

## REFUGEE HIRING AND ORGANIZATIONAL PERFORMANCE

GRAZIA D. SANTANGELO  
Department of Strategy & Innovation  
Copenhagen Business School  
Kilen, Kilevej 14a, Frederiksberg 2000  
DENMARK  
[gs.si@cbs.dk](mailto:gs.si@cbs.dk)

VERA ROCHA  
Department of Strategy & Innovation  
Copenhagen Business School  
Kilen, Kilevej 14a, Frederiksberg 2000  
DENMARK  
[vr.si@cbs.dk](mailto:vr.si@cbs.dk)

WOLFGANG SOFKA  
Department of Strategy & Innovation  
Copenhagen Business School  
Kilen, Kilevej 14a, Frederiksberg 2000  
DENMARK  
[ws.si@cbs.dk](mailto:ws.si@cbs.dk)

and

University of Liverpool Management School  
Strategy, International Business and Entrepreneurship Group (SIBE)  
Chatham Street, L69 7ZH, Liverpool  
UNITED KINGDOM

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### ABSTRACT

Prior research on the performance effects of hiring immigrants has mainly considered people who choose to move to other countries. We shift attention to forced migrants (i.e., refugees) and study the relationship between their employment and firm performance. We focus on the specific labor market conditions refugees face and theorize that performance improves among firms that hire refugees. We explain this relationship using two interconnected mechanisms that revolve around refugees' limited outside options. First, as refugees have strong incentives to remain employed, they put extensive effort into their jobs, work long hours and, thereby, reduce the employer's labor costs related to worker turnover (*effort mechanism*). Second, as refugees are generally willing to accept low pay, hiring them reduces the employer's labor costs related to salaries (*remuneration mechanism*). Moreover, we theorize that greater job insecurity at the hiring firm strengthens both mechanisms because it increases refugees' perceived risk of being fired and their fear of being unemployed. We find support for our theoretical predictions in a matched sample of 27,782 firms in Denmark covering the period from 2001 to 2016.

## INTRODUCTION

Migration is a major societal issue that has increasingly gained attention in the management field (Choudhury 2021). A growing body of research has provided theoretical arguments and empirical evidence on the role immigration plays in organizations. Immigrants can, for instance, start their own organizations and become entrepreneurs (Kulchina 2016). Immigrant inventors (Choudhury and Kim 2019) and managers (Hernandez and Kulchina 2020; Kulchina 2017) can also find employment in established organizations and enhance their performance. This stream of research, which has largely focused on immigrants who have voluntarily left their countries, explains how immigrants contribute to organizational performance through the knowledge and skills they bring to their destination countries (Kerr et al. 2016), the knowledge flows they create between their home and host countries (Hernandez 2014; Kerr et al. 2016; Wang 2014), and their distinct social capital, which allows them to connect their host-country employers with relevant actors in their home countries (Morgan et al. 2021; Gregorič, Rabbiosi, & Santangelo, 2021).

Forced migration has remained off the radar in this stream of literature, even though it is one of the most pressing global issues of our time (George et al. 2016; Salehyan 2018). This phenomenon has reached levels not seen since World War II, with more than 80 million people worldwide forced to leave their home countries due to conflicts, climate-related disasters, and persecution between the 1940s and 2020 (UNHCR 2020). The volume of refugees fleeing their home countries continues to increase owing to recent geopolitical events. Refugees' skills, knowledge, and experience (i.e., "refugee human capital," Ployhart and Moliterno 2011) are difficult to assess, and may be obsolete or undesirable in host countries (Bloch 1999, Bloch 2002; Naccache and Al Ariss 2018; Sargeant and Forna 2001). Nevertheless, forced migrants may constitute a valuable human resource-pool. However, although management scholars have extensively studied the mechanisms through which voluntary immigrants affect the hiring firm, we have limited knowledge of how refugees contribute to firm performance.

We advance organizations and migration research by identifying the distinct mechanisms underlying the contributions of refugee employees to firm performance. The United Nations 1951

Refugee Convention defines refugees as those who, owing to a well-founded fear of persecution due to race, religion, nationality, membership in a particular social group, or political opinion, are outside their native country, and unable or unwilling to return or to avail themselves of their homeland's protection. We acknowledge that refugees are vulnerable to ending up in exploitative, abusive, or illegal work (e.g., Chonghaile 2002), but these situations are not at the heart of our theorizing. Instead, our reasoning centers on refugees hired legally by host-country firms that comply with labor laws and regulations.

Our theorizing centers on current refugees in Europe, whose human capital is difficult to assess, sometimes obsolete and, on average, less abundant than that of voluntary migrants (European Commission and OECD 2016; IOM 2012). We recognize that these refugees may not be representative of all forced migrants, although they account for a large proportion of the long-lasting refugee crisis (EPRS 2022). We consider the specificity of these refugees' human capital and the labor-market conditions they face (Campion 2018; Gericke et al. 2018) in order to isolate how the hiring of refugees leads to performance gains for firms. We posit that both discrimination and uncertainty about refugees' qualifications constrain the demand for their human capital, thereby limiting their labor-market options and bargaining power. At the same time, refugees have a strong incentive to maintain their employment. They put extensive effort into their jobs by working long hours and they reduce firms' costs related to turnover (e.g., replacing and (re)training employees), which can increase firms' profitability (i.e., the *effort mechanism*). Furthermore, as refugees lack bargaining power in the labor market, they are typically willing to accept low pay, which lowers firms' labor costs related to salaries and increases their profitability (i.e., the *remuneration mechanism*). We also delve deeper into these two mechanisms by considering job insecurity in the hiring firm. Specifically, we theorize that refugees' job-related efforts and their willingness to accept low pay increase with the rate of turnover (i.e., *job insecurity*) at the hiring firm. In firms with greater job insecurity, refugees will perceive themselves as more at risk of being fired and fear becoming unemployed. Thus, we hypothesize that greater job insecurity increases firms' performance gains from hiring refugees.

We test our hypotheses using employer-employee linked data from Denmark. These data enable us to: (a) comprehensively and accurately identify refugees (i.e., separately from voluntary immigrants or asylum seekers with temporary status),<sup>1</sup> (b) follow the performance of the firms that hire them, and (c) obtain data on relevant variables to identify a suitable control group (i.e., firms that never hire refugees within our observation period). Overall, we analyzed 27,782 firms over the period from 2001 to 2016, 11,769 of which hired refugees at least once. We combine coarsened exact matching (CEM) with firm fixed effects regressions to test our hypotheses. In line with our predictions, we find that firms with higher shares of newly hired refugees in their workforce experience an increase in profitability in the following year. This effect is stronger in firms with higher worker turnover rates (i.e., firms with greater job insecurity). These results are robust to an instrumental variables (IV) approach and various sensitivity analyses. We also assess the validity of several alternative explanations but do not find support for any of them. Finally, our theorizing is informed by several semi-structured interviews with refugees. We use selected quotes from these interviews to illustrate the theoretical mechanisms that drive organizational performance gains from hiring refugees.

We make two contributions to theory. First, we advance research on organizations and migration and help move the phenomenon of forced immigration toward the core of organizational theory by examining the firm-level effects of hiring a distinct type of immigrant—refugees. A large body of organizations and migration research has focused on the hiring of economic (i.e., voluntary) immigrants and the access to valuable knowledge flows they provide to their hiring firms (Choudhury and Kim 2019; Hernandez and Kulchina 2020; Kerr 2008). However, economic immigrants are only a subset of all migrants, who often have scarce human capital that is in high demand in the host country. We extend the current conversation within organizations and migration research to an under-studied group of immigrants (i.e., refugees) who face very different conditions in the host country’s labor market. In so doing, we single out distinct theoretical mechanisms through which refugees can improve firm performance based

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<sup>1</sup> Asylum seekers and refugees are in different stages of the same process. The former had to leave their home countries and are seeking protection in a host country. The latter (considered in our analysis) have been granted such protection.

on the labor-market frictions (Chadwick 2017) they face. Within this logic, firms benefit from hiring refugees because refugees are particularly motivated to expend a great deal of effort while they have limited power to bargain for higher wages. Our analysis shows that refugees work, on average, 23% more regular hours and 39% more extra hours than other foreign employees. At the same time, refugees earn about 2.3% lower hourly wages than other foreign employees in the year they are hired. These gaps in effort and wages imply lower labor costs per employee for firms hiring refugees instead of other foreign employees. While our findings should not be interpreted as causal and refer to labor market conditions of one specific European country, they offer strong support to our theoretical logic and add important insights to a grand challenge of our time, given the magnitude of the refugee crisis in many host countries and the pressure on firms to help address it (Guo et al. 2020; Szkudlarek et al. 2019).

Second, we contribute to research on how organizational practices contribute to societal inequalities. While this body of research covers many societal outcomes of firms' hiring practices (Amis et al. 2019; Bapuji et al. 2019), it offers little theoretical guidance on the consequences of socially desirable hiring for firm performance. Without such guidance, too few marginalized individuals will be hired and societal inequalities will persist. We use the lens of labor-market frictions (Chadwick 2017) to develop a theory that makes the performance outcomes of hiring refugees more predictable for managers. Our theoretical logic should not be misunderstood as a recommendation for firms to exploit the labor-market disadvantages of refugees. Instead, our work is meant to describe how firms can experience performance gains while alleviating refugees' substantial unemployment rates and social exclusion by providing them opportunities for resettlement, (Brücker et al. 2020), improving their psychosocial well-being (Hussam et al. 2022), and contributing to their long-term integration (Knappert et al. 2023). If the performance potential of undervalued human resources can be widely observed and understood, more employers will want to hire these individuals and labor markets will gradually begin producing fairer economic opportunities for disadvantaged groups (Siegel et al. 2018).

## THEORY AND HYPOTHESES

### **Performance effects of hiring immigrants**

Prior research on migration and organizations has mostly studied voluntary immigrants—that is, individuals who self-select into immigration (for a recent review, see Choudhury 2021). Voluntary immigrants tend to be highly skilled individuals. Therefore, past research at the intersection of immigration and organizations has often investigated the effects of employing foreign inventors (Almeida et al. 2015; Choudhury and Kim 2019; Niebuhr 2010; Foley and Kerr 2013; Oettl and Agrawal 2008), foreign scientists (Borjas and Doran 2012; Franzoni et al. 2014; Ganguli 2015), and individuals qualifying for high-skilled visa programs (Doran et al. 2016). These individuals have documented credentials in the form of patents, publications, education degrees, and/or affiliations with credible organizations (e.g., universities or past employers). The performance impact of employing these immigrants typically emerges because they either increase their employer’s innovation outputs or they provide opportunities for internationalization. Theory on the former relies mostly on knowledge-transfer and knowledge-recombination mechanisms, while theory on the latter rests on immigrants’ distinct social capital.

The hiring of skilled immigrants allows firms to enhance their innovation performance because these hires often transfer valuable knowledge from their home countries, which is otherwise hard to access because it is tacit in nature or culturally embedded (Choudhury and Kim 2019; Ganguli 2015). Moreover, immigrants have strong incentives to create visible outputs (e.g., patents) to quickly advance their careers (Choudhury et al. 2019). In addition to direct knowledge transfers, skilled immigrants may be able to combine their own knowledge inputs with existing knowledge in the host country. As such, immigrants expand cultural diversity within regions and, thus, the potential novelty of innovations (Niebuhr 2010). Immigrants can also introduce productive practices (Hornung 2014) or establish connections between geographically dispersed researchers (Ganguli 2015; Oettl and Agrawal 2008), which can boost their employers’ performance.

A separate set of mechanisms connecting the employment of immigrants with firm performance emerges from immigrants' distinct social capital, especially their ability to combine relationships in their home and host countries (Brambilla et al. 2012; Gregorič et al., 2021; Morgan et al. 2021; Munch & Skaksen, 2008). This may be beneficial for their employers if it facilitates internationalization through exporting (Morgan et al. 2021), efficient outsourcing (Wang and Liu 2015), international technology licensing (Gregorič et al., 2021), or the management of foreign subsidiaries and acquisition targets (Foley and Kerr 2013; Useche et al. 2020). Immigrant's social capital can produce these benefits in several ways. First, immigrants benefit from their local language skills and their comprehensive understanding of home-country markets, all of which facilitate the identification of business opportunities (Hiller 2013; Liu et al. 2015; Vissak and Zhang 2014). Naturally, such opportunities are particularly strong when immigrants originate from home countries with growing market opportunities, such as China or India (Saxenian 2000). Second, immigrants' personal networks in their home countries can allow them to exploit or build trusting relationships, thereby limiting potential risks when firms conduct sensitive R&D in those countries and reducing the need for local joint-venture partners (Foley and Kerr 2013). Third, immigrant managers can compare resource costs (e.g., wages) in their host country with those in their home country and rely on home-country resources when they are more cost effective (Kulchina 2016, 2017). Finally, immigrants can form effective communities within their host countries to share knowledge (Almeida et al. 2015) or reduce the liabilities of foreignness when firms from their home countries invest in their area (Hernandez 2014; Hernandez and Kulchina 2020).

In sum, the extant theory on the performance effects of hiring immigrants suggests that they possess knowledge valuable to the host country or social capital from their home countries that can be fruitfully exploited when their employers internationalize to their home countries. Both conditions are unlikely to apply to refugees. Hence, different theoretical mechanisms are required to understand how hiring refugees can affect firm performance.



### **The specific labor market conditions of refugees**

The United Nations' 1951 Refugee Convention differentiates between refugees and economic, voluntary immigrants who make a deliberate choice to leave their countries (i.e., who self-select into immigration) to seek career opportunities and a better life elsewhere. Prior to their departure, economic immigrants often collect information about their destination, explore employment opportunities, and study the language. They are also free to return to their home countries at any time. These conditions do not apply to refugees, whose migration is typically forced rather than planned or voluntary.

The phenomenon of forced migration has been at the center of political discussions worldwide (Guo et al. 2020) and the number of refugees is expected to rise (UNHCR 2021). The UN found that more than 80 million people around the world had been forcibly displaced between the 1940s (due to World War II) and 2020 (UNHCR 2020). Most displacements were caused by wars, humanitarian crises, and climate disasters. The World Bank has estimated that 143 million people will be forced to leave their countries in Latin America, sub-Saharan Africa, and Southeast Asia by 2050 due to climate-related disasters alone (Rigaud et al. 2018). Forced migrants become refugees when host countries grant them asylum. However, the acceptance of refugees is fraught with conflict in host countries. Despite many public movements advocating for refugee rights, skepticism about the genuine nature of forced migration and the integration of these migrants remains widespread in host societies (IPSOS 2019). In these contexts, refugees struggle to obtain security and food, and face exploitation, exclusion, and underemployment (Campion 2018).

Employment is considered the most vital condition for successful refugee integration into host countries (Knappert et al. 2023; Phillimore and Goodson 2006). Host-country employment creates opportunities for refugees to learn the local language, attain economic independence, positively interact with the host society, and improve their psychosocial well-being (Bloch 1999, 2002; Hussam et al. 2022). For these reasons, refugees value and ultimately seek stable employment, as this is the key pathway for their effective socioeconomic integration into the host country (Guo et al. 2020).

However, refugees face several employment barriers in their host countries. Potential employers tend to be uncertain about their qualifications and often fear cultural differences that may create clashes with existing employees (Feeney 2000; Sargeant and Forna 2001). In addition, it is often difficult for refugees to demonstrate their professional credentials and skills, as they may not have taken the relevant documents (e.g., diplomas, employers' references, or evidence of work experience) when fleeing their home countries (Guo et al. 2020). Moreover, refugees usually do not speak the language of the host country when they first arrive. Obstacles to finding a job may have even deeper roots. Refugees often have skills that are not in demand or that are considered obsolete, limited insights into where to find jobs or training, and few (or no) family or professional ties that can connect them to potential employers (Bloch 1999). A refugee with a law degree from Iran provides a useful example for skills that are not in demand in the host country, in this case Denmark:

*“I really loved to be a lawyer [in Iran]. I really was passionate about it. [...] I skipped the accreditation of my degree [in Denmark]. I had studied Islamic law.”*

An Eritrean refugee describes his experience with lacking a professional network in the host country as follows:

*“Without the network you are nothing. It helps you to get a job, explain the work culture, taxes, etc. It is incredible how important it is.”*

In addition, refugees may suffer from mental and physical injuries caused by their forced migration (Bloch 1999). As a result, they are typically willing to accept temporary jobs and professional downgrades given the necessity of a job for survival (Dietz et al. 2015; Sargeant and Forna 2001; Mestheneos and Ioannidi 2002). This is explained by a Syrian refugee whose credentials were not recognized by the host country:

*“I was an engineer, but I had to do other classes, like cleaning and painting, because that is what the municipality mandates.”*

Recent experimental evidence shows that many refugees even prefer to forgo cash transfers associated with host-country interventions to continue working on tasks that may pay less but give them a

sense of stability and self-worth (Hussam et al. 2022). While some of these labor-market problems can be overcome through education and training in the host country, many challenges persist. In Germany, for example, only half of the refugees arriving in the country after 2013 were employed five years later (Brücker et al. 2020). A similar patterns has been found in Sweden, where the career situation of refugees converges with that of locals only after 20 years in the country (Lundborg 2013).

In sum, two main aspects of refugees' situations set them apart from the skilled immigrants extensively studied in prior management research. First, forced migration affects broad groups of individuals who are likely to lack skills considered valuable in host countries or whose skills are not always reliably documented (in the form of certificates, patents, or other visible achievements). Second, refugees' home countries are unlikely to present promising business opportunities for foreign firms because they are often suffering from wars or natural disasters. Therefore, the value of refugees' social capital for enabling their new employers to internationalize into their home countries is limited. However, we suggest that refugees can positively affect the performance of the firms that hire them. We offer a novel theoretical logic that rests on the specific labor-market conditions refugees encounter in their host countries. This proposed theoretical logic revolves around the lower labor costs that firms hiring refugees experience due to the effort these employees put into their jobs and their willingness to accept low pay.

### **Refugee hiring and firm profitability**

Our theoretical starting point is the existence of demand frictions in labor markets (Chadwick 2017), as they are a dominant challenge for refugees. Most labor markets suffer from frictions and inefficiencies, which benefit some firms but not others (Mahoney and Qian 2013; Molloy and Barney 2015). We reason that specific frictions in labor demand for refugees create conditions for improving the profitability of firms that hire refugees. Under ideal labor-market conditions, wages for individuals with widely available and transferable human capital (e.g., jobs in cleaning services) depend on the number of individuals searching for jobs in such occupations (i.e., supply) and the number of firms trying to fill these vacancies (i.e., demand). Demand frictions imply that some employers will not compete in the labor market for certain types of job seekers. For instance, firms may deliberately disregard potential employees from

stigmatized firms to avoid reputational losses (Rider and Negro 2015) or potential employees from particular religious groups due to stereotypes (Starbuck 1993). This reduces labor demand for certain groups of individuals and improves the bargaining power of firms ultimately hiring employees from those groups (Campbell et al. 2012).

We posit that demand-side frictions make refugees vulnerable in labor markets for three primary reasons. First, potential employers are uncertain about refugees' legal status and formal qualifications (Marfleet and Blustein 2011). Second, employers may be concerned about language barriers, cultural differences, or even a refugee's traumatic stress, which may lead to conflicts in the workplace (Feeney 2000; Sargeant and Forna 2001). Third, many firms avoid hiring refugees because of negative stereotypes or biases. As a result, refugees have fewer opportunities, and their human capital is undervalued. These gaps persist as long as demand frictions exist in labor markets for refugees.

We reason that these distinct labor-market vulnerabilities that refugees face affect the performance of their employers in two ways. First, we propose an *effort mechanism*. Refugees are aware of their labor-market vulnerabilities owing to either their own experience or the persistently high unemployment rate among the broader refugee community (Brücker et al. 2020). This awareness creates particularly strong incentives for refugees to demonstrate that they value their existing jobs and want to keep them (Knappert et al. 2023). From an employer perspective, these incentives create performance gains because they lower labor costs in both direct and indirect ways. In direct terms, refugees are willing to put a great deal of effort into their jobs to avoid an unfavorable job market. They often work long hours, and tend to be flexible in shifts, staffing, vacation, and contract lengths. Firms may directly benefit from the high effort expended by their refugee employees, who may be willing to accept less-attractive working conditions (e.g., night shifts) without extra pay and have strong incentives to avoid concerns about the quality of their work (e.g., customer complaints about late or missed deliveries), which could damage their reputation as employees. The indirect effect on costs arises when firms employ refugees who derive non-pecuniary benefits from being employed and prefer to stay in their current workplace.

This allows employers to reduce the turnover costs associated with searching for, selecting, and training new hires. A refugee born in Syria describes his approach to his work effort like this:

*“You need to work much harder. [...] After three or four years now, I don't need to prove myself anymore [...] now I know how to work and what needs to be done and how. But before that, I needed to work extra to prove myself.”*

Similarly, the employee of an engineering company in Denmark who fled Iran illustrates her attitude to work in the host country:

*“I never took days off. I thought, I cannot be sick. What will they think at work? I'd rather work sick in the home office. I still have problems with that. My Danish colleagues have no problem staying at home a few days.”*

In the same vein, a refugee from Eritrea describes his approach to work after he was granted asylum in Denmark as follows:

*“There is a lot of competition for jobs [...] but you need to be flexible. I can work in a warehouse; I can drive a taxi. Next day you collect data. You need to be flexible, just to get a place.”*

Second, the distinct labor-market frictions that affect refugees also constrain their bargaining power in salary negotiations. Other employers may not consider hiring them because of a lack of documented qualifications, fear of conflicts, or stereotypes (Feeney 2000; Marfleet and Blustein 2011; Sargeant and Forna 2001). As a result, it is hard for refugees to find new employers or use the threat of switching employers in salary negotiations. Therefore, refugees are typically willing to accept low pay, which reduces the hiring firm's labor costs related to salaries. We refer to this as the *remuneration mechanism*. A refugee from Syria working now for a service firm in Denmark describes his approach to salary negotiations:

*“The first one [job in Denmark], I took it [without negotiating salary] because I needed a job [...] Let me get something, I just need something.”*

An IT professional who fled Iran additionally describes how she first experienced the labor market when arriving in Denmark:

*“We want to get a job even if it does not pay [...] We [her and her husband] have our skills but we took the first job that we could get. [...] The salary we could get was very bad.”*

The same interviewee, now working at another firm, highlights how her approach to salary negotiations still differs from that of her native colleagues:

*“I recently had a discussion with my manager and he told me ‘you cannot have a bonus’ and I told him ‘that is fine, I am learning a lot’. If you compare with my Danish colleagues, the way they are asking is very different. They say: ‘I am getting better and I am doing so much’. There is confidence.”*

Taken together, both the *effort* and the *remuneration mechanisms* lower a firm’s general labor costs when hiring refugees, which in turn produces profitability gains. More formally, we propose:

*Hypothesis 1. Firms hiring refugees (versus non-refugees) experience an increase in profitability as the share of newly hired refugees in their workforce increases.*

### **The moderating role of job insecurity in the hiring firm**

Refugees’ labor-market vulnerability is central to our theorizing about the emergence of profitability gains via the *effort* and *remuneration mechanisms*. Demand frictions in the labor market expose refugees to the risk of being fired and employers differ in the degree to which they offer stable employment. Some firms treat job cuts as a measure of last resort, while others adjust employment levels frequently or drastically (Batt et al. 2002). This heterogeneity makes the level of job insecurity salient for the emergence of profitability gains from hiring refugees. Differences between employers in the rate of involuntary job losses (i.e., out-of-the-firm mobility that results in unemployment) affect refugees’ assessments of how much effort they should put into their jobs or whether they should negotiate their salaries to increase the likelihood of retaining those jobs.

First, the level of job insecurity at the hiring firm will affect refugees’ perceived risk of being fired. Refugees typically originate from very different geographical and/or cultural contexts, which may trigger concerns about poor fit, conflicts with coworkers, or a need for additional training (Feeney 2000; Sargeant and Forna 2001). In firms with high job insecurity, where involuntary staff attrition is frequent,

refugees will be extremely concerned about being at the top of the list in case of worker dismissals. A refugee from Eritrea explains his fear of losing a job like this:

*“There is a lot of pressure on people coming from Eritrea. I have my father and my little sister [in Eritrea]. They need to live. If I miss one month, what about their basic needs? I worry much about that. I worry more about back home than my family here. I cannot stop working because of this. You cannot have your mother crying on the street.”*

The employee of a manufacturing firm in Denmark who fled Syria describes similar feelings:

*“Security is so important. You will never know how important it is for me. I asked myself: What if they cancel me? The economic pressure is very stressful.”*

Second, refugees joining firms that tend to dismiss large shares of their workforce are likely to be more concerned about dealing with the difficulties of being unemployed in the host country. These difficulties derive from refugees’ distinct vulnerabilities in the host country’s labor market (Turchick Hakak and Al Ariss 2013), which result from their experience of forced migration, the associated loss of family and social ties, and any resulting trauma (Campion 2018). Refugees lack a safety net to help them deal with stressful events, such as losing a job. Moreover, as refugees are often unable to provide diplomas, references, or proof of prior work experience to credibly signal their human capital to host-country employers (Guo et al. 2020), the loss of a job soon after being hired can exacerbate the disadvantages they face and provide a negative signal of their quality to other employers. In addition, the potential consequences of unemployment can affect refugees’ legal status in the host country (Turchick Hakak and Al Ariss 2013). Finally, their lack of professional networks limits refugees’ access to information about alternative jobs and their ability to ask for references (Gericke et al. 2018). In line with these arguments, an Iranian refugee reports about her first experiences when arriving to Denmark:

*“I felt really insecure [...] I feel that job security is more important for refugees. You do not have support from family and friends. You are on your own.”*

She further describes her current perspective of the job market like this:

*“To be honest, I do not look at other jobs. Eventually, I would like to be a manager or product owner. I want to meet people. My work is nice, but there can be more and I can create more outcomes.*

*But for now, I stay put and I always tell myself: you do not know, this job might go away.”*

In response to the perceived risk of being fired and the fear of dealing with unemployment, refugees put even more effort into their jobs and are willing to accept lower wages when working for firms with greater job insecurity. Refugees anticipate that lowering labor costs for these employers can limit the risk of losing their jobs. Thus, greater job insecurity strengthens the contribution of newly hired refugees to the profitability of the hiring firm. Therefore, we propose:

*Hypothesis 2. The positive relationship between refugee hiring (versus non-refugee hiring) and firm profitability is stronger when job insecurity at the hiring firm is higher.*

## DATA AND METHODS

### **Data**

We test our theoretical predictions using employer-employee linked data from Denmark. Denmark is a suitable setting to test our theory for several reasons. First, the country has experienced large refugee inflows since the early 1980s (Arendt et al. 2022; Jakobsen et al. 2019). Second, although Denmark has a long political and societal tradition of openness and internationalization, frictions in labor demand for refugees are evident. Employers’ attitudes towards refugees have been characterized by stigma and discrimination, which hinders refugees’ socioeconomic integration (e.g., Bredgaard and Thomsen 2018; Hvidtfeldt et al. 2018), and can push refugees toward their ethnic enclaves (Damm 2009). Third, the Danish labor market is flexible and there is no statutory minimum wage. Wages and working hours are primarily regulated by collective agreements or individual employment contracts (OECD 2019). Finally, Denmark has excellent administrative data maintained by Statistics Denmark, which allows us to construct a comprehensive dataset that tracks firms and each of their employees. In sum, the Danish labor market is likely to serve as a representative setting for empirically tests of our hypotheses.



We combined the “Integrated Database for Labor Market Research” (IDA); the FIRM (*Generel Firmastatistik*) databases, which contain firm-level information (since 1999); and the OPHGIN (*Opholdsgrundlag for Indvandrede*) dataset, which identifies all refugees granted a residence permit in Denmark since 1997. All of these datasets are maintained by Statistics Denmark, which provides secure access to the data to authorized users. The Danish employer-employee linked registers are well-established in the social sciences and have been used in earlier studies on strategic human capital (e.g., Grimpe et al. 2019; Kaiser et al. 2018). We started by constructing a longitudinal database covering the population of firms located in Denmark and their employees. Employers and employees are identified with a unique serial number, which allows us to track and match them over time. At the firm level, IDA reports the location and industry of the firm as well as other characteristics. We obtained data on firms’ profits, sales, exports, and assets from FIRM files. At the employee level, IDA includes data on wages, tenure, and hierarchical position. We retrieved demographic information (e.g., gender, age, and nationality) from BEF (*Befolkningen*) files.

We leveraged all of these registers to create a matched employer-employee dataset spanning the years 2001 to 2016. We discarded self-employed people and firms without a physical workplace given our focus on hiring and work relationships.<sup>2</sup> We also excluded firms in the public sector owing to the nature of our dependent variable (i.e., firm profitability). These firms follow a logic other than profit maximization. We then applied matching methods (which we describe in detail below) to obtain comparable samples of firms that hired refugees and firms that hired other types of employees (including foreigners) but not refugees.

### *Dependent variable*

Our dependent variable is firm *profitability*, which is equal to the gross profits in year  $t+1$ . It represents the difference between a firm’s total revenue and the total costs arising from the consumption of goods,

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<sup>2</sup> In our full sample of refugees over the period from 2001 to 2016, about 24% became entrepreneurs at some point, while this was the case for 13% of non-refugee foreigners and 9% of Danes. Most of these entrepreneurs were self-employed: 16% of all refugees, 8% of all foreigners (non-refugees) and 5% of all Danes. Although an analysis of the entrepreneurial behaviour of refugees goes beyond the scope of this study, we believe there is promise in examining this further in future research.

energy, wages, and subcontracting. Profits are measured in Danish kroner (DKK) and adjusted for inflation based on the Consumer Price Index (using 2000 as a base year). We take the natural logarithm to account for skewness, and we exclude the top and bottom 1% of the distribution to eliminate outliers.<sup>3</sup>

### *Independent variables*

The main explanatory variable in our test of Hypothesis 1 is *newly hired refugees*—the share of newly hired refugees in the focal firm’s total workforce in year  $t$ . Refugees are explicitly identified by Statistics Denmark together with the issuance date of their residence permits, so they cannot be confused with regular immigrants or temporary asylum seekers. Status as a refugee allows individuals to live and work in Denmark. The median age of a refugee entering Denmark during the focal period was 28, but many children, adolescents, and older refugees also arrived in the country. We focused on the hiring of refugees aged 18 to 45 years in order to separate the theorized effects of being a refugee in labor markets from other potential, age-related labor-market challenges, such as a lack of experience or proximity to retirement age.

To test Hypothesis 2, we measure *job insecurity* in the firm as the share of workers in the firm who become unemployed in the following year (i.e., the share of involuntary staff attrition or turnover). In consistency checks, we considered an alternative operationalization of job insecurity at the firm level: one minus the firm’s retention rate, which was based on the share of employees working at the firm in  $t-1$  who were retained in  $t$ . The higher the value of either measure, the greater the job insecurity at the firm.

### *Control variables*

We control for several firm-level and contextual factors that may influence both the hiring of refugees and firm profitability. First, to capture firms’ general preferences for or access to (other) foreign migrants, we include *newly hired foreigners*, which is measured as the share of newly hired foreigners (i.e., non-

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<sup>3</sup> We followed the common procedure of adding “1” to the raw data on firm profits, as  $\log(0)$  is not defined. We adopted the same procedure every time we took the logarithm of any other variable included in our model (e.g., control variables) for which the value “0” was meaningful. In a robustness check, we repeated the estimation of our main model using actual firm profits (not log transformed) as a dependent variable, which allowed us to include the very rare firm-year observations that had negative profits. The results, which are described later, remained qualitatively similar.

refugees) in the firm's total workforce in year  $t$ . The inclusion of this variable allows us to compare our findings with prior work focused on voluntary migration. Furthermore, it allows us to test whether our theorized mechanisms also apply to other (non-refugee) foreign hires.

Second, to ensure that our findings are not confounded by pre-existing differences in firm performance or scale (which is partly addressed by the matching procedure described below), we control for several time-varying firm characteristics that may correlate with hiring patterns and subsequent profits. We include *firm age* and *firm size*, as hiring can vary substantially with these firm-level dimensions (Coad et al. 2014; Dahl and Klepper 2015; Ouimet and Zarutskie 2014). We also consider *firm exports*, as variations in export levels may affect firm profits, and reflect differences in human capital and skill utilization (e.g., Brambilla et al. 2012; Morgan et al. 2021; Munch and Skaksen 2008). Our model also includes *firm assets per employee*, which is measured at the end of the financial year, to capture heterogeneities in firms' resource portfolios, as well as firms' recent *sales growth*, which we measure as the difference between  $\log(\text{sales}_t)$  and  $\log(\text{sales}_{t-1})$ . All of these control variables should account for pre-existing differences in firm performance.

Third, we control for several characteristics of the firm's workforce. We account for the *share of part-time workers* (i.e., workers hired to work less than 37 hours per week) because greater reliance on these employees may correlate with an employer's need for flexible work arrangements, costs of recruiting and training, and fluctuations in firm performance or industry dynamics (e.g., Montgomery 1988). We also account for the share of *men in the workforce*, as differences in gender diversity may capture employers' unobserved preferences in recruitment and/or retention, which may affect firm performance (Zhang 2020) and correlate with preferences for (or against) other categories of employees. We also control for the share of *workers in the three highest ranks* (i.e., management roles, highly skilled jobs, and roles requiring medium-high knowledge) as well as the *average wage* in the firm, as both variables help capture the extent to which the firm is knowledge intensive.

Finally, we control for contextual factors that may affect the hiring of refugees and firm profitability. We compute the Herfindahl-Hirschman Index (*HHI*) based on yearly employment

concentration in the focal firm's industry (three-digit NACE) to capture changes in the intensity of competition. We also include the stock of refugees (logged) already living in the municipality of the focal firm (*refugees in the municipality in  $t-1$* ). To capture any remaining differences in regional labor markets, we add region-by-year fixed effects.<sup>4</sup> Finally, we include two-digit NACE industry-by-year fixed effects to capture any idiosyncratic industry shocks to which firms may be exposed.

### **Estimation approach and identification strategy**

Firms may hire refugees or perform differently due to factors we cannot observe or capture with the abovementioned variables. Specifically, some firms may choose to hire refugees, and this choice may affect their profitability to very different extents depending on the firms' industry, size, location, and past performance. These aspects may also create substantial variation in firms' openness to or demand for refugee employees. Furthermore, we must ensure that the captured effects are not confounded by a general hiring effect. For these reasons, we adopted a matching approach that allowed us to exactly match firms that hired refugees ("treatment group") with firms that hired one or more employees in the same year but never hired refugees during the focal period ("control group"). Using coarsened exact matching (CEM) (Iacus et al. 2011), we matched firms based on industry (exact matching on two-digit NACE codes), region (exact matching on the five main regions of Denmark), size in  $t-1$  ( $k2k$  matching on the number of employees), profitability in  $t-1$  ( $k2k$  matching on gross profits (logged) the year prior to the focal hiring event), and lagged sales growth ( $k2k$  matching on sales growth between  $t-2$  and  $t-1$ ). For each "treated" firm (i.e., a firm that hired refugees in year  $t$ ), this approach found the closest match in terms of size, past profitability, and past sales growth within the same industry, region, and year. We removed treated firms that could not be matched and control firms that were not a suitable match for any treated firm from the analysis. We obtained a final sample of 27,782 unique firms, 11,769 of which (i.e., 42%) hired refugees at some point during the focal period.<sup>5</sup> In robustness checks, we repeated this matching

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<sup>4</sup> Denmark is divided into five main regions: Hovedstaden, Sjælland, Syddanmark, Midtjylland, and Nordjylland.

<sup>5</sup> Given the matching procedure used in the first stage, our final estimation sample was an unbalanced panel because, for each firm hiring refugees in a given year ("treated" firms), we identified the closest match among "control firms" (i.e., firms that hired employees in the same year but never hired refugees). While this approach should lead to an equal number of treated and control

procedure, but instead of using a control group of similar firms that had hired any employee (Danes or foreigners, but never refugees) in the same year, we restricted the control group to firms that hired one or more foreign (non-refugee) employees. In Appendix Table A.1, we present balance statistics on the variables used in each of these matching procedures.<sup>6</sup>

Finally, we used the matched sample to estimate panel regression models with firm fixed effects to test our hypotheses, including all the control variables presented earlier. By adding firm fixed effects, we held the firm context constant and assessed the performance effects of hiring refugees for a given firm over time (i.e., within-firm variation). This estimation strategy helped us to isolate any remaining time-invariant, unobserved heterogeneity at the firm-level (e.g., the firm’s management quality, strategic orientation, or other firm-level aspects that remained fixed during the studied period) that may strongly correlate with either *newly hired refugees* or *profits*, and, therefore, bias the estimation of the relationship of interest.

Formally, in our baseline analyses, we estimate the following model:

$$\begin{aligned} Profitability_{it+1} = & \alpha_i + \beta_1 \cdot newly\ hired\ refugees_{it} + \beta_2 \cdot job\ insecurity_{it} + \\ & + \beta_3 \cdot newly\ hired\ refugees_{it} \times job\ insecurity_{it} + \mathbf{X}_{it}\boldsymbol{\theta} + \boldsymbol{\gamma}_{jt} + \boldsymbol{\rho}_{rt} + \varepsilon_{it}, \end{aligned} \quad (1)$$

Where  $\alpha_i$  denotes the firm fixed effect;  $\boldsymbol{\gamma}_{jt}$  and  $\boldsymbol{\rho}_{rt}$  represent industry-by-year and region-by-year fixed effects, respectively;  $\mathbf{X}_{it}$  is the vector of the previously described control variables; and  $\varepsilon_{it}$  is the idiosyncratic error term. We cluster the standard errors at the firm level to account for the correlation

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firms if we were to use a cross-sectional sample, we needed to follow firms over time, which created an unbalanced panel due to possible missing values in some variables in some years. Furthermore, if treated firms hired refugees in multiple years, they might be matched to different control firms in different years depending on how treated firms and others in the same region and industry evolved in terms of size, profitability, and sales growth (i.e., the variables used in *k2k* matching).

<sup>6</sup> As can be seen in Appendix Table A.1, no statistical differences remain after the geographical matching. The matching on industry is equally satisfactory (most differences between firms hiring and not hiring refugees disappear, and the few that are statistically significant are much smaller in magnitude than before matching). The balance in the three other (continuous) variables also improves substantially, but the algorithm does not identify identical matches. As these are continuous variables and large variations exist in these measures within our sample, exact matching is not possible. Therefore, we performed *k2k* (nearest-neighbor) matching for these three variables. Reassuringly, “treated” and “control” firms become much more similar in all three variables after matching (i.e., the magnitude of the difference is reduced considerably), but the difference is still statistically significant. For this reason, it is important to include control variables in our estimations because they help capture any remaining pre-existing differences between “treated” and “control” firms and, thus, minimize any omitted variable bias when estimating the relationship between refugee hiring and organizational performance.

between observations belonging to the same firm. Based on our theoretical hypotheses, we expect  $\beta_1$  to be positive and statistically significant, reflecting an increase in future profitability in firms that increase the proportion of newly hired refugees in their workforce. Furthermore, given our theorized mechanism, this profitability gain will be larger in firms that exhibit greater job insecurity. In other words, we expect  $\beta_3$  to be positive and statistically significant.

Our set of control variables intends to account for a substantial portion of firm-level (both observed and unobserved) heterogeneity. Moreover, with our matched samples, we try to alleviate concerns that firms self-select into refugee hiring based on their observable differences (e.g., their prior performance trends) and ensure that we are not confounding the effect of refugee hiring with a general hiring effect. Nevertheless, in follow-up analyses, we implement an instrumental variables (IV) approach to alleviate any remaining concerns regarding self-selection into refugee hiring or other omitted variable bias that could potentially bias the estimated relationship of interest. We discuss these additional estimations in the next section.

## RESULTS

Table 1 provides descriptive statistics for the key variables included in our models. The median firm in our sample has slightly more than DKK 3 million in annual profits (equivalent to about USD 406,000). However, the distribution of firm profitability is quite skewed—the mean value of firm profits in our matched sample is around DKK 11 million (i.e., nearly USD 1.5 million). This right-skewed distribution of firm profitability justifies our choice to use its log transformation as a dependent variable. On average, newly hired refugees account for 7.4% of the workforce, while other newly hired foreigners represent about 20% of total firm employment in our matched sample. We also observe important variation in job insecurity, with an average of 5.5% of the workforce becoming unemployed the following year. Firms in our matched sample had typically been active for almost 13 years, employed an average of 33 workers at the time of data collection (i.e., at the end of November every year), and reported nearly DKK 5,000 in yearly exports and just under DKK 580,000 in total assets per employee. These firms also exhibited a positive sales trend compared to the previous year. With respect to the average firm's workforce, the

descriptive statistics indicate that 62% were men, 23% had part-time contracts, and 18% were assigned to the three highest occupational ranks. Employees working at these firms earned about DKK 230,000 per year on average (around USD 30,000). Table 1 also provides pairwise correlations of the variables used in our main models. The correlation coefficients are generally low and the average variance inflation factor is less than 2, which does not raise multicollinearity concerns (Belsley et al. 1980).

--- Table 1 about here ---

Table 2 lists the top 10 industries in which it is more common to hire refugees; nearly 80% of the firms that hired refugees within our sample belonged to those industries. This evidence aligns with prior findings that ethnic enclaves often emerge in certain sectors (Portes and Jensen 1992; Portes and Manning 2019). The recruitment of refugees is more prominent in general (e.g., restaurants and cafés; transport services; property-related services, such as cleaning activities; wholesale and retail trade; and construction) than in professional services and in a few manufacturing industries (e.g., the manufacture of food products and fabricated metal products). Thus, refugees are concentrated in industries that are rather labor intensive, and in which effort and monetary compensation can substantially affect firms' profitability. This is consistent with our theoretical logic, and with Portes and Manning's (2019) argument that migrants' vulnerability and greater initial motivation translate into higher productivity and lower costs for hiring firms. Newly hired refugees are most often observed in less skilled, manual jobs (more than 60% in craftwork; transportation; operations or assembly lines; or other manual, low-skill work), or in general services and sales occupations (22%, consistent with their concentration in wholesale and retail trade, restaurants, and cafés). Most refugees granted residence permits in Denmark in recent years came from Afghanistan, Eritrea, Iran, Iraq, Somalia, and Syria.<sup>7</sup>

--- Table 2 about here ---

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<sup>7</sup> <https://www.norden.org/en/publication/nordic-integration-and-settlement-policies-refugees>, last accessed on September 18th, 2023.

### *Hypotheses testing*

Table 3 presents the results of panel data regression models estimated on our matched sample of firms. Model 1 is the baseline model, which tests Hypothesis 1. To facilitate the interpretation of the relevant coefficients, we have standardized the variables in bold around their sample means, so that all of them have a mean of zero and a standard deviation equal to one.

--- Table 3 about here ---

The coefficient of *newly hired refugees* is positive and statistically significant ( $p < 0.01$ ), and its magnitude implies that firms that increase the share of newly hired refugees in their workforce by one-standard deviation (i.e., 0.187 according to Table 1) experience, on average, nearly 3% higher profits in the following year. The effect size is notable, as the average firm in our sample is small. Given our matching approach and the control variables included in the model, differences in firms' resources, recent performance trends, or knowledge intensity are unlikely to drive this effect.<sup>8</sup> More precisely, our findings hold when we account for the fact that larger exporting firms with more assets per employee and a positive sales trajectory are more profitable on average. Thus, we find support for Hypothesis 1.

Model 1 also allows for replication of the positive relationship between other types of foreign hires and organizational performance found in prior studies (Choudhury and Kim 2019; Ganguli 2015). A one-standard-deviation increase in *newly hired foreigners* (0.304 according to Table 1) is associated with nearly 2% higher profits in the following year. Wald tests indicate that the coefficients of *newly hired refugees* and *newly hired foreigners* are not significantly different from each other. We return to this comparison below when we dissect the refugee-specific mechanisms that are central to our theoretical reasoning.

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<sup>8</sup> As mentioned above, our matching approach improves the balance between firms that hire and those that do not hire refugees, but some differences in scale and performance remain after matching (cf. Appendix Table A.1). Therefore, it is important to include control variables in our models to ensure that the relationships estimated are attributed to the hiring of refugees and not to other aspects in which firms differ. In this regard, we replicate Model 1 without control variables beyond firm, industry-by-year, and region-by-year fixed effects. As can be seen in Appendix Table A.2, neglecting differences in firm size produces different results for *newly hired refugees* and *newly hired foreigners*. However, simply including a control for firm size (where significant differences still exist between treated and control firms after matching) produces results similar to those reported in Table 3.



Model 2 tests Hypothesis 2 by extending the previous specification with an interaction term between *newly hired refugees* and *job insecurity*, where the latter is measured as the share of employees displaced (and becoming unemployed) by the hiring firm in the respective year. The coefficient of this interaction term is positive and statistically significant, indicating that the profitability gain associated with the hiring of refugees is greater in firms with higher shares of involuntary staff attrition. In line with our reasoning, refugees hired by these firms perceive a higher risk of being fired and are more fearful of unemployment. This increased vulnerability strengthens their interest in retaining their jobs, leading them to put even more effort into their work and accept lower salaries. In sum, this supports Hypothesis 2.

In Model 3, we extend model 2 with an interaction term between *newly hired foreigners* and *job insecurity*. The coefficient of the interaction term is not statistically significant, which suggests that the profitability gain associated with hiring other foreign migrants does not vary with firm-level conditions that could make them more vulnerable to job loss. This confirms that our theorized mechanism is specific to refugees as a distinct group of immigrant employees.

To further alleviate the potential endogeneity bias in the relationships estimated above, we repeat our hypotheses testing with an IV approach. We leverage the random variation in refugees' country of origin, time of arrival, and location across Denmark to construct two variables that are significantly correlated with a firm's hiring of refugees and that are supposedly exogenous to changes in the focal firm's profitability: a) the share of total refugees in the focal firm's municipality who "recently" arrived (i.e., who had been assigned a residence in the firm's municipality in the past two years) and b) diversity in refugees' country of origin, which we measured by applying the Herfindahl-Hirschman Index to the distribution of refugees from different countries within a certain location. This index varies from 0 to 1, and values closer to 1 (0) mean higher concentration in country of origin. The rationale for these instruments is twofold. First, waves of refugee inflows will randomly increase refugee labor supply over time and across municipalities. Second, if most newly arrived refugees originate from the same country, their migration is likely driven by a major event that has forced many individuals out of that country at the same time (e.g., war or a natural disaster). Therefore, both instrumental variables should be positively

correlated with firm-level shares of *newly hired refugees*. We confirmed this when estimating the first-stage equation predicting the share of *newly hired refugees* for each firm-year observation in our sample (see Table 4).

--- Table 4 about here ---

We have then replaced the original values of *newly hired refugees* with these predicted values in the second stage (profitability equation) and obtained qualitatively similar results to those reported earlier, in Table 3 (see Table 5).<sup>9</sup> Estimating the IV model without firm fixed effects and with bootstrapped standard errors instead yields qualitatively similar results (third and fourth models in Table 5). The sample applies if we follow Wooldridge (2015) and adopt a control function approach as an alternative (last two models of Table 5). All these analyses provide strong support to our theoretical hypotheses.

--- Table 5 about here ---

#### *Identification of the mechanisms*

Our theory suggests two mechanisms that underpin the hypothesized relationships and are specific to refugees as a distinct type of foreign migrants. We offer additional empirical evidence that singles out these two mechanisms.

To demonstrate the *effort mechanism*, Table 6 compares newly hired refugees with newly hired foreigners in terms of hours worked. The upper panel includes all foreign employees (both full-time and part-time), while the bottom panel restricts the comparison to foreigners (refugees and non-refugees) with full-time employment in the focal firm. In both cases, we find that refugees work more hours than other foreign hires. The statistics (based on all occupational codes and all job contracts) indicate that refugees work, on average, 23% more regular hours and 39% more extra hours than foreign employees. The

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<sup>9</sup> Given the nature of the dependent variable in the first stage (i.e., a share, ranging from 0 to 1), the use of a two-stage, least-squares (2SLS) model is not appropriate, as it would lead to predicted values below 0 and above 1. We therefore estimate the first-stage equation with a fractional logit model and use those estimates to predict the share of *newly hired refugees*, which varies from 0 to 1. We can assess the relevance of the instruments based on the individual and joint significance of their coefficients in the first stage (see Table 4). While we cannot explicitly test the validity of these instruments, we can run the Sargan-Hansen test (i.e., the over-identifying restrictions test), after we run our IV-baseline model (i.e., with no interaction term between *newly hired refugees* and *involuntary separations*). This test does not reject the null hypothesis that the over-identifying restrictions are valid.

difference is also statistically significant when we consider weekly work schedules—refugees work almost four hours more per week, or 17% longer, than other foreign employees. The differences are even greater when we restrict the comparison to full-time workers (bottom panel).

Table 7 compares the two groups of foreign hires within similar jobs (occupational codes). The differences in hours worked are large and statistically significant in medium- and low-skill jobs (i.e., the types of jobs that refugees most often get). We do not observe significant differences in hours worked by refugees and other foreign workers in high-skilled jobs, but few refugees are in these roles. In Appendix Table A.3, we extend the baseline models by distinguishing among three groups of refugees: those hired for low-skilled, medium-skilled, and high-skilled positions (defined as in Table 7). In line with the statistics above and the fact that most refugees in the Danish labor market find employment in low-skilled roles (e.g., manual jobs, craft work), we find that our results are essentially driven by refugees in low-skilled occupations. This group is the most vulnerable and sensitive to job insecurity in the firm either because their skillset is limited, or because they cannot convincingly prove their qualifications and they are, therefore, assigned to jobs for which they are overqualified. In either case, these refugees have limited bargaining power and more incentive to work hard to keep their jobs, which results in profitability gains for the firms that hire them.

Table 8 provides additional comparisons within sub-samples of firms of different sizes located in and outside of Copenhagen, operating in various industries that often hire refugees. The patterns remain largely consistent, with refugees working longer hours across these subsamples. Finally, we identify a positive (although marginally significant) association between the hiring of refugees and the rate of workforce retention in the following year (see the first column of Table 9). This indicates that employers benefit from lower labor costs related to labor-force adjustments when they hire refugees, who have strong incentives to retain their jobs.

--- Tables 6, 7, and 8 about here ---

To demonstrate the *remuneration mechanism*, Table 9 reports the estimated relationship between the hiring of refugees (and of other foreigners) and two additional firm outcomes—average labor costs

per employee in  $t+1$  (expenses including wages, pension, and other social security costs) and sales growth (from  $t$  to  $t+1$ )—including all of the controls listed in Table 3. This allows us to unpack the profitability gains identified in firms that hire either type of foreign employee into changes in costs or changes in revenues. We find that firms that increase the share of newly hired refugees in  $t$  have lower labor costs per employee in the subsequent year. The hiring of other foreign employees does not have an equivalent effect on labor costs. In contrast, we observe a significant increase in sales after firms hire foreign workers, while hiring refugees does not have the same effect. Thus, each group of immigrants affects firm profitability through distinct channels. Specifically, hiring refugees contributes to firm profitability by reducing labor costs, which confirms our remuneration mechanism.

--- Table 9 about here ---

To further probe the *remuneration mechanism*, Table 10 reports statistics for hourly wages of refugees and other foreign employees recruited by the firms in our sample, measured in the hiring year, when information asymmetries about these employees' productivity or quality are higher (i.e., entry wages). The first row reports the average hourly wage of each group of new hires, regardless of job roles. Refugees earn about 2.3% less per hour than other foreign workers in the year they join the firm. This wage gap is statistically significant across different occupations and particularly sizeable for those few refugees employed in more skilled occupations. Both smaller and larger firms pay refugees less than other foreign hires, but the pay gap seems more pronounced in firms with more than 50 employees. While the wage gap is twice as large in firms located outside the capital region, it does not seem to vary as much across the industries in which refugees tend to be represented.

--- Table 10 about here ---

Taken together, our main findings and additional empirical tests demonstrate that both forced and voluntary immigrants can enhance the performance of the firms they join. However, distinct mechanisms lead to increased profitability among firms that hire refugees.

### *Alternative explanations*

We conduct several additional analyses to rule out alternative explanations. First, we leverage our fine-grained data on employee heterogeneity in terms of country of origin to assess whether the profitability gains associated with hiring refugees are contingent on the presence of other co-national employees in the firm. Firms that already have employees from the same country of origin as the newly hired refugees may have developed integration capabilities and accumulated informational advantages about employees with certain backgrounds. In addition, the presence of other co-national employees can create opportunities for newly hired refugees to establish bonding ties with incumbent workers (e.g., Goel and Lang 2017; Stips and Kis-Katos 2020). These opportunities could increase refugees' work effort and their willingness to accept low pay in exchange for the non-pecuniary benefits of working with similar others. We test the validity of these confounding explanations in Table 11 (Model 1), where we distinguish between two types of newly hired refugees—those who have co-national coworkers in the firm and those who do not. For consistency, we make the same distinction for other foreign hires joining the firm in the same year. All variables refer to the share of each specific group of new hires in the firm's total workforce, standardized around their sample means to facilitate interpretation. We find no statistically significant difference across the two groups of newly hired refugees (Model 1), which indicates that our results are not driven by firms that have proven to be better matches for refugees or by refugees' different commitments when surrounded by co-nationals. Notably, newly hired foreigners are more likely to boost firm profits when the firm already has co-national employees in its workforce.

Second, in Model 2, we introduce interaction terms between each group of newly hired refugees and the share of involuntary turnover in the firm to further probe the theorized mechanisms laid out in Hypothesis 2. If refugees' work effort and their willingness to accept low pay are valid mechanisms, we would expect the moderating effect of job insecurity to be stronger when firms hire refugees that have no country ties with their co-workers for two reasons. First, refugees without co-national co-workers in the firm may be more vulnerable—as they lack social ties in the host country, they may have a particularly hard time finding employment if they lose their jobs. The perceived risk of being fired and the fear of

unemployment should trigger more effort and a greater willingness to accept low pay, especially among this group of refugees. Second, refugees who work with co-workers from the same country of origin may feel more motivated to work harder in general, and not only when they face a higher risk of losing their job, because they benefit from opportunities to establish bonding ties with co-national colleagues, who may speak the same language. Consistent with both arguments, we find that Hypothesis 2 holds for the first group of refugees but not for the second. In line with previous findings, we find no significant moderating effect of job insecurity for any group of foreign hires (Model 3).

--- Table 11 about here ---

### *Robustness checks*

We conducted a series of supplemental tests to confirm the validity of our theoretical hypotheses. First, our findings held when we estimated our models using a refined matched sample. As mentioned in the “Methods” section, we implemented an alternative matching procedure in which we restricted the control group to firms that hired one or more foreign employees (but never refugees). If unobserved factors, such as preferences for foreign workers or unique integration capabilities, matter for both hiring and performance, this more restrictive matching should help reduce variation in those unobserved factors and make “treated” and “control” firms even more comparable in other aspects that may correlate with their disproportionate reliance on foreign employees. We used the same set of control and matching variables as in our main analysis. In other words, we matched each firm that hired refugees with the closest firm (in terms of size, past profits, and sales growth) that hired foreigners (i.e., non-Danish employees) who were not refugees in the same year, region, and two-digit industry. We obtained a sample of 26,482 firms, 11,677 of which hired refugees during the focal period (2001-2016).<sup>10</sup> We tracked these firms’ profitability by estimating models with firm fixed effects (i.e., equation (1)) using this newly matched sample. We obtained results similar to those reported for our baseline sample (see Appendix Table A.4),

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<sup>10</sup> Notably, although the sample size is similar to our baseline matched sample, only 1,642 “control” firms feature in both matched samples. Therefore, the two control groups do not overlap to a great extent. Appendix Table A.1 reports the balance in the matching variables before and after matching in the second matched sample.

which supports both hypotheses. We also used this alternative sample to replicate the analyses of the two theorized mechanisms underpinning the relationships between refugee hiring and firm profitability. These analyses, which are reported in Appendix Tables A.5 and A.6, confirmed the patterns found using the first matched sample.

In additional estimations, we tested the robustness of our findings to different estimation models. We started by testing whether our hypotheses held in a pooled OLS model that used between-firm variation rather than within-firm variation to estimate the key coefficients of interest (first and second columns of Table 12). In line with our hypotheses, we found that firms with greater shares of newly hired refugees in their workforce enjoyed, on average, higher profits in the following year, and this profitability gain was more pronounced in firms with greater job insecurity.

Finally, the last two columns of Table 12 repeat our baseline models. However, instead of including firm fixed effects, we added fixed effects for each CEM strata identified in our matching procedure (i.e., the unique combinations of industry-region-year within which “treated” firms find their closest matches in terms of size, past profits, and recent sales growth). This model used within-strata variation to estimate the coefficients of interest. It comprised 1,079 strata, all of which included comparable firms that had hired refugees or other types of employees (i.e., treated and control firms of comparable size and performance within each stratum). We again found strong support for our hypotheses.

--- Table 12 about here ---

In Table 13, we report three additional tests that use alternative measures of our dependent variable and moderator. First, we used firms’ actual profits (in DKK 1,000) as a dependent variable instead of the log transformation of their profits. This allowed us to include firm-year observations that were previously excluded because some firms had reported losses in some years (i.e., negative profits, which was the case for 46 additional firms). Second, we re-estimated our baseline model using the moving average of profits in  $t+1$ ,  $t+2$ , and  $t+3$ . In both cases, we continued to find support for both hypotheses.

As a final robustness check, we tested Hypothesis 2 using an alternative measure of *job insecurity* at the firm level (last column of Table 13). We computed the rate of employee retention in the firm (i.e., the share of workers employed in the firm in  $t-1$  who were retained in  $t$ ). In light of our theorized mechanism, firms with high employee retention rates should not trigger as much effort or the same willingness to work for low pay among newly hired refugees, as their fear of losing their job will not be as strong as in firms with low retention rates. We used “ $1 - \text{retention rate}$ ” as an alternative measure of job insecurity, where higher values imply greater job insecurity within the firm. We re-estimated Model 3 in Table 3 using this alternative measure in the interaction terms. Consistent with our proposed mechanism for Hypothesis 2, we found that the profitability gains associated with hiring refugees increased with this measure—the coefficient of the interaction term is positive and statistically significant ( $p < 0.01$ ). Furthermore, the link between *newly hired foreigners* and *profitability* did not change with this measure, which confirms that our theorized mechanism is specific to refugees.

--- Table 13 about here ---

## DISCUSSION

A growing body of research within management and organizations is uncovering the important role that immigration plays in organizational phenomena (Choudhury and Kim 2019; Hernandez 2014; Kulchina 2016; Foley and Kerr 2013; Wang 2014). Immigrant scientists, inventors, and managers contribute to firm performance by facilitating the transfer and recombination of knowledge as well as the transmission of social capital (Choudhury 2021). This stream of research has largely focused on migrants who planned to leave their home countries. We shift attention to forced migration and discuss how, in contrast to the hiring of skilled migrants who chose to move to another country, the hiring of refugees is unlikely to improve firm performance through knowledge transfers or opportunities for internationalization into refugees’ home countries. In addition, we develop dedicated theoretical mechanisms focused on the performance gains associated with hiring refugees. We integrate the labor-market conditions refugees face into a theoretical model that explains the performance of hiring firms (Chadwick 2017). We predict



that the limited market demand for refugee human capital constrains refugees' bargaining power, and that this vulnerability further affects the behavior of refugees at work. Given the challenges that refugees face in the host-country labor market, we expect newly hired refugees to exhibit high work effort and to accept low pay. Hence, firms hiring refugees will experience an increase in profitability driven by a reduction in labor costs resulting from a combination of effort (more hours worked) and remuneration (lower hourly wage) mechanisms. Furthermore, we theorize that this effect is amplified for firms characterized by high job insecurity, which makes refugees' concerns about the unfavorable labor-market conditions particularly salient and strengthens their incentive to remain in their current jobs. As a result, we theorize that these firms will benefit disproportionately from hiring refugees based on effort and remuneration mechanisms.

Our study does not intend to advocate for the exploitation of refugees. Instead, it demonstrates how firms can offer opportunities for refugees' resettlement. By providing refugee with employment, firms can attenuate refugees' substantial unemployment rates (Brücker et al. 2020), improve their psychosocial well-being (Hussam et al. 2022), and contribute to their long-term integration (Knappert et al. 2023). The performance gains associated with the hiring of undervalued human resources can actually prompt more employers to hire minorities such as forced migrants and gradually produce fairer economic opportunities for groups that are disadvantaged in labor markets (Siegel et al. 2018).

Our empirical setting is the Danish labor market over the years 2001 to 2016. The country is an ideal testbed for our arguments because it has experienced large inflows of refugees over the period studied. While future work should explore the generalizability of our arguments to other host countries, we are confident our study paves the way for more studies investigating important social problems and grand challenges such as forced migration and the integration of refugees in host country labor markets. These issues have been understudied in the migration and organizations research as well as in the broader management literature. In addition, our study provides a solid foundation for future research to build on by leveraging unique employer-employee linked data that allow to distinguish refugees from other, non-refugee employees and demonstrating distinctive mechanisms regarding the association between refugee

hiring and firm performance using a rigorous empirical design that combines (different) matched samples with panel data models, instrumental variables, and a well-motivated set of control variables.

### *Contributions to theory*

We offer two contributions to theory. First, we advance the growing body of research on migration and organizations by shifting attention from economic migration to forced migration and, thus, broadening the discussion on the consequences of immigration for organizations. Refugees have distinct features (e.g., undocumented and/or obsolete skills, language barriers, mental and physical trauma) that limit their appeal in the labor market and weaken their bargaining power. The specifics of refugees challenge the idea that their geographic mobility can create rents for organizations through the same mechanisms that have been identified in the case of voluntary immigrants. A shift in focus to refugees allows us to relax the assumptions about the human resources often provided by voluntary immigrants and, thereby, uncover new mechanisms through which forced migrants can affect organizational outcomes. By leveraging the specifics of refugees, we can single out distinct mechanisms through which firms can benefit when hiring those individuals. Our work thus identifies new mechanisms that allow firms to reap the benefits of geographical mobility in the context of forced migration. In so doing, it extends prior research that has identified other mechanisms in the context of skilled and/or economic migrants. Ultimately, we help move the study of forced migration to the core of organizational research.

Second, we advance management research that regards firms' socially desirable hiring practices as an important step toward solving social problems (Amis et al. 2019; Bapuji et al. 2019). This literature has remained silent on the theoretical mechanisms that may explain how firms' involvement in achieving societal outcomes, such as refugee hiring, can affect their own performance. By making these mechanisms explicit, we can demystify the hiring of marginalized individuals and prompt firms to make more informed hiring decisions. Consequently, firms can play an active role in solving societal issues. In the context of refugees, we provide a theory that enables managers to form expectations about the consequences of their hiring practices for firm performance. When the performance potential of such undervalued human resources is widely observed and understood, more employers may want to hire these

individuals and labor markets can gradually begin to produce fairer economic opportunities for various disadvantaged groups (Siegel et al. 2018). Therefore, we believe our theory can be extended to the hiring of other types of individuals who are marginalized due to uncertainty, stereotypes, or discrimination. Examples include individuals discriminated against or stereotyped in specific societal contexts because of their ethnicity, felony record, country of origin, or sexual orientation.

#### *Contributions to practice*

Our study provides managers and policymakers with actionable insights. For managers, this study offers a theoretical logic for the implications of refugee hiring for firm performance. This logic is useful, as it enables managers to describe the benefits of hiring refugees to skeptical superiors or investors. If these benefits are widely understood by potential employers, more employment opportunities should emerge for refugees, serving as a primary tool for fostering their economic opportunities and social integration into host countries.

In relation to policy, our study can help government agencies overcome fears or stereotypes among potential employers about hiring refugees. We offer theoretical arguments and empirical evidence that support a performance premium for firms that hire refugees. Based on our findings, firms leave performance potential untapped when they exclude refugees from their hiring pool. Given this economic logic, government agencies do not have to make moral, political, or societal appeals to convince recruiters to hire refugees.

#### *Limitations and future research*

While conducting this research, we identified the boundaries of interesting content and mechanisms that can fit into a single study. As a result, we identified four aspects that may pave the way for future research and make our insights more comprehensive.

First, we developed a firm-level theory linking refugee hiring to firm performance. This perspective is useful for comparing the outcomes of hiring refugees with the outcomes obtained when not hiring them or when hiring other groups of individuals instead. Our approach is based on the generalized description of refugees' labor-market disadvantages in the host country. However, it necessarily mutes

some sources of heterogeneity that are likely to shape refugees' labor-market conditions, such as the severity of traumatic experiences, previous language education, or pre-migration international experience. Future studies that include data on such aspects might be able to develop theoretical arguments that consider this heterogeneity by, for example, utilizing a dyadic perspective in which certain refugees are superior matches for particular firms. Relatedly, future studies could embrace a mixed-methods approach and complement quantitative studies like ours with more substantive qualitative data from interviews with different actors beyond refugees that are part of their employment ecosystem, such as employers and other organizations that can help mitigate barriers to refugee employment (see Knappert et al. 2023 for an example of such data).

Second, we studied the link between hiring refugees and firm performance from the firm's perspective. Our findings are consistent with the proposed theoretical mechanisms, but we cannot observe the considerations of employers or refugees when they negotiate salaries or determine work effort. For example, refugees who need to send funds to family members in their home countries may have a superior work ethic, as some of our quotes from interviews with refugees in Denmark suggest. Future studies with dedicated research designs (e.g., experiments) might be able to disentangle the decision-making of employers, refugees, and non-refugee foreigners.

Third, our theoretical model explains variations in firm performance associated with a particular hiring decision. To empirically test our hypotheses, we isolated within-firm variation on a carefully matched sample of firms and used additional instrument variable approaches to alleviate potential endogeneity biases. With these multiple approaches, our work represents our best effort to shed light on an important question that is worth investigating. However, in the absence of a natural experiment, we should refrain from interpreting our findings as causal. Future studies may dedicate more attention to the selection stage (i.e., the decision to hire refugees) and to possible unobserved factors that may play a role in this context. For example, some firms may develop screening or reputation approaches that propel them to hire refugees who are particularly likely to improve their performance. We do not find significant support for this alternative explanation in our post-hoc analyses (i.e., we do not find the benefits of hiring

refugees to be conditional on the presence of co-national employees in the firm's workforce). However, future research may explore this and related questions with different data and alternative methods.

Fourth, our results may represent a partial equilibrium. The effects we theorize and empirically find may dissipate as refugees build reputations of valuable workers in their host country and seek alternative employment. Future studies may explore this avenue and fine-tune our arguments.

Fifth, we benefitted from the opportunity to empirically test our hypotheses for many firms and refugees over a 15-year period in Denmark. However, some labor-market conditions (e.g., the social safety net, flexible labor markets, and the fluency of the population in both Danish and English) might be specific to Denmark. Denmark offers a conservative test of our theory. We suspect that labor-market frictions for refugees would be stronger in other countries. Therefore, future studies may not just contrast our empirical findings with other country settings but also identify country-level characteristics that predict labor-market frictions for refugees and performance consequences for the firms hiring them.

Finally, our study focused on the value of employing refugees for firms, but many refugees become self-employed instead due, in part, to the difficulties they face in finding employment in host countries (Abebe 2023). This route often leads to the emergence of ethnic enclaves in which most refugee-led entrepreneurial ventures, which mostly serve their ethnic communities and do not exhibit signs of integrating into broader society, remain resource-constrained and poorly supported by the host country (Portes and Manning 2019; Portes and Puhmann 2015). The ways in which the integration of refugees unfolds (e.g., in terms of their psychological well-being and economic standing) through their employment in the host country (i.e., self-employment (within or outside of ethnic enclaves) or wage employment in non-ethnic firms) would likely constitute a promising area for future research.

## CONCLUSION

The global refugee crisis has drawn attention to forced migration and the challenges of integrating refugees into host societies. Employment is the most important factor for successfully integrating refugees into host countries and firms can play a key role in this process. We contribute to this timely academic debate by integrating the specific labor-market conditions refugees face into a framework

explaining variations in firm performance. We find a positive association between the hiring of refugees and organizational performance. Furthermore, hiring firms characterized by greater job insecurity profit even more from having refugees in their workforce. Such contexts tend to encourage newly hired refugees to exert even more effort and accept lower salaries to retain their jobs.

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## TABLES

**Table 1.** Descriptive statistics and correlation matrix

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Firm profits in $t+1$ – log (profits +1)	15.11	1.573	1.00													
2 Newly hired refugees (in % of total firm employment)	0.074	0.187	-0.31	1.00												
3 Newly hired foreigners (in % of total firm employment)	0.198	0.304	-0.18	0.27	1.00											
4 Job insecurity (% workers in $t \rightarrow$ unemployed in $t+1$ )	0.055	0.085	-0.09	0.09	0.09	1.00										
5 Share of part-time workers	0.231	0.241	-0.10	-0.05	-0.15	0.17	1.00									
6 Firm age (years since firm founding)	12.70	12.13	0.27	-0.12	-0.15	-0.07	-0.04	1.00								
7 Firm size – log (number of employees +1)	2.538	1.244	0.85	-0.31	-0.13	-0.01	-0.00	0.23	1.00							
8 Firm exports – log (1000 DKK exports +1)	1.639	3.393	0.49	-0.14	-0.19	-0.05	-0.11	0.25	0.38	1.00						
9 Firm assets per employee – log (M DKK +1)	0.351	0.362	0.21	-0.07	-0.18	-0.08	-0.12	0.19	-0.06	0.32	1.00					
10 Firm sales growth (between $t-1$ and $t$ )	0.147	0.531	-0.02	0.04	0.10	0.00	-0.01	-0.15	-0.02	-0.03	0.03	1.00				
11 Men in the workforce (in % total employment)	0.618	0.291	0.05	0.21	0.03	-0.02	-0.07	0.05	-0.08	0.08	0.13	0.03	1.00			
12 Workers in the three highest ranks (in % total employment)	0.180	0.241	0.16	-0.12	-0.12	-0.09	-0.05	0.03	0.06	0.21	0.21	0.01	-0.07	1.00		
13 Average annual wage (log)	11.54	2.687	0.39	-0.26	-0.16	-0.07	-0.16	0.13	0.27	0.19	0.19	0.01	0.04	0.13	1.00	
14 HHI (Herfindahl-Hirschman Index, employment shares)	0.027	0.058	0.16	-0.06	-0.04	0.00	-0.04	0.08	0.13	0.20	0.10	0.01	0.02	0.06	0.07	1.00
15 Stock of refugees in the municipality in $t-1$ – log (nr +1)	5.336	1.188	-0.02	0.08	0.18	-0.02	-0.10	-0.08	0.00	-0.07	-0.07	0.04	-0.03	0.10	-0.03	-0.04

**Table 2.** Top 10 industries in which firms that hire refugees operate

Industry	% of firms	Industry	% of firms
Restaurants and cafés	28.0%	Wholesale trade	4.5%
Retail trade	10.9%	Manufacture of food products	3.5%
Transport services	8.5%	Accommodation services (e.g., hotels)	3.2%
Services in connection to properties (cleaning)	7.8%	Trade and repair of cars and motorcycles	2.8%
Construction	4.9%	Manufacture of fabricated metal products, except machinery and equipment	2.3%

**Table 3.** Hiring of refugees and firm profitability

	<b>DV: Firm profitability – log (profits +1) in <math>t+1</math></b>					
	<b>(1)</b>		<b>(2)</b>		<b>(3)</b>	
<b>Newly hired refugees (in % of total employment)</b>	<b>0.028</b>	<b>***</b>	<b>0.026</b>	<b>***</b>	<b>0.026</b>	<b>***</b>
	<b>(0.009)</b>		<b>(0.009)</b>		<b>(0.009)</b>	
<b>Newly hired foreigners (non-refugees) (in % of total employment)</b>	<b>0.016</b>	<b>**</b>	<b>0.016</b>	<b>**</b>	<b>0.015</b>	<b>*</b>
	<b>(0.008)</b>		<b>(0.008)</b>		<b>(0.008)</b>	
<b>Job insecurity</b>	<b>-0.031</b>	<b>***</b>	<b>-0.037</b>	<b>***</b>	<b>-0.038</b>	<b>***</b>
	<b>(0.006)</b>		<b>(0.007)</b>		<b>(0.007)</b>	
<b>Newly hired refugees * Job insecurity</b>			<b>0.007</b>	<b>**</b>	<b>0.007</b>	<b>**</b>
			<b>(0.003)</b>		<b>(0.003)</b>	
<b>Newly hired foreigners * Job insecurity</b>					<b>0.005</b>	
					<b>(0.005)</b>	
Firm age	0.007		0.012		0.012	
	(0.038)		(0.039)		(0.039)	
Firm size	0.498	<b>***</b>	0.498	<b>***</b>	0.498	<b>***</b>
	(0.024)		(0.024)		(0.024)	
Firm exports	0.016	<b>***</b>	0.015	<b>***</b>	0.015	<b>***</b>
	(0.006)		(0.006)		(0.006)	
Firm assets per employee	0.189	<b>***</b>	0.188	<b>***</b>	0.188	<b>***</b>
	(0.062)		(0.062)		(0.062)	
Firm sales growth	0.073	<b>***</b>	0.073	<b>***</b>	0.073	<b>***</b>
	(0.013)		(0.013)		(0.013)	
Share of part-time workers	-0.110	<b>***</b>	-0.107	<b>***</b>	-0.107	<b>***</b>
	(0.037)		(0.038)		(0.038)	
Men in the workforce	0.021		0.020		0.021	
	(0.051)		(0.051)		(0.051)	
Workers in the three highest ranks	-0.019		-0.022		-0.021	
	(0.038)		(0.038)		(0.038)	
Average annual wage	0.005		0.005		0.005	<b>*</b>
	(0.003)		(0.003)		(0.003)	
HHI	-0.449		-0.452		-0.455	
	(0.337)		(0.337)		(0.337)	
Stock of refugees in the municipality in t-1	-0.009		-0.009		-0.009	
	(0.015)		(0.015)		(0.015)	
Industry (2d NACE)-by-year FE	YES		YES		YES	
Region-by-year FE	YES		YES		YES	
Firm FE	YES		YES		YES	
Observations	38,460		38,460		38,460	

\*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.10. Number of unique firms included in the estimations: 27,782. To facilitate coefficient interpretation, the variables in bold have been standardized around their sample mean, so that they all have mean value equal to 0 and standard deviation equal to 1. Values in parentheses are standard errors clustered at the firm level.

**Table 4.** First stage (IV model) predicting the share of newly hired refugees in a firm

	<b>Fractional logit model</b>	
<b>Newly arrived refugees in the municipality (in % of total number of refugees)</b>	<b>0.666</b>	<b>***</b>
	<b>(0.185)</b>	
<b>Newly arrived refugees' concentration in country of origin (HHI index)</b>	<b>0.152</b>	<b>**</b>
	<b>(0.060)</b>	
Job insecurity	0.691	<b>***</b>
	(0.127)	
Firm age	0.001	
	(0.001)	
Firm size	-1.523	<b>***</b>
	(0.024)	
Firm exports	-0.013	<b>**</b>
	(0.006)	
Firm assets per employee	-0.370	<b>***</b>
	(0.050)	
Firms sales growth	-0.004	
	(0.022)	
Men in the workforce	2.284	<b>***</b>
	(0.055)	
Workers in the three highest ranks	-0.438	<b>***</b>
	(0.070)	
Average annual wage	-0.037	<b>***</b>
	(0.004)	
HHI	0.063	
	(0.304)	
Stock of refugees in the municipality in t-1	0.083	<b>***</b>
	(0.013)	
Industry (2d NACE)-by-year FE	YES	
Region-by-year FE	YES	
Observations	38,460	

\*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.10. Variables in bold are instrumental variables (IV) used in the first-stage of the IV model.

**Table 5.** Instrumental Variables (IV) estimations (second-stage regressions)

	IV (baseline)		IV with bootstrapped standard errors				Control function approach	
Newly hired refugees	0.883 ***	0.699 ***	0.741 ***	0.478 ***	0.879 ***	0.715 ***		
	(0.137)	(0.143)	(0.058)	(0.079)	(0.137)	(0.151)		
Job insecurity	-0.466 ***	-0.739 ***	-0.823 ***	-1.237 ***	-0.462 ***	-0.550 ***		
	(0.073)	(0.101)	(0.050)	(0.062)	(0.074)	(0.087)		
Newly hired refugees * Job insecurity		1.531 ***		2.710 ***		0.392 **		
		(0.326)		(0.274)		(0.173)		
Controls as in Table 3	YES	YES	YES	YES	YES	YES		
Industry (2d NACE)-by-year FE	YES	YES	YES	YES	YES	YES		
Region-by-year FE	YES	YES	YES	YES	YES	YES		
Firm FE	YES	YES	NO	NO	YES	YES		
Observations	38,460	38,460	38,460	38,460	38,460	38,460		

\*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.10. The reported values are estimated coefficients for the original (i.e., not standardized). Values in parentheses are standard errors clustered at the firm level. The first four models are OLS models (with and without firm fixed effects) using the usual “plug-in” approach in which the actual values of “newly hired refugees” are replaced by the predicted values obtained from the first-stage model (see Table 4). All values in parentheses are standard errors. For the models labeled “IV with bootstrapped standard errors”, the standard errors are bootstrapped and were obtained with 100 replications. The last two models use the control function approach recommended by Wooldridge (2015) instead, i.e., they include the error term obtained from the first-stage model as an additional regressor in the profitability regression described in equation (1). We follow Wooldridge’s (2015) recommendation for models that are non-linear in the endogenous explanatory variable (i.e., when the endogenous variable is also included in an interaction term). The coefficients for these additional regressors are omitted to save space, but available upon request.

**Table 6.** Individual-level statistics on hours worked: newly hired refugees versus newly hired foreigners (non-refugees)

(All contracts)	Total hours paid	Total normal hours	Total extra hours	Hours per week
Newly hired refugee	640.4	617.3	22.84	27.28
Newly hired foreigners (non-refugees)	522.2	505.3	16.49	23.38
<b>Difference (t-test)</b>	<b>118.2 ***</b>	<b>112.0 ***</b>	<b>6.35 ***</b>	<b>3.91 ***</b>
(Only full-time contracts)	Total hours paid	Total normal hours	Total extra hours	Hours per week
Newly hired refugee	711.4	683.4	27.63	29.18
Newly hired foreigners (non-refugees)	569.2	550.3	18.54	24.45
<b>Difference (t-test)</b>	<b>142.2 ***</b>	<b>133.1 ***</b>	<b>9.09 ***</b>	<b>4.73 ***</b>

\*\*\* p < 0.01. Two-sided t-tests. Statistics on hours worked are only available for the period 2002-2012; a total of 5,537 (54,814) individual-year observations with non-missing values are available for refugees (other foreign workers).

**Table 7.** Individual-level statistics on hours worked: newly hired refugees versus newly hired foreigners (non-refugees) in low/medium-high skilled jobs

<b>a) Low skilled jobs</b> (craft work, operations, assembly line roles, other manual jobs)	<b>Total hours paid</b>	<b>Total normal hours</b>	<b>Total extra hours</b>	<b>Hours per week</b>
Newly hired refugee	675.08	647.99	26.80	28.92
Newly hired foreigners (non-refugees)	538.04	514.29	23.23	23.83
<b>Difference (t-test)</b>	<b>137.04 ***</b>	<b>133.70 ***</b>	<b>3.57 **</b>	<b>5.09 ***</b>

  

<b>b) Medium skilled jobs</b> (service jobs, sales jobs, office jobs)	<b>Total hours paid</b>	<b>Total normal hours</b>	<b>Total extra hours</b>	<b>Hours per week</b>
Newly hired refugee	518.02	503.30	14.72	21.56
Newly hired foreigners (non-refugees)	427.58	420.37	7.211	20.96
<b>Difference (t-test)</b>	<b>90.44 ***</b>	<b>82.93 ***</b>	<b>7.51 ***</b>	<b>0.60</b>

  

<b>c) High skilled jobs</b> (managerial roles, professional roles, technical roles)	<b>Total hours paid</b>	<b>Total normal hours</b>	<b>Total extra hours</b>	<b>Hours per week</b>
Newly hired refugee	704.00	700.25	3.77	27.93
Newly hired foreigners (non-refugees)	722.39	718.21	4.17	28.13
<b>Difference (t-test)</b>	<b>-18.39</b>	<b>-17.96</b>	<b>-0.40</b>	<b>0.20</b>

\*\*\* p < 0.01. \*\* p < 0.05. Two-sided t-tests. Statistics on hours worked are only available for the period 2002-2012.

**Table 8.** Individual-level statistics on hours worked: newly hired refugees versus newly hired foreigners (non-refugees) in different subsamples

	<b>Total hours paid</b>	<b>Total normal hours</b>	<b>Total extra hours</b>	<b>Hours per week</b>
<b>a) Smaller firms (&lt; 50 employees)</b>				
Newly hired refugee	684.90	667.26	17.65	29.71
Newly hired foreigners (non-refugees)	643.11	630.51	12.60	27.63
<b>Difference (t-test)</b>	<b>41.79 **</b>	<b>36.75 *</b>	<b>5.05 **</b>	<b>2.08 ***</b>
<b>b) Larger firms (50+ employees)</b>				
Newly hired refugee	631.17	606.93	23.91	26.78
Newly hired foreigners (non-refugees)	517.72	500.74	16.63	23.22
<b>Difference (t-test)</b>	<b>113.45 ***</b>	<b>106.19 ***</b>	<b>7.28 ***</b>	<b>3.56 ***</b>
<b>c) Copenhagen area</b>				
Newly hired refugee	589.21	575.34	13.87	26.54
Newly hired foreigners (non-refugees)	518.10	507.50	10.60	23.29
<b>Difference (t-test)</b>	<b>71.11 ***</b>	<b>67.84 ***</b>	<b>3.27 **</b>	<b>3.25 ***</b>
<b>d) Non-Copenhagen area</b>				
Newly hired refugee	665.99	638.32	27.33	27.65
Newly hired foreigners (non-refugees)	526.07	503.26	22.17	23.46
<b>Difference (t-test)</b>	<b>139.92 ***</b>	<b>135.06 ***</b>	<b>5.16 ***</b>	<b>4.19 ***</b>
<b>e) Top 5 industries (Table 2)</b>				
Newly hired refugee	538.53	523.07	15.46	23.97
Newly hired foreigners (non-refugees)	482.64	469.56	13.08	21.82
<b>Difference (t-test)</b>	<b>55.89 ***</b>	<b>53.51 ***</b>	<b>2.38 *</b>	<b>2.15 ***</b>
<b>f) Top 6-10 industries (Table 2)</b>				
Newly hired refugee	698.89	665.95	33.32	30.30
Newly hired foreigners (non-refugees)	674.44	641.71	32.73	29.02
<b>Difference (t-test)</b>	<b>24.44 *</b>	<b>24.24 *</b>	<b>0.59</b>	<b>1.28 ***</b>

\*\*\* p < 0.01. \*\* p < 0.05. Two-sided t-tests. Statistics on hours worked are only available for the period 2002-2012.

**Table 9.** Relationship between the hiring of foreign migrants (refugees and non-refugees) and other firm outcomes

	<b>Workforce retention rate (<math>t+1</math>)</b>	<b>Labor costs per employee (<math>t+1</math>)</b>	<b>Sales growth (from <math>t</math> to <math>t+1</math>)</b>
Newly hired refugees	0.007 * (0.004)	-0.029 *** (0.010)	0.018 (0.024)
Newly hired foreigners (non-refugees)	0.001 (0.003)	-0.003 (0.008)	0.064 *** (0.018)
Controls as in Table 3	YES	YES	YES
Industry (2d NACE)-by-year FE	YES	YES	YES
Region-by-year FE	YES	YES	YES
Firm FE	YES	YES	YES
Observations	38,989	36,325	39,002

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ . Newly hired refugees/foreigners represent their share in the firm's total workforce in  $t$ . To facilitate coefficient interpretation, the variables above have been standardized around their sample mean, so that they all have mean value equal to 0 and standard deviation equal to 1. Values in parentheses are standard errors clustered at the firm level.

**Table 10.** Average hourly wage (log) of newly hired refugees versus newly hired foreigners: Total sample and different sub-samples

	<b>Newly hired refugee</b>	<b>Newly hired foreigners (non-refugees)</b>	<b>Difference (t-test)</b>
All occupations	4.854	4.877	<b>-0.023</b> ***
Low skilled jobs (craft work, operations, assembly line roles, other manual jobs)	4.909	4.920	<b>-0.011</b> ***
Medium skilled jobs (service jobs, sales jobs, office jobs)	4.835	4.852	<b>-0.017</b> ***
High skilled jobs (managerial roles, professional roles, technical roles)	5.089	5.246	<b>-0.157</b> ***
Smaller firms (< 50 employees)	4.742	4.754	<b>-0.012</b> **
Larger firms (50+ employees)	4.901	4.962	<b>-0.061</b> ***
Copenhagen area	4.897	4.906	<b>-0.009</b> *
Non-Copenhagen area	4.830	4.850	<b>-0.020</b> ***
Top 5 industries (as in Table 2)	4.773	4.834	<b>-0.061</b> ***
Top 6-10 industries (as in Table 2)	4.893	4.941	<b>-0.048</b> ***

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ . Two-sided t-tests. Statistics on hourly wage cover the full period (2001-2016). Number of observations in the first row (all occupations):  $N = 27,211$  individual-year observations for refugees; 207,662 individual-year observations for other foreign hires.



**Table 11.** Hiring of different types of refugees in  $t$  and (log) firm profitability in  $t+1$ 

	(1)	(2)	(3)
Newly hired refugees with co-national co-workers in the firm	0.022 *** (0.006)	0.021 *** (0.006)	0.020 *** (0.006)
Newly hires refugees without co-national co-workers in the firm	0.019 ** (0.008)	0.016 ** (0.008)	0.016 ** (0.008)
Newly hired foreigners with co-national co-workers in the firm	0.016 ** (0.007)	0.015 ** (0.008)	0.015 * (0.008)
Newly hires foreigners without co-national co-workers in the firm	0.012 * (0.007)	0.012 * (0.007)	0.011 (0.007)
Job insecurity	-0.031 *** (0.006)	-0.037 *** (0.007)	-0.038 *** (0.007)
Newly hired refugees with co-national co-workers * Job insecurity		0.005 (0.003)	0.004 (0.003)
Newly hires refugees without co-national co-workers * Job insecurity		0.006 ** (0.003)	0.006 ** (0.003)
Newly hired foreigners with co-national co-workers * Job insecurity			0.004 (0.005)
Newly hires foreigners without co-national co-workers * Job insecurity			0.005 (0.005)
Controls as in Table 3	YES	YES	YES
Industry (2d NACE)-by-year FE	YES	YES	YES
Region-by-year FE	YES	YES	YES
Firm FE	YES	YES	YES
Observations	38,460	38,460	38,460

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ . Newly hired refugees/foreigners represent their share in the firm's total workforce in  $t$ . These variables are standardized around their sample mean to facilitate the interpretation of effect sizes. Values in parentheses are standard errors clustered at the firm level.

**Table 12.** Robustness tests: Testing Hypotheses 1 and 2 with alternative models

	OLS			CEM strata FE		
Newly hired refugees	0.060 ** (0.025)	0.030 (0.027)		0.071 *** (0.023)	0.039 * (0.021)	*
Job insecurity	-0.807 *** (0.054)	-1.007 *** (0.062)	***	-0.712 *** (0.053)	-0.841 *** (0.060)	***
Newly hired refugees * Job insecurity		1.208 *** (0.159)			0.995 *** (0.159)	***
Controls as in Table 3	YES	YES		YES	YES	
Industry (2d NACE)-by-year FE	YES	YES		YES	YES	
Region-by-year FE	YES	YES		YES	YES	
Firm FE	NO	NO		NO	NO	
Observations	38,460	38,460		38,460	38,460	

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ . The reported values are estimated coefficients for the original variables, not standardized variables. Values in parentheses are standard errors clustered at the firm level.

**Table 13.** Alternative measures of firm profitability and job (in)security

	<b>New DV: Profits in t+1 (no log)</b>	<b>New DV: Log profit (moving average between t+1, t+2, and t+3)</b>	<b>Alternative measure for Job insecurity: 1-Retention rate (1-% firm's workforce in t-1 retained in t)</b>
Newly hired refugees	6.615 *** (0.918)	0.024 *** (0.007)	0.025 *** (0.008)
Newly hired foreigners (non-refugees)	1.432 ** (0.561)	0.016 ** (0.006)	0.046 *** (0.008)
Job insecurity	-7.189 *** (2.020)	-0.032 *** (0.006)	-0.154 *** (0.011)
Newly hired refugees * Job insecurity	13.711 *** (3.316)	0.008 ** (0.004)	0.018 *** (0.005)
Newly hired foreigners * Job insecurity			-0.006 (0.008)
Controls as in Table 3	YES	YES	YES
Industry (2d NACE)-by-year FE	YES	YES	YES
Region-by-year FE	YES	YES	YES
Firm FE	YES	YES	YES
Observations	38,522	38,566	38,460

\*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.10. To facilitate coefficient interpretation, the variables above have been standardized around their sample mean, so that they all have mean value equal to 0 and standard deviation equal to 1. Values in parentheses are standard errors clustered at the firm level.

## APPENDIX

**Appendix Table A.1.** Balance on observables, before and after CEM

	Before Matching			Matched sample 1		Matched sample 2			
	Firms hiring refugees	Firms not hiring refugees		Firms hiring refugees	Firms not hiring refugees	Firms hiring refugees	Firms not hiring refugees		
<b>Region of the firm (exact matching)</b>									
Hovedstaden/Capital region	0.088	0.107	***	0.091	0.090		0.090	0.090	
Midtjylland	0.211	0.226	***	0.220	0.221		0.219	0.221	
Nordjylland	0.211	0.208	*	0.219	0.222		0.220	0.220	
Sjælland	0.366	0.319	***	0.345	0.347		0.347	0.349	
Syddanmark	0.123	0.140	***	0.125	0.120		0.124	0.120	
<b>Industry of the firm (exact matching)</b>									
Manufacture of food products	0.032	0.006	***	0.035	0.040	**	0.035	0.040	**
Manufacture of beverages	0.008	0.043	***	0.000	0.000		0.000	0.000	
Manufacture of textiles	0.004	0.003	***	0.003	0.004		0.003	0.003	
Manufacture of wearing apparel	0.007	0.041	***	0.001	0.001		0.001	0.001	
Manufacture of leather and footwear	0.001	0.010	***	0.000	0.000		0.000	0.000	
Manufacture of wood and wood products	0.006	0.007	**	0.008	0.009		0.008	0.009	
Manufacture of paper and paper products	0.002	0.001	***	0.002	0.002		0.001	0.002	
Printing and reproduction of recorded media	0.003	0.004	***	0.005	0.005		0.005	0.005	
Manufacture of chemical products	0.003	0.001	***	0.003	0.003		0.002	0.003	
Manufacture of pharmaceutical raw materials and pharmaceutical preparations	0.001	0.005	***	0.001	0.000		0.000	0.000	
Manufacture of rubber and plastic products	0.008	0.003	***	0.012	0.013		0.012	0.013	
Manufacture of other non-metal mineral (e.g., glass and ceramic) products	0.005	0.002	***	0.007	0.007		0.006	0.006	
Manufacture of basic metals	0.003	0.002	***	0.003	0.003		0.003	0.003	
Manufacture of fabricated metal products	0.015	0.011	***	0.023	0.023		0.023	0.023	
Manufacture of computers, electronic and optical products	0.004	0.002	***	0.004	0.006	**	0.004	0.006	*
Manufacture of electrical equipment	0.003	0.002	***	0.004	0.005		0.004	0.005	
Manufacture of machinery	0.013	0.006	***	0.014	0.018	***	0.014	0.019	***
Manufacture of motor vehicles and related parts	0.003	0.001	***	0.003	0.004		0.003	0.004	
Manufacture of ships and transport equipment	0.001	0.000	***	0.001	0.001		0.001	0.001	
Manufacture of furniture	0.006	0.006		0.008	0.008		0.008	0.008	
Other manufacturing	0.003	0.006	***	0.003	0.003		0.003	0.003	
Repair and installation of machinery and equipment	0.002	0.008	***	0.003	0.003		0.003	0.004	
Electricity, gas and steam (production and distribution)	0.001	0.004	***	0.000	0.000		0.000	0.000	
Water supply	0.000	0.005	***	0.000	0.000		0.000	0.000	
Sewerage	0.000	0.001	**	0.000	0.000		0.000	0.000	
Collection, treatment and disposal of waste; Recycling	0.002	0.001	***	0.002	0.002		0.002	0.002	
Construction of buildings	0.007	0.012	***	0.008	0.008		0.008	0.008	
Civil engineering	0.002	0.004	***	0.001	0.002		0.001	0.002	
Construction installation activities	0.038	0.096	***	0.049	0.047		0.049	0.047	
Trade and repair of motor vehicles	0.025	0.030	***	0.028	0.030		0.028	0.028	
Wholesale trade, except motor vehicles	0.040	0.064	***	0.045	0.052	***	0.045	0.052	***
Retail trade, except motor vehicles	0.105	0.087	***	0.109	0.118	**	0.111	0.118	**
Land and pipe transportation	0.056	0.034	***	0.085	0.082		0.085	0.082	
Water transport	0.001	0.001		0.000	0.001		0.000	0.001	
Air transport	0.001	0.000	**	0.001	0.000		0.001	0.000	
Support activities for transportation	0.006	0.005		0.006	0.007		0.006	0.007	

Postal and courier services	0.011	0.004	***	0.009	0.009		0.008	0.008	
Accommodation services	0.022	0.005	***	0.032	0.028	*	0.032	0.030	
Restaurants	0.253	0.040	***	0.280	0.266	**	0.282	0.266	***
Publishing	0.004	0.005	**	0.005	0.006		0.005	0.007	**
Motion picture, television and sound	0.002	0.007	***	0.002	0.002		0.002	0.002	
Radio and TV broadcasting	0.001	0.001		0.000	0.000		0.000	0.000	
Telecommunications	0.002	0.001	***	0.001	0.001		0.001	0.001	
Information technology service activities	0.006	0.028	***	0.007	0.007		0.007	0.007	
Information service activities	0.001	0.003	***	0.001	0.001		0.001	0.001	
Banking and financing activities except insurance	0.004	0.000	***	0.000	0.000		0.000	0.000	
Insurance and pension funding	0.001	0.001	**	0.000	0.000		0.000	0.000	
Auxiliary services in connection with financing business and insurance	0.002	0.002	**	0.000	0.000		0.000	0.000	
Real estate	0.013	0.060	***	0.008	0.007		0.007	0.007	
Legal assistance, bookkeeping and auditing	0.003	0.020	***	0.004	0.004		0.004	0.004	
Business consultancy activities	0.004	0.026	***	0.004	0.004		0.004	0.004	
Architectural and engineering activities	0.007	0.021	***	0.008	0.009		0.008	0.009	
Scientific research and development	0.002	0.002		0.001	0.001		0.001	0.001	
Advertising and market research	0.006	0.010	***	0.009	0.008		0.009	0.009	
Other liberal, scientific and technical services	0.010	0.021	***	0.012	0.012		0.012	0.011	
Veterinary activities	0.000	0.002	***	0.000	0.000		0.000	0.000	
Rental and leasing	0.002	0.006	***	0.003	0.003		0.003	0.003	
Employment activities	0.024	0.003	***	0.034	0.028	**	0.033	0.029	**
Travel agencies and tour operators	0.002	0.003	***	0.002	0.002		0.002	0.002	
Security services and monitoring	0.004	0.001	***	0.005	0.004		0.004	0.005	
Services to buildings, cleaning, etc.	0.059	0.027	***	0.078	0.069	***	0.079	0.070	***
Other business services	0.011	0.008	***	0.014	0.013		0.014	0.013	
Public administration, defense and social security	0.039	0.001	***	0.000	0.000		0.000	0.000	
Education	0.000	0.000		0.000	0.000		0.000	0.000	
Healthcare	0.014	0.052	***	0.000	0.000		0.000	0.000	
Residential care activities	0.010	0.004	***	0.000	0.000		0.000	0.000	
Social work without accommodation	0.014	0.014		0.000	0.000		0.000	0.000	
Creative activities, art and amusements	0.002	0.009	***	0.000	0.000		0.000	0.000	
Libraries, archives, museums, and other cultural enterprises	0.002	0.001	***	0.000	0.000		0.000	0.000	
Sports, amusements, and leisure activities	0.010	0.014	***	0.000	0.000		0.000	0.000	
Activities of membership organizations	0.000	0.025	***	0.000	0.000		0.000	0.000	
Repair of personal goods	0.004	0.006	***	0.003	0.004		0.003	0.003	
Other personal service activities	0.026	0.030	***	0.000	0.000		0.000	0.000	
Households as employers	0.000	0.001	***	0.000	0.000		0.000	0.000	
Extraterritorial organizations and bodies	0.002	0.003	***	0.000	0.000		0.000	0.000	
<b>Other firm characteristics (measured in t-1) - k2k matching</b>									
Firm size (number of employees)	431.24	8.271	***	51.31	11.90	***	52.31	17.22	***
Profits (log)	15.57	14.13	***	15.33	14.65	***	15.33	14.89	***
Sales growth	0.192	-0.038	***	0.166	0.129	***	0.161	0.146	***

\*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.10. In matched sample 1, firms that hired refugees were matched with the closest firm (in size, past profits and past sales growth) that hired *any other employees* (but never refugees) within the same year, industry (2d-NACE) and region (5 regions in Denmark). In matched sample 2, firms that hired refugees were matched with the closest firm (in size, past profits and past sales growth) that hired *any other foreign employees* (but never refugees) within the same year, industry (2d-NACE) and region (5 regions in Denmark).

**Appendix Table A.2.** Hiring of refugees and firm profitability (baseline model without control variables)

	<b>Matched sample 1 (as in Table 3)</b>		<b>Matched sample 2 (as in Table A.4)</b>	
	<b>No other controls</b>	<b>Controlling for firm size</b>	<b>No other controls</b>	<b>Controlling for firm size</b>
Newly hired refugees	-0.050 *** (0.009)	0.028 *** (0.009)	-0.049 *** (0.009)	0.032 *** (0.009)
Newly hired foreigners (non-refugees)	0.004 (0.008)	0.023 *** (0.008)	-0.013 (0.008)	0.034 *** (0.008)
Job insecurity	-0.032 *** (0.006)	-0.031 *** (0.006)	-0.030 *** (0.006)	-0.034 *** (0.006)
Industry (2d NACE)-by-year FE	YES	YES	YES	YES
Region-by-year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Observations	38,460	38,460	38,282	38,282

\*\*\* p < 0.01. Replicating model 1 of Table 3 and model 1 of Appendix Table A.4 without controls. No other control variables included besides industry-by-year FE, region-by-year FE, and firm FE. The second and fourth columns include a control for firm size.

**Appendix Table A.3.** Hiring of refugees and firm profitability, depending on the jobs filled by refugees

	<b>(1)</b>	<b>(2)</b>
Newly hired refugees in high skilled jobs	0.098 (0.099)	0.078 (0.121)
Newly hired refugees in medium skilled jobs	0.013 (0.069)	0.037 (0.070)
Newly hired refugees in low skilled jobs	0.090 * (0.052)	0.042 (0.057)
Job insecurity	-0.363 *** (0.072)	-0.398 *** (0.079)
Newly hired refugees in high skilled jobs * Job insecurity		0.149 (0.216)
Newly hired refugees in medium skilled jobs * Job insecurity		-0.223 (0.463)
Newly hired refugees in low skilled jobs * Job insecurity		0.511 ** (0.230)
Industry (2d NACE)-by-year FE	YES	YES
Region-by-year FE	YES	YES
Firm FE	YES	YES
Observations	38,460	38,460

\*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.10. Values in parentheses are standard errors clustered at the firm level. Controls included as in Table 3.

**Appendix Table A.4.** Hiring of refugees and firm profitability (alternative matched sample)

	<b>DV: Firm profitability – log (profits +1) in <math>t+1</math></b>					
	<b>(1)</b>		<b>(2)</b>		<b>(3)</b>	
Newly hired refugees	0.031	***	0.028	***	0.028	***
	(0.009)		(0.009)		(0.009)	
Newly hired foreigners (non-refugees)	0.026	***	0.025	***	0.025	***
	(0.008)		(0.008)		(0.008)	
Job insecurity	-0.033	***	-0.039	***	-0.040	***
	(0.006)		(0.006)		(0.007)	
Newly hired refugees * Job insecurity			0.008	***	0.008	***
			(0.003)		(0.003)	
Newly hired foreigners * Job insecurity					0.003	
					(0.005)	
Firm age	-0.002		0.006		0.005	
	(0.031)		(0.033)		(0.033)	
Firm size	0.529	***	0.530	***	0.530	***
	(0.023)		(0.023)		(0.023)	
Firm exports	0.012	**	0.012	**	0.012	**
	(0.005)		(0.005)		(0.005)	
Firm assets per employee	0.192	***	0.191	***	0.191	***
	(0.066)		(0.066)		(0.066)	
Firm sales growth	0.096	***	0.096	***	0.096	***
	(0.014)		(0.014)		(0.014)	
Share of part-time workers	-0.158	***	-0.154	***	-0.154	***
	(0.034)		(0.034)		(0.034)	
Men in the workforce	0.021		0.019		0.019	
	(0.050)		(0.050)		(0.050)	
Workers in the three highest ranks	0.023		0.019		0.020	
	(0.038)		(0.038)		(0.038)	
Average annual wage	0.007	**	0.007	***	0.007	***
	(0.003)		(0.003)		(0.003)	
HHI	-0.008		-0.009		-0.011	
	(0.270)		(0.269)		(0.270)	
Stock of refugees in the municipality in $t-1$	-0.006		-0.006		-0.006	
	(0.015)		(0.015)		(0.015)	
Industry (2d NACE)-by-year FE	YES		YES		YES	
Region-by-year FE	YES		YES		YES	
Firm FE	YES		YES		YES	
Observations	38,282		38,282		38,282	

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ . Number of unique firms included in the estimations: 26,482. To facilitate coefficient interpretation, the variables in bold have been standardized around their sample mean, so that they all have mean value equal to 0 and standard deviation equal to 1. Values in parentheses are standard errors clustered at the firm level. The models above are estimated on the second matched sample, in which firms that hired refugees were matched with the closest firm (in size, past profits and past sales growth) that hired any other foreign employees (but never refugees) within the same year, industry (2d-NACE) and region (5 regions in Denmark).

**Appendix Table A.5.** Individual-level statistics on hours worked and hourly wages for newly hired refugees versus newly hired foreigners (non-refugees) on the alternative matched sample (all occupational codes and all firms)

<b>(All contracts)</b>	<b>Total hours paid</b>	<b>Total normal hours</b>	<b>Total extra hours</b>	<b>Hours per week</b>	<b>Hourly wage (log)</b>
Newly hired refugee	633.01	609.99	22.76	27.12	4.853
Newly hired foreigners (non-refugees)	527.83	510.56	16.95	23.78	4.873
<b>Difference (t-test)</b>	<b>105.18 ***</b>	<b>99.43 ***</b>	<b>5.81 ***</b>	<b>3.34 ***</b>	<b>-0.020 ***</b>
<b>(Only full-time contracts)</b>	<b>Total hours paid</b>	<b>Total normal hours</b>	<b>Total extra hours</b>	<b>Hours per week</b>	<b>Hourly wage (log)</b>
Newly hired refugee	700.69	673.02	27.29	28.92	4.905
Newly hired foreigners (non-refugees)	573.10	553.75	18.96	24.82	4.892
<b>Difference (t-test)</b>	<b>127.59 ***</b>	<b>119.27 ***</b>	<b>8.33 ***</b>	<b>4.10 ***</b>	<b>-0.013 ***</b>

\*\*\* p < 0.01. Statistics on hours worked are only available for the period 2002-2012; statistics on hourly wage cover the full period (2001-2016).

**Appendix Table A.6.** Relationship between the hiring of foreign migrants (refugees and non-refugees) and other firm outcomes on the alternative matched sample

	<b>Labor costs per employee <math>t+1</math></b>	<b>Sales growth (from <math>t</math> to <math>t+1</math>)</b>	<b>Log profit (moving average between <math>t+1</math>, <math>t+2</math>, and <math>t+3</math>)</b>
Newly hired refugees	-0.026 ** (0.011)	0.022 (0.024)	0.027 *** (0.007)
Newly hired foreigners (non-refugees)	-0.005 (0.009)	0.076 *** (0.018)	0.021 *** (0.006)
Controls as in Table 3	YES	YES	YES
Industry (2d NACE)-by-year FE	YES	YES	YES
Region-by-year FE	YES	YES	YES
Firm FE	YES	YES	YES
Observations	36,305	38,847	38,391

\*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.10. Newly hired refugees/foreigners represent their share in the firm's total workforce in  $t$ . Values in parentheses are standard errors clustered at the firm level. The variables listed above have been standardized around their sample mean to make the interpretation of size effects easier.