ESTIMATING AND EXPLAINING ETHNIC DISPARITIES IN THE CUMULATIVE RISK OF PATERNAL INCARCERATION IN DENMARK

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ABSTRACT

Paternal incarceration is a well-known risk factor for poor child outcomes, and even though 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, focusing on a small number of racial/ethnic groups. Second, no research has decomposed disparities in the risk of paternal incarceration into analytically distinct components. In this article, we address both of these gaps using Danish administrative data and two core demographic techniques: birth cohort life tables and Blinder-Oaxaca decompositions. Our analysis proceeds in two stages. First, we 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. We find that descendants of immigrants are much more likely to experience paternal incarceration than native Danes, but that there is a great deal of heterogeneity across country of origin. Additionally, we find that for the majority of countries most – if not all – of the observed disparities in paternal incarceration risk can be explained by group differences in paternal employment, education and previous criminal justice contact – with differences in employment being most important.

INTRODUCTION

A substantial body of research has linked paternal incarceration to poor child outcomes including poor health and elevated mortality risk (e.g. Lee, Fang, & Luo 2013; Turney 2014; Wildeman 2012), behavioral problems and delinquency (e.g. Porter & King 2014; Roettger & Swisher 2011; Wakefield & Wildeman, 2011; Wildeman 2010) and poor educational outcomes (e.g. Hagan & Foster, 2012; Haskins, 2016; Turney & Haskins, 2014), to name just three sets of outcomes. Even if children are not directly harmed by paternal incarceration, it can also take a toll on the mother's mental health (Wildeman, Schnittker, and Turney 2012), increase the risk of being exposed to a high level of family complexity (Turney, 2015; Turney & Wildeman, 2013) and introduce or exacerbate financial stresses (Schwartz-Soicher, Geller, and Garfinkel 2011). The bulk of the 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 UK (Murray and Farrington 2008), the Netherlands (Besemer et al. 2011), Sweden (Dobbie et al. 2018) and Denmark (Andersen & Wildeman 2014; Wildeman & Andersen 2017) also document the negative impact of having a father incarcerated, indicating that although the extent to which fathers are incarcerated in the US may be unique, the negative consequences for family life are not simply a US phenomenon.

Previous research within the US has shown marked racial and ethnic disparities in paternal incarceration risk between black, white and Hispanic children (Wildeman 2009; Sykes and Pettit 2014; Turney 2014; Chung 2011), 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 US (but see Dennison, Stewart, & Freiberg 2013; Dowell, Preen, & Segal 2017; Quilty, Levy, Howard, Barratt, & Butler 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 Western and non-Western descendants of immigrants using birth cohort life tables, (2) estimating heterogeneity in paternal incarceration risks by country of origin, and (3) formally decomposing differences in paternal incarceration risks to examine how much can be explained by 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% for descendants of Western and non-Western immigrants respectively are estimated to have experienced paternal incarceration. Country of origin specific estimates show a great deal of heterogeneity, with Somali descendants being at particularly high risk and having a 35.5% risk of experiencing paternal incarceration. Descendants from, for example, Iraq have a much lower risk (14.8%). Decomposition results show that differences in paternal employment, education, previous criminal justice contact, and a set of basic compositional factors explain most if not all of the observed disparities – with employment status being the primary explanatory factor. But this result is not universal across all countries of origin. Rather, results show that almost half the observed disparity in paternal incarceration risk between Somali descendants and native Danes is due to unexplained factors, which may include negative selection or discrimination (above and beyond composition of explanatory factors).

By using two core demographic techniques – birth cohort life tables and a Blinder-Oaxaca decomposition – we provide insight into how future research on paternal incarceration and other risk factors for poor child wellbeing could better estimate and explain the risk of experiencing these events.

BACKGROUND

Racial and Ethnic Disparities in Paternal Incarceration Risk

Table 1 summarizes the 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 US has 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, 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. non-marital children (Chung 2011)) or narrower family definitions (i.e. residential fathers (Turney 2014)). In these studies, Hispanic children are often much more on par with whites when it comes to the risk of having a father incarcerated (Chung 2011; Turney 2014) although they are still estimated to be thrice 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).

[Insert Table 1 about here.]

Outside the US, 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 US (e.g. Dobbie et al. 2018; Murray & Farrington 2008; Wildeman & Andersen 2017). A Danish study compares parental incarceration risk in Denmark and US (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 non-indigenous children (Dennison, Stewart, and Freiberg 2013; Dowell, Preen, and Segal 2017; Quilty et al. 2004), highlighting how yet another minority group is disproportionally affected by the criminal justice system.

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 the 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 & 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 the US, 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 U.S. or in Europe – has examined how the heterogeneities in ethnic disparities in incarceration rates is reflected in the childhood experience of paternal incarceration.

Factors Shaping the Risk of Paternal Incarceration

Although the studies mentioned above have documented racial or ethnic disparities at a very broad level, none has formally addressed potential drivers of these disparities (but a few studies have estimated within-race educational gradients in the cumulative risk of paternal incarceration (Wildeman 2009; Sykes and Pettit 2014). 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 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 & 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 most of the 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.

Education: We also know paternal incarceration to be highly concentrated among children whose fathers received little education (Wildeman 2009; Sykes and Pettit 2014). Indeed, the above mentioned racial disparities in paternal incarceration risk 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 & Tranæs 2015; Statistics Denmark 2015) and most of the differences disappear when factors such as socioeconomic background are taken into account (Andersen & 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 results 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.

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 the immigration into Denmark – through stricter family-reunification and asylum rules – coupled with a 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.[1] 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 it remains very low at 40% (Andersen, Hansen, Schultz-Nielsen, & Tranæs, 2012). This is mostly tied to immigrants arriving with comparatively low levels of education – this 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 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).

Another important feature for understanding the Danish context in which the paternal incarceration risk is estimated, is that Denmark has a comparatively mild penal regime in comparison with the US but also many other countries.[2] Similarly, to other Scandinavian countries Denmark has an incarceration rate of 61 per 100,000, compared to 148 for the UK and 698 for the US (Walmsley 2016). The relatively low incarceration rate reflect both the use of much shorter sentences – roughly 60% of prison sentences are less than four months (Danish Prison and Probation Services 2017) – and an extensive use of non-custodial alternatives to imprisonment, such as electronic monitoring and community service from 2000 and onwards. Furthermore, the mild penal regime is reflected in the 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 US, 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 & 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 US, paternal incarceration has indeed been documented to be a salient childhood experience with important consequences for child well-being in both countries.

DATA AND METHOD

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 in time as 1980 (for a description of the Danish administrative data, see Andersen 2018). From the population register we link family members – like children and their fathers – and the population register also contains information on birth date, immigrant status along with country of origin. Information on (paternal) incarceration is obtained through the incarceration register, which contains admission and release dates reported to Statistics Denmark by the Danish Prison and Probation Services. 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 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).[3] And finally, we use the housing register to measure whether the father lives in one of the four largest cities during the year of the child's birth.

Employment. We follow the categories recommend 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 ultimo 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 and which contain official diploma information from the Ministry of Education. We categorize the highest achieved education of the father into the following three categories: tertiary, secondary and elementary/missing education.

Crime. Information on previous paternal crime is obtained 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 a dummy indicating whether the father was convicted of a penal offence between 1980 (or the date of immigration) and up to one year prior to child's birth.

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 (N_0). [4] 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 (D_x). Third, we adjust the population count by subtracting the number of children experiencing first time paternal incarceration at the previous age (D_{x-1}), to get the number of children at risk of experiencing first time paternal incarceration at the beginning of each age (N_x). Finally, we use the number of children at risk and the number of first time

paternal incarceration at each age to estimate age-specific risks (q_x) and the cumulative risk of paternal incarceration (c_x) 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 five 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) arrests (usually <24 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; (3) imprisonments, which can include both pretrial detention and post-conviction imprisonment, lasting less than 1 month; (4) imprisonments lasting 1-6 months; and finally (5) imprisonments lasting more than 6 months. We thus first conduct a life table analysis of the overall cumulative risk of *any* type of paternal incarceration (1), but we then also conduct separate life table analyses of the cumulative risk of experiencing each of the (2) through (5) 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.[5]

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 US, Australia and New Zealand. The group of non-Western countries consists of any other country.[6] 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, Iraq, Vietnam, Morocco,

Iran). Due to the small population of descendants from Western countries we do not break estimates down by their country of origin.

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 explained by 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 which make up the foundation for the life table analysis above using all descendants of immigrants, but only 10% randomly sampled native Danes.[7]

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*. The technique has been used to examine, for example, gender discrimination and disparities in the labor market (see Weichselbaumer & 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:

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

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

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

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, asides from capturing disparities stemming from differing returns to the same characteristics, also captures differences in unobserved variables affecting the likelihood of paternal incarceration (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.[8] 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 criminal conviction – all of which are described in detail in the "Danish Administrative Data" section above – and cluster standard errors on father ID.[9] Furthermore, in addition to the overall decomposition described above we do a detailed decomposition, in which the overall difference is further decomposed into differences arising from different levels (explained part) of 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.

RESULTS

Estimating the Cumulative Risks of Paternal Incarceration

Table 2 summarizes the birth cohort life table estimates for cohorts 1991-1998 (see table A-3 for the full birth cohort life table).[10] 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.

[Insert Table 2 about here]

The age-specific patterns of first paternal incarceration risk, shown in Figure 1, are similar for the three groups, and the highest risks occur during the first year after birth and then decline steeply from thereon. 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).

[Insert Figure 1 about here]

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 imprisonments 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 imprisonment 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 imprisonments lasting 1-6 months and lowest for the shorter spells of imprisonment lasting less than 1 month[11], and the risk ratios range between 1.1 and 1.9 for Western descendants and 1.9 and 2.4 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 indeed masks a great deal of heterogeneity across the countries that make up the category. Descendants from all 10 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 (3.5-4 times as high as the risk for native Danes). As many as 35% of Somali descendant experience paternal arrest before age 15, and 9% experience paternal imprisonment lasting 1-6 months. Also, descendants of immigrants from Ex-Yugoslavia have comparatively high risks of experiencing paternal imprisonment 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) imprisonments, descendants of immigrants from Iraq, Sri Lanka, and Vietnam have cumulative paternal incarceration risks that are very similar as those for native Danes.[12]

[Insert Table 3 about here]

Decomposing Disparities in Paternal Incarceration Risks

Table 4 summarizes the distribution of paternal covariates by country of origin and from the table it is evident 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 to Denmark as unskilled guest workers. When looking at the proportion of fathers convicted of penal offences, the proportion is most often higher for descendants from non-Western countries than for native Danes (except for Vietnamese, Sri Lankan, and Iraqi fathers). Somali fathers also have remarkably low rates of prior conviction, yet they are also the ones who have spent least time in Denmark prior to the birth of the child, as mentioned, which means that they had less time to get convicted in Denmark.

[Insert Table 4 about here]

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. Table A-4 reports the full set of decomposition results. For descendants from most countries the observed differences in paternal employment, educational, criminal and basic compositional factors explain most if not all 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.

For descendants of immigrants from Turkey, Lebanon, Iraq, and Morocco the gap in paternal arrest risks compared to native Danes would be between 23% and 153% 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 actually 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, a high level of education than Danes in terms of avoiding arrest. A different pattern is found for especially Somali descendants, however. Here, the explained parts make up only 54% of the observed differences in paternal arrest risks, respectively. Even if descendants from Somalia had the same level of explanatory factors (same composition) as native Danes they would still have a 8.6 percentage point higher risk of experiencing paternal arrest (compared to the observed 18.6%) – 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 father, for example). [13]

[Insert Figure 2 about here]

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 are 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 across countries of origin and is lowest for Turkey (37%) and Pakistan (43%) and highest for Iraq and Somalia (both 81%). Differences in paternal education explain generally less of the disparities in paternal arrest risks than differences in employment, but does reach 26-28% 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, Morocco and Iran, and matters the most for descendants from Turkey (27%), Somalia and Ex-Yugoslavia (both 22%). Last, differences in prior

paternal convictions also explain some of the differences in the risks of paternal arrest for Lebanese, Pakistani, Moroccan and Iranian descendants (10-27%), yet, curiously, the differences in prior paternal criminal convictions between descendants from Somali (and to a negligible extent Iraqi, Vietnamese and Sri Lankan) and native Danes actually suppress differences in paternal incarceration risk driven by the observed differences in the other explanatory factors (negative percentages in Panel B in Figure 2).

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-2). 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 still matters the most.

Results from Blinder-Oaxaca decompositions of 1-6 months of paternal imprisonments. 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 imprisonments lasting 1-6 months. Overall, results are very similar to the ones for paternal arrest risks. Differences in basic composition, education, employment, and prior convictions jointly explain most if not all observed differences between native Danes and descendants from all countries, except Somalia for whom the explained part only accounts for 56%, 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. 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 43% (Turkey) and 94% (Somalia) of the explained parts. In comparison, the other explanatory factors carry little weight for most countries.

[Insert Figure 3 about here]

DISCUSSION AND CONCLUSION

From previous research we know paternal incarceration is a salient childhood experience, and we also know that it is unequally distributed among broadly defined racial, ethnic or minority groups. 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 imprisonment lasting more than 6 months). However, results also highlight that the broadly defined ethnic groups 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 & Wildeman 2014) and 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, so another potential explanation can be found in the exceptionally high emigration rates for Somali children. Somali families often emigrate to other countries within the EU (the UK 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. This interpretation is, however, only based on high emigration rates among Somali immigrants, and the mechanism itself and its implications for paternal incarceration risk should be examined further in future studies.

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 socio-economic 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) 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, Iraq, and Morocco we find that unexplained positive discrimination or selection serves to suppress differences in paternal incarceration risks 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 54% of paternal arrest risks and 56% of paternal imprisonment (1-6 months) risks and the rest is due to negative selection or discrimination.

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.

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[1] 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 job 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.

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

[4] 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. Table A-1 shows the proportion of the original sample who have left the sample due to death or emigration by country of origin, and there are indeed differences between countries.

[5] As a child can experience more than one type of paternal incarceration during childhood, and separate life table analysis are conducted for each for the five types, the cumulative risk of any paternal incarceration (1) would not equal the sum of the cumulative risk of (2) through (5). A child might, for example, experience one instance of paternal imprisonment 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 imprisonment" but would also enter the life table analysis of ">6 months imprisonment" with a first time incarceration at age 6. Table A-2 shows the percentage of children experiencing shorter incarceration spells, who also experience longer incarceration spells.

[6] 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)

[7] 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.

[8] In Appendix B we show results from two alternative specifications of the decomposition model. One in which we use a two-country pooled regression to estimate the "non-discriminatory coefficient vector" (Figure B-1 and B-2), and one, where we do not include measures for the years in Denmark (Figure B-3 and B-4). In both specifications results are very similar to the main results.

[9] The fertility patterns (measured by the number of children born 1991-1998 per father in our sample) for some countries of origin differ somewhat from the Danish pattern (see Table B-5). 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. Looking across the board of results, however, there are 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.

[10] 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.

[11] These are also the imprisonments that are most likely to be replaced by non-custodial alternatives, and the imprisonments 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).

[12] Table B-4 shows 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 incarceration both children residing and not residing with their father are detrimentally impacted by their fathers' incarceration (Geller et al. 2012).

[13] 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.

Tables

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

	Incarceration			Racial/ethnic group				Minority/
US	Paternal	Maternal	Parental	Black	White	Hispanic	Other	**majority**[a]
Chung, 2011[b]	✓			✓	✓	✓	✓	2.62
Sykes & Pettit, 2014			✓	✓	✓	✓		6.21
Turney, 2014[c]			✓	✓	✓	✓	✓	1.95
Wildeman, 2009	✓	✓	✓	✓	✓			6.97
Australia	Paternal	Maternal	Parental	Indigenous		Non-indigenous		
Dennison et al, 2013	✓			✓		✓		3.84
Dowel et al, 2017		✓		✓		✓		26.86
Quilty et al, 2004	✓	✓	✓	✓		✓		5.31
Denmark	Paternal	Maternal	Parental					
Wildeman & 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)

Table 2: Cumulative risk of paternal incarceration by age 15 by incarceration type for Native Danes, Western and Non-western descendants, cohorts:1991-1998

	Cumulative risk by age 15			Ratio to Natives	
Incarceration type	Natives	Western	Non-Western	Western	Non-Western
Any	0.088	0.151	0.202	1.716	2.295
Arrest only	0.075	0.124	0.162	1.653	2.160
1-30 days imprisonment	0.027	0.031	0.052	1.148	1.926
1-6 months imprisonment	0.018	0.034	0.044	1.889	2.444
>6 months imprisonment	0.007	0.010	0.017	1.429	2.429

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 imprisonment categories include both pre-trial detention and 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-2). 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 3: Cumulative risk of paternal incarceration by age 15 by country of origin, birth cohorts: 1991-1998

	Cumulative risk by age 15					Ratio to Natives					
Country of origin	Any	Arrest	1-30 d.	1-6 m.	>6 m.	Any	Arrest	1-30 d.	1-6 m.	>6 m.	N_0
Denmark	0.088	0.075	0.027	0.018	0.007						453,263
Western desc.	0.151	0.124	0.031	0.034	0.010	1.716	1.653	1.148	1.889	1.429	2,330
Non-Western descendants											
Turkey	0.195	0.159	0.051	0.040	0.016	2.211	2.126	1.907	2.293	2.349	8,816
Lebanon	0.218	0.166	0.058	0.057	0.018	2.467	2.208	2.177	3.253	2.748	5,095
Ex-Yugoslavia	0.215	0.182	0.070	0.049	0.023	2.430	2.421	2.615	2.817	3.542	2,891
Pakistan	0.205	0.164	0.065	0.043	0.015	2.316	2.185	2.426	2.449	2.178	2,325
Sri Lanka	0.165	0.149	0.031	0.027	0.008	1.872	1.980	1.158	1.548	1.259	1,656
Iraq	0.148	0.112	0.024	0.042	0.007	1.674	1.493	0.894	2.397	1.112	1,473
Vietnam	0.186	0.158	0.030	0.032	0.009	2.100	2.106	1.139	1.800	1.373	1,519
Morocco	0.154	0.127	0.039	0.028	0.018	1.748	1.688	1.474	1.588	2.694	1,327
Iran	0.211	0.171	0.046	0.030	0.009	2.392	2.277	1.736	1.683	1.375	1,083
Somalia	0.355	0.262	0.117	0.091	0.024	4.011	3.488	4.406	5.177	3.611	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.

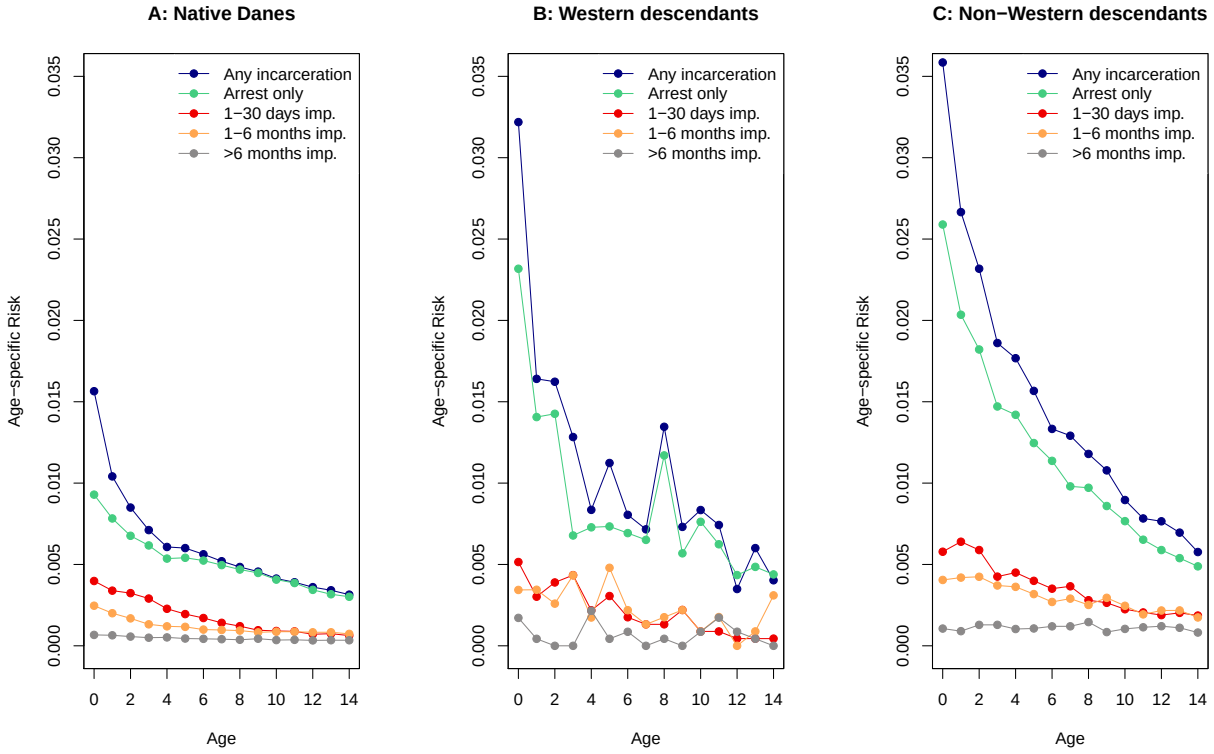
Table 4: Sample characteristics, birth cohorts: 1991-1998

							Non-Western					
Paternal covariates	DK	WES	TUR	LEB	YUG	PAK	SR	IRAQ	VIE	MOR	IRAN	SOM
Basic Composition												
Age at child's birth												
<25	0.061	0.056	0.290	0.091	0.152	0.111	0.010	0.033	0.067	0.024	0.017	0.053
25-29	0.284	0.207	0.351	0.317	0.337	0.287	0.178	0.151	0.265	0.173	0.109	0.287
30-34	0.373	0.342	0.209	0.345	0.295	0.245	0.473	0.316	0.359	0.278	0.339	0.343
35+	0.281	0.394	0.149	0.247	0.216	0.357	0.338	0.500	0.309	0.524	0.536	0.317
Living in major city	0.310	0.520	0.595	0.559	0.509	0.911	0.107	0.705	0.521	0.864	0.642	0.616
Years in Denmark												
<2	0.004	0.129	0.089	0.063	0.303	0.071	0.025	0.183	0.048	0.050	0.056	0.203
2-4	0.004	0.162	0.085	0.133	0.248	0.094	0.046	0.251	0.089	0.072	0.105	0.378
4-6	0.004	0.123	0.088	0.210	0.080	0.083	0.100	0.204	0.086	0.083	0.114	0.240
>6	0.987	0.586	0.738	0.595	0.368	0.752	0.829	0.362	0.777	0.794	0.724	0.179
Employment												
Employed	0.889	0.608	0.508	0.144	0.385	0.557	0.513	0.145	0.489	0.469	0.303	0.071
In education	0.005	0.007	0.003	0.005	0.002	0.003	0.004	N/A	0.008	N/A	0.024	N/A
Unemployed/missing	0.106	0.385	0.489	0.850	0.613	0.440	0.483	N/A	0.503	N/A	0.673	N/A
Education												
Elementary/missing	0.257	0.310	0.706	0.490	0.490	0.551	0.496	0.394	0.531	0.554	0.386	0.432
Upper secondary	0.283	0.199	0.124	0.222	0.206	0.260	0.257	0.256	0.155	0.169	0.291	0.253
Tertiary	0.460	0.491	0.171	0.288	0.304	0.189	0.247	0.350	0.313	0.277	0.323	0.315
Crime												
Previously convicted	0.151	0.164	0.212	0.311	0.168	0.252	0.149	0.139	0.135	0.275	0.295	0.074
% of children emigrated[a]	1.24	37.54	2.74	7.25	3.50	13.86	16.81	13.88	1.87	5.04	13.67	57.42
N	45,437[b]	2,330	8,816	5,095	2,891	2,325	1,656	1,473	1,519	1,327	1,083	990

[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. Table A-1 also shows the percentage leaving the population due to death.
[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 whether the father has previously been convicted of a penal offense (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.

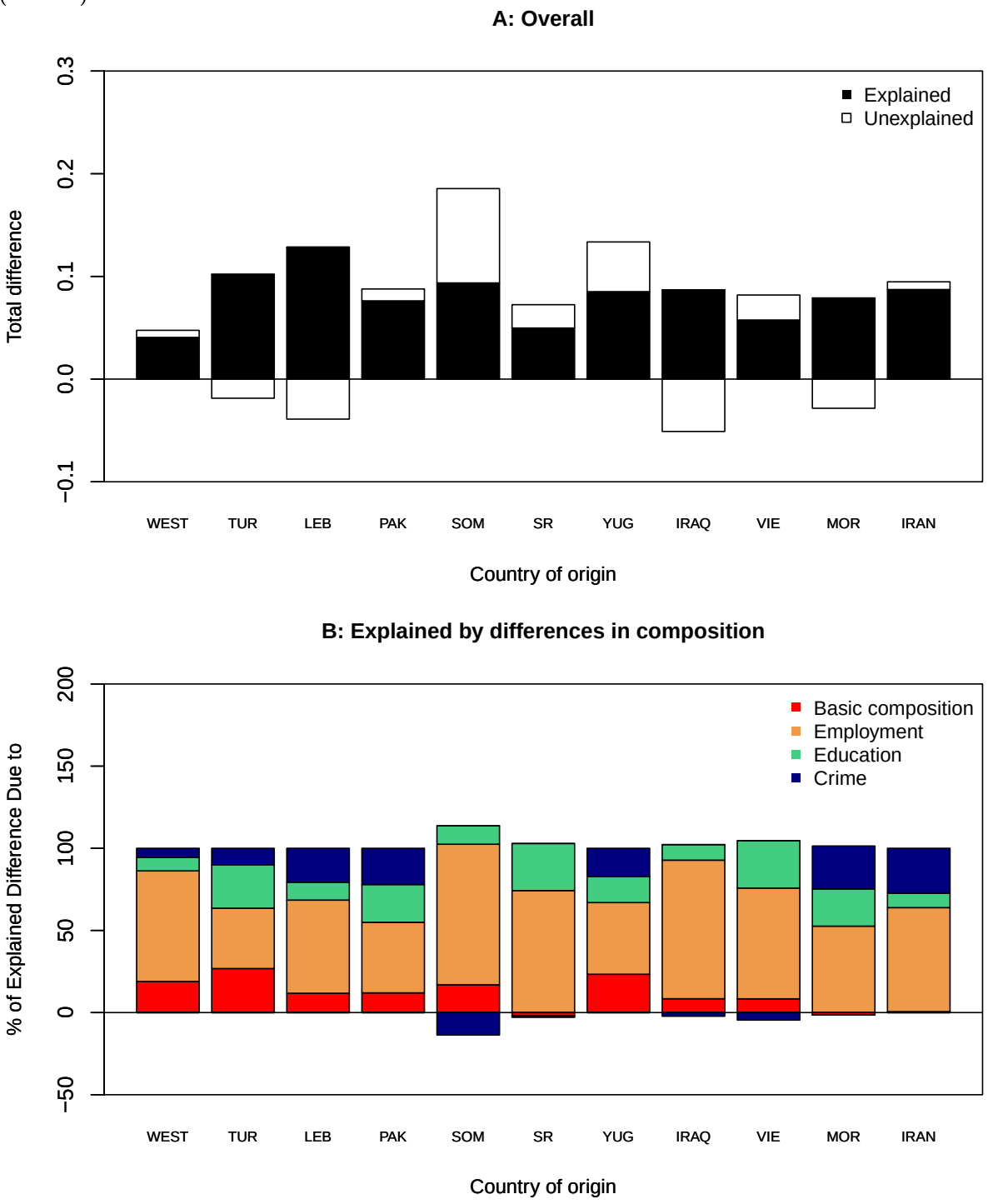
Figures

Figure 1: Age-specific Risks of Paternal Incarceration, cohorts: 1991-1998



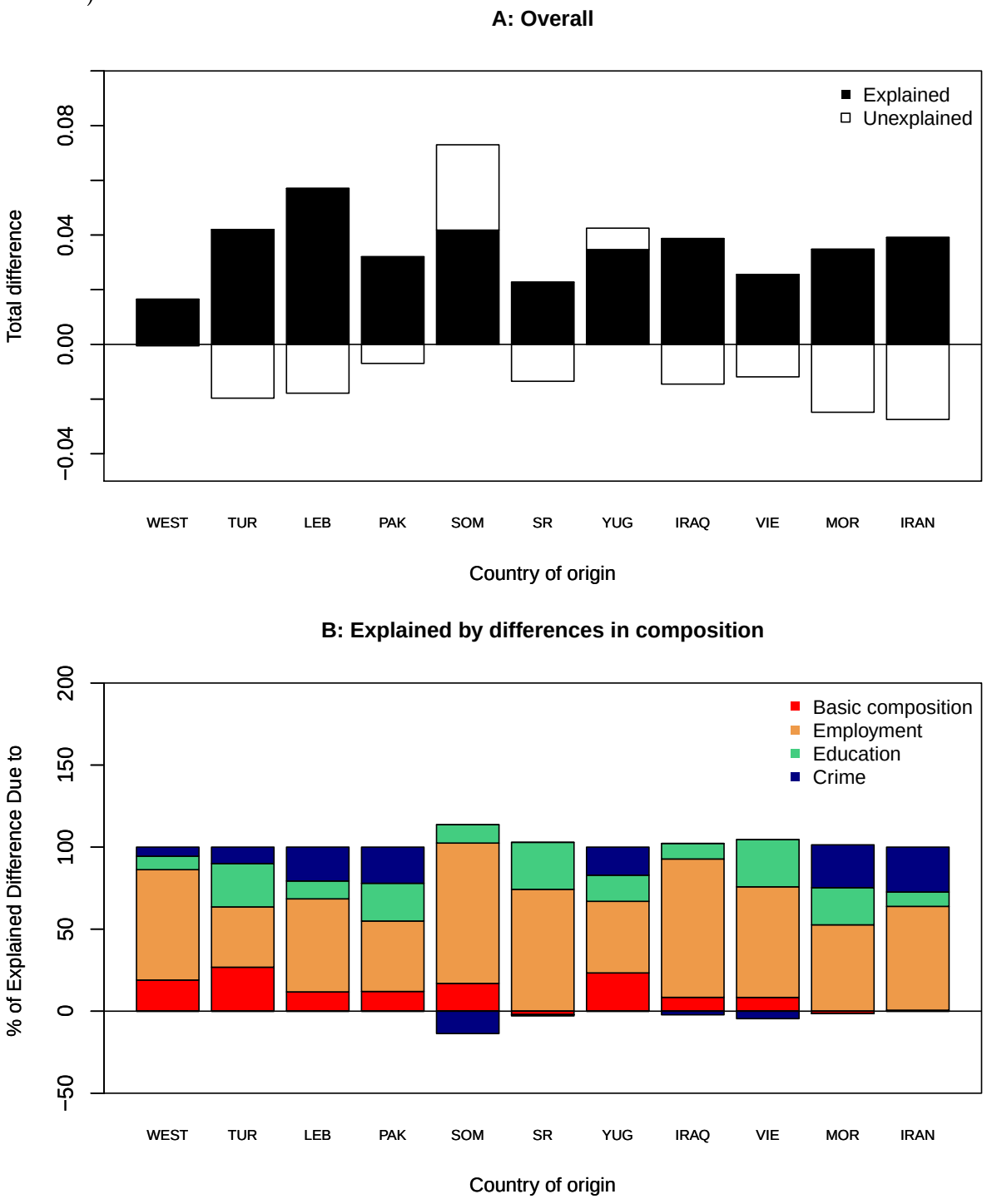
Note: Age-specific risks are also reported in Table A-3.
Due to a small number of Western descendants experiencing longer spells of paternal incarceration at certain ages, we do not show age-specific estimates for the longer spells for this group.
Source: Own calculations based on data from Statistics Denmark.

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



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: 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 from Table A-4 within a given explanatory factor. 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. Figures B-1, B-2, B-3 and B-4 show decomposition results using A) a two-country pooled sample to estimate the nondiscriminatory coefficient vector and B) removing years in Denmark from the models.
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. N/A = Not available.
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 from Table A-5 within a given explanatory factor. 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. Figures B-1, B-2, B-3 and B-4 show decomposition results using A) a two-country pooled sample to estimate the nondiscriminatory coefficient vector and B) removing years in Denmark from the models.
Source: Own calculations based on data from Statistics Denmark.

Appendix A

Table A-1: Birth cohort death and emigration by age 15, cohorts: 1991-1998

		% leaving due to		
Country	Start pop.	Death	Emigration	N
Danish	460,144	0.26	1.24	453,263
Western descendants	3,748	0.29	37.54	2,330
Non-Western descendants	35,373	0.47	11.53	31,127
Turkey	9,123	0.62	2.74	8,816
Lebanon	5,518	0.42	7.25	5,095
Ex-Yugoslavia	3,003	0.23	3.50	2,891
Pakistan	2,721	0.70	13.86	2,325
Sri Lanka	1,999	0.35	16.81	1,656
Iraq	1,722	0.58	13.88	1,473
Vietnam	1,551	*N/A*	*N/A*	1,519
Morocco	1,408	0.71	5.04	1,327
Iran	1,258	*N/A*	*N/A*	1,083
Somalia	2,346	0.38	57.42	990

Note: Children are marked as emigrated if they do not appear in the population register at age 15 and are not dead.
Source: Own calculations based on data from Statistics Denmark.

Table A-2: 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 only	69.25	11.46	12.61	6.68
1-30 days imprisonment		61.04	25.11	13.85
1-6 months imprisonment			78.29	21.71

Source: Own calculations based on data from Statistics Denmark.

Table A-3: Cumulative risk of any paternal incarceration for Native Danes, Western and Non-western descendants, cohorts:1991-1998

	Native Danes				Western descendants				Non-western descendants			
Age	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

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-4: Detailed decomposition results: paternal arrest, birth cohorts: 1991-1998

	Arrest										
	WES	TUR	LEB	YUG	PAK	SR	IRAQ	VIE	MOR	IRAN	SOM
Overall											
Descendants	0.124***	0.159***	0.166***	0.182***	0.164***	0.149***	0.112***	0.158***	0.127***	0.171***	0.262***
	(0.008)	(0.005)	(0.008)	(0.009)	(0.010)	(0.011)	(0.010)	(0.012)	(0.012)	(0.013)	(0.020)
Native Danes	0.076***	0.076***	0.076***	0.076***	0.076***	0.076***	0.076***	0.076***	0.076***	0.076***	0.076***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Diff.	0.047***	0.083***	0.090***	0.106***	0.088***	0.072***	0.036***	0.082***	0.050***	0.095***	0.186***
	(0.008)	(0.005)	(0.008)	(0.009)	(0.010)	(0.011)	(0.010)	(0.012)	(0.012)	(0.013)	(0.020)
Explained	0.042***	0.103***	0.130***	0.086***	0.077***	0.050***	0.091***	0.059***	0.079***	0.088***	0.099***
	(0.006)	(0.005)	(0.007)	(0.010)	(0.005)	(0.004)	(0.010)	(0.005)	(0.005)	(0.006)	(0.012)
Unexplained	0.005	−0.019**	−0.040***	0.020	0.011	0.022+	−0.055***	0.023+	−0.029*	0.006	0.086***
	(0.010)	(0.007)	(0.010)	(0.013)	(0.011)	(0.012)	(0.014)	(0.012)	(0.012)	(0.014)	(0.023)
Explained											
<25 at child's birth	−0.000	0.016***	0.002***	0.006***	0.003***	−0.003***	−0.002***	0.000	−0.003***	−0.003***	−0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
25-29 at child's birth	0.001***	−0.001***	−0.001***	−0.001***	−0.000	0.002***	0.002***	0.000	0.002***	0.003***	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
30-34 at child's birth	0.001**	0.004***	0.001***	0.002***	0.003***	−0.003***	0.001***	0.000	0.002***	0.001*	0.001+
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
>35 at child's birth	−0.003***	0.003***	0.001***	0.002***	−0.002***	−0.001***	−0.006***	−0.001*	−0.006***	−0.007***	−0.001+
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Living in big city	−0.001	−0.001	−0.001	−0.001	−0.002	0.001	−0.001	−0.001	−0.002	−0.001	−0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
In DK <2 years	−0.004+	−0.003+	−0.002+	−0.010+	−0.002+	−0.001	−0.006+	−0.001	−0.002	−0.002	−0.007+
	(0.003)	(0.002)	(0.001)	(0.006)	(0.001)	(0.000)	(0.004)	(0.001)	(0.001)	(0.001)	(0.004)
In DK 2-4 years	0.006+	0.003+	0.005+	0.009+	0.003+	0.001+	0.009+	0.003+	0.002+	0.004+	0.013+
	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)	(0.001)	(0.005)	(0.002)	(0.001)	(0.002)	(0.007)
In DK 4-6 years	0.002	0.002	0.004	0.001	0.001	0.002	0.004	0.001	0.001	0.002	0.004
	(0.002)	(0.002)	(0.004)	(0.001)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.005)
In DK >6 years	0.008+	0.005+	0.008+	0.013+	0.005+	0.003+	0.013+	0.004+	0.004+	0.005+	0.017+
	(0.004)	(0.003)	(0.004)	(0.007)	(0.002)	(0.002)	(0.007)	(0.002)	(0.002)	(0.003)	(0.009)
Employed	0.008***	0.010***	0.020***	0.014***	0.009***	0.010***	0.020***	0.011***	0.011***	0.016***	0.022***
	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.004)
In educ.	−0.000	0.000*	−0.000	0.000*	0.000	0.000	0.000**	−0.000	0.000**	−0.001**	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Unemployed or miss.	0.020***	0.027***	0.053***	0.036***	0.024***	0.027***	0.053***	0.028***	0.030***	0.040***	0.058***
	(0.002)	(0.002)	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)	(0.002)	(0.003)	(0.003)	(0.005)
Upper sec. educ.	0.002***	0.003***	0.001***	0.002***	0.000+	0.001+	0.001+	0.003***	0.002***	−0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tertiary educ.	−0.001*	0.006***	0.003***	0.003***	0.005***	0.004***	0.002***	0.003***	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Elementary school or miss.	0.002***	0.018***	0.009***	0.009***	0.012***	0.010***	0.006***	0.011***	0.012***	0.005***	0.007***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Penal. conv.	0.002	0.010***	0.027***	0.003*	0.017***	−0.000	−0.002	−0.003	0.021***	0.024***	−0.013***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)

... Continued

... Continued	WES	TUR	LEB	YUG	PAK	SR	IRAQ	VIE	MOR	IRAN	SOM
						Arrest					
Unexplained											
<25 at child's birth	−0.003^{+}	−0.008**	−0.001	0.005	0.003	0.000	0.001	0.002	−0.001	0.002	0.004
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)
25-29 at child's birth	0.008*	0.005*	0.002	0.002	0.000	0.003	−0.000	0.012*	0.009*	−0.002	0.017^{+}
	(0.003)	(0.002)	(0.003)	(0.004)	(0.004)	(0.007)	(0.004)	(0.005)	(0.004)	(0.005)	(0.009)
30-34 at child's birth	0.004	0.003^{+}	0.004	0.001	0.004	−0.005	0.002	−0.014*	0.008	−0.012	−0.009
	(0.005)	(0.002)	(0.004)	(0.004)	(0.004)	(0.018)	(0.007)	(0.007)	(0.007)	(0.012)	(0.011)
>35 at child's birth	0.001	−0.000	−0.002	−0.008**	−0.014*	−0.018	−0.012	−0.012^{+}	−0.025^{+}	−0.033^{+}	−0.033**
	(0.006)	(0.001)	(0.003)	(0.003)	(0.006)	(0.013)	(0.011)	(0.006)	(0.014)	(0.019)	(0.010)
Living in big city	−0.001	−0.005	0.007	−0.004	−0.016	0.004	−0.004	0.002	−0.031	−0.020	0.010
	(0.008)	(0.006)	(0.008)	(0.010)	(0.033)	(0.004)	(0.015)	(0.012)	(0.030)	(0.017)	(0.024)
In DK <2 years	0.003	0.002	0.004*	0.004	0.000	0.001	0.011*	0.003^{+}	0.003	0.008*	0.007
	(0.003)	(0.002)	(0.002)	(0.008)	(0.002)	(0.001)	(0.005)	(0.002)	(0.002)	(0.003)	(0.007)
In DK 2-4 years	−0.008*	−0.002	−0.002	−0.007	−0.002	−0.002	−0.007	−0.003	−0.003	−0.002	−0.011
	(0.004)	(0.002)	(0.003)	(0.006)	(0.003)	(0.002)	(0.006)	(0.003)	(0.003)	(0.004)	(0.011)
In DK 4-6 years	0.003	−0.001	−0.005	−0.000	0.001	−0.000	−0.010*	−0.003	−0.004	−0.007	−0.002
	(0.003)	(0.002)	(0.005)	(0.002)	(0.003)	(0.004)	(0.005)	(0.003)	(0.003)	(0.004)	(0.007)
In DK >6 years	−0.000	0.008	−0.012	0.006	0.005	0.007	0.005	−0.005	0.018	−0.042*	−0.000
	(0.009)	(0.010)	(0.010)	(0.007)	(0.016)	(0.025)	(0.007)	(0.019)	(0.020)	(0.019)	(0.006)
Employed	0.025***	0.023*	0.004	0.005	0.010	0.019**	−0.012	0.018	0.017^{+}	0.008	−0.003
	(0.007)	(0.009)	(0.003)	(0.005)	(0.022)	(0.006)	(0.014)	(0.016)	(0.010)	(0.007)	(0.006)
In educ.	−0.000^{+}	−0.000	0.000	−0.000^{+}	0.000	−0.000	0.000	−0.000	−0.000	−0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)
Unemployed or miss.	−0.002	−0.003	−0.031^{+}	0.014^{+}	−0.016	0.003	−0.172*	0.003	−0.007	−0.017	−0.161*
	(0.005)	(0.009)	(0.018)	(0.008)	(0.018)	(0.007)	(0.084)	(0.017)	(0.011)	(0.015)	(0.068)
Upper sec. educ.	0.005^{+}	0.004***	0.005^{+}	0.003	0.004	0.005	0.003	0.005	0.002	0.009	0.000
	(0.003)	(0.001)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.006)	(0.007)
Tertiary educ.	−0.000	0.001	0.005	0.002	0.002	0.004	0.005	0.009	0.011*	−0.003	0.016^{+}
	(0.005)	(0.002)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.006)	(0.005)	(0.006)	(0.009)
Elementary school or miss.	−0.007^{+}	−0.029***	−0.018***	−0.010^{+}	−0.015^{+}	−0.019*	−0.010^{+}	−0.030***	−0.029**	−0.008	−0.023*
	(0.004)	(0.005)	(0.005)	(0.006)	(0.008)	(0.007)	(0.005)	(0.008)	(0.009)	(0.007)	(0.011)
Penal. conv.	0.007	−0.002	−0.015*	0.006	−0.004	0.002	−0.011*	0.000	0.005	−0.011	0.004
	(0.005)	(0.003)	(0.006)	(0.005)	(0.007)	(0.006)	(0.005)	(0.005)	(0.009)	(0.009)	(0.006)
Constant	−0.028	−0.015	0.016	0.011	0.048	0.015	0.160	0.034	−0.002	0.136**	0.286***
	(0.020)	(0.023)	(0.027)	(0.019)	(0.053)	(0.044)	(0.105)	(0.042)	(0.040)	(0.044)	(0.082)
Observations	47,767	54,253	50,532	48,300	47,762	47,093	46,910	46,956	46,764	46,520	46,427

Standard errors in parentheses, clustered on father id.

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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: Cohort dummies are also included (not shown here). 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. Figures B-1, B-2, B-3 and B-4 show decomposition results using A) a two-country pooled sample to estimate the nondiscriminatory coefficient vector and B) removing years in Denmark from the models.

Source: Own calculations based on data from Statistics Denmark.

Table A-5: Detailed decomposition results: paternal imprisonment 1-6 months, birth cohorts: 1991-1998

	1-6 months										
	WES	TUR	LEB	YUG	PAK	SR	IRAQ	VIE	MOR	IRAN	SOM
Overall											
Descendants	0.034***	0.040***	0.057***	0.050***	0.043***	0.027***	0.042***	0.032***	0.028***	0.030***	0.091***
	(0.004)	(0.003)	(0.005)	(0.005)	(0.006)	(0.005)	(0.007)	(0.006)	(0.006)	(0.006)	(0.013)
Native Danes	0.018***	0.018***	0.018***	0.018***	0.018***	0.018***	0.018***	0.018***	0.018***	0.018***	0.018***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Diff.	0.016***	0.022***	0.039***	0.032***	0.025***	0.009+	0.024***	0.014*	0.010+	0.012*	0.073***
	(0.004)	(0.003)	(0.005)	(0.005)	(0.006)	(0.005)	(0.007)	(0.006)	(0.006)	(0.006)	(0.013)
Explained	0.016***	0.042***	0.057***	0.031***	0.032***	0.023***	0.038***	0.025***	0.034***	0.039***	0.041***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.003)	(0.002)	(0.006)	(0.003)	(0.003)	(0.003)	(0.007)
Unexplained	0.000	−0.019***	−0.018**	0.001	−0.007	−0.013*	−0.014	−0.012+	−0.024***	−0.027***	0.032*
	(0.005)	(0.004)	(0.007)	(0.007)	(0.006)	(0.006)	(0.009)	(0.006)	(0.006)	(0.007)	(0.014)
Explained											
<25 at child's birth	−0.000	0.006***	0.001***	0.002***	0.001***	−0.001***	−0.001***	0.000	−0.001***	−0.001***	−0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
25-29 at child's birth	0.000**	−0.000***	−0.000**	−0.000**	−0.000	0.001***	0.001***	0.000	0.001***	0.001***	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
30-34 at child's birth	0.000**	0.002***	0.000**	0.001***	0.001***	−0.001***	0.001***	0.000	0.001***	0.000*	0.000+
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
>35 at child's birth	−0.001***	0.001***	0.000***	0.001***	−0.001***	−0.001***	−0.002***	−0.000+	−0.003***	−0.003***	−0.000+
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Living in big city	0.000	0.000	0.000	0.000	0.000	−0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
In DK <2 years	−0.003*	−0.002*	−0.001*	−0.007*	−0.002*	−0.001*	−0.004*	−0.001*	−0.001*	−0.001*	−0.005*
	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.000)	(0.002)	(0.000)	(0.000)	(0.001)	(0.002)
In DK 2-4 years	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.001
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.001)	(0.004)
In DK 4-6 years	0.003+	0.002+	0.005+	0.002+	0.002+	0.002+	0.005+	0.002+	0.002+	0.003+	0.006+
	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)
In DK >6 years	0.001	0.000	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.002
	(0.002)	(0.002)	(0.002)	(0.004)	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)	(0.002)	(0.005)
Employed	0.005***	0.006***	0.012***	0.008***	0.005***	0.006***	0.012***	0.007***	0.007***	0.010***	0.013***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
In educ.	−0.000	0.000+	−0.000	0.000+	0.000	0.000	0.000*	−0.000	0.000*	−0.000*	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Unemployed or miss.	0.009***	0.012***	0.023***	0.016***	0.010***	0.012***	0.023***	0.012***	0.013***	0.017***	0.025***
	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)	(0.001)	(0.002)	(0.002)	(0.003)
Upper sec. educ.	0.001***	0.001***	0.000***	0.001***	0.000+	0.000+	0.000+	0.001***	0.001***	−0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tertiary educ.	−0.000*	0.002***	0.001***	0.001***	0.002***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Elementary school or miss.	0.001***	0.007***	0.003***	0.003***	0.004***	0.004***	0.002***	0.004***	0.004***	0.002***	0.003***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Penal. conv.	0.001	0.004***	0.011***	0.001*	0.007***	−0.000	−0.001	−0.001	0.008***	0.010***	−0.005***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

Continued...

	1-6 months										
... Continued	WES	TUR	LEB	YUG	PAK	SR	IRAQ	VIE	MOR	IRAN	SOM
Unexplained											
<25 at child's birth	−0.001	−0.001	0.003^{+}	0.002	0.000	−0.000**	0.003^{+}	0.001	−0.000	0.001	0.005
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.000)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)
25-29 at child's birth	0.006**	0.002	−0.002	0.001	0.002	0.005*	−0.006*	−0.001	0.004	−0.002	−0.008
	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.007)
30-34 at child's birth	−0.002	0.001	−0.004	0.002	−0.001	0.006^{+}	−0.012*	−0.002	−0.001	−0.006	−0.007
	(0.003)	(0.001)	(0.003)	(0.002)	(0.002)	(0.003)	(0.006)	(0.004)	(0.004)	(0.008)	(0.009)
>35 at child's birth	−0.002	−0.001	−0.004	−0.005**	−0.003	0.001	−0.015	−0.003	−0.007	−0.022	−0.016*
	(0.003)	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)	(0.010)	(0.004)	(0.007)	(0.013)	(0.008)
Living in big city	−0.002	−0.002	0.006	0.001	−0.034	0.002	0.007	0.008	0.003	−0.002	0.010
	(0.004)	(0.003)	(0.005)	(0.005)	(0.025)	(0.002)	(0.009)	(0.005)	(0.017)	(0.008)	(0.015)
In DK <2 years	0.002	0.001	0.002*	0.001	0.002^{+}	0.001^{+}	0.004	0.003*	0.001	0.002^{+}	0.002
	(0.002)	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.004)
In DK 2-4 years	0.001	−0.000	−0.000	−0.002	−0.002^{+}	−0.000	0.003	−0.000	−0.001	−0.002	−0.009
	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.002)	(0.007)
In DK 4-6 years	−0.003^{+}	−0.002*	−0.004	−0.001	−0.001	−0.003*	−0.003	−0.002	−0.000	−0.002	0.004
	(0.002)	(0.001)	(0.003)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.005)
In DK >6 years	0.000	0.011*	−0.003	0.005	0.005	0.000	−0.006	−0.024*	−0.005	−0.003	−0.000
	(0.005)	(0.005)	(0.005)	(0.004)	(0.008)	(0.013)	(0.004)	(0.011)	(0.010)	(0.009)	(0.004)
Employed	0.005	0.003	0.007***	−0.004	0.012**	0.007*	−0.016	0.009**	0.008**	0.007**	0.004^{+}
	(0.004)	(0.009)	(0.001)	(0.003)	(0.004)	(0.003)	(0.013)	(0.003)	(0.003)	(0.002)	(0.002)
In educ.	−0.000	0.000	−0.000**	0.000	−0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Unemployed or miss.	0.001	−0.011	−0.007	0.003	0.002	−0.008*	−0.133	−0.009*	−0.001	−0.012*	−0.012
	(0.003)	(0.009)	(0.006)	(0.004)	(0.004)	(0.004)	(0.083)	(0.004)	(0.005)	(0.005)	(0.021)
Upper sec. educ.	−0.001	0.001*	0.002	0.002	0.001	0.002	0.002	−0.000	0.001	0.001	−0.005
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.004)
Tertiary educ.	0.004	0.001	0.003	−0.001	0.004^{+}	0.004	−0.000	0.003	0.004	0.002	0.013*
	(0.003)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)
Elementary school or miss.	−0.001	−0.011***	−0.008*	−0.003	−0.013**	−0.011**	−0.002	−0.004	−0.013**	−0.004	−0.009
	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.003)	(0.007)
Penal. conv.	−0.001	−0.000	−0.003	0.005	0.003	−0.000	0.000	0.001	−0.006	−0.009^{+}	0.002
	(0.003)	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.005)	(0.004)
Constant	−0.007	−0.010	−0.003	−0.005	0.016	−0.017	0.163	0.010	−0.012	0.023	0.056*
	(0.010)	(0.019)	(0.012)	(0.010)	(0.025)	(0.013)	(0.103)	(0.016)	(0.022)	(0.023)	(0.026)
Observations	47,767	54,253	50,532	48,300	47,762	47,093	46,910	46,956	46,764	46,520	46,427

Standard errors in parentheses, clustered on father id.

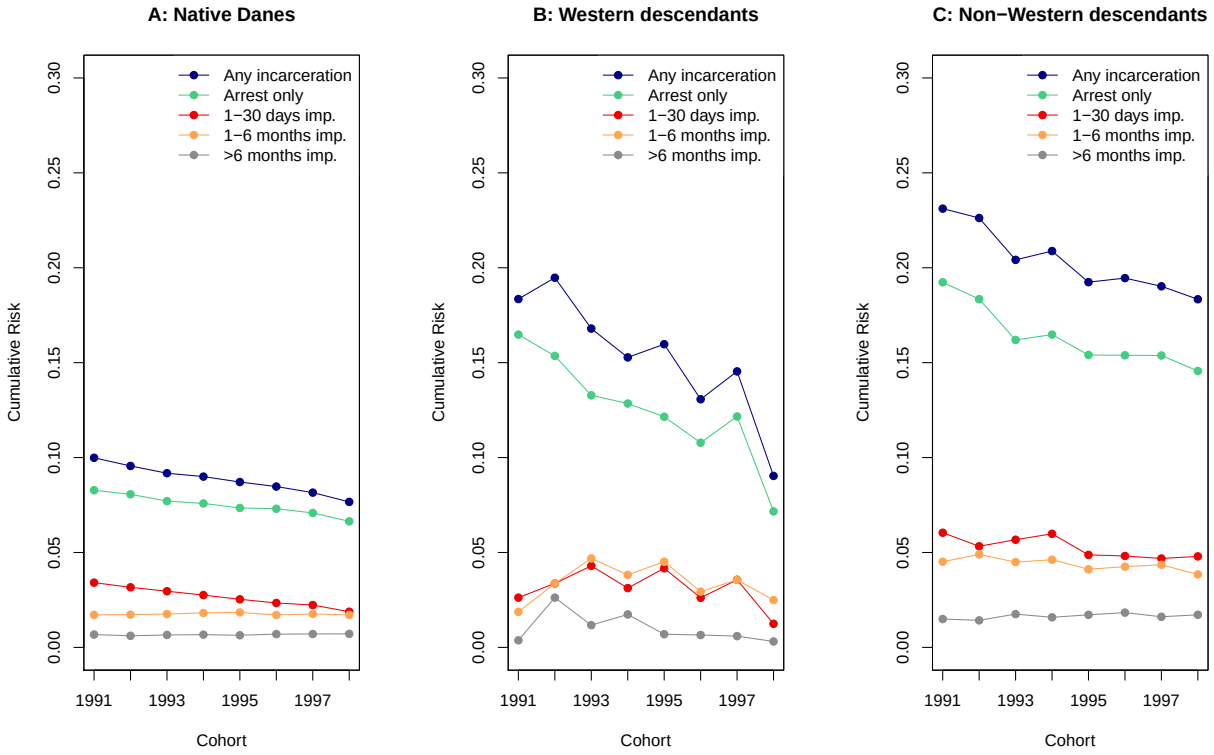
$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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: Cohort dummies are also included (not shown here). 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. Figures B-1, B-2, B-3 and B-4 show decomposition results using A) a two-country pooled sample to estimate the nondiscriminatory coefficient vector and B) removing years in Denmark from the models.

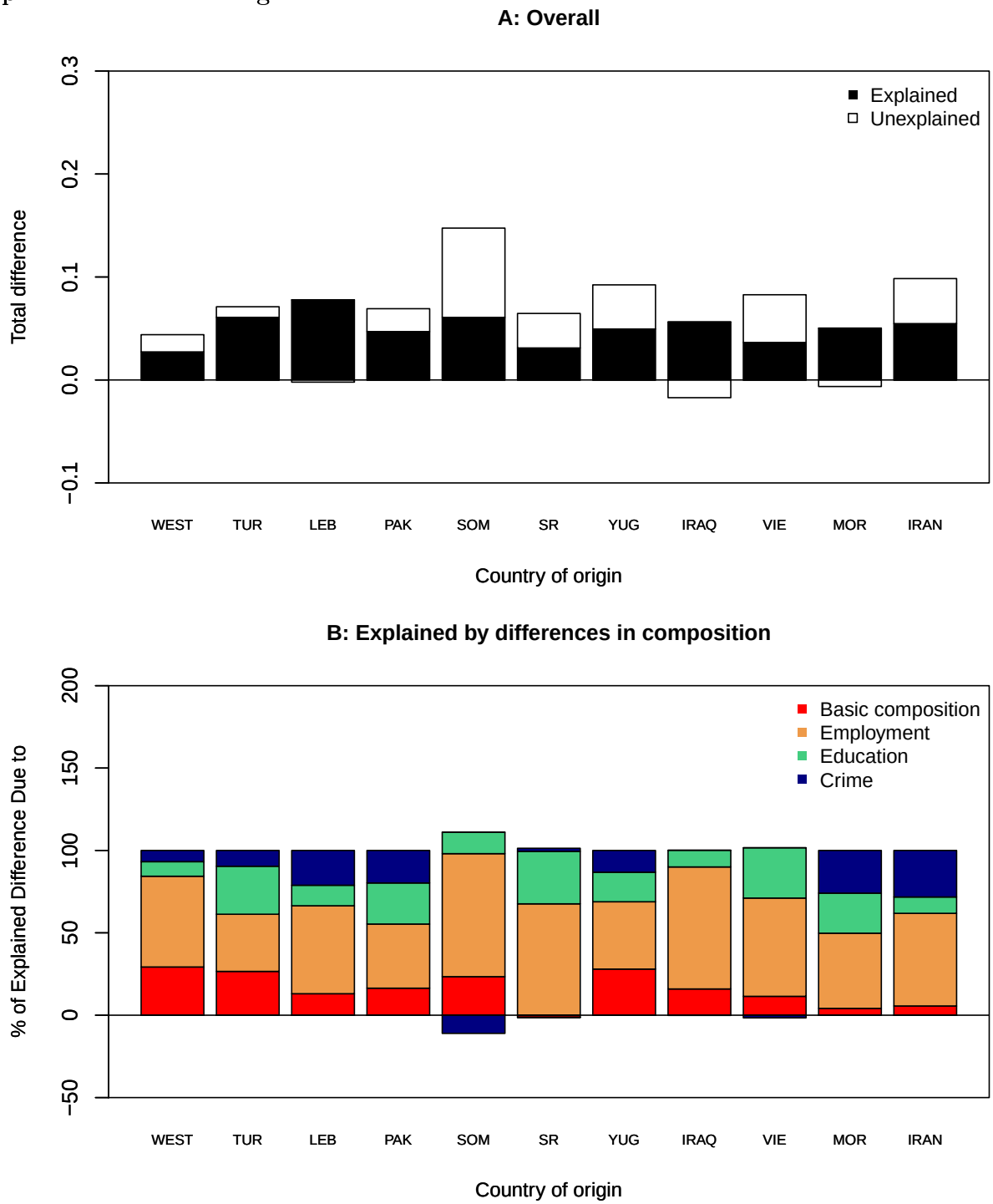
Source: Own calculations based on data from Statistics Denmark.

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 at certain ages, 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, WES = Western country, TUR = Turkey, LEB = Lebanon, YUG = Ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR=Morocco, SOM = Somalia.
Source: Own calculations based on data from Statistics Denmark.

Appendix B

Table B-1: Condensed decomposition results, paternal arrest, birth cohorts: 1991-1998

	% of diff. due to			% of explained due to							Direction of unexpl. factors	
	Diff	Expl.	Unexpl.	Cohort	Age	City	In DK	Empl.	Educ.	Crime	Slope	Intercept
Western	0.047	89.00	11.00	−1.23	−2.82	−1.68	27.93	64.59	7.88	5.33	**+**	−
Non-Western												
Turkey	0.083	123.16	−23.16	0.10	21.63	−0.94	6.46	36.52	26.28	9.95	−	**−**
Lebanon	0.090	145.22	−45.22	−0.04	2.41	−0.65	11.06	56.04	10.74	20.44	**−**	+
Ex-Yugoslavia	0.106	81.08	18.92	−2.49	10.57	−0.79	14.87	58.06	16.38	3.41	+	**+**
Pakistan	0.088	87.94	12.06	0.30	6.14	−2.64	9.32	42.38	22.73	21.78	−	**+**
Sri Lanka	0.072	69.44	30.56	−2.20	−11.59	1.37	11.45	73.38	28.32	−0.74	+	**+**
Iraq	0.036	253.45	−153.45	−2.84	−4.32	−1.47	21.17	80.53	9.05	−2.12	**−**	+
Vietnam	0.082	71.52	28.48	−1.99	0.64	−1.22	12.54	66.24	28.28	−4.49	−	**+**
Morocco	0.050	157.11	−57.11	−0.73	−5.68	−2.37	7.88	52.36	22.54	26.00	**−**	−
Iran	0.095	93.37	6.63	−0.63	−6.60	−1.27	10.46	62.40	8.66	26.99	−	**+**
Somalia	0.186	53.56	46.44	−4.19	−0.79	−1.04	27.71	80.63	10.56	−12.88	+	**+**

Diff: Observed difference in paternal incarceration risk between native Danes and descendants of immigrants (descendants - native Danes).
Expl.: Difference attributable to the explained part (i.e. compositional differences in explanatory factors). If this exceeds the observed difference, then this means that we would expect an even larger difference in paternal risk than observed if the only difference between the groups were differences in the levels of explanatory factors.
Unexpl.: Differences attributable to the unexplained part (i.e. differential returns to the explanatory factors or baseline differences in paternal incarceration risk stemming from unobserved factors). A negative estimate means that we would expect descendants to have lower paternal incarceration risk than native Danes if there were no compositional differences between the groups. If the estimate is negative, on the other hand, then we would still expect descendants to have higher paternal incarceration risk compared to native Danes in the absence of any compositional differences.
Note: The unexplained part can be broken down into two components. A component that is attributable to different returns to the explanatory factors (i.e. different slopes) or differences in intercept (i.e. baseline differences due to unobserved factors). Column 11 and 12 shows the directions of the slope and intercept parameters. - indicates the unexplained part being associated with a lower paternal incarceration risk, and + indicates the unexplained part being associated with a higher paternal incarceration risk. The symbol in bold is the numerically largest - and therefore most important - factor.
Source: Own calculations based on data from Statistics Denmark.

Table B-2: Condensed decomposition results, paternal imprisonment 1-6 months, birth cohorts: 1991-1998

	% of diff. due to			% of explained due to								Direction of unexpl. factors	
	Diff	Expl.	Unexpl.	Cohort	Age	City	In DK	Empl.	Educ.	Crime		Slope	Intercept
Western	0.016	98.87	1.13	0.45	−3.81	0.39	5.84	83.44	7.92	5.78	+	−	
Non-Western													
Turkey	0.022	186.27	−86.27	−0.01	21.33	0.20	1.45	43.41	23.68	9.94	−	**−**	
Lebanon	0.039	144.85	−44.85	−0.09	2.26	0.13	7.85	61.92	8.97	18.97	**−**	−	
Ex-Yugoslavia	0.032	96.55	3.45	0.92	11.93	0.19	−11.88	78.24	16.73	3.86	**+**	−	
Pakistan	0.025	126.69	−26.69	−0.20	5.77	0.56	2.84	49.58	20.03	21.42	**−**	+	
Sri Lanka	0.009	244.03	−144.03	0.54	−10.78	−0.27	9.49	78.78	22.91	−0.67	+	**−**	
Iraq	0.024	158.81	−58.81	0.92	−4.66	0.30	5.68	92.00	7.81	−2.04	**−**	+	
Vietnam	0.014	186.24	−86.24	0.36	0.44	0.24	5.76	73.56	23.82	−4.18	**−**	+	
Morocco	0.010	345.24	−245.24	0.27	−5.82	0.47	3.66	58.12	19.00	24.29	**−**	−	
Iran	0.012	334.03	−234.03	0.07	−6.70	0.25	5.33	69.03	7.13	24.89	**−**	+	
Somalia	0.073	56.13	43.87	1.84	−0.79	0.22	7.75	94.32	9.32	−12.65	−	**+**	

Diff: Observed difference in paternal incarceration risk between native Danes and descendants of immigrants (descendants - native Danes).
Expl.: Difference attributable to the explained part (i.e. compositional differences in explanatory factors). If this exceeds the observed difference, then this means that we would expect an even larger difference in paternal risk than observed if the only difference between the groups were differences in the levels of explanatory factors.
Unexpl.: Differences attributable to the unexplained part (i.e. differential returns to the explanatory factors or baseline differences in paternal incarceration risk stemming from unobserved factors). A negative estimate means that we would expect descendants to have lower paternal incarceration risk than native Danes if there were no compositional differences between the groups. If the estimate is negative, on the other hand, then we would still expect descendants to have higher paternal incarceration risk compared to native Danes in the absence of any compositional differences.
Note: The unexplained part can be broken down into two components. A component that is attributable to different returns to the explanatory factors (i.e. different slopes) or differences in intercept (i.e. baseline differences due to unobserved factors). Column 11 and 12 shows the directions of the slope and intercept parameters. - indicates the unexplained part being associated with a lower paternal incarceration risk, and + indicates the unexplained part being associated with a higher paternal incarceration risk. The symbol in bold is the numerically largest - and therefore most important - factor.
Source: Own calculations based on data from Statistics Denmark.

Table B-3: Refugee status of fathers of children born 1991-1998

	Share of fathers			
Country	Refugee	Other immigrant	Missing	N
Denmark	N/A	N/A	0.98	45,437
Western	0.13	0.50	0.37	2,330
Turkey	0.01	0.46	0.53	8,816
Lebanon	0.43	0.51	0.06	5,095
Ex-Yugoslavia	0.44	0.36	0.20	2,891
Pakistan	0.01	0.40	0.59	2,325
Sri Lanka	0.88	0.01	0.11	1,656
Iraq	0.97	N/A	N/A	1,473
Vietnam	0.95	0.02	0.02	1,519
Morocco	0.07	0.39	0.53	1,327
Iran	0.98	N/A	N/A	1,083
Somalia	0.96	0.01	0.03	990

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 B-4: Family stability for children born 1991-1998

	P(living with dad at age)		N
	0	15	
Denmark	0.941	0.687	45,437
Western	0.894	0.626	2,330
Turkey	0.968	0.817	8,816
Lebanon	0.941	0.708	5,095
Ex-Yugoslavia	0.930	0.770	2,891
Pakistan	0.970	0.807	2,325
Sri Lanka	0.975	0.891	1,656
Iraq	0.973	0.706	1,473
Vietnam	0.881	0.720	1,519
Morocco	0.943	0.737	1,327
Iran	0.918	0.608	1,083
Somalia	0.830	0.395	990

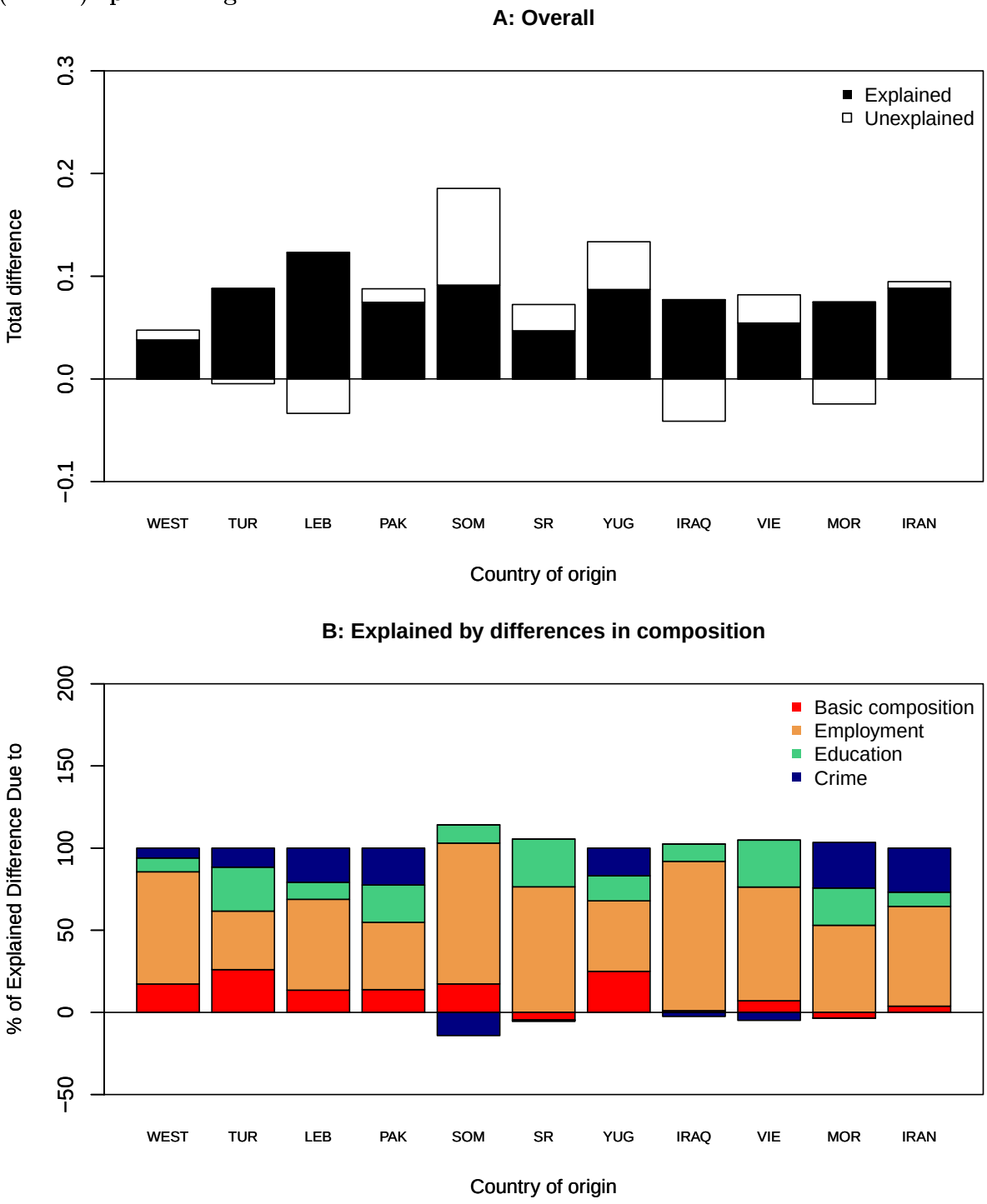
Note: Table shows the proportion of children sharing an address with their father January 1st the year they turn 1, and January first the year they turn 16.
Source: Own calculations based on data from Statistics Denmark.

Table B-5: Mean number of children per father by country, cohorts 1991-1998

	Mean # of children	N
Denmark	1.393	325,687
Western	1.313	1,747
Turkey	1.482	5,869
Lebanon	2.062	2,454
Ex-Yugoslavia	1.267	2,233
Pakistan	1.672	1,378
Sri Lanka	1.535	1,073
Iraq	1.390	1,058
Vietnam	1.452	1,044
Morocco	1.611	814
Iran	1.252	853
Somalia	1.570	625

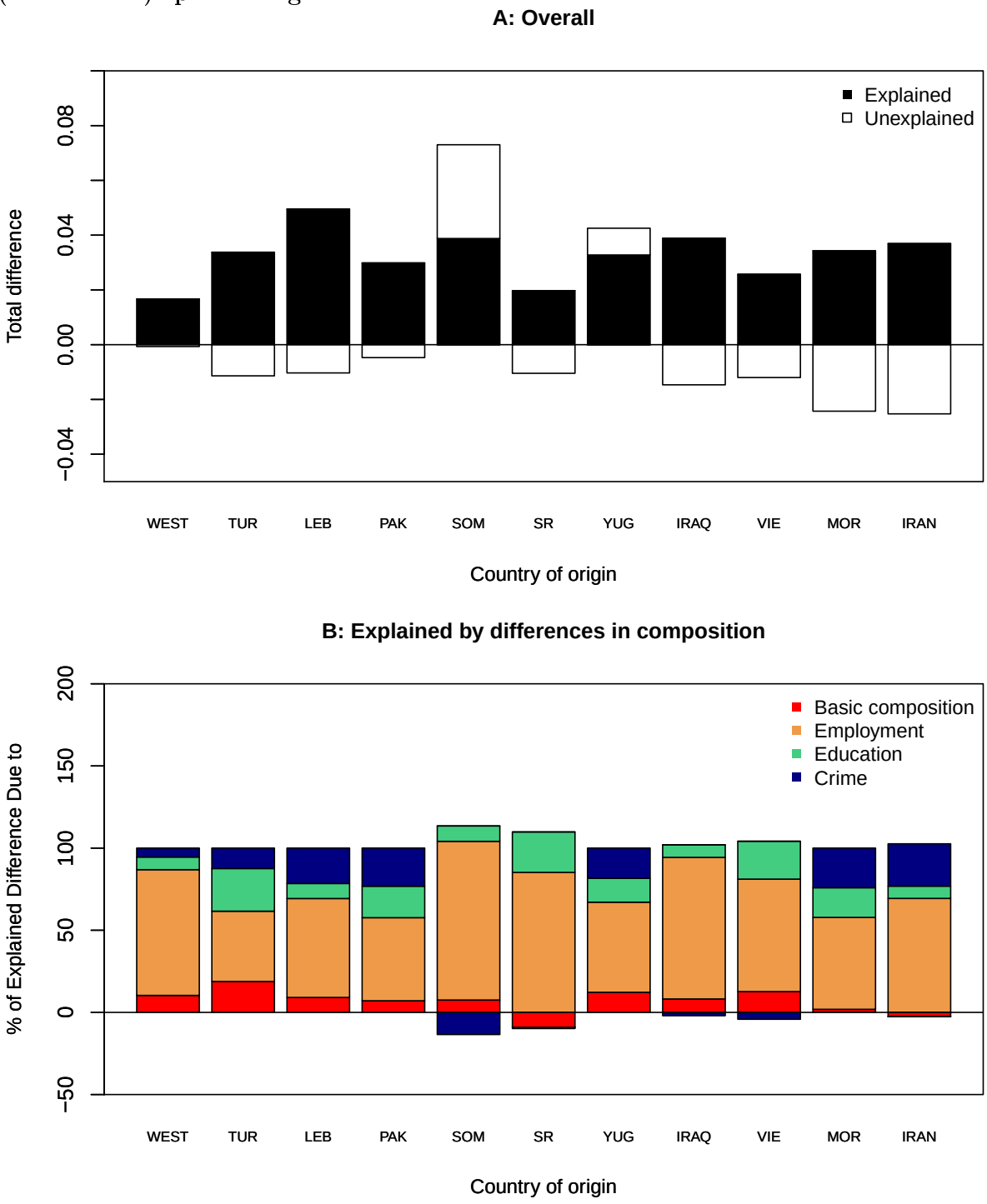
Note: Table shows the mean number of children (born in Denmark between 1991-1998) per father in our sample.
Source: Own calculations based on data from Statistics Denmark.

Figure B-1: Decomposed difference from Native Danes in paternal incarceration risk (arrest): pooled regression as reference



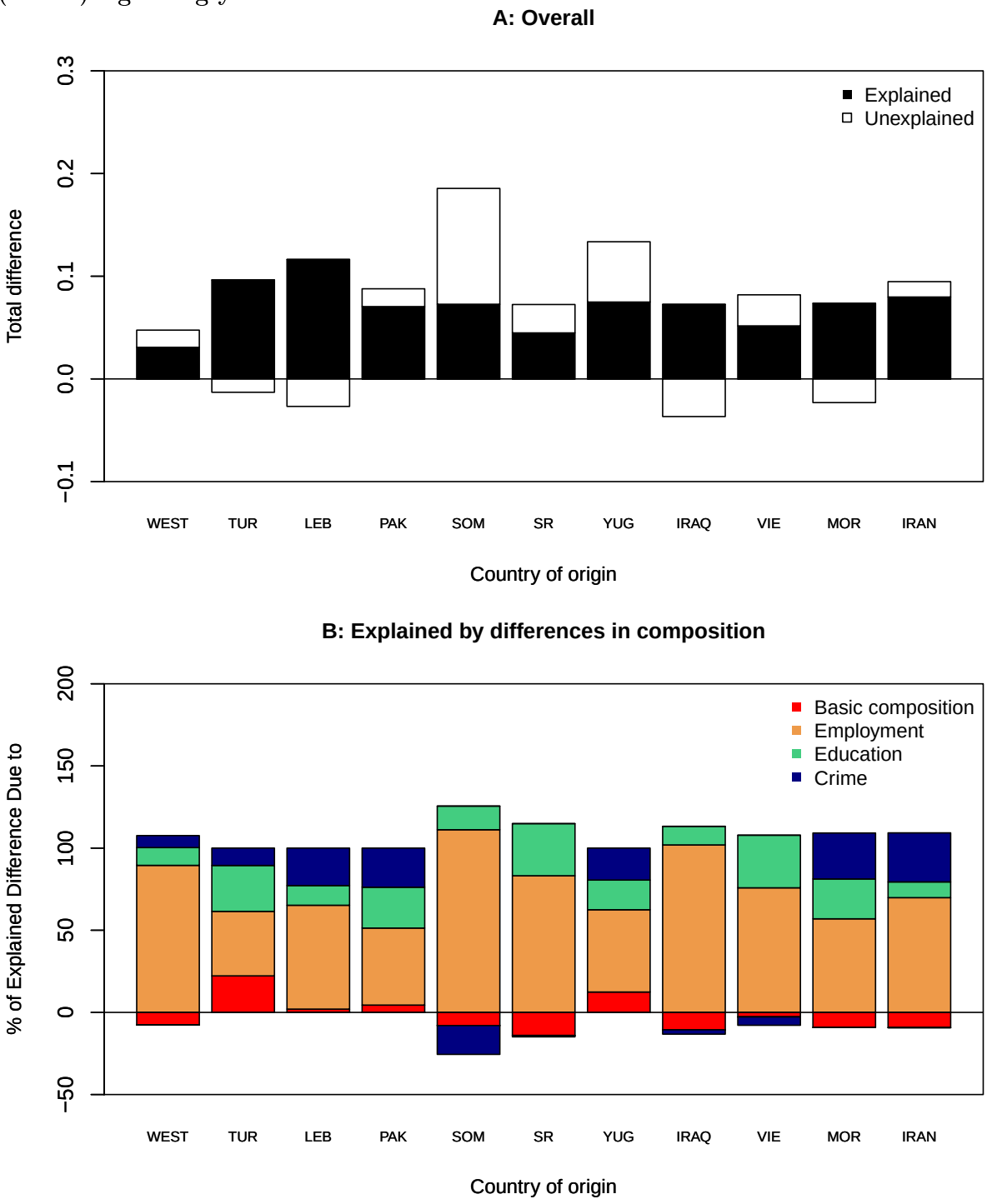
Abbreviations: DK = Denmark, WES = Western country, TUR = Turkey, LEB = Lebanon, YUG = Ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR=Morocco, SOM = Somalia.
Source: Own calculations based on data from Statistics Denmark.

Figure B-2: Decomposed difference from Native Danes in paternal incarceration risk (1-6 months): pooled regression as reference



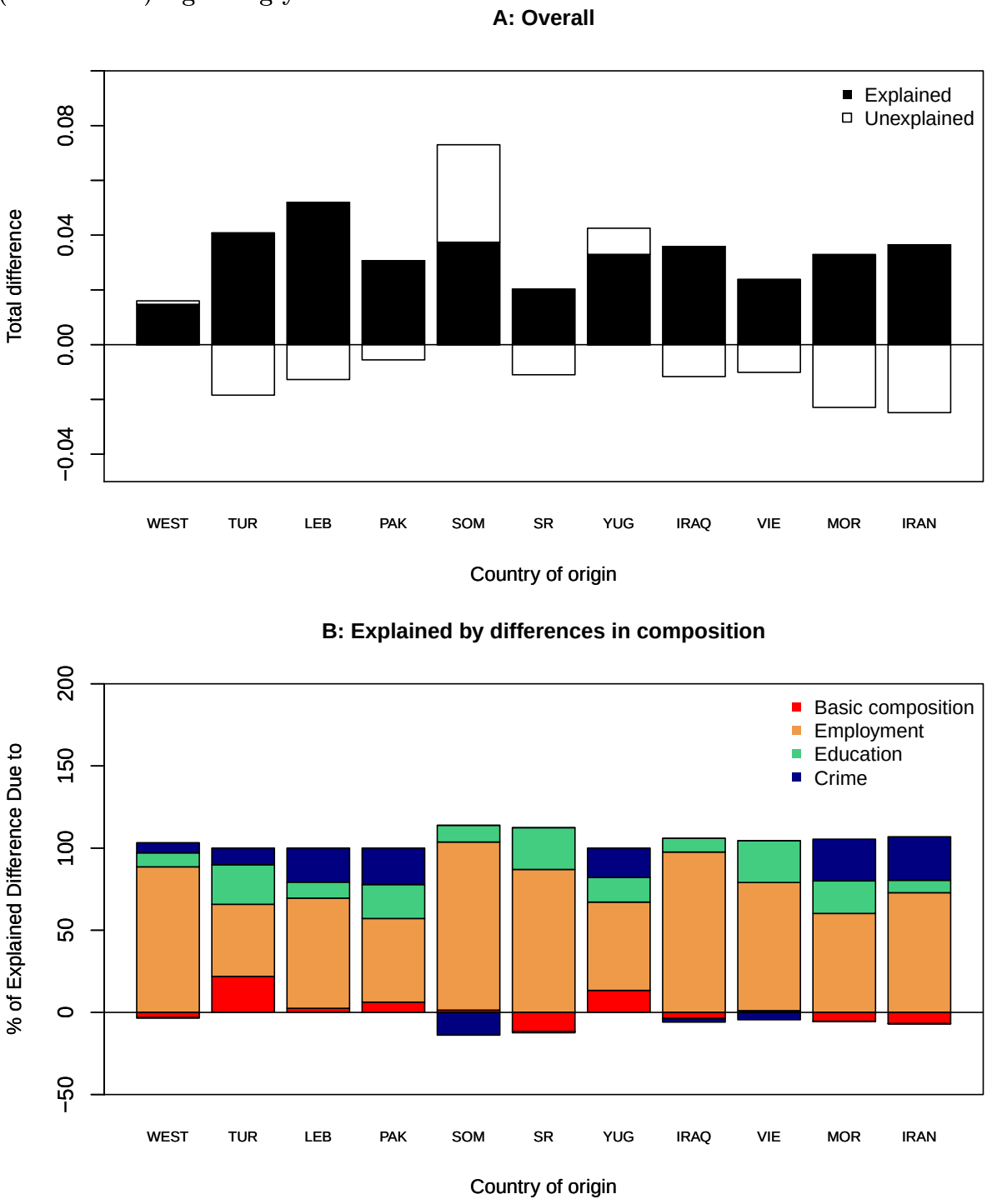
Abbreviations: DK = Denmark, WES = Western country, TUR = Turkey, LEB = Lebanon, YUG = Ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR=Morocco, SOM = Somalia.
Source: Own calculations based on data from Statistics Denmark.

Figure B-3: Decomposed difference from Native Danes in paternal incarceration risk (arrest): ignoring years in Denmark



Abbreviations: DK = Denmark, WES = Western country, TUR = Turkey, LEB = Lebanon, YUG = Ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR=Morocco, SOM = Somalia.
Source: Own calculations based on data from Statistics Denmark.

Figure B-4: Decomposed difference from Native Danes in paternal incarceration risk (1-6 months): ignoring years in Denmark



Abbreviations: DK = Denmark, WES = Western country, TUR = Turkey, LEB = Lebanon, YUG = Ex-Yugoslavia, PAK = Pakistan, SR = Sri Lanka, VIE = Vietnam, MOR=Morocco, SOM = Somalia.
Source: Own calculations based on data from Statistics Denmark.

Figure B-5: Age at birth of child

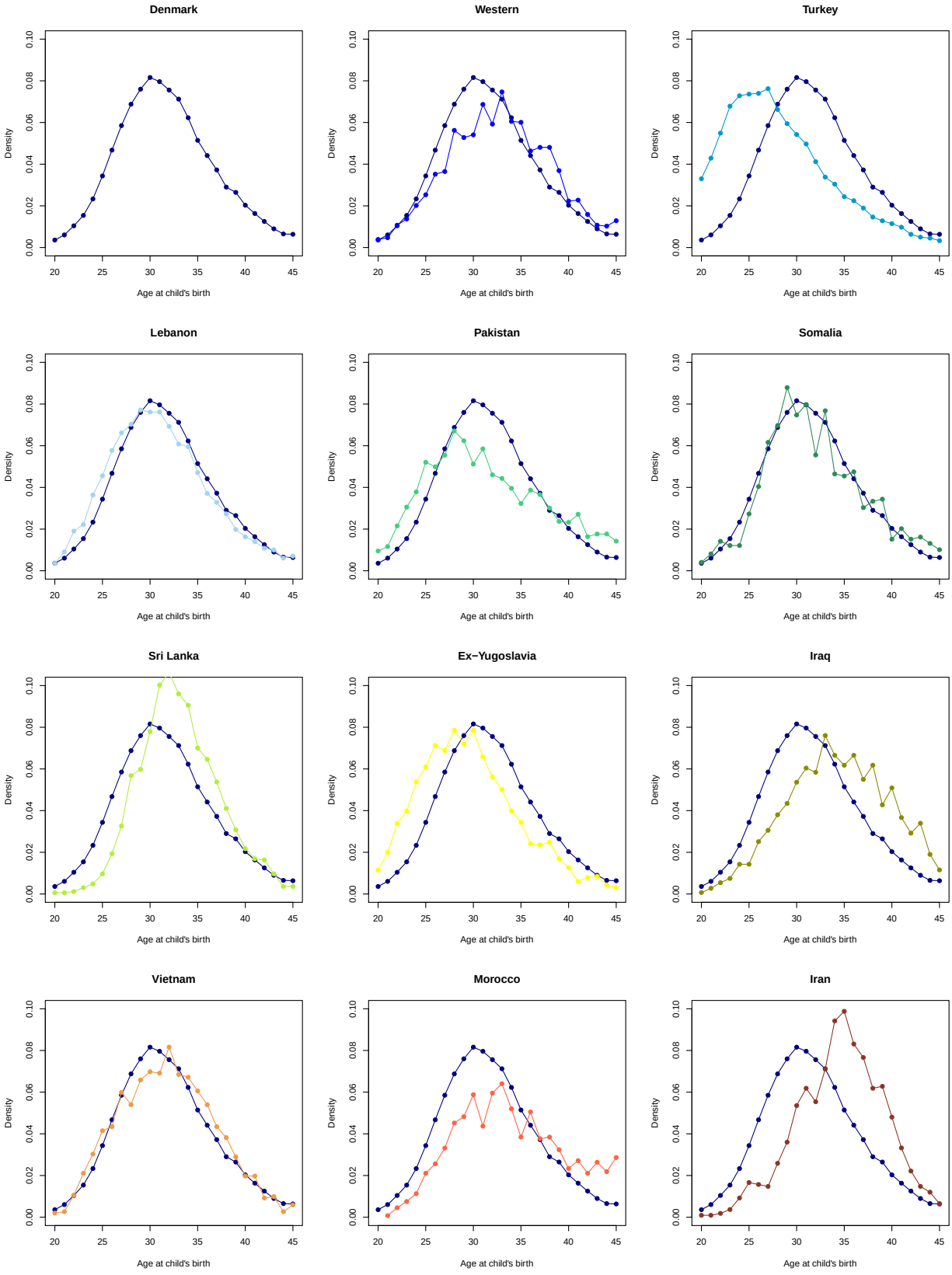
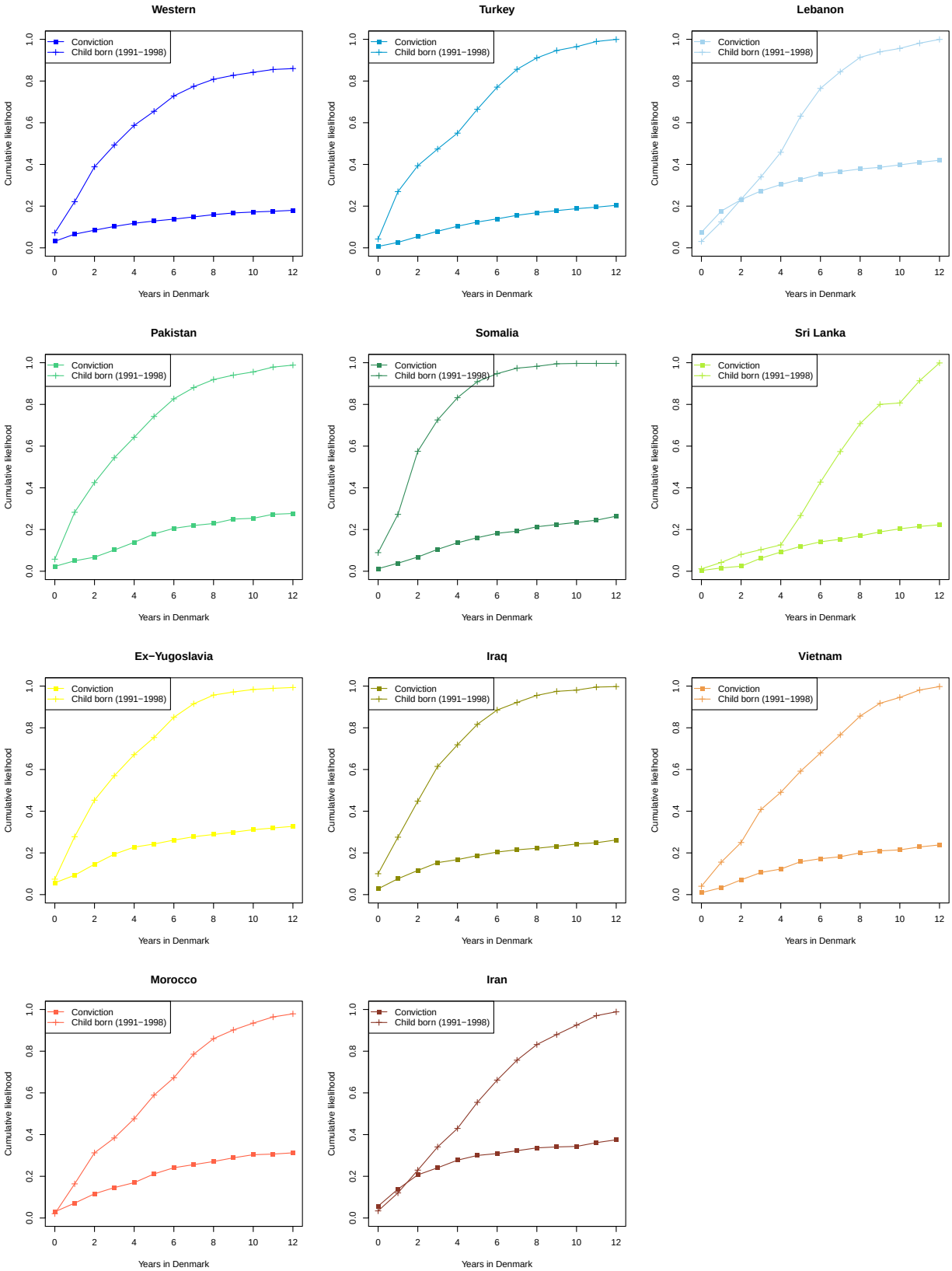


Figure B-6: Likelihood of conviction and child born by years in Denmark



Note: Sample: fathers of children in our sample with non-missing immigration date. Shows the cumulative probability of the eldest child in our sample having been born and the the cumulative likelihood that the father has been convicted. Source: Own calculations based on data from Statistics Denmark.