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Essays on Marginalization and Integration of Immigrants and Young Criminals – A Labour Economics Perspective

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Essays on Marginalization and Integration of Immigrants and Young Criminals

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A Labor Economics Perspective

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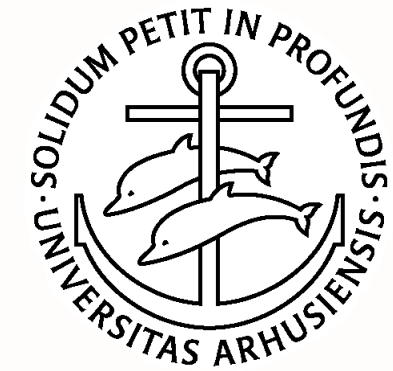

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Summary

The present PhD dissertation consists of three chapters and is concerned with the integration and marginalization of two specific groups: immigrants and young delinquents. The main motivation behind the present dissertation is to investigate, from a novel and economics perspective, topics that are highly discussed in the public and political debates because they concern social groups that are at the margin of our society. This motivation represents the main thread linking the three chapters to one another.

The dissertation starts by looking at the integration of immigrants in the receiving society in the first two chapters. The first chapter investigates the relationship between non-Western immigrants' ethnic identity, i.e., attachment to their home country and the host country, and employment. Although many studies look at factors behind immigrants' economic integration,[1] there has been litlle but growing focus on the role of values and ethnic identity among immigrants (see, e.g., Zimmermann, 2007; Battu and Zenou, 2010; Casey and Dustmann, 2010; Nekby and Rödin, 2010; Bisin et al., 2011). The first chapter contributes to the literature as it looks at immigrants from both the first and the second generations, compares nearly all measures of ethnic identity from the literature and, more importantly, includes a novel dimension of ethnic identity: immigrants' relation to the majority's social norms. Using survey data from Gundelach and Nørregård-Nielsen (2007), I measure ethnic identity both directly, i.e., through the direct report of immigrants' attachment to the host and the home countries, and indirectly, e.g., through immigrants' language mostly spoken at home or the origin of most contacts. The relation to majority norms is summarized in an index reflecting immigrants' opinions about social norms widely accepted in the Danish society including democracy, gender equality, and acceptance of abortion, divorce, and homosexuality.

I find that immigrants' employment outcomes do not systematically associate with their ethnic identity when I reproduce identity measures from the literature. Nevertheless, I find that immigrants who share social norms with the majority experience significantly better employment outcomes, particularly first-generation immigrant women. Furthermore, I show that interethnic differentials in majority norms could account for up to 20% of the explained part of the employment

[1] E.g., Chiswick (1978), Borjas (1985), and Constant and Massey (2003) constitute major works on the economic assimilation of immigrants. See also Constant and Zimmermann (2011) for a review of this literature.

gap between natives and first-generation immigrants. Those results shed more light on the interethnic employment gap and aspects of immigrants' identity relevant to economic integration.

The second chapter of this dissertation also focuses on the integration of immigrants in receiving societies but turns from values among immigrants to values among individuals from the majority population. More precisely, the chapter investigates whether natives' hostility to immigrants influences migrant inflows in OECD countries. Over the past three decades, fears about immigrants and their impact on the host society have developed among native populations in several OECD countries. Indeed, about half of the natives of EU countries think that their government should place stricter limits on the number of immigrants or prohibit new immigrants to come (European Values Survey, 2008). However, over the same period, OECD countries have experienced overall expanding rates of immigration. To our knowledge, no other study has regarded natives' attitudes to immigrants as a potential factor affecting immigration.[2] Our analysis uses an extensive data set on international bilateral migrant flows and stocks, also applied in Adsera and Pytlikova (2012), which we combine with longitudinal survey data on natives' attitudes toward immigrants in destination countries to cover eventually 30 OECD destination countries and up to 224 sending countries from 1980 to 2010.

Our findings show that natives' hostility, when measured with natives' readiness to discriminate against immigrants on the labor market when jobs are scarce, reduces immigration. The effect of natives' attitudes persists even after taking into account that politicians may restrict immigration policies following public hostility. This finding resonates with the works of Waisman and Larsen (2007), Zimmermann et al. (2008), Constant et al. (2009), and Carlsson and Eriksson (2012) who show that natives' negative attitudes toward immigrants constitute a major barrier for integration. Examining mechanisms behind our findings, we show that knowledge of the destination country's language reinforces the effect. Thus immigrants are likely to learn about natives' opinions before they migrate. In addition, our findings suggest that OECD migrants—most often labor-driven migrants and facing in general fewer entry restrictions—are more sensitive to natives' hostility than other migrants. This chapter raises an important issue for policymakers when both the structural demand for skilled workers and natives' hostility to immigrants are high. Indeed, in such a situation how to dampen natives' opposition to immigrants becomes crucial.

[2] For recent studies on the drivers of international immigration see: e.g., Pedersen et al (2006), Mayda (2010), Grogger and Hanson (2011), Ortega and Peri (2012).

The last chapter turns to another group of individuals at risk for marginalization in our society: young delinquents. The chapter investigates the transmission of criminal capital behind bars—or whether young offenders commit new criminality after serving time in a prison due to interactions with other inmates. We look at inmates incarcerated for the first time at age 18 to 22 using data from Danish registers on all adults incarcerated in a sentencing institution. Studying criminality among young individuals is relevant as criminality peaks in late adolescence or early adulthood (e.g., Hirschi and Gottfredson, 1985). Moreover, several studies show the importance of peer effects in transmitting delinquent behavior (e.g., Ludwig et al., 2001; Kling, et al., 2005). Specifically, we estimate the effect of other inmates' criminal background on crime-specific recidivism among young delinquents. Similar to Bayer et al. (2009), we deal with selection into prisons and possible time trends in criminal activity by including facility-by-prior-offense fixed effects and quarter-of-release fixed effects. We thus identify peer effects from the random variation in the duration of time-serving overlap between each pair of inmates in a facility.

Our most robust result shows that exposure to young peers with a criminal record of drug-related offenses strengthens criminality with drug-related offenses (i.e., reinforcing peer effects). Moreover, we show that reinforcing peer effects on drug-related offending from other young inmates and from other young inmates of the same ethnic group are larger and more significant than reinforcing peer effects from inmates in general or peer effects from young inmates from the same county. Hence, social interactions leading to more criminality happen more often among young inmates with a criminal record of drug-related offenses. From a policy perspective, this chapter suggests that grouping inmates convicted of drug-related offenses together by age is not optimal and carries perverse effects on criminal behavior. Moreover, as we only find evidence of reinforcing peer effects on drug crimes, training and programs offered in prisons may be effective in reducing possible learning peer effects from incarceration on recidivism with other crimes than drugs.

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Table of Contents

Chapter 1

Ethnic Identity, Majority Norms, and the Native-Immigrant Employment Gap

Ethnic Identity, Majority Norms, and the Native-Immigrant Employment Gap*

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Abstract—Earlier studies do not agree on whether ethnic identity, i.e., immigrants' attachment to the home country and the host country, can explain lower employment outcomes among immigrants. This study investigates the relationship between employment and ethnic identity and complements the literature by capturing a novel dimension of ethnic identity: openness to majority norms. Reproducing measures from earlier studies, I find that immigrants' employment outcomes do not systematically associate with their ethnic identity. However, immigrants who share social norms with the majority experience significantly better employment outcomes, particularly first-generation immigrant women. Furthermore, I show that interethnic differentials in majority norms could account for up to 20% of the explained part of the employment gap between natives and first-generation immigrants. Those results shed more light on the interethnic employment gap and aspects of immigrants' identity relevant to economic integration.

Keywords: ethnic identity, integration, assimilation, acculturation, social norms, employment gap.
JEL Classification: F22 - J15 - Z13

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1. Introduction

Immigrants often experience lower employment rates than natives. Accelerating the entry of immigrants in the host country's labor market, consequently, constitutes a major political objective in many receiving countries; especially in the Scandinavian welfare states. Denmark represents an interesting case to investigate the labor market integration of immigrants, as the country sadly distinguishes from other EU member states with one of the widest interethnic employment gaps. In 2005, the gap between non-EU immigrants and natives amounted to 25 percentage points; more than 12 points above the average of EU-15 countries (Alfieri and Matthiesen 2005). At the center of the public debate on immigrants' economic success resides the argument that immigrants' retaining of their culture of origin and their non-adoption of the majority identity impede economic and social inclusion in the host society. In several immigrant-receiving countries, this argument takes the form of a vivid discussion opposing two main directions for post-migration policies: assimilation (i.e., immigrants should adopt the host country culture and reject their culture of origin) and integration (i.e., immigrants should adopt the host country culture and can retain their ethnic customs and traditions).[1]

Motivated by this growing debate, economists have started to investigate how immigrants' commitment to their country of origin and the country of adoption relates to labor market outcomes—see, e.g., Battu et al. (2007), Battu and Zenou (2010), Constant and Zimmermann (2008 2009), Constant et al. (2009), Casey and Dustmann (2010), Nekby and Rödin (2010), and Bisin et al. (2011). The economics literature on ethnic identity highlights the relevance of distinguishing non-mutually excludable attachments to the culture of the host and the sending countries. Indeed, immigrants often experience plural identities, which may conflict with one another (Sen 2001). Some studies conclude that strong commitment to the minority can induce an employment penalty, although attachment to the majority may reduce this penalty. Nevertheless, a pitfall of the existing studies typifies in that they examine different populations and measure ethnic identity in various ways, making a comparability of the available results difficult. An additional pitfall in the literature is that previous measures of ethnic identity disregard other mechanisms that possibly affect immigrants' labor market outcomes such as adaptability and openness to majority norms (Nekby and Rödin 2010, Bisin

[1] In Denmark, the 2008 European Values Survey reveals that one of the biggest concerns associated with immigration is the undermining of the majority culture, and only 6% of the Danish population wishes that immigrants keep their customs and traditions. This evidence points toward public preferences for an assimilation policy. See also Gundelach (2011).

et al. 2011).

This paper deals with these two caveats by answering two main questions. First, it investigates how different measures of ethnic identity and acceptance of majority norms, separately, associate with the employment probabilities of immigrants. Throughout the paper, the term *ethnic identity* refers to chosen and imposed measures of immigrants' attachment to the country of origin and the host country that I reproduce from the literature.[2] Second, this study decomposes the native-immigrant employment gap and looks at how measures of ethnic identity and acceptance of majority norms, also separately, relate to interethnic differentials in terms of employment rates. Using a Danish survey of six immigrant groups and natives, the Ethnic Groups' Values survey (EGV), I can reproduce measures of ethnic identity from the previous literature for both first- and second-generation immigrants. In addition, I capture openness to majority norms including gender equality, individual choice of partner, democracy, and tolerance of actions such as divorce, abortion, and homosexuality through a *modernization* index inspired by Bevelander and Veenmann (2006). I employ the terms *modernization* and *openness to majority norms* interchangeably to refer to the modernization index measuring the adoption of norms widely shared in the country of reception. I argue that immigrants adopt social norms of the majority population as a result of their plural identities, and, in this sense, the modernization index nicely complements ethnic identity measures from earlier studies as it captures new dimensions of immigrants' identity.

The present study contributes to the literature and the public debate with at least three novelties. First, this study is the first to capture openness to majority norms together with ethnic identity. Doing so enables me to qualify the current debate on post-migration policies. More precisely, this study can suggest what facets of immigrants' plural identities relate to employment and therefore it can lead toward more effective post-migration initiatives. Second, as the EGV data also samples ethnic Danes, I observe interethnic differentials in variable endowments and can evaluate by how much adoption of majority norms could improve the current interethnic employment gap. Third, the EGV data set is representative of Denmark's largest immigrant groups; non-Western immigrants who entered the country as tied movers or asylum seekers. Analyzing the economic integration of non-Western immigrants is relevant as they often experience lower employment rates than other immigrant

[2]Nekby and Rödin (2010) also call ethnic identity "acculturation identity" when it accounts for attachment to both the country of origin and the host country. See Section 3 for a presentation of the ethnic identity measures used in this study.

groups and are underregarded in the literature (Kerr and Kerr 2011). Given the remarkable dissimilarity in immigrant employment rates across genders, I look at males and females distinctively. Due to the nature of the EGV data and inherent potential endogeneity, the coefficients of the variables most likely show overestimated effects. Hence, results should be interpreted as lower and upper bounds rather than causal relationships. The previous literature has acknowledged the difficulty to find appropriate instruments for ethnic identity measures and eliminate potential endogeneity despite the use of earlier employment data (e.g., Casey and Dustman 2010, Nekby and Rödin 2010).

The different empirical specifications confirm that openness to majority norms strongly associates with higher employment probabilities for first-generation immigrants; particularly for first-generation immigrant women (average marginal effect of .10 for women, .04 for men). Quite differently, and only when the degree of religiosity proxies ethnic identity (as in Bisin et al. 2011), I find that first-generation women strongly committed to their home culture are less likely to be in employment (average marginal effect of .06). Furthermore, by decomposing the interethnic employment gap, I show that interethnic differentials in terms of majority norms could account for up to 20% of the explained part of the employment gap between ethnic native and first-generation immigrant females and up to 14% between ethnic native and first-generation immigrant males.

The rest of the paper is organized as follows. Section 2 sets up the theoretical and empirical background of the study. Section 3 introduces the EGV data, the ethnic identity measures, and the modernization index. Empirical findings are outlined in Section 4. Finally, Section 5 concludes.

2. The Economics of Self-Identity and Social Norms among Immigrants

Whether and how immigrants catch up with natives in terms of economic outcomes has received considerable attention in the literature. Economists find that factors related to the receiving country and individual characteristics including age at entry, acquisition of local human capital, and country of origin influence the labor market outcomes of immigrants.[3]

Recently, economists have manifested interest for ethnic identity as a possible

[3]See, e.g., Chiswick (1978), Borjas (1985), and Constant and Massey (2003), for major works on the economic assimilation of immigrants. See also Constant and Zimmermann (2011) for a review of this literature.

integration factor for immigrants.[4] Battu et al. (2007) theoretically explain how identity choice can affect economic outcomes among the non-white population. In the model, members of the non-white group form their own identity depending not only on individual preferences and group membership but also on social roles and peer (i.e., non-white) pressure. Peer pressure, in particular, matters as the utility level of the whole non-white group decreases with each non-white member's interacting with a white person. Non-white people constitute a small minority and job openings—all located in the white community—circulate only by word-of-mouth. As a result, interactions with white individuals become essential to get a job. A member of the non-white group must then tradeoff between: (1) interacting with the white population but, at the same time, lowering her own and the non-white group' s level of utility, and (2) adopting *oppositional identities*, thus not interacting with the white population and suffering an adverse employment effect. As Battu et al. (2007) acknowledge, individuals may hold plural and conflicting identities and, consequently, the choice between adopting oppositional identities and interacting with the majority can rarely be clear-cut (see also Sen 2001).

In the present paper, I argue that the adoption of majority norms, too, can affect economic outcomes. Norms and behaviors form a product of individual identity—or identities (Akerlof and Kranton 2000; Russo and van Hooft 2011)—and represent values behind national identities (Manning and Roy 2010). Accordingly, if identity can influence economic outcomes, believed norms and behaviors also can potentially do so. Again, as individuals own many characteristics and belong to several groups (ethnic, age, education groups, etc.), they can hold multiple identities and follow conflicting norms and behaviors.

Empirically, several studies test whether and how ethnic identity relates to economic outcomes. Battu and Zenou (2010) empirically test the Battu et al. (2007) theory. The authors measure oppositional identities in an aggregated index that combines *chosen* measures, i.e., direct reports on attachment to the home and the host countries, and *imposed* measures such as attitudes toward interethnic marriage and ethnic schooling. Their findings corroborate the Battu et al. (2007) theory and show that non-white people with oppositional identities

[4]Sen (1977) represents a pioneer work in the economics of identity literature. Again, see Constant and Zimmermann (2011) for a thorough presentation of the more general literature on the economics of identity. The work of Akerlof and Kranton (2000) constitutes a major reference for recent works linking identity choice and economic outcomes among immigrants. For instance, their model has been used by Fryer and Levitt (2004) to explain the utility associated with the choice of distinctive names among black communities in the USA.

experience lower employment outcomes more often than other non-white people in the UK. Using German data, Constant and Zimmermann (2008, 2009) find that commitment to the host-country identity can enhance employment outcomes, but for immigrant women commitment to both the minority identity and the majority identity matters. The authors capture ethnic identity with the *ethnosizer*, an index based on chosen and imposed measures including interethnic contacts, the language practiced at home, and the origin of everyday media.[5] Casey and Dustmann (2010) also utilize German data to study how chosen identity of immigrants is transmitted across ancestries and relates to employment outcomes. The authors document a small opposite relationship between labor market outcomes and attachment to the receiving country, but only for first-generation immigrant females. Interestingly, they show also a positive relationship between deep commitment to the minority and employment for second-generation immigrant males. This latter result may be explained by an active participation in ethnic networks, easing labor market opportunities within the minority and, in particular, within ethnic enclaves. Although Constant and Zimmermann (2008 2009) and Casey and Dustmann (2010) use German data, they measure ethnic identity differently, look at two different immigrant populations, and their consequent findings point toward two different conclusions.

Using Swedish data on second-generation immigrants and immigrants who moved to Sweden at a young age, Nekby and Rödin (2010) find that strong identification with the majority is more relevant to employment than identification with the home ethnicity. Using cross-country data for Europe, Bisin et al. (2011) show that strong attachment to religion and strong attachment to ethnic traditions, two proxies for ethnic identity, lead to an employment penalty for first-generation immigrants.

This short review typifies that results on the link between ethnic identity and labor market outcomes are likely to vary across immigrant populations, country settings, and measures of ethnic identity. In the present study, I look at first and second generations of immigrants and reproduce imposed and chosen measures of ethnic identity applied in the literature.

[5]See Constant et al. (2009) for further details on the construction of the ethnosizer. One innovation of the ethnosizer is to measure ethnic identity in two dimensions, placing individual identity relative to both the home and the host countries.

3. Data and Measure Construction

3.1. Immigrants in Denmark and the EGV Sample

Immigrants in Denmark

Denmark has a more recent migration history than most other European countries. The first large influx came in the 1960s and mostly consisted of guest workers from Turkey, Pakistan and West Balkan countries. Following the 1973 oil crisis, the inflows of guest workers reduced and Denmark started to welcome immigrants mainly for family-reunification purposes. In the 1980s, Denmark began accepting many asylum seekers from, e.g., Iran, Iraq, Palestine, Somalia, and the former Yugoslavia. In the early 2000s, given the sudden and significant rise in the number of immigrants and the difficulty to manage immigrants' integration, the Danish government tightened entry possibilities. As a result, most first-generation immigrants present in Denmark nowadays moved from a non-Western country (71% of all first-generation immigrants in 2005). Moreover, the second-generation immigrant population is relatively young and mainly of Turkish or Pakistani origin (49% of all second-generation immigrants in 2005).[6]

The EGV Sample

The present study uses the EGV survey conducted by Gundelach and Nørregård-Nielsen (2007) in Denmark. This survey asks 2966 first-generation immigrants and 992 second-generation immigrants about their opinions and attitudes toward their home country and Denmark's values.[7] The EGV survey also includes a control group of 520 ethnic Danes. The immigrants interviewed in the survey originate from Turkey, Pakistan, Vietnam, West-Balkan countries, Iraq, or Iran. These six origins were deliberately selected to represent Denmark's

[6] Numbers are given within the sample age categories, i.e., 18-50 for first-generation and 18-34 for second-generation immigrants, and are taken from Statistics Denmark (2012). See, e.g., Liebig (2007) and Alfieri and Matthiesen (2005) for further details on Denmark's immigration history.

[7] In this paper the term immigrants designates both first- and second-generation immigrants.The EGV definition of group ancestry equates that of Statistics Denmark. First-generation immigrants were born abroad of parents without Danish citizenship and born outside Denmark. Second-generation immigrants are born in Denmark and none of their parents are both Danish citizen and born in Denmark. If one or both parents born in Denmark become Danish by naturalization, their children will not be second-generation immigrants anymore but natives. If both parents born in Denmark hold their foreign citizenship, their children will be second-generation immigrants. I call second-generation immigrants alternatively descendants.

largest non-Western immigrant groups and diverse regions of the globe.[8] For descendants, the countries of origin were restricted to Turkey and Pakistan; the two most common ethnic groups among second-generation immigrants. Choosing other groups might have increased the likelihood that second-generation respondents in the EGV survey come from the same family. The authors randomly selected the sample within those ethnic groups conditional on that individuals were 18 to 50 years old (18 to 34 for second generations), held a permanent residence permit, and had lived at least 3.5 years in Denmark at the time of the interview to ensure that they can better relate to Danish values. In 2005, first-generation immigrants from Turkey, Pakistan, Vietnam, West-Balkan countries, Iraq, or Iran represented 52% of the total non-Western immigrant population aged 18 to 50 years in Denmark, while descendants from Turkey or Pakistan represented 60% of all non-Western descendants aged 18 to 34 years (Statistics Denmark, 2012). The EGV sample is then fairly representative of the non-Western ethnic minorities present in Denmark in 2005 in the respective age groups.

Data collection took place through phone and internet interviews in the first half of 2006.[9] The overall response rate among immigrants is 54%, which is typical of surveys conducted among immigrants (Deding et al. 2008).

Table 1 presents summary statistics for the main socioeconomic variables. First-generation and second-generation immigrants are on average 37 and 25 years old, respectively. First-generation immigrants enter Denmark on average at age 21, which implies a mean of years after migration of 16. The number of years after migration is slightly lower for women as most of them migrate to Denmark for family-reunification purposes (57%). Over half of the first-generation men, quite differently, come to Denmark as asylum seekers. Relative to other religions, Islam is overrepresented among immigrants (66% of first-generation immigrants and 95% of descendants).

Employment probabilities are lower for immigrants than for ethnic Danes. The employment gap is especially remarkable between first-generation immigrant and native

[8] Gundelach and Nørregård-Nielsen excluded countries of origin close to Denmark in terms of values but largely represented in the immigrant population in 2005 such as Norway and Germany. See Gundelach and Nørregård-Nielsen (2007) for more details on the data set construction.

[9] This period coincides with the international crisis that followed the publication of Mohammed cartoons in a Danish newspaper. Although this crisis could have influenced respondents' answers, statistics from the EGV data cannot depict major differences in responses before and after the cartoon publication date.

females: more than 30 percentage points, while for men the gap amounts to 11 percentage points. The native-immigrant employment gap depicted in the EGV sample is representative of the actual gap in Denmark, 24 percentage points on average in 2011 (Statistics Denmark 2011).[10] The employment gap is less notorious between descendants and ethnic Danes; 4 and 18 percentage points for males and females, respectively, in the EGV sample.

The education variables depict whether a respondent has attended or completed education in Denmark and the home country—for first-generation immigrants.[11] First-generation males have attended more education than females, either in the home country or in Denmark, while second-generation females show higher education rates than their male counterparts. These education trends among non-Western immigrants are fairly representative (Statistics Denmark, 2011). In addition, both first-generation immigrants and descendants experience lower attainment rates in tertiary education than ethnic Danes. While first-generation immigrants entered Denmark as adults, descendants grew up in Denmark and speak Danish fluently. The differential in educational attainment rates with ethnic Danes, then, remains more puzzling for descendants; the latter complete a tertiary education on average 20 percentage point less than natives in the same age group (18 to 35 years old).

[Table 1 about here]

3.2. Measuring Majority Norms and Ethnic Identity

The literature proposes several ways to measure ethnic identity among immigrants. Direct (or chosen) measures use self-expressed attachment to the home and/or the receiving countries. Indirect (or imposed) indicators use other information such as the origin of the language spoken at home, which also reveal preferences of ethnic identity. The EGV survey allows me to reproduce most measures applied in the literature and, in addition, to capture immigrants' openness to majority norms.

[10]Given that 2006 corresponds to one of the lowest unemployment rates within the past 30 years in Denmark (4.5% of the total workforce in June 2006, Statistics Denmark 2006), one may fear that a selection of non-working immigrants may have occurred among the survey respondents. In fact, the opposite is true. As found for other surveys conducted among immigrants in different countries (Deding et al. 2008), one can rather observe an overrepresentation of immigrants in employment in the EGV survey.

[11]The EGV survey asks also how many grades (in all education categories) were completed in the home country. The average is around 8.5 (standard deviation 4.3) for both male and female first-generation immigrants. Adding the number of grades from the home country does not appear significant and does not change the results.

Measuring Openness to Majority Norms—the Modernization Index

Inspired by Bevelander and Veenman (2006), I construct a composite index called modernization. This index measures cultural assimilation, i.e., open-mindedness and adaptability to norms widely shared among the majority population, and helps understand better the relevance of the different dimensions of ethnic identity. In fact, an immigrant may be culturally assimilated and, at the same time, express deep commitment to her home culture. The modernization index aggregates four variables. The first variable is a dummy that reflects the acceptance of certain actions. The question "*To what extent do you think this action is acceptable?*" was asked for homosexuality, divorce and abortion. Each answer is scaled from 1 to 10, where 10 corresponds to "*I think this is totally acceptable*". If a respondent reports 7 or above for at least two of these three actions, the dummy is coded 1. The second variable is a dummy equal to 1 if the respondent agrees "*very much*" or "*pretty much*" with Denmark being governed by a democracy. The third composing dummy relies on the question: "*How big an influence should a youth and the parents have on the choice of partner?*" Answers can spread from 1 ("*The youth decides*") to 10 ("*The parents decide*"). The third dummy equals 1 when the respondent gives the question an answer 1. The fourth variable concerns gender equality. When the person reports "*strongly disagree*" after the following statement: "*If jobs are not available to all, men have more right to work than women*", the fourth dummy equals 1. For each respondent, the sum of the four dummies forms the modernization index, which then can take values between 0 and 4.[12] Table 2 sums up the construction of the modernization index and presents mean values for immigrants and natives.

[Table 2 about here]

Approximately 50% of the immigrant population and more than 90% of ethnic Danes score high (3 or 4) in the modernization index. Disaggregating the index by gender reveals that first-generation immigrant men score higher than first-generation immigrant women, while descendant women score higher than descendant men. Moreover, descendant women report a high modernization index more often than first-generation immigrant women, whereas descendant men report a high modernization index less often than first-generation immigrant

[12] A standard factor analysis shows that, even though the variance does not vary much across the four dimensions, the first dimension on the tolerance of some actions and the fourth dimension on gender equality explain most of the variance. See Fig. A1 in the Appendix for a graphic representation of immigrant shares across the values of the modernization index.

men.[13] Looking at each composing dummy individually teaches us that tolerance of abortion, divorce and/or homosexuality is the least supported dimension among all groups (from 28 to 82%),[14] whereas most groups largely support the Danish democratic system (from 87 to 99%).

Measuring Ethnic Identity—Chosen and Imposed Measures

Individuals who have left their country of origin to settle in a new country and their descendants can have mixed feelings regarding the country and the culture with which they identify the most. For example, an Iranian person who has permanently moved to Denmark may feel either mostly Dane or mostly Iranian. Alternatively, she may feel simultaneously strongly or weakly attached to both the country of origin and the host country. The acculturation framework of Berry (1997) positions immigrants' identity into two dimensions, i.e. in relation to the country of origin and the host country, and thus it allows the respective country attachments to be non-mutually exclusive. As the EGV data contains information on ethnic identity toward both the sending and the receiving countries, Berry's framework serves the purpose of this study ideally. Moreover, Constant et al. (2006) underline that the use of a one-dimension framework, where attachment to one country excludes attachment to the other country, can yield an overestimation of immigrants' attachment to the host country.

Using the EGV questions "*How strong is your attachment to Denmark?*" and "*How strong is your attachment to your country of origin?*", I classify each immigrant in one of four possible acculturation states: (1) *integrated* (strongly or very strongly attached to both the host country and the country of origin), (2) *assimilated* (not or little attached to the country of origin while strongly or very strongly attached to the host country), (3) *separated* (not or little attached to the host country and strongly or very strongly attached to the country of origin), and (4) *marginalized* (attached to either countries). The four acculturation states constitute the chosen measures of ethnic identity I use, similar to, e.g., Casey and Dustmann (2010) and Nekby and Rödin (2010).

In addition, I reproduce three imposed measures of ethnic identity (see, e.g., Zimmermann 2007, Constant et al. 2009, Battu and Zenou 2010, Bisin et al. 2011). The first

[13] Yet, once the first-generation sample is restricted to Turkish and Pakistanis, the only origins observed for second generations, males from the second generation classify more often as highly modern than males from the first generation of the same origin (see Fig. A2 in the Appendix).

[14] Tolerance toward abortion, divorce or homosexuality correlates negatively with the degree of religiosity—the raw coefficient for the whole sample is -.3. Accordingly, I control simultaneously for *religious* and a high modernization index in the employment equations.

measure encompasses a set of dummies on the origin of the language mostly spoken at home. Likewise, the second measure uses the origin of regular contacts to proxy ethnic identity preferences.[15] Language used at home and regular contacts are categorized as mostly Danish, mostly co-ethnic, equally both, or from another origin. Each answer category reflects one of the Berry acculturation states: assimilation, separation, integration, or marginalization, respectively. Third, identity is captured with the degree of religiosity. Individuals were asked: "*No matter what your religion is, would you say that you are: (1) very religious, (2) religious, (3) not particularly religious or (4) not religious at all?*' If they answer (1) or (2), the variable *religious* equals 1. Table 3 presents a summary of the ethnic identity measures.[16]

[Table 3 about here]

The repartition of immigrants over the acculturation states of chosen identity (first panel) differs across generations. Among first-generation immigrants integration is by far the most reported acculturation state (50%), followed by assimilation (27%), separation (16%) and marginalization (7%). In comparison, descendants are mostly assimilated (42%) or integrated (40%); attachment to the country of destination is thus stronger among immigrants from the second generation. Differences in chosen identity stand out also across genders. Among first-generation immigrants, females report assimilated preferences less often than males but express separated and integrated preferences more often. Quite differently, among descendants, females report assimilated preferences more frequently—but separated preferences less frequently—than males. Probably, the higher participation rates in Danish education among descendant females (Table 1) partly explain higher attachment to Denmark and less attachment to the ethnic origin.

When turning to imposed identity measures (last three panels), we notice similar patterns. For instance, first-generation immigrant women reveal imposed separated preferences more often than first-generation immigrant men. Nonetheless, among descendants, the share of separated in terms of regular contacts exceeds the share of separated

[15] Origin of regular contacts and language spoken at home constitute two dimensions of the Constant et al. (2009) ethnosizer index. The reproduction of the ethnosizer was considered but abandoned due to a high correlation between employment and interactions measures and the non-availability of pre-study employment information. Nevertheless, in the estimations, I keep the two dimensions of contacts and language as alternative indirect identity measures.

[16] In addition, a measure similar to the *oppositional identity* index of Battu and Zenou (2010) was reproduced. The reproduction of the index is shown in the Appendix (Tables A3 and A4).

in terms of chosen identity. Indeed, Table 3 shows that descendants, although they speak mostly Danish (second panel) and self-identify mostly as Danes (first panel), largely acquaint people from their own ethnic groups (third panel). Co-ethnic acquaintance may be particularly high when descendants live in an area of high ethnic minority concentration. (In the sample, 39% of the descendants and 27% of the first-generation immigrants live in an area where at least 40% of the population is from an ethnic minority.) Moreover, the share of immigrants in the imposed separated categories is larger than the share of immigrants in the chosen separated category. For instance, more than 50% of first-generation immigrants speak mainly the origin language at home (i.e., separated in the second panel), whereas only 16% express a chosen separated identity (i.e., separated in the first panel). Finally, Table 3 depicts that females report being religious more often than males, and rather surprisingly the degree of religiosity increases across generations.[17]

The following section investigates the link between employment, ethnic identity, and openness to the majority norms. I argue that the modernization index and the ethnic identity measures capture distinct elements of immigrants' (plural) identities and, therefore, should be controlled for simultaneously in the employment estimations.[18]

4. Ethnic Identity, Majority Norms, and Employment

4.1. Identifying the Effect of Identity and Majority Norms on Immigrant Employment

It is important to note that the following results represent associative rather than causal relationships. Ideally, immigrants would classify across the different values of the modernization index and the ethnic identity measures randomly. Moreover, the EGV sample does not offer valid instruments for ethnic identity and modernization. Nekby and Rödin (2010) also acknowledge the difficulty of finding appropriate instruments for ethnic identity. Alternatively, longitudinal survey data (including data on employment over time) could help identify how a change in ethnic identity and modernization can affect immigrants' likelihood to get a job. Nonetheless, past employment may not suffice to eliminate endogeneity, since expected employment, which I cannot observe in the EGV data, may also influence

[17] Yet, this pattern does not hold when restricting the first-generation sample to Turkish and Pakistani immigrants (results are not shown but are available from the author).

[18] Looking at simple correlation teaches us that the modernization index only associates with measures of ethnic identity with coefficients below .25 for most of them (see Table A1).

immigrants' openness to majority norms.[19]

Consequently, the results of this study may suffer from two estimation biases—upward or downward. First, simultaneity bias will tend to cause an overestimation of the modernization effect and the effect of attachment to the majority identity (e.g., *assimilated* preferences) on employment if reverse causality between employment and the adoption of majority norms or ethnic identity exists. The bias may appear as, once an immigrant gets a job in a native-dominated environment, she increasingly becomes more exposed to natives' culture and thus may gradually adopt natives' norms and identity. Moreover, the modernization estimates will be biased upward if attachment to majority norms for unobserved reasons correlates positively with getting a job. Second, similar mechanisms might bias estimates on attachment to the home identity, but the bias would point in the opposite direction. More explicitly, an immigrant might slowly detach from her home identity once in employment. Further, if the job implies interactions mostly with natives, the immigrant will interact less with other immigrants and consequently shift her position in the four *imposed identity-origin of regular contacts* variables. If at work, those mechanisms will bias the coefficient estimates on ethnic attachment (e.g., *separated* preferences) and religiosity (*religious*) downward.

Although I cannot draw conclusions on causalities, earlier empirical and theoretical works document that ethnic identity, thereby ethnic behavior and norms, affects economic outcomes. For instance, Constant and Zimmermann (2008, 2009) demonstrate that pre-migration characteristics such as gender, ethnic origin and religion can predict ethnic identity, and thus ethnic identity can influence labor market outcomes in the receiving country.[20]

4.2. Employment, Ethnic Identity, and Openness to Majority Norms

Table 4 presents estimates from employment probability equations, reported as average marginal effects. I run estimations separately for (1) male first-generation immigrants, (2) female first-generation immigrants, and (3) second-generation immigrants regardless of their

[19] Previous works have acknowledged the difficulty to eliminate endogeneity and identify a causal relationship between ethnic identity and employment (e.g., Casey and Dustmann 2010), also when using data on earlier employment (e.g., Nekby and Rödin 2010).

[20] Other works, however, show that age, time of arrival, and years spent in the country also can shape ethnic identity (Casey and Dustmann 2010).

gender.[21] Estimations include alternatively chosen and imposed ethnic identity measures.

[Table 4 about here]

The first row shows that sharing norms with the majority, as captured by a high modernization index, associates positively with employment probabilities of immigrants (columns 1, 3, and 4). Results differ, however, across genders and ancestries. First, for first-generation females a one-point increase in the modernization index correlates with a 10% increase in employment probabilities (columns 3 and 4). The size of the marginal effect of a high modernization index is larger than that of a separated chosen identity (-.08 in column 3). Moreover, imposed identity measured with the origin of regular contacts associates significantly with employment, whereas imposed identity measured with the origin of the language spoken at home does not (column 4). In particular, being mostly in contact with ethnic fellows, other ethnic groups, or a mix of both natives and ethnic fellows, in comparison to interacting mostly with ethnic Danes, associates negatively with employment by .24 for first-generation females (column 4).[22] Strong religiosity (*religious*) correlates also negatively with having a job for first-generation immigrant females (column 4), although Table 4 does not show any significant relationship between employment and a particular religious belief.

Second, for first-generation immigrant men adopting majority norms associates positively with employment; a one-point increase in the modernization index correlates with a 4% increase in employment (column 1). This number is smaller than for women (.10 in column 3). However, for first-generation immigrant males, the estimate of the modernization index does not remain significant in column 2, when I control for imposed—and not chosen—ethnic identity measures. Furthermore, and rather surprisingly, I find that chosen separated identity correlates significantly and positively with employment for males. This finding may reflect that immigrant males strongly committed to their home identity enjoy wider co-ethnic networks, offering them more job opportunities. Moreover, if reverse causality is present, men employed in a minority-dominated environment might feel confident enough to report

[21] Running separate models for male and female descendants leads to similar results in terms of associations between employment, ethnic identity and norms adoption but, due to a significant loss in the number of observations, the statistical significance of other covariates such as education becomes less stable (see Table A2 in the Appendix). Furthermore, in estimations not shown here, I exclude first-generation immigrants above the age of 35 (upper limit for the descendant sample) and do find very similar results.

[22] Reverse causality between employment and, in particular, ethnic identity measured with regular contacts is highly likely.

separated preferences. Nevertheless, the positive and significant relationship between separated preferences and employment disappears when I measure ethnic identity with imposed measures. In addition, religiosity does not correlate with employment for immigrant men.

Third, for descendants (columns 5 and 6), I do not find any statistically significant relationships between employment and either ethnic identity or the modernization index. For this group, the only significant variables are the two education dummies. That modernization and ethnic identity do not associate with employment for descendants may originate from the too little number of observations in this sample, the sample restriction to two ethnic origins, endogeneity, or other mechanisms. One possible mechanism is that descendants, who attend Danish kindergartens and schools in the same proportions as Danish children (Statistics Denmark, 2011), have integrated majority norms and remain more open to them, even though they report that they disagree with some. In other words, the modernization index may not capture the same degree of opposition to majority norms for second-generation immigrants than for first-generation immigrants.[23] Moreover, descendants experience employment rates closer to those of natives, and thus the remaining unexplained gap may relate to factors other than majority norms such as labor market discrimination and the extent to which the majority population regards descendants as "natives" (Manning and Roy 2010).[24]

In sum, Table 4 shows that adopting majority norms positively and robustly associates with employment probabilities for first-generation immigrants, particularly females, whereas identity captured by chosen measures or language preferences does not. Those findings exemplify the Manning and Roy (2010) postulate that acquiring majority values is "more important to the functioning of society than any name that people use to identify themselves" (p.97). The results are also consistent with Andersen and Lüchau (2011) who show that immigrants' employment is influenced by "a product of traditions" (p.47) including a more conservative view of gender roles—one dimension of the modernization index.

4.3. Decomposing the Native-Immigrant Employment Gap

This section investigates how different endowments in the modernization index and religiosity degree between natives and first-generation immigrants can potentially explain the interethnic

[23] Response bias, including social desirable responding, constitutes a major issue in self-reports on individual attitudes and behaviors (Paulhus 1991).

[24] See, e.g., Carlsson and Rooth (2007 2012) for recent evidence on ethnic discrimination on Scandinavian labor markets.

employment gap.[25] The gap decomposition is possible as the EGV samples 520 ethnic Danes, for whom also I can measure the modernization index and the degree of religiosity. The technique used to decompose the employment gap (Fairlie 1999, 2005) distinguishes the part of the gap due to differences in observed variable endowments across the two groups (i.e., the *explained* part) from the part due to differences in unobserved characteristics (i.e., the *unexplained* part). In the non-linear-case, the decomposition takes the form:

$$\overline{Y}^{D} - \overline{Y}^{I} = \left[\sum_{k=1}^{N^D} \frac{F(X_k^D \hat{\beta}^D)}{N^D} - \sum_{k=1}^{N^I} \frac{F(X_k^I \hat{\beta}^D)}{N^I}\right] + \left[\sum_{k=1}^{N^I} \frac{F(X_k^I \hat{\beta}^D)}{N^I} - \sum_{k=1}^{N^I} \frac{F(X_k^I \hat{\beta}^I)}{N^I}\right], \qquad (1)$$

where $\overline{Y}^{j}$ represents the mean value of the dependent variable Y, X^{j} is a vector of average values of the explanatory variables, $\hat{\beta}^{j}$ is a vector of coefficients estimates, and N^{j} is the sample size of ethnic group *j* (with *j=D* for ethnic Danes and *j=I* for immigrants).[26] In Eq. (1), the first term on the right-hand side represents the explained part; the second term the unexplained part.[27] Similar to, for instance, Fairlie (2005) and Braakmann (2009), I only focus on the explained part due to the difficulty to interpret the unexplained part of the differential.

The explanatory variables observed for both *D* and *I* groups are: openness to majority norms, religiosity, education attended in Denmark, and other characteristics including gender, marital status and age. The vector $\hat{\beta}^{j}$ represents weights resulting from running simple employment estimations for group *j*. The endowments X^{j} take on weights from the same sample to assess by how much the gap in *Y* will change if group *j* was given the same variable endowments than the other group. Table 5 shows the decomposition results, using alternatively weights from the ethnic Dane sample (columns 1 to 4) and the first-generation immigrant sample (columns 5 to 8).[28]

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[25] As results from the previous section show that modernization and religious correlate significantly with employment only for first-generation immigrants, I decompose the employment gap for this group only.

[26] F is the cumulative distribution function from the logistic estimation. Yet, to remain consistent with the previous results, I also employ probit functions to decompose the employment gap.

[27] The ethnic inequality literature often interprets the latter term as actual ethnic discrimination but, as Aaberhardt et al. (2010) discuss, the term unexplained is more appropriate.

[28] Following Jann (2006), I also use weights from a pooled sample of both first-generation immigrants and ethnic Danes. Moreover, weights from this pooled sample were computed after controlling for additional immigrant characteristics. Finally, weights from a larger pooled sample including the two immigrant generations and natives were used. Those robustness checks are shown in Table A6 (Appendix) and present estimates similar in size and statistical precision.

[Table 5 about here]

The observed ethnic gap in employment probabilities is reported in the third row of Table 5 and amounts to 16 and 31 percentage points for males and females, respectively. Columns (5) to (8) present the preferred specifications. These specifications offer more relevance politically, as they give the possible reduction in the interethnic employment gap would immigrants own the same average endowments as natives. Moreover, they can potentially explain larger proportions of the gap, around 40% for males (fourth line columns 5 and 6) and 65% for females (fourth line columns 7 and 8). Again, the results in Table 5 do not depict causal relationships.

In line with the findings from the previous section, openness to majority norms presents more relevance to employment for immigrant women than men. More explicitly, ethnic differentials in modernization endowment might account for up to 20% of the actual employment gap among females (columns 7 and 8), while up to 14% for males (column 5). Differentials in religiosity might account for up to 5% of the employment gap among women (columns 7 and 8), whereas I do not find any significant results for men. In addition, for both genders, as the coefficients of the variable *tertiary education attained in DK* depict in columns (5) to (8), bringing tertiary education rates of first-generation immigrants closer to the education rates of natives could reduce the interethnic employment gap by 20 to 30%. I include an interaction term between high modernization and the education variables to test for possible mechanisms behind the findings. The non-statistical significance of the interaction term estimates in columns (6) and (8) obviates that being open to majority norms and owning country-specific human capital might represent for first-generation immigrants two distinctive factors both essential to succeed on the Danish labor market. In addition, different endowments in other characteristics such as age, having children and being married may carry an indirect association with employment for males (columns 5 and 6). For instance, single Danish men might be more career-oriented than Danish fathers and husbands and, thus, the results indicate that lower marital rates among immigrants could improve their chances to catch up with Danes' employment outcomes.

In spite of their non-causal interpretation, the findings in this section constitute a progress toward identifying some of the so far unexplained part of the employment disparities between natives and non-Western immigrants in host societies.

5. Conclusion

Using Danish survey data, this study investigates whether ethnic identity and openness to majority norms relate to employment probabilities among non-Western immigrants of first and second generations. This study is the first in the existing literature on the economics of ethnic identity to capture openness to majority norms besides ethnic identity. The present findings shed more light on factors that can enhance the inclusion of the most economically excluded ethnic minority groups in host societies.

Results show that immigrants' employment does not systematically associate with measures of ethnic identity. Only when ethnic identity is measured with the degree of religiosity, I find that first-generation immigrant women with a strong attachment to their home culture are less likely to be in employment (average marginal effect of .06). To this extent, my findings corroborate those of, e.g., Casey and Dustmann (2010), Nekby and Rödin (2010), and Bisin et al. (2011) but do not directly align with Constant et al. (2009) and Battu and Zenou (2010). Nevertheless, I find that employment probabilities relate more significantly to openness to majority norms (captured with a *modernization* index) for first-generation immigrants (average marginal effect of .10 for females and .05 for males). Moreover, results from decomposing the interethnic employment gap reveal that differentials in openness to majority norms between first-generation immigrants and natives can potentially explain a significant part of the employment gap (up to 20% for females and up to 14% for males). In comparison, the part of the gap that differentials in religiosity can potentially account for is considerably lower (bound of 5% of the interethnic female employment gap).

Those findings suggest that immigrants' feelings of national identity *per se* do not relate much to their economic success, and thus this study improves our understanding of what facets of immigrant's identities are relevant for immigrants' economic integration. Moreover, this study can qualify the ongoing debate opposing assimilation and integration post-migration policies. Indeed, it does not support the argument of an assimilation policy, i.e., that immigrants' attachment to their home culture detriments their chances of economic inclusion, as long as immigrants and natives share common norms that are fundamental in the host society. This nuance is important as attachment to one's identity and culture contributes to one's general well-being (Nekby and Rödin 2010). Nevertheless, the results also suggest that immigrants whose norms are the furthest away from the norms of the host country will experience the greatest difficulties to enter the labor market. To minimize the gap between the

norms of immigrants and the norms of the majority, a post-migration policy must promote, among other things, interethnic interactions and access to education. In addition to providing immigrants with networks and skills necessary to achieve success on the labor market, education and interactions with natives convey social norms and mutual understanding essential to build a cohesive society with fewer interethnic conflicts.

More research is needed to examine the part of the employment gap that remains unexplained and to assess whether ethnic discrimination exists in the Danish labor market, particularly for second-generation immigrants.[29] Although descendants experience employment rates closer to those of natives, they feel discriminated against more often than first-generation migrants (Gundelach and Nørregård-Nielsen 2007). Survey evidence on natives' attitudes toward immigrants shows that, in order to appear Danish in most Danes' eyes, immigrants must fulfill a number of criteria including mastering the language, complying with Danish institutions and laws, and being born in Denmark (Gundelach 2011). Focusing on natives' attitudes toward immigrants is relevant as Carlsson and Eriksson (2012) document a correlation between natives' attitudes and actual ethnic discrimination. More work on how natives' hostility influences immigrants' economic inclusion will bring further insight on immigrants' lower employment rates in host countries.

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7. List of tables

Table 1: Sample characteristics

	Males		Females	
First-generation immigrants	mean	st. dev.	mean	st. dev.
Age	37.547	(7.976)	36.648	(7.959)
Age at entry	21.274	(9.341)	21.594	(9.151)
Have children	0.774	(0.418)	0.870	(0.337)
Married	0.724	(0.447)	0.791	(0.407)
Turkey	0.173	(0.378)	0.197	(0.398)
Pakistan	0.147	(0.355)	0.139	(0.347)
West Balkan	0.171	(0.377)	0.184	(0.388)
Iraq	0.175	(0.380)	0.139	(0.347)
Iran	0.177	(0.382)	0.150	(0.358)
Vietnam	0.156	(0.363)	0.189	(0.392)
Kurd origin*	0.140	(0.347)	0.123	(0.329)
Christian	0.126	(0.332)	0.143	(0.350)
Muslim	0.660	(0.474)	0.668	(0.471)
Atheist	0.067	(0.249)	0.032	(0.175)
Other religion	0.147	(0.355)	0.157	(0.364)
Moved as a refugee	0.562	(0.496)	0.357	(0.479)
Moved for family reunification	0.344	(0.475)	0.574	(0.495)
Moved to work or study	0.094	(0.291)	0.067	(0.250)
Tertiary education in the home country	0.335	(0.472)	0.277	(0.448)
Secondary education in Denmark	0.308	(0.462)	0.256	(0.437)
Tertiary education in Denmark	0.358	(0.480)	0.303	(0.460)
Fluent in Danish	0.575	(0.495)	0.451	(0.498)
In employment incl. self-employment	0.788	(0.409)	0.596	(0.491)
In employment excl. self-employment	0.649	(0.477)	0.480	(0.500)
Sample size	1473		1104	
Second-generation immigrants				
Age	24.691	(4.190)	25.213	(4.219)
Have children	0.292	(0.455)	0.498	(0.501)
Married	0.376	(0.485)	0.552	(0.498)
Turkey	0.506	(0.501)	0.542	(0.499)
Pakistan	0.494	(0.501)	0.458	(0.499)
Kurd	0.101	(0.302)	0.129	(0.335)
Christian	0.006	(0.075)	0.009	(0.097)
Muslim	0.952	(0.214)	0.956	(0.205)
Atheist	0.031	(0.173)	0.009	(0.097)
Other religion	0.011	(0.106)	0.025	(0.157)
Secondary education in Denmark	0.584	(0.494)	0.658	(0.475)
Tertiary education in Denmark	0.660	(0.474)	0.702	(0.458)
Fluent in Danish	0.924	(0.265)	0.925	(0.264)
In employment incl. self-employment	0.907	(0.290)	0.721	(0.449)
In employment excl. self-employment	0.713	(0.453)	0.545	(0.498)
Sample size	356		319	
Ethnic Danes				
Age	37.858	(8.000)	38.299	(8.047)
Have children	0.690	(0.464)	0.821	(0.384)
Married	0.591	(0.493)	0.607	(0.489)
Muslim	0.000	(0.000)	0.000	(0.000)
Christian	0.759	(0.429)	0.844	(0.364)
Atheist	0.121	(0.326)	0.089	(0.286)
Other religion	0.121	(0.326)	0.067	(0.251)
Secondary education in Denmark	0.487	(0.501)	0.723	(0.448)
Tertiary education in Denmark	0.780	(0.415)	0.862	(0.346)
In employment incl. self-employment	0.944	(0.230)	0.906	(0.292)
In employment excl. self-employment	0.841	(0.367)	0.737	(0.441)
Sample size	232		224	

Source: EGV survey. Students are excluded. *522 respondents from Turkey, Iraq and Iran reported Kurd as their origin.

Table 2: Modernization index and composing dummies

	1st generation		2nd generation		Ethnic Danes		No-resp.
	Males	Females	Males	Females	Males	Females	rate (%)
Dummies composing the Modernization index							
Tolerate to a large extent two of these actions: abortion, divorce, homosexuality	0.305	0.306	0.284	0.364	0.776	0.817	3.5
Agree with Denmark being a democracy	0.933	0.865	0.888	0.881	0.991	0.973	5.3
Whom to marry should only be an individual and not a parental decision	0.705	0.666	0.621	0.661	0.841	0.888	0.7
Men and women have the same right to work	0.595	0.560	0.649	0.743	0.918	0.955	1.4
High Modernization index (equals 1 if the sum of the dummies is 3 or 4)	0.514	0.474	0.480	0.583	0.909	0.933	-
Observations	1473	1104	356	319	232	224	

Source: EGV survey. Students are excluded.

Table 3: Chosen and imposed measures of ethnic identity

	1st generation		2nd generation	
	Males	Females	Males	Females
Chosen identity: moderate or strong attachment to				
Country of origin and Denmark: *Integrated*	0.485	0.514	0.379	0.426
Denmark only: *Assimilated*	0.303	0.239	0.419	0.433
Country of origin only: *Separated*	0.132	0.197	0.098	0.085
Neither the country of origin nor Denmark: *Marginalized*	0.080	0.050	0.104	0.056
Imposed identity: Language spoken at home				
Equally Danish and the ethnic language: *Integrated*	0.327	0.324	0.455	0.545
Mainly Danish: : *Assimilated*	0.155	0.094	0.253	0.248
Mainly the ethnic language: *Separated*	0.501	0.572	0.289	0.191
Other language: *Marginalized*	0.016	0.009	0.003	0.016
Imposed identity: Origin of regular contacts				
Equally Danish and co-ethnic: *Integrated*	0.271	0.210	0.275	0.257
Mostly Danish: : *Assimilated*	0.215	0.164	0.121	0.119
Mostly co-ethnic : *Separated*	0.195	0.310	0.216	0.207
Other origins: *Marginalized*	0.318	0.312	0.386	0.410
Imposed identity: (Very) religious person	0.475	0.590	0.663	0.768
Observations	1473	1104	356	319

Source: EGV survey. Students are excluded. The chosen identity categories refer to Berry (1997) acculturation states and use the survey questions "*How strong is your attachment to Denmark?"* and "*How strong is your attachment to your country of origin?"*. Three questions regarding regular contacts were asked, two with respect to the own minority, one with respect to other minorities and one with respect to the majority. "*Don't know*" responses are excluded.

Table 4: Modernization, ethnic identity, and employment

	1st generation				2nd generation	
	Males		Females		Males and females	
	(1)	(2)	(3)	(4)	(5)	(6)
High Modernization	0.043**	0.026	0.095***	0.096***	-0.024	-0.034
	(0.017)	(0.018)	(0.026)	(0.026)	(0.030)	(0.039)
Integrated (chosen)	0.028		-0.023		-0.003	
	(0.019)		(0.034)		(0.041)	
Separated (chosen)	0.045*		-0.077*		0.048	
	(0.025)		(0.043)		(0.067)	
Marginalized (chosen)	0.050*		-0.100		0.057	
	0.028		(0.069)		(0.071)	
Integrated (imposed - language)		-0.014		0.035		-0.017
		(0.032)		(0.054)		(0.049)
Separated (imposed - language)		-0.049		0.037		0.015
		(0.033)		(0.054)		(0.058)
Marginalized (imposed - language)		0.021		-0.027		0.005
		(0.067)		(0.134)		(0.240)
Integrated (imposed - contacts)		-0.025		-0.112**		-0.054
		(0.030)		(0.050)		(0.078)
Separated (imposed - contacts)		-0.127***		-0.241***		-0.037
		(0.039)		(0.052)		(0.082)
Marginalized (imposed - contacts)		-0.052*		-0.156***		-0.088
		(0.031)		(0.047)		(0.078)
Turkish	-0.089**	-0.086*	-0.006	0.021	0.052	0.045
	(0.043)	(0.049)	(0.046)	(0.048)	(0.042)	(0.043)
West Balkan	-0.111**	-0.123**	0.021	0.035		
	(0.046)	(0.052)	(0.052)	(0.054)		
Iraq	-0.248***	-0.254***	-0.207***	-0.194***		
	(0.052)	(0.056)	(0.058)	(0.059)		
Iran	-0.126**	-0.140**	-0.015	-0.017		
	(0.051)	(0.056)	(0.054)	(0.058)		
Vietnam	-0.076	-0.051	0.094	0.111*		
	(0.054)	(0.058)	(0.058)	(0.061)		
Kurd	0.003	0.006	0.001	-0.003	0.011	0.003
	(0.029)	(0.032)	(0.042)	(0.044)	(0.062)	(0.061)
Muslim	-0.025	-0.014	-0.037	-0.029		
	(0.033)	(0.038)	(0.049)	(0.052)		
Atheist	0.070*	0.092**	0.056	0.076		
	(0.036)	(0.043)	(0.089)	(0.098)		
Other religion	-0.046	-0.055	-0.044	-0.051		
	(0.041)	(0.046)	(0.052)	(0.055)		
Religious	-0.028	-0.021	-0.065**	-0.056*	0.029	0.035
	(0.021)	(0.023)	(0.030)	(0.032)	(0.041)	(0.042)
Tertiary education in the home country	0.015	0.012	0.062**	0.043		
	(0.020)	(0.023)	(0.029)	(0.032)		
Secondary education in Denmark	0.071***	0.082***	0.090***	0.102***	0.063*	0.070*
	(0.018)	(0.022)	(0.033)	(0.036)	(0.033)	(0.042)
Tertiary education in Denmark	0.054***	0.057**	0.082***	0.077**	0.076**	0.091**
	(0.020)	(0.023)	(0.031)	(0.033)	(0.031)	(0.040)
Observations	1,473	1,470	1,104	1,098	675	670
Pseudo R-squared	0.107	0.123	0.149	0.166	0.109	0.106
Log pseudolikelihood	-679.2	-665.2	-634.1	-617.5	-284.1	-278.9

Source: EGV survey. Probit estimations with average marginal effects. The dependent variable is a dummy equal to 1 if the person is in employment for more than 30 hours a week at the time of the survey. The sample excludes ethnic Danes and students. For second-generation immigrants the sample covers both males and females, and religious beliefs are not controlled given the high share of Muslims in the sample (see Table 1). High Modernization is a dummy equal to 1 if the modernization index equals 3 or 4 (see Table 2 for the index construction). The categories used as reference are Pakistan, Christian and Assimilated for the ethnic identity categories (for chosen identity, imposed-contacts, and imposed-language). Additional covariates include dummies for: being married, having children, age, age squared. In addition, for first-generation immigrants years since migration (5-year intervals) and fluency in Danish are controlled for. Robust standard errors in parentheses. ***p<0.001,** p<0.05, *p<0.1.

Table 5: (First-generation) native-immigrant employment gap – non-linear decomposition

Weighted by:	Ethnic Danes				1st generation			
	Males only		Females only		Males only		Females only	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Employment rate: Immigrants	.7882	.7882	.5960	.5960	.7882	.7882	.5960	.5960
Employment rate: Ethnic Danes	.9440	.9440	.9063	.9063	.9440	.9440	.9063	.9063
Ethnic employment gap	-.1558	-.1558	-.3103	-.3103	-.1558	-.1558	-.3103	-.3103
Total *explained* (%)	.0326 (20.92)	.1413 (90.69)	.1346 (43.38)	.1058 (34.09)	.0621 (39.86)	.0647 (41.53)	.2063(66.48)	.2006 (64.65)
Contributions(coefficients on the left and share in % on the right) from ethnic differentials in:								
High Modernization	-0.029 -18.6	-0.098* -62.9	-0.043 -13.9	-0.009 -2.9	-0.022*** -14.1	-0.013 -8.3	-0.058*** -18.7	-0.063*** -20.3
	(0.026)	(0.056)	(0.058)	(0.086)	(0.008)	(0.010)	(0.014)	(0.017)
Religious	-0.007 -4.5	-0.008 -5.1	0.002 0.6	0.003 1.0	-0.006 -3.9	-0.006 -3.9	-0.016*** -5.2	-0.016*** -5.2
	(0.011)	(0.009)	(0.011)	(0.011)	(0.004)	(0.004)	(0.005)	(0.005)
Secondary education in Denmark	-0.006 -3.9	0.046** 29.5	-0.059* -19.0	0.024 7.7	-0.011*** -7.1	-0.005 -3.2	-0.040** -12.9	-0.051** -16.4
	(0.009)	(0.018)	(0.031)	(0.068)	(0.004)	(0.005)	(0.016)	(0.024)
Tertiary education in Denmark	-0.009 -5.8	-0.232*** -148.9	-0.087** -28.0	-0.122 -39.3	-0.035*** -22.5	-0.032** -20.5	-0.089*** -28.7	-0.094*** -30.3
	(0.017)	(0.038)	(0.043)	(0.117)	(0.010)	(0.015)	(0.019)	(0.028)
High Modernization × Secondary education		-0.119*** -76.4		-0.087 -28.0		-0.015 -9.6		0.018 5.8
		(0.022)		(0.081)		(0.010)		(0.034)
High Modernization × Tertiary education		0.254*** 163.0		0.040 12.9		-0.005 -3.2		0.009 2.9
		(0.039)		(0.113)		(0.021)		(0.039)
Other characteristics	0.017 10.9	0.015 9.6	0.052** 16.8	0.046 14.8	0.012*** 7.7	0.012*** 7.7	-0.002 -0.6	-0.003 -1.0
	(0.014)	(0.013)	(0.022)	(0.032)	(0.004)	(0.004)	(0.007)	(0.007)
Observations Natives	232	224	232	224				
Observation Immigrants	1473	1104	1473	1104				

Source: EGV survey. Students are excluded. Contributions estimates are reported with robust standard errors in parentheses below each coefficient and shares in percentage are reported to the right of the coefficient. The Jann (2008) application of Fairlie's (2005) method is used with a Probit and 200 replications. (Using 300 replications leads to very similar results.) Other characteristics include age, age squared, being married and having children. Negative and positive signs indicate direct and indirect effect on a gap reduction, respectively. First-stage estimations on the employment probabilities used in each sample are available in the Appendix (Table A5). Alternative samples include pooled first-generation immigrants and ethnic Danes, pooled first-generation immigrants and ethnic Danes and additional covariates, and pooled first- and second-generation immigrants and ethnic Danes. Conclusions are similar (Table A6 in the Appendix). ***p<0.001,** p<0.05, *p<0.1.

8. Appendix

Table A 1: Correlations between modernization and ethnic identity

Correlation estimates between High Modernization index and:	1st generation		2nd generation	
	Males	Females	Males	Females
Integrated (*chosen*)	-.09*	-.06*	-.14*	.05
Assimilated (*chosen*)	.16*	.18*	.18*	.00
Separated (*chosen*)	-.08*	-.09*	-.11*	-.09
Marginalized (*chosen*)	-.01	-.05	.04	-.01
Integrated (*imposed - language*)	.04	.04	-.05	-.01
Assimilated (*imposed - language*)	.13*	18*	.13*	.12*
Separated (*imposed - language*)	-.13*	-.15*	-.05	-.12*
Marginalized (*imposed - language*)	.02	.02	-.05	.06
Integrated (*imposed - contacts*)	.02	.04	.09	.00
Assimilated (*imposed - contacts*)	.18*	.16*	.13*	.11*
Separated (*imposed - contacts*)	-.13*	-.14*	-.04	-.07
Marginalized (*imposed - contacts*)	-.06*	-.02	-.13*	-.02
Oppositional identity	-.10*	-.14*	-.07	-.10
Religious	-.24*	-.26*	-.10	-.07
Observations	1473	1104	356	319

Source: EGV survey. The sample excludes students. See Table 2 for the construction of the modernization index. Chosen and imposed Integrated, Assimilated, Separated, and Marginalized acculturation states are the identity measures presented in Table 3. Oppositional identity is an imposed ethnic identity measure presented in Table A3. Religious is coded 1 if the respondent reports being a very religious or a religious person. *p<0.05.

Table A 2: Modernization, ethnic identity, and employment of second-generation immigrants

	2nd generation			
	Males		Females	
	(1)	(2)	(3)	(4)
High Modernization	-0.063	-0.135	-0.129	-0.094
	(0.199)	(0.196)	(0.167)	(0.168)
Integrated (chosen)	0.126		-0.020	
	(0.219)		(0.182)	
Separated (chosen)	0.825*		-0.165	
	(0.447)		(0.316)	
Marginalized (chosen)	0.734		-0.410	
	(0.487)		(0.331)	
Integrated (imposed - language)		0.074		-0.092
		(0.244)		(0.236)
Separated (imposed - language)		0.233		-0.062
		(0.283)		(0.282)
Marginalized (imposed - language)				0.042
				(0.939)
Integrated (imposed - contacts)		-0.004		-0.212
		(0.334)		(0.345)
Separated (imposed - contacts)		0.243		-0.243
		(0.391)		(0.358)
Marginalized (imposed - contacts)		-0.289		-0.188
		(0.323)		(0.326)
Turkish	0.009	0.081	0.433**	0.400**
	(0.228)	(0.232)	(0.187)	(0.198)
Kurd	-0.049	-0.147	0.386	0.342
	(0.333)	(0.331)	(0.269)	(0.271)
Muslim	-3.322***	-3.203***	-3.577***	-3.414***
	(0.331)	(0.333)	(0.250)	(0.285)
Atheist	-3.219***	-3.192***	-4.339***	-4.230***
	(0.702)	(0.735)	(0.587)	(0.593)
Other religion			-3.816***	-3.748***
			(0.575)	(0.585)
Religious	0.175	0.140	0.245	0.267
	(0.209)	(0.212)	(0.212)	(0.223)
Secondary education in Denmark	0.238	0.278	0.306*	0.228
	(0.204)	(0.211)	(0.185)	(0.188)
Tertiary education in Denmark	0.428**	0.391**	0.364**	0.377**
	(0.193)	(0.193)	(0.181)	(0.184)
Observations	352	350	319	315
Pseudo R-squared	0.0828	0.0773	0.190	0.189
Log pseudolikelihood	-100.4	-98.77	-152.9	-149.8

Source: EGV survey. The sample excludes first-generation immigrants, ethnic Danes and students. The dependent variable is a dummy equal to 1 if the person is in employment for more than 30 hours a week at the time of the survey. High Modernization is a dummy equal to 1 if the modernization index equals 3 or 4 (see Table 2 for the index construction). The categories used as reference are Pakistan, Christian and Assimilated for the ethnic identity categories (for chosen identity, imposed-contacts and imposed-language). For men, the variables *other religion* and Marginalized (imposed - language) were dropped due to an insufficient number of observations. Coefficients from Probit estimations are reported. Robust standard errors in parentheses. ***p<0.001,** p<0.05, *p<0.1.

Table A 3: Oppositional Identity and composing variables

	1st gen.		2nd gen.		No resp. (%)
	Males	Fem.	Males	Fem.	
Dummies composing the Oppositional Identity index					
No attachment to the majority (chosen)	0.04	0.03	0.03	0.01	2.2
Very strong attachment to the home country (chosen)	0.30	0.32	0.18	0.18	1.9
The respondent would not allow her child to marry a Dane	0.12	0.17	0.17	0.28	5.9
Own children would not be allowed to acquaint Danish children	0.02	0.02	0.01	0.01	0.7
Oppositional identity index (equals 1 if at least 2 of the 4 dummies are coded 1)	0.09	0.11	0.06	0.08	
Observations	1613	1353	498	494	

Source: EGV survey. The Oppositional Identity index is inspired by the index of Battu and Zenou (2010).

Table A 4: Oppositional Identity, modernization, and employment

	1st generation		2nd generation
	Males	Females	Males and females
	(1)	(2)	(3)
Oppositional Identity	-0.008	-0.031	-0.015
	(0.029)	(0.041)	(0.055)
High Modernization	0.038**	0.100***	-0.026
	(0.017)	(0.026)	(0.030)
Turkish	-0.081*	-0.002	0.044
	(0.042)	(0.046)	(0.032)
West Balkan	-0.109**	0.024	
	(0.046)	(0.051)	
Iraq	-0.245***	-0.194***	
	(0.051)	(0.057)	
Iran	-0.118**	-0.027	
	(0.050)	(0.055)	
Vietnam	-0.066	0.087	
	(0.052)	(0.059)	
Kurd	-0.000	-0.004	0.010
	(0.029)	(0.042)	(0.049)
Muslim	-0.023	-0.042	-0.349***
	(0.033)	(0.049)	(0.100)
Atheist	0.073**	0.051	-0.626***
	(0.035)	(0.092)	(0.079)
Other religion	-0.048	-0.045	-0.600***
	(0.040)	(0.052)	(0.072)
Religious	-0.024	-0.065**	0.020
	(0.020)	(0.030)	(0.034)
Tertiary education in the home country	0.013	0.060**	
	(0.020)	(0.029)	
Secondary education in Denmark	0.070***	0.094***	0.061*
	(0.018)	(0.033)	(0.032)
Tertiary education in Denmark	0.052***	0.086***	0.075**
	(0.020)	(0.031)	(0.031)
Observations	1,473	1,104	675
Pseudo R-squared	0.104	0.146	0.107
Log pseudolikelihood	-681.2	-636.4	-284.7

Source: EGV survey. Probit estimations with average marginal effects. The sample excludes ethnic Danes and students. For second-generation immigrants, the sample covers both males and females, and religious beliefs are not controlled given the high share of Muslims in the sample (see Table 1). High Modernization is a dummy equalt to 1 if the modernization index equals three or four (see Table 2 for the index construction). See Table A3 for the construction of the Oppositional Identity index. The categories used as reference are Pakistan and Christian. Additional covariates include dummies for: being married, having children, age, age squared. In addition for first-generation immigrants, years since migration (5-year intervals) and fluency in Danish are also controlled for. Robust standard errors in parentheses. ***p<0.001,** p<0.05, *p<0.1.

Table A 5: Employment probabilities used for the non-linear decomposition

Sample	(1) Danish males	(2) Danish males	(3) Danish females	(4) Danish females	(5) 1st gen. males	(6) 1st gen. males	(7) 1st gen. females	(8) 1st gen. females
High Modernization	0.069	0.339***	0.094	0.022	0.053***	0.033	0.122***	0.134***
	(0.048)	(0.085)	(0.108)	(0.178)	(0.018)	(0.023)	(0.026)	(0.032)
Religious	-0.030	-0.051	0.013	0.016	-0.028	-0.026	-0.090***	-0.090***
	(0.051)	(0.053)	(0.058)	(0.057)	(0.021)	(0.021)	(0.030)	(0.030)
Age	-0.004	-0.015	-0.006	-0.005	0.021*	0.020*	0.042***	0.043***
	(0.016)	(0.018)	(0.032)	(0.030)	(0.011)	(0.011)	(0.015)	(0.015)
Age squared	0.000	0.000	-0.000	-0.000	-0.000***	-0.000**	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Having children	0.048	0.036	0.124	0.128*	-0.008	-0.008	-0.131**	-0.133**
	(0.050)	(0.051)	(0.076)	(0.074)	(0.030)	(0.030)	(0.056)	(0.056)
Married	0.074*	0.067	0.155***	0.151***	0.060**	0.060**	0.001	0.000
	(0.041)	(0.046)	(0.057)	(0.057)	(0.024)	(0.024)	(0.037)	(0.038)
Secondary education in Denmark	0.032	-0.454***	0.137**	-0.063	0.073***	0.037	0.091***	0.111**
	(0.037)	(0.066)	(0.055)	(0.166)	(0.020)	(0.031)	(0.034)	(0.048)
Tertiary education in Denmark	0.023	0.561***	0.159***	0.221*	0.080***	0.072**	0.157***	0.166***
	(0.038)	(0.070)	(0.060)	(0.125)	(0.019)	(0.028)	(0.030)	(0.044)
High Modernization × Secondary education		0.407***		0.177**		0.066*		-0.036
		(0.044)		(0.078)		(0.038)		(0.070)
High Modernization × Tertiary education		-0.526***		-0.079		0.011		-0.015
		(0.053)		(0.214)		(0.044)		(0.066)
Observations	232	232	224	224	1,473	1,473	1,104	1,104
Pseudo R-squared	0.0820	0.211	0.181	0.187	0.0609	0.0627	0.0911	0.0914
Log pseudolikelihood	-45.98	-39.53	-57.10	-56.64	-714.3	-712.9	-676.9	-676.7

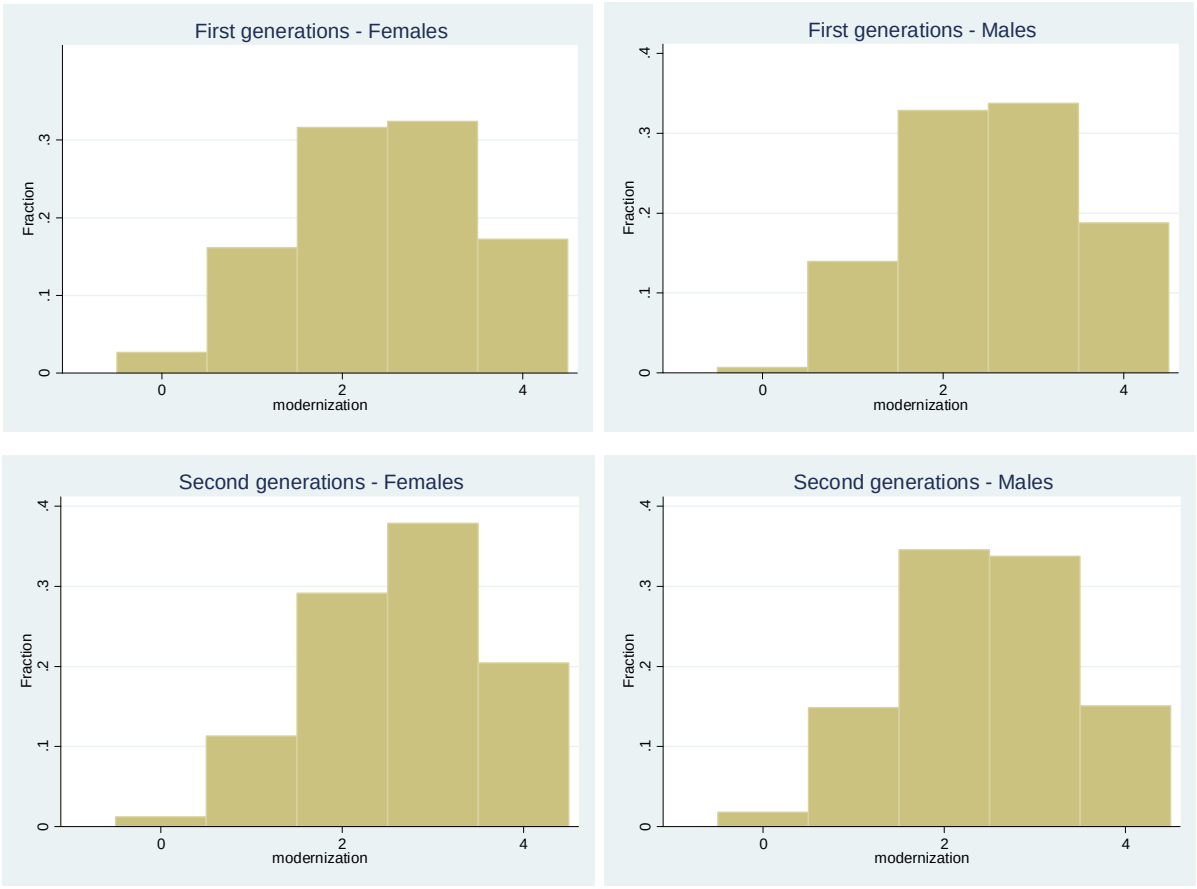
Source: EGV survey. Probit estimations with average marginal effects used in the calculations shown in Table 5. All samples exclude students. High Modernization is a dummy equal to 1 if the modernization index equals 3 or 4 (see Table 2 for the index construction). Robust standard errors in parentheses. ***p<0.001,** p<0.05, *p<0.1.

Table A 6: (First-generation) native-immigrant employment gap—non-linear decomposition

Weighted by:	First-generation immigrants and Ethnic Danes		First-generation immigrants and Ethnic Danes with add. controls		First-generation, second-generation immigrants and Ethnic Danes	
	Males only	Females only	Males only	Females only	Males only	Females only
	(1)	(2)	(3)	(4)	(5)	(6)
Employment rate: Immigrants	.7882	.5960	.7882	.5960	.8114	.6240
Employment rate: Ethnic Danes	.9440	.9063	.9440	.9063	.9440	.9063
Ethnic employment gap	.1558	.3103	.1558	.3103	.1326	.2823
Total *explained* (%)	.0706 (45.31)	.2310 (74.44)	.0318 (20.41)	.1650 (53.17)	.0509 (38.39)	.1908 (67.58)
High Modernization	-0.027*** -17.3	-0.065*** -20.9	-0.012** -7.7	-0.052*** -16.8	-0.022*** -16.6	-0.049*** -17.4
	(0.008)	(0.013)	(0.006)	(0.014)	(0.007)	(0.010)
Religious	-0.007 -4.5	-0.013*** -4.2	-0.004 -2.6	-0.011** -3.5	-0.004 -3.0	-0.012*** -4.3
	(0.004)	(0.004)	(0.003)	(0.005)	(0.004)	(0.004)
Secondary education in Denmark	-0.010*** -6.4	-0.052*** -16.8	-0.007** -4.5	-0.055*** -17.7	-0.007*** -5.3	-0.040*** -14.2
	(0.003)	(0.013)	(0.003)	(0.017)	(0.002)	(0.010)
Tertiary education in Denmark	-0.040*** -25.7	-0.103*** -33.2	-0.017** -10.9	-0.062*** -20.0	-0.036*** -27.1	-0.080*** -28.3
	(0.008)	(0.017)	(0.008)	(0.020)	(0.007)	(0.012)
Other characteristics	0.013*** 8.3	0.002 0.6	0.009** 5.8	0.013 4.2	0.018*** 13.6	-0.009 -3.2
	(0.004) -17.3	(0.007) -20.9	(0.004) -7.7	(0.008) -16.8	(0.004) -16.6	(0.007) -17.4
Observations Natives	232	224	232	224	232	224
Observation Immigrants	1473	1104	1473	1104	1829	1423

Source: EGV survey. Students are excluded. Contributions estimates are reported with robust standard errors in parentheses and shares in percentage next to the coefficient. The Jann (2008) application is used with a Probit function and 200 replications. (Using 300 replications leads to very similar results.) Other characteristics include age, age squared, being married and having children. First-stage estimations on the employment probabilities used in each sample are available in Table A5. Additional controls apply to first-generation immigrants in columns and refer to dummies for: ethnic origin, religious belief, years since migration (5-year intervals), tertiary education in the home country, and fluency in Danish. The categories used as reference are Pakistan and Christian. ***p<0.001,** p<0.05, *p<0.1. Adding an interaction between a high modernization index and education attended in Denmark leads to very similar conclusions as the interactions do not appear statistically significant in any of the specifications above. Results are available from the author.

Figure A 1: Immigrants in the modernization index



Source: EGV survey. See Table 2 for the construction of the modernization index. N=2966 for first generations (males and females); N=992 for second generations (males and females). The sample here includes students.

Figure A 2: Immigrants from Turkey and Pakistan in the modernization index

Source: EGV survey. See Table 2 for the construction of the modernization index. N=937 for first generations (males and females); N=992 for second generations (males and females). The sample here includes students.

Chapter 2

Do Attitudes toward Immigrants Influence International Migration?

Do Attitudes toward Immigrants Influence International Migration?*

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Abstract—We investigate whether natives' hostility to immigrants influences migrant inflows in OECD countries. Using comprehensive data on bilateral flows and natives' attitudes, we find that natives' hostility, when captured with natives' readiness to discriminate against immigrants on the labor market, reduces immigration. This effect persists after we control for changes in immigration policies and is stronger for immigrants from other OECD countries. Furthermore, we show that knowledge of the destination country's language reinforces the effect. Our results make sense in light of the existing evidence that natives' hostility toward immigrants reflects actual discrimination against ethnic minorities.

Keywords: international migration, attitudes toward immigrants, migration policies.

JEL Classification Codes: F22, J61.

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1. Introduction

Over the past three decades, OECD countries have experienced expanding rates of immigration, although the yearly size of migrant inflows varies considerably across receiving countries.[1] Receiving societies often view immigrants as a solution to labor shortages and an ageing population. Yet, at the same time, fears about immigrants and their impact on the host society have developed among native populations (hereafter natives) in several OECD countries. According to the European Values Survey (2008), half the natives of EU countries report that their government should place stricter limits on or prohibit the entry of immigrants, that immigrants exacerbate criminality problems, and that immigrants represent a strain on their country's welfare state. The combination of growing immigrant populations and natives' hostility toward the foreign-born contribute to making the integration of immigrants problematic and a top-priority on the political agenda of several OECD countries. The main challenge for policymakers arises as they may have to reconcile labor shortages and domestic demand for foreign workers with increasing hostility against immigrants and public pressure for tighter immigration policies. If natives' hostility affects the migration decision of potential immigrants, initiatives that dampen this hostility will be necessary. This paper sheds empirical light on this potential challenge for policymakers by examining whether and, if so, how natives' attitudes toward immigrants influence immigration to OECD countries.

International migration and natives' attitudes toward immigrants represent two well-documented bodies of literature in economics. First, with the development of the tough immigration discourse, economists have begun examining the formation of natives' attitudes toward immigrants (e.g., Bauer et al. (2000); Fertig and Schmidt (2002); Card et al. (2012); Daniels and von der Ruhr (2005); Dustmann and Preston (2004a, 2004b); Malchow-Møller et al. (2008); Facchini and Mayda (2009a, 2009b)). Mechanisms behind natives' hostility include fear of labor-market competition from immigrants with substitutable skills, tax adjustment concerns in welfare states, and racial prejudice toward the foreign-born population.[2] Natives' attitudes

[1] In our data set, we count 95 million foreign-born in OECD countries in 2008. See also Mayda (2010) and the OECD database (2013).

[2] There is evidence that individual factors such as being religious (Daniels and von der Ruhr (2005); Facchini and Mayda (2008)), living in a large city (Card et al. (2012); Brenner and Fertig (2006)), and scoring high in the personality traits "openness" and "agreeableness" (Dinesen et al. (2011)) positively correlate with natives' openness to immigration. Furthermore, in a recent

play a major role in the integration process of ethnic minorities, both directly through interethnic conflicts and indirectly through political decisions and the public debate (Dustmann and Preston (2001)). Second, a number of studies have focused on identifying the determinants of international migration. Those studies (starting with Hicks (1932); Sjastaad (1962), and, most recently, including Clark et al. (2007); Pedersen et al. (2008); Belot and Ederveen (2011); Ortega and Peri (2013); Mayda (2010); Hatton and Williamson (2003, 2011); Naudé (2010); Adsera and Pytlikova (2012)) point out that economic conditions in destination and source countries, physical distance, linguistic and cultural differences, diasporas, changes in migration policies, and political pressures in the country of origin can influence international migration.[3] Moreover, ethnic networks can explain the persistence of migration flows and sequential migration (e.g., Carrington et al. (1996); Bauer et al. (2007); Heitmueller (2006); Clark et al. (2007); Pedersen et al. (2008); Beine and Salomone (2012)) and accelerate labor market integration in the receiving country (Hatton and Leigh (2011)).

Thus far, however, little discussion exists on the importance of natives' hostility to immigrants in determining the size of migrant inflows, and this paper aims at filling this gap. We argue that natives' attitudes send immigrants signals about integration possibilities such as the ease of finding employment or building a social network. Accordingly, negative attitudes can represent additional migration costs and countries with more positive attitudes will receive larger migrant inflows. Negative attitudes will affect the location decision of, particularly, labor-driven immigrants if attitudes reflect potential discrimination against immigrants as Carlsson and Eriksson (2012) document. To the best of our knowledge, only one paper, Facchini and Mayda (2008), links natives' attitudes to migrant inflows as a part of a more general study on the relationship between attitudes and policy outcomes. Using one wave of the International Social Survey Programme, the authors show a positive relationship between net migration and pro-immigration opinions in a receiving country. In comparison, our data set is longitudinal and contains richer information on bilateral migrant inflows. Our study complements the international migration literature as it sheds light on a new migration determinant: natives'

American survey Hainmueller and Hiscox (2010) show that natives favor highly skilled migrants independently from their level of skills, their labor market situation or their level of income. The authors also point out that natives are concerned about the consequences of immigration not only at the individual but also on the whole nation levels.

[3] See also Belot and Hatton (2012) for evidence on how cultural and physical distances influence immigrants' educational selectivity in immigration.

attitudes toward immigrants. Furthermore, exploiting the richness of our data, we investigate whether the determinants of migrant inflows vary with the origin of immigrants (OECD vs. non-OECD sending country) and disentangle possible mechanisms behind the effects of natives' attitudes on international migration.

One may think of at least four mechanisms through which negative attitudes can determine international migration. First, politicians may translate natives' hostility to immigrants into tighter immigration policies to reduce actual inflows (Benhabib (1996); Facchini and Mayda (2008)). Second, potential immigrants can learn about natives' opinions *before* migration via ethnic networks established in the destination country. Third, knowledge of the destination country's language may help collect relevant information also prior to migration. Fourth, one might argue that immigrants perceive negative attitudes only *after* arrival in the destination. If they react to natives' attitudes after migration, immigrants will leave to another country or return to their home country. The consequent attitude effect will not lead to lower migrant *in*flows but, rather, higher migrant *out*flows; i.e., natives' hostility may affect the overall immigrant population stock in the destination country. This paper offers a test for each of these four possible mechanisms. In addition, the influence of natives' hostility immigrants' location choice may vary with the type of immigrants. For instance, labor-driven immigrants may react more to natives' hostility if this latter reflects ethnic discrimination on the labor market. As a test for this hypothesis, we distinguish our results for OECD and non-OECD immigrants.

We conduct our analysis using several waves of the Integrated Values Survey (hereafter IVS) and a unique data set on bilateral migrant inflows and stocks also applied in Adsera and Pytlikova (2012). The data covers 224 sending countries and 30 receiving countries from 1980 to 2010. We use the IVS data to construct three variables capturing natives' attitudes toward: (1) living close to immigrants, (2) labor market discrimination against immigrants when jobs are scarce, and (3) more immigration to the country. To account for characteristics specific to the relationship between each pair of origin and destination countries, we apply a model of international migration with a series of push and pull factors, migration costs, and country-pair fixed effects. To reduce possible endogeneity, we use the lagged values (one year) of time-variant independent variables and treat these variables as predetermined—similar to, e.g., Clark et al. (2007); Mayda (2010); and Ortega and Peri (2013). Furthermore, because the surveys are

not conducted every year in each country, an alternative specification offers estimates of the attitude measures referring to the previous survey wave.

We find that natives' hostility reduces migrant inflows, particularly when we measure natives' hostility with readiness to discriminate against immigrants. The effect of natives' attitudes persists when we account for the possible adaptation of immigration policies to natives' hostility. Furthermore, we demonstrate the relevance of distinguishing immigrants' origin in international migration studies. In particular, we find that some migration factors in the destination, such as GDP per capita, unemployment rates, and social expenditures, are more decisive for migrants from non-OECD countries than other migrants. Moreover, our estimates of natives' attitudes turn larger in amplitude for OECD migrants, meaning that immigrants from OECD countries are more sensitive to natives' hostility. This finding makes sense if OECD migrants are most likely driven by economic opportunities and, thus, more sensitive to their likelihood to be discriminated against on the labor market. Finally, we find that immigrants are likely to learn about natives' opinions in the destination country *before* they migrate most likely via their knowledge of the destination language.

One way to understand our results is that natives' hostility to immigrants constitutes a major integration barrier (Constant et al. (2009); Zimmermann et al. (2008); Waisman and Larsen (2007)) and therefore will affect foreign workers' choice of location. Beyond its contribution to the literature, this study raises the policy issue that maneuvering immigration policies may not suffice for influencing the size of migrant inflows, whereas natives' hostility and likelihood to discriminate against immigrants represent a non-negligible determinant of immigration. When both the structural demand for foreign workers and natives' opposition to immigrants are high, how to dampen natives' hostility toward immigrants then constitutes a great challenge for policymakers in OECD countries.

The paper is organized as follows. Section 2 describes our data set. Section 3 introduces our theoretical model of international migration. Section 4 presents our empirical results from the main specifications, before Section 5 submits our findings to a series of robustness and mechanism tests. Section 6 concludes.

2. Data and Descriptive Statistics

Our analysis draws from the combination of (1) a data set on international migration with (2) a survey data set on attitudes toward immigrants. Data set (1) contains information on bilateral migrant inflows and stocks from 224 source countries in 30 destination countries over 1980–2010 collected by the authors from national statistical bureaus.[4] Beyond information on migrant flows and stocks, data set (1) gathers time-variant economic and social measures for, e.g., income, social expenditures, and unemployment. Most of these economic and social measures were collected from the OECD and the World Bank (See Table A1 in the Appendix for exact sources and summary statistics for data set (1)). Data set (2) comprises survey information from the IVS[5] collected during up to seven waves between 1981 and 2010. We only keep variables that measure natives' attitudes toward immigrants from 30 OECD countries and average each relevant variable at the country-year level.[6]

Figure 1 illustrates migrant inflows and stocks during the last 30 years in OECD countries. Migrant inflows (dashed line) and stocks (solid line) depict a steady increase between 1980 and 2010 with two peaks, particularly noticeable for inflows. One peak occurs in 1991 and consists mostly of immigrants from Latin America to the United States and immigrants from the Eastern part of Europe following the fall of the Berlin wall. The other peak, around 2007, arises with

[4] Data set (1) is an extension of the original OECD migration data set by Pedersen et al. (2008) and is also applied in Adsera and Pytlikova (2012). Refer to Tables A2 and A3 in the Appendix for the data source and immigrant definition by receiving country. Although our data set presents substantial progress in comparison to data sets in earlier studies such as data from Docquier and Marfouk (2006), the United Nations, the OECD, and the World Bank, few limitations remain. First, the data set is unbalanced with missing information on migration flows and stocks for some countries in some years. For an overview of comprehensiveness of flows and stocks see Tables A4 and A5, respectively. This data set is available from the authors.

[5] IVS gathers data collected under two surveys: the World Values Survey and the European Values Survey. How the IVS is constructed can be seen at the European Values Survey (undated) homepage. We have also considered using other survey databases such as the European Social Survey (ESS) and the International Social Survey Programme (ISSP). Yet, these two surveys ask about attitudes toward immigrants only in few waves, 1995 and 2003 for the ISSP and 2002 for the ESS, whereas the IVS covers the period 1981-2010 more similarly to our migration data set. See European Social Survey (2012), World Values Survey (2011) and the International Social Survey Programme (2010) for more information on the ESS, the IVS and the ISSP, respectively.

[6] We obtain 236 cases. We use sample weights (design weight) for each observation to ensure a better representation of genders, age groups and regions. All questions always offer a "don't know" and/or an "N/A" option, which represent on average 2 to 4% of the responses, and which we code as missing.

sudden migration from China and India to OECD countries and following EU enlargement phases. Between 1998 and 2007, overall, migrant inflows to OECD countries have increased noticeably. The total number of immigrants is about twice as high in 2007 as in 1990. After 2007, however, migrant inflows and stocks in OECD countries decline sharply most likely due to adjustments to the recent economic crisis.[7] Limitation in access to and poorer registration of data in some countries and some years, especially in the 1980s and in 2010, may drive part of the development we observe in Fig. 1. Nevertheless, the data set comprehends most migrant inflows and stocks from 1990 to 2009, which coincides with the period of observation of our three attitude measures.

[Fig. 1 about here]

To capture natives' attitudes toward immigrants, we choose in the IVS three questions available for several waves in 30 OECD countries. We argue that the three questions reflect dimensions that can influence a potential migrant's decision. First, following Mayda (2006) and Card et al. (2012),[8] we construct a variable on opinions toward migration policy and the entry of new immigrants, called *let_anyone/noone*. The variable draws from the IVS question: "How about people from other countries coming here to work? Which one of the following do you think the government should do? (a) Let anyone come who wants to? (b) Let people come as long as there are jobs available? (c) Place strict limits on the number of foreigners who can come here? (d) Prohibit people coming here from other countries?". *Let_anyone/noone,* takes the value 1 for responses (c) or (d), and the value 0 for responses (a) or (b). This IVS question was first included in the 1995-96 wave.

A second variable captures natives' readiness to discriminate against immigrants on the labor market when jobs are scarce. Between 1989 and 2009, the IVS asks: "When jobs are scarce, employers should give priority to [nation] people over immigrants. Do you: (a) agree, (b) disagree, or (c) neither agree nor disagree?". We use this question to construct *labor_discrimination_agree*, equal to 1 (agree) or 0 (neither or disagree). We argue that this

[7] Figure A1 in the Appendix depicts the development of migrant inflows to OECD countries, distinguishing OECD and non-OECD origin.

[8] The attitude measure in Card et al. (2012) uses a similar question from the European Social Survey.

variable reflects the ease of finding employment and potential ethnic labor market discrimination.

A third variable uses a question asking natives about their willingness to live close to immigrants, foreign workers, and people from a different race between 1981 and 2009. Gundelach (2011) uses the same question to mirror natives' general attitudes toward immigrants. Respondents could answer: "On this list are various groups of people. Could you sort out any that you would not like to have as neighbors?" by ticking different groups.[9] If a respondent mentions "immigrants," "foreign workers," or "people from a different race," the dummy *no_immigrant_neighbor* is coded 1. We argue that *no_immigrant_neighbor* can capture natives' willingness to interact with immigrants. Table 1 summarizes the measures' construction and average statistics.[10] The higher the measure, the more negative the attitudes.

[Table 1 about here]

3. A Model of International Migration

This section presents a theoretical model of migration, which constitutes the base of our empirical specification. The model follows the human capital investment theoretical framework (Sjastaad (1962)) applied in, e.g., Grogger and Hanson (2011), Adsera and Pytlikova (2012), and Ortega and Peri (2013). The model assumes that a potential immigrant chooses to locate in the country that allows her to maximize her level of utility. The utility that migrant *k*, currently living in country *i*, attains by moving to country *j* is logarithmic and given by:

$$U_{kij} = (y_{kj} - c_{kij})^{\lambda} \exp(\varepsilon_{kij}), \quad (1)$$

where $y_{kj} - c_{kij}$ is the difference between income in destination country *j* (y_{kj}) and the costs of migration from *i* to *j* (c_{kij}).[11] We can write the probability that individual *k* from origin *i* chooses destination country *j* among *J* possibilities as:

$$\Pr(j_k / i_k) = \Pr\left[U_{ijk} = \max(U_{ki1}, U_{ki2}, ..., U_{kiJ})\right]. \quad (2)$$

[9] Some answer possibilities may vary according to the surveyed country. See World Values Survey (2011) for more information.

[10] Figures A2, A3, and A4 in the Appendix depict the values of *let_anyone/noone*, *labor_discrimination_agree*, and *no_immigrant_neighbor* by year of survey and country.

[11] Naturally, the utility of individual *k* staying in *i* does not include migration costs.

We assume that ε_{kij} is i.i.d. and follows an extreme value distribution and that we have λ >0. Then, using the approximation $\ln(y_j - c_{ij}) \approx \ln y_j - (c_{ij}/y_j)$, we apply the results of McFadden (1974) to write the log odds of migrating to destination country *j* versus staying in the source country *i* in the following way:

$$\ln \frac{M_{ij}}{P_i} = \ln m_{ij} \approx \lambda[\ln y_j - \ln y_i] - \lambda C_{ij}, \quad (3)$$

where M_{ij} is the inflow in destination country *j* of individuals from origin *i*, P_i is the population of the origin country, m_{ij} represents the emigration rate from *i* to *j*, and C_{ij} captures migration costs expressed as a proportion of the expected income in the destination country, so that $C_{ij} = c_{ij}/y_j$. The probability to emigrate, thus, depends on income differentials between the origin and the destination country adjusted for migration costs. The costs of migration C_{ij} can encompass direct out-of-pocket costs, due to moving to a new country, and psychological costs, due to settling down in a new country and leaving the origin country. In addition, we expect C_{ij} to include costs associated with possible integration barriers to the destination country's labor market such as the difficulty to transfer skills and ethnic discrimination. If we define income in a location, y_j, similarly to Harris and Todaro (1970), i.e., income equals wage times the probability of finding a job, or $y = w^*e$, where *e* denotes employment rate and *w* real earnings, we can express the migration rate in Eq. (3): [12]

$$\ln \frac{M_{ij}}{P_i} = \ln m_{ij} \approx \lambda[\ln w_{kj} + \ln e_{kj} - \ln w_{ki} - \ln e_{ki}] - \lambda C_{ij}. \quad (4)$$

We derive our econometric model from Eq. (4) to obtain:

$$\ln m_{ijt} = \gamma_1 + \gamma_2 \ln Att_{j\,t-1} + \gamma_3 \ln(GDP_j)_{t-1} + \gamma_4 \ln(GDP_i)_{t-1} + \gamma_5 \ln(GDP_i)^2_{t-1} + \gamma_6 \ln u_{j\,t-1} + \gamma_7 \ln u_{i\,t-1} + \gamma_8 \ln pse_{j\,t-1} + \gamma_9 \ln p_{ij\,t-1} + \gamma_{10} \ln s_{ij\,t-1} + \gamma_{11} FH_{i\,t-1} + \delta_{ij} + \theta_t + \varepsilon_{ij\,t}, \quad (5)$$

[12] Suppose that income in country of origin *i*, y_i, can be defined as average earnings from employment and benefits received otherwise, $y_i = w_i e_i + (1 - e_i)\tau_i$, where τ_i are net transfers. Then, the migration rate is approximated by: $\ln(M_{ij}/P_i) \approx \lambda[\ln e_{kj} + \ln[w_{kj} + (\tau_{kj}(1/e_{kj} - 1))] - \ln e_{ki} - \ln w_{ki} + (\tau_{ki}(1/e_{ki} - 1))]] - \lambda C_{ij}$.

where m_{ij} denotes inflows of migrants from country *i* to country *j* divided by the population in the country of origin *i* at time *t*, or the propensity to emigrate from *i* to *j* at *t*, where *i*=1,…,224; *j*=1,…,30 and *t*=1,...,30.[13] To account for what information was available to the potential migrant at the time of the migration decision, we lag time-variant relative differences in economic development and employment between origin and destination countries, as well as migration costs, by one period. More importantly, reverse causality might be present if migrant inflows impact earnings, employment or natives' attitudes in the destination country.[14] Although we cannot exclude that natives' attitudes, earnings, or employment are not strictly exogenous with respect to migrant inflows, lagging time-variant explanatory variables allows us to treat them as predetermined, such that migrant inflows can affect only contemporaneous and future levels of attitudes toward migrants, earnings, and employment.

Following our theoretical model, we control for measures of economic differentials between source and destination countries: GDP per capita and unemployment rates in the origin and the destination countries. In addition, we include a squared GDP per capita in the source country to test for poverty traps (similarly to, e.g., Hatton and Williamson (2005); Clark et al. (2007)). Moreover, we control for public social expenditure in *j*, $\ln pse_{j\,t-1}$, to account for the *welfare magnet* theory (Borjas (1999)) and the relative population size between a receiving country and a sending country, $\ln p_{ij\,t-1}$, to capture demographic developments.

Furthermore, we cover variables that can increase or lower the costs associated with migration. The variable affecting migration costs that we mainly emphasize in the paper is attitudes toward immigrants, $\ln Att_{j\,t-1}$, measured alternatively in the three different ways presented in Section 2. We expect the costs related to migration to increase with more negative attitudes toward immigrants. Indeed, natives' hostility may hinder immigrants' entry in the labor market and interactions with natives in the destination country. Given that the IVS is not run every year, we use linearly interpolated values of our three attitude measures in years with no survey. We treat the attitude measures as predetermined and include measures with one-year lagged value in the same way as other covariates. Alternatively, instead of interpolating the missing survey years, we disregard years with no survey and capture attitudes in the immediate

[13] We add one to each observation of immigration flows and foreign population stocks prior to constructing emigration and stock rates, so that once taking logs we do not discard the "zero" observations (only around 4.5% in our data).

[14] Immigration might affect natives' attitudes (e.g., Facchini and Mayda (2008, 2009a, and 2009b); Markaki and Longhi (2012)).

year after a survey with the measure from the previous actual survey. For instance, if a survey is run in 1990, 1992 and 1995, we use the survey value from 1990 for t = 1993 and the survey value from 1992 in t = 1996. Consequently, this alternative way of capturing decreases the number of observations dramatically.

Moreover, we expect ethnic networks, i.e., family members, friends and people of the same origin, to facilitate migration by providing newcomers with help and social milieu and decrease direct and psychological costs of migration (Massey et al. (1993); Munshi (2003)). We capture ethnic networks by the number of country fellows established in the receiving country one year before migration. The variable enters Eq. (5) as a ratio per receiving country population, $\ln s_{ij\,t-1}$. Further, we control for time-invariant bilateral factors of migration, e.g., physical and linguistic distance or special ties between two countries, by including country-pair fixed effects (δ_{ij}).[15]

Finally, individuals may leave their country of origin when civil liberties and political rights are violated. At the same time, a lack of civil liberties and political rights can limit individuals' freedom to emigrate. We include two indices from Freedom House, $FH_{i\,t-1}$, to measure the degree of freedom in, separately, political rights and civil liberties in sending countries. The higher the index, the lower the degree of freedom.[16]

The model also includes year fixed effects, θ_t, to control for common idiosyncratic shocks over time and robust standard errors clustered at each pair of destination and source countries. All non-categorical variables enter Eq. (5) in logarithms thus allowing us to interpret estimated coefficients as impact elasticities.

4. Empirical Results

This section presents our main findings. Table 2 gathers four sets of results. The first set (columns 1 to 3) controls for natives' attitudes and year fixed effects only. In light of columns (1) to (3), natives' opposition to immigrants in a country associates negatively with migrant inflows to this country at a convincing statistical level, no matter how attitudes are captured. The effects

[15] Alternatively we use destination and origin country-specific fixed effects, $\delta_j + \varphi_i$. In this alternative specification, we add bilateral time-invariant variables such as physical distance, common border, and common colonial past to the set of controls introduced in Eq. (5). This specification yields very similar results, not shown in the paper.

[16] See the Freedom House (2013) homepage for more information on the indices.

are quite sizeable. For instance, a one-percentage-point increase in *no_immigrant_neighbor* in a country decreases the propensity to immigrate to this country by 34 percent.

However, in the second set (columns 4 to 6) where we add other migration factors and country-pair fixed effects to the right-hand side, the estimates of attitudes diminish remarkably in amplitude and become less precise. Note that, for the sake of comparison, columns (1) to (6) draw from the same sample—for each respective attitude measure—and use one-level lagged interpolated measures of attitudes.

The effect of natives' attitudes on migration remains insignificant in the third set (columns 7 to 9), when we control for the same covariates but refer to the fourth lag of natives attitudes in case attitudes toward immigrants only affect migrant inflows over periods of time longer than one year.

The fourth set (columns 10 to 12), nonetheless, shows different results. This specification set includes the same controls as the second set but exploits a smaller sample; the attitude measures are no longer interpolated in the years with no survey but refer to the measure from the previous actual survey wave. As a result, this specification uses longer lags. In column (11), the coefficient of the attitude measure *labor_discrimination_agree* turns significant at a 1-percent level. The estimate suggests that a one-percentage point increase in the measure of natives' readiness to discriminate against immigrants reduces migrant inflows by 36 percent.

In sum, Table 2 depicts that natives' negative attitudes in a country, when attitudes are captured with natives' readiness to discriminate against immigrants on the labor market, can dissuade immigrants to move to this country—other migration factors being equal. This result, however, only holds for the specification where attitudes refer to the former actual survey wave (column 11) but not when we interpolate attitudes linearly in the missing survey waves. In Table 2, we do not find significant estimates when we measure attitudes with *no_immigrant_neighbor* or *let_anyone/noone*.

[Table 2 about here]

Our estimates of the other covariates are in line with the economic theory and the literature. We find that favorable economic conditions in a country, characterized by high GDP per capita and low unemployment rates, attract significantly the number of immigrants to this country. Moreover, public social expenditure (*lnpsepj*) shows a positive and significant coefficient in

most columns in line with Borjas' (1999) theory, which shows that welfare states attract more immigrants. Emigration rates increases when GDP per capita in the origin country decreases, but the significance of the squared term in some specifications suggests the presence of poverty traps that limit emigration. The two latter economic measures turn significant in the same specifications (columns 6, 9, 10, 11, and 12). Higher unemployment rates in *i* countries and the relative population size between *j* and *i* countries appear to motivate emigration. As expected, the two Freedom House indices show coefficients of opposite sign in all columns. The statistical significance is more convincing and robust for the Freedom House index in civil rights, which show a negative coefficient. In other words, countries with less freedom in terms of civil rights experience lower emigration rates, most likely due to the reduced liberty to move freely. On the other hand, citizens in countries with more freedom in terms of political rights tend to emigrate more often, probably for the very opposite reason. Finally, in line with, e.g., Pedersen et al. (2006); Mayda (2010); Beine and Salomone (2012), we find that ethnic networks in the destination country significantly attract immigrants from the same origin.

Table 2 shows results from a sample of 30 major OECD destination countries. Yet, these destination countries constitute a very heterogeneous group in terms of economy and history, not least history of immigration. Therefore, in Table 3, we restrict the sample to the oldest recipient of immigrants, i.e., the EU-15 countries, USA, Canada, and Australia. In comparison to Table 2, the number of observations naturally decreases, for example from 25,654 (column 4, Table 2) to 17,585 in (column 1, Table 3), when we include the same set of covariates. In Table 3, interestingly, we find stronger evidence of a negative effect of natives' attitudes on immigration, again when readiness to discriminate against immigrants on the labor market capture attitudes. This evidence appears in both the specification with linear interpolation (column 2) and the specification without linear interpolation (column 5). Both estimates have larger amplitude than the estimates in Table 2.

A counter-intuitive result is the positive and significant coefficient of *let_anyone/noone* in column (3) in Table 3. Yet, the same coefficient turns negative and insignificant in column (6) when the attitude measure is no longer interpolated.

[Table 3 about here]

5. Robustness and Mechanism Tests: Explaining the Effect of Natives' Attitudes on International Migration Flows

This section digs further into the results from Tables 2 and 3 and examines possible mechanisms behind the results. First, we propose a way to disentangle the possible intertwine between migration policies and natives' attitudes. Second, we look at whether the effect of attitudes on immigration varies with immigrant origin. Third, we explore possible channels through which natives' attitudes may influence migrant inflows.

5.1. Natives' Attitudes toward Immigrants and Migration Policies

In Tables 2 and 3, the coefficient size of *labor_discrimination_agree* may be overestimated if politicians, concerned with their public popularity, translate public opposition toward immigrants into tighter migration policies. Facchini and Mayda (2008), Stein et al. (2000), Dustmann and Preston (2001), among others, discuss how public opinions influence migration policies. Notwithstanding, the power of lobbies in shaping the political agenda—including immigration policies—may be stronger than the influence of general opinion on immigration restrictions (Facchini and Mayda (2008)). There is yet some discrepancy between the tough public discourse on immigration and the actual tightness of entry measures in Western countries (de Haas (2011); Czaika and de Haas (2011)). Indeed, politicians might implement stricter entry measures when the demand for foreign labor is high. Given the mixed nature of the evidence on the link between natives' attitudes and immigration policies, we account for immigration policies in the two following ways.

First, we control simultaneously for natives' attitudes and changes in immigration policies using a policy measure originally collected by Mayda and Patel (2004) and updated by Ortega and Peri (2013). This measure captures changes in laws related to immigrants' ability to enter a country (*entry_laws_tight*). Such laws include, e.g., requirements and fees to enter the country, to obtain or renew work permits. The measure is normalized to 0 for all countries in 1980. Each year up to 2005 the measure remains the same, increases by 1, or decreases by 1 according to whether the

country does not change, tightens, or relax its immigration policy, respectively.[17] Controlling for changes in immigration policy is only possible for 14 OECD countries and from 1980 to 2005; thus, it yields a significant loss in the number of observations in comparison to our original data set—used in Table 2.

[Table 4 about here]

Table 4 shows the results. Columns (1) to (3) start by showing the estimates when we restrict the sample to the countries and the years in which data on migration policy and data on natives' attitudes are available. Doing so, we find negative and significant coefficients for *no_immigrant_neighbor* and *labor_discrimination_agree* in columns (1) and (2), respectively.

Further, we add *entry_laws_tight* on the right-hand side in columns (4) to (6). We find that tightness of immigration policies reduces immigration rates, in line with Ortega and Peri (2013). Most importantly, we find that natives' hostility toward immigrants reduces migrant inflows also when we account for the possible intertwine between entry policies and natives' attitudes. Then, the findings in columns (4) and (5) do not suggest that the coefficients in Table 2 are overestimated due to omitted control for tightness of entry policies.

However, rather surprisingly, the coefficient of *let_anyone/noone* turns positive and significant in columns (3) and (6). Recall that the question used to construct *let_anyone/noone* first appears in 1995-96 wave or in the 1999-2000 wave of the IVS and that data on *entry_laws_tight* stops in 2005. The restriction in the number of years in Table 4 may explain this surprising result. The last three columns of Table 4 are based only on a little number of years and countries and therefore remain difficult to interpret.

Second, to further test the possible intertwine between the effect of immigration policy and that of natives' attitudes on immigration, we reduce the sample to EU-to-EU bilateral flows in years with no entry restrictions. The European Union's construction and successive enlargement, including country-specific agreements on the free movement of labor, provides us with an ideal setting. We define a simple dummy equal to 1 when a country has no entry restriction on its labor market for workers from another EU member country and we restrict observations to

[17] Figure A5 in the Appendix depicts the evolution of the measure over time for the relevant receiving countries. See Mayda and Patel (2004) and Ortega and Peri (2013) for more details on the migration policy measure.

migration flows between country pairs in years when the dummy equals 1. Table 5 presents the results.

The negative effect of natives' attitudes remains significant across the specifications with linear interpolation only for *labor_discrimination_agree* (columns 2 and 5). Comparing the coefficients with and without controlling for other migration factors, we find in Table 5 that natives' readiness to discriminate against immigrants on the labor market constitutes a major dissuading factor for migration among EU citizens facing no migration restrictions. Again, given the little number of observations left without linear interpolation of the attitude measures and the sample restriction in Table 5, estimates in the last three columns (columns 7 to 9) are difficult to draw conclusions from.

[Table 5 about here]

5.2. Factors of Immigration: OECD vs. Non-OECD Immigrants

In another test we run regressions separately for OECD and non-OECD immigrants, motivated by at least four reasons. First, the attitude effect shown previously might hold only for some specific groups of immigrants. Particularly, natives' attitudes may be less important for non-labor motivated migrants, i.e., tied-movers and asylum-seekers, whose migration tends to be motivated by other factors than work (e.g., Pedersen et al. (2006)). Moreover, labor-motivated migrants may pay more attention to natives' attitudes in the destination country as natives' hostility is likely to constitute an indicator for the easiness to find a job and potential ethnic discrimination (Carlsson and Eriksson (2012)). Therefore, we argue that distinguishing OECD migrants from non-OECD migrants is a fair way to separate labor motivated from non-labor motivated immigrants, respectively.

Second, most recent migration policy restrictions in several OECD countries aim to reduce immigration of non-labor driven, low-educated, and non-Western individuals (e.g., staying possibilities conditional on employment status in some EU countries, entry rules that favor skilled immigration in several countries, etc.). Such policy orientations may provide OECD immigrants with easier entry conditions in the destination country compared to non-OECD immigrants. Empirically, the measure of immigration policy tightness in Table 4 is aggregated at the level of the receiving—and not the sending—country. Hence, the specifications of Table 4 may not be relevant for migrant inflows from other OECD countries.

Third, recent surveys (e.g., Hainmueller and Hiscox (2010); European Social Survey (2012)) show that natives oppose immigration from Western countries less often than migrants from non-Western countries. However, the IVS does not distinguish immigrant origins and thus the survey does not allow us to see whether natives generalize their opinion about non-western immigrants to all immigrants. In other words, if natives in OECD countries think of non-Western immigrants as all immigrants when they answer the IVS, the measures of natives' hostility are more likely to reflect natives' opposition to non-Western immigrants generalized to all immigrants—also immigrants of Western origin. On the other end of the spectrum is the possibility that potential immigrants from OECD countries interpret natives' opposition towards non-OECD immigrants as a sign of hostility toward them. In this case, natives' hostility may still work as a migration costs also for immigrants from OECD countries.[18]

Fourth, there has been little attention in the international migration literature on distinguishing different group of sending countries. Yet, factors behind immigrants' decision to migrate may vary according to their origin. Table 6 shows estimation results separately for OECD immigrants and non-OECD immigrants.

[Table 6 about here]

The first six columns show coefficients for OECD migrants and the last six columns display coefficients for non-OECD migrants. Natives' attitudes captured by *labor_discrimination_agree* continue to show negative and significant estimates. When comparing estimates from the same specifications but across sending groups, we find that the coefficient of *labor_discrimination_agree* is larger for OECD migrants (-0.20 in column 2 and -0.39 in column 5) than for non-OECD migrants (-0.01 in column 8 and -0.36 in column 11). The coefficients are more precise statistically for OECD migrants than other migrants. Again, *let_anyone/noone* turns significant and positive in columns (3) and (9), but the statistical significance does not hold when we do not interpolate the attitude measures in the years of missing survey, contrarily to *labor_discrimination_agree*.

[18] Obviously, the economic argument explains that natives will oppose high-skilled immigrants who represent a substitutable workforce. For evidence on the effect of high-skilled migration on natives' labor market outcomes, see e.g., Borjas (2008); Ottaviano and Peri (2012).

Hence, our results suggest that natives' attitudes, captured by their readiness to discriminate against immigrants when jobs are scarce, affect negatively the size of migrant inflows. We find that natives' attitudes play a more determining role in the migration of labor-motivated immigrants (i.e., natives of OECD countries) than for other immigrants (i.e., natives of non-OECD countries).[19]

Turning to the other covariates, we can draw some interesting conclusions. First, OECD migrants appear to be more driven by the economic wealth of the destination than non-OECD migrants: GDP per capita in the destination shows larger estimates for OECD migrants. Interestingly, non-OECD migrants seem to react to a larger extent to the level of unemployment in the destination compared to other migrants. Then, differentials in employment opportunities drive migration from non-OECD countries to a larger extent than migration from other OECD countries. Second, we do not find robust evidence to a finding in Table 2; namely, that migrants from either origin are "pushed" by changes in GDP per capita in the country of origin. Third, evidence of the Borjas (1999) theory of welfare magnets is corroborated especially for non-OECD migrants, who often come from least developed countries. Fourth, the Freedom House index for civil rights introduced in Table 2 shows, not so surprisingly, larger and more precise coefficients for non-OECD migrants. Fifth, the size of ethnic networks turns decisive for immigration choice for both types of immigrants and, rather interestingly, their estimates appear slightly larger for immigrants from OECD countries. This result might be driven by migrant inflows from Mexico to the US.

Overall, Table 6 brings new evidence on the origin of international migration for different ethnic groups of immigrants.

5.3. Natives' Attitudes toward Immigrants and Immigration: Other Mechanisms

This subsection tests for three possible mechanisms behind our results: (1) ethnic networks, (2) common language, and (3) post-migration reactions (Table 7). For Tests (1) and (2), we include both a specification with an interaction term between attitudes and, respectively, networks and

[19] In Table A6 in the Appendix, we add controls for the tightness of entry policies. Table A6 verifies our most robust result. Nonetheless, we should underlie the sudden reduction of the sample size especially in the econometric specification without interpolation.

language in the first three columns; and a specification without the interaction term and the attitude measure but using the exact same sample.[20]

First, by including an interaction term between the size of ethnic networks and attitudes, we aim to understand whether the presence of country fellows can help potential migrants to learn about natives' opposition toward immigrants prior to migration (columns 1 to 6). We find coefficients of ethnic networks very similar to those in Table 2 and very alike when comparing them across the two specifications in Table 7. However, we do not find any evidence that ethnic networks represent a channel through which immigrants can learn about natives' hostility in a destination country. If anything, our results confirm that ethnic networks attract immigrants form the same ethnic origin rather than dissuade them.

Second, for an immigrant to learn about a population's hostility to immigrants in a potential destination country before she actually migrates, knowledge of the destination language may be crucial. Indeed, knowledge of the destination language may give better access to relevant information about the destination's country, for example through the media. We test this hypothesis by including an interaction between the measures of natives' attitudes and a dummy for common language.[21] Columns (7) to (12) in Table 7 show the estimates with country-specific fixed effects. The negative sign and significance of the interaction term reveals that countries with more negative attitudes receive fewer immigrants from countries who share the same language. For the first time in the paper, this finding remains robust for all measures of negative attitudes in columns (7) through (9), but the coefficient of the interaction is larger for *labor_discrimination_agree*. Moreover, the coefficients of *labor_discrimination_agree* and *let_anyone/noone* in columns (8) and (9) diminish in comparison to the same coefficients in Table 2, columns (5) and (6). Finally, adding the interaction between attitudes and sharing a common language takes the significance of the common language dummy away in columns (7) to (9). All in all, the findings in columns (7) to (12) suggest that the negative effect of natives' attitudes is significantly stronger for immigrants who know the destination language, which may

[20] Results in columns (1) to (12) are directly comparable to the results in Table 2, using no interaction terms but the exact same sample.

[21] The variable for common language comes from Mayer and Zignago (2011). We use a dummy equal to 1 if at least 9% of the origin and the destination populations can speak a common language.

constitute the main channel through which immigrants learn about natives' hostility in a country *before* migrating.

Yet, one may argue that immigrants may learn about natives' attitudes only *after* arriving in the destination country. The third test looks into this possible channel behind the effects of attitudes on international migration. If natives' hostility affects international migration only after immigrants have arrived in the country, we would expect that an immigrant leaves the first receiving country to another destination. In other words, natives' opposition to immigrants may affect immigrant *out*flows out of the destination country. As we use aggregated data, we cannot observe individual migration outflows and do not have information on return migration. Nevertheless, any attitude effect on migrant outflows should be reflected in the size of *net* migration inflows, i.e., the difference in immigrant stocks.[22] We then use a slightly different specification to test this hypothesis and define net migration flows as the difference between immigrant stock in *t+1* and immigrant stock in *t*. Accordingly, we use attitudes from *t-1* but other migration factors from *t*. The results shown in columns (13) to (18), do not suggest that natives' hostility has any influence on international migration after an immigrant has arrived in the destination. These findings make sense if the costs of re-migration are larger than the costs related to the first migration.[23]

Hence, our tests show that immigrants are likely to learn about natives' hostility before migration and all the more if immigrants know the destination language.

[Table 7 about here]

6. Conclusion

This paper investigates whether natives' hostility toward immigrants in a country can have a negative effect on the size of migrant inflows to this country. To conduct the analysis, we combine an extensive data set on international bilateral migrant flows and stocks with longitudinal survey data on natives' attitudes toward immigrants in destination countries, thus

[22] If return migration rates differ from outmigration rates, net migration inflows can differ significantly from gross migration inflows. Therefore, we use gross migration inflows in our main specifications.

[23] We also run similar specifications but using the stock difference between *t+3* and *t+2* to allow for longer time of reaction to natives' hostility (results not shown here). We still do not find evidence of any effect of natives' opposition toward immigrants on future net migration flows.

covering 30 OECD destination countries and 224 sending countries over the years 1980 to 2010. To the data we apply a standard model of international migration with pull and push factors, migration costs, and other destination-country- and sending-country-specific factors. We capture natives' attitudes toward immigrants with three variables measuring attitudes toward: (1) more immigration (*let_anyone/noone*), (2) ethnic labor market discrimination when jobs are scarce (*labor_discrimination_agree*), and (3) living close to immigrants (*no_immigrant_neighbor*). Thanks to the richness, the novelty, and the longitudinal nature of our data, this paper can contribute to the literature on the determinants of bilateral migration flows by documenting new migration factors and showing how migration factors vary with immigrants' origin.

Our most robust result suggests that natives' hostility captured with *labor_discrimination_agree* can reduce the size of actual migrant inflows. This finding resonates with the works of Waisman and Larsen (2007); Zimmermann et al. (2008); Constant et al. (2009); Carlsson and Eriksson (2012) who show that natives' negative attitudes toward immigrants constitute a major integration barrier in the receiving country. Robustness and sensitivity tests allow us to strengthen the validity of our results and identify possible mechanisms behind our findings. First, the negative effect of *labor_discrimination_agree* persists in a setting with no immigration policy constraint, suggesting that our finding is not simply due to that politicians tighten entry rules to comply with public hostility to immigrants. Second, we find larger negative coefficients of *labor_discrimination_agree* on immigration from OECD countries. This finding makes sense if OECD migrants are more labor driven, thus more sensitive to labor market conditions, than non-OECD migrants who more often move to OECD countries for humanitarian reasons (e.g., family reunification, asylum seeking). Third, we find that migration factors other than attitudes also change with migrants' origin. For instance, migration from non-OECD countries to OECD countries is driven by differentials in employment opportunities to a larger extent than migration from OECD countries, and OECD countries with higher level of welfare are more likely to receive flows from non-OECD regions. Fourth, interested in identifying possible mechanisms behind the effects of attitudes on migration, we demonstrate that immigrants from countries where a large proportion of the population knows the destination language are less likely to move to country with high hostility, while we do not find evidence that immigrants react to natives' hostility after their move to the

destination country. In other words, due to language knowledge, potential migrants can learn about natives' attitudes *prior to* migration.

In addition to contributing to the literature, this paper raises at least two policy issues. First, the direct effect of natives' hostility on international migration in a context with no policy constraint questions the power of immigration policies to control the number of immigrants. Second, this paper documents the effect of natives' attitudes toward ethnic labor discrimination on immigration. Hence, when both the structural demand for foreign workers and natives' hostility to immigrants are high, how to dampen natives' opposition to immigrants calls for further attention.

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8. Tables and Figures

Table 1: Measuring Attitudes toward Immigrants

Attitude variables	Survey questions and code	Single obs. (year*country)	Survey period	Mean	S.d.
no immigrant neighbor	"On this list are various groups of people. Could you sort out any that you would not like to have as neighbors?" (1) If a respondent mentions either *"immigrants," "foreign workers"* or *"people from a different race,"* (0) otherwise.	126	1981 - 2009	0.18	0.12
labor discrimination agree	"When jobs are scarce, employers should give priority to [nation] people over immigrants. Do you:" (1) *"agree"*, (0) *"neither"* or *"disagree"*?	114	1989 - 2009	0.64	0.18
Let anyone/noone	"How about people from other countries coming here to work? Which one of the following do you think the government should do?" (1) *"Place strict limits on the number of foreigners who can come here?"* or *"Prohibit people coming here from other countries*?" (0) *Let people come as long as there are jobs available?*" or " *Let anyone come who wants to?"*	82	1995 - 2009	0.50	0.12

Notes: The survey was not conducted every year during the survey period. For an overview of covered years by country see Fig. A2, A3, and A4.

Table 2: Natives' Attitudes and Bilateral Migration Flows

Dep. Var. : Propensity to emigrate from *i* to *j*, *Mijt* = log of the share of emigration flows to country *j* in country *i* total population												
	No country fixed effects (same sample as in col. 4 to 6)			Country-pair fixed effects - Linear interpolation			Country-pair fixed effects - Linear interpolation			Country-pair fixed effects -No linear interpolation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
No immigrant neighbor (t-1)	-0.335***			0.041						0.056		
	(0.090)			(0.036)						(0.078)		
Labor discrimination agree (t-1)		-1.055***			-0.096						-0.357***	
		(0.111)			(0.059)						(0.119)	
Let anyone/noone (t-1)			-0.870***			0.449***						0.026
			(0.174)			(0.076)						(0.137)
No immigrant neighbor (t-4)							0.061					
							(0.039)					
Labor discrimination agree (t-4)								-0.081				
								(0.062)				
Let anyone/noone (t-4)									-0.031			
									(0.079)			
$\ln(GDP_j)_{t-1}$				2.309***	2.131***	1.920***	2.257***	2.163***	0.854***	3.229***	2.981***	3.362***
				(0.211)	(0.219)	(0.227)	(0.219)	(0.228)	(0.279)	(0.495)	(0.388)	(0.413)
$\ln(GDP_i)_{t-1}$				-0.324	-0.885	-1.324**	-0.514	0.061	-1.860**	-3.799**	-4.099***	-3.109***
				(0.596)	(0.604)	(0.663)	(0.577)	(0.647)	(0.753)	(1.490)	(1.099)	(1.186)
$\ln(GDP_i)^2_{t-1}$				0.016	0.047	0.076**	0.025	-0.004	0.097**	0.211***	0.221***	0.177***
				(0.033)	(0.034)	(0.037)	(0.033)	(0.036)	(0.044)	(0.081)	(0.063)	(0.066)
$ln\ pse_{j\,t-1}$				0.749***	0.782***	0.315	0.751***	0.797***	-0.415*	2.484***	2.324***	3.987***
				(0.128)	(0.134)	(0.202)	(0.142)	(0.162)	(0.221)	(0.471)	(0.403)	(0.555)
$\ln U_{j\,t-1}$				-0.072**	-0.044	-0.156***	-0.061*	-0.053	0.019	-0.146**	-0.201***	-0.627***
				(0.036)	(0.036)	(0.041)	(0.036)	(0.041)	(0.048)	(0.070)	(0.066)	(0.130)
$\ln U_{i\,t-1}$				0.086***	0.096***	0.107***	0.086***	0.111***	0.127***	0.166**	0.172**	0.148
				(0.027)	(0.027)	(0.031)	(0.028)	(0.028)	(0.035)	(0.084)	(0.084)	(0.090)
$ln\ p_{ij\,t-1}$				0.524***	0.543**	0.170	0.537***	0.498**	0.458	0.179	0.472	-0.361
				(0.196)	(0.223)	(0.258)	(0.193)	(0.231)	(0.289)	(0.453)	(0.461)	(0.502)
$FH_{i\,t-1}$ Political Rights				0.083**	0.029	0.087**	0.070**	0.036	0.076*	0.028	-0.012	0.040
				(0.034)	(0.035)	(0.040)	(0.034)	(0.039)	(0.045)	(0.098)	(0.098)	(0.115)
$FH_{i\,t-1}$ Civil Rights				-0.126***	-0.192***	-0.252***	-0.148***	-0.270***	-0.203***	-0.151	-0.148	-0.308***
				(0.038)	(0.041)	(0.045)	(0.037)	(0.045)	(0.050)	(0.094)	(0.091)	(0.104)
$ln\ s_{ij\,t-1}$				0.532***	0.536***	0.472***	0.546***	0.500***	0.357***	0.649***	0.644***	0.557***
				(0.039)	(0.037)	(0.036)	(0.036)	(0.034)	(0.036)	(0.063)	(0.060)	(0.056)
Constant	-4.405***	-5.163***	-3.775***	-30.228***	-26.696***	-19.110***	-29.080***	-31.387***	-6.190	-25.818**	-24.549***	-32.226***
	(0.362)	(0.128)	(0.220)	(4.071)	(4.313)	(4.602)	(3.978)	(4.545)	(5.245)	(10.057)	(7.851)	(8.806)
N	25,654	23,685	18,257	25,654	23,685	18,257	25,723	22,327	14,614	4,131	4,336	3,804
Adjusted R-sq	0.011	0.038	0.017	0.951	0.952	0.956	0.951	0.954	0.962	0.949	0.950	0.957

Notes: OLS estimates with country-pair fixed effects (col. 4 to 12). All specifications include year dummies. Differently from col. (1) to (9), in col. (10) to (12) we disregard years with no survey waves and capture attitudes with the measure from the previous actual survey in the immediate year after the survey. Robust standard errors clustered at the country-pair level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A1 and the main text for the definition of the covariates.

Table 3: Natives' Attitudes and Bilateral Migration Flows to the EU15, USA, Canada, and Australia

Dep. Var. : Propensity to emigrate from *i* to *j*, *Mijt* = log of the share of emigration flows to country *j* in country *i* total population						
	Country-pair fixed effects - linear interpolation			Country-pair fixed effects -No linear interpolation		
	(1)	(2)	(3)	(4)	(5)	(6)
No immigrant neighbor(t-1)	-0.004			0.007		
	(0.044)			(0.088)		
Labor discrimination agree(t-1)		-0.161***			-0.437***	
		(0.061)			(0.133)	
Let anyone/noone (t-1)			0.572***			-0.104
			(0.086)			(0.172)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	17,585	15,986	11,912	2,996	3,011	2,542
Adjusted R-sq	0.951	0.953	0.959	0.940	0.942	0.952

Notes: OLS estimates with country-pair fixed effects. All specifications include year dummies. Differently from Columns (1) to (3), in Columns (4) to (6) we disregard years with no survey waves and capture attitudes with the measure from the previous actual survey in the immediate year after the survey. All specifications include controls for GDP per capita in the source (in addition to a squared term), GDP per capita in the destination, a measure of public social expenditure, unemployment rate in the destination and the source, a population size ratio, two measures from Freedom House, and the number of migrants from *i* in *j* countries at (t-1). Robust standard errors clustered at the country-pair level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A1 and the main text for the definition of the covariates.

Table 4: Natives' Attitudes, Migration Policies and Bilateral Migration Flows

Dep. Var. : Propensity to emigrate from *i* to *j*, *Mijt* = log of the share of emigration flows to country *j* in country *i* total population

	No country fixed effects (same sample as in col. 4 to 6)			Country-pair fixed effects - Linear interpolation			Country-pair fixed effects - No linear interpolation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
No immigrant neighbor(t-1)	-0.160***			-0.139***			2.056***		
	(0.043)			(0.046)			(0.742)		
Labor discrimination agree(t-1)		-0.219***			-0.213***			-0.521	
		(0.066)			(0.066)			(0.332)	
Let anyone/noone (t-1)			0.231***			0.245***			-
			(0.079)			(0.080)			-
Entry_laws_tight(t-1)	No	No	No	-0.017**	-0.023**	-0.017*	-0.990*	0.000	-0.175***
				(0.008)	(0.009)	(0.009)	(0.517)	(0.071)	(0.063)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	12,550	10,951	7,788	12,550	10,951	7,788	1,387	1,514	1,221
Adjusted R-sq	0.963	0.966	0.966	0.959	0.963	0.966	0.970	0.969	0.981

Notes: OLS estimates with country-pair fixed effects. All specifications include year dummies. Differently from Columns (1) to (6), in Columns (7) to (9) we disregard years with no survey waves and capture attitudes with the measure from the previous actual survey in the immediate year after the survey. Due to the sample size reduction in Column (9), the estimation software drops the attitude variable. The coefficients of the three attitude variables remain very similar when we use the same sample as in columns 7 to 9 to run the same specification without the migration policy control (Results not shown here). All specifications include controls for GDP per capita in the source (in addition to a squared term), GDP per capita in the destination, a measure of public social expenditure, unemployment rate in the destination and the source, a population size ratio, two measures from Freedom House, and the number of migrants from *i* in *j* countries at (t-1). Robust standard errors clustered at the country-pair level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A1 and the main text for the definition of the covariates.

Table 5: Natives' Attitudes and Bilateral Migration Flows with no Policy Constraints

Dep. Var. : Propensity to emigrate from *i* to *j*, *Mijt* = log of the share of emigration flows to country *j* in country *i* total population

	No country fixed effects (same sample as in col. 4 to 6)			Country-pair fixed effects - Linear interpolation			Country-pair fixed effects - No linear interpolation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
No immigrant neighbor(t-1)	0.053			0.028			0.252		
	(0.073)			(0.079)			(0.228)		
Labor discrimination agree(t-1)		-0.313***			-0.276***			0.015	
		(0.102)			(0.092)			(0.241)	
Let anyone/noone (t-1)			0.260			0.329**			0.790
			(0.172)			(0.143)			(0.803)
Other controls	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
N	5,819	5,237	4,138	4,181	3,995	3,152	513	526	393
Adjusted R-sq	0.937	0.937	0.942	0.938	0.940	0.941	0.954	0.951	0.979

Notes: OLS estimates with country-pair fixed effects. All specifications include year dummies. Differently from Columns (1) to (3), in Columns (4) to (6) we disregard years with no survey waves and capture attitudes with the measure from the previous actual survey in the immediate year after the survey. All specifications include controls for GDP per capita in the source (in addition to a squared term), GDP per capita in the destination, a measure of public social expenditure, unemployment rate in the destination and the source, a population size ratio, two measures from Freedom House, and the number of migrants from *i* in *j* countries at (t-1). Robust standard errors clustered at the country-pair level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A1 and the main text for the definition of the covariates.

Table 6: Natives' Attitudes and Bilateral Migration Flows—OECD vs. non-OECD Migrants

Dep. Var. : Propensity to emigrate from *i* to *j*, *Mijt* = log of the share of emigration flows to country *j* in country *i* total population

	Migrants from OECD countries						**Migrants from non-OECD countries**					
	Country-pair fixed effects - linear interpolation			Country-pair fixed effects -No linear interpolation-			Country-pair fixed effects - linear interpolation			Country-pair fixed effects -No linear interpolation-		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
No immigrant neighbor (t-1)	0.002			-0.004			0.072			0.080		
	(0.049)			(0.093)			(0.049)			(0.126)		
Labor discrimination agree (t-1)		-0.195**			-0.391***			-0.009			-0.363*	
		(0.077)			(0.125)			(0.085)			(0.200)	
Let anyone/noone (t-1)			0.505***			0.147			0.473***			-0.042
			(0.104)			(0.154)			(0.110)			(0.230)
$\ln(GDP_j)_{t-1}$	2.379***	2.237***	2.123***	3.432***	3.095***	3.419***	2.153***	1.939***	1.686***	3.047***	2.878***	3.232***
	(0.306)	(0.320)	(0.340)	(0.675)	(0.498)	(0.542)	(0.276)	(0.279)	(0.291)	(0.724)	(0.601)	(0.632)
$\ln(GDP_i)_{t-1}$	1.085	4.538**	7.253**	-2.505	-1.543	4.245	1.032	0.312	0.182	-1.186	-1.828	-1.229
	(2.128)	(2.311)	(3.368)	(3.801)	(3.757)	(4.960)	(0.713)	(0.779)	(0.890)	(1.659)	(1.478)	(1.779)
$\ln(GDP_i)^2_{t-1}$	-0.070	-0.240**	-0.347**	0.142	0.085	-0.199	-0.048	-0.011	-0.003	0.078	0.109	0.085
	(0.110)	(0.120)	(0.172)	(0.198)	(0.196)	(0.255)	(0.041)	(0.044)	(0.050)	(0.093)	(0.086)	(0.101)
$ln\ pse_{j\ t-1}$	-0.020	0.012	-0.722**	1.848***	1.601***	2.848***	1.463***	1.488***	1.051***	3.308***	3.123***	5.368***
	(0.162)	(0.169)	(0.295)	(0.581)	(0.449)	(0.633)	(0.180)	(0.186)	(0.269)	(0.729)	(0.679)	(0.957)
$\ln U_{j\ t-1}$	-0.004	0.026	-0.069	-0.073	-0.122*	-0.437***	-0.141***	-0.121**	-0.231***	-0.237**	-0.289***	-0.916***
	(0.047)	(0.048)	(0.051)	(0.076)	(0.070)	(0.144)	(0.049)	(0.048)	(0.060)	(0.115)	(0.107)	(0.242)
$\ln U_{i\ t-1}$	0.043	0.042	0.161***	0.133	0.117	0.139	0.055	0.055	0.041	0.073	0.100	0.085
	(0.042)	(0.044)	(0.057)	(0.092)	(0.089)	(0.109)	(0.035)	(0.034)	(0.037)	(0.142)	(0.145)	(0.144)
$ln\ p_{ij\ t-1}$	0.993***	0.656*	0.164	0.896	1.404**	-0.669	-0.307	-0.074	-0.180	-1.308*	-1.047	-0.877
	(0.332)	(0.383)	(0.488)	(0.648)	(0.620)	(0.768)	(0.273)	(0.304)	(0.332)	(0.724)	(0.734)	(0.773)
$FH_{i\ t-1}$ Political Rights	0.186**	0.107	0.209*	0.041	-0.060	0.126	0.080**	0.065*	0.097**	0.093	0.060	0.079
	(0.075)	(0.078)	(0.108)	(0.185)	(0.177)	(0.225)	(0.037)	(0.039)	(0.043)	(0.126)	(0.127)	(0.143)
$FH_{i\ t-1}$ Civil Rights	-0.087*	-0.120**	-0.186***	-0.086	-0.078	-0.177	-0.144***	-0.211***	-0.241***	-0.298*	-0.275*	-0.349**
	(0.047)	(0.051)	(0.058)	(0.107)	(0.105)	(0.124)	(0.053)	(0.062)	(0.068)	(0.154)	(0.149)	(0.175)
$ln\ s_{ij\ t-1}$	0.589***	0.595***	0.510***	0.635***	0.621***	0.577***	0.524***	0.519***	0.437***	0.681***	0.682***	0.538***
	(0.052)	(0.049)	(0.058)	(0.088)	(0.083)	(0.094)	(0.054)	(0.051)	(0.047)	(0.092)	(0.088)	(0.077)
N	10,746	9,758	7,119	1,717	1,798	1,559	14,908	13,927	11,138	2,414	2,538	2,245
Adjusted R-sq	0.949	0.950	0.951	0.950	0.951	0.957	0.949	0.951	0.955	0.947	0.946	0.954

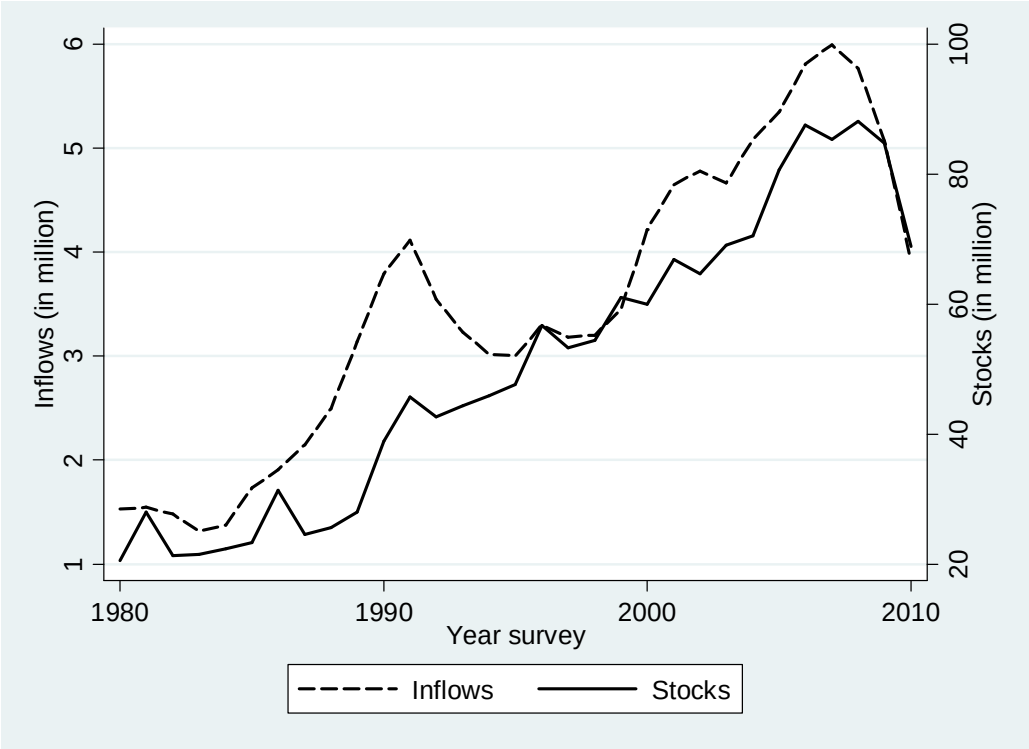
Notes: OLS estimates with country-pair fixed effects. All specifications include year dummies. Differently from col. (1) to (3) and col. (7) to (9), in col. (4) to (6) and col. (10) to (12) we disregard years with no survey waves and capture attitudes with the measure from the previous actual survey in the immediate year after the survey. Robust standard errors clustered at the country-pair level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A1 and the main text for the definition of the covariates.

Table 7: Mechanisms behind the Effect of Natives' Attitudes and International Migration

Dep. Var. :	Propensity to emigrate from *i* to *j*: log of the share of emigration flows to country *j* in country *i* total population												Net Migration Flows (1 lead) from *i* to *j*: log of the difference between two years of immigrant stocks (*EStock_(t+1) – Estock_(t)*)					
	(1) The ethnic network channel						*(2) The common language channel*						*(3) The post-migration channel*					
	Country-pair fixed effects – linear interpolation			Country-pair fixed effects - same sample as in col. 1 to 3 but no controls for attitudes			Country-specific fixed effects – linear interpolation			Country-specific fixed effects - same sample as in col. 1 to 3 but no controls for attitudes			Country-pair fixed effects – linear interpolation			Country-pair fixed effects -No linear interpolation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
No immigrant neighbor (t-1)	0.051						0.042						0.084			0.266		
	(0.047)						(0.036)						(0.063)			(0.267)		
Labor discrimination agree (t-1)		-0.139*						-0.045						-0.035			0.288	
		(0.079)						(0.060)						(0.106)			(0.250)	
Let anyone /noone(t-1)			0.363***						0.354***						-0.165			-1.511***
			(0.092)						(0.079)						(0.141)			(0.582)
Attitude measure x Immigrant Stock	0.005	-0.023	-0.048															
	(0.016)	(0.028)	(0.037)															
$ln\ s_{ij\ t-1}$	0.542***	0.527***	0.434***	0.532***	0.536***	0.487***												
	(0.044)	(0.037)	(0.043)	(0.039)	(0.037)	(0.037)												
Attitude measure x Common Language							-0.336***	-0.940***	-0.394*									
							(0.098)	(0.308)	(0.215)									
Common Language							-0.317	-0.143	0.150	0.397***	0.422***	0.469***						
							(0.209)	(0.188)	(0.179)	(0.060)	(0.063)	(0.067)						
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	25,654	23,685	18,257	25,654	23,685	18,257	25,622	23,653	18,225	25,622	23,653	18,225	19,278	17,667	13,224	2,820	2,889	2,210
Adjusted R-sq	0.951	0.952	0.956	0.951	0.952	0.956	0.906	0.905	0.903	0.906	0.905	0.902	0.867	0.869	0.880	0.876	0.871	0.896

Notes: OLS estimates with country-pair fixed effects in columns (1) to (6) and (13) to (18); with country-specific fixed effects in columns (7) to (12). Columns (4) to (6), and (10) to (12), are robustness tests for the stock variables and the common language variables, respectively, where we do not control for attitudes but use the same sample as if attitudes were controlled for. In Columns (16) to (18), we disregard years with no survey waves and capture attitudes with the measure from the previous actual survey in the immediate year after the survey. All specifications include controls for GDP per capita in the source (in addition to a squared term), GDP per capita in the destination, a measure of public social expenditure, unemployment rate in the destination and the source, a population size ratio, year dummies, and two measures from Freedom House in (t-1)—in t in columns (13) to (18). In columns (7) to (12), measures of distance in km between the source and the destination (in log), a dummy for whether the two countries share a common border and a dummy for whether they share a past colonial relationship are also included. Robust standard errors clustered at the country-pair level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A1 and the main text for the definition of the covariates.

Figure 1: Migrant Inflows and Stocks in 30 OECD Countries



Source: own calculations from our data set. For a list of the 30 OECD countries included in the figure please refer to Appendix Tables A3 and A4.

9. Appendix

Table A 1: Descriptive statistics, definitions, and sources of migration variables

Variables	Definition	Source	Obs.	Mean	S.d.	Min	Max
Mij_t	Ln(migration inflow from i to j per source population) in t	Own data collection, see Table A1	105,498	-5.28	2.61	-14.07	4.02
Mijt_t-1	Ln(migration inflow from i to j per source population) in t-1	Own data collection, see Table A1	101,978	-5.29	2.61	-14.07	4.02
Ln Sij_t-1	Ln(foreign population stock from i in j per source population) in t-1	Own data collection, see Table A2	80,821	-3.38	2.96	-12.32	6.53
NetMij_t	Ln(difference in population stock from i in j between t+1 and t)	Own data collection, see Table A2	45,982	-5.43	2.62	-13.85	5.96
Ln (GDPj)_t-1	Ln GDP per capita, PPP (constant 2005 international $) in destination j, t-1	WDI, World Bank	213,744	9.95	0.47	8.62	11.22
Ln (GDPi)_t-1	Ln GDP per capita, PPP (const 2005 international $) in origin i, t-1	WDI, World Bank	165,444	8.47	1.26	5.02	11.47
Ln (GDPi)2_t-1	Ln GDP per capita, PPP (const 2005 intern $) in origin i squared, t-1	WDI, World Bank	165,444	73.33	21.42	25.16	131.47
Ln psej_t-1	Ln Public social expenditure as a percentage of GDP in destination j, t-1	OECD SOCX Database	178,923	2.86	0.48	0.50	3.57
Ln Uj_t-1	Ln Unemployment, total (% of total labor force) in destination j, t-1	WDI, World Bank	184,398	1.86	0.57	-0.51	3.17
Ln Ui_t-1	Ln Unemployment, total (% of total labor force) in origin i, t-1	WDI, World Bank	83,334	1.98	0.71	-1.87	4.09
Ln Pij_t-1	Ln Share of population in destination j per population in country i, t-1	WDI, World Bank	218,076	8.12	2.75	-1.51	17.25
FHi Political Rights_t-1	Ln of Freedom House Index – Political Rights in origin i	Freedom in the World Scores	162,990	1.06	0.75	0	1.95
FHi Civil Rights_t-1	Ln of Freedom House Index – Civil Liberties in origin i	Freedom in the World Scores	162,990	1.13	0.65	0	1.95
Entry_laws_tight_t-1	Variation of the tightness level of immigration laws relative to immigrants' entry restrictions in country j, t-1	Mayda and Patel (2004), Ortega and Peri (2013)	81,536	-0.20	1.90	-6	4
Common Language	Dummy variable for whether in a pair of i and j countries 9% of the population can speak a common language	Mayer and Zignago (2011)	261,699	0.10	0.30	0	1
Distance in km	Ln Distance between capitals of destination j and origin i in km	Own extension of CEPII	232,283	8.57	0.89	2.27	9.88
Neighboring Dummy	Dummy variable for neighbouring countries	Own extension of CEPII	235,476	0.02	0.13	0	1
Colonial Past Dummy	Dummy variable for countries ever in colonial relationship	Own extension of Rose (2004)	235,476	0.02	0.12	0	1

Table A 2: Inflows of Foreign Population: Definitions and Sources

Migration flows to	*Definition of "foreigner" based on*	*Source*
Australia	Country of Birth	Permanent and long-term arrivals, Government of Australia, DIMA, Dept. of Immigration and Multicultural Affairs http://www.immi.gov.au/media/statistics/index.htm
Austria	Citizenship	Population register, Statistik Austria (1997 to 2002), Wanderungsstatistik 1996-2001, Vienna
Belgium	Citizenship	Population register. Institut National de Statistique.
Canada	Country of Birth	Issues of permanent residence permit. Statistics Canada–Citizenship and Immigration Statistics. *Flow is defined as a sum of foreign students, foreign workers and permanent residents.* http://www.cic.gc.ca/english/resources/statistics/facts2009/glossary.asp
Czech Rep.	Citizenship	Permanent residence permit and long-term visa, Population register, Czech Statistical Office
Denmark	Citizenship	Population register. Statistics Denmark
Finland	Citizenship	Population register. Finish central statistical office
France	Citizenship	Statistics on long-term migration produced by the 'Institut national d'études démographiques (INED)' on the base on residence permit data (validity at least 1 year) transmitted by the Ministry of Interior.
Germany	Citizenship	Population register. Statistisches Bundesamt
Greece	Citizenship	Labour force survey. National Statistical Service of Greece 2006-2007 Eurostat
Hungary	Citizenship	Residence permits, National Hungary statistical office.
Iceland	Citizenship	Population register. Hagstofa Islands national statistical office.
Ireland	Country of Birth	Labour Force Survey. Central Statistical Office. Very aggregate, only very few individual origins.
Italy	Citizenship	Residence Permits. ISTAT
Japan	Citizenship	Years 1988-2005: Permanent and long-term permits. Register of Foreigners, Ministry of Justice, Office of Immigration. Years 2006-2008: Permanent and long-term permits. OECD Source International Migration data
Korea	Citizenship	OECD Source International Migration data
Luxembourg	Citizenship	Population register, Statistical Office Luxembourg
Mexico	Citizenship	OECD Source International Migration data
Netherlands	Country of Birth	Population register, CBS
New Zealand	Last Permanent Residence	Permanent and Long-term ARRIVALS (Annual–Dec) Census, Statistics New Zealand
Norway	1979-1984 Country of Origin 1985-2009 Citizenship	Population register, Statistics Norway
Poland	Country of Origin	Administrative systems (PESEL, POBYT), statistical surveys (LFS, EU-SILC, Population censuses). Central Statistical Office of Poland
Portugal	Citizenship	Residence Permit, Ministry of Interior.
Slovak rep.	Country of Origin	Permanent residence permit and long-term visa, Slovak Statistical Office
Spain	Country of Origin	Residence Permit, Ministry of Interior
Sweden	Citizenship	Population register, Statistics Sweden
Switzerland	Citizenship	Register of Foreigners, Federal Foreign Office of Switzerland
Turkey	Citizenship	OECD Source International Migration data
United Kingdom	Citizenship	Residence permits for at least 12 months. IPS - office for national statistics, and EUROSTAT
United States	Country of Birth	US Census Bureau Current Population Survey (CPS); U.S. Department of Homeland Security: *Yearbook of Immigration Statistics.* Persons obtaining Legal Permanent Resident Status by Region and Country of birth www.dhs.gov/ximgtn/statistics/publications/LPR06.shtm)

Table A 3: Stock of Foreign Population: Definitions and Sources

Foreign population stock in	*Definition of "foreigner" based on*	*Source*
Australia	Country of birth	Census of Population and Housing, Australian Bureau of Statistics
Austria	Country of birth	Statistics Austria, Population Census 2001 and Population Register 2001 to 2009. For census year 1981 and 1991 definition by citizenship
Belgium	Citizenship	Population register. Institut National de Statistique
Canada	Country of birth	Census of Canada, Statistics Canada. www.statcan.ca/
Czech Rep.	Citizenship	Permanent residence permit and long-term visa, Population register, Czech Statistical Office and Directorate of Alien and Border Police
Denmark	Country of origin	Population register. Statistics Denmark
Finland	Country of birth	Population register. Finish central statistical office
France	Country of birth	Census. Residence permit. Office des migrations internationals.
Germany	Citizenship	Population register. Statistisches Bundesamt
Greece	Citizenship	Labour force survey. National Statistical Service of Greece.
Hungary	Citizenship	National Hungary statistical office
Iceland	Country of birth	Population register. Hagstofa Islands
Ireland	Country of birth	Censuses, Statistical office, Ireland
Italy	Citizenship	Residence Permits. ISTAT
Japan	Citizenship	Years 1980-1999, Register of Foreigners, Ministry of Justice, Office of Immigration. Years 1999-2008 OECD Source Migration stat. Both sources based on permanent and long-term permits.
Korea	Citizenship	1986-1988: Trends in international migration Outlook, OECD 1990-2008: OECD Source International Migration Database
Luxembourg	Citizenship	Population register, Statistical office Luxembourg
Mexico	Country of birth	2005: Trends in international migration Outlook, OECD 2000: OECD Source International Migration Database
Netherlands	Citizenship	Population register, CBS
New Zealand	Country of birth	Census, Statistics New Zealand
Norway	Country background	Population register, Statistics Norway Country background is the person's own, their mother's or possibly their father's country of birth. Persons without an immigrant background only have Norway (000) as their country background. In cases where the parents have different countries of birth, the mother's country of birth is chosen.
Poland	Country of birth	2002 Census, rest permits, Statistics Poland
Portugal	Citizenship	Residence Permit, Ministry of Interior, www.ine.pt
Slovak Republic	Country of Origin	Permanent residence permit and long-term visa, Slovak Statistical Office
Spain	1985-1995 Citizenship 1996-2009 Country of birth	Residence Permit, Ministry of Interior
Sweden	Country of Birth	Population register, Statistics Sweden
Switzerland	Citizenship	Register of Foreigners, Federal Foreign Office
Turkey	Country of birth	OECD Source International Migration Database
United Kingdom	Country of Birth	LFS, UK statistical office
United States	Country of birth	US Census Bureau: 1990 and 2000 US census, the rest Current Population Survey (CPS) December. Data Ferret. Years 1980-1989, 1991-2004 from extrapolations by Tim Hatton (RESTAT)

Table A 4: Country-Year Coverage of Migration Inflows

	AUS	AUT	BEL	CAN	CHE	CZE	DEU	DNK	ESP	FIN	FRA	GBR	GRC	HUN	IRL	ISL	ITA	JPN	KOR	LUX	MEX	NLD	NOR	NZL	POL	PRT	SVK	SE	TUR	USA
2010	208	190		218	198	135	193	203	113	183				144	2	179				141		194	213	212	124	148	212	194		197
2009	205	190		215	194	141	193	203	113	183				139	2	178	188	201	58	141	128	198	202	212	123	150	212	192	200	198
2008	204	190		215	194	143	194	203	113	183	120			142	2	178	187	198	57	146	126	195	202	213	205	143	212	192	196	196
2007	206	190	93	215	194	147	193	203	113	183	124		191	128	2	178	181	197	28	142	126	197	202	213	205	126	211	192	195	197
2006	206	190	96	215	194	142	193	202	108	183	120	17	190	133	2	178	182	195	10	139		193	202	213	205	128	208	192	193	193
2005	203	190	85	215	194	142	191	203	66	183	107	114		121	2	178	185	10	10	137		187	202	213	205	124	208	192	193	195
2004	203	190	71	215	194	146	191	203	57	183	107	109		108	2	178	183	10	10	135		193	202	213	205	118	208	192	193	204
2003	201	189	70	215	195	142	191	203	57	183	127	107		121	2	178	180	10	10	127		191	202	213	205	114	208	192	194	204
2002	198	189	70	215	194	141	191	203	57	183	128	99		110	2	178	182	10	10	123		198	192	213	205	126	208	192	193	204
2001	198	189	70	215	194	115	84	203	57	183	130	104		117	2	178	181	10	10	116		197	192	213	205	114	208	192	194	204
2000	200	189	70	215	180	110	83	203	59	183	129	69		118	2	178	182	15	10	124		197	192	213	205	113	208	192	194	204
1999	198	189	70	215	180	108	193	203	58	183	118	70		114	2	178	181	15		123		191	192	213	205	114	208	159	172	204
1998	193	189	70	215	180	122	193	203	59	183	117	73	188	114	2	178	182	14		120		191	192	213	16	144	208	166	171	204
1997	192	189	55	215	179	111	193	203	39	183	118	8	183	114	2	178	179	14		110		194	192	213	14	144	208	164	172	204
1996	195	189	55	215	176	114	193	203	58	183	118	9	205	116	2	178	178	14		108		191	191	213	14	144	208	167	165	203
1995	187		55	215	176	117	193	203	39	183	118	6	203	117	2	178	48	15		110		187	192	213	13	144		165	165	203
1994	186		55	215	179	106	193	203	39	183	118	4	205	119	2	178	32	14		103		186	192	213	13	144		164		203
1993	180		48	215	178	97	193	203	39	183		5	205	106	2	178	32	14		99		185	192	213	11	143		168		204
1992	182		48	215	174		189	203	45	183		8	205	111	2	178	32	14		105		174	191	213	11	143		157		205
1991	171		48	214	158		172	203	42	183		6	206	104	2	178	32	11		95		160	191	213	11			148		206
1990	168		48	214	156		44	203	42	183		38	200	102	2	178	32	12		100		163	190	213	10			144		205
1989	155		48	214	154		105	203	42	183		31		97	2	178	32	11		93		164	192	213	10			142		205
1988	150		25	214	159		105	203	42	183		38		100	2	178	32	11		94		158	192	213				138		205
1987	159		27	214	155		105	203		183		29		99	2	178	32	7		93		161	192	213				136		205
1986	153		27	214	154		105	203		183		33		103		178	32	7					191	213				138		205
1985	155		27	214	154		105	203		183		35		95		18	32	7					116	213				134		205
1984	154		27	214	151		105	203		183						18							205	213				126		205
1983	166		27	214	152		105	203		183						18							205	213				123		205
1982	161		27	214	154		105	203								18							205	213				121		205
1981			27	214	154		105	203								18							205	213				123		204
1980			27	214			105	203															205	213				119		202
	AUS	AUT	BEL	CAN	CHE	CZE	DEU	DNK	ESP	FIN	FRA	GBR	GRC	HUN	IRL	ISL	ITA	JPN	KOR	LUX	MEX	NLD	NOR	NZL	POL	PRT	SVK	SE	TUR	USA

Notes: Columns: Destination Countries; Rows: Year; Cell: numbers of source countries for which we have some observations of number of migrants for a given year

Table A 5: Country-Year Coverage of Immigrant Stocks

	AUS	AUT	BEL	CAN	CHE	CZE	DEU	DNK	ESP	FIN	FRA	GBR	GRC	HUN	IRL	ISL	ITA	JPN	KOR	LUX	MEX	NLD	NOR	NZL	POL	PRT	SVK	SE	TUR	USA
2010		209			191	171	192	201		193		179		173	209	175	192			26		209	213		209	176	150	199		107
2009	209	209	185		194	172	190	201	112	191		171		180	208	175	190	201	27	26		207	213		209	177	145	199		133
2008	209	209	187		194	171	192	201	112	191	127	177		178		175	192	199	28	26		209	213			176	144	199		133
2007	209	209	178		194	168	193	200	112	191	128	174		174		175	188	198	25	26		207	213			179	142	199		133
2006	199	209	184	210	194	168	193	200	112	193	193	148	189	173	43	175	189	195	25	23		207	213	211		174	144	199		96
2005	209	209	182		194	166	139	201	112	193	204	97	191	165		175	189	183	25	23	10	208	213			173	139	199		96
2004	208	209	181		194	165	139	201	112	193		101	189	162		172	188	18	25	23		208	213			171	137	199		96
2003	208	209	181		194	163	138	201	112	193		100	190	156		172	188	18	25	23		207	213			168	149	199		96
2002	208	209	181		194	161	138	201	99	193		100		158	177	172	186	42	25	23		207	213		201	168	148	199		96
2001	190	207	181	190	194	163	138	201	99	193		97		154		172	187	42	19	12		206	213	199		167	142	199		96
2000	207	191	176		195	161	138	201	99	193		102	207	163		172	184	122	19	137	201	206	213			164	140	199	196	132
1999	206		174		195	164	138	201	99	193	162	87		163		172	185	42	19	12		204	213			158	136	111		96
1998	206		174		195	158	138	201	99	193		104		161		172	38	42	19	12		204	213			155	144	111		96
1997	204		55		195	152	138	201	99	193		100	189	159		172	189	42	19	12		204	212			152	144	111		96
1996	192		55	201	195	153	138	201	63	193		90	205	157	36	65	50	18	19	12		204	212	52		151	139	111		96
1995	202		55		195	150	138	201	58	193		85	205	146		65	50	37	19	12		200	212			151	140	111		96
1994	49		55		195	145	137	201	58	193		87	205			66	50	18	19	12		9	212			147		107		126
1993	49		48		195		137	201	58	193		87	205			66	50	18	19	12		9	212			140		104		126
1992	49		48		194		132	201	58	193		82	205			66	185	18	17	12		9	212			130		101		126
1991	168		48	180	194		117	201	58	193		70	205		2	43	184	16	15	12		9	212	51		126		98		126
1990	49	70	48		194		118	201	57	193	76		205			60		42	15	82		9	212			121		100	12	127
1989			48		194		118	201	57	134			204			60		12		8		9	212			122		98		125
1988					194		118	201	57	134			204			60		12	3	8		9	212			120		98		125
1987					194		118	201	57	131			204			60		12	4	8		9	212			118		97		125
1986	75			42	194		118	201	57	125			204		2	60		12	9	8		9	212	75		115		94		125
1985					194		118	201	57	124			204			60		42				9	212			109		95		125
1984					194		118	201		191			204			60		12				9	187			103		89		125
1983					194		118	201					204			60		12				9	187			100				125
1982					194		118	201					204			60		12					193			83		85		125
1981	81		47	42	194		118	201					204		2	59		12					189	75		98				125
1980		64			194		116	201					204					42		79			190			90		95		128
	AUS	AUT	BEL	CAN	CHE	CZE	DEU	DNK	ESP	FIN	FRA	GBR	GRC	HUN	IRL	ISL	ITA	JPN	KOR	LUX	MEX	NLD	NOR	NZL	POL	PRT	SVK	SE	TUR	USA

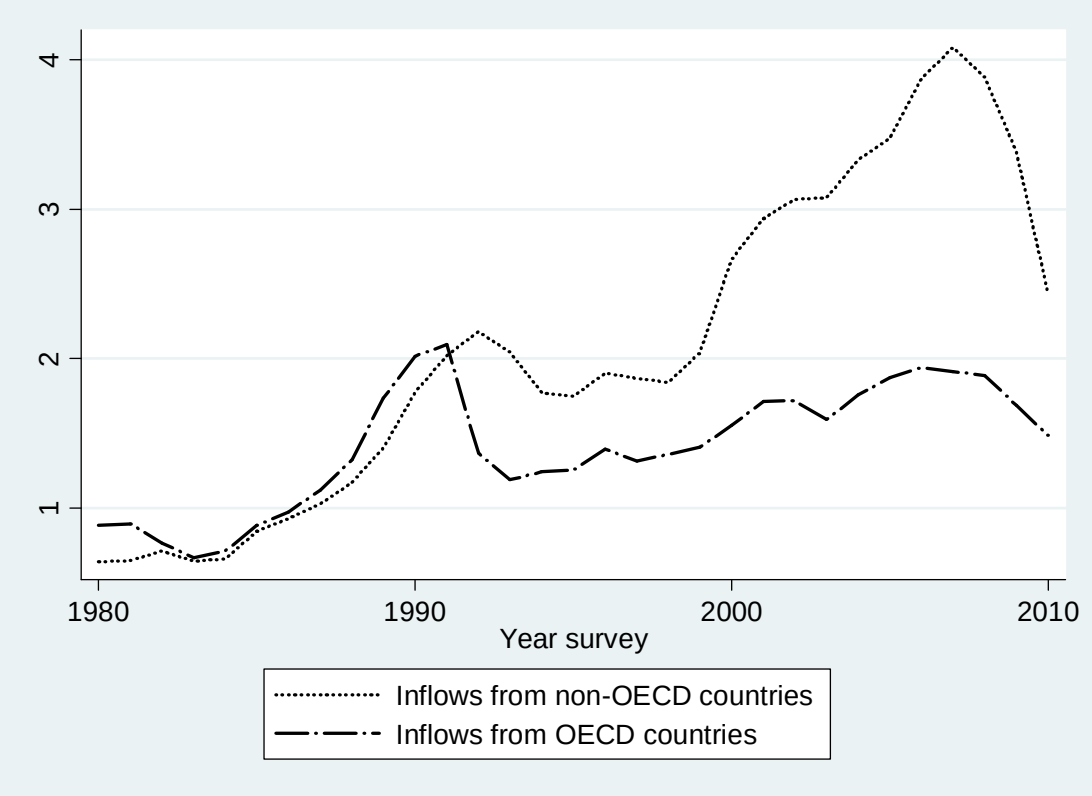
Notes: Columns: Destination Countries; Rows: Year; Cell: numbers of source countries for which we have some observations of number of migrants for a given year

Table A 6: Natives' Attitudes, Migration Policies and Bilateral Migration Flows—OECD vs. non-OECD Migrants

Dep. Var. : Propensity to emigrate from *i* to *j*, *Mijt* = log of the share of emigration flows to country *j* in country *i* total population						
	Country-pair fixed effects - linear interpolation			Country-pair fixed effects -No linear interpolation		
Migrants from OECD countries						
	(1)	(2)	(3)	(4)	(5)	(6)
No immigrant neighbor(t-1)	-0.205***			1.773*		
	(0.058)			(0.929)		
Labor discrimination agree(t-1)		-0.326***			-0.867***	
		(0.081)			(0.306)	
Let anyone/noone (t-1)			0.172*			-
			(0.095)			-
Entry laws tight(t-1)	0.006	0.004	0.003	-1.490**	-0.021	-0.151**
	(0.010)	(0.011)	(0.012)	(0.597)	(0.048)	(0.069)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	5,410	4,602	3,077	619	667	518
Adjusted R-sq	0.958	0.964	0.968	0.972	0.973	0.983
Migrants from non-OECD countries						
	(7)	(8)	(9)	(10)	(11)	(12)
No immigrant neighbor(t-1)	-0.080			2.353		
	(0.068)			(1.499)		
Labor discrimination agree(t-1)		-0.117			-0.062	
		(0.096)			(0.529)	
Let anyone/noone (t-1)			0.274**			-
			(0.122)			-
Entry laws tight(t-1)	-0.039***	-0.041***	-0.032**	-0.359	-0.044	-0.238*
	(0.013)	(0.013)	(0.013)	(0.722)	(0.146)	(0.127)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	7,140	6,349	4,711	768	847	703
Adjusted R-sq	0.956	0.958	0.961	0.973	0.967	0.976

Notes: OLS estimates with country-pair fixed effects. All specifications include year dummies. The sample used in columns (1) to (6) only includes migrant inflows from OECD countries, while the sample used in columns (7) to (12) only includes migrant inflows from non-OECD countries. Differently from Columns (1) to (3) and columns (7) to (9), in Columns (4) to (6) and Columns (10) to (12) we disregard years with no survey waves and capture attitudes with the measure from the previous actual survey in the immediate year after the survey. All specifications include controls for GDP per capita in the source (in addition to a squared term), GDP per capita in the destination, a measure of public social expenditure, unemployment rate in the destination and the source, a population size ratio, two measures from Freedom House, and the number of migrants from *i* in *j* countries at (t-1). Due to the little variation left by the reduction in the number of countries and years represented in Columns (6) and (12), the software drops the attitude variable. Robust standard errors clustered at the country-pair level are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A1 and the main text for the definition of the covariates.

Figure A 1: Migrant Inflows (in million) to 30 OECD Countries: OECD vs. Non-OECD Migrants



Source: own calculations from our data set. For a list of the 30 OECD countries included in the figure please refer to Appendix Tables A4 and A5.

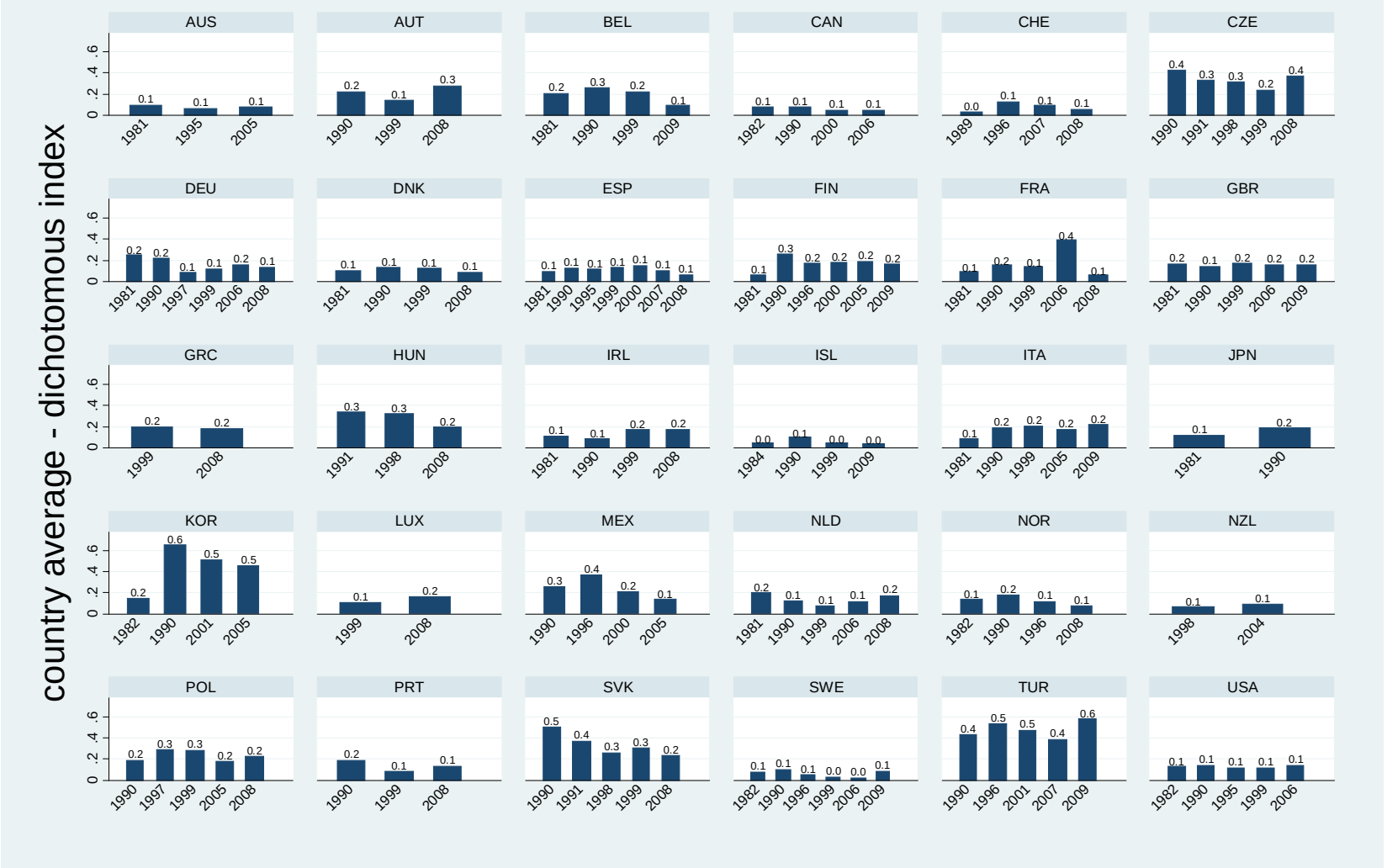
Figure A 2: *Let_anyone/noone*, Average by Country and Year of Survey

Notes: We compute country averages using the *collapse* STATA command and design weights. *Let_anyone/noone* draws from the IVS question: "How about people from other countries coming here to work? Which one of the following do you think the government should do?" and takes the following values, according to the answer provided: 1 if the person answers "Place strict limits on the number of foreigners who can come here" or "Prohibit people coming here from other countries"; 0 if the person answers "Let anyone come who wants to" or "Let people come as long as there are jobs available."

Figure A 3: *labor_discrimination_agree*, Average by Country and Year of Survey

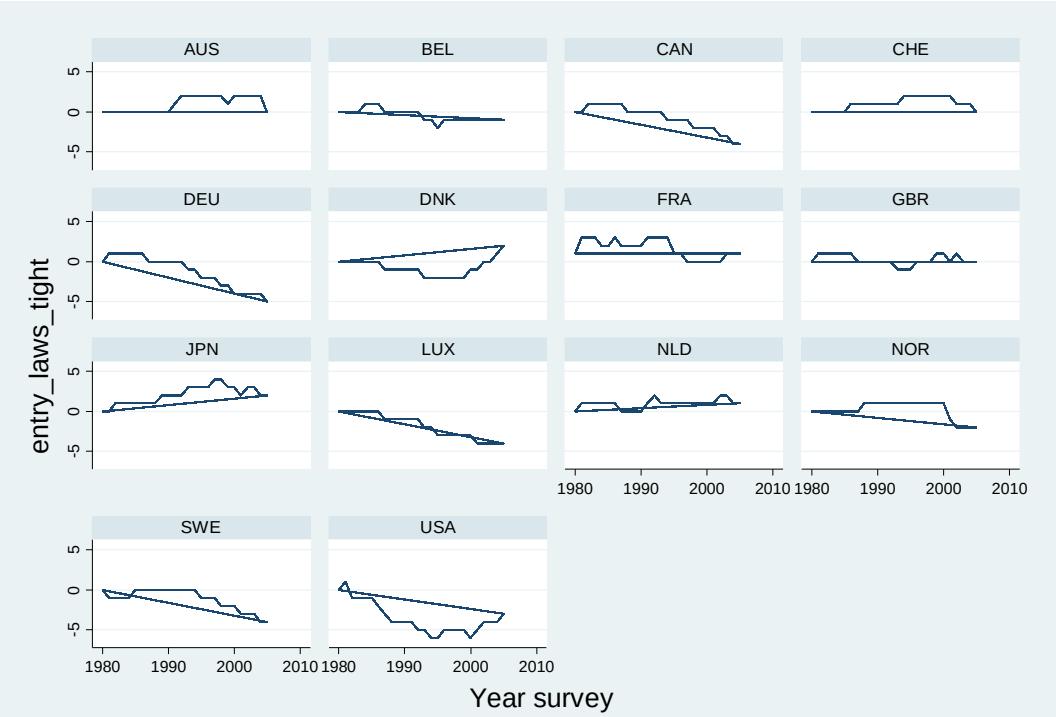
Notes We compute country averages using the *collapse* STATA command and design weights. *labor discrimination agree* draws from the IVS question: "When jobs are scarce, employers should give priority to [nation] people over immigrants. Do you disagree, agree, or neither?" and takes the following values, according to the answer provided: 1 if the person answers "agree", 0 if the person answers "neither" or "disagree".

Figure A 4: *no_immigrant_neighbor*, Average by Country and Year of Survey



Notes: We compute country averages using the *collapse* STATA command and design weights. *no immigrant neighbor* draws from the IVS question: "On this list are various groups of people. Could you sort out any that you would not like to have as neighbors?," and is equal to 1 when a respondent mentions either "immigrants," "foreign workers" or "people from a different race". It is 0 otherwise.

Figure A 5: Changes in Immigration Policies



Sources: Mayda and Patel (2004) and Ortega and Peri (2013). The measure reflects changes in destination countries' migration policies related to immigrants' entry possibilities. The measure is normalized to zero for all countries in 1980. Each year up to 2005 the indicator value remains the same, increases by 1 or decreases by 1 according to whether the country does not change its migration policy, adopts stricter measures, or implements more open policies, respectively. See Mayda and Patel (2004) and Ortega and Peri (2013) for more details on the indicator construction.

Chapter 3

Deal Drugs Once, Deal Drugs Twice: Reinforcing Peer Effects in Prison on Recidivism

Deal Drugs Once, Deal Drugs Twice: Reinforcing Peer Effects in Prison on Recidivism*

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Abstract—Given its illegal nature, criminal activity is likely to be learned through social interactions. Few studies, however, estimate a causal relationship between social networks or peer interactions and individual delinquency. This study investigates the effects of other inmates' criminal background on crime-specific recidivism among young adults incarcerated for the first time. For drug offenders we find robust evidence that exposure to other young drug offenders while serving time increases the probability of recidivism with a drug-related offense, i.e., reinforcing peer effect for drug criminals. By contrast, we do not find strong evidence of peer effects for other types of crimes. We also show that the definition of the peer group is of key importance for testing the existence and magnitude of peer effects in prisons. Indeed, we find strong evidence of reinforcing peer effects when defining peers as inmates of similar criminal background and age, whereas we find little evidence of peer effects when defining peers as inmates of similar criminal background but irrespective of their demographic characteristics. Our findings suggest that prison assignment policies can be used to prevent recidivism of young offenders with a drug-related criminal background.

Keywords: crime, peer effects, young offenders, prisons

JEL Classification codes: K4, J10

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1. Introduction

Crime yields high social costs (for US evidence, see, e.g., Anderson, 1999). There is extensive evidence that the tendency to commit crime is much higher for men and peaks in late adolescence and early adulthood (Hirschi and Gottfredson, 1983; Greenberg, 1985; Hirschi and Gottfredson, 1985; Steffensmeier et al., 1989; Andersen and Tranæs, 2011). Given its illegal nature, criminal activity is likely to be learned within social networks and through peer interactions.[1] Previous findings document the importance of social networks in determining criminal activity (Case and Katz, 1991; Reiss, 1988; Glaeser et al., 1996; Ludwig et al., 2001; Kling et al., 2005). Few studies, however, estimate a causal relationship between peer interactions and individual delinquency. Three notable exceptions are Ludwig and Kling (2007); Bayer et al., (2009); and Damm and Dustmann (2012).[2] Exploiting the Moving-To-Opportunities Demonstration, Ludwig and Kling (2007) find no effect of neighborhood crime—measured by the number of committed violent crimes reported in the police beat per 10,000 inhabitants—on juvenile arrests for violence. Exploiting quasi-random assignment of refugees over Denmark, Damm and Dustmann (2012) find no effect of neighborhood crime—measured by the rate of committed violent crimes—on juvenile delinquency. However, they argue that the share of *young* criminals in the neighborhood better accounts for social interactions with delinquent peers living in the neighborhood. Using this measure of neighborhood crime, they establish a causal relationship between growing up in a highly criminal neighborhood and male juvenile delinquency. Furthermore, they find that the youth crime conviction rate of individuals from the same ethnic group matters more than the overall youth crime conviction rate in the neighborhood. Exploiting random variation in the duration of time-overlap between juveniles in the same correctional facility and data from Florida, Bayer et al. (2009) show that young inmates acquire and even strengthen criminal capital behind bars due to peer effects. In particular, a youth who serves time with juvenile offenders with similar criminal background is more likely to recidivate with the same type of offense.

Our study investigates whether young individuals acquire criminal capital in sentencing facilities due to peer effects. The offenders in our sample serve time with inmates who differ not only in terms of criminal background but also in terms of demographic characteristics like

[1] See also, e.g., the pioneer works of Becker (1968) on the determinants of criminal behavior and Freeman (1999) for an extensive literature review.

[2] Another recent study (Corno, 2012) brings evidence that peers affect criminal behavior among the homeless. Corno directly observes individuals' networks and, using instrumental variables, identifies strong peer effects: The probability of arrest of the homeless increases by 20 percentage points when acquainting other homeless people with a criminal record.

age, ethnicity and county of residence. We expect young offenders to have more social interactions with offenders with both a similar criminal background and similar demographic characteristics. In other words, we expect stronger peer effects on individual recidivism with a repeat offense due to the share of inmates with similar age or ethnicity and similar criminal record than due to the share of all inmates with similar criminal record. If our hypothesis holds, a policy that groups inmates with similar criminal background and demographic characteristics may have the unintended effect of increasing exposure to peers who can facilitate a criminal career.

We add to the literature in at least three ways. First, using linked administrative and criminal data from Danish registers over 10 years, we estimate peer effects in prisons for first-time incarcerated individuals aged 18 to 22. To date, there is only evidence about peer effects among juveniles. Second, our study offers a test as to whether the results of Bayer et al. (2009) hold in a different institutional context than the one of Florida. In addition to a different offer of training and programs *during* incarceration, young inmates in Denmark can benefit from a more accessible educational system, different labor market opportunities and policies *after* incarceration that all can ease reinsertion in the society and prevent new criminality. Hence, this paper takes a new look at peer effects from prison on recidivism by focusing on a new age group and a different institutional context compared to the Bayer et al. (2009) study. Moreover, as our data covers all sentencing facilities in Denmark, we examine whether peers' effect on crime varies with the type of sentencing institution—open, closed, or local prison. Third, we use several peer definitions, distinguishing peers not only by criminal background but also by demographic characteristics as presented in the following paragraphs.

Using a unique person identifier, we link records on incarceration, charges, and convictions for the entire Danish population from the central Police registers with Danish administrative registers. To ensure that any peer effect reflects true criminal capital transmission behind bars and is not due to past incarceration, we extract a sample of individuals incarcerated for the first time at age 18 to 22 between 1994 and 1997 and look at their criminal convictions within one year after release.[3] As Bayer et al. (2009), we use facility-by-prior-offense fixed effects to deal with possible non-randomness in prison assignment and identify peer effects from the random variation in the duration of time-serving

[3] In Denmark, the minimum age of criminal responsibility was 15 until July 2010 (where it was sunk to 14). Denmark has no juvenile justice system: Persons aged 15 and above are sentenced in the same courts as adults and in accordance with the same criminal code (Kyvsgaard, 2004). However, most juveniles convicted of an unconditional sentence serve time in a half-way house (*pension* in Danish). Unfortunately, the central Police registers have no information about incarcerations in half-way houses before 2007. Therefore, we exclude juvenile offenders from our sample.

overlap between each pair of inmates in a facility. Our study uses a number of alternative peer definitions. We define peers as other inmates with a criminal history in offense *h* and: (1) from the same age group (below the age of 26); (2) from the same ethnic group (Western vs. non-Western); (3) from the same age and ethnic groups; (4) from the same age group and the same county; (5) irrespective of demographic characteristics.

We distinguish six representative types of offense: misdemeanor assault, burglary, theft, handling of stolen goods, vandalism, and drug-related offenses. For drug criminals we find strong evidence that peer exposure increases the probability of recidivism with a drug-related offense (i.e., reinforcing peer effects) when we define peers as other inmates from the same age group or from the same age and ethnic groups. By contrast, this reinforcing effect of exposure to drug offenders turns insignificant when we define peers as all other inmates irrespective of demographic characteristics. The magnitude of the reinforcing effect for drug-related crimes is sizable: A one-percentage point increase in the share of young convicts of drug-related offenses increases an individual's propensity to commit a new drug-related offense by 2.7 percentage points, if the individual has experience in drug-related offending. In other words, a standard deviation increase in the share of young inmates with a drug conviction augments the likelihood of recidivism with drugs of first-time incarcerated drug convicts' by 9 percentage points. Our findings thus partly support the view that young offenders build criminal capital behind bars due to social interactions with inmates with similar criminal history and demographic characteristics. Moreover, our results highlight the importance of defining peers appropriately to identify peer effects. From a political perspective, our findings can help design more appropriate prison assignment strategies to prevent recidivism among young drug offenders.

The rest of the paper is organized as follows. Section 2 presents information about Danish sentencing institutions. Section 3 introduces the data and depicts summary statistics. Section 4 explains the empirical model. Section 5 presents the empirical results from our baseline specification and robustness analyses. Section 6 concludes.

2. Danish Sentencing Institutions

2.1. Contemporary Prison Assignment Criteria

The assignment of criminals to sentencing institutions in Denmark is decided by The Danish Prison and Probation Service (thereafter DPPS, *Kriminalforsorgen* in Danish).[4] The decision of the DPPS depends on factors such as the sentence, the age, or the residence location and follows the Danish Sentence Enforcement Act.[5] The assignment decision is typically a two-stage decision process. First, the DPPS chooses the type of institution the offender should be sent to: an open state prison or a closed state prison.[6] By law, as a starting point, offenders with an unconditional sentence must serve time in an open state prison. Yet persons with a sentence longer than five years, with a high protection need, a high risk of evasion, or known as gang members may serve time in closed prisons, characterized by higher levels of security and monitoring.[7] Local prisons (*arresthus* in Danish) are primarily used for custody, but members of certain gangs and offenders with a short sentence may serve their entire sentence in a local prison.[8]

Second, the DPPS chooses a particular prison where to send the offender. The primary determinant is the age of the person. Offenders of age 18 or 19 are typically sent to an open prison close to their residential address, so that they can stay close to their relatives and easily remain enrolled (or become so while serving time) in education or vocational training. Offenders between 20 and 22 assigned to an open prison can go to any open institution, whereas offenders of the same age group assigned to a closed prison must serve their time at the prison of Ringe. In the decision of the particular prison, the second-most important determinant includes family needs (e.g., whether one has young children or elderly parents who need care), medical treatment needs (e.g., for drug or gambling addicts), and whether the

[4] During interviews with the responsible unit we learned that, formally, the Police decides on the prison assignment of weapon- and violence-convicted criminals. Yet, the Police follows the guidelines of the DPPS.

[5] Available (in Danish) in Retsinformation (2013). This Act, nonetheless, leaves the DPPS with some discretionary power to consider practical issues such as bed availability.

[6] For some groups of offenders alternative sentencing forms exist. For instance, juveniles and persons with medical needs may serve their full sentence in treatment institutions, including half-way houses and offenders with a sentence of less than five months can avoid custodial serving via electronic monitoring since 2005.

[7] A few institutions (e.g., the open prisons of Kragskovhede and Møgelkær) also have half-open sections with an intermediary security level.

[8] In addition to the country's 36 local prisons, the term local prison encompasses the arrest departments in three closed state prisons (Nyborg, Vridsløselille and Østjylland). Local prisons generally apply the same rules as the closed prisons (DPPS, 2013).

person is likely to return to education or employment after release. Detailed information on each criminal offender is accessed via several documents available to the DPPS including a visitation scheme filled out at the local prison by both the personnel and the offender and the person's criminal dossier provided by the Police.[9] The third most important determinant of the choice of prison is capacity.[10] If none of the above-mentioned determinants applies, the DPPS may assign criminals in an institution according to their municipality of residence.[11]

Moreover, young inmates change institutions more often than older inmates so that they can, for instance, be closer to education or vocational training facilities in their area of residence and, thus, slowly prepare for the post-release period. Our data allow us to observe an individual who serves a sentence in different institutions. Moreover, we have administrative information on the person's age, level of education at time of incarceration, family situation, and municipality of residence.[12] In the remaining text, we will use interchangeably the terms prison, institution, and facility to refer to all types of prison.

2.2. Inmates' Interactions within Facilities

Each facility houses several sections and is responsible for offender assignment to a particular section. For instance, gang members serve time in highly secured sections fully separated from the remaining sections, while juveniles serve time in juvenile sections. However, according to the DPPS the composition of sections cannot be always predetermined.

Possibilities for interactions between inmates are multiple. Except if they are placed in highly secured sections, inmates can meet across sections during the day while attending classes and workshops or exercising in the yard. Inmates usually share kitchen amenities with the rest of the section. Some open prisons have double cells. The composition of a cells varies constantly with the facilities' accurate needs, and thus cell composition is not registered. Possibilities for electronic communication are limited; inmates have access to new technologies when necessary for daytime training, but only relevant websites are accessible

[9] In contrast to the dossier provided by the Police, the content of the visitation form cannot be encrypted and is therefore unobserved by us. Most information in the form is relevant for inmates with incarceration history, and we choose to look only at peer effects for individuals incarcerated for the first time. A blank version of the form can be obtained from the authors.

[10] Capacity represents an increasingly important issue over the past two decades particularly due to the development of gang wars, which has led to an overcrowding of highly secured sections.

[11] Assignment according to the municipality of residence follows the DPPS internal guidelines.

[12] Information on employment status at the time of incarceration is available to us, but we decide to disregard this variable because of its obvious endogeneity with incarceration and recidivism.

and mobile phones are prohibited.[13] Finally, toward the end of their sentence, young inmates typically enroll in an education program outside the prison. Young inmates then can interact with persons from other sections or from outside the facility.

3. Data

3.1. Primary Data Sources, Sample Construction, and Peer Measures

Our data stem from five primary sources: (1) the central Police registers on individual incarcerations in a Danish sentencing institution for the entire population, irrespective of the country of residence; (2) the central Police registers on individual crime convictions for the entire Danish population; (3) the central Police registers on individual crime charges; (4) the administrative registers, which provide individual demographic characteristics for the entire Danish population (age, marital status, number of children below age 18, current residence, country of origin, and immigrant status); and (5) the Educational Institution Register and Surveys, which provide information about individual educational attainment. All registers are available for the period 1980-2009. However, we limit our observations to the years between 1991 and 2006 for two reasons. First, the central Police registers lack information about the date of release before 1991. Second, following a reform that modified Police districts in 2007, Statistics Denmark stopped converting the coding of sentencing institutions registered by the Police, and since then institutions have been coded differently. We can link individual records from the five registers using a unique person identifier for Danish residents.

In our observation period, the central Police registers on incarcerations contain information about the date of incarceration, the date of release, the reason for incarceration, the reason for release, and the identifier of the sentencing institution. We use this information to construct facility-specific spells of incarcerations for all persons in Danish sentencing institutions. The central Police registers on crime convictions include information about the date of conviction, the verdict, the sentence, and the type of offense. We link this information to the first charge in an individual's lifetime using the central Police registers on individual charges to construct individual crime histories.

To construct our sample, we link individual records from all five registers and extract observations for offenders who were incarcerated for the first time between 1994 and 1997 at age 18 to 22. We use age 18 as the lower age limit because most juvenile offenders serve time

[13] Yet, entrepreneurs in open prisons may get access to a computer and the internet in order to continue running their business.

in a half-way house, which unfortunately does not appear in the registers before 2007. Moreover, according to the DPPS, juvenile offenders who are incarcerated for the first time have most likely already committed a series of criminal activities unpunished due to their young age; i.e., they are habitual offenders. By contrast, older first-time incarcerated offenders are not necessarily habitual offenders. Fortunately, the number of juvenile offenders who receive an unconditional prison sentence is quite low. In 2007, only 88 juveniles received an unconditional sentence compared to 1,376 offenders aged 18 to 22 (Statistics Denmark, 2012). We use age 22 as the upper age limit because this age threshold is often used in the decision on prison and prison section assignment (e.g., the prison of Ringe houses mainly men under 23, while all men in the institution of Vridsløselille are 23 or above). Moreover, to ensure that individuals are not influenced by peers from earlier incarcerations, we look only at persons incarcerated for the first time. We look at persons incarcerated from 1994, i.e., three years after the first year of observation of the release period in the central Police registers given that the Danish age of criminal responsibility is 15. We exclude individuals incarcerated after 1997 to avoid potential bias stemming from a reform voted in 1997 (*Voldspakke II*).[14] The resulting sample counts 1,928 individuals.

In addition, we construct a data set with facility-specific spells of incarceration, individual crime histories, and individual demographic characteristics for all persons serving time in a Danish sentencing institution over the 1994-2003 period.[15] This data set allows us to construct different peer measures. In our baseline specification, the peer measure (Peer measure I) is the share of inmates below the age of 26 at the time of incarceration (thereafter *young* peers) who have a criminal history with offense *h* weighted by the time-serving overlap with young inmates with criminal history with offense *h* relative to the time-serving overlap with all young inmates, irrespective of criminal history. To construct this peer measure, we first calculate for each facility *j* and at any date *t* in our observation period the share of young individuals who have a criminal history with offense *h* as the number of young individuals who have been convicted of offense *h* divided by the total number of young individuals. Next,

[14] *Voldspakke II* was voted in May 1997 (law nr. 350 on 23 May 1997). To our knowledge, the only study that evaluates the causal effect of the reform on incarceration length for violent crime is Landersø (2012), who shows a significant increase by 13 percent (p10) of a 2002 change of the reform in the penal code, and no other study documents any effects of the reform before 2002. Nevertheless, as we cannot exclude that *Voldspakke II* might have increased incarceration length for violent offenses already from 1998, which might influence the incarceration length of individuals in our sample, we restrict our observations to people incarcerated before 1997. See Sections 4 and 5 for tests of our identification strategy.

[15] Criminal history and demographic characteristics are only observed for Danish residents. As some individuals in our sample are only released as late as 2003, our data set covers the 1994-2003 period.

for each individual *i* in our sample we construct the share of young inmates who have a criminal history with offense *h* by leaving out individual *i*'s own criminal history from the calculation of the share of young individuals who have been convicted of offense *h* in facility *j* at date *t*. Finally, for each individual *i* in our sample we construct the share of young inmates with a criminal history with offense *h* weighted by the number of days overlap between the serving time of individual *i* and the serving time of her inmates with criminal history in offense *h* relative to the number of days overlap between the serving time of individual *i* and the serving time of inmates with criminal history in all offenses. We repeat the same technique to construct alternative peer measures defining peers according to similar criminal background and other demographic characteristics: (1) Peer measure II, inmates from the same ethnic origin (Western or non-Western); (2) Peer measure III, inmates from the same ethnic origin and below the age of 26; (3) Peer measure IV, inmates from the same county and below the age of 26; (4) Peer measure V, all other inmates irrespective of demographic characteristics.

3.2. Descriptive Statistics

Table 1 depicts some summary statistics of our main variables. 95% of individuals in our sample are males and 88% are ethnic Danes (i.e., neither immigrants nor descendants).[16] At the time of first incarceration (early 1996 on average), 10% of the individuals have children under the age of six and 0.2% are married. Moreover, 8% of the individuals in the sample have completed a vocational education degree at the time of incarceration. The average age at incarceration is almost 19.

Some individuals are transferred to another facility during their sentence and thus the overall incarceration duration of individuals consists of one or more facility-specific spells. For individuals with more than one facility-specific spell, we keep only the longest spell. The average duration of the longest facility-specific spell is 43 days.[17] Most individuals serve their longest spell in an open institution (66%), while only few serve it in a closed prison (7%) or a local prison (27%).

[16] We follow the definition of Statistics Denmark. Immigrants are born abroad of parents without Danish citizenship and born outside Denmark. Descendants are born in Denmark and none of their parents are both Danish citizen and born in Denmark. The average overall share of the immigrant and descendant population in Denmark is about 7.5% in the same period (Statistics Denmark, 2012).

[17] 511 individuals in our sample serve their sentence across several institutions. For these individuals, the longest spell represents about 40% of the total duration of incarceration.

At the present stage we focus on six categories of offenses: misdemeanor assault (or simple violence), burglary, theft, handling of stolen goods, vandalism, and offenses against the drugs act. We choose these 6 crime categories on the basis of two selection criteria: (1) the crime category should be easily interpretable for policy purposes (unlike "other penal code offenses" or "unknown type of crime"); and (2) the probability of recidivism with the crime category should be high enough for a precise estimation. We then disregard offense categories such as "arson" and "murder or murder attempt" with which less than one percent of the individuals in our sample recidivate. When we look at individual criminal histories, 38% of the sample have been convicted at least once for misdemeanor assault, 28% for theft, and 21% for burglary. Yet most individuals recidivate with theft (10%), burglary (9%), or drug-related offenses (6%).

Turning to peers' characteristics, we observe that most inmate fellows are males (96%), above 26 years old (70%), of Western origin (92%), Danish residents (97%), and without a vocational education degree (75%). The average number of inmates vary across facility types. While overall a prison houses daily 57 inmates, of whom 17 are below the age of 26, an open prison count 124 inmates, of whom 33 are below the age of 26. As far as peers' criminal background is concerned, we note that 12% of young peers have at least one earlier conviction for burglary, 11% for theft, 11% for misdemeanor assault, and 6% for drug-related offenses. The respective shares of peers' criminal characteristics are fairly similar across peer definitions, although misdemeanor assault is much less represented among peers defined without an age restriction (6% for Peer measures II and V).

We also have information on individuals' and peers' municipality characteristics, i.e., socioeconomic and criminal environments that may influence criminal behavior. Table 1 shows, among other things, that the average real gross income per capita is approximately DKK 200,000 (USD 34,000), the unemployment rate is 9.3%, and the overall youth crime conviction rate (after exclusion of traffic offenses) is 2.4% in the municipality of residence of individuals at the time of incarceration. The peers' average municipality unemployment rate is 9.6% and peer's average overall crime conviction rate is 2.3% at the time of incarceration.

[Table 1 about here]

4. Methodology

4.1. Studying Peer Effects

The estimation of peer effects contains several identification challenges. The most commonly applied model considers an individual outcome (Y_i) a function of individual characteristics (X_i), individual's peers' average characteristics ($\overline{X}_{-i}$), and individual's peers' average outcome ($\overline{Y}_{-i}$). This model, also known as the linear-in-means model, can formally be written as:

$$Y_i = \theta + \varphi_1 * \overline{Y}_{-i} + \omega_1 * X_i + \omega_2 * \overline{X}_{-i} + \varepsilon_i \ . \quad (1)$$

The work of Manski (1993) highlights the *reflection problem* that arises when studying peer effects with simple OLS regressions in Eq. (1). This issue typifies in that the outcome of each member *i* potentially affects the outcome of the rest of the group *–i* (*endogenous effect*) and, thus, reverse causality may exist between Y_i and $\overline{Y}_{-i}$ in Eq. (1). This endogenous effect may be accompanied by what Manski (1993) calls an *exogenous effect*, or the effect of average peer's characteristics. The endogenous effect and the exogenous effect make it difficult to distinguish the effect of average peers' outcome, φ_1 in Eq.(1), from the effects of average peers' characteristics, ω_2 in Eq. (1), since peers' characteristics determine peers' outcomes. An additional identification problem relates to the difficulty of eliminating potential bias from selection into the group.

4.2. Model and Identification Strategy

We introduce our empirical model by presenting how we deal with the issues just described. First, strong functional form assumptions are necessary to eliminate the reflection problem. Similarly to previous works, e.g., Bayer et al. (2009) and Corno (2012), we assume that φ_1 is zero, i.e., peer effects take place through interactions within the group only due to peers' characteristics rather than subsequent peer outcomes. Therefore, we do not include a measure of peers' average outcome ($\overline{Y}_{-i}$) on the right-hand side.

Second, we deal with possible selection into prisons by inserting facility-by-prior-offense fixed effects in our specification.[18] Such fixed effects enable us to control for the non-

[18] Similar fixed effects are used in Bayer et al. (2009). Our interviews with the DPPS have allowed us to identify the most decisive criteria, which we can observe, used to assign young offenders to a particular prison. Moreover, we have learned that

randomness of assignment to prisons due to criminal background and other observables and to identify the probability of recidivism from the variation in the duration of sentence-serving overlap between each pair of inmates in a facility. We include these fixed effects separately for individuals with and without prior experience in offense *h*, and thus we account for the possibility that peer effects are not linear-in-means but heterogeneous across individuals' criminal history.

For this method to be valid, first, some within-variation of peer characteristics within prisons should be observed, and this variation should be uncorrelated to individual characteristics. Second, the validity of this method is conditional on the close-to-randomness of the timing of assignment of individuals with respect to the other inmates' characteristics. In other words, the presence of a criminal trend in our sample period would undermine the validity of our results. Although a simple test does not show strong systematic evidence of trends in criminality, we include quarter-of-release fixed effects to rule out any time trend. Furthermore, we test the first condition and show the results in Section 5. We do not find any strong correlations between our peer measures and recidivism predicted by individual and municipality characteristics once we account for facility-by-prior-offense fixed effects. This latter result supports the validity of our identification strategy.

Formally, we apply the following model as our baseline specification:

$$R_{ijt}^{h} = \beta_0\left(Offense_{ijt}^{h} * peer_{ijt}^{h}\right) + \beta_1\left(No\_Offense_{ijt}^{h} * peer_{ijt}^{h}\right) + \alpha P_{ijt} + \gamma X_{ijt} + \lambda_j + Offense_{ijt}^{h} * \mu_j + \eta_t + \varepsilon_{ijt}^{h} \; . \quad (2)$$

R_{ijt}^{h} equals 1 if a young criminal *i*, first-time incarcerated in prison *j*, recidivates with offense *h* (h = 1,…,6) at date *t* and within 12 months after release.[19] $Offense_{ijt}^{h}$ is 1 if individual *i* has committed an offense of type *h* before her first incarceration, while $No\_offense_{ijt}^{h}$ is 1 if individual *i* has no recorded history of offense *h*.[20] The vector $peer_{ijt}^{h}$ measures individual *i*'s exposure to peers with experience in offense *h* and below the age of 26 (Peer measure I).

young criminals were more likely to be randomly assigned to prisons in our sample period than what they are today. We show results with and without prison fixed effects alternatively (Table 4).

[19] The term recidivism means committing, within one year after release, an offense that will end with a conviction. Future work includes looking at a longer time span (two or three years) after release.

[20] Similar to Bayer et al. (2009), we argue that any history of crime of type *h* must be accounted for as opposed to the most recent crime only, as—especially young—criminals might be incarcerated not only as a result of their most recent criminal activity but also due to their entire criminal history.

Alternatively, we define peers as presented at the end of Section 3, that is inmate fellows with experience in offense *h* and: (Peer measure II) from the same ethnic origin (Western vs. non-Western); (Peer measure III) from the same ethnic origin and below the age of 26; (Peer measure IV) from the same county and below the age of 26; (Peer measure V) irrespective of demographic characteristics. β_0 and β_1 are called the *reinforcing* peer effect and the *introductory* peer effect, respectively, and constitute the estimates of interest. P_{ijt} and X_{ijt} capture, respectively, peer and individual demographic characteristics such as age, gender, ethnicity, whether the person had completed a vocational education at the time of incarceration, and criminal histories in all types of offense h. The vector $Offense_{ijt}^{h} * \mu_j$ captures facility-by-prior-offense fixed effects and λ_j represents prison fixed-effects. The vector η_t accounts for possible time trends and represents dummies for each quarter of release represented in our sample.

Our paper departs from Bayer et al. (2009) and uses alternative peer definitions. In a robustness test, we conduct pairwise comparisons of peer measures applying the following model to our data:

$$R_{ijt}^{h} = \beta_0\left(Offense_{ijt}^{h} * peerA_{ijt}^{h}\right) + \beta_1\left(No\_offense_{ijt}^{h} * peerA_{ijt}^{h}\right) + \beta_2\left(Offense_{ijt}^{h} * peerB_{ijt}^{h}\right) + \beta_3\left(No\_Offense_{ijt}^{h} * peerB_{ijt}^{h}\right) + \alpha P_{ijt} + \gamma X_{ijt} + \lambda_j + Offense_{ijt}^{h} * \mu_j + \eta_t + \varepsilon_{ijt}^{h}, \quad (3)$$

where the vector $peerA_{ijt}^{h}$ stands for Peer measure I and the vector $peerB_{ijt}^{h}$ represents alternatively Peer measures II to V.

5. Results

5.1. Baseline Specification

We introduce the empirical results from the baseline specification (Eq. 2) in three steps: by presenting results on specialization in crime without accounting for peer effects, by testing the validity of our identification strategy, and finally by discussing the coefficient estimates from running Eq. (2). First, in Table 2, we present the results of simple OLS regressions of an individual's probability to recidivate with a particular offense conditioning on criminal history in all types of offenses. The coefficient estimates show that having been convicted for a particular offense is positively and significantly correlated with the propensity to recidivate with the same offense. For instance, a first-time incarcerated offender with earlier convictions

of burglary is 11% more likely to be convicted of burglary within one year upon first release compared to an individual with no earlier conviction of burglary (column 2). Interestingly, the average of the off-diagonal coefficients, which represent criminal history in all the other types of offense, is close to zero in all columns and always smaller than the diagonal coefficient. Table 2 shows the relevance of distinguishing peer effects by individual's conviction history in the particular crime category in Eq. (2) and (3).

[Table 2 about here]

Second, we test our identification strategy. We identify peer effects on crime-specific recidivism from the random variation in overlap between the incarceration spells of two inmates in a facility. This variation is random if our interacted peer measures $\left(Offense_{ijt}^{h} * Peer_{ijt}^{h}\right)$ and $\left(No\_Offense_{ijt}^{h} * Peer_{ijt}^{h}\right)$ are unrelated to individual characteristics within a facility (cond. 1) and if criminal behavior of young delinquents is not influenced by any criminal trend over time (cond. 2). We account for cond. 2 by including time fixed effects (i.e., dummies for each quarter of release for each individual).[21] To deal with cond. 1, we first construct a predicted indicator for recidivism with offense *h* using individual and municipality characteristics and facility fixed effects. Then, we run a regression of the predicted indicator on the two interacted peer measures with and without facility-by-prior-offense fixed effects. Table 3 presents the results. Without facility-by-prior-offense fixed effects (Panel A), the two interacted peer measures appear significantly correlated with the characteristics used to construct the predicted indicator of recidivism, although the coefficients are small. Hence, using across-facility variation our interacted peer measures associate with individual attributes behind recidivism in each crime category, which likely also determine prison assignment.

When we add facility-by-prior-offense fixed effects (Panel B) and thus use only within-facility variation in peer measures, the significance of the interacted peer measures disappears. Although one out of twelve coefficients turns significant (*burglary*, column 8), all coefficients are very close to zero. Therefore, peer measures and individual characteristics are not related within a facility when we add facility-by-prior-offense fixed effects to the model. As a result, these fixed effects allow us to identify peer effects from the random variation in time-serving overlap between two inmates in a facility.

[Table 3 about here]

[21] Alternatively, we use a dummy for each quarter of incarceration. Results (not shown here) are very similar.

Table 4 presents the main empirical results when we apply different sets of controls. In Panel A, we report the correlations between peer measures and crime-specific recidivism using Control set 1: the two interacted peer measures, the share of peers with criminal background in each of the other five offenses, and indicators for having a criminal history in each of the six offense categories. Virtually all estimated correlations in Panel A are insignificant, although the correlation between the share of peers with a drug-related offense and recidivism with a drug-related offense is rather large in magnitude (column 6, Panel A). In Panel B, we report estimated correlations using Control set 2: Control set 1, other individuals characteristics, characteristics of municipality of residence at the time of incarceration, demographic characteristics of peers and time and prison fixed effects. The estimated correlation between the share of peers with a history in drug-related offending and individual recidivism with drug-related offending increases in magnitude and turns significant at a 5-percent significance level (column 6, Panel B). Finally, we estimate the causal effects of peer exposure on crime-specific recidivism using Control set 3: Control set 2 and facility-by-prior-offense fixed effects. The results are reported in Panel C. Two estimates of peer effects are significant: the reinforcing peer effect on recidivism with a drug-related offense of 2.7 percentage points (significant at a 1-percent level) and the introductory but negative peer effect on recidivism with misdemeanor assault (significant at a 5-percent level).[22] Also notice that the coefficient estimates in Panel B are overall very close to the estimates in Panel C, suggesting that non-randomness of offenders' assignment to a particular prison and time-serving overlap between two inmates may not be a critical issue in our sample.[23]

To sum up, in Table 4, we find significant evidence that young drug-criminals strengthen criminal capital behind bars, increasing the probability of recidivism in drug-related offenses. A way to interpret our finding is to see by how much the propensity to commit new drug crime varies for drug convicts due to peer effects in prison. To do so one can compare the estimates in Table 4 (i.e., recidivism due to peer effects) to the numbers in Table 2 (i.e., individual propensity to specialize in crime irrespective of peer effects). A standard deviation increase in the number of inmates under the age of 26 with drug-related criminal background (3.4) increases the likelihood of recidivism with drugs for individuals with a background in drugs from 17% (Table 2) to 26% (Table 4), i.e., by 9 percentage points.

[22] Table A2 in the Appendix displays estimates for all control variables included in the model in Control set 3 in Table 4.

[23] We estimate Eq. (2) with the same set of controls as in Control set 2 simultaneously for ten crime-specific recidivism indicators instead of the six crime-specific recidivism indicators in Table 4. Results are shown with all control variables in Table A7. We still find reinforcing peer effects only on drug-related recidivism.

[Table 4 about here]

5.2. Robustness and Sensitivity Analyses

Next, we test whether peer effects vary with the definition of peers to investigate if interactions take place more often among individuals not only from the same age group but also from the same ethnic group or from the same residential area. Table 5 presents the results when we change the definition of peers and use Peer measures II to V. All specifications in Table 5 include the full set of control variables and facility-by-prior-offense fixed effects.[24] Using peer measure II (Panel A), other inmates from the same ethnic group (Western or non-Western origin), we do not find any significant peer effects on crime-specific recidivism.

Using peer measure III (Panel B), other inmates from the same ethnic group and below 26 years old, we find evidence of reinforcing peer effects on drug-related offenses (estimate of 2.1 percentage points in column 6) of a magnitude similar to that of the estimate in Table 4 (estimate of 2.7 percentage points, column 6, Panel C, Table 4), but less precisely estimated. Moreover, in contrast to the findings in Table 4, we now find negative but small estimates of introductory peer effects on vandalism and drug-related offenses (estimates of 0.3 and 0.4 percentage point, columns 5 and 6, respectively, Panel B, Table 5). The later results suggest that exposure to peers with a criminal history in vandalism (drug-related crimes) decreases the probability of recidivism with vandalism (drug-related crimes) for individuals without experience in vandalism (drug-related crimes).

Using peer measure IV, young inmates from the same county of residence, we do not find any statistical evidence of peer effects (Panel C).

Similarly, using peer measure V, all inmates irrespective of demographic characteristics (Panel D), we do not find any significant positive crime-specific peer effects. Nevertheless, we find a negative reinforcing peer effect on recidivism with misdemeanor assault and negative introductory peer effects on recidivism with theft and vandalism. The statistically significant peer effects in Panel D might suggest that older inmates with past experience in one of these three offenses discourage young offenders to recidivate with these two offenses. Recall, however, that peer effects on recidivism with theft and vandalism are insignificant

[24] See in the Appendix Tables A3, A4, A5, and A6 for the validity test of our identification strategy (similar to the test presented in Table 3) when defining peers as inmates from the same ethnic origin (Western vs. non-Western), as inmates from the same ethnic origin and below the age of 26, as inmates from the same county and below the age of 26, and as inmates irrespective of age or ethnicity, respectively.

when we use our preferred peer measure (Peer measure I or inmates below the age of 26) in Table 4.

[Table 5 about here]

To be able to conclude more clearly on which peer definition best characterizes social interactions of inmates, we propose to compare pairwise peer effects from different peer groups in the same econometric specification. Tables 4 and 5 show evidence of reinforcing peer effect on drug-related recidivism, when defining peers according to Peer measures I (young inmates) and III (young inmates of the same ethnic origin), respectively. In Table 6, we present estimates when applying Eq. (3) and control for two sets of peer measure simultaneously. Panel A of Table 6 reports estimates when both Peer measures I and III are included in the model. The estimate of the reinforcing peer effect on recidivism with a drug-related offense using Peer measure I is of similar magnitude as the baseline estimate in Table 4, whereas the reinforcing peer effect on recidivism with a drug-related offense using Peer measure III approaches zero. Moreover, a simple post estimation test rejects the null-hypothesis that both reinforcing peer effects in Panel A (column 6) are statistically insignificant at a 5-percent level. Taken together these findings suggest that Peer measure I captures social interactions of young inmates better than Peer measure III and that reinforcing peer effects exist for recidivism with drug-related offending.

In Panel B of Table 6, we report the estimated peer effects when using Peer measure I (young inmates) and Peer measure V (all inmates). By including both Peer measures I and V in the model, we can distinguish peer effects from young inmates from peer effects from older inmates. Comparing peer effects from young and older inmates is relevant, particularly in terms of transmission of criminal capital along two opposing hypotheses. First, novice criminals may learn from older and confirmed offenders behind the bars. Second, a young inmate may become discouraged to commit new criminality when exposed to older inmates with similar criminal records as the young inmate realizes that he, similarly to older inmates, may end up having a life punctuated by frequent prison stays. In other words, exposure to older inmates with a similar criminal background may exacerbate the criminality deterrence effect of a prison stay. The estimates in Panel B appear to corroborate the later hypothesis. Indeed, we find evidence of a significant and negative reinforcing effect on recidivism with misdemeanor assault due to exposure to older inmates convicted of misdemeanor assault (-2.4 percentage points, column 1, Panel B). According to this estimate a standard deviation increase in the share of inmates earlier convicted of simple violence reduces the likelihood of

reiterating with simple violence from 6.4% to 3.1%. In addition, our finding of a significant and positive reinforcing peer effect for drug-related offenses due to exposure to other young inmates reported in Table 4 (column 6, Panel C) is robust to the inclusion of Peer measure V in Table 6 (column 6, Panel B). In fact, the point estimate increases slightly (3.2 percentage points) in Table 6.

Panel C of Table 6 reports estimated peer effects when we include Peer measure I (young inmates) and Peer measure IV (young inmates from the same county). The positive and significant reinforcing effect on recidivism with a drug-related crime reported in Table 4 (column 6, Panel C) is robust to the inclusion of Peer measure IV. In fact, the point estimate in Table 6 (column 6, Panel C) increases somewhat (4.2 percentage points). The reason is that the estimate of the reinforcing peer effect for drug-related offenses due to peers under the age of 26 from the same county is negative and significant in Table 6 (-2.1 percentage points) in the same column. Thus, surprisingly, serving time with other young drug offenders from the same county appears to dissuade young drug offenders from recidivism with drug-related offenses. However, this finding should be interpreted with caution since no such result is found in Table 5 (Panel C).

[Table 6 about here]

We draw three main conclusions from our findings in Tables 4, 5, and 6. First, our finding of a positive reinforcing peer effect on recidivism with drug-related offending reported in Table 4 (Panel C) is robust to the inclusion of alternative peer measures in Tables 5 and 6. This robustness suggests that the peer measure that best captures social interactions in Danish prisons is Peer measure I, inmates under the age of 26 irrespective of ethnic origin and county of residence. The alternative peer measures are either too narrow (Peer measures II, III and IV) or too broad (Peer measure V). Second, we find little evidence of reinforcing and introductory peer effects for the five other types of offenses (misdemeanor assault, burglary, theft, handling of stolen goods, vandalism). Nevertheless, a third conclusion is that exposure to older inmates with the same criminal background may prevent young inmates from continuing down the criminal path as shown in Table 6, Panel B. At least we find robust evidence of such a protective peer effect for misdemeanor assault. This finding may partly reflect the implementation of proper training and treatment programs, such as anger management programs, that seem to be successful in reducing simple violence crimes also via learning peer effects.

The significant result for recidivism with offenses related to drugs may reveal the presence and, of greater concern, the development of networks involving drugs in prisons. If this is true, we would expect stronger peer effects in institutions where inmates have a greater opportunity to interact. In our data, we can distinguish three types of institution: closed state prison, open state prison, and local prison. Closed prisons are characterized by the highest level of monitoring and security, little possibility for bringing illegal objects in the institution, and fewer social interactions across the prison' s sections. By contrast, inmates in open prisons typically move more freely within the institution and sometimes participate in daytime activities outside the facility. Local prisons' main purpose is to house individuals in custody, but offenders in our sample may get to serve their whole sentence in a local prison if, for instance, their sentence does not exceed the number of days already spent in custody. Rules about security and monitoring in local and closed prisons are alike in many cases (DPPS, 2013). However, talking with the DPPS, we have learned that local prisons do not always have the resources to apply all rules. For instance, inmates and visitors in non-highly secured sections might not systematically get checked upon entry and the offer of training and treatment preparing for reinsertion is often more modest in local prisons. As a result, inmates are more likely to possess illegal objects facilitating continued drug operations and to interact with other inmates off training hours in local prisons than in closed prisons.

Given these differences, in another test we investigate whether peer effects vary by facility type. Due to the obvious possibility of selection on unobservables into a particular type of facility, we use interacted terms between our two peer measures and the facility type instead of running regressions separately for each facility type. We report our results in Table 7 where the peer definition refers to inmates under the age of 26.

In Table 7 we do not find evidence of difference in peer effects across facility types. The specification for drug-related offenses (column 5) shows the same coefficient as in Table 4, 2.7 percentage points, and we do not find any statistical estimate for any of the interaction terms. Moreover, interestingly, we find statistical evidence that incarceration in a closed prison reduces recidivism with burglary and that serving time in a local prison decreases the likelihood to commit vandalism.

[Table 7 about here]

All in all, our most robust finding suggests that inmate fellows below the age of 26 convicted of drug-related crime influence first-time incarcerated young drug convicts in recidivating with drug-related offenses.

Our findings are partly in line with those of Bayer et al. (2009), who provide strong evidence of reinforcing peer effects among juveniles in Florida (USA) for several offenses including offenses related to drugs. At first sight, the Bayer et al. (2009) point estimate of reinforcing peer effects for drug-related offending is significantly smaller than ours (0.31 vs. 2.7). Yet, the dissimilarity between the estimates of the two studies becomes substantially smaller if we compare changes in recidivism probability due to a standard deviation increase: 3 percentage points in Bayer et al. (2009) against 9 percentage points in our study. A major difference between our study and the Bayer et al. (2009) study is the simple probability of specialization in drugs depicted in Table 2: It is much higher in Bayer et al. (2009) (29%) than in our study (17%). One has to keep in mind that the two papers look at two different populations—juveniles vs. young adults—and depart from two different contexts. Thus, labor market, educational, and criminal opportunities are likely to differ between the two countries. In addition, previous studies have shown that juveniles have a higher likelihood to commit crime than adults for at least two reasons. First, they lack maturity to reflect on the consequences of crime (Moffitt, 1993; Pichler and Romer, 2011). Second, they tend to experience a lower employment penalty than older offenders as employers consider juveniles relatively less culpable when committing crime (Mears et al., 2007). Furthermore, Danish and Floridian institutions remain hardly comparable if they differ in terms of monitoring practices, trainings, treatment programs, and so forth during incarceration.

6. Conclusion

In this paper, we use Danish criminal and administrative registers to investigate peer effects on crime-specific recidivism among offenders incarcerated for the first time at age 18 to 22. Similar to Bayer et al. (2009), we deal with selection and possible time trends in criminal activity by including facility-by-prior-offense fixed effects and quarter-of-release fixed effects. We thus identify peer effects from the random variation in time-serving overlap between each pair of inmates in a facility. We define peers alternatively as other inmates with a criminal history in offense *h* and: (1) under the age of 26, (2) from the same ethnic group, (3) under the age of 26 and from the same ethnic group, (4) under the age of 26 and from the same county, and (5) irrespective of any demographic characteristics.

We provide robust evidence that drug convicts' exposure to other young drug convicts in prison increases their probability of recidivism with drug crimes (i.e., a reinforcing peer effect for drug-related crime). Our preferred estimate shows that a percentage increase in the

share of young convicts of drug-related offenses increases an individual's propensity to commit a new drug-related offense by 2.7 percentage points if the individual has past experience with drug-related offending—or by 9 percentage points for a standard deviation increase. This reinforcing peer remains across all types of facility: local, open, and closed prisons. In addition, we find little evidence of peer effects on recidivism with simple violence, burglary, theft, handling of stolen goods, or vandalism. Our findings partly differ from those of Bayer et al. (2009) since they find evidence of peer effects not only on drug-related offenses, but also on violent offenses and property crimes. The difference of our findings may arise from the two distinct populations (juveniles vs. first-time incarcerated young adults) and institutional dissimilarities such as the extent of training programs in prisons, educational and labor market opportunities upon release, or(and)—on the other end of the spectrum—different criminal opportunities.

Moreover, our results highlight that the definition of peers is of key importance for investigating the existence of peer effects in prisons. More explicitly, we find little evidence of peer effects in prisons when defining peers as all other inmates irrespective of demographic characteristics such as age. We interpret our results as evidence of social interactions among inmates in the same age group. The main policy implication of our findings is that grouping inmates convicted of drug-related crime by age is not optimal as it increases the probability to recidivate with drug-related crime. Furthermore, no evidence of peer effects for other types of offenses than drugs may reflect the effectiveness of training programs offered during incarceration, such as anger management programs for violent offenders, in reducing peer effects on crime.

Future extensions of this paper include digging into drug convicts' *criminal career* to shed light on, among others, individuals and their peers' criminal record pre- and post-incarceration and the possible development of networks among former co-inmates that are also drug-related offenders. An additional development of this paper will be to connect person and case identifiers available in the central Police registers to assess whether individuals in our sample recidivate jointly with former inmates. Our study will increase knowledge about the early steps of a criminal career and the formation of social networks in sentencing facilities.

7. References

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8. List of Tables

Table 1: Summary statistics

	Mean	Std. Dev.	
		Overall	Within
Recidivism rates (at least once within 12 months upon first release)			
Overall	0.532	0.50	0.48
Misdemeanor assault	0.059	0.23	0.23
Burglary	0.091	0.29	0.28
Theft	0.104	0.30	0.29
Stolen goods (handling)	0.023	0.15	0.15
Vandalism	0.030	0.17	0.16
Drug-related offense	0.064	0.24	0.24
Other offenses	0.358	0.48	0.47
Socioeconomic characteristics in the year of incarceration			
Male	0.951	0.22	0.19
Ethnic Dane	0.879	0.33	0.32
Married	0.002	0.04	0.04
Has at least one child under 6	0.096	0.29	0.29
Year	1996	0.89	0.87
Age	18.93	0.91	0.89
Has a vocational education degree	0.008	0.09	0.09
Incarceration conditions			
Duration (of the longest spell) in days	43.17	105.31	94.70
Closed prison	0.074	0.26	0
of which Copenhagen prison	0.060	0.24	0
Open prison	0.657	0.47	0
Local prison	0.269	0.44	0
Criminal behavior before first incarceration (1 if at least one conviction in offense h)			
Misdemeanor assault	0.384	0.49	0.47
Burglary	0.212	0.41	0.40
Theft	0.276	0.45	0.44
Stolen goods (handling)	0.061	0.24	0.24
Vandalism	0.131	0.34	0.33
Drug-related offense	0.108	0.31	0.30
Other offenses	0.744	0.44	0.43
Peer measure I: share (in%) of peers under the age of 26 (weighted averages) with criminal history characteristics in			
Misdemeanor assault	10.79	5.74	4.48
Burglary	11.71	5.39	4.15
Theft	11.04	4.05	3.34
Stolen goods (handling)	3.281	2.40	2.15
Vandalism	4.931	2.85	2.44
Drug-related offense	6.034	3.40	2.78
Other offenses	52.22	7.40	6.21

	Mean	Std. Dev.	
		Overall	Within
Peer measure II: share (in%) of peers of the same ethnic origin (weighted averages) with criminal history characteristics in			
Misdemeanor assault	5.962	3.68	3.43
Burglary	9.078	3.44	2.59
Theft	10.81	2.84	2.54
Stolen goods (handling)	3.999	2.10	1.91
Vandalism	4.137	1.95	1.84
Drug-related offense	6.420	2.71	2.22
Other offenses	59.39	6.78	5.40
Peer measure III: share (in%) of peers of the same ethnic origin and under the age of 26 (weighted averages) with criminal history characteristics in			
Misdemeanor assault	11.23	8.37	7.47
Burglary	11.40	6.46	5.51
Theft	10.93	5.29	4.83
Stolen goods (handling)	3.270	3.38	3.16
Vandalism	4.815	3.40	3.09
Drug-related offense	5.971	4.56	4.12
Other offenses	51.92	10.48	9.49
Peer measure IV: share (in%) of peers living in the same county prior to incarceration and under the age of 26 (weighted averages) with criminal history characteristics in			
Misdemeanor assault	11.00	12.92	11.94
Burglary	10.39	11.27	10.37
Theft	9.89	8.85	8.48
Stolen goods (handling)	2.74	4.06	3.89
Vandalism	4.34	5.67	5.42
Drug-related offense	4.97	5.97	5.64
Other offenses	46.92	21.62	20.46
Peer measure V: Share (in%) of all peers (weighted averages) with criminal history characteristics in			
Misdemeanor assault	5.644	1.98	1.59
Burglary	9.209	2.68	1.49
Theft	10.63	1.79	1.35
Stolen goods (handling)	3.987	1.28	1.04
Vandalism	4.171	1.31	1.13
Drug-related offense	6.394	1.98	1.31
Other offenses	59.96	4.72	2.97
Individual characteristics of the municipality of residence in the year of incarceration (averages)			
Real gross income in DKK	206,027	17,836	16,790
Unemployment rate	9.286	2.68	2.47
Share of population of non-Western origin	4.257	3.59	3.13
Gini coefficient	0.263	0.02	0.02
Overall youth crime conviction rate	2.386	0.73	0.63
Crime detection rate	19.95	4.02	3.82
Reported crimes per capita	10.78	4.42	4.06
Reported violent crimes per 10,000 inhabitants	0.276	0.12	0.11

	Mean	Std. Dev.	
		Overall	Within
Number of police officers per 1,000 inhabitants	1.610	0.90	0.78
Labor market participation rate	77.43	3.04	2.89
Number of pupils per class	19.12	1.62	1.46
Peer characteristics (general definition) at the time of incarceration			
Share of male inmates	0.959	0.10	0.02
Share of inmates below the age of 26	0.301	0.10	0.06
Share of inmates of non-Western origin	0.078	0.06	0.03
Share of inmates non-Danish residents	0.027	0.07	0.03
Share of inmates with a vocational education degree	0.255	0.09	0.04
Unemployment rate in the peer's municipality of residence (weighted average)	9.591	1.60	1.26
Overall youth crime conviction rate in the peer's municipality of residence (weighted average)	2.342	0.35	0.10
Other peer characteristics (not controlled for in the specifications)			
Average daily number of inmates in a facility	57		
Average daily number of inmates under the age of 26 in a facility	17		
Average daily number of inmates in a closed prison	69		
Average daily number of inmates under the age of 26 in a closed prison	30		
Average daily number of inmates in an open prison	124		
Average daily number of inmates under the age of 26 in an open prison	33		
Average daily number of inmates in a local prison	51		
Average daily number of inmates under the age of 26 in a local prison	18		
Observations	1.928		

Notes: own calculations based on our sample of young inmates incarcerated for the first time between 1994 and 1997 at the age of 18 to 22. See the main text for more information on the data.

Table 2: Specialization in crime

	Dep. var.: Indicator for recidivism with					
	Misd. assault	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**
	(1)	(2)	(3)	(4)	(5)	(6)
Prior offense	0.064**	0.114**	0.084**	0.018	0.027*	0.110**
	(0.012)	(0.024)	(0.021)	(0.018)	(0.010)	(0.025)
No prior offense (aver. of off-diagonal coefficients)	0.006	-0.009	-0.007	0.012	0.003	0.002
Constant	0.015	0.115**	0.128**	0.005	0.040**	0.056**
	(0.008)	(0.020)	(0.027)	(0.011)	(0.012)	(0.018)
R-squared	0.021	0.057	0.038	0.010	0.011	0.032
Observations	1,928					

Notes: OLS estimations of the propensity to recidivate (i.e., be convicted at least once within the year following the first release) on crime history (i.e., convicted at least once). "Prior offense" represents the offense stated in the head of each column. Each specification includes controls for criminal history in all types of offenses. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

Table 3: Predicted recidivism on the relevant peer measure (peers under the age of 26)

	Dependent variable: Indicator for predicted recidivism with											
	Misd. assault	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**	**Misd. Assault**	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.003**	0.012**	0.009**	0.003**	0.003**	0.014**	-0.001	0.000	0.001	0.004	-0.001	-0.003
	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
No_offenseXpeers_h	-0.001*	0.002	0.001	-0.001	-0.001	-0.000	0.001	0.003**	0.001	-0.001	-0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.065	0.186	0.095	0.003	0.011	0.109	0.322	0.496	0.424	0.305	0.286	0.368
Observations	1,928						1,928					

Notes: The dependent variable is recidivism (in *h* offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the interacted peer measures relevant for each offense (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense *h* in the two peer measures in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

Table 4: Crime-specific peer effects on recidivism (Peer measure I: inmates under the age of 26)

	Dependent variable: Indicator for recidivism with misd. assault (1), burglary (2), theft (3), stolen goods (4), vandalism (5), drugs (6)																	
	Panel A; Control set 1						**Panel B; Control set 2**						**Panel C; Control set 3**					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXpeers_h (β_0)	-0.001	0.008	0.009	-0.014	-0.002	0.017	-0.003	0.005	0.007	-0.010	-0.000	0.021*	0.001	0.006	-0.002	-0.021	-0.005	0.027**
	(0.002)	(0.005)	(0.005)	(0.007)	(0.002)	(0.009)	(0.002)	(0.005)	(0.006)	(0.006)	(0.003)	(0.009)	(0.003)	(0.006)	(0.006)	(0.015)	(0.004)	(0.010)
No_offenseXpeers_h (β_1)	0.000	0.000	0.001	-0.000	-0.002*	-0.001	-0.002	-0.003	0.001	0.000	-0.002	-0.002	-0.004*	-0.002	-0.003	-0.001	-0.003	-0.000
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Individ. charact.	Restrict						YES						YES					
Municipality charact.	NO						YES						YES					
Peer characteristics	NO						YES						YES					
Time fixed effects	NO						YES						YES					
Facility fixed effects	NO						YES						YES					
Facility-by-prior-offense fixed effects	NO						NO						YES					
R-squared	0.024	0.065	0.047	0.019	0.010	0.051	0.201	0.217	0.233	0.173	0.237	0.207	0.319	0.386	0.410	0.345	0.363	0.353
Observations	1,928						1,928						1,928					

Notes: Each column represents a different specification. For instance, offense *h* in the two peer measures for columns (1) is misd. assault. In this table, peers are defined as other inmates below the age of 26. "Restrict" refers to a set of controls for individual characteristics restricted to criminal history in all offense categories and the measures of peer shares not interacted with crime. “Individ. charact.” refers to the complete set of controls for individual characteristics including criminal history, not interacted peer measures for off-diagonal offenses, and socioeconomic variables. “Municipality charact.” refers to a set of controls for the individual's municipality (at the time of incarceration) characteristics and municipality dummies. “Peer characteristics” refers to controls for share of inmates in particular demographic groups: under the age of 26, of non-Western origin, non-Danish residents, male, who have completed vocational education degree; and to controls for peer municipality characteristics such as average unemployment rate and average youth crime conviction rate. See Table A2 in the Appendix for the estimated coefficients of all control variables with the same specifications. All specifications are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

Table 5: Crime-specific peer effects on recidivism: several definitions of peers

Dependent variable: Indicator for recidivism with misd. assault (1), burglary (2), theft (3), stolen goods (4), vandalism (5), drugs (6)												
	Panel A						Panel B					
	Peer measure II: inmates of same ethnic origin						**Peer measure III: inmates of same ethnic origin & under 26**					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXpeers_h (β_0)	-0.002	0.003	-0.001	-0.003	0.009	0.020	0.002	0.003	0.003	-0.011	-0.002	0.021*
	(0.003)	(0.009)	(0.005)	(0.012)	(0.008)	(0.018)	(0.001)	(0.005)	(0.003)	(0.009)	(0.003)	(0.010)
No_offenseXpeers_h (β_1)	-0.001	-0.004	0.004	0.002	-0.003	-0.004	-0.001	-0.000	0.002	0.003	-0.004**	-0.003*
	(0.002)	(0.003)	(0.004)	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)
Individ. charact.	YES						YES					
Municipality charact.	YES						YES					
Peer characteristics	YES						YES					
Time fixed effects	YES						YES					
Facility-by-prior-offense fixed effects	YES						YES					
R-squared	0.314	0.384	0.408	0.342	0.356	0.346	0.320	0.383	0.411	0.345	0.359	0.351
Observations	1,928						1,928					

Dependent variable: Indicator for recidivism with misd. assault (1), burglary (2), theft (3), stolen goods (4), vandalism (5), drugs (6)												
	Panel C						Panel D					
	Peer measure IV: inmates from the same county & under 26						**Peer measure V: all inmates**					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXpeers_h (β_0)	-0.000	0.002	-0.003	-0.010	0.001	-0.011	-0.017*	-0.002	-0.001	-0.014	0.011	0.011
	(0.001)	(0.002)	(0.002)	(0.006)	(0.002)	(0.007)	(0.007)	(0.015)	(0.013)	(0.024)	(0.016)	(0.021)
No_offenseXpeers_h (β_1)	-0.000	0.000	0.001	-0.000	-0.001	0.001	-0.005	-0.006	-0.015*	0.001	-0.009*	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.006)	(0.007)	(0.003)	(0.004)	(0.005)
Individ. charact.	YES						YES					
Municipality charact.	YES						YES					
Peer characteristics	YES						YES					
Time fixed effects	YES						YES					
Facility-by-prior-offense fixed effects	YES						YES					
R-squared	0.316	0.383	0.407	0.341	0.361	0.343	0.320	0.383	0.409	0.341	0.358	0.342
Observations	1,928						1,928					

Notes: Each column represents a different specification. For instance, offense *h* in the two peer measures for columns (1) is misd. assault. In this table, peers are defined alternatively as other inmates from the same ethnic origin—Western vs. non-Western—(Peer measure II), other inmates below the age of 26 and from the same ethnic origin (Peer measure III), other inmates below the age of 26 and from the same residence county at the time of incarceration (Peer measure IV), and all inmates in general (Peer measure V). "Individ. charact." refers to the complete set of controls for individual characteristics including criminal history, not interacted peer measures for off-diagonal offenses, and socioeconomic variables. "Municipality charact." refers to a set of controls for the individual's municipality (at the time of incarceration) characteristics and municipality dummies. "Peer characteristics" refers to controls for share of inmates in particular demographic groups: under the age of 26, of non-Western origin, non-Danish residents, male, who have completed vocational education degree; and to controls for peer municipality characteristics such as average unemployment rate and average youth crime conviction rate. All specifications are simultaneously estimated as a SUR and include facility fixed effects. Robust standard errors clustered at the facility level are in parentheses. **: $p<0.01$, *: $p<0.05$.

Table 6: Crime-specific peer effects on recidivism. Comparing peer groups

Dependent variable: Indicator for recidivism with misd. assault (1), burglary (2), theft (3), stolen goods (4), vandalism (5), drugs (6)

	Panel A						**Panel B**						**Panel C**					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXyoung peers_h (β_0)	-0.000	0.009	-0.006	-0.025	-0.009	0.022	0.005	0.011	-0.005	-0.024*	-0.009*	0.032**	0.001	0.005	0.000	-0.019	-0.010**	0.042**
	(0.003)	(0.012)	(0.007)	(0.017)	(0.006)	(0.019)	(0.004)	(0.008)	(0.007)	(0.012)	(0.004)	(0.012)	(0.003)	(0.006)	(0.006)	(0.014)	(0.004)	(0.010)
No_offenseXyoung peers_h (β_1)	-0.003	-0.004	-0.008*	-0.007	-0.000	0.005	-0.004*	-0.001	0.000	-0.001	-0.002	0.000	-0.005*	-0.003	-0.004	-0.001	-0.003	-0.001
	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)
OffenseXyoung own ethnic peers_h (β_2)	0.001	-0.003	0.005	0.003	0.004	0.007												
	(0.001)	(0.010)	(0.003)	(0.009)	(0.005)	(0.017)												
No_offenseXyoung own ethnic peers_h (β_3)	-0.001	0.002	0.006	0.005	-0.003	-0.004**												
	(0.001)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)												
OffenseXoverall peers_h (β_2)							-0.024**	-0.020	0.009	0.007	0.023	-0.021						
							(0.009)	(0.021)	(0.017)	(0.022)	(0.018)	(0.025)						
No_offenseXoverall peers_h (β_3)							0.001	-0.008	-0.013	0.004	-0.007	-0.003						
							(0.005)	(0.006)	(0.007)	(0.004)	(0.004)	(0.005)						
OffenseXyoung own county peers_h (β_2)													-0.000	0.001	-0.003	-0.008	0.003	-0.021**
													(0.001)	(0.002)	(0.003)	(0.006)	(0.003)	(0.006)
No_offenseXyoung own county peers_h (β_3)													0.001	0.001	0.002	0.000	-0.001	0.001
													(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Individ. charact			YES						YES						YES			
Municip. charact.			YES						YES						YES			
Peer characteristics			YES						YES						YES			
Time fixed effects			YES						YES						YES			
F-P-O fixed effects			YES						YES						YES			
R-squared	0.322	0.388	0.417	0.350	0.366	0.358	0.326	0.388	0.414	0.348	0.366	0.354	0.321	0.388	0.413	0.348	0.371	0.363
			H_0: $\beta_0 = \beta_2 = 0$ for drug-related offenses (column 6) p = 0.0202						H_0: $\beta_0 = \beta_2 = 0$ for drug-related offenses (column 6) p = 0.0215						H_0: $\beta_0 = \beta_2 = 0$ for drug-related offenses (column 6) p = 0.0000			
Observations			1,928						1,928						1,928			

Notes: Each column represents a different specification. For instance, offense *h* in the two peer measures for columns (1) is misd. assault. “Young peers” stands for peers under the age of 26 (Peer measure I in Table 4); “young own ethnic peers” stands for peers under the age of 26 and of the same ethnic origin (Western or non-Western) (Peer measure III in Table 5); “overall peers” refers to peer irrespective of their demographic groups (Peer measure V in Table 5); “young own county peers” refers to peers residing in the same county and under the age of 26 (Peer measure IV in Table 5). “Individ. charact.” refers to the complete set of controls for individual characteristics including criminal history, not interacted peer measures for off-diagonal offenses, and socioeconomic variables. “Municip. charact.” refers to a set of controls for the individual's municipality (at the time of incarceration) characteristics and municipality dummies. “Peer characteristics” refers to controls for share of inmates in particular demographic groups: under the age of 26, of non-Western origin, non-Danish residents, male, who have completed vocational education degree and to controls for peer municipality characteristics such as average unemployment rate and average youth crime conviction rate. “F-P-O fixed effects“ refers to a set of interacted fixed effects for facility and criminal background fixed effects. All specifications are simultaneously estimated as a SUR and include facility fixed effects. Robust standard errors clustered at the facility level are in parentheses. **: $p<0.01$, *: $p<0.05$.

Table 7: Crime-specific peer effects on recidivism: the role of facility type

	Dep. variable: indicator for recidivism with:				
	Misd. assault	**Burglary**	**Theft**	**Vandalism**	**Drugs**
	(1)	(2)	(3)	(4)	(5)
OffenseXpeers_h (β_0)	0.001	0.011	0.018	-0.006	0.027*
	(0.004)	(0.009)	(0.012)	(0.006)	(0.014)
No_offenseXpeers_h (β_1)	-0.002	-0.005	0.002	-0.004	0.005
	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)
OffenseXpeers_hXclosed	0.028	-0.007	-0.033	0.030	0.058
	(0.015)	(0.045)	(0.018)	(0.049)	(0.036)
No_offenseXpeers_hXclosed	-0.009	0.027	-0.003	0.009	-0.028
	(0.012)	(0.014)	(0.011)	(0.007)	(0.018)
OffenseXpeers_hXlocal	-0.000	-0.016	-0.025	0.005	-0.013
	(0.007)	(0.012)	(0.014)	(0.007)	(0.018)
No_offenseXpeers_hXlocal	-0.001	0.003	-0.008	0.001	-0.007
	(0.003)	(0.004)	(0.005)	(0.004)	(0.004)
Closed prison	-0.018	-0.683*	0.129	0.037	0.273
	(0.168)	(0.276)	(0.189)	(0.063)	(0.178)
Local prison	0.109	-0.162	0.124	-0.212**	0.138
	(0.158)	(0.226)	(0.130)	(0.074)	(0.179)
Open prison			Ref.		
Individ. charact.			YES		
Municip. charact.			YES		
Peer characteristics			YES		
Time fixed effects			YES		
Facility-by-prior-offense fixed effects			YES		
R-squared	0.517	0.369	0.389	0.339	0.343
Observations			1,928		

Notes: Each column represents a different specification. For instance, offense *h* in the two peer measures for column (1) is misd. assault. In this table, peers are defined as other inmates below the age of 26. Note that it was not possible to include more than five types of offense in Table 7 without further restrictions on the model. We then remove the offense that is the least committed with recidivism: handling stolen goods. "*OffenseXpeers_hXclosed*" and "*No_offenseXpeers_hXclosed*" refer to the interacted peer measures for those who serve time in a closed prison. "*OffenseXpeers_hXlocal*" and "*No_offenseXpeers_hXlocal*" refer to the interacted peer measures for those who serve time in a local prison. The reference type of facility is open prison. "Individ. charact." refers to the complete set of controls for individual characteristics including criminal history, not interacted peer measures for off-diagonal offenses, and socioeconomic variables. "Municip. charact." refers to a set of controls for the individual's municipality (at the time of incarceration) characteristics and municipality dummies. "Peer characteristics" refers to controls for share of inmates in particular demographic groups: under the age of 26, of non-Western origin, non-Danish residents, male, who have completed vocational education degree; and to controls for peer municipality characteristics such as average unemployment rate and average youth crime conviction rate. All specifications are simultaneously estimated as a SUR and include facility fixed effects. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

9. Appendix

Table A 1: Variable definitions and primary data sources

Variable	Definition	Primary data source
	Individual characteristics	
Recidivism rate overall	Dummy for having been convicted (i.e., found guilty) of any offense within one year after release	Central Police Register, Statistics Denmark (DST)
Recidivism rate; criminal offense of type *j*	Dummy for having been convicted (i.e., found guilty) of an offense of type *j* (j=misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) within one year after release	Central Police Register, DST
Criminal history in crime category *j* prior to first incarceration	Dummy for having been convicted (i.e., found guilty) of at least one offense of type *j* (j=misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) prior to the first incarceration	Central Police Register, DST
Male	Dummy for male	Population register, DST
Has a vocational degree	Dummy for having completed a vocational (professional) education degree at the time of incarceration	Educational Institution Register and Surveys, DST
Ethnic Dane	Dummy for being born in Denmark of Danish parents. The dummy equals 0 for first-generation and second-generation immigrants.	Population register, DST
Married	Dummy for being married at the time of incarceration	Population register, DST
Has at least one child under 6	Dummy for having at least one child under the age of six at the time of incarceration	Population register, DST
Age	Age at the time of incarceration	Population register, DST
Duration in days	Duration in days of the time spent during the first incarceration (in the longest spell in case the individual transfers across facilities)	Central Police Register, DST
Closed prison	Dummy for spending the longest spell in a closed prison	Central Police Register, DST
Of which Copenhagen prison	Dummy for spending the longest spell in one of the closed prisons in Copenhagen	Central Police Register, DST
Open prison	Dummy for spending the longest spell in an open prison	Central Police Register, DST
Local prison	Dummy for spending the longest spell in a local prison	Central Police Register, DST
	Peer characteristics	
Share (in %) of peer under the age of 26 with a criminal history in crime category *j*	Weighted average of the share of other inmates under the age of 26 with at least one conviction of type *j* (j=misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST
Share (in %) of peer of the same ethnic origin with a criminal history in crime category *j*	Weighted average of the share of other inmates of the same ethnic origin (Western including Danish vs. non-Western) with at least one conviction of type *j* (j=misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST

Variable	Definition	Primary data source
Share (in %) of peer of the same ethnic origin and below age 26 with a criminal history in crime category *j*	Weighted average of the share of other inmates of the same ethnic origin (Western including Danish vs. non-Western) and below age 26 with at least one conviction of type *j* (j=misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST
Share (in %) of peer residing in the same county and below age 26 with a criminal history in crime category *j*	Weighted average of the share of other inmates residing in the same county and under the age of 26 at the individual's time of incarceration with at least one conviction of type *j* (j=misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST
Share (in %) of peer - general definition - with a criminal history in crime category *j*	Weighted average of the share of other inmates with at least one conviction of type *j* (j=misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST
Share of inmates below the age of 26	Share of other inmates (foreigners excluded) below age 26 in the individual's year of incarceration	Central Police Register, Population Register, DST
Share of male inmates	Share of inmates (foreigners excluded) who are male	Central Police Register, Population Register, DST
Share of inmates of non-Western origin	Share of other inmates (foreigners excluded) who are immigrants (first or second generation) from a non-Western country	Central Police Register, Population Register, DST
Share of inmates non-Danish residents	Share of other inmates who are foreigners, i.e., do not have registered residence in Denmark, in the individual's year of incarceration	Central Police Register, DST
Share of inmates with a vocational education degree	Share of other inmates (foreigners excluded) who have completed a vocational (professional) education degree in the individual's year of incarceration	Central Police Register, Educational Institution Register and Surveys, DST
Unemployment rate in the peer's municipality of residence	Weighted average of the unemployment rate (in %) in the municipality of residence of peers in the year of incarceration of peers	Central Police Register, Population Register, DST
Overall crime rate in the peer's municipality of residence	Weighted average of the share (in %) of individuals aged 15 to 25 who have been convicted of an offense (except traffic offenses) committed in the municipality of residence of peers in the year of the incarceration of peers	"Statistiske Efterretninger om Social Sikring og Retsvæsen", DST (1986-1998)
	Municipality Characteristics	
Real gross income in DKK	Average real gross income in DKK in the municipality in the individual's year of incarceration (in 2000-prices)	Authors' construction from time series IF221 and BEF1A in Statistikbanken, DST.
Unemployment rate	The unemployment rate (in %) in the municipality in the individual's year of incarceration	Authors' construction from time series AARD in Statistikbanken, DST.
Share of population of non-Western origin	Share of the municipal population of non-Western origin in the individual's year of incarceration	Authors calculations from population register, DST.
Gini coefficient	Gini coefficient of household incomes in the municipality in the individual's year of incarceration	Authors' calculations from tax register, DST.
Youth crime conviction rate	Share (in %) of individuals aged 15 to 25 living in the municipality who have been convicted of an offense (except traffic offenses) committed in the individual's year of incarceration	Central Police Register, DST

Variable	Definition	Primary data source
Crime detection rate	Annual number of charges divided by the annual number of reported crimes in the municipality (or police district) in the individual's year of incarceration	"Statistiske Efterretninger om Social Sikring og Retsvæsen", DST (1986-1998)
Reported crimes per capita	Number of reported crimes divided by the number of inhabitants in the municipality (or police district) in the year of the individual's incarceration	"Statistiske Efterretninger om Social Sikring og Retsvæsen", DST (1986-1998)
Reported violent crimes per 10,000 inhabitants	Number of reported violent crimes divided by the number of inhabitants in the municipality (or police district) and multiplied by 10,000 in the individual's year of the incarceration	"Statistiske Efterretninger om Social Sikring og Retsvæsen", DST (1986-1998)
Number of police agents per 1,000 inhabitants	Sum of number of detectives and uniformed police officers employed in the police district per 1,000 inhabitants.	Annual reports from the Police (1986-1999)
Labor market participation rate	Share of the population in the municipality who is active on the labor market in the year of the individual's incarceration	Authors' construction from time series RAS1 and BEF1A in Statistikbanken, DST.
Number of pupils per class	Average number of pupils per class (only normal classes) in the municipality in the individual's year of the incarceration	"Folkeskolen i de enkelte kommuner", Ministry of Education (1989-1993)

Table A 2: Crime-specific peer effects on recidivism (peers under the age of 26): All controls

Control variables	Dep. var.: Indicator for recidivism with					
	Misd. assault	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**
	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXpeers_h (β_0)	0.001	0.006	-0.002	-0.021	-0.005	0.027**
	(0.003)	(0.006)	(0.006)	(0.015)	(0.004)	(0.010)
No_offenseXpeers_h (β_1)	-0.004*	-0.002	-0.003	-0.001	-0.003	-0.000
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Share (in%) of peers under the age of 26 (weighted averages) with criminal history characteristics in						
Misdemeanor assault		-0.000	-0.001	-0.000	-0.000	0.000
		(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Burglary	-0.001		0.005*	0.003**	-0.001	0.003**
	(0.001)		(0.002)	(0.001)	(0.001)	(0.001)
Theft	-0.001	0.002		-0.001	0.001	-0.001
	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)
Stolen goods (handling)	-0.007**	0.009*	0.003		0.002	0.010**
	(0.003)	(0.004)	(0.004)		(0.002)	(0.004)
Vandalism	-0.004	0.006*	0.001	0.001		-0.002
	(0.003)	(0.003)	(0.003)	(0.001)		(0.003)
Drug-related offense	-0.003	0.001	-0.005	0.001	0.001	
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	
Criminal behavior before first incarceration (at least one conviction in offense h, ref. category: other types of offenses)						
Misdemeanor assault	-0.231	-0.221	-0.018	-0.060	0.017	-0.059
	(0.123)	(0.145)	(0.079)	(0.031)	(0.030)	(0.070)
Burglary	-0.067	-0.200	-0.014	-0.089	-0.041	0.345
	(0.118)	(0.186)	(0.110)	(0.062)	(0.056)	(0.256)
Theft	-0.065	0.099	0.047	0.013	-0.063	-0.111
	(0.072)	(0.107)	(0.125)	(0.031)	(0.045)	(0.102)
Stolen goods (handling)	-0.028	-0.119	-0.130	0.012	0.079	-0.312
	(0.075)	(0.147)	(0.127)	(0.071)	(0.082)	(0.200)
Vandalism	0.102	0.043	-0.047	0.051	-0.088	-0.122
	(0.067)	(0.072)	(0.085)	(0.037)	(0.056)	(0.111)
Drug-related offense	-0.167*	0.015	-0.007	-0.037	-0.023	-0.393
	(0.066)	(0.120)	(0.105)	(0.052)	(0.108)	(0.237)
Peer characteristics (Peer measure V: all other inmates) at the time of incarceration						
Share of male inmates	0.563	0.140	-0.487	0.139	-0.041	-0.286
	(0.310)	(0.359)	(0.408)	(0.188)	(0.185)	(0.317)
Share of inmates below the age of 26	-0.376**	-0.025	-0.176	-0.055	0.171*	0.022
	(0.114)	(0.136)	(0.137)	(0.069)	(0.067)	(0.127)
Share of inmates of non-Western origin	0.285	0.050	-0.370	0.004	-0.342*	0.383
	(0.210)	(0.288)	(0.270)	(0.130)	(0.160)	(0.228)
Share of inmates non-Danish residents	-0.293	0.212	0.295	-0.551**	-0.046	-0.420
	(0.287)	(0.406)	(0.411)	(0.166)	(0.220)	(0.323)
Share of inmates with a vocational education degree	0.159	0.084	-0.181	-0.020	-0.107	0.078
	(0.138)	(0.172)	(0.170)	(0.068)	(0.107)	(0.137)
Unemployment rate in the peer's municipality of residence	-0.011	0.010	-0.048*	0.006	0.003	-0.018
	(0.016)	(0.019)	(0.020)	(0.009)	(0.014)	(0.017)
Overall crime youth conviction rate in the	0.125	-0.038	0.124	0.018	-0.230**	0.078

peer's municipality of residence						
	(0.088)	(0.095)	(0.106)	(0.051)	(0.059)	(0.083)
Socioeconomic individual characteristics in the year of incarceration						
Male	0.043	0.069	-0.084	0.004	0.026	-0.004
	(0.022)	(0.037)	(0.049)	(0.021)	(0.014)	(0.045)
Has a vocational education degree	0.051	-0.011	0.014	-0.014	0.033	-0.002
	(0.062)	(0.038)	(0.078)	(0.023)	(0.058)	(0.034)
Ethnic Dane	0.020	-0.015	-0.017	0.000	-0.004	-0.039
	(0.020)	(0.023)	(0.026)	(0.010)	(0.014)	(0.021)
Married	0.055	0.008	-0.157	0.020	-0.010	-0.024
	(0.074)	(0.077)	(0.081)	(0.033)	(0.055)	(0.082)
Has at least one child under 6	0.030	-0.037	0.010	-0.031**	0.000	0.024
	(0.022)	(0.023)	(0.027)	(0.009)	(0.015)	(0.019)
Age	-0.006	-0.029**	-0.003	-0.006	-0.001	-0.001
	(0.007)	(0.008)	(0.009)	(0.004)	(0.006)	(0.007)
Individual characteristics of the municipality of residence in the year of incarceration (averages)						
Log of real income in DKK	1.251	0.617	1.124	0.267	-1.324	0.035
	(0.971)	(1.115)	(1.164)	(0.576)	(0.753)	(1.024)
Unemployment rate	-0.008	0.003	0.025	-0.011	-0.002	-0.000
	(0.013)	(0.016)	(0.013)	(0.008)	(0.010)	(0.013)
Share of non-Western population	-0.002	0.022	0.021	-0.018	0.041*	-0.005
	(0.022)	(0.020)	(0.025)	(0.013)	(0.017)	(0.025)
Gini coefficient	-0.064	0.364	-1.014	-0.130	0.453	0.185
	(0.492)	(0.486)	(0.775)	(0.267)	(0.339)	(0.573)
Crime detection rate	-0.003	-0.001	0.004	-0.001	0.004	0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Youth crime conviction rate	-0.024	-0.015	0.003	-0.029	0.003	0.047
	(0.030)	(0.030)	(0.034)	(0.015)	(0.016)	(0.027)
Reported crimes per capita	-0.014	-0.013	0.012	-0.011	0.004	-0.005
	(0.012)	(0.012)	(0.014)	(0.007)	(0.009)	(0.011)
Reported violent crimes per 10,000 inhabitants	-0.141	-0.206	0.192	-0.146	-0.022	0.151
	(0.121)	(0.123)	(0.153)	(0.086)	(0.116)	(0.124)
Number of pupils per class	-0.007	0.005	-0.012	-0.005	0.007	-0.027**
	(0.008)	(0.010)	(0.011)	(0.006)	(0.004)	(0.009)
Number of police officers per 1,000 inhab.	0.034	-0.164	-0.284	0.094	0.064	0.108
	(0.134)	(0.157)	(0.156)	(0.078)	(0.100)	(0.137)
Labor market participation rate	-0.018	-0.013	-0.006	-0.002	0.021	-0.008
	(0.018)	(0.019)	(0.018)	(0.012)	(0.011)	(0.016)
Time fixed effects				YES		
Facility-by-prior-offense fixed effects				YES		
R-squared	0.319	0.386	0.410	0.345	0.363	0.353
Observations				1,928		

Notes: Each column represents a different specification. For instance, offense *h* in the two peer measures for column (1) is misd. assault. In this table, peers are defined as other inmates below the age of 26. All specifications are simultaneously estimated as a SUR and include facility fixed effects. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

Table A 3: Predicted recidivism on the relevant peer measure (peers from the same ethnic group)

	Dependent variable: Indicator for predicted recidivism with											
	Panel A						Panel B					
	Misd. Assault	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**	**Misd. Assault**	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.005**	0.015**	0.011**	0.002*	0.005**	0.017**	0.001	-0.004	0.002	-0.004	0.001	0.001
	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
No_offenseXpeers_h	-0.002	0.003	0.003	-0.001	-0.001	0.002	0.000	0.003	0.003	-0.001	-0.001	0.002
	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.081	0.201	0.104	0.005	0.014	0.136	0.321	0.500	0.426	0.301	0.289	0.370
Observations	1,928						1,928					

Notes: The dependent variable is recidivism (in *h* offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the interacted peer measures relevant for each offense (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense *h* in the two peer measures in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

Table A 4: Predicted recidivism on the relevant peer measure (peers from the same ethnic group below the age of 26)

	Dependent variable: Indicator for predicted recidivism with											
	Panel A						Panel B					
	Misd. assault	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**	**Misd. Assault**	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.002**	0.010**	0.006**	0.003**	0.003**	0.013**	-0.000	-0.002	0.000	0.002	0.000	-0.004*
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
No_offenseXpeers_h	-0.001*	0.000	-0.001	-0.000	-0.000	-0.001	0.000	0.001	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.055	0.169	0.081	0.002	0.011	0.102	0.321	0.492	0.424	0.304	0.285	0.368
Observations	1,928						1,928					

Notes: The dependent variable is recidivism (in *h* offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the interacted peer measures relevant for each offense (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense *h* in the two peer measures in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

Table A 5: Predicted recidivism on the relevant peer measure (all peers)

	Dependent variable: Indicator for predicted recidivism with											
	Panel A						Panel B					
	Misd. assault	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**	**Misd. Assault**	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.006**	0.018**	0.016**	0.002	0.005*	0.019**	0.001	0.003	0.001	-0.005	0.001	-0.003
	(0.002)	(0.003)	(0.004)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
No_offenseXpeers_h	-0.003*	0.005	0.007	-0.002	-0.001	0.002	0.001	0.007**	0.005	-0.002	-0.001	0.004
	(0.002)	(0.003)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.081	0.201	0.104	0.005	0.014	0.136	0.321	0.500	0.426	0.301	0.289	0.370
Observations	1,928						1,928					

Notes: The dependent variable is recidivism (in *h* offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the interacted peer measures relevant for each offense (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense *h* in the two peer measures in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

Table A 6: Predicted recidivism on the relevant peer measure (peers from the same county below the age of 26)

	Dependent variable: Indicator for predicted recidivism with											
	Panel A						Panel B					
	Misd. assault	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**	**Misd. Assault**	**Burglary**	**Theft**	**Stolen goods**	**Vandalism**	**Drugs**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.001**	0.006**	0.006**	0.001	0.002**	0.011**	-0.001**	0.001*	0.001	-0.000	-0.000	-0.001
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No_offenseXpeers_h	-0.001**	0.000	-0.001	-0.001*	-0.000	-0.001	-0.000	0.001**	-0.000	-0.001*	-0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.034	0.114	0.075	0.003	0.006	0.071	0.324	0.495	0.424	0.301	0.285	0.367
Observations	1,928						1,928					

Notes: The dependent variable is recidivism (in *h* offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the interacted peer measures relevant for each offense (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense *h* in the two peer measures in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

Table A 7: Crime-specific peer effects on recidivism (peers under the age of 26): All controls; 10 offense categories and no facility-by-prior-offense fixed effects

Control variables	Dep. var.: Indicator for recidivism with **Misd. assault** (1)	**Agg. assault** (2)	**Burglary** (3)	**Theft** (4)	**Fraud** (5)	**Stolen goods** (6)	**Robbery** (7)	**Vandalism** (8)	**Drugs** (9)	**Weapons** (10)
OffenseXpeers_h (β_0)	-0.004	0.007	0.005	0.007	0.004	-0.010	0.003	-0.001	0.020*	0.002
	(0.002)	(0.007)	(0.005)	(0.006)	(0.002)	(0.006)	(0.003)	(0.003)	(0.009)	(0.003)
No_offenseXpeers_h (β_1)	-0.002	0.000	-0.003	0.002	-0.001	0.000	-0.001	-0.003*	-0.002	-0.002
	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Share (in%) of peers under the age of 26 (weighted averages) with criminal history characteristics in										
Misdemeanor assault		-0.000	-0.000	0.002	-0.001	-0.000	0.000	-0.001	-0.000	-0.001
		(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Aggravated assault	-0.000		-0.002	0.001	-0.000	-0.001	0.001	-0.001	-0.001	0.001
	(0.002)		(0.002)	(0.002)	(0.000)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Burglary	-0.002	0.000		0.004	0.000	0.002	0.000	-0.001	0.002	0.001
	(0.001)	(0.001)		(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Theft	-0.001	-0.003**	0.000		0.000	-0.001	0.001	-0.003*	-0.002	0.003*
	(0.002)	(0.001)	(0.002)		(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Fraud	-0.006*	-0.003	0.010*	-0.006		0.002	0.005**	-0.006*	-0.004	-0.001
	(0.003)	(0.002)	(0.005)	(0.004)		(0.002)	(0.002)	(0.003)	(0.003)	(0.002)
Stolen goods (handling)	-0.004	-0.001	0.008*	0.004	-0.002		-0.001	0.001	0.008*	-0.001
	(0.002)	(0.001)	(0.004)	(0.005)	(0.001)		(0.002)	(0.002)	(0.004)	(0.001)
Robbery	0.000	-0.002	-0.002	0.003	0.000	0.000		-0.001	0.000	0.002
	(0.002)	(0.001)	(0.004)	(0.002)	(0.001)	(0.001)		(0.002)	(0.002)	(0.001)
Vandalism	-0.004	-0.001	0.004	0.004	0.001	-0.001	-0.001		-0.001	-0.001
	(0.002)	(0.001)	(0.003)	(0.004)	(0.001)	(0.001)	(0.001)		(0.002)	(0.001)
Drug-related offense	-0.003	-0.002*	-0.000	-0.001	0.000	0.000	0.003**	-0.001		0.001
	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.001)	(0.001)		(0.001)
Offenses against the weapons act	0.001	-0.001	0.004	0.000	0.004*	-0.001	0.002	-0.001	0.005	
	(0.003)	(0.002)	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	
Criminal behavior before first incarceration (at least one conviction in offense h, ref. category: other types of offenses)										
Misdemeanor assault	0.079*	0.002	-0.071**	-0.054**	-0.018**	-0.004	0.000	-0.006	-0.026*	-0.005
	(0.037)	(0.006)	(0.010)	(0.014)	(0.005)	(0.007)	(0.006)	(0.007)	(0.012)	(0.005)
Aggravated assault	0.007	0.005	-0.111**	-0.069*	-0.002	-0.005	-0.003	0.009	0.001	-0.013
	(0.024)	(0.027)	(0.029)	(0.032)	(0.018)	(0.014)	(0.009)	(0.011)	(0.027)	(0.009)
Burglary	-0.017	0.010	0.024	-0.039*	-0.006	0.025**	0.010	-0.012	0.010	0.011
	(0.010)	(0.010)	(0.063)	(0.019)	(0.008)	(0.009)	(0.013)	(0.007)	(0.019)	(0.011)
Theft	0.046**	-0.014**	0.021	0.018	0.010	0.005	-0.002	0.019	0.027	-0.002
	(0.010)	(0.005)	(0.015)	(0.056)	(0.006)	(0.006)	(0.007)	(0.012)	(0.014)	(0.010)
Fraud	0.009	-0.019*	-0.001	-0.002	-0.030*	0.033	0.010	-0.004	0.024	-0.019
	(0.025)	(0.009)	(0.033)	(0.030)	(0.014)	(0.029)	(0.018)	(0.014)	(0.029)	(0.020)
Stolen goods (handling)	-0.021	0.008	-0.030	0.047	0.003	0.052	-0.010	0.008	0.009	-0.001
	(0.025)	(0.015)	(0.024)	(0.036)	(0.015)	(0.029)	(0.014)	(0.021)	(0.029)	(0.020)
Robbery	0.038	0.006	-0.059*	-0.102**	-0.033**	0.005	-0.011	-0.018*	0.019	-0.007
	(0.021)	(0.010)	(0.024)	(0.024)	(0.009)	(0.014)	(0.019)	(0.007)	(0.022)	(0.013)

Control variables	Dep. var.: Indicator for recidivism with									
	Misd. assault	**Agg. assault**	**Burglary**	**Theft**	**Fraud**	**Stolen goods**	**Robbery**	**Vandalism**	**Drugs**	**Weapons**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Vandalism	0.019	-0.003	0.027	-0.024	-0.021**	0.012	-0.001	0.018	0.011	-0.009
	(0.018)	(0.007)	(0.021)	(0.020)	(0.006)	(0.013)	(0.007)	(0.023)	(0.017)	(0.009)
Drug-related offense	-0.007	-0.007	0.039	0.082**	0.002	0.025*	0.011	0.023	-0.023	0.018
	(0.013)	(0.009)	(0.026)	(0.031)	(0.012)	(0.013)	(0.012)	(0.016)	(0.059)	(0.015)
Offenses against the weapons act	0.025	0.002	0.024	-0.009	-0.001	-0.005	-0.001	-0.007	0.012	-0.038*
	(0.015)	(0.012)	(0.025)	(0.027)	(0.010)	(0.011)	(0.012)	(0.012)	(0.019)	(0.020)
Peer characteristics (general definition) at the time of incarceration										
Share of male inmates	0.518*	-0.027	-0.021	-0.381	0.116	0.116	-0.195	0.109	-0.067	0.047
	(0.238)	(0.136)	(0.312)	(0.407)	(0.108)	(0.155)	(0.190)	(0.200)	(0.259)	(0.165)
Share of inmates below the age of 26	-0.270**	-0.019	0.061	-0.066	-0.008	-0.041	-0.004	0.117	-0.000	-0.022
	(0.084)	(0.066)	(0.141)	(0.148)	(0.035)	(0.066)	(0.068)	(0.080)	(0.125)	(0.068)
Share of inmates of non-Western origin	0.144	-0.026	0.152	-0.483*	-0.111	-0.047	-0.083	-0.211*	0.317	-0.043
	(0.185)	(0.103)	(0.221)	(0.229)	(0.067)	(0.141)	(0.153)	(0.100)	(0.252)	(0.141)
Share of inmates non-Danish residents	-0.164	0.138	0.502	-0.028	0.081	-0.268*	-0.126	0.109	-0.351*	-0.013
	(0.260)	(0.214)	(0.344)	(0.431)	(0.120)	(0.136)	(0.158)	(0.162)	(0.169)	(0.130)
Share of inmates with a vocational education degree	0.161	0.027	0.195	-0.019	0.024	-0.036	0.012	-0.130	-0.053	0.016
	(0.150)	(0.080)	(0.186)	(0.211)	(0.062)	(0.055)	(0.078)	(0.132)	(0.093)	(0.084)
Unemployment rate in the peer's municipality of residence	-0.009	0.014*	-0.005	-0.022	0.004	0.005	0.008	0.009	-0.018	-0.013
	(0.014)	(0.006)	(0.017)	(0.024)	(0.008)	(0.010)	(0.010)	(0.011)	(0.015)	(0.009)
Overall youth crime conviction rate in the peer's municipality of residence	0.110	-0.051	-0.059	0.098	0.002	0.004	-0.023	-0.219**	-0.019	0.162**
	(0.064)	(0.038)	(0.080)	(0.090)	(0.041)	(0.047)	(0.046)	(0.041)	(0.083)	(0.053)
Socioeconomic individual characteristics in the year of incarceration										
Male	0.070**	0.002	0.103**	-0.079	-0.018	0.009	0.037	0.026*	-0.021	0.058**
	(0.025)	(0.022)	(0.025)	(0.041)	(0.026)	(0.014)	(0.022)	(0.012)	(0.031)	(0.018)
Has a vocational education degree	0.052	0.003	-0.024	0.096	0.041	-0.010	-0.007	0.074	-0.016	0.068
	(0.071)	(0.009)	(0.035)	(0.114)	(0.051)	(0.014)	(0.011)	(0.082)	(0.026)	(0.076)
Ethnic Dane	0.023	-0.003	-0.007	-0.013	-0.010	-0.000	-0.016	-0.003	-0.021	-0.013
	(0.021)	(0.009)	(0.017)	(0.027)	(0.018)	(0.011)	(0.013)	(0.010)	(0.026)	(0.017)
Married	0.055	-0.039	-0.001	0.141	-0.044	0.352	-0.018	0.003	0.154	-0.002
	(0.045)	(0.038)	(0.109)	(0.206)	(0.046)	(0.272)	(0.034)	(0.033)	(0.292)	(0.021)
Has at least one child under 6	0.034	-0.004	-0.030*	0.027	-0.002	-0.022**	-0.003	0.006	0.024	-0.003
	(0.023)	(0.010)	(0.015)	(0.025)	(0.009)	(0.008)	(0.012)	(0.012)	(0.023)	(0.012)
Age	-0.006	-0.003	-0.032**	-0.024**	-0.004	-0.005	-0.006	-0.002	-0.008	-0.005
	(0.005)	(0.003)	(0.007)	(0.009)	(0.004)	(0.005)	(0.003)	(0.004)	(0.011)	(0.003)

Control variables	Dep. var.: Indicator for recidivism with									
	Misd. assault	**Agg. assault**	**Burglary**	**Theft**	**Fraud**	**Stolen goods**	**Robbery**	**Vandalism**	**Drugs**	**Weapons**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Individual characteristics of the municipality of residence in the year of incarceration (averages)										
Log of real income in DKK	1.049	0.377	1.051	0.687	-0.090	0.095	0.405	-1.084*	-0.137	-0.667
	(0.731)	(0.335)	(1.047)	(1.139)	(0.386)	(0.709)	(0.444)	(0.508)	(0.805)	(0.617)
Unemployment rate	-0.005	0.002	0.015	0.011	-0.002	-0.008	-0.006	0.007	-0.001	-0.013*
	(0.012)	(0.004)	(0.013)	(0.015)	(0.005)	(0.009)	(0.008)	(0.008)	(0.013)	(0.006)
Share of non-Western population	-0.005	0.006	0.009	0.025	-0.020*	-0.019	0.001	0.046**	-0.007	0.007
	(0.016)	(0.012)	(0.018)	(0.029)	(0.009)	(0.011)	(0.009)	(0.014)	(0.019)	(0.009)
Gini coefficient	-0.331	-0.030	-0.134	-0.829	0.003	-0.233	-0.291	0.366	0.371	0.125
	(0.531)	(0.226)	(0.474)	(0.642)	(0.173)	(0.295)	(0.260)	(0.306)	(0.544)	(0.187)
Crime detection rate	-0.002	-0.001	-0.000	0.003	0.002	-0.001	0.001	0.004*	0.002	0.001
	(0.002)	(0.001)	(0.003)	(0.003)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Youth crime conviction rate	-0.023	0.018	0.000	0.007	-0.003	-0.006	0.023*	0.003	0.044*	-0.017
	(0.026)	(0.016)	(0.027)	(0.026)	(0.010)	(0.014)	(0.011)	(0.012)	(0.021)	(0.014)
Reported crimes per capita	-0.008	-0.012*	-0.014	0.002	-0.005	-0.007	0.001	0.000	0.001	-0.004
	(0.008)	(0.006)	(0.013)	(0.015)	(0.005)	(0.007)	(0.007)	(0.006)	(0.010)	(0.007)
Reported violent crimes per 10,000 inhabitants	-0.168*	-0.015	-0.112	0.279	-0.026	-0.108	-0.057	-0.084	0.088	0.033
	(0.072)	(0.064)	(0.115)	(0.159)	(0.063)	(0.071)	(0.058)	(0.121)	(0.104)	(0.054)
Number of pupils per class	-0.003	0.003	0.008	-0.007	-0.006	-0.002	-0.007	0.002	-0.022**	0.011
	(0.007)	(0.002)	(0.008)	(0.012)	(0.005)	(0.006)	(0.005)	(0.003)	(0.006)	(0.007)
Number of police officers per 1,000 inhab.	0.037	0.056	-0.176	-0.137	-0.017	0.026	-0.033	0.130	0.133	0.034
	(0.132)	(0.041)	(0.154)	(0.178)	(0.039)	(0.084)	(0.104)	(0.080)	(0.155)	(0.054)
Labor market participation rate	-0.016	-0.007	-0.027	-0.009	-0.008	-0.008	0.003	0.013	-0.014	0.030**
	(0.014)	(0.009)	(0.017)	(0.019)	(0.007)	(0.010)	(0.012)	(0.007)	(0.011)	(0.011)
Time fixed effects	YES									
Facility-by-prior-offense fixed effects	NO									
R-squared	0.205	0.187	0.230	0.243	0.188	0.176	0.169	0.241	0.211	0.201
Observations	1,928									

Notes: Each column represents a different specification. For instance, offense *h* in the two peer measures for column (1) is misd. assault. In this table, peers are defined as other inmates below the age of 26. All specifications are simultaneously estimated as a SUR, include facility fixed effects but no facility-by-prior-offense fixed effects. The ten chosen offense categories represent offenses that are the most committed within one year upon first release and are easy to interpret for policy purposes. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

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