Economic Uncertainty in Fertility Research
Evidence from the Czech Republic

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One of the crucial issues of the fertility research in demography is low fertility in most industrialised countries, because it significantly contributes to the process of population ageing which has impact on the social and health systems. Decline in fertility is usually explained in accordance with the demographic transition framework stressing in a simplified way the improvements in infant mortality and increased living standards. Furthermore, the explanation of fertility fall below the replacement level is captured in several formal concepts which rely on socio-economic and demographic factors (i.e. the second demographic transition, the postponement transition, the gender theory, etc). The profound change in fertility is also related to economic development, however unequivocal empirical evidence on relationship between fertility and economic performance has not been obtain yet (Hondroyiannis, 2010). This paper aims to extend our understanding of the demographic and economic determinants behind fertility decline including into the research an issue of economic uncertainty.

Economic uncertainty has been relatively a new determinant of fertility which begins to appear in research. The main reason for that is obvious. Economic uncertainty measurement is difficult and not straightforward. For instance, Hofman and Hohmeyer (2013) examine perceived economic uncertainty employing German Socio-economic Panel data through the announcement of a major German unemployment benefit reform. The analysis outcomes reveal that women with strong economic concern reduced fertility. On the on the hand, Pailé and Solaz (2012), Bernadrdi et al. (2008), Hondroyiannis (2010), Kreyenfeld (2005, 2010), Vignolli et al. (2012) stress the uncertainty coming from labour market. Economic uncertainty is therefore often approximated by variation in unemployment rate and income, employment status and form of employment contract. Besides that, Ranjan (1999) focuses directly on income uncertainty utilizing a two period model of fertility and Sobotka et al. (2011) put economic uncertainty into the context economic recession. However, economic uncertainty is more frequently involved in to the consideration, its specification is not clear. Therefore, the article aims to answer following questions:

1) What is economic uncertainty?
2) Why does economic uncertainty matter in fertility research?
3) How can we measure economic uncertainty?
4) Has economic uncertainty influenced fertility in the Czech Republic?

The basic link between economy and fertility relates to high opportunity cost of childbearing due to an overall improvement in economic activity which is documented since the second half

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of 19th century[2]. In sum, women have almost the same opportunities as men in market employment and in education these days. But these opportunities are limited by having children. Therefore, on average women restrict the number of children what maintain fertility level approximated by the total fertility rate at a low level. Fewer children is not necessarily included in women's decision, they could have an idea of four or five children, but to obtain sufficient human and social capitals to be competitive in the labour market needs time and resources, and human reproduction is time-limited. Therefore, childbearing is postponed to higher ages as a rational response to economic development (Kohler et al. 2002) and to pressure caused by market structure based on equivalence principle (Sivková 2012). The main argument is that responsible parents will decide to have children when they are able to support them. But not only current economic situation, but also future development matters. Therefore, if prospect of potential parents' future is negative, they may postpone childbearing to higher ages, or cut the number of children. The state of affairs is complicated by the fact that people form their judgements not only on macroeconomic development, but also on their proximate surrounding. Furthermore, uncertainty about future economic conditions changes over time. Although people do not necessarily admit that, economic uncertainty may significantly influence their decision about childbearing.

Quantification of economic uncertainty is with no doubts difficult, because it is not directly observable and it is related to individuals' subjective beliefs about economic development. Nevertheless, there are some ways how economic uncertainty could be captured. One possibility, how to measure economic uncertainty, is to use financial market data on the implied volatility of options which shows the potential moves of stock's market. Another possibility is to use the dispersion of annual GDP growth forecast or survey data which ask on opinion about future expectations of economic development or forthcoming state of labour market. Economic uncertainty can be captured also by monitoring media. If economic uncertainty is frequently mentioned in newspapers or in TV, people can feel unsecure about their life-standard in the near future, what consequently may influence their demand for goods and services. Therefore, economic uncertainty can be approximated by number of press articles mentioning "economic uncertainty". Which approach could be the most appropriate to population data is not clear, because empirical evidence on that question is scarce. Considering economic uncertainty measurement, it is necessary to mention the Economic Policy Uncertainty Index, which is utilized primarily in economic analysis. The Economic Policy Uncertainty Index consist of three components: newspaper coverage of policy-related economic uncertainty, the number of federal tax code provisions set to expire in future years, and disagreement among economic forecasters (Baker et al. 2013). However it does not fit to population data, the approach of more dimensions could be interesting for demographic research.

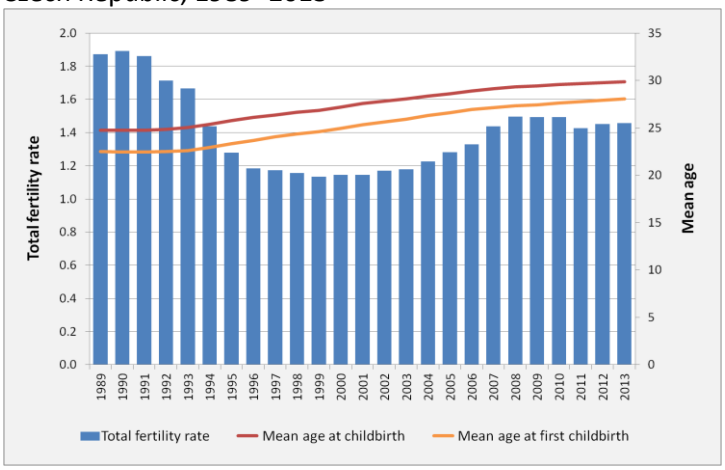
To fulfil the last question, all above mentioned possibilities of economic uncertainty measurement have been considered. The construction of the economic uncertainty index for the Czech data applicable to fertility research is in process currently. Afterwards, time series analysis

[2] World GDP in constant prices grew 19-fold between years 1900 and 2000. It corresponds to annual growth rate 3% (International Monetary Fund, 2000).

to examine the relationship between economic uncertainty and fertility will be applied. The Czech Republic was chosen in purpose, because Czech economy underwent transition from a command to market economy from 1989 and since then, the fall in the total fertility rate is captured in data (Fig.1). The drop in fertility is significant especially for the 90's of the 20th century when the total fertility rate declined from 1.87 children per woman in 1989 to 1.14 children per woman in 2000. Thereafter fertility increased to current 1.46 children in 2013 what was caused predominately by fertility postponement of populous generations born in 70's of the 20th century. Changing demographic behaviour of the Czech population is also apparent from the mean age at childbirth and mean age at first childbirth in the period 1989–2013, which both almost linearly increased to current 29 and 28 years in a given order. Considering economic development, the annual change in GDP (Fig. 2) illustrates how the economy was volatile due to economic transition and how much was affected by the economic crises related to global downturn in the period 2008–2014. Taking into account that, it is reasonable to assume that economic uncertainty could influence people's intentions of having children in the Czech Republic.

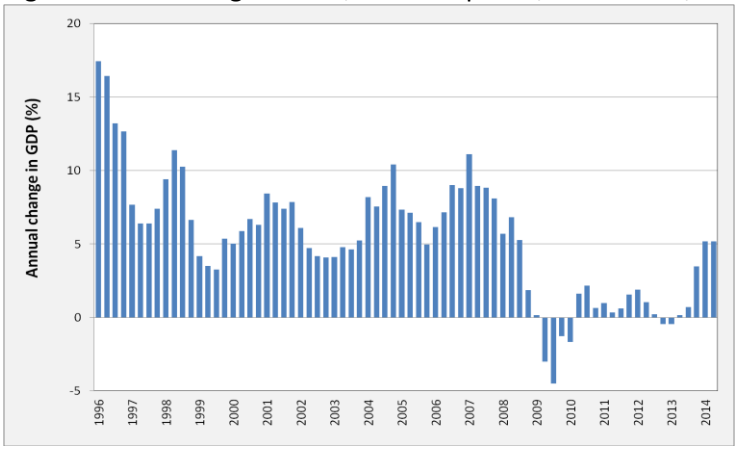
The research contributes not only to the understanding of fertility development in the Czech Republic with respect to economic performance. The issue of the economic uncertainty, which is not clearly captured in fertility research, is examined. Based on preliminary results, it seems that the economic uncertainty index constituted by two components (information in media about economic uncertainty and disagreement among economic forecasts) could be a useful tool of uncertainty approximation for demographic research.

Fig. 1: Total fertility rate, Mean age at childbirth and first childbirth, Czech Republic, 1989–2013



Source: The Czech Statistical Office, 2014

Fig. 2: Annual change in GDP, Czech Republic, 1996–2014, %



Note: Current prices, seasonally adjusted.
Source: The Czech Statistical Office, 2014

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