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Ethnic Inequality in Preterm Birth

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Abstract

Preterm delivery is associated with lower health chances after birth. Women with a migration background often have a higher preterm risk (<37 gestational weeks) compared to the nonmigrant majority population. In Germany, little is known about the scope and causes for more adverse birth outcomes among immigrant women. Focusing primarily on two large migrant groups, that is first-generation Turkish and ethnic German immigrants, we examine whether these groups experience elevated preterm risk, and, if so, whether resources (e.g., economic, cultural, and social capital), health behavior (e.g., smoking during pregnancy and low utilization of prenatal care), and / or maternal constitution (height) help to explain the observed inequality relations. For the analysis, we estimate multiple logistic regression models based on the SOEP's newborn questionnaire (years 2003 – 2011). Our findings show that preterm birth is more prevalent among Turkish and ethnic German immigrants compared to women without a migration background. As expected, accounting for maternal constitution and resources decreases the preterm risk for all migrant groups, while – unexpectedly – a mother's and a partner's language proficiency is rather irrelevant. Health behavior during pregnancy then has no further explanatory power. After adjustment for all factors, no significant preterm differences between migrants and the nonmigrant majority population are observed.

JEL-Classification: I10

1. Why Should Migrants' Offspring in Germany Do Poorly in the Beginning of Life?

Worldwide, preterm birth constitutes a public health challenge (Petrou et al., 2001; Behrman / Butler, 2007). Since 2003, Germany's preterm rate has remained stable (around 9%, see BQS, 2012). Internationally, this value is above the European (in 2005: 6.2%, see Beck et al., 2010) but below the US-American average (in 2006: 12.3%, see MacDormann, 2011). The major problem is that extremely preterm infants (<37 gestational weeks) have lower postnatal survival chances (Rettwitz-Volk, 2003; WHO, 2005) and face "a wide variety

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of health and developmental problems, including long-term cognitive, behavioral, social, emotional, and neurodevelopmental difficulties" (MacDorman, 2011, 202). For Europe – as for the United States (Shiono/Klebanoff, 1986; Behrman/Butler, 2007) – empirical evidence shows significant ethnic disparities in preterm delivery (see e.g., Bollini et al., 2009). For Germany, contemporary research on this subject lacks significant progress (David et al., 2006). Existing findings are inconsistent, reporting either significantly elevated (see, for mortality, Oeter et al., 1979; for preterm birth, Robert Koch-Institut 2008; for stillbirth, Reeske et al., 2011a) or nonsignificant (see, for mortality, Rimbach, 1967; for preterm birth, David et al., 2006) ethnic disadvantages in birth outcomes.

Not less unfortunately, because ethnic and social origin are strongly entangled (Razum et al., 2011), ascertaining the nature of ethnic disparities in reproductive health is difficult. Relying solely on socioeconomic status (Schenk, 2007), however, often does not fully account for migrants' lower health chances, thereby indicating that minority-specific mechanisms might be at work. Alongside social background, (poor) language skills of the destination country, health beliefs, smoking during pregnancy, inadequate utilization of prenatal care, and ethnic segregation are all assumed to be of importance when discussing ethnic inequality in health (Collatz et al., 1979; Mersmann, 1998; David et al., 2006; Schenk, 2007; Razum et al., 2008; Hartung et al., 2010; Glaesmer et al., 2011). In addition, maternal constitution (height) might deliver a better understanding of migrants' worse birth outcomes (Goedhart et al., 2008).

Using preterm delivery as a dependent variable, the aim of this study is to compare early health chances in offspring with versus without a migration background. We expect Turkish and ethnic German women to experience a higher preterm risk. This assumption rests on various empirical observations. Both immigrant groups face *socioeconomic disadvantages* – though to a different degree (Fuchs/Sixt, 2008; Gresch/Becker, 2010). Compared with the "newer" migrants with ethnic German roots (so-called *Aussiedler*), Turkish women should have the most elevated preterm risks, given their comparatively lower education, lower proficiency in the German language, lower sociocultural and legal integration (Söhn, 2008; Reiss et al., 2010), and, not least, lower physical height.

The present analysis is based on data from the German Socio-Economic Panel. It is used to answer two questions: *First,* what role does maternal constitution (height) as a minority-specific nonsocial factor play in this context? *Second,* is immigrant offspring at a higher risk of being born preterm, and if so, can economic, cultural, and social capital with its links to maternal health behavior (e.g., maternal smoking during pregnancy and inadequate prenatal care utilization) be held responsible for the observed inequality relations?

Theoretically, we shall start with a *nonsocial* argument on the association between migration background and preterm birth, before discussing more general arguments based on social production theory (Bourdieu, 1983, 1987). This seems appropriate, because the relative contribution of socioeconomic and constitutional factors to these differences remains unclear (Goedhart et al., 2008).

2. Theoretical Remarks on Ethnic Disparities in Preterm Birth

With regard to *constitutional* characteristics, studies on ethnic differences in birth outcomes stress the importance of maternal height (Goedhart et al., 2008). Being specific to certain (but not all) migrant groups, height may impact on gestation through a "biological" channel. This, in turn, would explain ethnic differences "naturally" in gestational age "with no need for preventive actions" (Goedhart et al., 2008, 361). For the Netherlands, using large-scale data, it could be shown that taller mothers are less likely to deliver their babies preterm or with low birthweight – even after adjustment for social and behavioral factors (Verkerk et al., 1994). Similarly, Goedhart and colleagues (2008) showed that after adjustment for maternal height no significant disparities in term birthweight were observed in first- and second-generation Turkish and Moroccan offspring compared to native Dutch newborns. Based on this empirical evidence, we expect maternal height to explain a significant portion of ethnic disparities in preterm birth in Germany.

However, given a stronger amount of social inequality, stronger linkages between ethnic and social background, and Germany's weak integration policy (see Bollini et al., 2009), maternal height alone should not fully explain an ethnic gradient in preterm birth. Also, given a stronger correlation of height with Turkish rather than ethnic German origin, adjustment for maternal height may particularly provide an explanation of the higher preterm risk in Turkish women, but less so in *ethnic* Germans who share – to some extent – the same biological heritage as native Germans. Accordingly, for the most (height-)heterogeneous migrant groups, that is, immigrant women of all other countries of origin, constitution may have the least explanatory power for (possibly) elevated prematurity risk.

With respect to *mechanisms of social production*, as with ethnic and social inequalities in education (see, e.g. Kristen/Granato, 2007), first and foremost, a mother's (and a father's) general resource endowment with economic, cultural, and social capital is commonly assumed to play a decisive explanatory role for migrants' lower life chances (see, for health, Razum et al., 2011). When discussing inequality in health, *education* (knowledge) plays a key role (Abel, 2008). In more general terms, given first-generation migrants' lower educational level (Glaesmer et al., 2011), they might not know what preventive care services are available, and what they are for (Collatz et al., 1979; Spallek et al., 2010; Choté et al., 2011; Razum et al., 2011). From a more minority-specific perspective, underutilization of preventive care might also be attributable to what in migration sociology is referred to as a "restricted transferability of origin-specific resources" (Kristen et al., 2011, 124; see, also, Esser, 1999, 2008). Not having grown up in the destination country, immigrants lack knowledge on the German health system (Spallek et al., 2010, 4), what may be especially true for first-generation migrants from Turkey (or other non-Western countries).

Applying Bourdieu's (1983, 1987) arguments in the sphere of social disparities in health behavior, migrants may practice rather unhealthy *lifestyles* due to facing greater socioeconomic disadvantages (Spallek et al., 2010; Glaesmer et al., 2011). Again, education with its strong linkage to health behavior (see, Abel, 2008; see, also, Currie / Moretti, 2003, 1496) may be highly relevant in this context. Among risky health behaviors, smoking (Steyn et al., 2006) and insufficient prenatal care utilization (Krueger / Scholl, 2000) are assumed to be causally linked to pregnancy outcomes. Although there is profound evidence for *smoking* (Voigt et al., 2007), there are limitations with respect to "the efficacy and effectiveness of prenatal care on pregnancy outcomes" (Reime et al., 2009). Nevertheless, in Germany, women with a migration background seem to practice a rather unhealthy lifestyle. Using German census data for the year 2005, Reime et al. (2009) compared smoking habits between the migrant and nonmigrant population and found for females independent of educational level a higher smoking prevalence among first- and second-generation Turkish women. In contrast, smoking is less prevalent among ethnic German immigrants (Reiss et al., 2010; Kuhrs et al., 2012) compared to the majority population without migration background.

Similarly, with respect to preventive health orientation, both ethnic groups considered here (as low-educated women) use pre- and postnatal services late and irregularly (Collatz et al., 1979; Koller et al., 2009; Razum et al., 2011). Finally, in this behavioral context, unwanted pregnancy might increase the likelihood of smoking during pregnancy – or inadequate prenatal care utilization (Reime et al., 2009) – thereby promoting adverse pregnancy outcomes. However, this argument applies to both migrant and non-migrant women, what in turn should not alter migrants' preterm risk.

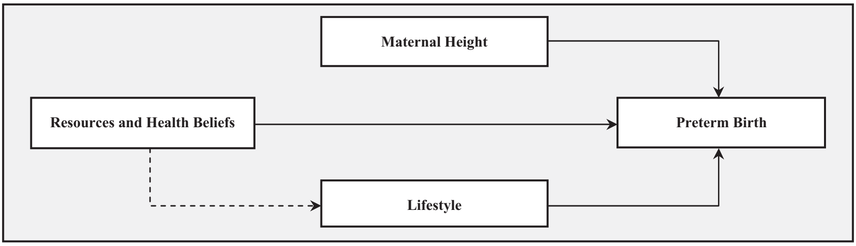
Alongside education, *income* is undoubtedly relevant to health and health behavior (Mielck, 2005). For example, financial deprivation might influence an early and regular uptake of prenatal care. Though basic prenatal care is free of charge in Germany (Reime et al., 2009), financially deprived migrants are more likely to fear further screening costs (Fransen et al., 2007) or "co-payment" (Spallek et al. 2010, 4). Furthermore, income may impact on unequal gestation length between different groups of origin also through various indirect channels. Economic deprivation is associated with regional segregation, and thereby with restricted opportunities for interethnic contacts and language exposure (Kalter, 2008, 25). Ethnic segregation, as US-American research reveals, might also be associated with higher levels of air pollution, thereby disproportionately more often having an adverse effect on the pregnancy outcome of immigrant women (Woodruff et al., 2003; Ponce et al., 2005).

It is also worth mentioning that beyond this standard social risk set (education, income) sociocultural factors might also influence ethnic disparities in lifestyle (Shiono et al., 1997). These include proficiency in the language of the destination country (Delvaux et al., 2001; Hurrelmann, 2006; Spallek et al., 2010) and "fatalistic" theories on health (Razum et al., 2008). For the former, a prospective cohort study (Alderliesten et al., 2007) revealed that all non-Dutch migrant groups assessed start prenatal care late, showing that, for pregnant Turkish women, socioeconomic composition and language proficiency fully explained initial ethnic differences in prenatal care utilization. Regarding the latter, low prenatal care utilization among migrants may also be linked to migrants' greater "acceptance of 'what God gives'" (Fransen et al., 2007, 1262), although such beliefs might also be present among religious nonmigrant Germans. Due to data-restriction we cannot capture health beliefs. Accordingly, we do not derive a hypothesis.

Alternatively, because migration is "itself" a mental and physical health risk (Rutter/Quin, 1990; Berger/Schücking, 2011), maternal risk behaviors (e.g., smoking during pregnancy and insufficient prenatal care) may serve "as a means of coping with stress" (Behrman/Butler, 2007, 180). Not having adequate information on migration-related stress experience during pregnancy, we only control for mothers' general health status before conception.

In the context of "health knowledge and literacy" immigrant women's behavior during pregnancy should also depend on their partners' host-country-specific resources – that is, social capital to mothers – because there are positive effects of father involvement on maternal health behavior (Teitler, 2001). Additionally, as Reime et al. (2009, 1281) point out, the pregnant women herself may not be the person deciding over prenatal care utilization in all cultures. Here, family formation with natives is a strong indicator for successful integration in the host country (Schroedter/Kalter, 2008).

Thus, the better the integration of pregnant women with a migration background, the lower their risk for preterm birth. This should apply for all considered immigrant groups. However, it should be particularly the case for the least socioculturally integrated Turkish group (Schroedter/Kalter, 2008), and less the case for the comparatively better integrated and legally advantaged ethnic German women (Söhn, 2008). The argument behind this assumption is that migrant women's birth outcomes might be influenced positively by a partner's use of the host country's language by virtue of access to health-relevant knowledge and assistance when accessing health service and in terms of improving a mother's language competence – with the latter being important for "direct communication with medical staff" (e.g., Spallek et al., 2010, 4).



Note: Direct pathways are indicated by solid, indirect in dashed lines; own illustration.

Figure 1: Theoretical model explaining *ethnic* inequalities in preterm delivery

In brief, the theoretical discussion is illustrated in an explanatory scheme in *Figure 1*. Besides *maternal constitution* (e.g., height), we expect *resources*, as indicated by immigrant mother's (and partner's) *cultural* (e.g., education, language proficiency) and *economic* capital, to play both a direct and – insofar as those factors are associated with "unhealthy" lifestyles during pregnancy (smoking, inadequate utilization of prenatal care) – an indirect role in explaining ethnic preterm heterogeneity.

3. Data and Variables

The empirical analyses are based on the newborn questionnaire ("Mother–Child: Age 0–1," period 2003–2011, v28) of the German Socio-Economic Panel (SOEP) merged together with data on mothers' ethnic and social origin as well as health-related behavior. To avoid statistical bias due to repeated participation, only mothers' first newborn interview is used (see Becker/Kurz, 2011). To figure out "natural preterm delivery" (Peters 2010, 13, translated), we dropped women with medically initiated pregnancies as well as multiple births.[1]

To measure mothers' resources and sociocultural integration, we relied on information surveyed in the year mothers were pregnant. In case of missing information on the time of or around pregnancy, data of the year mothers reported on the newborn questionnaire are used (sample summary statistics are presented in Table A1 in the appendix).

1 Keeping those cases in the sample does not lead to different results.

The *dependent* variable is derived from the question "*In which pregnancy week was your child born?*" We differentiate preterm babies (< 37 weeks = 1) from none preterm babies (≥ 37 weeks = 0). Our migration variable differentiates five categories: no migration background (reference), first-generation Turkish women, first-generation ethnic German immigrants, and one category each for other first- and second-generation migrants. This measure is derived from the generated variables "*migback"* (none / direct / indirect migration background), "*corigin"* (country of origin, both that of mothers and their parents), and – to identify ethnic Germans (see Frick / Söhn, 2005) – also "*biimgrp*" (immigration group), and citizenship. Due to the small number of cases (*n* = 11), second-generation Turkish women are coded in the last category (second-generation migrants).[2]

To disentangle the influence of ethnic and social origin on preterm delivery, we account for mothers' resource endowment, that is, institutionalized *cultural* capital[3] (low vs. medium / high educational degree), *economic* capital, which is derived from the household net-equivalence income (poor = < 60 % of median vs. none poor), and *social* capital (partnered mother vs. single). As an indicator for the opportunity structure, mothers' self-reports on *residential segregation* are taken into account (migrants living in the neighborhood vs. no migrants). Further, mothers' *sociocultural integration* is captured by variables on mothers' as well as partners' self-reported proficiency in the host country's language (poor vs. (very) good)), partners' migration history (direct, indirect, as opposed to no migration background), and partners' education (low vs. medium / high educational degree).

Behavioral risk factors for preterm birth are mothers' doctor visits ("Have you gone to a doctor within the last 3 months? If yes, please state how often") and tobacco use ("Do you currently smoke, be it cigarettes, a pipe, or cigars?"). Information on both is covered within the person questionnaire only. A significant portion of mothers were not interviewed while pregnant (e.g., due to 12-month interval between two annual interviews[4]). Particularly with regard to the question about tobacco use (which is an integral part of the questionnaires in 2001, 2002, 2004, 2006, 2008, and 2010), the smoking variable has high missing values. Thus, we control for missing behavioral data in our analysis. Using the year / month of pregnancy (*bcpregy / bcpregmo*) from "bioage01", we con-

[2] Interestingly, however, second-generation Turkish women showed a comparable preterm risk to first-generation Turks in both strength and direction.

[3] Following Bourdieu (1987, 146), years of education are not able to indicate institutionalized cultural capital. Objectification is only possible on the basis of certificates. Because migrants are systematically overrepresented in the least prestigious German school track ("*Hauptschule*"), the variable differentiating migrants' formal education is dichotomous.

[4] For further explanations concerning sample deficits, see Haisken-DeNew / Frick (2005, 27).

struct the variable whether mothers smoked *within* pregnancy (yes = 1, no = 0). Similarly, we design a proxy for prenatal care utilization, indicating whether mothers had insufficient (= 1) or adequate care (= 0). Prenatal care is defined as adequate when mothers had a minimum of one doctoral visit until the third month of pregnancy, two within the fourth month, and three doctoral visits until childbirth; and inadequate, when there were no or irregular doctor visits. In order to account for healthcare provision, we use the distance to the family doctor as a rough indicator for having a gynecologist nearby (< 20 min. by foot = 1, otherwise = 0).

Further explanatory variables are mother's height (metric), and mother's age at conception (15–21, 22–34, ≥ 35 years). Other studied control variables are type of health insurance (public vs. private), region (east vs. west), year of childbirth (metric), child's sex (girl vs. boy), unplanned pregnancy (yes vs. no), mother's parity (first child, second child, > 2 children), and maternal health before pregnancy (poor vs. (very) good).

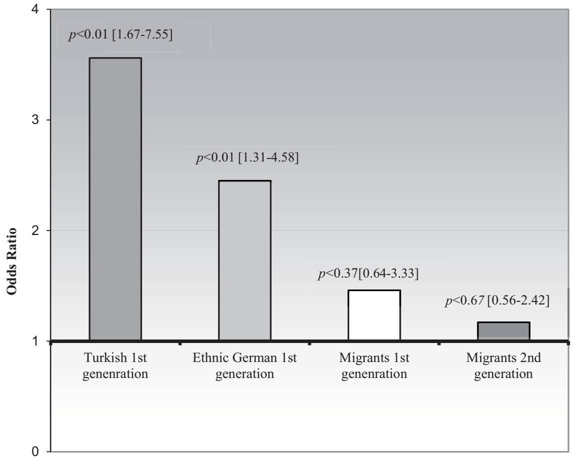
4. Empirical Results: Migrant Offspring's Early Health

The sample for the analysis consists of 1,175 observations of which 118 (10.04%) are preterm newborns. Our analyses show that the majority of all preterm babies (70%) are *late* preterm babies (34–37 weeks of gestation). This result is in line with previous research indicating that late preterm births account for about 80% of the overall preterm prevalence (Engle 2007, et al.; see also BQS, 2012).

Regarding women's birth outcome, Turkish women have the highest preterm rate (25%, $n = 40$), followed by ethnic German immigrants (18.67%, $n = 75$) and other first-generation migrants (12.07%, $n = 58$). Interestingly, only 9.89% of the second-generation migrants delivered their babies too early ($n = 91$), compared to women with no migration background (8.56%, $n = 911$). The group-specific odds ratios (*OR*) for preterm delivery are illustrated in *Figure 2* (Turks: $OR = 3.55$, ethnic German immigrants: $OR = 2.45$, first-generation migrants: $OR = 1.46$, second-generation migrants: $OR = 1.72$).

Descriptive analyses[5] reveal that the observed disparities in preterm birth between the origin groups under study may be the result of differences in their constitutional, socioeconomic, sociocultural, and behavioral composition. As expected, Turks (161.7), ethnic Germans (165.0), and other first-generation (165.7) and second-generation (165.0) migrant women are, on average, significantly less tall than native women with no migration background (168.0). Re-

[5] We computed chi² tests for categorical variables, and *t* tests for metric measures. If not indicated otherwise, all reported associations between maternal migration background and independent measures are statistically significant ($p < 0.05$).



Source: SOEP 2003–2011, own calculations.

Figure 2: Migrants' preterm risks (ref. nonmigrant women; odds ratio [95% CI])

garding maternal health before pregnancy, the studied origin groups do not differ statistically (p > 0.90). With respect to social inequality, the Turkish group is the least well educated (low education: 72.5%), least proficient in the German language (poor language skills: 48.7%), and most economically deprived (poor: 32.5%), whereas the ethnic Germans' resource endowment is comparatively less disadvantaged (38.6%, 19.2%, and 17.3%, respectively), though not as privileged as that of the nonmigrant majority population (low education: 14.1%, poor language skills: 0.0%, poor: 13.6%).

Furthermore, all immigrant groups are almost to the same degree more likely to live in an ethnically segregated neighborhood compared to the nonmigrant reference group (> 90.0% vs. 66.1%).

Concerning health lifestyle, almost half of the Turkish women smoked during pregnancy (41.6%). Interestingly, we observe a higher participation rate in prenatal care for Turkish women (92.0% vs. nonmigrant women: 83.2%). In contrast, ethnic German immigrants, as has been reported before (see Razum et al., 2011), are less likely to utilize prenatal care adequately (72.5%). However, at the same time, ethnic Germans less often smoke during pregnancy compared to the nonmigrant majority population (11.1% vs. 17.1%). With respect to sociocultural integration, first-generation Turkish women (2.5%) followed by ethnic German immigrants (25.0%) are – among all migrant groups under study (other first-generation migrants: 44.4%, second-generation migrations: 42.6%) – least likely to have a partner without migration background.

In the following, we examine the role of these variables in explaining migrants' higher risk for preterm delivery (for *univariate* standardized and nonstandardized effects of all covariates, see Table A1 in the appendix).

Table 1 reports on logistic regression models predicting the probability of ethnic preterm risks. Comparing the *odds ratios* across hierarchical models has been subject to critical debate (Winship / Mare, 1984; Mood, 2009). To ensure that the decline in ethnic group specific odds ratios is not a statistical artifact, we also display *y*-standardized coefficients (b_i). As the comparison across models reveals, conclusions do not differ when using nonstandardized estimates only.

Turning to the results of the first multivariate model (*Model 1*), preterm risks still seem greater for Turks (OR = 3.13, p < 0.01) and ethnic German immigrants (OR = 2.14, p < 0.05), when controlling for important confounds such as maternal age and parity. We then introduce maternal height to the analysis to determine its contribution to explaining migrants' elevated preterm patterns (*Model 2*). As expected, maternal height explains part of the observed inequality. Because it is lowest for Turkish women, the reduction of their preterm risk is largest for them, although the significance level changes only slightly (p = 0.006 to p = 0.021).

Table 1

Logistic regression models predicting the probability of preterm delivery

Dependent variable: Preterm birth	M1		M2	
	Exp(b)	b_i	Exp(b)	b_i
Mother's migration background (ref. none)				
Turkish 1st generation	3.13**	*1.013*	2.69*	*0.872*
Ethnic German immigrants 1st generation	2.14*	*0.677*	1.99*	*0.605*
Migrants 1st generation	1.33	*0.254*	1.25	*0.202*
Migrants 2nd generation	1.14	*0.118*	1.06	*0.052*
Maternal age (ref. 22–34 years)				
15–21 years	0.55	*–0.531*	0.52	*–0.571*
≥ 35 years	0.87	*–0.117*	0.88	*–0.109*
Poor maternal health before pregnancy (ref. (very) good)	0.92	*–0.065*	0.92	*–0.067*
Parity (ref. first child)				
2nd child	1.65*	*0.445*	1.63~	*0.434*
>2 children	1.15	*0.130*	1.15	*0.122*
Maternal height			0.97	*–0.021*
N	1,175		1,175	
Adjusted R^2	0.044		0.047	

Note: M1–M2 controlling for child's sex, year of childbirth, region.
Significance level: ~p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001; Source: SOEP 2003–2011.

Having shown significant ethnic disparities in preterm delivery that are not (fully) attributable to maternal constitution, we estimate five further models (*Table 2*) to analyze whether economic, social and cultural capital as well as heath lifestyles substantially explain ethnic disparities in preterm birth. *Model 3* thus includes information on mothers' general resource endowment, while, at the same time, controlling for effects of residential segregation, and self-reported language competencies. Adding these central independent variables results in a decreased preterm risk, with the largest risk reduction for Turkish women (*Model 2*: *OR* = 2.69 vs. *Model 3*: *OR* = 2.18), followed by the ethnic German group (OR = 1.99 vs. OR = 1.82) and other first-generation migrants (*OR* = 1.25 vs. *OR* = 1.22). Indeed, these migration groups are no longer significantly disadvantaged, although their risk estimate is still higher compared to that of native women. Similarly, there is a slight delivery "advantage" of the other second-generation as opposed to native women (*OR* = 1.06 vs. *OR* = 0.95). With respect to resource effects, all variables introduced in Model 3 (except partner status and language competence)[6] contribute to the reduction of the ethnic preterm gradient.

Further, we expect mediating effects of maternal health lifestyle. We find that smoking during pregnancy (*OR* = 2.19, $p < 0.05$) but not inadequate prenatal care utilization (*OR* = 1.55) to be related significantly to short gestational length (*Model 4*). Controlling for behavioral risk factors, the Turks' and ethnic Germans' preterm risk coefficient remains basically unchanged. This result has to be interpreted with caution, given the very small number of migrant cases and a high level of missing information in the behavioral variables. Somewhat surprisingly, we find an unexpected regression estimate for the distance to the family doctor. Having the doctor at a reachable distance (less than 20 min. by foot) results in an almost 100% increase in preterm risk ($p < 0.05$).

In sum, mothers' characteristics (constitution, resources, health lifestyle, and various confounding factors) account for about 10% of the variance in birth outcome. Nevertheless, the remaining effects of maternal migration history on preterm delivery are yet to be explained.

6 Adjustment for maternal language ability does not provide further explanation to migrants' higher preterm risk, though language proficiency is statistically associated with preterm birth in a univariate analysis (see Table A1, appendix). Not altering any of the coefficients in *Model 3*, and due to space limitations with respect to number of regression models, we simultaneously controlled for a mother's language skills and the resource variables.

Table 2

Logistic regression models predicting the probability of preterm delivery

Dependent variable: Preterm birth	M3 Exp(b)	b_i	M4 Exp(b)	b_i	M5 Exp(b)	b_i	M6 Exp(b)	b_i	M7 Exp(b)	b_i
Mother's migration background (ref. none)										
Turkish 1st generation	2.18	*0.653*	2.20	*0.597*	2.17	*0.575*	2.11	*0.540*	1.03	*0.025*
Ethnic German immigrants 1st generation	1.82	*0.503*	1.86	*0.472*	1.85	*0.456*	1.53	*0.307*	0.70	*–0.249*
Migrants 1st generation	1.22	*0.171*	1.23	*0.160*	1.17	*0.121*	0.92	*–0.056*	0.47	*–0.531*
Migrants 2nd generation	0.95	*–0.038*	0.89	*–0.088*	0.90	*–0.075*	0.73	*–0.228*	0.39	*–0.664*
Maternal age (ref. 22–34 years)										
15–21 years	0.30*	*–1.003*	0.30*	*–0.909*	0.22*	*–1.098*	*–1.077*	0.22*	0.22*	*–1.064*
≥ 35 years	0.92	*–0.061*	0.91	*–0.069*	0.89	*–0.086*	0.91	*–0.061*	0.90	*–0.072*
Poor maternal health before pregnancy (ref. (very) good)	0.86	*–0.125*	0.81	*–0.155*	0.75	*–0.208*	0.75	*–0.204*	0.72	*–0.228*
Parity (ref. first child)										
2nd child	1.63~	*0.409*	1.72*	*0.414*	1.71~	*0.396*	1.82*	*0.435*	1.83*	*0.432*
> 2 children	0.92	*–0.067*	0.95	*–0.038*	0.80	*–0.162*	0.75	*–0.202*	0.77	*–0.182*
Maternal height	0.98	*–0.014*	0.98	*–0.013*	0.98	*–0.014*	0.98	*–0.011*	0.98	*–0.011*
Household net equivalence income: < 60% of median (ref. ≥ 60%)	1.90*	*0.538*	1.70~	*0.405*	1.61~	*0.353*	1.57	*0.328*	1.51	*0.299*
Residential segregation (ref. no)	1.72~	*0.457*	1.58	*0.347*	1.53	*0.317*	1.56	*0.324*	1.50	*0.290*
Partnered mother (ref. lone)	0.63	*–0.378*	0.66	*–0.307*	0.86	*–0.111*	0.79	*–0.164*	0.95	*–0.035*
Mother with low education (ref. medium/high degree)	1.40	*0.282*	1.16	*0.116*	1.17	*0.115*	1.01	*0.012*	1.05	*0.040*
Mother with poor German language skills (ref. (very) good)	0.94	*–0.044*	1.01	*0.012*	1.15	*0.108*	1.19	*0.128*	1.21	*0.138*

Smoking during pregnancy (ref. no)			2.19*	*0.597*	2.25*	*0.601*	2.20~	*0.573*	2.22~	*0.571*
Inadequate prenatal care utilization (ref. adequate)			1.55	*0.336*	1.49	*0.296*	1.49	*0.290*	1.48	*0.280*
Family doctor is nearby (ref. > 20 min. by foot)			2.00*	*0.528*	2.01*	*0.518*	2.08*	*0.530*	2.05*	*0.517*
Nonplanned Pregnancy (ref. planned)					1.99**	*0.508*	2.01**	*0.507*	2.03**	*0.508*
Partner with low education (ref. medium/high degree)							1.91*	*0.471*	1.87*	*0.451*
Partner with poor German language skills (ref. (very) good)							0.82	*–0.317*	0.74	*–0.214*
Partner's migration background (ref. none)										
Direct									2.45*	*0.643*
Indirect									1.46	*0.273*
N	1,175		1,175		1,175		1,175		1,175	
Adjusted R^2	0.066		0.100		0.111		0.120		0.126	

Note: M3–M7 controlling for child's sex, year of childbirth, region; M4–M7 controlling for health insurance.
Significance level: ~$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; *Source:* SOEP 2001–2011.

As *Model 5* shows, after accounting for nonplanned pregnancy – itself significantly associated with preterm birth – neither the risk estimate of migrant women nor that of the smoking indicator change significantly, indicating that nonplanned pregnancy is probably not mediating migrants' adverse birth outcome. As discussed in theory, we assume that mothers' sociocultural integration in the host country explains the observed ethnic inequalities in reproductive health. Hence, we now introduce information on a mother's partner to the regression analysis (*Model 6*). The origin effects further slightly decrease after controlling for indicators of partners' institutionalized cultural capital (OR = 1.91, $p < 0.05$), and proficiency in the language of the destination country. As for maternal language skills before, a partner's language ability is not significantly associated with preterm birth. Our hypothesis on language barriers hampering access to health services is thus not met empirically.

Finally, *Model 7* controls for partners' migration background. As expected, mothers mating first-generation partners (instead of natives) are two and a half times more likely to give birth prematurely. This supports the view that a lack of social integration, as indicated by cohabitation with a foreign-born partner, adversely affects gestational age. In sum, across all models presented, the migrants' risk coefficients steadily decline for the two largest (Turkish and ethnic German immigrants) as well as the other migrant groups, and finally show lower risk estimates compared to native women – even when the risk coefficients for all ethnic groups are nonsignificant in the last model.

5. Summary and Discussion

This article explored the *extent* and *nature* of ethnic inequalities in reproductive health in Germany, with preterm birth as the outcome of interest. Empirically, the nationally representative SOEP data (Waves 2003 to 2011) reveal that women with a migration background experience a higher risk of preterm birth compared to their nonmigrant counterparts. More specifically, we observe the lowest chances for a healthy start in life for offspring of first-generation Turkish women – what has been reported before (see Robert Koch-Institut, 2008) on the basis of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS, 2003–2006) – followed by first-generation ethnic German newborns, and other migrants.

Having found ethnic disparities in preterm delivery, we assumed that maternal constitution (height), a mother's (and partner's) general resource endowment (income, education, language), and behavioral factors (smoking during pregnancy, inadequate utilization of prenatal care) would play a decisive role in generating these inequalities. Indeed, accounting for maternal height resulted in decreased preterm risk for all migrant groups under study, though the reduction was most significant for the, on average, smallest group in the sample – the Turkish women. Overall, the contribution of maternal height is rather limited in contrast to the resource impact. As expected, we find a substantial reduction of the ethnic inequalities in preterm delivery when adjusting for a mother's economic, educational, and language resources, which widely supports the primary relevance of social reproduction mechanisms. The reduction in the preterm odds ratio was highest for the Turkish group, but less pronounced for ethnic Germans, which is plausible, given the, on average, greater socioeconomic disadvantages on the Turkish side. Unexpectedly, though, above socioeconomic status, maternal language proficiency did not further reduce migrants' higher preterm risk.

Theoretically, we further argued that behavioral factors might help to understand ethnic health inequalities – though they provide little further insight into the mechanisms underlying the remaining ethnic effects. Nevertheless, this conclusion could be misleading, given the high missing values in the variables on smoking and – the self-constructed measure – prenatal care utilization. Despite this limitation, the results support that smoking and, as a trend, also underutilization of prenatal care are influential factors for the emergence of preterm delivery. Also accounting for important partner characteristics such as education, and proficiency in the host-country's language provides (except for ethnic German women) no further explanation in Turkish women's remaining preterm risk. Last not least, not until accounting for partners' migration background first-generation Turkish or ethnic German women's elevated preterm risks vanishes. However, this effect remains speculative, because health-relevant partner characteristics such as education and language are already controlled for. Similarly, despite the obvious relevance of general resources, which processes these resources refer to exactly remains unclear. What does identifying segregation as influential tell us theoretically about living in ethnically segregated neighborhoods? Does it refer to sociocultural processes or rather to factors related to environment, such as higher levels of air pollution?

Due to a lack of (representative) quantitative data on maternal and child health that often contain unsatisfactory information on ethnic (and social) origin (Glaesmer et al., 2011, 541; Reeske et al., 2011b, 21–22; David et al., 2006, 278), it is difficult to make generalizations on the extent and nature of ethnic health inequalities in Germany.

In light of small case numbers, further research is necessary to back up the present findings. It would seem worthwhile to distinguish first from second and third generations, given changing patterns of partner choice (and thereby better sociocultural integration) among better educated Turkish offspring (Huschek et al., 2012). Aside from this, our contribution provides – though a causal analysis is not applied – first explanatory insights into a set of multifactorial preterm risk factors ranging from "mere" maternal constitution to more general resources. Moreover, it seems helpful to desist from viewing mothers as isolated entities, because their partners also play more than a minor role in the emergence of preterm delivery.

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Appendix

Table A1

Sample characteristics (%, mean) and univariate and multivariate logistic regression results (odds ratios, bStdY, dependent variable: Preterm birth)

	Descriptive % (mean)	Univariat Exp(b)	b_i	Multivariat[1] Exp(b)	b_i
Mother's migration background					
None (ref.)	77.53	–	–	–	–
Turkish 1st generation	3.40	3.56**	*1.211*	1.03	*0.025*
Ethnic German immigrants 1st generation	6.38	2.45**	*0.855*	0.70	*–0.249*
Migrants 1st generation	4.94	1.46	*0.364*	0.47	*–0.531*
Migrants 2nd generation	7.74	1.17	*0.151*	0.39	*–0.664*
Maternal age					
15–21 years	4.60	0.67	*–0.390*	0.22*	*–1.064*
22–34 years (ref.)	76.26	–	–	–	–
≥ 35 years	19.15	0.77	*–0.249*	0.90	*–0.072*
Maternal health before pregnancy					
(Very) Good (ref.)	64.85	–	–	–	–
Poor	25.53	0.89	*–0.102*	0.72	*–0.228*
Missing information	9.62	2.52***	*0.891*	1.25	*0.161*
Parity					
First child (ref.)	56.09	–	–	–	–
2nd child	27.66	1.31	*0.269*	1.83*	*0.432*
>2 children	16.26	1.36	*0.307*	0.77	*–0.182*

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Table A1 (continued)

	Descriptive % (mean)	Univariat Exp(b)	b_i	Multivariat[1] Exp(b)	b_i
Child's sex					
Boy (ref.)	50.47	–	–	–	–
Girl	49.53	0.91	*–0.092*	0.86	*–0.104*
Year of birth (child)	(2005)	0.91*	*–0.091*	0.91~	*–0.064*
Region					
East	25.45	0.64~	*–0.430*	0.93	*–0.047*
West (ref.)	74.55	–	–	–	–
Maternal height (cm)	(167.29)	0.96*	*–0.032*	0.98	*–0.011*
Household net equivalence income					
< 60% of median	15.15	1.98**	*0.666*	1.51	*0.299*
≥ 60% of median (ref.)	84.85	–	–	–	–
Residential segregation					
Yes	64.77	2.19**	*0.744*	1.50	*0.290*
No (ref.)	25.11	–	–	–	–
Missing information	10.13	1.66	*0.483*	0.81	*–0.147*
Partnered mother					
Yes	95.49	0.61	*–0.489*	0.95	*–0.035*
Lone (ref.)	4.51	–	–	–	–
Mother's education					
Low degree	20.00	1.89**	*0.618*	1.05	*0.040*
Medium / high degree (ref.)	80.00	–	–	–	–
Mother's German language skills					
(Very) Good (ref.)	90.21	–	–	–	–
Poor	4.09	2.47*	*0.890*	1.21	*0.138*
Missing information	5.70	0.92	*–0.078*	0.51	*–0.477*

Smoking during pregnancy					
No (ref.)	27.15	–	–	–	–
Yes	6.04	2.63**	*0.946*	2.22~	*0.571*
Missing information	66.81	1.33	*0.281*	0.93	*–0.044*
Prenatal care utilization					
Adequate (ref.)	49.87	–	–	–	–
Inadequate	10.47	1.70	*0.491*	1.48	*0.280*
Missing information	39.66	2.42***	*0.816*	2.40**	*0.629*
Health insurance					
Private	10.64	0.67	*–0.397*	0.67	*–0.098*
Public (ref.)	89.36	–	–	–	–
Distance to family doctor					
Family doctor is nearby	68.77	2.22**	*0.751*	2.05*	*0.517*
>20 min. by foot (ref.)	27.40	–	–	–	–
Missing information	3.83	2.59~	*0.898*	3.69~	*0.935*
Nonplanned pregnancy					
Yes	26.38	1.99**	*0.662*	2.03**	*0.508*
No (ref.)	73.62	–	–	–	–
Partner's education					
Low degree	23.91	2.22***	*0.760*	1.87*	*0.451*
Medium/high degree (ref.)	57.53	–	–	–	–
Missing information	18.55	1.34	*0.282*	0.76	*–0.196*
Partner's German language skills					
(Very) Good (ref.)	85.87	–	–	–	–
Poor	2.81	2.13	*0.750*	0.74	*–0.214*
Missing information	11.32	1.41	*0.339*	2.69~	*0.709*

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Table A1 (continued)

	Descriptive % (mean)	Univariat Exp(b)	b_i	Multivariat[1] Exp(b)	b_i
Partner's migration background					
None (ref.)	66.81	–	–	–	–
Direct	12.77	2.86***	*0.994*	2.45*	*0.643*
Indirect	6.55	1.32	*0.268*	1.46	*0.273*
Missing information	13.87	1.33	*0.272*	1.59	*0.334*
N	1,175	1,175		1,175	

Note: [1] Multivariate model adjusted for all univariate determinants (equivalent to M7, Table 2).
Significance level: ~$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Source: SOEP 2003–2011.