

## PITFALLS IN TESTING WITH LINEAR REGRESSION MODEL BY OLS. THE RECENT CASE STUDY OF RAMADAN FASTING EFFECTS ON SEX-RATIO AT BIRTH, AND BIRTH WEIGHT IN GERMAN MUSLIM BABIES<sup>1</sup>

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### Abstract:

*This is a comment on "Ramadan fasting, sex-ratio at birth, and birth weight: No effects on Muslim infants born in Germany" [Economic Letters, 2015] DOI <http://dx.doi.org/10.1016/j.econlet.2015.10.015>. We show that due to some methodological aspects the main conclusions of the above mentioned paper should be a little bit altered.*

**Key words:** Fasting, birth characteristics, quantitative methods

We read with great interest Jürges (2015) regarding Ramadan fasting effects on births on babies born in Muslim families. This report appears to be an interesting one since it is based on a very large database obtained from administrative sources and correlated to

additional factors (such as day length). As the report's title mention the author found almost no evidence of Ramadan effects on births. Subsequently the author suggests that other previous conclusions based "on smaller samples from other countries must be interpreted with caution". We believe that, in our opinion, a number of issues need to be raised:

- (i) The author fails to give credit to other recent (and very interesting) papers on this and highly related topics topic (Friger et al., 2009 or Herteliu et al., 2015); in the latter about 100 years, 35 429 days, and 24 947 061 births were recorded and analyzed!
- (ii) The "samples" term is a little bit ambiguous since the paper which the author is much referring to, i.e. Almond and Mazumder (2011) is focused on whole populations (and not on a sample – which usually implies a selection process). A population could be smaller but this does not mean that the conclusions based on an exhaustive database could be biased such as it can be in a voluntarily selected sample.
- (iii) Since the Ordinary Least Squares (OLS) method was used, except for t-tests on regression parameters there is no other econometrical test (or vital information such as  $R^2$  regression analysis, models validity-Fisher test etc.) presented. Moreover there is no evidence about data statistical homogeneity, or about the distribution of variables used.
- (iv) Depending on the distribution of assumed as continuous variables (e.g. birth weight) a semi-logarithmic approach could be a better solution instead of the presented-linear one. In the case of a non-linear approach the statistical significance of the covariates and the OLS assumption may have a significant impact on the practical results.
- (v) Since the data used by Jürges (2015) study contains birthdays, there is a lack of precision induced by an over use the dichotomization (13 dummy variables!). Other papers took into consideration the overlap proportion of Ramadan (Almond and Mazumder, 2011) or a countdown approach (Herteliu et al., 2015) or a little bit more sophisticated models, as a cosinor (Friger et al., 2009, Cancho-Candela et al., 2007).

While the scientific sound of the paper and its topic maintain it to a high academic level, a part of the claimed conclusions could be a little bit inaccurate. We warn readers of Economic Letters, authors, reviewers, and editors to take the Jürges (2015) conclusion with caution. In fact, in (Herteliu et al., 2015), noticeable effects dues to Lent and Nativity fast periods in which sexual activity is reprimanded by church leaders were demonstrated. Maybe, Muslim babies (in Germany) are different from Eastern Orthodox ones (in Romania)! A major question seems to be related to baby "production": concerning "Ramadan" per se, Friger et al. (2009) found a systematic increase in the number of births (200 009) during the Ramadan, in the Muslim population, - but not in the Jewish population in Israel. The findings suggest a high sexual activity during the Hajj pilgrimage. Thus, cultural constraints or psychological (Akuchekian *et al.*, 2004) have to be taken during such analyses. Notice, for completeness, that data analyzed by Roehner (2014) revealed a fall of about 15% in suicide numbers during the month of Ramadan (with respect to same-non-Ramadan months). Alas, there is no gender discussion on suicide of Muslims, then. Thus, to take into account baby

deaths is another interesting question. Let our comment be also considered as a set of questions, beside a methodological one, raised by Jürges (2015) contribution.

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