Family Status and Low Birth Weight Risk: Trends and Changes over Time (CZECH REPUBLIC)

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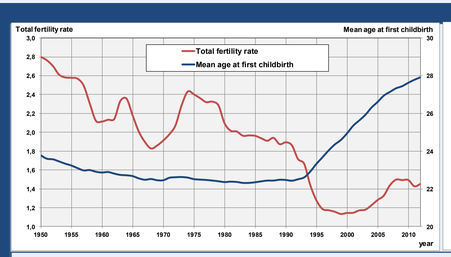
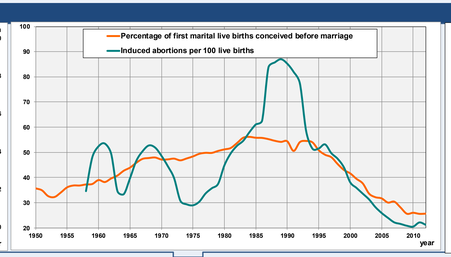
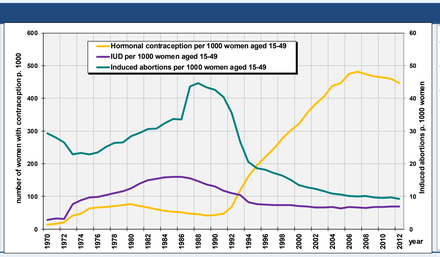
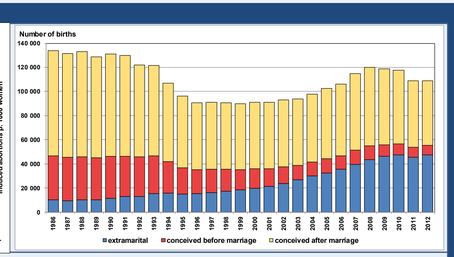
The frequency of children born with low birth weight (less than 2 500 grams) has recently increased in the Czech Republic. In 2012, 8.0 % of live births with low birth weight were reported, compared to only 5.7 % in 1986. Over the same time period, the percentage of extramarital live births increased from 7.4 % to 43.4 %. Unmarried mothers are often considered more likely to deliver a low-birth weight baby. However, the adverse effect on the low birth weight outcome can also vary according to age, education and other factors.



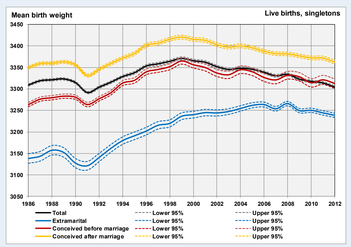




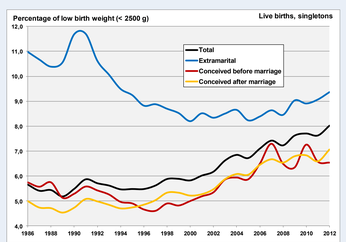


Birth weight

The research focuses on examining changes in low birth weight (<2500 g) over time (1986-2012) across three groups of live births (singletons): children born to unmarried women, those coming from premarital conceptions, and children conceived after marriage. The analysis also allows us to compare the impact of two different socio-economic settings (before and after 1989) on birth weight. The increasing number of unmarried mothers is becoming more heterogeneous today than in the past when they represented a small marginal group. Live births for unmarried mothers are predominantly children born to single women (69.4 % in 1986 and 86.2 % in 2012). These mothers are more likely to be young and less educated, therefore they have more frequently low birth weight and first birth order babies. **The role of increasing use of hormonal contraception resulted in better family planning and consequently in the decrease of induced abortion. Premarital conceptions also becaming less frequent. On the other hand, the mean age at first childbearing increased significantly.**



The mean birth weight had been increasing up to the end of the 1990's; however, it has recently shown a sign of a decline. This phenomenon has been observed across all family categories.



The percentage of low birth weight decreased among children born outside marriage, likely reflecting a diversification of family forms: from lone motherhood towards a more frequent cohabitation.

Furthermore, the decrease in mean birth weight, recently observed, can be attributed to the increase in low birth weight across all family arrangements.

The impact of changing mother's age, mother's education, child birth order, and family status on birth weight controlling for vitality, and sex of a child

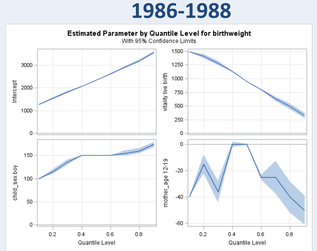
Data and Method:

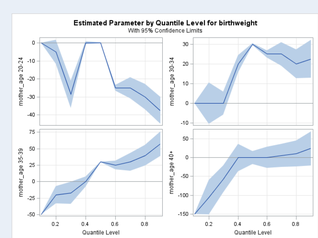
Data: Special dataset of individual anonymous records on births for the period 1986-2012 in the Czech Republic. Data are collected by the Czech Statistical Office. Premarital conceptions are births conceived within 0-7 completed months before marriage.

Method: Quantile regression is used in order to model the effects of covariates on the conditional quantiles of a response variable (available in **SAS 9.4** software). Quantile regression is particularly useful when the rate of change in the conditional quantile, expressed by the regression coefficients, depends on the quantile. Regression quantile model demonstrates that conditional quantile functions provide more complete information about the covariate effects on birth weight.

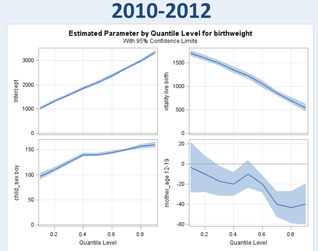
MODEL: Outcome variable: birthweight;
Covariates: *mother's age*: 12-19, 20-24, **25-29,** 30-34, 35-39, 40+; *birth order*: 1, **2**, 3, 4+;
mother's education: basic, **vocational,** secondary, university; *family status*: nonmarital, premarital, **marital**;
vitality: live birth, **stillbirth**; *child sex*: boy, **girl**; *reference categories are in bold and underlined*
Two periods – two models: 1986-1988 and 2010-2012
In each plot, the regression coefficient at a given quantile indicates the effect on birth weight of a unit change in that factor, assuming that the other factors are fixed. The bands represent 95% confidence intervals.
The intercept "may be interpreted as the estimated conditional quantile function of the birth-weight distribution of the reference categories.

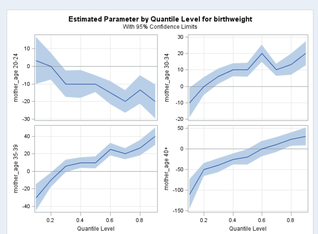
1986-1988





2010-2012

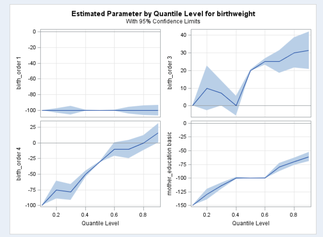




- **Live born** children compared to stillbirth have higher birth weight, more particularly in the lower tail.
- **Boys** weigh more than girls for any chosen quantile; this difference is smaller in the lower quantiles of the distribution.
- **Young mothers** (12-19) deliver lower weight children compared to 25-29 old mothers; the difference is higher in the upper tail.

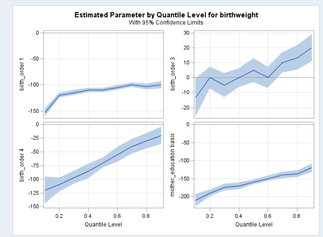
- Mothers aged 20-24 years have also slightly lower birth weight children compared to 25-29 old mothers, especially in the higher quantiles of the distribution.
- **Older mothers** (30+) have children with lower birthweight in the lower tail but have babies with higher birthweight in the upper tail.

1986-1988

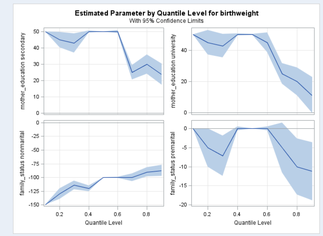


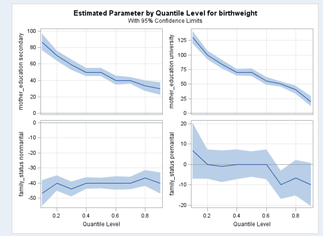
First birth order children (compared to the 2nd birth order) experienced low birthweight for any quantile in the 1986-1988s while in the 2010-2012s the risk of low birthweight was particularly pronounced in the lower quantile.

2010-2012



Third birth order children have lower birthweight in the lower tail but higher birthweight in the upper tail. This birthweight profile is similar for fourth order children but at lower birthweight levels.





Children born to mothers with **basic education** consistently show lower birthweight. The differences are more apparent in the lower quantiles. The opposite picture is seen among children born to highly educated women.

Nonmarital births always experienced lower birthweight. However, this unfavorable phenomenon has been lessened in 2010-2012 compared to 1986-1988. When the proportion of nonmarital birth was low (1986-1988), the difference was higher in the lower tail. Current prematurally conceived children have lower weight in the upper tail.

Conclusion

Factors impacting lower birthweight have not shown significant changes over time in the direction. Therefore, recent increase in the percentage of low birthweight babies seems to be primarily due to structural effects.

However, the results of logistic regression, (not shown here) **with the low birthweight as the outcome variable when controlling for the same covariates, demonstrated that since 2010 the rise of low birthweight has been also due to intensity change.**

Acknowledgments

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For further information

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