amenities are estimated for each firm, worker demographic, and skill decile.

5.2 Estimation Results and Model Fit

We display selected statistics of the estimated parameters in Table 4. Given non-Saudi women are under-represented at foreign firms and do not have enough movers across firm types in our sample, we are under-powered to present their estimates. First, 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: firms face an upward-sloping labor supply curve and need to raise wages in order to hire an additional worker. Second, in Table C1 in Appendix C.2, we present the results from a regression of standardized x_i on education,

[23] In practice, we use move-type indicators to construct moment conditions. Specifically, let $\mathbb{I}_i^{kk'}$ be an indicator that equals one when worker i moves from firm j in cluster k to firm j' in cluster k'. We obtain the following moment that is equivalent to equation (8):

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

The moment condition is satisfied if workers do not select to move based on the error ϵ. Note that there are $2K$ parameters and K^2 moments, so $\psi_k(d)$ and $\phi_k(d)$ are over-identified. We estimate the parameters using the Generalized Method of Moments (GMM) with equal weights across moments.

Table 4: Estimated parameters by worker demographics

Parameter		Statistic	Saudi female	Saudi male	Non-Saudi male	Moment
Labor supply elasticity	$\beta(d)$	Estimate:	4.36	2.91	4.05	(7)
Skill complementarity	$\psi_j(d)$	Std. dev.:	0.35	0.28	0.21	(8)
		Count:	10	10	10	
Productivity (permanent)	$\phi_j(d)$	Std. dev.:	0.53	0.52	0.74	(8)
		Count:	10	10	10	
Productivity (time-varying)	$\tilde{\phi}_{jt}(d)$	Std. dev.:	0.08	0.13	0.10	(9)
		Count:	42,050	147,553	78,385	
Worker skill	x_i	Std. dev.:	0.25	0.36	0.50	(10)
		Count:	178,377	922,777	1,133,608	
Amenity	$\tilde{a}_j(d,x)$	Std. dev.:	0.40	0.52	0.65	(11)
		Count:	58,469	196,700	101,771	

occupation, and nationality (within non-Saudis) dummies. We find that better educated workers as well as managers and professionals have higher skills, which suggests that our estimates are sensible. Lastly, in Table C2 in Appendix C.2, we present the correlations between observed and predicted worker wages as well as firm employment. The correlations exceed 0.95 across all worker demographics, which suggests that our model fits the data well.

6 Model Insights on Foreign Firm Behavior

Equipped with estimated productivity and amenities, we examine the differences between foreign and domestic firms and their implications on differing labor market outcomes. We further analyze heterogeneous productivity and amenities of foreign firms from different countries, shedding light on the roles of differing deep-seated cultural norms.

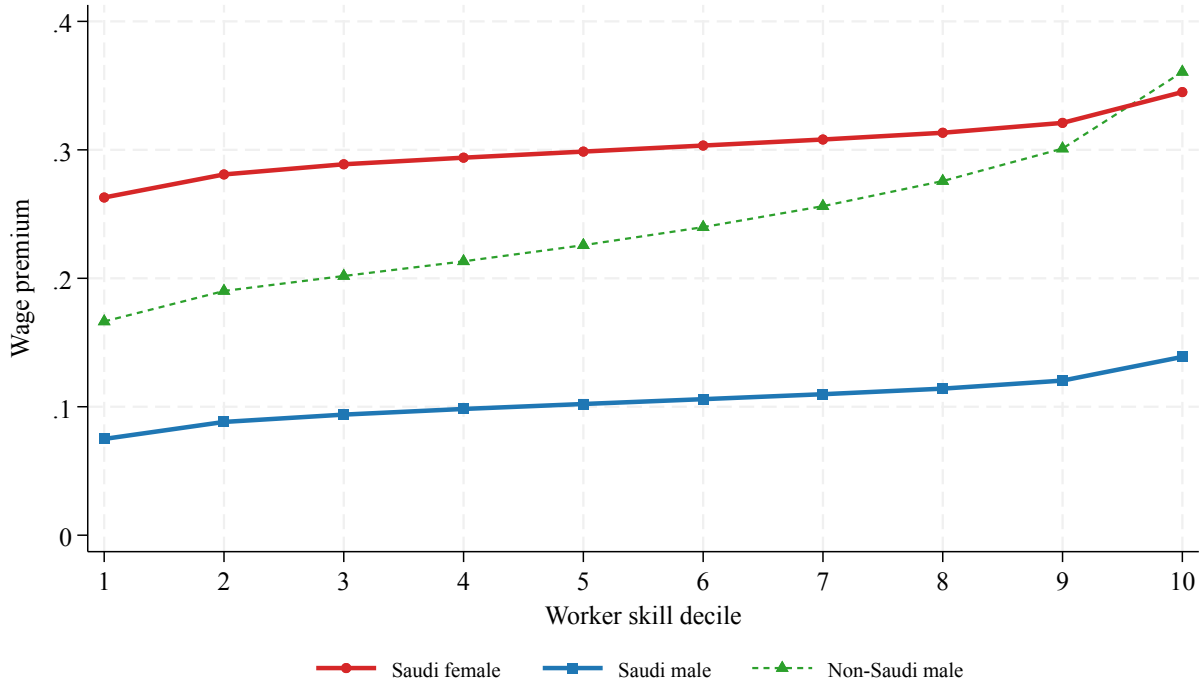
6.1 Foreign Wage Premiums

We first characterize the productivity and skill complementarity for the average worker at foreign and domestic firms. Denote $\bar{\phi}_o(d)$ and $\bar{\psi}_o(d)$ as the employment-weighted average productivity $\phi_j(d)$ and skill complementarity $\psi_j(d)$ of firms with ownership o. We define the foreign wage premium for (d,x) workers as the sum of productivity difference and skill premium:

$$ForeignWagePremium(d,x) = \underbrace{\bar{\phi}_F(d) - \bar{\phi}_D(d)}_{\text{productivity difference}} + \underbrace{\left(\bar{\psi}_F(d) - \bar{\psi}_D(d)\right) x}_{\text{skill premium}}.$$

Figure 2 displays the foreign wage premium as a function of worker skill decile for different worker demographics. First, foreign wage premiums are positive across worker demographics. Averaging across the skill distribution, we estimate a foreign wage premium at 30%, 10%, and 24%

Figure 2: Foreign wage premiums



Notes: The figure displays the foreign wage premiums by skill deciles and worker demographics. Foreign wage premiums are calculated based on the definition in the text.

for Saudi women, Saudi men, and non-Saudi men, respectively. Our results are consistent with the reduced-form estimates in Section 3 and vast empirical evidence on positive foreign wage premiums in different settings.

The fact that foreign firms are more productive on average is consistent with selection into FDI (Melitz 2003, Helpman et al. 2004). Multinational firms need to be sufficiently productive to overcome the fixed costs of operating in a foreign country, which include the costs of overcoming communication frictions, screening, training, and monitoring employees, adjusting marketing and sales strategies, navigating local regulations and policies, as well as building local relationships and networks. Moreover, the sizable foreign wage premiums in our setting can be rationalized by stringent selection due to differing deep-seated cultural norms. Foreign firms are required to make additional investments to learn about and comply with local cultural norms. Therefore, foreign firms need to overcome higher fixed costs when operating in a host country with differing deep-seated cultural norms.

Second, we find evidence of positive skill premiums, where more skilled workers receive higher foreign wage premiums. The results are consistent with more productive foreign firms exhibiting greater skill complementarity, a pattern also documented by Setzler and Tintelnot (2021) for MNEs in the U.S.

6.2 Amenity Differences

We now characterize the amenities for the average worker at foreign and domestic firms. We denote $\bar{\tilde{a}}_o(d,x)$ as the employment-weighted average amenities $\tilde{a}_j(d,x)$ experienced by (d,x) workers at firms with ownership o. We calculate the amenity differences as $\bar{\tilde{a}}_F(d,x) - \bar{\tilde{a}}_D(d,x)$, displayed in Figure 3. We find that, averaging across the skill distribution, the difference in amenities is -18%, 4%, and -13% for Saudi women, Saudi men, and non-Saudi men, respectively, with substantial heterogeneities across skill deciles. Notice that women experience disproportionately lower amenities at foreign firms relative to men. To interpret these numbers, we note that amenity and wage differences of the same magnitude are equivalent in utility terms in our model. In other words, the amenity difference affects workers' choice of employer as much as the wage difference of the same magnitude. Our estimates on foreign wage premiums and amenity differences imply that workers enjoy utility gains from moving to foreign firms where the gains are driven by higher wages rather than better amenities.[24]

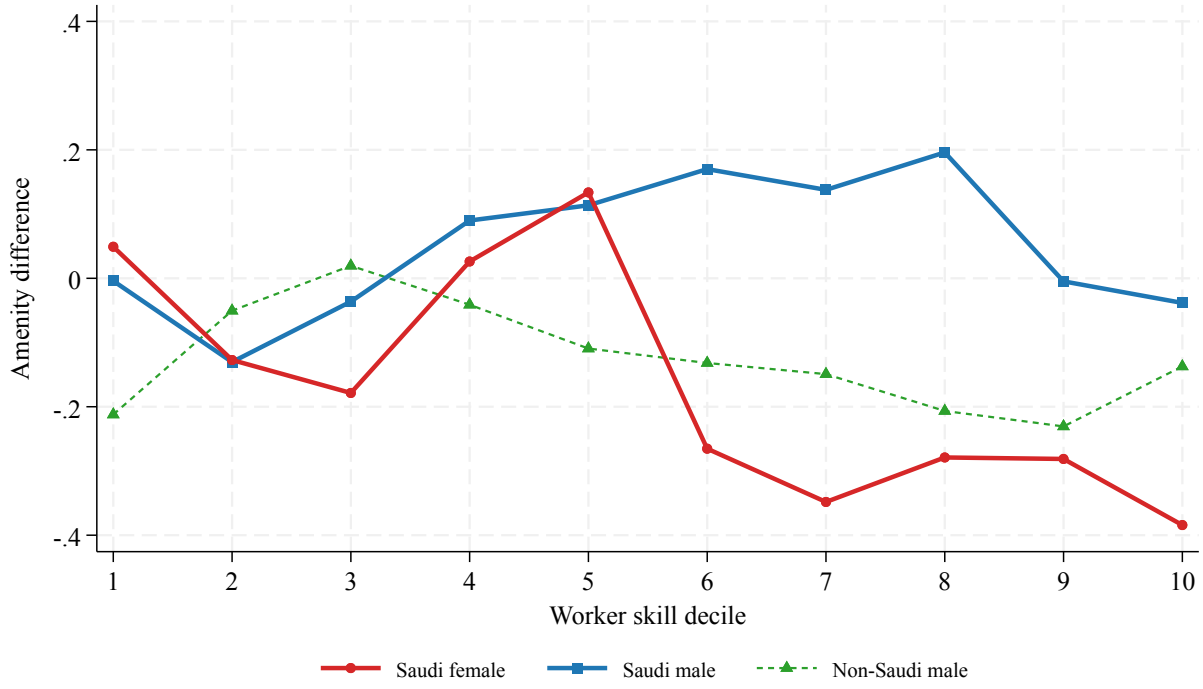
Amenity differences can be rationalized by frictions arising from differing deep-seated cultural norms. On the one hand, foreign firms unfamiliar with local cultural norms may be constrained in providing desired amenities in finding, hiring, and retaining workers. For example, as locals and women are scarce in the labor market, foreign firms may face difficulties in finding suitable workers if they do not have local networks. As foreign firms are expected to set up the workplaces that satisfy cultural expectations, they may find it too costly to learn about, understand, and accommodate local norms, thereby providing fewer amenities. Due to conservative gender norms, some foreign firms in this period may choose to avoid hiring women altogether. On the other hand, workers, especially women, may face disamenities working at foreign firms. Workers may be discouraged from working at foreign firms if they are concerned about their employers' ability to accommodate local norms, or if there is a perceived stigma against working at those firms.[25]

Evidence on the Amenity Mechanism. Additional qualitative evidence supports our proposed mechanism that differing deep-seated cultural norms generate frictions affecting amenities. For example, one study by Alfarran (2016) of 47 interviews with Saudi government officials, women

[24] Our results suggest that workers are far from being indifferent between working at foreign or domestic firms. However, because of idiosyncratic preferences, the marginal worker, who is indifferent between working at foreign or domestic firms, may value amenities differently. By definition, for the marginal worker, 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, and given the wage level at the domestic firm, we are able to obtain the monetary value of amenities for the marginal worker. Figure C3 in Appendix C.2 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.

[25] While our focus has been on the outcomes of Saudi workers, we note that non-Saudis may also be subject to these norms. Most of the non-Saudi workers in our sample come from culturally similar countries according to our definition, which are countries with majority Muslims or low FLFP (e.g., Egypt, Pakistan) and are likely familiar with and may even generally agree with Saudi cultural norms. Moreover, non-Saudis face further local cultural regulations due to their foreign status (e.g., *Nitaqat*, visa restrictions). Hence, accounting for amenities may help explain the labor market outcomes of non-Saudis, although the underlying mechanisms may differ from those affecting locals.

Figure 3: Amenity differences between foreign and domestic firms



Notes: The figure displays the amenity differences between foreign and domestic firms by skill deciles and worker demographics. Amenity differences are calculated based on the definition in the text.

employees, and senior managers at two multinational firms shows that foreign firms were perceived as discriminating against women by under-providing amenities. Due to restrictions on women's travel and gender segregation, foreign firms made minimal efforts to hire women and preferred hiring men to avoid the cost of accommodating workplace conditions and maintain productivity. Many foreign firms were unclear about the specific regulations regarding women's work. One foreign firm, for instance, misinterpreted the regulation on gender-segregated workplaces being women and men working together with only space between their desks. As a result, foreign firms preferred hiring men to avoid conflicts with complex cultural regulations and unwritten boundaries. In addition, many jobs offered to women were reportedly culturally inappropriate because they often required working in public and mixed-gender environments. Therefore, women preferred to accept jobs that matched their qualification and were compatible with cultural expectations.

Foreign firms are generally constrained in providing desired amenities, even when they do not intend to discriminate. Alfarran (2016) shows that foreign firms struggled to find and attract qualified locals, especially women, as recruitment in the private sector often relies on personal relationships and family ties (*wasta*). A case study by Alhejji et al. (2018) analyzing 16 interviews at a British firm operating in Saudi Arabia indicates that the firm was unable to implement gender equality rapidly due to pressures from informal institutions, despite legal approval from formal institutions.

Table 5: Counterfactual labor market outcomes

	(1) Baseline	(2) $\bar{\phi}_F(d) = \bar{\phi}_D(d)$	(3) $\bar{\psi}_F(d) = \bar{\psi}_D(d)$	(4) $\bar{\phi}_F(d) = \bar{\phi}_D(d)$ $\bar{\psi}_F(d) = \bar{\psi}_D(d)$	(5) $\bar{\tilde{a}}_F(d,x) = \bar{\tilde{a}}_D(d,x)$
Panel A: Foreign wage premium					
Saudi female	0.30	0.01	0.29	0.00	0.30
Saudi male	0.10	0.00	0.11	0.00	0.10
Non-Saudi male	0.24	-0.01	0.25	0.00	0.24
Panel B: Log employment difference					
Saudi female	1.05	-0.05	0.96	-0.14	2.43
Saudi male	1.44	1.14	1.45	1.15	1.37
Non-Saudi male	1.90	0.99	1.90	0.99	2.59
Panel C: Worker share difference					
Saudi share	-0.15	-0.01	-0.15	-0.02	-0.25
Female share	-0.10	-0.11	-0.10	-0.11	-0.03
Female share of Saudis	-0.10	-0.16	-0.11	-0.16	0.09

Notes: The table reports the counterfactual labor market outcomes, with each counterfactual scenario indicated by the columns. All outcomes are calculated using counterfactual firm-level permanent productivity, skill complementarity, and amenities.

On the other hand, workers may prefer not to work at foreign firms due to cultural differences. In a survey of 45 managers and 189 customers from multinational firms by Mababaya (2002), Muslim respondents believed it was important for foreign firms to understand local culture and religious values, but they worried that non-Muslim managers had limited local knowledge and thus lacked the ability to comprehend these values and satisfy cultural needs. Analyzing data from 15 interviews with workers and managers from a Japanese firm operating in Saudi Arabia, Adham (2021) highlights a conflict between the Japanese culture of lifelong career and Saudi cultural norms, and Saudis preferred to leave the Japanese firm for better options.[26] While these findings may not represent the entire private sector, they align with our proposed mechanisms.

6.3 Counterfactual Exercises

Having characterized the productivity and amenity differences between foreign and domestic firms, we now conduct counterfactual analysis to quantify the extent to which productivity and amenities drive the differences in labor market outcomes. To be concrete, we impose the averages for foreign firms to be the same as those for domestic firms. Specifically, we consider four counterfactual scenarios: foreign and domestic firms share the same (1) productivity, (2) skill complementarity, (3)

[26] Our data collected from a female-focused career fair (Table A4 in Appendix A.1) suggest that foreign firms did not have significantly more daily attendees or female workers representing the company at the booth 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, a type of amenity that women value in this setting, to signal cultural compatibility with female job seekers.

productivity and skill complementarity, or (4) amenities. We examine how foreign wage premiums, log employment differences, and worker share differences change in each scenario.

We note several observations from the counterfactual results shown in Table 5. First, productivity matters more than skill complementarity in determining the labor market outcomes. Comparing columns (2) and (3), foreign wage premiums, log employment differences, and worker share differences change significantly when productivity is the same, whereas they change moderately when skill complementarity is the same. Second, amenities are quantitatively important to rationalize employment outcomes. As shown in column (5), failure to account for amenities would have produced biased predictions on log employment and worker share differences. Moreover, amenities matter more than productivity in driving female share differences: one would have predicted a less negative or even positive female share difference if foreign and domestic firms assimilate amenities. The counterfactual analysis unveils that both productivity and amenities are quantitatively important in rationalizing the labor market outcome differences between foreign and domestic firms.

6.4 Heterogeneous Foreign Wage Premiums and Amenity Differences

We have focused on the differences in productivity and amenities between the average foreign and domestic firm. However, as discussed in Section 3, labor market outcomes differ substantially for foreign firms with distinct cultural norms. We are thus motivated to examine potential heterogeneity in foreign wage premiums and amenity differences for foreign firms from different countries. To this end, we calculate the average foreign wage premium and amenity difference separately for foreign firms from culturally different and similar countries. As shown in Table 6, most workers receive higher wage premiums but lower amenities at foreign firms from culturally different countries relative to those from culturally similar countries.[27]

The results imply that differing cultural norms likely drive productivity and amenities across countries. On the one hand, foreign firms from culturally different countries need to be more productive to overcome the higher fixed costs of operation and remain competitive. On the other hand, cultural frictions may disproportionately affect foreign firms from culturally different countries such that workers experience lower amenities at those firms. Although these estimates are not causal, they are consistent with our proposed mechanism that differing deep-seated cultural norms generate frictions.[28]

[27] In Table C3 in Appendix C.2, we further compute the foreign-country-specific estimates and correlate them with home characteristics. Cultural distance is positively correlated with foreign wage premiums but negatively correlated with amenity differences. Part of the variations in foreign wage premiums can be explained by log GDP per capita, which is a measure of home productivity. On the other hand, cultural distance remains a nontrivial predictor of amenity differences after controlling for log GDP per capita.

[28] Note that in our setting, for historical reasons, geographically close countries are also likely to share a common religion (although with differing schools of thought) and a relatively low FLFP rate (although with some heterogeneity). Part of the correlation with cultural distance may be explained by the correlation with geographical distance. Separating culture from geography might be possible in other settings in which culture and geography are less correlated.

Table 6: Heterogeneous foreign wage premiums and amenity differences by cultural similarity

	Saudi female	Saudi male	Non-Saudi male
Panel A: Foreign wage premium			
Culturally different	0.52	0.16	0.27
Culturally similar	0.24	0.02	0.18
Panel B: Amenity difference			
Culturally different	−0.39	−0.07	−0.17
Culturally similar	−0.10	0.25	−0.04

Notes: The table reports heterogeneous foreign wage premiums and amenity differences by cultural similarity. Foreign wage premiums and amenity differences are calculated based on the definition in the text, while splitting foreign firms into those from culturally different and similar countries.

6.5 Additional Results

Domestic MNEs. In Table C4 in Appendix C.2, we additionally show the wage premiums and amenity differences for domestic MNEs. We find that domestic MNEs pay positive wage premiums ranging from 7% to 11%, which is consistent with selection into participating in multinational networks. Moreover, workers at domestic MNEs experience higher amenities relative to domestic non-MNEs. This further emphasizes amenities as a key differentiator between foreign firms and domestic MNEs. Since domestic MNEs are less likely to face cultural frictions, this aligns with our proposed mechanism.

Robustness Checks. We examine how our main results are affected by alternative estimation methods and sample restrictions. First, we scale labor supply elasticities by a factor of 2 or 0.5 to examine the sensitivity of our results to a more or less elastic labor supply. Second, we increase the number of clusters in the K-means algorithm to 20. Third, we relax the sample restrictions on firms and workers discussed in Section 2.1. Specifically, we consider the following cases: (1) including all firms (with or without a match in Orbis), (2) including all workers (full-time or part-time), and (3) including all firms and workers. As shown in Table C5 in Appendix C.2, our main results on average foreign wage premiums and amenity differences are largely robust to these alternative specifications.

6.6 Discussion

Alternative Mechanisms. We note several alternative mechanisms that might contribute to our results. First, it is possible that foreign firms have longer hours of work, which increases measured productivity but serves as a disamenity for workers. Although we do not observe hours of work in our data, we do not find conclusive legislative or other evidence suggesting any systematic differences in hours of work between foreign and domestic firms. Second, it is possible that there is MNE-wise wage and amenity setting by the headquarter, which is not driven by cultural norms

per se. While we do not have access to data on amenities or labor market outcomes of MNEs' subsidiaries worldwide, Alfaro-Urena et al. (2019) find that multinationals in Costa Rica have better fringe benefits such as paid extra hours, bonuses, paid vacation days or sick leave, social security contributions, and occupational hazard insurance. If this were the case in Saudi Arabia, better fringe benefits are possibly offset by other sources of disamenities. In addition, qualitative evidence suggests that foreign firms in our setting tend to adapt to local norms rather than adhere to home country norms (Park 2018, Adham 2021). Third, the empirical patterns may be explained by labor search and match frictions. For instance, wage premiums, particularly for women, might result from higher costs of searching for jobs at foreign firms, and worker share differences could reflect varying search costs and match probabilities across firm ownership categories and worker demographics. While our model abstracts from the search and match process, our definition of amenities partly captures these frictions. Since workplace characteristics as well as preferences of both firms and workers are also relevant in this context, they likely coexist with labor search and match frictions, jointly determining worker compensation and sorting. Accounting for differing deep-seated cultural norms may still provide insights into the underlying mechanisms within a search-and-match framework. Therefore, we believe these alternative mechanisms do not necessarily rule out our proposed mechanism that differing deep-seated cultural norms affect labor market outcomes through productivity and amenities.

Policy Implications. We briefly comment on the implications of our results for 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 deep-seated cultural norms as potential barriers to foreign firm cultural spillovers. From a positive perspective, we quantify the extent to which productivity and amenities determine the allocation of workers with different demographics and skills. Specifically, as a result of differing deep-seated cultural norms, more productive foreign firms under-hire locals and women, who are more skilled on average. The existence of skill misallocation implies potentially sizable efficiency gains from the optimal 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 deep-seated 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 and female workers. Preferential policies in favor of foreign firms would help them comply with local regulations, would help them survive, and may benefit domestic firms indirectly as well as the Saudi economy overall.

7 Conclusion

In this paper, we analyze the labor market decisions of multinational firms in a setting in which differing deep-seated cultural norms affect labor supply and demand. Using a novel dataset of the Saudi private sector, we find that foreign firms are larger in employment size, hire a smaller share of female workers, and pay higher wages. Although the empirical results suggest that foreign firms have higher productivity, productivity alone is not sufficient to rationalize the smaller female share at foreign firms.

To account for these empirical patterns, we propose and estimate a simple model in which firms differ in both productivity and amenities. We find that foreign firms offer positive wage premiums, but women experience disproportionately lower amenities at foreign firms relative to men. We conduct counterfactual analysis to quantify the importance of productivity and amenities in determining labor market outcomes and find that the sorting of women is primarily driven by differences in amenities rather than productivity. In addition, we find evidence that foreign firms from culturally different countries pay higher wage premiums but have lower amenities relative to those from culturally similar countries. These findings are consistent with the potential mechanism that differing deep-seated cultural norms generate frictions that systematically affect productivity and amenities at foreign firms. 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.

References

Abowd, J. M., F. Kramarz, and D. N. Margolis (1999): "High wage workers and high wage firms," Econometrica, 67, 251–333.

Adham, A. (2021): "Managing labour in multinational corporations in Saudi Arabia," International Journal of Advanced Research in Management and Social Sciences, 10, 11–29.

Alfaro-Urena, A., I. Manelici, and J. P. Vasquez (2019): "The Effects of Multinationals on Workers: Evidence from Costa Rica," Working paper, Institute of Industrial Relations, UC Berkeley.

Alfarran, A. (2016): "Increasing women's labour market participation in Saudi Arabia: the role of government employment policy and multinational corporations," Ph.D. thesis, Victoria University.

Alhejji, H., E. S. Ng, T. Garavan, and R. Carbery (2018): "The impact of formal and informal distance on gender equality approaches: the case of a British MNC in Saudi Arabia," Thunderbird International Business Review, 60, 147–159.

Balsvik, R. (2011): "Is labor mobility a channel for spillovers from multinationals? Evidence from Norwegian manufacturing," Review of Economics and Statistics, 93, 285–297.

Bayer, P., R. McMillan, A. Murphy, and C. Timmins (2016): "A dynamic model of demand for houses and neighborhoods," Econometrica, 84, 893–942.

Bloom, N., R. Sadun, and J. Van Reenen (2012): "The organization of firms across countries," Quarterly Journal of Economics, 127, 1663–1705.

Bonhomme, S., T. Lamadon, and E. Manresa (2019): "A distributional framework for matched employer employee data," Econometrica, 87, 699–739.

Bursztyn, L., A. L. González, and D. Yanagizawa-Drott (2020): "Misperceived Social Norms: Women Working Outside the Home in Saudi Arabia," American Economic Review, 110, 2997–3029.

Card, D., A. R. Cardoso, J. Heining, and P. Kline (2018): "Firms and labor market inequality: Evidence and some theory," Journal of Labor Economics, 36, S13–S70.

Card, D., J. Heining, and P. Kline (2013): "Workplace heterogeneity and the rise of West German wage inequality," Quarterly Journal of Economics, 128, 967–1015.

Cortés, P., S. Kasoolu, and C. Pan (2021): "Labor Market Nationalization Policies and Exporting Firm Outcomes: Evidence from Saudi Arabia," Economic Development and Cultural Change.

Evidence for Policy Design, E. (2015): "Back to work in a new economy: Background paper on the Saudi labor market," .

Fujiy, B. C., G. Khanna, and H. Toma (2022): "Cultural Proximity and Production Networks," .

González, A. L. (2020): "Insider's advantage: when foreign firms do not capture opportunity in the local labour market," Transnational Corporations Journal, 27.

Guillouet, L., A. Khandelwal, R. Macchiavello, and M. Teachout (2021): "Language Barriers in Multinationals and Knowledge Transfers," Working paper, National Bureau of Economic Research.

Helpman, E., M. J. Melitz, and S. R. Yeaple (2004): "Export versus FDI with heterogeneous firms," American Economic Review, 94, 300–316.

Heyman, F., F. Sjöholm, and P. G. Tingvall (2007): "Is there really a foreign ownership wage premium? Evidence from matched employer–employee data," Journal of International Economics, 73, 355–376.

Hijzen, A., P. S. Martins, T. Schank, and R. Upward (2013): "Foreign-owned firms around the world: A comparative analysis of wages and employment at the micro-level," European Economic Review, 60, 170–188.

Jensen, R. T. (2010): "Economic opportunities and gender differences in human capital: Experimental evidence for India," Working paper, National Bureau of Economic Research.

Kodama, N., B. S. Javorcik, and Y. Abe (2018): "Transplanting corporate culture across international borders: Foreign direct investment and female employment in Japan," World Economy, 41, 1148–1165.

Lamadon, T., M. Mogstad, and B. Setzler (2022): "Imperfect competition, compensating differentials, and rent sharing in the US labor market," American Economic Review, 112, 169–212.

Lipka, M. (2017): "Muslims and Islam: Key Findings in the U.S. and around the World," Tech. rep., Pew Research Center.

Mababaya, M. P. (2002): The role of multinational companies in the Middle East: the case of Saudi Arabia, Universal-Publishers.

Macias-Alonso, I., H. Kim, and A. L. González (2023): "Self-driven Women: Gendered mobility, employment, and the lift of the driving ban in Saudi Arabia," Gender, Place & Culture, 1–20.

McFadden, D. (1981): "Econometric models of probabilistic choice," Structural analysis of discrete data with econometric applications, 198272.

Melitz, M. J. (2003): "The impact of trade on intra-industry reallocations and aggregate industry productivity," econometrica, 71, 1695–1725.

Miller, C., J. Peck, and M. Seflek (2020): "Missing Women, Integration Costs, and Big Push Policies in the Saudi Labor Market," American Economic Journal: Applied Economics.

Morchio, I. and C. Moser (2024): "The gender pay gap: Micro sources and macro consequences," Tech. rep., National Bureau of Economic Research.

Mun, E. and J. Jung (2018): "Change above the glass ceiling: Corporate social responsibility and gender diversity in Japanese firms," Administrative Science Quarterly, 63, 409–440.

Naidu, S., Y. Nyarko, and S.-Y. Wang (2016): "Monopsony power in migrant labor markets: evidence from the United Arab Emirates," Journal of Political Economy, 124, 1735–1792.

Park, Y.-E. (2018): "The endless challenges of KIA motors for globalization: A case study on kia in Saudi Arabia," The Journal of Industrial Distribution & Business, 9, 45–52.

Peck, J. R. (2017): "Can hiring quotas work? The effect of the Nitaqat program on the Saudi private sector," American Economic Journal: Economic Policy, 9, 316–47.

Sadek, G. (2020): "Saudi Arabia: Ministry of Human Resources and Social Development Launches Labor Reform Initiatives," https://www.loc.gov/item/global-legal-monitor/2020-12-04/saudi-arabia-ministry-of-human-resources-and-social-development-launches-labor-reform-initiatives/.

Saudi Labor Law (2005): "Labor Law," https://www.hrsd.gov.sa/sites/default/files/2017-05/LABOR%20LAW.pdf.

Setzler, B. and F. Tintelnot (2021): "The effects of foreign multinationals on workers and firms in the United States," Quarterly Journal of Economics, 136, 1943–1991.

Siegel, J., L. Pyun, and B. Cheon (2019): "Multinational firms, labor market discrimination, and the capture of outsider's advantage by exploiting the social divide," Administrative Science Quarterly, 64, 370–397.

Song, J., D. J. Price, F. Guvenen, N. Bloom, and T. Von Wachter (2019): "Firming up inequality," Quarterly Journal of Economics, 134, 1–50.

Tang, H. and Y. Zhang (2021): "Do multinationals transfer culture? Evidence on female employment in China," Journal of International Economics, 133, 103518.

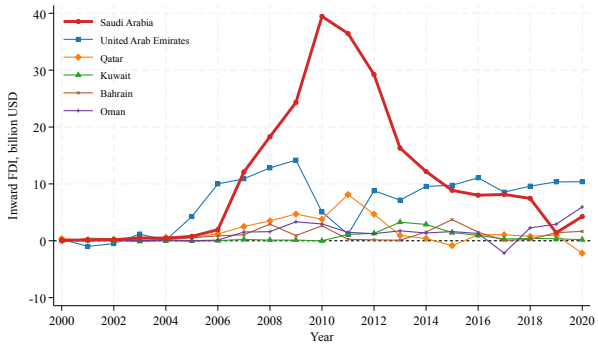
Villarreal, A. and W.-h. Yu (2007): "Economic globalization and women's employment: the case of manufacturing in Mexico," American Sociological Review, 72, 365–389.
World Bank (2024): "World Bank Open Data," https://data.worldbank.org/.

APPENDIX

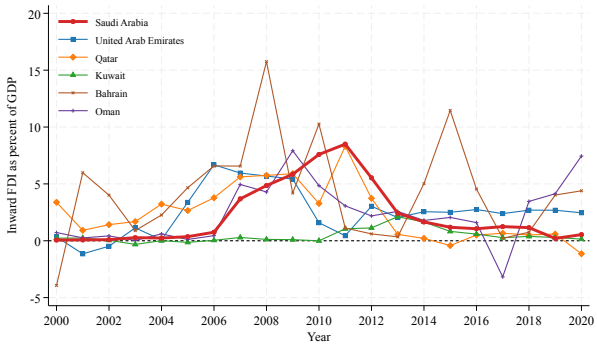
A Data Appendix

Figure A1: Inward FDI of GCC countries

(a) Inward FDI



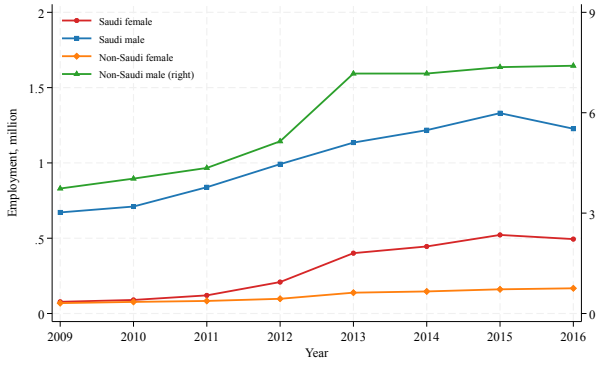
(b) Inward FDI as percent of GDP



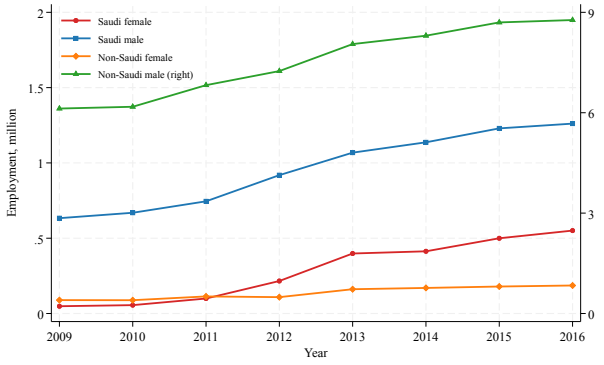
Notes: The data are sourced from UNCTAD.

Figure A2: Total employment in the private sector from GOSI and GAStat

(a) GOSI

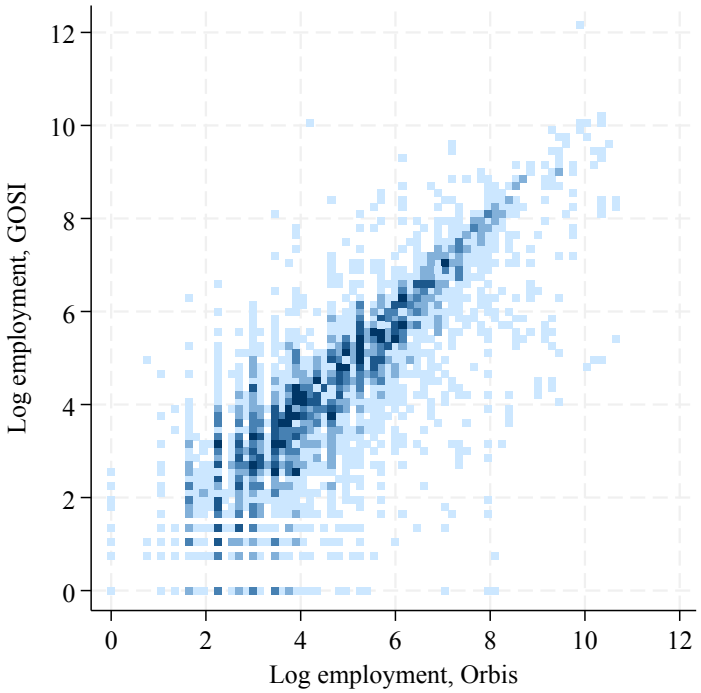


(b) GAStat



Notes: Total employment from GOSI is calculated using our full GOSI sample.

Figure A3: Log employment from GOSI and Orbis



Notes: Log employment from GOSI is calculated using our full GOSI sample.

Table A1: Stringency of sample restrictions

	(1) None	(2) Prime-age workers	(3) Full-time workers	(4) GOSI-Orbis matched firms	(5) All
Panel A. 2009-2012 sample					
Number of firms	265,483	264,668	141,031	100,264	74,245
	(100.0%)	(99.7%)	(53.1%)	(37.8%)	(28.0%)
Number of foreign MNEs	194	193	193	194	192
	(100.0%)	(99.5%)	(99.5%)	(100.0%)	(99.0%)
Number of domestic MNEs	137	136	134	137	133
	(100.0%)	(99.3%)	(97.8%)	(100.0%)	(97.1%)
Number of workers, million	8.2	8.1	3.0	6.0	2.3
	(100.0%)	(98.8%)	(36.6%)	(73.2%)	(28.0%)
Wage bill, billion SAR/month	47.8	46.3	38.6	32.1	24.4
	(100.0%)	(96.9%)	(80.8%)	(67.2%)	(51.0%)
Panel B. 2013-2016 sample					
Number of firms	502,657	500,752	304,222	226,439	170,468
	(100.0%)	(99.6%)	(60.5%)	(45.0%)	(33.9%)
Number of foreign MNEs	411	410	410	411	409
	(100.0%)	(99.8%)	(99.8%)	(100.0%)	(99.5%)
Number of domestic MNEs	225	223	222	225	221
	(100.0%)	(99.1%)	(98.7%)	(100.0%)	(98.2%)
Number of workers, million	13.0	12.8	5.2	9.9	4.1
	(100.0%)	(98.5%)	(40.0%)	(76.2%)	(31.5%)
Wage bill, billion SAR/month	88.9	85.9	73.2	64.5	50.4
	(100.0%)	(96.6%)	(82.3%)	(72.6%)	(56.7%)

Notes: The table reports the stringency of sample restrictions. The share of observations remaining after imposing the restriction indicated by the column is in parentheses.

Table A2: Descriptive statistics of the analysis samples

	Analysis 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)	7.68	7.93	7.95	8.08	7.89	8.39	8.02	8.19	7.83	7.95	8.14	8.32
	(0.48)	(0.67)	(0.63)	(0.74)	(0.63)	(0.77)	(0.60)	(0.72)	(0.56)	(0.65)	(0.67)	(0.81)
Age	29	27	33	38	31	31	36	40	28	26	37	39
	(9)	(9)	(9)	(10)	(7)	(8)	(9)	(9)	(6)	(8)	(10)	(9)
College degree share (%)	27.85	6.53	31.62	13.19	32.54	5.31	24.77	10.00	17.19	2.65	17.75	8.23
Panel B. Firm Statistics												
Log employment	0.61	0.83	0.81	1.47	1.70	3.22	0.96	3.74	1.12	1.60	0.97	2.22
	(0.87)	(1.09)	(1.13)	(1.53)	(1.42)	(1.41)	(1.41)	(1.37)	(1.15)	(1.33)	(1.25)	(1.66)
Log wage bill (SAR/month)	8.17	8.45	8.76	9.36	9.64	11.37	9.12	11.98	8.78	9.35	9.02	10.24
	(0.99)	(1.30)	(1.31)	(1.83)	(1.46)	(1.56)	(1.54)	(1.62)	(1.28)	(1.57)	(1.39)	(1.95)
Panel C. Aggregate Statistics												
Total number of firms	74,245	74,245	74,245	74,245	5,575	5,575	5,575	5,575	27,041	27,041	27,041	27,041
Total number of workers	178,429	922,826	36,542	1,133,639	16,339	223,238	6,051	341,154	23,016	264,920	924	60,766
Total wage bill (thousand SAR/month)	871,551	9,723,846	305,470	13,492,896	212,078	5,420,921	94,105	6,786,353	39,981	557,913	2,349	196,832
Total number of observations	320,829	2,169,498	80,617	2,852,183	60,418	846,303	24,093	1,356,182	34,524	397,380	1,386	91,149

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

A.1 Qualitative Data

As part of a larger project on Saudi employer and job seeker matching, we collected qualitative data from 2016 to 2020. 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.

As shown in Table A3, 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) 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 A3: 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)).

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. 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 A4, we report the estimated coefficient on the foreign dummy, which captures the difference between foreign and domestic firms. As shown in column (1), multinational firms did not have significantly more daily attendees compared to domestic firms. Similarly, columns (2) and

(3) show that multinational firms did not have significantly more female workers representing the company at the booth 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.

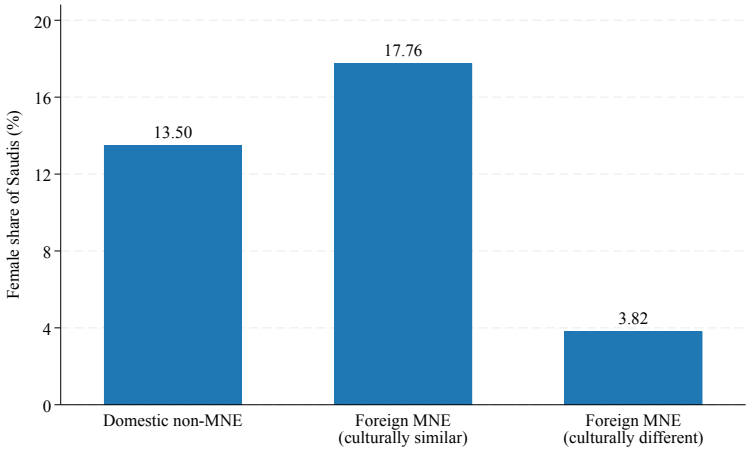
Table A4: Attendance differences between foreign and domestic firms at the career fair

	(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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B Additional Empirical Results

Figure B1: Cultural similarity and female share of Saudis



Notes: The figure shows the female share of Saudis at firms by cultural similarity, calculated using the full analysis sample. The countries included in each category are listed in Table B2 in Appendix B.

Table B1: Characteristics of foreign countries in Saudi Arabia and at home

	In Saudi Arabia				At Home		
Country (ISO-2)	Saudi share (%)	Female share (%)	FDI stock (mil. SAR)	FDI stock share (%)	Muslim share (%)	FLFP (%)	GDP per capita (USD)
SA	46.1	7.5	-	-	97.0	17.2	16,113
US	39.9	1.1	49,267	12.9	0.8	58.1	47,100
CH	40.6	1.0	5,934	1.5	4.3	61.7	69,927
FR	25.5	0.6	33,513	8.7	6.0	50.8	41,575
GB	46.2	3.1	23,124	6.0	2.7	55.5	38,454
AE	43.0	1.8	67,448	17.6	76.2	42.7	32,024
BH	38.3	0.9	25,588	6.7	81.2	42.6	19,356
KW	52.9	12.1	54,404	14.2	95.0	45.1	37,539
DE	23.2	0.8	11,766	3.1	5.0	52.5	41,733
IT	30.0	0.1	3,684	1.0	1.0	38.0	36,977
DK	32.1	1.1	862	0.2	2.0	60.6	58,163

Notes: The table shows the characteristics of the top 10 foreign countries with the largest number of firms operating in Saudi Arabia. Saudi and female shares are calculated using the full analysis sample. Data on FDI stock are from 2016, sourced from the Ministry of Investment of Saudi Arabia. Data on Muslim share are from 2009, sourced from the Pew Research Center. Data on FLFP and GDP per capita are from 2009, sourced from the World Bank.

Table B2: List of countries within each category

Category	Countries included in the full analysis sample (ISO-2)
GCC	AE, BH, KW, OM, QA, SA
MENA	AE, BH, EG, JO, KW, LB, OM, QA, SA, SY, TN
Muslim	AE, BH, EG, JO, KW, LB, MY, OM, QA, SA, SY, TN, TR, YE
Low-FLFP	EG, IN, JO, LB, OM, SA, SY, TN, TR, YE
Culturally similar	Muslim ∪ Low-FLFP
Culturally different	AU, BE, CA, CH, CY, DE, DK, ES, FI, FR, GB, GR, IT, JP, KR, LU, NO, NZ, RU, SG, US

Table B3: Differences in employment and worker composition, with occupation controls

	Log employment					Worker composition			
	All	Saudi female	Saudi male	Non-Saudi female	Non-Saudi male	Saudi share	Female share	Female share of Saudis	Gender integrated
Foreign MNE	1.90***	0.53***	1.31***	0.27**	1.57***	−0.06***	−0.05***	−0.08**	0.10**
	(0.15)	(0.20)	(0.15)	(0.13)	(0.14)	(0.02)	(0.02)	(0.03)	(0.04)
	[467]	[146]	[438]	[45]	[454]	[438]	[163]	[146]	[467]
Foreign MNE (culturally different)	1.87***	0.19	1.19***	0.20	1.58***	−0.08***	−0.06***	−0.13***	0.05
	(0.17)	(0.19)	(0.17)	(0.00)	(0.15)	(0.02)	(0.02)	(0.04)	(0.06)
	[341]	[101]	[322]	[30]	[333]	[322]	[115]	[101]	[341]
Foreign MNE (culturally similar)	2.00***	1.28***	1.62***	0.42	1.55***	−0.01	−0.04	−0.02	0.20***
	(0.29)	(0.41)	(0.28)	(0.00)	(0.27)	(0.04)	(0.03)	(0.05)	(0.06)
	[126]	[45]	[116]	[15]	[121]	[116]	[48]	[45]	[126]
Observations	178,135	41,773	147,209	6,307	78,137	157,601	43,814	41,773	178,135

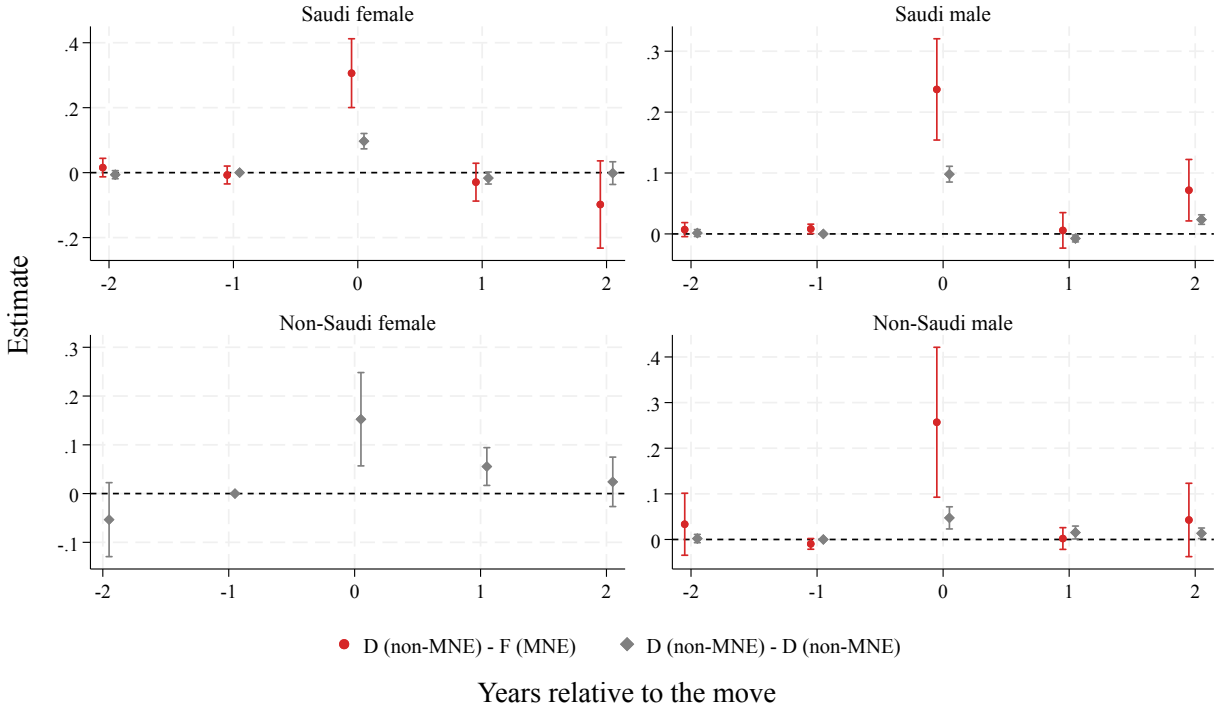
Notes: The table reports estimated β from equation (1) for foreign firms using the full analysis sample. All regressions control for the share of workers in each major occupation category based on the International Standard Classification of Occupations (ISCO) for each firm-year and market-year fixed effects. Regressions for worker composition are weighted by employment. Standard errors are clustered at the firm level and are in parentheses. Number of observations associated with the regressor in the first column are in brackets. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table B4: Differences in wages, with worker fixed effects

	All	Saudi female	Saudi male	Non-Saudi female	Non-Saudi male
Foreign MNE	0.07***	0.17***	0.07***	0.17*	0.07***
	(0.01)	(0.05)	(0.02)	(0.09)	(0.02)
	[88,765]	[1,953]	[31,081]	[67]	[55,664]
Foreign MNE (culturally different)	0.08***	0.21***	0.10***	0.07	0.05***
	(0.02)	(0.08)	(0.03)	(0.11)	(0.02)
	[61,604]	[571]	[20,801]	[43]	[40,189]
Foreign MNE (culturally similar)	0.07***	0.16***	0.03	0.31***	0.10***
	(0.02)	(0.06)	(0.02)	(0.08)	(0.02)
	[27,161]	[1,382]	[10,280]	[24]	[15,475]
Observations	4,668,509	225,399	1,856,815	66,630	2,519,665

Notes: The table reports estimated β from equation (2) for foreign firms using the full analysis sample. Regressions control for age polynomials, worker fixed effects, and market-year fixed effects. Standard errors are clustered at the firm level and are in parentheses. Number of observations associated with the regressor in the first column are in brackets. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Figure B2: Mover design: analysis of pre-trend



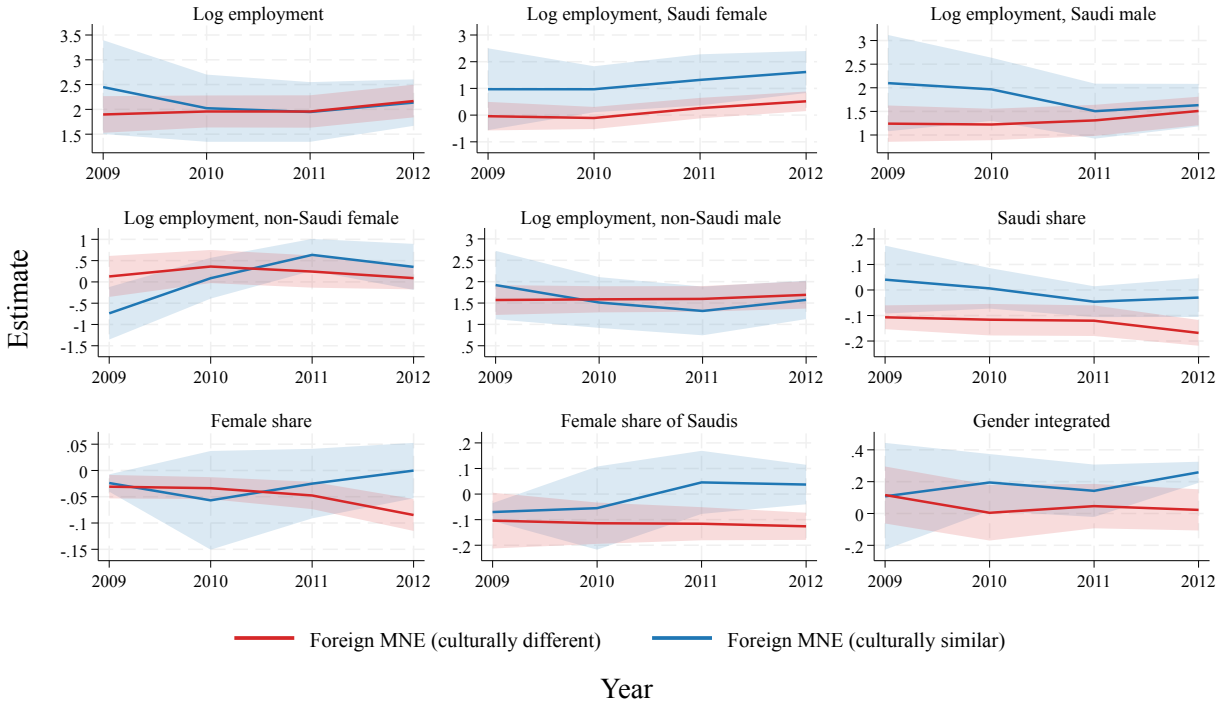
Notes: The figure shows the event study analogue of equation (3) using the movers sample. We regress change in residualized log wage on a set of dummies for years relative to the move interacted with move types. The 90-th confidence intervals are shown as caps.

Table B5: Differences in employment and worker composition, including domestic MNEs

	Log employment					Worker composition			
	All	Saudi female	Saudi male	Non-Saudi female	Non-Saudi male	Saudi share	Female share	Female share of Saudis	Gender integrated
Foreign MNE (culturally different)	2.01***	0.25	1.34***	0.19	1.62***	−0.13***	−0.05***	−0.12***	0.04
	(0.18)	(0.19)	(0.18)	(0.16)	(0.17)	(0.03)	(0.01)	(0.04)	(0.06)
	[341]	[101]	[322]	[30]	[333]	[322]	[115]	[101]	[341]
Foreign MNE (culturally similar)	2.10***	1.37***	1.71***	0.27	1.53***	−0.02	−0.01	0.02	0.21***
	(0.29)	(0.41)	(0.29)	(0.23)	(0.27)	(0.03)	(0.03)	(0.05)	(0.06)
	[126]	[45]	[116]	[15]	[121]	[116]	[48]	[45]	[126]
Domestic MNE	3.32***	1.63***	2.88***	0.72**	2.69***	−0.13***	−0.05***	−0.09***	0.32***
	(0.23)	(0.25)	(0.22)	(0.29)	(0.23)	(0.05)	(0.01)	(0.02)	(0.04)
	[361]	[162]	[338]	[98]	[347]	[340]	[190]	[162]	[361]
Observations	178,135	41,773	147,209	6,307	78,137	157,601	43,814	41,773	178,135

Notes: The table reports estimated β from equation (1) for foreign firms and domestic MNEs using the full analysis sample. All regressions control for market-year fixed effects. Regressions for worker composition are weighted by employment. Standard errors are clustered at the firm level and are in parentheses. Number of observations associated with the regressor in the first column are in brackets. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Figure B3: Differences in employment and worker composition over time



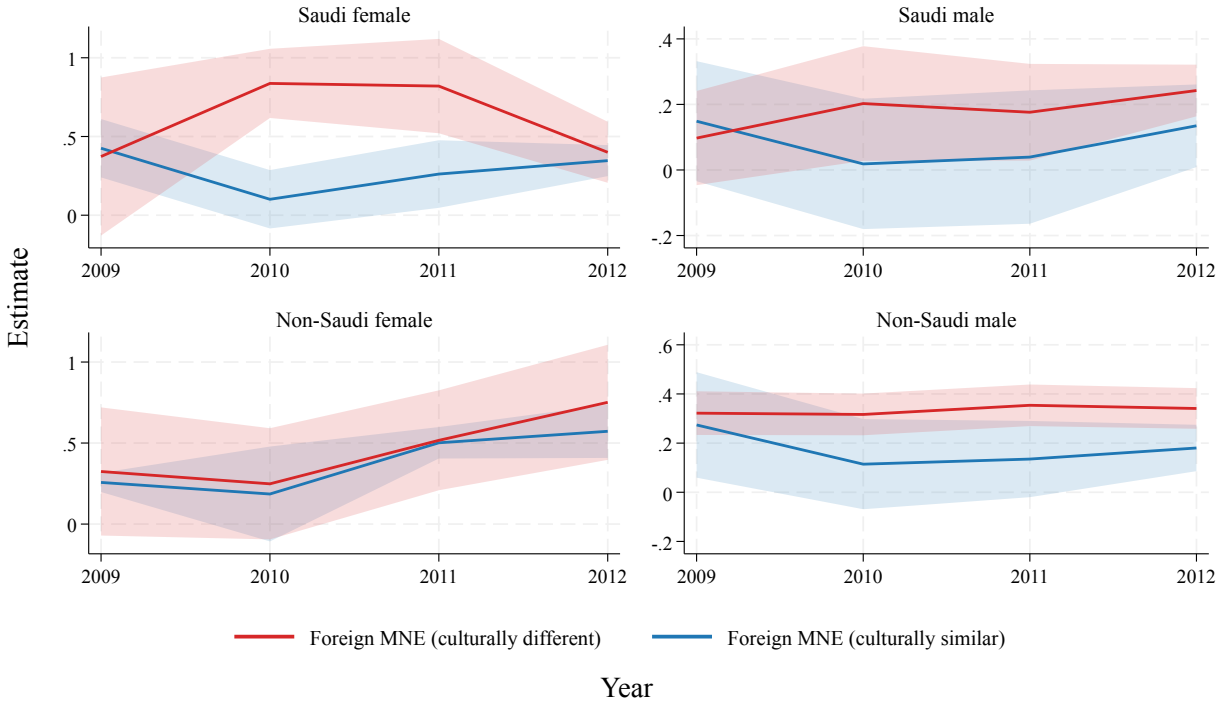
Notes: The figure plots estimated coefficients for the ownership dummies in equation (1) interacted with year dummies using the full analysis sample. All regressions control for market-year fixed effects. Regressions for worker composition are weighted by employment. The 90-th confidence intervals are shown as shaded areas.

Table B6: Differences in wages, including domestic MNEs

	All	Saudi female	Saudi male	Non-Saudi female	Non-Saudi male
Foreign MNE	0.29***	0.53***	0.19***	0.50***	0.33***
(culturally different)	(0.05)	(0.13)	(0.07)	(0.16)	(0.04)
	[69, 422]	[907]	[22, 902]	[57]	[45, 556]
Foreign MNE	0.15**	0.31***	0.10	0.51***	0.17**
(culturally similar)	(0.07)	(0.08)	(0.08)	(0.10)	(0.07)
	[33, 825]	[2, 795]	[12, 944]	[55]	[18, 031]
Domestic MNE	0.11***	0.08	0.13**	0.11	0.10***
	(0.03)	(0.08)	(0.06)	(0.07)	(0.03)
	[573, 667]	[15, 085]	[197, 633]	[3, 863]	[357, 086]
Observations	5, 422, 623	320, 690	2, 169, 349	80, 502	2, 852, 082

Notes: The table reports estimated β from equation (2) for foreign firms and domestic MNEs using the full analysis sample. Regressions control for age polynomials, nationality-gender-education dummies, occupation dummies, and market-year fixed effects. Standard errors are clustered at the firm level and are in parentheses. Number of observations associated with the regressor in the first column are in brackets. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Figure B4: Differences in wages over time



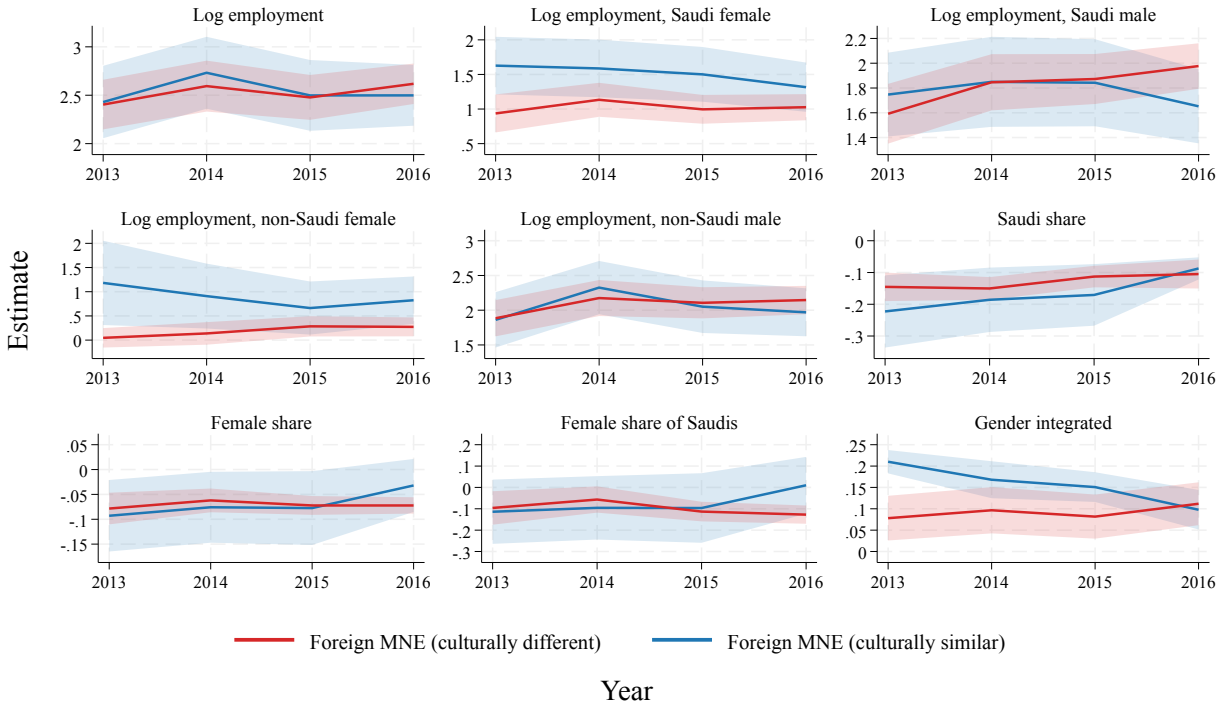
Notes: The table reports estimated coefficients for the ownership dummies in equation (2) interacted with year dummies using the full analysis sample. Regressions control for age polynomials, nationality-gender-education dummies, occupation dummies, and market-year fixed effects. The 90-th confidence intervals are shown as shaded areas.

Table B7: Differential wage growth from mover design, including domestic MNEs

	All	Saudi female	Saudi male	Non-Saudi female	Non-Saudi male
D (non-MNE) → F (different)	0.19***	0.35**	0.19***	–	0.18
	(0.06)	(0.15)	(0.06)	(–)	(0.11)
	[2, 130]	[104]	[1, 721]	[0]	[305]
D (non-MNE) → F (similar)	0.09	0.15**	0.06	–	0.34**
	(0.08)	(0.07)	(0.09)	(–)	(0.15)
	[1, 367]	[240]	[1, 052]	[0]	[75]
D (non-MNE) → D (MNE)	0.07	0.02	0.08	0.31***	0.04
	(0.06)	(0.09)	(0.07)	(0.08)	(0.07)
	[11, 085]	[504]	[8, 965]	[46]	[1, 570]
D (non-MNE) → D (non-MNE): omitted					
Observations	174, 813	11, 508	132, 460	462	30, 383

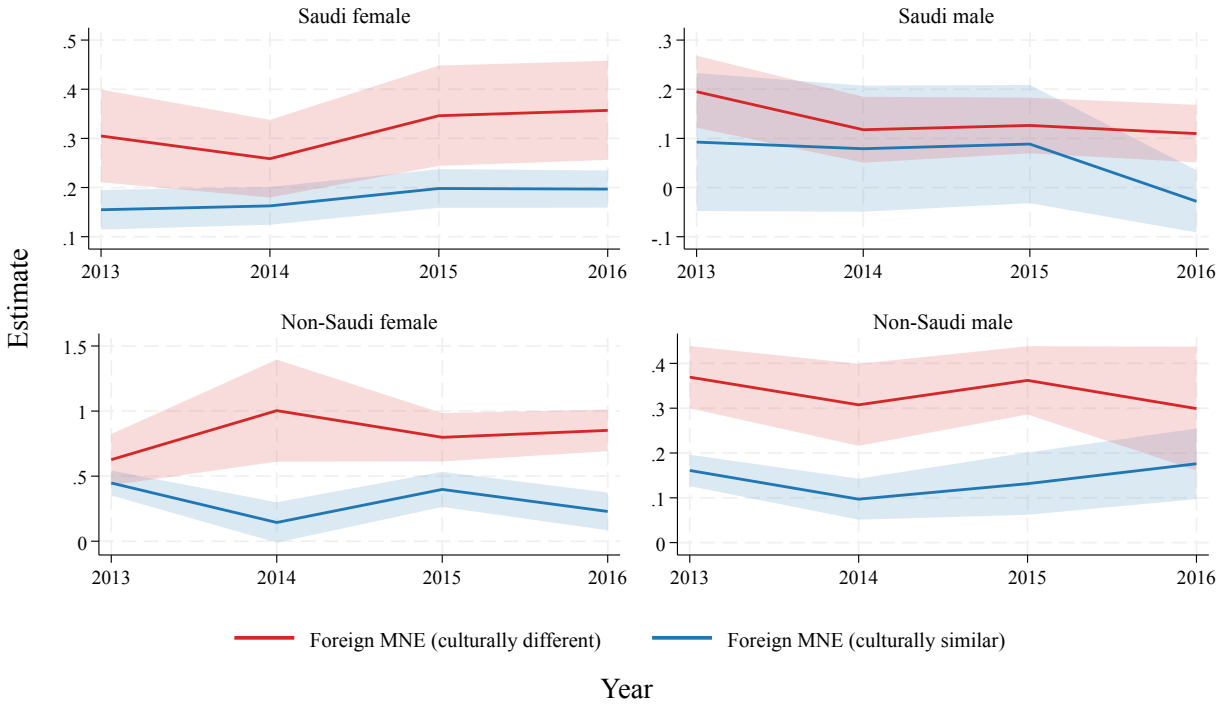
Notes: The table reports selected $\tilde{\beta}^{oo'}$ from equation (3) using the movers sample. Standard errors are clustered at the firm level and are in parentheses. Number of observations associated with the regressor in the first column are in brackets. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Figure B5: Differences in employment and worker composition over time, 2013-2016 sample



Notes: The figure plots estimated coefficients for the ownership dummies in equation (1) interacted with year dummies using the 2013-2016 sample. All regressions control for market-year fixed effects. Regressions for worker composition are weighted by employment. The 90-th confidence intervals are shown as shaded areas.

Figure B6: Differences in wages over time, 2013-2016 sample



Notes: The table reports estimated coefficients for the ownership dummies in equation (2) interacted with year dummies using the 2013-2016 sample. Regressions control for age polynomials, nationality-gender-education dummies, occupation dummies, and market-year fixed effects. The 90-th confidence intervals are shown as shaded areas.

C Model Appendix

C.1 Model Derivations

Wages. Recall that firm j's optimization problem in period t is given by

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

subject to

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

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

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

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:

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

which gives equation (5). The wage for (d,x) workers at firm j in period t is a constant markdown $\frac{\beta(d)}{1+\beta(d)}$ of workers' marginal product $\exp(\phi_{jt}(d)+\psi_j(d)x)$. In log, we have

$$w_{jt}(d,x) = \log\frac{\beta(d)}{1+\beta(d)} + \phi_{jt}(d) + \psi_j(d)x. \tag{C1}$$

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

$$\begin{aligned} B_{jt}(d) &\equiv \int_{\mathcal{X}} W_{jt}(d,x)L_{jt}(d,x)\mathrm{d}x \\ &= \exp(\phi_{jt}(d))^{1+\beta(d)} \int_{\mathcal{X}} \left(\frac{\beta(d)}{1+\beta(d)}\exp(\psi_j(d)x)\right)^{1+\beta(d)} \exp\left(\beta(d)a_j(d,x)\right)\lambda_t(d,x)\bar{L}(d,x)\mathrm{d}x. \end{aligned}$$

We focus on stationary equilibria, where aggregate variables are time invariant. We write log wage bill as

$$b_{jt}(d) = (1+\beta(d))\,\phi_{jt}(d) + h_j(d), \tag{C2}$$

where

$$h_j(d) = \log \int_{\mathcal{X}} \left(\frac{\beta(d)}{1+\beta(d)} \exp(\psi_j(d)x) \right)^{1+\beta(d)} \exp\left(\beta(d) a_j(d,x)\right) \lambda(d,x) \bar{L}(d,x) \mathrm{d}x, \tag{C3}$$

which captures the determinants of wage bill other than $\phi_{jt}(d)$. Eliminate $\phi_{jt}(d)$ in equation (C1) using equation (C2) and obtain

$$w_{jt}(d,x) = \log \frac{\beta(d)}{1+\beta(d)} + \frac{1}{1+\beta(d)} b_{jt}(d) - \frac{1}{1+\beta(d)} h_j(d) + \psi_j(d)x,$$

which gives equation (6).

Productivity Shocks. Recall that $\phi_{jt}(d)$ follows a unit root process:

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

Eliminate $\tilde{\phi}_{jt}(d)$ and obtain

$$\phi_{jt}(d) = \phi_{m(j)t}(d) + \phi_j(d) + \sum_{s=1}^{t} \nu_{js}(d), \tag{C4}$$

where $\tilde{\phi}_{j0}(d) = 0$. Using equations (C2) and (C4), calculate the change in log wage bill as

$$\Delta b_{jt}(d) = (1+\beta(d))\, \Delta\phi_{jt}(d) = (1+\beta(d))\, \Delta\phi_{m(j)t}(d) + (1+\beta(d))\, \nu_{jt}(d).$$

The change in log wage bill net from the market-year effect identifies the productivity shock scaled by $1+\beta(d)$:

$$\Delta\tilde{b}_{jt}(d) = (1+\beta(d))\, \nu_{jt}(d). \tag{C5}$$

Permanent Wage Components. Note that the log wage net from the market-year effect is given by

$$\tilde{w}_{jt}(d,x) = \phi_j(d) + \sum_{s=1}^{t} \nu_{js}(d) + \psi_j(d)x = \phi_j(d) + \frac{1}{1+\beta(d)} \Delta^t \tilde{b}_{jt}(d) + \psi_j(d)x,$$

where the second equality uses equation (C5):

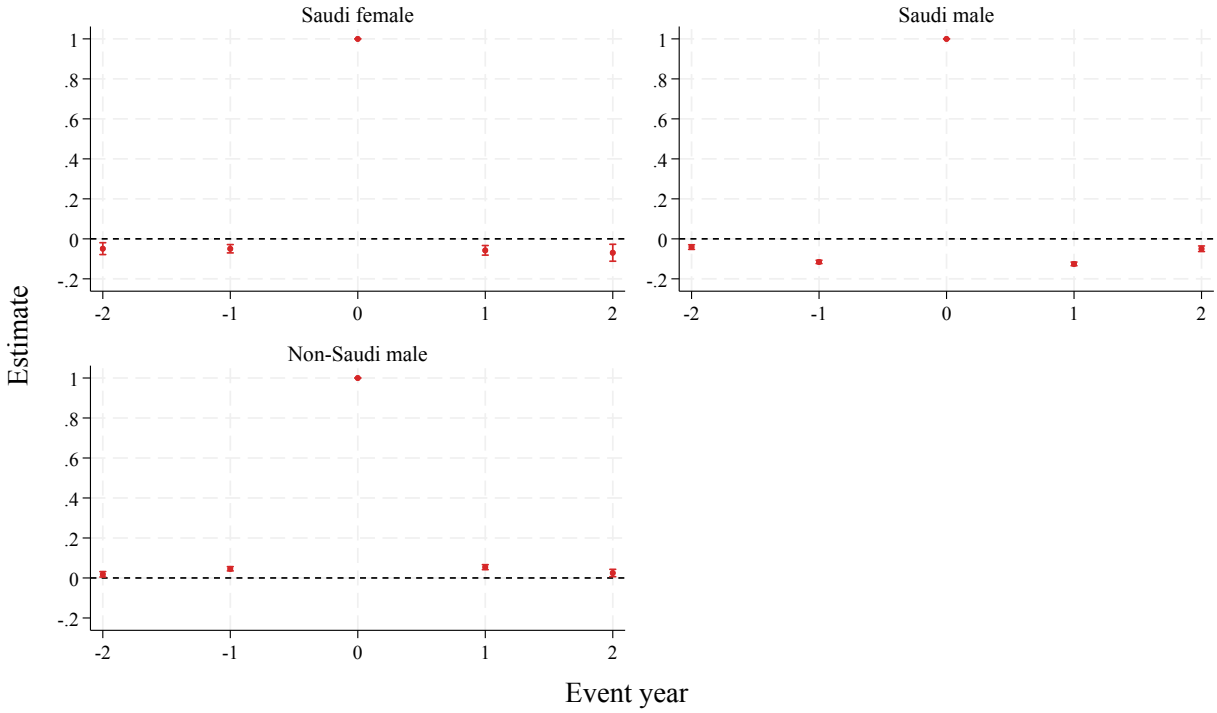
$$\sum_{s=1}^{t} \nu_{js}(d) = \frac{1}{1+\beta(d)} \sum_{s=1}^{t} \Delta\tilde{b}_{js}(d) = \frac{1}{1+\beta(d)} \Delta^t \tilde{b}_{jt}(d).$$

Therefore, the permanent component of wage is given by

$$w^p_{jt}(d,x) \equiv \phi_j(d) + \psi_j(d)x = \tilde{w}_{jt}(d,x) - \frac{1}{1+\beta(d)} \Delta^t \tilde{b}_{jt}(d). \tag{C6}$$

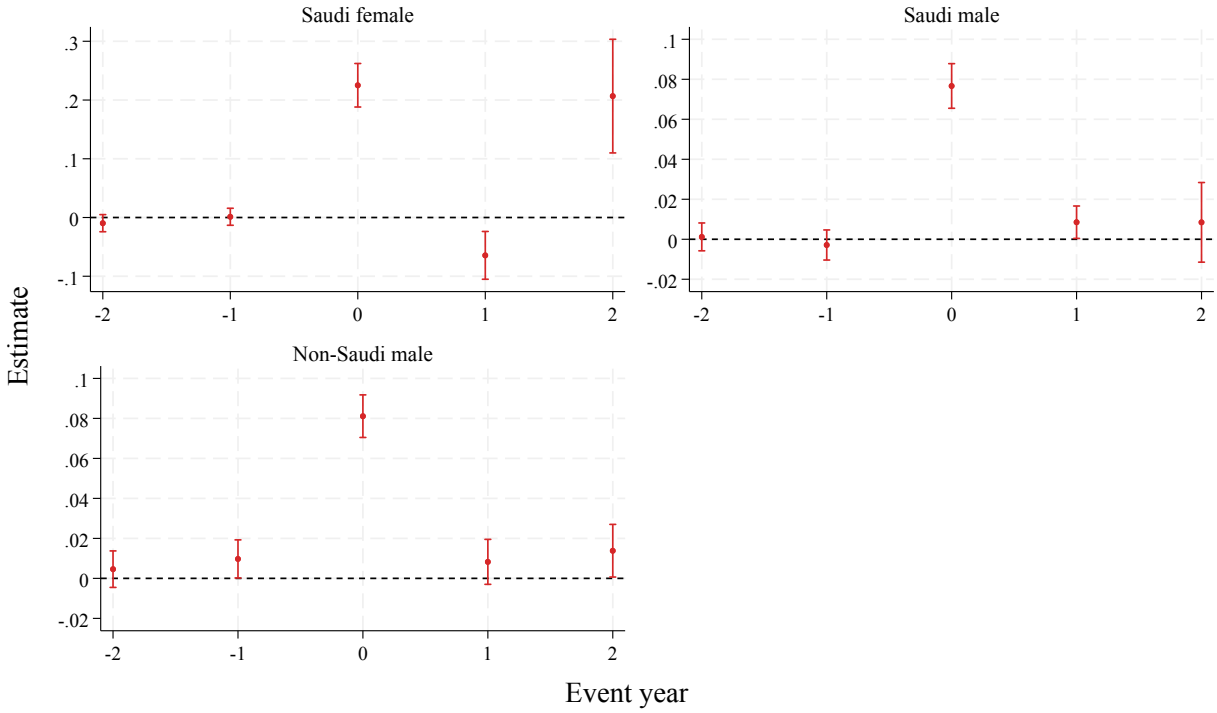
C.2 Additional Results from the Model

Figure C1: Productivity shock processes



Notes: The figure reports the estimates from the regression of productivity shocks on their leads and lags. The 90-th confidence intervals are shown as caps.

Figure C2: Pass-through of wage bill shocks to wages



Notes: The figure reports the estimates from the regression of wage changes on the leads and lags of wage bill shocks. The 90-th confidence intervals are shown as caps.

Table C1: Accounting for worker skills

	Saudi female	Saudi male	Non-Saudi male
Illiterate (omitted)	-	-	-
	(-)	(-)	(-)
Elementary	-0.08***	0.02**	-0.01
	(0.02)	(0.01)	(0.01)
Secondary	-0.07***	0.22***	-0.02**
	(0.02)	(0.01)	(0.01)
High School	-0.03**	0.32***	0.03***
	(0.01)	(0.01)	(0.01)
Diploma	0.02	0.45***	0.10***
	(0.02)	(0.01)	(0.01)
Bachelor	0.23***	0.73***	0.36***
	(0.02)	(0.01)	(0.01)
Master	1.16***	1.29***	0.68***
	(0.04)	(0.02)	(0.01)
Phd	2.77***	1.91***	1.00***
	(0.12)	(0.05)	(0.02)
Elementary Occupations (omitted)	-	-	-
	(-)	(-)	(-)
Managers	0.43***	1.03***	1.15***
	(0.01)	(0.01)	(0.00)
Professionals	0.39***	0.89***	0.87***
	(0.01)	(0.01)	(0.00)
Technicians and Associate Professionals	-0.11***	0.12***	0.32***
	(0.01)	(0.00)	(0.00)
Clerical Support Workers	-0.04***	0.17***	0.43***
	(0.01)	(0.00)	(0.00)
Service and Sales Workers	-0.14***	0.13***	0.37***
	(0.01)	(0.00)	(0.00)
Skilled Agricultural, Forestry and Fishery Workers	-0.25***	-0.04***	0.11***
	(0.01)	(0.00)	(0.00)
Craft and Related Trades Workers	-0.38***	-0.08***	0.11***
	(0.05)	(0.02)	(0.02)
Plant and Machine Operators, and Assemblers	-0.17***	0.05***	0.28***
	(0.02)	(0.01)	(0.01)
Armed Forces Occupations	-0.52*	0.25***	0.24
	(0.27)	(0.09)	(0.18)
Nationality dummies	✗	✗	✓
Constant	-0.02	-0.46***	-0.52***
	(0.02)	(0.01)	(0.00)
Observations	178,377	922,777	1,133,588
R^2	0.070	0.126	0.350

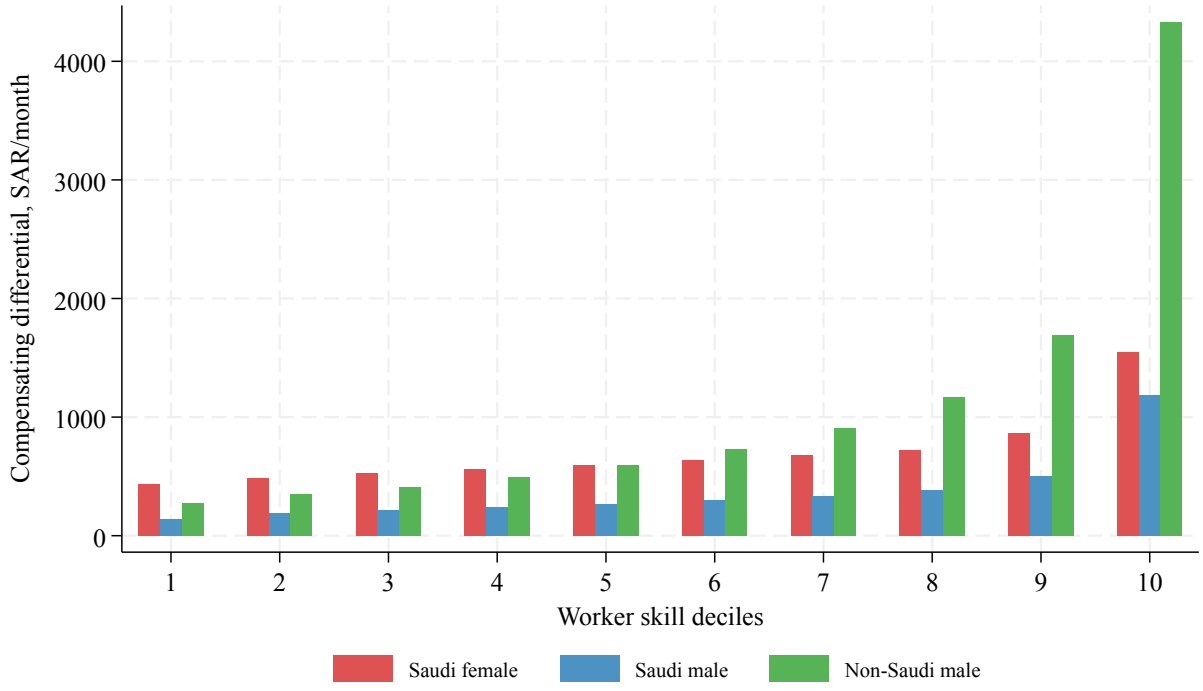
Notes: The table reports the results from regressing standardized worker skill on dummies for education, occupation, and nationality (for non-Saudis). Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C2: Model fit

	Saudi female	Saudi male	Non-Saudi male
$Corr(\widetilde{\log W_{it}^{\text{data}}}, \widetilde{\log W_{it}^{\text{model}}})$	0.953	0.964	0.989
$Corr(\widetilde{\log L_{jt}^{\text{data}}}, \widetilde{\log L_{jt}^{\text{model}}})$	0.985	0.990	0.995

Notes: The table reports the correlations between model-predicted outcomes and their data counterparts. Variables are residualized on market-year fixed effects.

Figure C3: Compensating differentials



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

Table C3: Correlations between foreign-country-specific estimates and home characteristics

	Saudi female		Saudi male		Non-Saudi male	
Panel A: Foreign wage premium						
Culturally different	0.28	0.21	0.06	-0.00	0.07	-0.04
Log GDP per capita		0.04		0.03		0.07
Panel B: Amenity difference						
Culturally different	-0.45	-0.38	-0.13	-0.10	-0.09	-0.16
Log GDP per capita		-0.04		-0.02		0.04

Notes: The table reports the correlations between foreign-country-specific estimates and home characteristics. The data on log GDP per capita is dated in 2009.

Table C4: Heterogeneous wage premiums and amenity differences, including domestic MNEs

	Saudi female	Saudi male	Non-Saudi male
Panel A: Foreign wage premium			
Foreign MNE (culturally different)	0.52	0.16	0.27
Foreign MNE (culturally similar)	0.24	0.02	0.18
Domestic MNE	0.07	0.11	0.10
Panel B: Amenity difference			
Foreign MNE (culturally different)	−0.39	−0.07	−0.17
Foreign MNE (culturally similar)	−0.10	0.25	−0.04
Domestic MNE	0.27	1.24	0.98

Notes: The table reports heterogeneous wage premiums and amenity differences for foreign firms by cultural similarity and domestic MNEs. Wage premiums and amenity differences are calculated based on the definition in the text. Foreign firms are split into those from culturally different and similar countries. Domestic MNEs are included as a separate category.

Table C5: Robustness results

	(1) Baseline	(2) Low β	(3) High β	(4) $K = 20$	(5) All firms	(6) All workers	(7) All firms and workers
Panel A: Foreign wage premium							
Saudi female	0.30	0.26	0.31	0.25	0.25	0.31	0.25
Saudi male	0.10	0.11	0.12	0.17	0.05	0.11	0.07
Non-Saudi male	0.24	0.25	0.23	0.28	0.23	0.95	1.15
Panel B: Amenity difference							
Saudi female	−0.18	−0.20	−0.20	−0.19	−0.17	−0.18	−0.17
Saudi male	0.04	0.18	−0.03	−0.00	−0.06	0.04	−0.08
Non-Saudi male	−0.13	−0.06	−0.16	−0.16	−0.11	−0.46	−0.51

Notes: The table reports the average foreign wage premiums and amenity differences under different robust specifications indicated by the columns. Columns (2) and (3) scale estimated β by a factor of 0.5 and 2, respectively. Column (4) considers $K = 20$ when grouping firms using the K-means algorithm. Column (5) includes all firms (with or without a match in Orbis). Column (6) includes all workers (full-time or part-time). Column (7) includes all firms and workers.