Pitfalls in testing with linear regression model by OLS

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Abstract
This is a comment on Economic Letters
DOI\url{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.
1 Introduction

Physical, physiological and behavioral changes may occur in direct response to environmental fluctuations that have an obvious and immediate adaptive function. Shimura et al. (1981) were first to discuss in a modern way "Geographical and secular changes in the seasonal distribution of births". Since then, much data has been reported by seasonal effects time series. It seems that there is an 11-year cycle in human births (Randall and Moos, 1993).

There is much weight on seasonal effects about birth weights, for example in Germany (Miura and Richter, 1981), Israel (Chodick et al, 2007), in Iran (Khajavi et al., 2016) and in Chile (Torche and Corvalan, 2010). In the same spirit, Jurges (2015) provides interesting results 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 reports 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:

2 Data

Consider the following points

- (i) The samples term is a little bit ambiguous since the paper to which one 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.

- (ii) Jurges 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!

- (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 R2 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 Jurges (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).

3 Conclusions

In any seasonal adjustment filter, some cyclical variation will be misattributed to seasonal factors and vice versa. Wright (2013) argues for using filters that constrain the seasonal factors to be more stable than the default filters and also for using filters that are based on estimation of a state-space model. Finally, some evidence of predictability in revisions to seasonal factors is discussed.

While the scientific sound of Jurges 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, authors, reviewers, and editors to take Jurges (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.
Thus, cultural constraints or psychological (Akuchekian et al., 2004) have to be taken during such analyses, exactly like in daily market index and company level stock return data (Bley and Saad, 2010). 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). 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 recent contributions.

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