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Research Article

Estimating and explaining ethnic disparities in the cumulative risk of paternal incarceration in Denmark

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Estimating and explaining ethnic disparities in the cumulative risk of paternal incarceration in Denmark

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Abstract

BACKGROUND

Paternal incarceration is a well-known risk factor for poor child outcomes. Although existing research documents the prevalence of paternal incarceration and racial/ethnic disparities in this risk, research in this area is still sorely limited in two ways. First, the range of groups for which we know the cumulative risk of paternal incarceration is still quite narrow. Second, no research has decomposed disparities in the risk of paternal incarceration into analytically distinct components.

OBJECTIVE

To estimate and explain ethnic disparities in paternal incarceration risk in Denmark.

METHOD

We use Danish administrative data and two core demographic techniques. First, we use birth cohort life tables to estimate country of origin-specific paternal incarceration risks for native Danes, Western descendants of immigrants, and ten groups of non-Western descendants of immigrants. Second, we conduct Blinder-Oaxaca decompositions to see how three factors – paternal employment, education, and previous criminal justice contact – shape these risks.

RESULTS

We find that descendants of immigrants are much more likely to experience paternal incarceration than native Danes, but that there is substantial heterogeneity across country of origin. Additionally, we find that for most countries the observed disparities in paternal incarceration risk can be almost entirely explained by group differences in paternal employment, education, and previous criminal justice contact.

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CONTRIBUTION

By using two core demographic techniques we provide insight into how future research on paternal incarceration and other risk factors for poor child well-being could better estimate and explain the risk of experiencing these events.

1. Introduction

Although the study of paternal incarceration is relatively new to the demographic literature, entering mainstream demography only around a decade ago (Wildeman 2009), recent research in the United States and a host of other nations has shown that paternal incarceration is both sufficiently common and sufficiently unequally distributed that it could be relevant for population health and well-being and inequalities in such (e.g., Enns et al. 2019; Wildeman 2009; Wildeman and Andersen 2015). Recent analyses, for instance, tie paternal incarceration to elevated risks of behavior and mental health problems in early childhood (Geller et al. 2012; Wakefield and Wildeman 2011), poor physical health (Roettger and Boardman 2012; Turney 2014a), and elevated risks of exposure to child abuse and neglect (Turney 2014b), all of which likely have important implications not only for criminology but also for demography, sociology, and public health.

The bulk of research on the collateral consequences of incarceration for families has been situated within the US context, but evidence from many other countries such as the United Kingdom (Murray and Farrington 2008), the Netherlands (Besemer et al. 2011), Sweden (Dobbie et al. 2018), and Denmark (Andersen and Wildeman 2014; Wildeman and Andersen 2017) also document the largely negative consequences of having a father incarcerated, indicating that although the extent to which fathers are incarcerated in the United States may be unique, the negative consequences for family life are not simply a US phenomenon.

Previous research within the United States has shown marked racial and ethnic disparities in paternal incarceration risk between black, white, and Hispanic children (Chung 2011; Sykes and Pettit 2014; Turney 2014a; Wildeman 2009), which likely exacerbates existing childhood inequalities (Wakefield and Wildeman 2013). But very little is known about how paternal incarceration is distributed among racial, ethnic, or minority/majority groups outside the United States (but see Dennison, Stewart, and Freiberg 2013; Dowell, Preen, and Segal 2017; Quilty et al. 2004). And even within the US context, little attention has been given to explaining what drives disparities in paternal incarceration risks. Both of these represent substantial research gaps. The lack of more fine-grained estimates across racial/ethnic groups presents a picture of risk

homogeneity within these groups that is likely inaccurate. And the lack of formal analysis of the factors driving disparities in paternal incarceration is problematic because it means we know that such disparities exist but not why.

This study fills these gaps by estimating and explaining the cumulative risk of paternal incarceration for native Danes and descendants of immigrants using Danish administrative data for children born between 1991 and 1998. This article makes three novel contributions by (1) providing estimates of paternal incarceration risks for native Danes and Western and non-Western descendants of immigrants using birth cohort life tables, (2) moving beyond these broad categories and estimating heterogeneity in paternal incarceration risks by country of origin, and (3) formally decomposing differences in paternal incarceration risks to examine how much is attributable to compositional differences in a set of explanatory factors using a Blinder-Oaxaca decomposition. Results show that 8.8% of native Danes born between 1991 and 1998 experienced some form of paternal incarceration – including arrests – before age 15, whereas as many as 15.1% and 20.2% of descendants of Western and non-Western immigrants respectively are estimated to have experienced paternal incarceration. Not surprisingly, the estimates by country of origin show that the joint categorization of non-Western countries masks a great deal of heterogeneity.⁴ Somali descendants appear to be at particularly high risk and have a 35.5% risk of experiencing paternal incarceration (including arrests). Descendants from, for example, Iraq have a much lower risk (14.8%). Decomposition results, which notably should not be interpreted as causal effects, show that differences in paternal employment, education, previous criminal justice contact, and a set of basic compositional factors account for most if not all of the observed disparities – with employment status and previous criminal justice contact being the primary explanatory factors. But this result is not universal across all countries of origin. Rather, results show that more than half the observed disparity in paternal incarceration risk between Somali descendants and native Danes is attributable to unexplained factors, which may include negative selection or discrimination (above and beyond composition of explanatory factors).

⁴ The distinction between Western and non-Western countries is widely used within the Danish context with Western referring to countries within the EU, other European countries, Canada, the United States, Australia, and New Zealand. The group of non-Western countries consists of any other country, making both categories very heterogeneous.

2. Background

2.1 Racial and ethnic disparities in paternal incarceration risk

Table 1 summarizes studies of the cumulative – or childhood – risk of parental incarceration within and outside the US context. Previous studies estimating paternal incarceration or imprisonment risk within the United States have solely focused on three to four racial or ethnic groups – blacks, whites, Hispanics and “other” – and none have attempted to examine potential heterogeneity within these broadly defined groups. Drawing on the Survey of Inmates in State and Federal Correctional Facilities, Wildeman (2009) documents large racial disparities with black children in the most recent cohort being almost seven times as likely to experience paternal imprisonment compared to white children. These estimated black-white disparities are mirrored in other studies (Sykes and Pettit 2014) although the gap is smaller in studies with more selective samples (i.e., nonmarital children (Chung 2011)) or narrower family definitions (i.e., residential fathers (Turney 2014a)). In these studies, Hispanic children are often much more on par with white children when it comes to the risk of having a father incarcerated (Chung 2011; Turney 2014a) although they are still estimated to be three times as likely to experience paternal imprisonment in the one study that uses a broad definition of family and nationally representative data (Sykes and Pettit 2014).

Outside of the United States, the prevalence of parental incarceration has generally received little attention, although, as we noted earlier, extensive research on the consequences of parental incarceration for children has been conducted outside of the United States (e.g., Dobbie et al. 2018; Murray and Farrington 2008; Wildeman and Andersen 2017). A Danish study compares parental incarceration risk in Denmark and United States (Wildeman and Andersen 2015), but does not examine whether this experience is concentrated within certain racial or ethnic groups. Additionally, a group of studies from Australia show extreme disparities in childhood exposure to paternal or maternal incarceration between indigenous and nonindigenous children (Dennison, Stewart, and Freiberg 2013; Dowell, Preen, and Segal 2017; Quilty et al. 2004), highlighting how yet another minority group is disproportionately affected by the criminal justice system.

Table 1: Selected studies on cumulative paternal, maternal, or parental incarceration risk

United States	Incarceration			Racial/ethnic group			Minority/ Majority ^a	
	Paternal	Maternal	Parental	Black	White	Hispanic		Other
Chung 2011 ^b	✓			✓	✓	✓	✓	2.62
Sykes and Pettit 2014			✓	✓	✓	✓		6.21
Turney 2014a ^c			✓	✓	✓	✓	✓	1.95
Wildeman 2009	✓	✓	✓	✓	✓			6.97
Australia	Paternal	Maternal	Parental	Indigenous	Non-Indigenous			
Dennison, Stewart, and Freiberg 2013	✓			✓			✓	3.84
Dowell, Preen, and Segal 2017		✓		✓			✓	26.86
Quilty et al. 2004	✓	✓	✓	✓			✓	5.31
Denmark	Paternal	Maternal	Parental					
Wildeman and Andersen 2015	✓		✓					

^a Shows the minority/majority risk ratio for each study. For US studies the black/white risk ratio is reported. For studies with results for several cohorts or measures of family member incarceration priority is given to the most recent cohort and paternal incarceration.

^b Non-marital children only, and only until age 5 (Wisconsin)

^c Residential parents only (National Survey of Children's Health)

In sum, these studies have documented that there are large racial/ethnic disparities in how many children have had the criminal justice system reach into their lives through the incarceration of a parent. These broad disparities are generally mirrored in adult incarceration risk/rates (Mauer and King 2007; Pettit and Western 2004), and here we find a couple of studies that examine heterogeneity in incarceration rates (though not cumulative risks of incarceration) across country of origin or nativity. Rumbaut and Ewing (2007) show that broad categorizations of ethnic groups, like Hispanic and Asian immigrants, mask considerable variation in male incarceration risks across country of origin and nativity status. For example, among Hispanic males, Mexican immigrants have a comparatively low incarceration rate (0.7%) whereas Puerto Rican “immigrants” have a much higher rate (4.5%) (Rumbaut and Ewing 2007). Outside of the United States, studies consistently find different minority groups to have much higher incarceration rates than the majority group (Tonry 1997) – examples include indigenous people in Canada and Australia (Broadhurst 1997; Roberts and Doob 1997), immigrants from Arab and South American countries in Sweden (Martens 1997), black residents in England and Wales (Smith 1997), and Algerian, Moroccan, and Tunisian immigrants in France (Tournier 1997). But no study to date – neither in the United States or in Europe – has examined how the heterogeneities in ethnic disparities in incarceration rates is reflected in the childhood experience of paternal incarceration.

2.2 Factors shaping the risk of paternal incarceration

Although the studies mentioned above have documented racial or ethnic disparities at a broad level, none has formally addressed potential drivers of these disparities (although a few have estimated within-race educational gradients in the cumulative risk of paternal incarceration (Sykes and Pettit 2014; Wildeman 2009)). In this article we address four broad potential explanatory factors that could drive group-level disparities in paternal incarceration risks.

Compositional factors. There is the possibility that differences in basic demographic or compositional factors – such as age at child’s birth, residential patterns, and residence seniority – could explain why children from some minority or ethnic groups are more or less likely to experience paternal incarceration than others. The linkage between age and crime has been extensively studied and consistently found crime to peak in the late teens to early twenties (e.g., Farrington 1986; Hirschi and Gottfredson 1983) and a bit later for incarceration (Porter et al. 2016). The age-crime relationship might matter for disparities in paternal incarceration risk if ethnic groups differ in the age at which they have children, and therefore differ in whether they have “aged out” of crime before that. Differences in where ethnic groups most often reside

might also matter in the sense that living in disadvantaged neighborhoods, which are often located in the larger cities where much crime occurs (Glaeser and Sacerdote 1999), could also make (paternal) incarceration more likely (Clear 2007). Additionally, residence seniority – i.e., the number of years spent in the country – might matter for paternal incarceration risk. A consistent finding is that native born descendants of immigrants have higher incarceration rates than immigrants, even conditional on country of origin, which is sometimes referred to as the assimilation paradox (Rumbaut and Ewing 2007), but time spent in the country could also matter within the immigrant generation.

Employment. Another potential explanatory factor is labor market status, which has previously been linked to crime and incarceration. Within the Scandinavian context it is well documented that immigrants have poorer labor market attachment than natives – although the degree to which depends on refugee status (Schultz-Nielsen 2016) – and are more likely to live in poverty (Blume et al. 2007), which could make paternal crime (and incarceration) more prevalent among these groups. In fact, recent evidence has underscored the causal link between crime and welfare and labor market policies targeted at immigrants (Andersen, Dustmann, and Landersø 2019; Couttenier et al. 2019).

Education. We also know that paternal incarceration is highly concentrated among children whose fathers achieved little education (Sykes and Pettit 2014; Wildeman 2009). Indeed, the abovementioned racial disparities in paternal incarceration risks are somewhat lower within some education categories, suggesting that racial differences in educational attainment might drive some of the observed disparities in paternal incarceration.

Crime. Finally, group-level differences in paternal incarceration risk could simply be driven by differences in criminal propensity and prior criminal justice contact among the fathers. There is some evidence within the Danish and Scandinavian (Skardhamar, Aaltonen, and Lehti 2014) context that immigrants are more likely to be convicted for a criminal offense, although this is mostly true for immigrants from non-Western countries (Andersen and Tranæs 2015; Statistics Denmark 2015) and most of the differences disappear when factors such as socioeconomic background are taken into account (Andersen and Tranæs 2015). If such initial group-level differences in criminality exist, these could be expected to carry over into the paternal incarceration risks that the children are exposed to. However, there is also evidence that immigrants and descendants of immigrants are discriminated against by the police and the criminal justice system (Holmberg and Kyvsgaard 2003), which would also result in higher paternal incarceration risks – even in the absence of higher paternal criminality.

The latter three explanatory factors all involve some kind of system contact – that being either the labor market, the educational system or the criminal justice system –

and these are the three factors we will emphasize in the decomposition. Knowing how much these factors contribute to disparities in paternal incarceration risk is especially important since disparities in employment, education, and criminal justice contact could potentially be addressed at the policy level – although the results presented in this paper should not be interpreted as causal estimates.

2.3 The Danish context

Denmark has a long history of immigration but the first (in terms of relevance for our analyses) major influx of immigrants to Denmark, who arrived in the 1960s, were guest workers from countries like Turkey, Yugoslavia, and Pakistan responding to a demand for a larger workforce. Despite this arrangement being halted in the 1970s, the immigrant population from these countries continued to grow by means of family reunification. The 1980s and 1990s were marked by the arrival of refugees from a wide range of countries, such as Vietnam, Lebanon, Poland, ex-Yugoslavia, Iran, Iraq, and Somalia. At this point, Denmark was at the forefront when it came to accepting refugees, going above and beyond the UN definition of refugees (Schultz-Nielsen 2016). But in the late 1990s and early 2000s the Danish immigration policy took a more restrictive turn, limiting immigration into Denmark – through stricter family reunification and asylum rules – coupled with reduced (access to) welfare benefits (Schultz-Nielsen 2016). These later years have also been characterized by immigration critics gaining more attention in the public debates (Yilmaz 2012) and according to global opinion polls Denmark is – along with the rest of Europe – among the countries with the most negative attitudes towards immigration (Esipova et al. 2015).

Once in Denmark, entry into the Danish labor market has proven difficult for many immigrants – particularly those arriving as refugees.⁵ For example, the employment rate among refugees granted residence in Denmark is at only 15% after 15 months in Denmark and after 4.5 years remains very low at 40% (Andersen et al. 2012). This is mostly tied to immigrants arriving with comparatively low levels of education, which is particularly true for immigrants from non-Western countries and even more so for refugees (Schultz-Nielsen and Skaksen 2017). However, even highly educated immigrants have difficulty profiting from these skills within the Danish context and they have both lower levels of labor market attachment and lower wages than similarly educated native Danes (Schultz-Nielsen and Skaksen 2017). In terms of residential

⁵ The observations in this subsection are not necessarily true for immigrants who come to Denmark on work permits, as they typically already have employment in Denmark upon arrival and in jobs that require the specific skills they possess. But for other types of immigrants, such as refugees and immigrants who are family reunified to refugees, the observation holds true.

patterns, immigrants and descendants of immigrants are often concentrated in disadvantaged neighborhoods (Damm, Schultz-Nielsen, and Tranæs 2006), and many live in public housing (Andersen 2017). Furthermore, pathways to citizenship are cumbersome for both immigrants and descendants, with increasingly restrictive demands on residence seniority, financial self-sufficiency (i.e., not relying on public benefits), Danish language skills, and avoiding criminal justice contact, among other things.

Denmark has a comparatively mild penal regime in comparison with the United States but also many other countries.⁶ Similarly to other Scandinavian countries, Denmark has an incarceration rate of 61 per 100,000, compared to 148 for the United Kingdom and 698 for the United States (Walmsley 2016). The relatively low incarceration rate reflects both the use of much shorter sentences – roughly 60% of prison sentences are shorter than four months (Danish Prison and Probation Services 2017) – and an extensive use of noncustodial alternatives to imprisonment, such as electronic monitoring and community service. Furthermore, the mild penal regime is reflected in comparably good prison conditions, where many inmates serve their sentence in open prisons with few barriers to the outside world (Pratt 2008). Whereas it is important to highlight how the Danish context differs from the United States, which is the basis for the majority of the knowledge we have about the prevalence, correlates, and consequences of paternal incarceration, this should not be understood to mean that paternal incarceration is not a significant event in a setting like Denmark. In fact, Danish studies have shown paternal incarceration to have causal effects on the risk of foster care placement (Andersen and Wildeman 2014) and the risk of being charged by young adulthood (Wildeman and Andersen 2017) even for short spells of paternal incarceration lasting a month or so. Thus, whereas both the dose and prevalence of paternal incarceration may differ between Denmark and the United States, paternal incarceration has indeed been documented to be a salient childhood experience with important consequences for child well-being in both countries.

⁶ The mild penal regime can also be traced in Danish female incarceration rates. Wildeman and Andersen (2015) estimate Danish children's cumulative risk of experiencing maternal incarceration for more than 24 hours by age 15 to be lower than one percent. With so few children experiencing maternal incarceration it would be impossible to conduct meaningful statistical analyses hereof – which (in addition to paternal incarceration being the main focus of existing studies) is why we do not also focus on maternal incarceration in this paper.

3. Data and method

3.1 Danish administrative data

We use full population administrative data from Denmark – made available by Statistics Denmark – which contain unique individual identifiers on all residents of Denmark. The individual identifiers enable us to link data from various registers often as far back as 1980 (for a description of the Danish administrative data, see Andersen 2018). From the population register we link family members – children and their fathers – and the population register also contains information on date of birth and immigrant status along with country of origin. We obtain information on (paternal) incarceration through the incarceration register, which contains admission and release dates reported to Statistics Denmark by the Danish Prison and Probation Service. The population register and the incarceration register make up the foundation for the birth cohort life table analysis, but for the decomposition we take advantage of the easy linkage (using the unique individual identifiers) to additional registers to construct measures of the following explanatory factors.

Compositional factors. We construct dummies for paternal age at child's birth (younger than 25 years, 25–29 years, 30–34 years, and 35+ years) using the population register. We use information from the Database of Historical Migrations to obtain the number of years between child's birth and the most recent immigration date and code this in dummies (< 2 years, 2–4 years, 4–6 years, and > 6 years).⁷ And finally, we use the housing register to measure whether the father lives in one of the municipalities that hold the four largest cities during the year of the child's birth.

Employment. We follow the categories recommended by the International Labour Organisation (ILO) for measuring employment status: employed, in education, and unemployed/outside labor force/missing. We measure employment status as each persons' primary labor market attachment in November the year before the child's birth.

Education. We obtain information on paternal education from the education register, which summarizes information from the Danish educational institutions supplemented by historical data which contain official diploma information from the Ministry of Education. In the period 1999–2004 Statistics Denmark surveyed all immigrants aged 18–59, in order to supplement the data from the Danish educational institutions with self-reported completed education from origin countries (Mørkeberg

⁷ As immigration dates are not recorded prior to 1986, all immigrant fathers with missing values are set to > 6 years in Denmark.

2000).⁸ We categorize the highest completed education of the father into the following three categories: tertiary, secondary, and elementary/missing education.

Crime. We obtain information on previous paternal conviction through the conviction registers, which contains information on conviction date, sentence type and crime type as far back as 1980 and is reported to Statistics Denmark by The Danish National Police (and hence represents the full population of official convictions). We measure prior paternal conviction as number of convictions for penal offences divided by the number of years in Denmark between immigration year or 1986 (the latest) and one year prior to child's birth.

3.2 Birth cohort life tables

For the birth cohort life tables we first obtain the number of children born in Denmark from 1991 to 1998 with a father in the country, counted on the 1st of January the year after the birth year, who also remain in the country until the age of 15.⁹ Second, we use the incarceration register to determine whether the children experienced paternal incarceration before age 15 and the exact age at the first instance of paternal incarceration. When aggregated, this gives us the number of children experiencing first paternal incarceration at each age. Third, we adjust the population count by subtracting the number of children experiencing first time paternal incarceration at the previous age, to get the number of children at risk of experiencing first time paternal incarceration at the beginning of each age. Finally, we use the number of children at risk and the number of first-time paternal incarcerations at each age to estimate age-specific risks and the cumulative risk of paternal incarceration at age 0 through 14.

Incarceration type and length. The detailed nature of the incarceration data allows us to distinguish between different types and durations of paternal incarceration, which is particularly relevant because experiences with paternal incarceration most likely depend on whether the father was incarcerated just for a few hours or for several months or years. Accordingly, we construct *separate* life table estimates for six different types of paternal incarceration: (1) any paternal incarceration, which is all-encompassing and includes both arrests and incarcerations of any length before or after a conviction; (2) any paternal incarceration excluding arrests; (3) arrests (usually < 24

⁸ The response rate to these surveys are low (around 50%), which means that this aspect of our educational measure is somewhat inaccurate.

⁹ We choose to limit the analysis to children who remain in the country until the age 15 to avoid letting differential emigration rates skew the comparisons between countries of origin, and because we believe that this measure is the most informative in terms of grasping the childhood experiences of the descendants currently entering adulthood themselves. As a supplementary analysis, we present life table estimates for all children born in Denmark (disregarding emigration) in Table A-1 and Table A-2.

hours) that do not result in further incarceration, meaning that the individual is either not charged, not detained pretrial, acquitted, or that the sentence does not involve a prison sentence; (4) incarcerations, including pretrial detention and/or post-conviction incarceration, lasting less than 1 month; (5) incarcerations lasting 1–6 months; and finally (6) incarcerations lasting more than 6 months. We thus first conduct a life table analysis of the overall cumulative risk of *any* type of paternal incarceration – including/excluding arrests (1/2), but we then also conduct separate life table analyses of the cumulative risk of experiencing each of the (3) through (6) lengths of paternal incarceration – each time using the first time paternal incarceration of a given length to estimate the age-specific risks for that particular length of paternal incarceration.¹⁰

Country of origin. For the first part of the analysis we construct birth cohort life tables for native Danes and descendants of immigrants from Western and non-Western countries separately, with the definition of Western descendants taken from Statistics Denmark to include children born in Denmark to immigrant parents from countries within the EU, other European countries (Andorra, Iceland, Lichtenstein, Monaco, Norway, San Marino, Switzerland, and Vatican City), Canada, the United States, Australia, and New Zealand. The group of non-Western countries consists of any other country.¹¹ For the second part of the analysis we construct country of origin specific estimates for the descendants from the ten non-Western countries with the largest descendant population in the 1991–1998 birth cohorts (Turkey, Lebanon, Pakistan, Somalia, Sri Lanka, ex-Yugoslavia, Vietnam, Iraq, Morocco, Iran). Due to the small population of descendants from Western countries we do not break estimates down by their country of origin.¹²

¹⁰ As a child can experience more than one type of paternal incarceration during childhood, and we conduct separate life table analyses for each for the six types, the cumulative risk of any paternal incarceration (1) does not necessarily equal the sum of the cumulative risk of (3) through (6). A child might, for example, experience one instance of paternal incarceration lasting 1–6 months at age 4, and another one, exceeding 6 months at age 6. That child would enter the life table analysis of “Any incarceration” with a first-time incarceration at age 4, and likewise for the life table analysis of “1–6 months incarceration” but would also enter the life table analysis of “> 6 months incarceration” with a first time incarceration at age 6. Table A-3 shows the percentage of children experiencing shorter incarceration spells who also experience longer incarceration spells.

¹¹ If the country of origin differs for two immigrant parents, the child receives the maternal country of origin, and priority is given to birth country over citizenship country if both are known (<https://www.dst.dk/da/Statistik/dokumentation/Times/moduldata-for-befolkning-og-valg/opr-land>)

¹² The Western countries of origin with the largest descendant population in Denmark are the Nordic countries, Poland, the Netherlands, Rumania, Great Britain, Germany, and Lithuania.

3.3 Decomposition analysis

Country of origin specific estimates of the cumulative risk of paternal incarceration shows which children are at higher risk of having a father incarcerated but leaves us guessing *why* such differences exist. The third step in the analysis is therefore to examine how much of the country-level differences that can be attributed to differences in paternal employment, education, and prior criminal justice contact and the basic compositional factors outlined above. For this we do a Blinder-Oaxaca decomposition on the individual level data that makes up the foundation for the life table analysis above using all descendants of immigrants, but only 10% randomly sampled native Danes.¹³

Following the logic of the Blinder-Oaxaca decomposition there can be two reasons that average outcomes differ between groups: (a) the groups have different characteristics known to affect the outcome and (b) they are treated differently on the basis of the same characteristics (i.e., discrimination). Put in the language of regression analysis the two groups can have (a) different levels of explanatory variables (X) or (b) different returns/coefficients (β) to these explanatory variables. The Blinder-Oaxaca decomposition identifies how much of the observed difference in average outcomes between groups can be ascribed to (a), which is termed the *explained part*, and how much can be ascribed to (b), which is termed the *unexplained part*. In this sense, the technique is used as an accounting exercise to examine which factors are quantitatively important, providing indications of which explanations to explore further, but without warranting causal claims in the absence of strong assumptions or exogenous variation (Fortin, Lemieux, and Firpo 2011). The Blinder-Oaxaca decomposition has been used to examine, for example, gender discrimination and disparities in the labor market (see Weichselbaumer and Winter-Ebmer 2005 for a meta-analysis). We use the decomposition to break down observed differences in paternal incarceration risk between native Danes and descendants from a particular country of origin into the explained and unexplained part, which can be written as follows:

$$E(Y_{Descendants}) - E(Y_{Natives}) = \text{Explained part} + \text{unexplained part}$$

$$\text{The explained part: } \{E(X_{Descendants}) - E(X_{Natives})\}\beta_{Natives}$$

$$\text{The unexplained part: } E(X_{Descendants})(\beta_{Descendants} - \beta_{Natives})$$

¹³ We use a 10% random sample of native Danes due to the huge differences in population size between native Danes and descendants of immigrants and for computational simplicity.

where $\beta_{Descendants}$ and $\beta_{Natives}$ are obtained from linear probability models separately regressing paternal incarceration on the explanatory factors for natives Danes and descendants of immigrants. The decomposition analysis then shows the proportions of the overall difference in paternal incarceration risk that the explained and unexplained part each constitutes. It should be noted that the unexplained part, aside from capturing disparities stemming from differing returns to the same characteristics, also captures differences in unobserved variables affecting the likelihood of paternal incarceration (Fortin, Lemieux, and Firpo 2011; Jann 2008).

We choose to use natives Danes as the reference group. We define the expected returns to each factor for the native Danes as expressing what the returns to the factors would be among the descendants if there were no differences in returns between the groups.¹⁴ We decompose separately for Western descendants and each of the ten non-Western countries of origin and include the following explanatory factors (X) in the decomposition models: basic compositional factors (+ child cohort dummies), paternal employment status, paternal education, and paternal convictions – all of which are described in detail in the “Danish Administrative Data” section above – and cluster standard errors on father ID.¹⁵ Furthermore, in addition to the overall decomposition described above we do a detailed decomposition, in which we further decompose the overall difference into differences attributable to different levels of (explained part) and different returns (unexplained part) to each of the explanatory variables. The detailed decomposition thus allows us to assess the explanatory power of each of the factors separately, although we must stress that these estimates should not be interpreted as causal effects.

¹⁴ As a robustness check we run two alternative specifications of the decomposition model. One in which we use a two-country pooled regression to estimate the “non-discriminatory coefficient vector,” and one where we do not include measures for the years in Denmark. In both specifications results are very similar to the main results (results are available upon request).

¹⁵ The fertility patterns (i.e., the number of children per father) for some countries of origin differ somewhat from the Danish pattern. This compositional difference across the groups could inflate disparities in the cumulative risk of paternal incarceration relative to the situation where all countries exhibited similar fertility patterns if fathers with high risks of incarceration also have more children. However, we see no signs that children from the countries with high fertility are systematically at higher risk of experiencing paternal incarceration than children from countries with lower fertility.

4. Results

4.1 Estimating the cumulative risks of paternal incarceration

Table 2 summarizes the birth cohort life table estimates for cohorts 1991–1998 (see table A-4 for the full birth cohort life table).¹⁶ The estimated cumulative risk of any paternal incarceration (including arrest) is 8.8% for native Danes, 15.1% for Western descendants, and 20.2% for descendants of non-Western immigrants. Thus, the cumulative risk of paternal incarceration by age 15 differs widely between native Danes and descendants of Western and non-Western immigrants. Whereas roughly 1 in 12 native Danes experience some form of paternal incarceration before they turn 15, this is true for 1 in 7 and 1 in 5 for Western and non-Western descendants, respectively. Disregarding paternal arrests, the cumulative risks of paternal incarceration are lower for all groups (3.7% for native Danes, 5.8% for Western descendants, and 8.5% of non-Western descendants) but the relative risks are similar to the results including arrests.

Table 2: Cumulative risk of paternal incarceration by age 15 by incarceration type for native Danes, Western and non-Western descendants, cohorts: 1991–1998

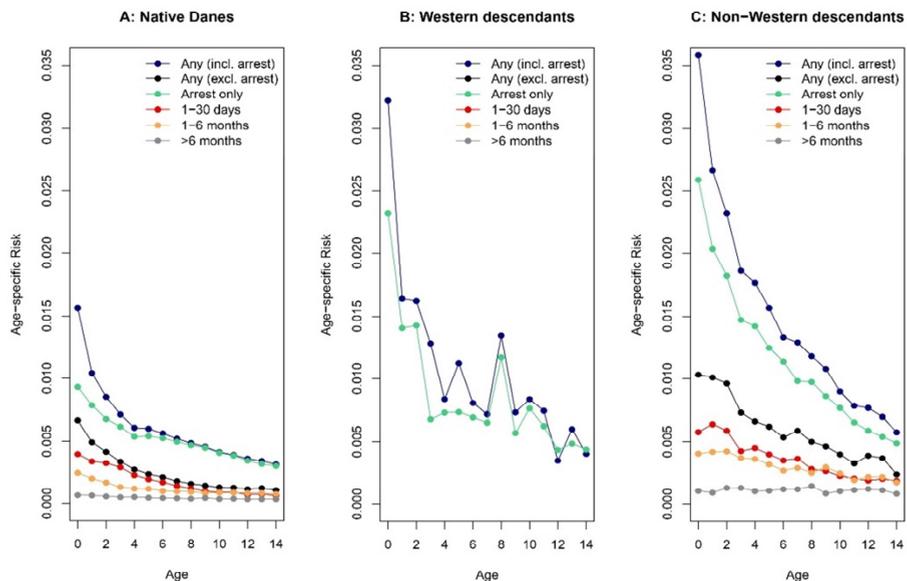
Incarceration type	Cumulative risk by age 15			Ratio to natives	
	Natives	Western	Non-Western	Western	Non-Western
Arrest only	0.075	0.124	0.162	1.648	2.162
1-30 days incarceration	0.027	0.031	0.052	1.162	1.963
1-6 months incarceration	0.018	0.034	0.044	1.931	2.485
>6 months incarceration	0.007	0.010	0.017	1.470	2.460
Any (incl. arrest)	0.088	0.151	0.202	1.709	2.287
Any (excl. arrest)	0.037	0.058	0.085	1.598	2.318

Note: Arrest refers to arrests where no further incarceration follows within the same case, meaning that the individual is either not charged, acquitted or that the sentence does not involve a prison sentence. These arrests usually only last a few hours. The 1–30 days, 1–6 months, and > 6 months categories include both pretrial detention and/or serving a sentence. The four categories are mutually exclusive within a case, but the child can experience more than one category of paternal incarceration during childhood (see Table A-3). The ratios are the cumulative risks for Western and non-Western divided by the cumulative risk for native Danes.
Source: Own calculations based on data from Statistics Denmark.

¹⁶ Figure A-1 plots the cumulative risk of paternal incarceration by age 15 for each of the birth cohorts separately. For native Danes and non-Western descendants, the estimates are fairly stable, but do show a gradually receding risk for the younger birth cohorts, with steeper declines observed for non-Western descendants. The estimates for Western descendants are on the other hand quite volatile, but also exhibit a receding pattern.

The age-specific patterns of first paternal incarceration risk, shown in Figure 1, are similar for the three groups. The highest risks occur during the first year after birth and then decline steeply afterwards. These patterns are consistent with the fathers aging or maturing out of crime as they have children but could also mask continued paternal criminal involvement throughout the children’s childhood, which is not captured by our focus on first time paternal incarceration. But consistent with the large differences in the cumulative risks of having experienced paternal incarceration at age 15, which we just presented, Panel C in Figure 1 also shows a much higher level of age-specific risks for non-Western descendants than for native Danes, and more than 3% of non-Western descendants having a father arrested or in other ways incarcerated during their first year. Panel B shows a similar result for Western descendants, although estimates for this group are less stable (lower N).

Figure 1: Age-specific risks of paternal incarceration, cohorts: 1991–1998



Note: Due to a small number of Western descendants experiencing longer spells of paternal incarceration, we do not show age-specific estimates for the longer spells for this group.
Source: Own calculations based on data from Statistics Denmark.

Estimates for type and length of incarceration. The risks of experiencing paternal incarceration are higher among descendants of immigrants than among native Danes

both across type and length of paternal incarceration. In addition to the cumulative risk of any paternal incarceration, Table 2 also shows the estimated cumulative risk by age 15 of paternal arrest and paternal incarcerations lasting less than 1 month, 1–6 months, and longer than 6 months. Disparities between groups persist – with some variation – across paternal incarceration types. Here, 1.8% of native Danes experience paternal incarceration lasting 1–6 months compared to 3.4% and 4.4% among Western and non-Western descendants. The cumulative risk ratio to native Danes (shown in rightmost columns in Table 2) is highest for incarcerations lasting 1–6 months and lowest for the shorter spells of incarcerations lasting less than 1 month¹⁷, and the risk ratios range between 1.2 and 1.9 for Western descendants and 2.0 and 2.5 for non-Western descendants. That differences persist across paternal incarceration type indicates that the paternal incarceration disparities between these broadly defined ethnic groups do not simply reflect disparities in minor brushes with the law.

Estimates by country of origin. Table 3, which summarizes country specific paternal incarceration risks, shows that the broad “non-Western” category masks a great deal of heterogeneity across the countries that make up the category. Descendants from all ten non-Western countries have higher paternal incarceration risks than native Danes, and some countries stand out with exceptionally high risks. Children of Somali immigrants are at particularly high risk of experiencing paternal incarceration (3.5–5.2 times as high as the risk for native Danes). As many as 35% of Somali descendant experience paternal incarceration (including arrest) before age 15, 19% experience paternal incarceration (excluding arrests), and 9% experience paternal incarceration lasting 1–6 months. Also, descendants of immigrants from ex-Yugoslavia have comparatively high risks of experiencing paternal incarceration lasting > 6 months (2.3% compared to 0.7% for native Danes) but do not stand out from the other non-Western countries when it comes to the shorter paternal incarceration spells. It is also worth mentioning that when considering only the short (< 1 month) and long (> 6 months) incarcerations, descendants of immigrants from Iraq, Sri Lanka, and Vietnam have cumulative paternal incarceration risks that are very similar to those for native Danes.¹⁸

¹⁷ These are also the incarcerations that are most likely to be replaced by non-custodial alternatives, and the incarcerations for which we clearly see a declining trend for the younger cohorts of native Danes, but where the pattern is not so clear for the descendants of immigrants (Figure A-1).

¹⁸ In a supplementary analysis (not shown) we find that there are differences across the countries in the proportion of children who live with their father at age 15 (a rough measure of family stability). This result indicates that although some of the groups have higher cumulative risks of paternal incarceration, these risks do not necessarily translate into direct experiences or effects on the children. Descendants of Somali immigrants have particularly low likelihood of living with their father at age 15, which may lessen the intergenerational impacts of the extremely high paternal incarceration risk presented in the results. However, prior studies have highlighted that although effects are stronger for children residing with their father prior to

Table 3: Cumulative risk of paternal incarceration by age 15 by country of origin, birth cohorts: 1991–1998

Country of origin	Cumulative risk by age 15					Ratio to natives					N ₀		
	Arrest	1–30 d.	1–6m.	>6m.	Any	Arrest	1–30 d.	1–6m.	>6m.	Any			
												incl. arrest	incl. arrest
Denmark	0.075	0.027	0.018	0.007	0.088	0.037						453,263	
Non-Western descendants													
Turkey	0.159	0.051	0.040	0.016	0.195	0.080	2.126	1.907	2.293	2.349	2.211	2.186	8,816
Lebanon	0.166	0.058	0.057	0.018	0.218	0.100	2.208	2.177	3.253	2.748	2.467	2.734	5,095
Ex-Yugoslavia	0.182	0.070	0.049	0.023	0.215	0.098	2.421	2.615	2.817	3.452	2.430	2.679	2,891
Pakistan	0.164	0.065	0.043	0.015	0.205	0.092	2.185	2.426	2.449	2.178	2.316	2.531	2,325
Sri Lanka	0.149	0.031	0.027	0.008	0.165	0.053	1.980	1.158	1.548	1.259	1.872	1.454	1,656
Vietnam	0.156	0.030	0.032	0.009	0.186	0.057	2.106	1.139	1.800	1.373	2.100	1.550	1,519
Iraq	0.112	0.024	0.042	0.007	0.148	0.060	1.493	0.894	2.397	1.112	1.674	1.635	1,473
Morocco	0.127	0.039	0.028	0.018	0.154	0.062	1.688	1.474	1.588	2.694	1.748	1.691	1,327
Iran	0.171	0.046	0.030	0.009	0.211	0.067	2.277	1.736	1.683	1.375	2.392	1.845	1,063
Somalia	0.262	0.117	0.091	0.024	0.355	0.188	3.488	4.406	5.177	3.611	4.011	5.142	990

Note: Due to the small sample size, estimates for Western descendants are not shown by country of origin. Source: Own calculations based on data from Statistics Denmark.

incarceration both children residing and not residing with their father are detrimentally impacted by their fathers' incarceration (Geller et al. 2012).

As a supplementary analysis, we have estimated the cumulative paternal incarceration risk by paternal refugee status (presented in Table A-5) as incarceration risk may be tied to prior disadvantage and trauma. However, there are only small differences across paternal refugee status, which might be connected to the crude nature of the available measure of refugee status for the period in question (imputed from country of origin and year of arrival).

4.2 Decomposing disparities in paternal incarceration risks

Table 4 summarizes the distribution of paternal covariates by country of origin and shows that in addition to the large differences in paternal incarceration risks across country of origin, natives Danes and descendants of immigrants from different countries of origin also have widely different demographic and socioeconomic characteristics. A higher proportion of Turkish and ex-Yugoslavian fathers are young (under the age of 25 when the child is born), whereas Iranian, Iraqi, and Moroccan fathers tend to be older (35 years or older when the child is born). Additionally, immigrant fathers are all – with the exception of fathers of descendants from Sri Lanka – much more likely to live in one of the four largest cities in Denmark. Table 4 also shows that many of the fathers have spent only few years in Denmark before the child’s birth. As many as 58% of Somali descendants have fathers who immigrated to Denmark within the last four years prior to child’s birth, and a large proportion of Iraqi and ex-Yugoslavian fathers also arrived recently in Denmark. Compared to Danish fathers, a lower proportion of fathers are employed prior to the child’s birth, which, as mentioned, is also what we would expect. Among native Danes, 89% of fathers were employed, but this was only true for 7% of fathers of Somali descendants and 14% of fathers of Lebanese and Iraqi descendants (these low employment rates likely also reflect the low residence seniority of these immigrant groups, as mentioned). Regarding education level, Pakistani and Turkish fathers stand out with the lowest proportion with tertiary education (19% and 17% compared to 46% for native Danes). These low education levels make sense as immigrants from these countries, as mentioned, traditionally arrived in Denmark as unskilled guest workers. When looking at the measure of prior paternal convictions, which adjusts for the number of years since immigration, the levels are similar to native Danes for descendants from Sri Lanka, Vietnam, and Somalia, whereas descendants from Lebanon stand out with exceptionally high levels of prior paternal convictions.

Table 4: Sample characteristics, birth cohorts: 1991–1998

Paternal covariates	Non-Western											
	DK	WES	TUR	LEB	YUG	PAK	SR	VIE	IRAQ	MOR	IRAN	SOM
Basic Composition												
Aged <25 at child's birth	0.064	0.056	0.290	0.091	0.152	0.111	0.010	0.067	0.033	0.024	0.017	0.063
Aged 25-29 at child's birth	0.288	0.207	0.351	0.317	0.337	0.287	0.178	0.265	0.151	0.173	0.109	0.287
Aged 30-34 at child's birth	0.365	0.342	0.209	0.345	0.295	0.245	0.473	0.359	0.316	0.278	0.339	0.343
Aged >35 at child's birth	0.283	0.394	0.149	0.247	0.216	0.357	0.338	0.309	0.500	0.524	0.536	0.317
Living in big city	0.307	0.520	0.595	0.559	0.509	0.911	0.107	0.521	0.705	0.864	0.642	0.616
<2 years in Denmark	0.004	0.129	0.089	0.063	0.303	0.071	0.025	0.048	0.183	0.050	0.056	0.203
2-4 years in Denmark	0.005	0.162	0.085	0.133	0.248	0.094	0.046	0.089	0.251	0.072	0.105	0.378
4-6 years in Denmark	0.004	0.123	0.088	0.210	0.080	0.083	0.100	0.086	0.204	0.083	0.114	0.240
>6 years in Denmark	0.986	0.586	0.738	0.595	0.368	0.752	0.829	0.777	0.362	0.794	0.724	0.179
Employment												
Employed	0.888	0.608	0.508	0.144	0.385	0.557	0.513	0.489	0.145	0.469	0.303	0.071
In education	0.005	0.007	0.003	0.005	0.002	0.003	0.004	0.008	N/A	N/A	0.024	N/A
Unemployed or miss.	0.107	0.385	0.489	0.850	0.613	0.440	0.483	0.503	N/A	N/A	0.673	N/A
Education												
Elementary or missing	0.256	0.310	0.706	0.490	0.490	0.551	0.496	0.531	0.394	0.554	0.386	0.432
Upper sec. educ.	0.287	0.199	0.124	0.222	0.206	0.260	0.257	0.155	0.256	0.169	0.291	0.253
Tertiary educ.	0.457	0.491	0.171	0.288	0.304	0.189	0.247	0.313	0.350	0.277	0.323	0.315
Crime												
# conv./years in DK	0.025	0.048	0.044	0.107	0.068	0.052	0.025	0.026	0.037	0.061	0.079	0.027
N	45,373 ^b	2,330	8,816	5,095	2,863	2,325	1,656	1,519	1,473	1,327	1,083	990
% emigrated ^a	1,239	29,052	2,740	7,249	3,497	13,855	16,808	1,870	13,879	5,043	13,672	57,417

^a Shows the percentage of the starting population (i.e., children born in Denmark in 1991–1998 with a father in the country) who have emigrated and not returned to Denmark before turning 15. Emigrating children are not including in the main analysis.
^b 10% random sample of native Danes.
 Abbreviations: DK = Denmark, WES = Western country, TUR = Turkey, LEB = Lebanon, YUG = Ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR=Morocco, SOM = Somalia, N/A = Not available Note: All paternal covariates are measured prior to the child's birth and the variable measuring the number of penal convictions relative to years in Denmark is measured one year prior to child's birth. Years in Denmark refers to years between child's birth and most recent immigration date, but as immigration dates are not recorded prior to 1986 all fathers with missing immigration date are set to >6 years in Denmark. The basic compositional factors included in the model also include child cohort dummies, but these are excluded here for the sake of brevity.
 Source: Own calculations based on data from Statistics Denmark.

Results from Blinder-Oaxaca decompositions of paternal arrest. Panel A in Figure 2 illustrates results from the Blinder-Oaxaca decomposition models by plotting the total difference in paternal arrest risks between native Danes and descendants from various countries of origin and breaking this difference down into the explained and the unexplained part.¹⁹ For descendants from most countries the observed differences in paternal employment, educational, criminal, and basic compositional factors account for most if not all of the differences in paternal arrest risks compared to native Danes. This finding shows that if the composition of the groups on employment, educational, criminal, and basic factors had been similar to that for native Danes, we would also expect their paternal arrest risks to be similar to what it is for native Danes following the decomposition model, although none of the estimates should be interpreted as causal effects of employment/education/crime-prevention initiatives.

For descendants of immigrants from Lebanon and Iraq we would expect the gap in paternal arrest risks compared to native Danes to be between 43% and 97% higher than what is actually the case if descendants and native Danes only differed on the explanatory factors that we focus on in our analyses. But for these countries the unexplained part serves to make the difference smaller than it would be in such a case (indicated by the bars below zero in Panel A in Figure 2). Fathers of descendants from these countries thus appear to be positively selected on unobserved variables which makes them less likely to be arrested or they have higher “returns” to, for example, level of education than Danes in terms of avoiding arrest. A different pattern is found for Somali descendants, however. Here, the explained parts make up only 44% of the observed differences in paternal arrest risks. According to the decomposition models, even if descendants from Somalia had the same level of explanatory factors (same composition) as native Danes, they would still have a 10.5 percentage point higher risk of experiencing paternal arrest (compared to the observed 18.7 percentage point) – a difference that can either be attributed to negative selection on characteristics that are unobserved in the data or negative discrimination in terms of worse “returns” to the explanatory factors (education making a larger difference for Danish fathers, for example).²⁰

Panel B in Figure 2 shows the percentage of the explained part from the Blinder-Oaxaca decomposition models that can be attributed to differences in specific factors, thus allowing us to examine which factors appear to be most important in the explained part of the decomposition that we just reported results for. Differences in employment status have the largest explanatory power. The explanatory power of employment varies

¹⁹ Tables A-6 and A-7 report a condensed version of the decomposition results with standard errors.

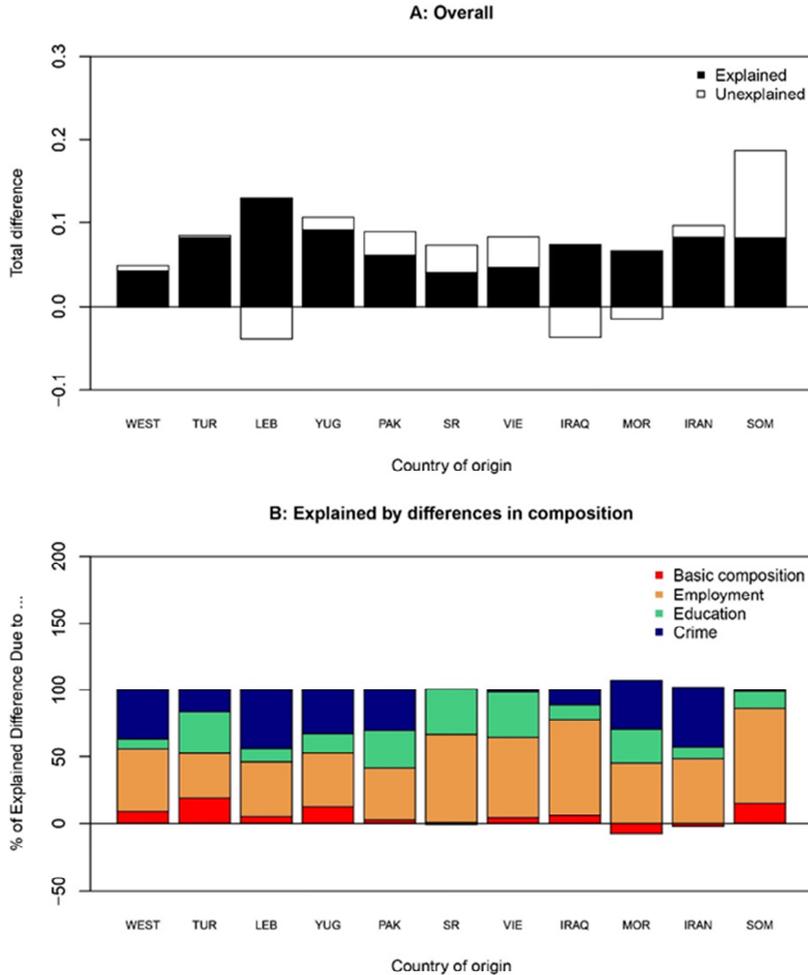
²⁰ We acknowledge that discrimination may also operate through the composition or the level of explanatory factors, for example by making it harder for certain groups to obtain jobs. However, when we refer to discrimination in connection to the unobserved part, we are referring to discrimination above and beyond discriminatory selection into the explanatory factors.

across countries of origin and is lowest for Turkey (33%) and Pakistan (39%) and highest for Somalia (71%) and Iraq (72%). Differences in paternal education explain generally less of the disparities in paternal arrest risks than differences in employment, which could be related to the relatively imprecise nature of this measure, but does reach 31–34% for Turkish, Sri Lankan, and Vietnamese descendants. Differences in basic composition (child cohort, age at child's birth, residential patterns, and years in Denmark) is of negligible importance for descendants from Sri Lanka, Pakistan, and Iran, and matters the most for descendants from Turkey (19%). Last, differences in prior paternal convictions also account for a large part of the differences in the risks of paternal arrest for descendants from Western countries, Lebanon, ex-Yugoslavia, Pakistan, Morocco, and Iran (30–45%).

We also perform the decomposition analyses for paternal arrest risks discarding the children who in addition to paternal arrest experience longer paternal incarceration spells before age 15 (Figure A-2 reports the results). This exercise excludes 30% of the children experiencing paternal arrest in the original dataset (Table A-3). Results from decomposition models show that the unexplained parts account for larger proportions of the differences in paternal arrest risks than what was the case in the main results. These results thus show that paternal arrest only is less related to, for example, socioeconomic status and is more likely to be driven by discrimination or “randomness”. In terms of the detailed decompositions, paternal employment status and prior paternal convictions still matters the most.

Results from Blinder-Oaxaca decompositions of 1–6 months of paternal incarcerations. Figure 3 shows results both from the overall decomposition into explained and unexplained parts (Panel A) and the detailed decomposition (Panel B) of the risk of paternal incarcerations lasting 1–6 months. Overall, results are similar to the ones for paternal arrest risks. Differences in basic composition, education, employment, and prior convictions jointly account for most if not all observed differences between native Danes and descendants from all countries, except Somalia for whom the explained part only accounts for 42%, and the rest is due to negative selection or discrimination. For most other countries the unexplained differences and differential “returns” to the explanatory factors serve to minimize the ethnic disparities that we would observe if the groups only differed on explanatory factors – and significantly so for descendants from Turkey, Lebanon, Morocco, and Iran. When it comes to the detailed decomposition in Panel B of Figure 3, observed differences in paternal employment status again carry the most explanatory power and account for between 35% (Turkey) and 83% (Sri Lanka) of the explained parts. The explanatory power of prior paternal convictions is high for descendants from Iran, Morocco, Lebanon, ex-Yugoslavia, Pakistan, and Western countries (42–55%), but quite low and insignificant for descendants from Sri Lanka, Vietnam, and Somalia (2–5%).

Figure 2: Decomposed difference from native Danes in paternal arrest risk

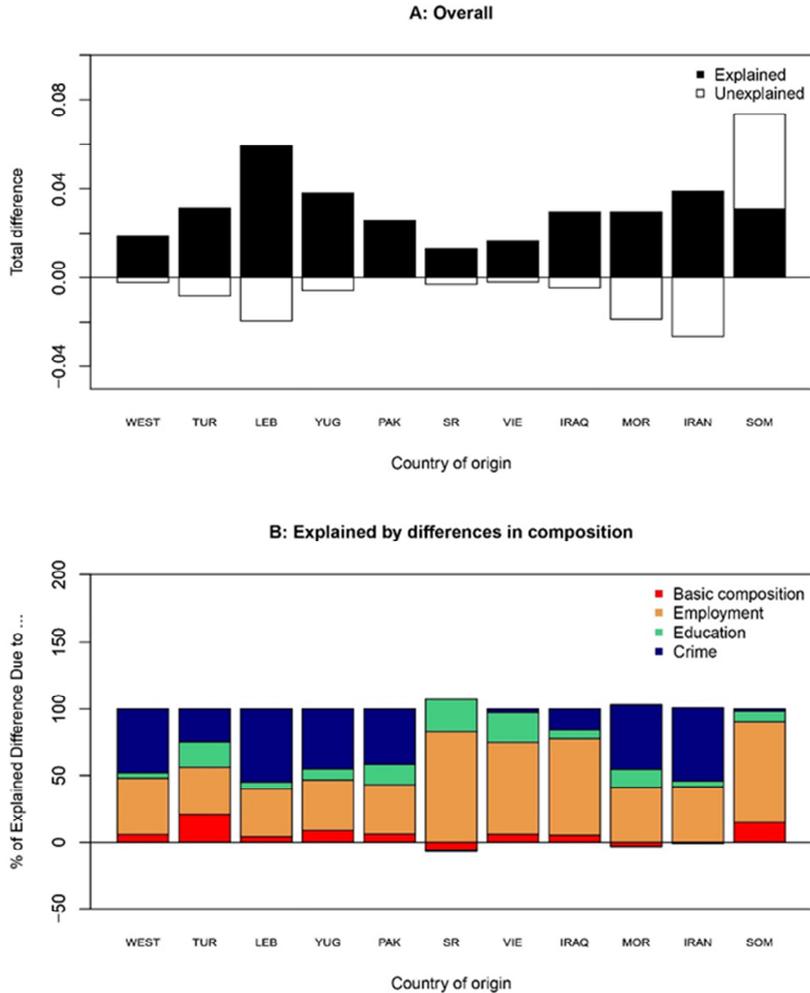


Abbreviations: DK = Denmark, WEST = Western country, TUR = Turkey, LEB = Lebanon, YUG = ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR = Morocco, SOM = Somalia.

Note: Included in the basic compositional factors are child cohort, age at child's birth, city, and years in Denmark. Panel B shows the sum of the explained coefficients within a given explanatory factor (reported in Table A-6). The decomposition performed is a detailed two-fold Blinder-Oaxaca decomposition using estimates from regressing paternal incarceration on explanatory factors for native Danes only as the nondiscriminatory coefficient vector.

Source: Own calculations based on data from Statistics Denmark.

Figure 3: Decomposed difference from native Danes in paternal incarceration risk (1–6 months)



Abbreviations: DK = Denmark, WES = Western country, TUR = Turkey, LEB = Lebanon, YUG = ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR=Morocco, SOM = Somalia.

Note: Included in the basic compositional factors are child cohort, age at child's birth, city and years in Denmark. Panel B shows the sum of the explained coefficients within a given explanatory factor (reported in Table A-7). The decomposition performed is a detailed two-fold Blinder-Oaxaca decomposition using estimates from regressing paternal incarceration on explanatory factors for native Danes only as the nondiscriminatory coefficient vector.

Source: Own calculations based on data from Statistics Denmark.

5. Discussion and conclusion

Previous research shows that paternal incarceration is a salient childhood experience that is highly unequally distributed across racial/ethnic and class lines. The present study used highly detailed administrative data to show that there are also large ethnic disparities in the cumulative risk of paternal incarceration in Denmark. Whereas 8.8% of native Danes born between 1991–1998 experienced some form of paternal incarceration by the age of 15, this is true for 15.1% and 20.2% of descendants of immigrants from Western and non-Western countries. These disparities persist – with some variation – across all types of paternal incarcerations (from arrest to incarceration lasting more than 6 months). However, results also highlight that broad ethnic groupings mask heterogeneity in children’s experiences and that children from specific communities or ethnic groups are much more likely to experience paternal incarceration than others. In particular, the children of Somali fathers have a 35% cumulative risk of experiencing any form of paternal incarceration before age 15, and a 9% risk of having a father incarcerated between 1–6 months (which is five times the risk for native Danes). From other studies on Danish data we know that even comparably short paternal incarcerations causally increase risks of foster care placement (Andersen and Wildeman 2014) and youth crime (Wildeman and Andersen 2017), and through these channels the unequal distribution of paternal incarceration could exacerbate already existing inequalities between native Danes and the ethnic minority groups that we have analyzed in this paper.

The reason for the particularly high exposure to paternal incarceration among Somali children could be connected to the high proportion of Somali fathers arriving as refugees (estimated at 98%) with potentially traumatizing experiences behind them. However, descendants from Iraq, Iran, and Vietnam also have a comparably high proportion of refugee fathers, and supplementary analysis does not reveal refugee status as a key dimension in distinguishing high/low paternal incarceration risks. Another potential explanation can be found in the exceptionally high emigration rates for Somali children. Somali families often emigrate to other countries within the European Union (the United Kingdom in particular), but this kind of mobility might be reserved for the more resourceful immigrants, leaving behind a negatively selected group of Somali immigrants and their children. We see support for this speculated relationship between emigration and incarceration for Somalis in a supplementary analysis, which retains children who emigrate in the sample. Overall, including children who emigrate brings down the estimates since they experience paternal incarceration (while in the country) at a lower rate than the ones remaining, but the decline is particularly steep for Somali descendants.

Moving beyond documenting that ethnic disparities exist, the present study also made a first attempt to account for the observed differences in paternal incarceration risk among the descendants from different countries of origin. Here, results showed that large differences exist in paternal socioeconomic status and prior criminal convictions for native Danes and descendants from various countries of origin, and that the differences in the distributions of these explanatory factors (especially employment status and prior convictions) do indeed account for most – if not all – of the disparities in paternal incarceration risks for most countries. In fact, for descendants from Turkey, Lebanon, Iran, and Morocco we find that unexplained positive discrimination or selection serves to suppress differences in paternal incarceration risks (1–6 months) that would otherwise have arisen because of the observed differences in basic composition, paternal employment status, education, and previous criminal convictions. The opposite is the case for descendants from Somalia, where differences in explanatory factors only account for 42% of paternal incarceration risks and the rest is due to negative selection or discrimination.

We should note that the use of the Blinder-Oaxaca decompositions is not without its caveats. First, as with any other analysis that does not rely on exogenous variation in explanatory variables, omitted variables as well as measurement error may bias the estimates. Our measure of paternal education is suspected to be somewhat inaccurate, which could potentially explain the relatively low explanatory power attributed to education in the decomposition models. We could also imagine that a host of unobserved variables (like paternal psychological trauma, substance use, and experienced discrimination or integration into the Danish society) could influence both paternal incarceration risk and some of the explanatory factors, thus potentially inflating the importance attributed to particularly employment and prior criminal justice contact.

Second, although studies using the Blinder-Oaxaca decomposition models frequently attribute the unexplained part in the decompositions to discrimination, we are hesitant to do so in our analysis. The topic of discrimination or targeting based on skin-color or ethnicity in criminal justice encounters, which is indeed an important issue that warrants further research, is better tackled head on in a separate study better equipped at handling the detailed nature of the circumstances leading up to these encounters.

One issue that this study does not address is the topic of repeated paternal incarcerations. The aim of the study was to document disparities on the extensive margin – showing the differences in the risk of ever experiencing paternal incarceration – and examine the main compositional drivers of these disparities. However, it is very reasonable to suspect that both the distribution and impact of paternal incarceration varies at the intensive margin – and not just measured as the type of paternal incarceration, as we do in this study, but rather measured as the frequency of paternal incarceration. In fact, a previous study using Danish data has shown that higher

frequency and duration of paternal incarceration is associated with worse outcomes in terms of education and crime (Andersen 2016). Future studies should build on the three contributions to the research on paternal incarceration which this paper advances, and examine, for example, how paternal incarceration experiences differ between ethnic groups in terms of frequency of paternal incarceration.

Particularly for immigrants, incarceration may carry a host of negative consequences for individuals and family members. In cases of severe crime, conviction (and incarceration) may both hinder citizenship acquisition, delay citizen acquisition for the family, and potentially lead to deportation orders against the father. Consequently, some of the children in our sample may experience both paternal incarceration and deportation. Rules are complex, time-varying, and depend both on length of residence and prison sentence, but there are reasons to suspect that especially Somali descendants experience this combination since (1) the risk of long spells of paternal incarceration is high, (2) a large proportion of fathers have only spent a short amount of time in Denmark, (3) only 40% of Somali descendants live with their father at age 15, which could be a direct consequence of paternal deportation. Whether these children are doubly disadvantaged by paternal incarceration and deportation or if paternal deportation may alleviate negative consequences of having a criminally engaged father, remains unclear.

The topic addressed in the present study borders the much-contested question of whether immigration leads to higher or lower levels of crime. A recent review of US-based studies finds that immigration is negatively (albeit weakly) related to crime (Ousey and Kubrin 2018) and incarceration rates are generally lower for immigrants compared natives within the United States (Rumbaut and Ewing 2007). But studies from Europe consistently find that immigrants are overrepresented in crime statistics (Andersen and Tranæs 2015; Killias 2011; Skardhamar, Aaltonen, and Lehti 2014). This contrast emphasizes the need to address heterogeneity across both destination context and immigrant groups. Our results are line with prior research on crime and immigration within the Danish and Nordic context, showing elevated criminal justice contact for most immigrant groups. But our study is the first to examine how the contested link between immigration and criminal justice contact bears on disparities in the intergenerational experiences with incarceration.

References

- Andersen, H.S. (2017). Selective moving behaviour in ethnic neighbourhoods: White flight, white avoidance, ethnic attraction or ethnic retention? *Housing Studies* 32(3): 296–318. doi:10.1080/02673037.2016.1208161.
- Andersen, L.H. (2016). How children's educational outcomes and criminality vary by duration and frequency of paternal incarceration. *The Annals of the American Academy of Political and Social Science* 665(1): 149–170. doi:10.1177/0002716216632782.
- Andersen, L.H. (2018). Danish register data: flexible administrative data and their relevance for studies of intergenerational transmission. In: Eichelsheim, V.I. and van de Weijer, S. (eds.). *Intergenerational continuity of criminal and antisocial behavior: An international overview of studies*. New York: Routledge: 28–43. doi:10.4324/9781315102788-3.
- Andersen, L.H., Dustmann, C., and Landersø, R. (2019). Lowering welfare benefits: Intended and unintended consequences for migrants and their families. Copenhagen: The ROCKWOOL Foundation Research Unit. (Study Paper 138). <https://www.rockwoolfonden.dk/en>.
- Andersen, L.H., Hansen, H., Schultz-Nielsen, M.L., and Tranæs, T. (2012). Starthjælpens betydning for flygtninges levevilkår og beskæftigelse. Rockwool Fondens Forskningsenhed & Syddansk Universitetsforlag. (Arbejdsrapport 25). <https://www.rockwoolfonden.dk/publikationer/starthjaelpens-betydning-for-flygtninges-levetilkaar-og-beskaeftigelse/>.
- Andersen, L.H. and Tranæs, T. (2015). Er ikke-vestlige indvandrere og efterkommere mere kriminelle end danskere? In: Jensen, B., Tamm, D., and Tranæs, T. (eds.). *Forbrydelse, straf og afsoning i Danmark*. Gyldendal og Rockwool Fondens Forskningsenhed: 64–78.
- Andersen, S.H. and Wildeman, C. (2014). The effect of paternal incarceration on children's risk of foster care placement. *Social Forces* 93(1): 269–298. doi:10.1093/sf/sou027.
- Besemer, S., van der Geest, V., Murray, J., Bijleveld, C.C.J.H., and Farrington, D.P. (2011). The relationship between parental imprisonment and offspring offending in England and the Netherlands. *British Journal of Criminology* 51(2): 413–437. doi:10.1093/bjc/azq072.

- Blume, K., Gustafsson, B., Pedersen, P.J., and Verner, M. (2007). At the lower end of the table: Determinants of poverty among immigrants to Denmark and Sweden. *Journal of Ethnic and Migration Studies* 33(3): 373–396. doi:10.1080/13691830701234517.
- Broadhurst, R. (1997). Aborigines and crime in Australia. In: Tonry, M. (ed.). *Ethnicity, crime, and immigration: Comparative and cross-national perspectives*. Chicago: University of Chicago Press: 407–468. doi:10.1086/449255.
- Chung, Y. (2011). Children’s exposure to paternal imprisonment: Incidence, evolution, and correlates among young nonmarital children. *Children and Youth Services Review* 33(5): 575–587. doi:10.1016/j.childyouth.2010.10.008.
- Clear, T.R. (2007). *Imprisoning communities how mass incarceration makes disadvantaged neighborhoods worse*. Oxford: Oxford University Press. doi:10.1093/acprof:oso/9780195305791.001.0001.
- Couttenier, M., Petrencu, V., Rohner, D., and Thoenig, M. (2019). The violent legacy of conflict: Evidence on asylum seekers, crime, and public policy in Switzerland. *American Economic Review* 109(12): 4378–4425. doi:10.1257/aer.20170263.
- Damm, A.P., Schultz-Nielsen, M.L., and Tranæs, T. (2006). *En befolkning deler sig op?* Copenhagen: Rockwool Fondens Forskningsenhed & Gyldendal. <https://www.rockwoolfonden.dk/publikationer/en-befolkning-deler-sig-op/>.
- Danish Prison and Probation Services (2017). Statistik 2016. Retrieved from <https://www.kriminalforsorgen.dk/wp-content/uploads/2018/12/kriminal-forsorgensstatistik2016.pdf>.
- Dennison, S., Stewart, A., and Freiberg, K. (2013). A prevalence study of children with imprisoned fathers: Annual and lifetime estimates. *Australian Journal of Social Issues* 48(3): 339–362. doi:10.1002/j.1839-4655.2013.tb00286.x.
- Dobbie, W., Grönqvist, H., Niknami, S., Palme, M., and Priks, M. (2018). The intergenerational effects of incarceration (NBER Working Paper 24186). Retrieved from doi:10.3386/w24186.
- Dowell, C.M., Preen, D.B., and Segal, L. (2017). Quantifying maternal incarceration: A whole-population linked data study of Western Australian children born 1985–2011. *Australian and New Zealand Journal of Public Health* 41(2): 151–157. doi:10.1111/1753-6405.12613.

- Enns, P.K., Yi, Y., Comfort, M., Goldman, A.W., Lee, H., Muller, C., Wildeman, C. (2019). What percentage of Americans have ever had a family member incarcerated? Evidence from the Family History of Incarceration Survey (FamHIS). *Socius: Sociological Research for a Dynamic World* 5. doi:10.1177/2378023119829332.
- Esipova, N., Ray, J., Pugliese, A., and Tsubutashvili, D. (2015). *How the world views migration*. Geneva: International Organization for Migration. www.iom.int.
- Farrington, D.P. (1986). Age and crime. *Crime and Justice: An Annual Review of Research* 7: 189–250. doi:10.1086/449114.
- Fortin, N., Lemieux, T., and Firpo, S. (2011). *Decomposition methods in economics. Handbook of labor economics* (Vol. 4). London: Elsevier. doi:10.1016/S0169-7218(11)00407-2.
- Geller, A., Cooper, C., Garfinkel, I., Schwartz-Soicher, O., and Mincy, R. (2012). Beyond absenteeism: Father incarceration and child development. *Demography* 49(1): 49–76. doi:10.1007/s13524-011-0081-9.
- Glaeser, E.L. and Sacerdote, B. (1999). Why is there more crime in cities? *Journal of Political Economy* 107(S6): 225–258. doi:10.1086/250109.
- Hirschi, T. and Gottfredson, M. (1983). Age and the explanation of crime. *American Journal of Sociology* 89(3): 552–584. doi:10.1086/227905.
- Holmberg, L. and Kyvsgaard, B. (2003). Are immigrants and their descendants discriminated against in the Danish criminal justice system? *Journal of Scandinavian Studies in Criminology and Crime Prevention* 4(2): 125–142. doi:10.1080/14043850310020027.
- Jann, B. (2008). The Blinder-Oaxaca decomposition for linear regression models. *Stata Journal* 8(4): 453–479. doi:10.1177/1536867X0800800401.
- Killias, M. (2011). Immigration and crime: The European experience. (Working paper EU-US. Immigration Systems 19).
- Martens, P.L. (1997). Immigrants, crime and criminal justice in Sweden. In Tonry, M. (ed.). *Ethnicity, crime, and immigration: Comparative and cross-national perspectives*. Chicago: University of Chicago Press: 183–256. doi:10.1086/449251.
- Mauer, M. and King, R.S. (2007). Uneven justice: State rates of incarceration by race and ethnicity. (The Sentencing Project). https://www.prisonlegalnews.org/media/publications/rd_stateratesofincbyraceandethnicity.pdf.

- Mørkeberg, H. (2000). *Indvandrernes uddannelse*. Retrieved from www.dst.dk.
- Murray, J. and Farrington, D.P. (2008). The effects of parental imprisonment on children. *Crime and Justice* 37(1): 133–206. doi:10.1086/520070.
- Ousey, G.C. and Kubrin, C.E. (2018). Immigration and crime: Assessing a contentious issue. *Annual Review of Criminology* 1(1): 63–84. doi:10.1146/annurev-criminol-032317-092026.
- Pettit, B. and Western, B. (2004). Mass imprisonment and the life course: Race and class inequality in U.S. incarceration. *American Sociological Review* 69(2): 151–169. doi:10.1177/000312240406900201.
- Porter, L.C., Bushway, S.D., Tsao, H.-S., and Smith, H.L. (2016). How the U.S. prison boom has changed the age distribution of the prison population. *Criminology* 54(1): 30–55. doi:10.1111/1745-9125.12094.
- Pratt, J. (2008). Scandinavian exceptionalism in an era of penal excess part I: The nature and roots of Scandinavian exceptionalism. *British Journal of Criminology* 48(2): 119–137. doi:10.1093/bjc/azm072.
- Quilty, S., Levy, M.H., Howard, K., Barratt, A., and Butler, T. (2004). Children of prisoners: A growing public health problem. *Australian and New Zealand Journal of Public Health* 28(4): 339–343. doi:10.1111/j.1467-842X.2004.tb00441.x.
- Roberts, J.V. and Doob, A.N. (1997). Race, ethnicity, and criminal justice in Canada. In Tonry, M. (ed.). *Ethnicity, crime, and immigration: Comparative and cross-national perspectives*. Chicago: University of Chicago Press: 469–522. doi:10.1086/449256.
- Roettger, M.E. and Boardman, J.D. (2012). Parental incarceration and gender-based risks for increased body mass index: Evidence from the National Longitudinal Study of Adolescent Health in the United States. *American Journal of Epidemiology* 175(7): 636–644. doi:10.1093/aje/kwr409.
- Rumbaut, R.G. and Ewing, W.A. (2007). The myth of immigrant criminality and the paradox of assimilation: Incarceration rates among native and foreign-born men. Washington, D.C.: American Immigration Law Foundation. <https://www.americanimmigrationcouncil.org/sites/default/files/research/Imm%20Criminality%20%28IPC%29.pdf>

- Schultz-Nielsen, M.L. (2016). Arbejdsmarkedstilknytningen for flygtninge og indvandrere -ankommet til Danmark i perioden 1997–2011. Rockwool Fondens Forskningsenhed and Syddansk Universitetsforlag. <https://www.rockwoolfonden.dk/app/uploads/2016/05/Arbejdsmarkedstilknytningen-for-flygtninge-og-indvandrere.pdf>.
- Schultz-Nielsen, M.L. and Skaksen, J.R. (2017). Indvandreres uddannelse (Arbejdsrapport 48). Copenhagen: Rockwool Fondens Forskningsenhed. https://www.rockwoolfonden.dk/app/uploads/2017/06/Arbejdsnotat-48_VER_S2_5korr.pdf.
- Skardhamar, T., Aaltonen, M., and Lehti, M. (2014). Immigrant crime in Norway and Finland. *Journal of Scandinavian Studies in Criminology and Crime Prevention* 15(2): 107–127. doi:10.1080/14043858.2014.926062.
- Smith, D.J. (1997). Ethnic origins, crime and criminal justice in England and Wales. In Tonry, M. (ed.). *Ethnicity, crime, and immigration: Comparative and cross-national perspectives*. Chicago: University of Chicago Press: 101–182. doi:10.1086/449250.
- Statistics Denmark (2015). Indvandrere i Danmark 2015. <https://www.dst.dk/Site/Dst/Udgivelser/GetPubFile.aspx?id=20703&sid=indv2015>.
- Sykes, B.L. and Pettit, B. (2014). Mass incarceration, family complexity, and the reproduction of childhood disadvantage. *Annals of the American Academy of Political and Social Science* 654(1): 127–149. doi:10.1177/0002716214526345.
- Tonry, M.H. (ed.). (1997). *Ethnicity, crime, and immigration: Comparative and cross-national perspectives*. Chicago: University of Chicago Press. doi:10.1086/449248.
- Tournier, P. (1997). Nationality, crime and criminal justice in France. In: Tonry, M. (ed.). *Ethnicity, crime, and immigration: Comparative and cross-national perspectives*. Chicago: University of Chicago Press: 523–551. doi:10.1086/449257.
- Turney, K. (2014a). Stress proliferation across generations? Examining the relationship between parental incarceration and childhood health. *Journal of Health and Social Behavior* 55(3): 302–319. doi:10.1177/0022146514544173.
- Turney, K. (2014b). The consequences of paternal incarceration for maternal neglect and harsh parenting. *Social Forces* 92(4): 1607–1636. doi:10.1093/sf/sot160.

- Wakefield, S. and Wildeman, C. (2011). Mass imprisonment and racial disparities in childhood behavioral problems. *Criminology and Public Policy* 10(3): 793–817. doi:10.1111/j.1745-9133.2011.00740.x.
- Wakefield, S. and Wildeman, C. (2013). *Children of the prison boom: Mass incarceration and the future of American inequality*. New York: Oxford University Press. doi:10.1093/acprof:oso/9780199989225.001.0001.
- Walmsley, R. (2016). World prison population list, eleventh edition. World Prison Brief. http://www.prisonstudies.org/sites/default/files/resources/downloads/world_prison_population_list_11th_edition_0.pdf.
- Weichselbaumer, D. and Winter-Ebmer, R. (2005). A meta-analysis of the international gender wage gap. *Journal of Economic Surveys* 19(3): 479–511. doi:10.1111/j.0950-0804.2005.00256.x.
- Wildeman, C. (2009). Parental imprisonment, the prison boom, and the concentration of childhood disadvantage. *Demography* 46(2): 265–280. doi:10.1353/dem.0.0052.
- Wildeman, C. and Andersen, L.H. (2015). Cumulative risks of paternal and maternal incarceration in Denmark and the United States. *Demographic Research* 32(57): 1567–1580. doi:10.4054/DemRes.2015.32.57.
- Wildeman, C. and Andersen, S.H. (2017). Paternal incarceration and children’s risk of being charged by early adulthood: Evidence from a Danish policy shock. *Criminology* 55(1): 32–58. doi:10.1111/1745-9125.12124.
- Yilmaz, F. (2012). Right-wing hegemony and immigration: How the populist far-right achieved hegemony through the immigration debate in Europe. *Current Sociology* 60(3): 368–381. doi:10.1177/0011392111426192.

Appendix

Table A-1: Cumulative risk of paternal incarceration by age 15 by incarceration type for native Danes, Western, and non-Western descendants, cohorts: 1991–1998. Disregarding emigration/death

Incarceration type	Cumulative risk by age 15			Ratio to natives	
	Natives	Western	Non-Western	Western	Non-Western
Arrest only	0.075	0.098	0.158	1.307	2.105
1–30 days incarceration	0.027	0.027	0.051	1.024	1.927
1–6 months incarceration	0.018	0.028	0.044	1.610	2.490
>6 months incarceration	0.007	0.008	0.016	1.191	2.444
Any (incl. arrest)	0.088	0.121	0.198	1.365	2.239
Any (excl. arrest)	0.037	0.049	0.084	1.336	2.305

Note: Arrest refers to arrests where no further incarceration follows within the same case meaning that the individual is either not charged, acquitted or that the sentence does not involve a prison sentence. These arrests usually only last a few hours. The 1–30 days, 1–6 months and > 6 months categories include both pretrial detention and serving a sentence. The four categories are mutually exclusive with in a case, but the child can experience more than one category of paternal incarceration during childhood. The ratios are the cumulative risks for Western and non-Western divided by the cumulative risk for native Danes.

Source: Own calculations based on data from Statistics Denmark.

Table A-2: Cumulative risk of paternal incarceration by age 15 by country of origin, birth cohorts: 1991–1998. Disregarding emigration/death

Country of origin	Cumulative risk by age 15					Ratio to natives					N ₀		
	Arrest	1–30 d.	1–6m.	>6m.	Any incl. arrest	Arrest	1–30 d.	1–6m.	>6m.	Any incl. arrest			
												0.075	0.027
Denmark	0.160	0.050	0.040	0.016	0.195	0.080	2.130	1.897	2.297	2.365	2.211	2.178	460,144
Non-Western descendants													
Turkey	0.162	0.055	0.055	0.018	0.213	0.097	2.160	2.086	3.126	2.724	2.414	2.658	9,123
Lebanon	0.180	0.070	0.051	0.024	0.215	0.100	2.409	2.643	2.882	3.618	2.435	2.743	5,518
Ex-Yugoslavia	0.160	0.061	0.039	0.018	0.201	0.090	2.129	2.281	2.218	2.625	2.271	2.454	3,003
Pakistan	0.143	0.029	0.032	0.009	0.162	0.056	1.910	1.073	1.794	1.340	1.834	1.519	2,721
Sri Lanka	0.157	0.032	0.033	0.010	0.184	0.057	2.100	1.188	1.872	1.439	2.087	1.570	1,999
Vietnam	0.109	0.027	0.040	0.009	0.144	0.060	1.449	1.005	2.281	1.296	1.630	1.653	1,551
Iraq	0.122	0.038	0.027	0.018	0.150	0.060	1.631	1.416	1.537	2.748	1.696	1.652	1,722
Morocco	0.157	0.042	0.028	0.009	0.196	0.063	2.101	1.585	1.584	1.301	2.213	1.718	1,408
Iran	0.196	0.084	0.076	0.015	0.266	0.139	2.611	3.159	4.320	2.284	3.010	3.802	1,258
Somalia													2,346

Note: Due to the small sample size, estimates for Western descendants are not shown by country of origin. Source: Own calculations based on data from Statistics Denmark.

Table A-3: Percentage of children experiencing shorter paternal incarcerations who also experience longer paternal incarcerations

	% with longest paternal incarceration			
	Arrest	1-30 days	1-6 months	>6 months
Arrest	69.25	11.44	12.62	6.68
1-30 days incarceration		61.00	25.14	13.87
1-6 months incarceration			78.32	21.68

Source: Own calculations based on data from Statistics Denmark.

Table A-4: Cumulative risk of any paternal incarceration for native Danes, Western, and non-Western descendants, cohorts: 1991-1998

Age	Native Danes				Western descendants				Non-Western descendants			
	N	D	q	c	N	D	q	c	N	D	q	c
0	453,263	7,093	0.016	0.016	2,330	75	0.032	0.032	31,127	1116	0.036	0.036
1	446,170	4,646	0.010	0.026	2,255	37	0.016	0.048	30,011	800	0.027	0.062
2	441,524	3,752	0.008	0.034	2,218	36	0.016	0.064	29,211	677	0.023	0.083
3	437,772	3,114	0.007	0.041	2,182	28	0.013	0.076	28,534	531	0.019	0.100
4	434,658	2,641	0.006	0.047	2,154	18	0.008	0.083	28,003	495	0.018	0.116
5	432,017	2,595	0.006	0.053	2,136	24	0.011	0.094	27,508	431	0.016	0.130
6	429,422	2,416	0.006	0.058	2,112	17	0.008	0.101	27,077	361	0.013	0.142
7	427,006	2,220	0.005	0.063	2,095	15	0.007	0.107	26,716	345	0.013	0.153
8	424,786	2,058	0.005	0.067	2,080	28	0.013	0.119	26,371	311	0.012	0.163
9	422,728	1,928	0.005	0.072	2,052	15	0.007	0.126	26,060	281	0.011	0.172
10	420,800	1,739	0.004	0.075	2,037	17	0.008	0.133	25,779	231	0.009	0.179
11	419,061	1,637	0.004	0.079	2,020	15	0.007	0.139	25,548	200	0.008	0.186
12	417,424	1,505	0.004	0.082	2,005	7	0.003	0.142	25,348	194	0.008	0.192
13	415,919	1,420	0.003	0.086	1,998	12	0.006	0.148	25,154	175	0.007	0.198
14	414,499	1,304	0.003	0.088	1,986	8	0.004	0.151	24,979	144	0.006	0.202

Note: N: Number of children at risk of experiencing first-time paternal incarceration at a given age. D: Number of children experiencing paternal incarceration for the first time at a given age. q: age-specific risk of experiencing first-time paternal incarceration. c: estimated cumulative risk of experiencing paternal incarceration at a given age.

Source: Own calculations based on data from Statistics Denmark.

Table A-5: Cumulative risk of paternal incarceration by age 15 by incarceration type and by refugee status, cohorts: 1991–1998

Incarceration type	Cumulative risk by age 15				Ratio to natives		
	Natives	Refugee	Other	Missing	Refugee	Other.	Missing
Arrest only	0.075	0.163	0.159	0.157	2.171	2.115	2.094
1–30 days incarceration	0.027	0.050	0.046	0.057	1.869	1.738	2.161
1–6 months incarceration	0.018	0.045	0.040	0.044	2.575	2.284	2.516
>6 months incarceration	0.007	0.014	0.017	0.017	2.084	2.562	2.492
Any (incl. arrest)	0.088	0.206	0.196	0.194	2.325	2.222	2.196
Any (excl. arrest)	0.037	0.085	0.078	0.087	2.316	2.127	2.394
Share from country							
Western	.	0.005	0.105	0.092			
Turkey	.	.	0.322	0.462			
Lebanon	.	0.206	0.203	0.034			
Ex-Yugoslavia	.	0.120	0.080	0.057			
Pakistan	.	.	0.074	0.136			
Sri Lanka	.	0.138	0.001	0.019			
Iraq	.	0.140	.	.			
Vietnam	.	0.145	.	.			
Morocco	.	.	0.045	0.073			
Iran	.	0.103	.	.			
Somalia	.	0.091	.	0.003			
Other Non-Western	.	0.052	0.169	0.125			
N_0	453,263	10,505	12,789	10,163			

Note: Prior to 1997 refugee status is not available and refugee status is instead imputed from country of origin and year of arrival following Statistics Denmark's definition of refugee countries.

Before 1986 immigration date is not available and refugee status is set as missing unless the father arrives from either Iraq, Iran, Afghanistan, Vietnam, Serbia-Montenegro, or Palestine, which are categorized as refugee countries in all years.

Source: Own calculations based on data from Statistics Denmark.

Table A-6: Condensed decomposition results, paternal arrest risk

	WEST	TUR	LEB	YUG	PAK	SR
Difference	0.049*** (0.008)	0.085*** (0.005)	0.091*** (0.008)	0.107*** (0.009)	0.089*** (0.011)	0.074*** (0.011)
Explained	0.043*** (0.007)	0.083*** (0.004)	0.130*** (0.008)	0.091*** (0.010)	0.061*** (0.005)	0.041*** (0.004)
Unexplained	0.006 (0.010)	0.002 (0.007)	-0.039*** (0.011)	0.016 (0.013)	0.028** (0.011)	0.033** (0.012)
% of explained						
Basic composition	9.464 (11.030)	19.294*** (3.697)	4.991 (3.929)	12.846 (8.559)	2.532 (5.461)	0.641 (5.809)
Employment	46.698*** (7.590)	33.253*** (2.630)	41.101*** (3.219)	39.798*** (5.111)	39.234*** (4.039)	66.206*** (5.427)
Education	7.189*** (1.858)	31.345*** (2.205)	10.374*** (1.001)	14.736*** (1.998)	27.885*** (2.897)	33.840*** (3.712)
Crime	36.650*** (7.229)	16.108*** (1.715)	43.533*** (3.189)	32.619*** (4.896)	30.349*** (4.515)	-0.687 (3.816)
Observations	47,703	54,189	50,468	48,236	47,698	47,029
		VIE	IRAQ	MOR	IRAN	SOM
Difference		0.084*** (0.012)	0.038*** (0.010)	0.052*** (0.012)	0.096*** (0.013)	0.187*** (0.020)
Explained		0.047*** (0.004)	0.074*** (0.009)	0.067*** (0.006)	0.083*** (0.008)	0.082*** (0.012)
Unexplained		0.037** (0.012)	-0.037** (0.013)	-0.015 (0.012)	0.013 (0.014)	0.105*** (0.022)
% of explained						
Basic composition		4.168 (5.816)	5.945 (10.25)	-7.360 (4.671)	-2.075 (4.431)	15.314 (11.018)
Employment		60.482*** (5.290)	72.281*** (8.626)	45.238*** (4.349)	48.409*** (5.001)	71.140*** (9.905)
Education		33.757*** (3.596)	10.726*** (1.842)	25.485*** (2.812)	9.009*** (1.512)	12.315*** (2.358)
Crime		1.593 (4.157)	11.048** (3.384)	36.637*** (4.595)	44.658*** (5.117)	1.230 (4.138)
Observations		46,892	46,846	46,700	46,456	46,363

Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

Abbreviations: DK = Denmark, WEST = Western country, TUR = Turkey, LEB = Lebanon, YUG = ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR = Morocco, SOM = Somalia.

Note: Basic composition includes child cohort, age at child's birth, residence seniority, and whether father lives in one of the four largest cities.

Source: Own calculations based on data from Statistics Denmark.

Table A-7: Condensed decomposition results, paternal incarceration risk (1–6 months)

	WEST	TUR	LEB	YUG	PAK	SR
Difference	0.017*** (0.004)	0.023*** (0.003)	0.040*** (0.005)	0.032*** (0.005)	0.026*** (0.006)	0.010+ (0.005)
Explained	0.019*** (0.004)	0.031*** (0.002)	0.059*** (0.005)	0.038*** (0.005)	0.026*** (0.003)	0.013*** (0.002)
Unexplained	-0.002 (0.005)	-0.008* (0.004)	-0.019** (0.007)	-0.006 (0.007)	0.000 (0.006)	-0.003 (0.006)
% of explained						
Basic composition	5.801 (13.575)	21.032*** (5.224)	4.136 (4.646)	8.766 (10.745)	6.099 (6.623)	-5.814 (10.269)
Employment	42.127*** (8.960)	34.993*** (4.076)	35.660*** (4.149)	37.834*** (6.642)	37.013*** (5.335)	82.735*** (10.574)
Education	4.033** (1.229)	19.248*** (2.572)	5.217*** (0.847)	8.166*** (1.638)	15.123*** (2.554)	24.331*** (4.661)
Crime	48.039*** (9.225)	24.726*** (3.040)	54.986*** (4.357)	45.234*** (6.798)	41.765*** (5.986)	-1.252 (6.990)
Observations	47,703	54,189	50,468	48,236	47,698	47,029
		VIE	IRAQ	MOR	IRAN	SOM
Difference		0.014* (0.006)	0.025*** (0.007)	0.011+ (0.006)	0.012* (0.006)	0.074*** (0.013)
Explained		0.016*** (0.002)	0.029*** (0.005)	0.029*** (0.003)	0.039*** (0.005)	0.031*** (0.006)
Unexplained		-0.002 (0.006)	-0.005 (0.008)	-0.019** (0.006)	-0.027*** (0.007)	0.043** (0.014)
% of explained						
Basic composition		5.882 (8.641)	5.188 (13.719)	-3.031 (5.306)	-0.872 (4.921)	14.772 (15.949)
Employment		68.972*** (8.902)	72.440*** (11.827)	41.008*** (5.500)	41.473*** (5.819)	75.753*** (15.256)
Education		22.507*** (3.955)	6.224*** (1.464)	13.521*** (2.337)	4.347*** (0.988)	7.568*** (2.029)
Crime		2.639 (6.817)	16.148** (5.027)	48.501*** (5.769)	55.051*** (5.893)	1.907 (6.377)
Observations		46,892	46,846	46,700	46,456	46,363

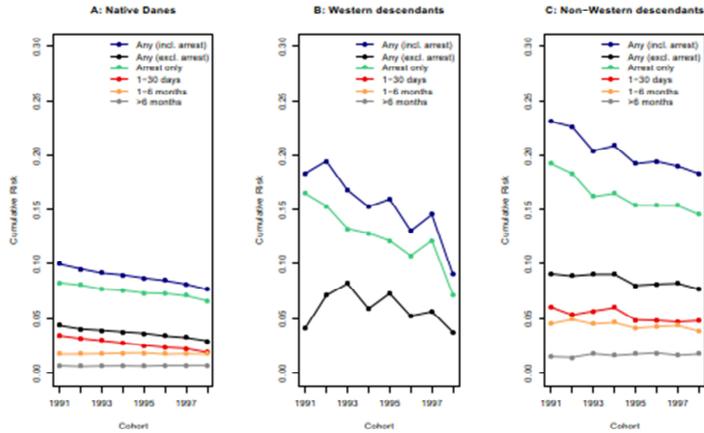
Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

Abbreviations: DK = Denmark, WEST = Western country, TUR = Turkey, LEB = Lebanon, YUG = ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR = Morocco, SOM = Somalia.

Note: Basic composition includes child cohort, age at child's birth, residence seniority, and whether father lives in one of the four largest cities.

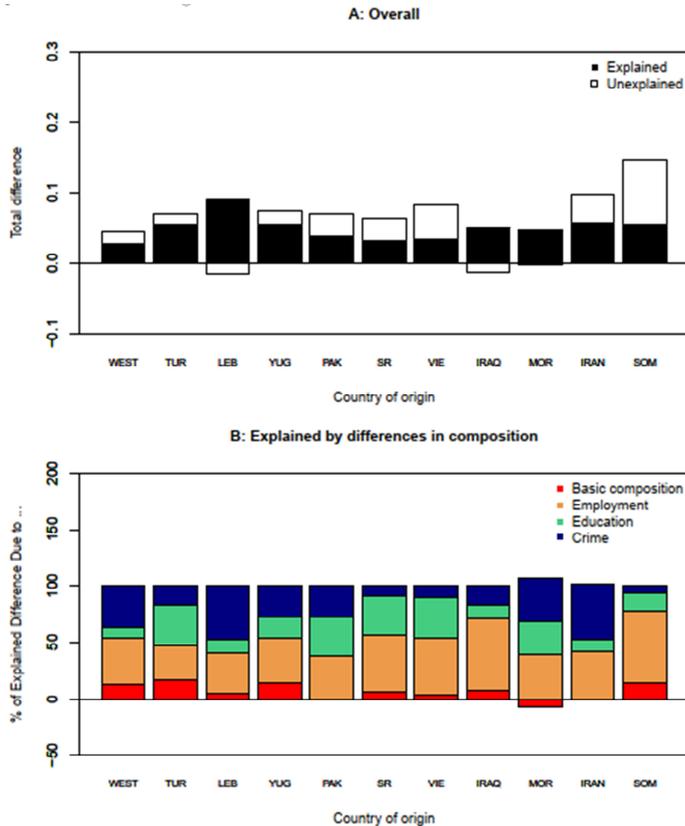
Source: Own calculations based on data from Statistics Denmark.

Figure A-1: Cumulative risks of paternal incarceration by age 15, cohort: 1991–1998



Note: Due to a small number of Western descendants experiencing longer spells of paternal incarceration for certain cohorts, we do not show cohort specific estimates for the longer spells for this group.
Source: Own calculations based on data from Statistics Denmark.

Figure A-2: Decomposed difference from native Danes in risk of solely experiencing paternal arrest during childhood



Abbreviations: DK = Denmark, WEST = Western country, TUR = Turkey, LEB = Lebanon, YUG = ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR = Morocco, SOM = Somalia.

Note: Children who experience paternal arrest in combination with other types of paternal incarceration (roughly 30% of all children with paternal arrest) are excluded from these models.

Source: Own calculations based on data from Statistics Denmark.

