On the Regional Birth Rate Differences in Uzbekistan

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Abstract

The purpose of this study is to investigate, theoretically and empirically, regional variation in crude birthrates in Uzbekistan at a provincial (*viloyat*) level for the period 1991-2010. Also, it offers maps showing the provincial crude birth rates for this period, and probe the ways in which regional fertility differences have arisen. A panel data analysis is also carried out to explain determinants of birth rates. The findings of this study underline that increased women's participation in the labor force, urbanization rate and poverty have all contributed to the fertility decline in all regions. Moreover, real disposable income was not found to have sizable influence on differences in regional birth rates, which can be explained by preference to traditional socio-cultural norms over opportunity costs of having children. These norms usually encourage fecundity, which can be also confirmed by the average household size that had the biggest impact on reproductive behavior of women living in these regions.

*Key words:*regional fertility differences, determinants of birth rates, panel data analysis

JEL classification: J11, J18, P25.

Introduction

Between 1960 and 1990, fertility rate in Uzbekistan declined from levels of nearly seven births per woman to rates slightly above four births (measured by the total fertility rate). In the period since independence (1991-2011) - the focus of this paper - it is still declining, by 38.4% (from 4.2 to 2.6 children per woman), which shows that the country has experienced a rapid fertility transition during this period. A number of studies even show that Uzbekistan has made steps towards to its replacement level, with its total fertility rate of 2.59 children per woman in 2010 (Maksakova, 2011).

Such a fall in birth rates since the independence can be partially explained by decline in the preference early marriage in pretransition societies, the restraint of sexual activities before marriage and procreation at a young. The erosion of the pro-natalist measures typical of the socialist era, relaxation of the norms prohibiting abortion are also factors frequently cited (Giovanni and Renato, 1995).

This trend, observed in all regions over 1991-2010, can also be attributed to decline in the size of the cohorts reaching the age of most frequent marriage. Additionally, average age at first marriage did not increase meaningfully, and therefore, an absolute contraction in the frequency of marriage among all age groups also might explain this trend.

Though these factors explain well the changes in fertility behavior at republican level, which was experiencing sudden and large shocks during the initial transition period, it does not clarify birth rate differences among regions at later stages. Therefore, we aim to study the causes of interregional variations in birth rates. And based upon this purpose, we also have two objectives, which are to analyze of the reproductive

behavior of women at fertility age at the regional level, and to explain the determinants of birth rates in those regions.

The paper is organized as follows. Section 2 briefly describes regional trends in birth rates in Uzbekistan. Section 3 reviews literature on factors of regional fertility rate differences. Section 4 gives description of data used. Section 5 provides regression results, and Section 6 concludes.

2. Regional trends in birth rates

Due to the historical cultural norms encouraging couples to have many children, and consequently, preferences for large families (1), economic reliance upon agriculture (2), and the worthy child benefits during the Soviet Union (3), TFR was historically high in Uzbekistan (*see Fig.1*). However, shortly after the disintegration, birth rates began to decline sharply: during 1991 – 2003,it decreased by 42.6% (from 34.5 to 19.8 per thousand), and accordingly, TFR also declined by 43.8% (from 4.199 to 2.357) due to a number of socio-economic and demographic factors.
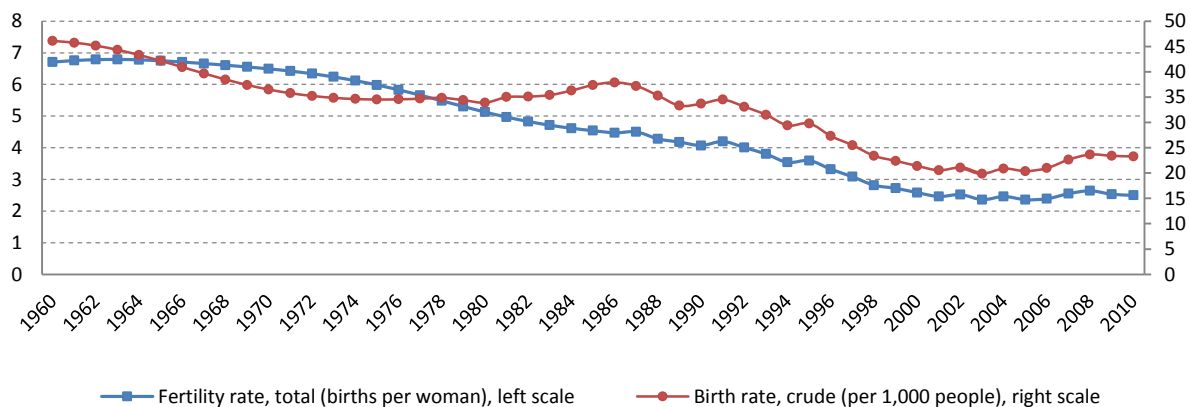

Figure 1. TFR and crude birth rate dynamics in Uzbekistan, 1960-2010
Source: World Bank, 2012.

These factors include, but not limited to: decline in living standards for the majority of the population in the early years of the transition due to a fall in production, employment, unpaid or arrear wages, which reduced total real income of households, occurring simultaneously with increased spending on children (1); as a result of labor migration, associated with the prolonged absence of men (or spouses), the main concern and responsibility for the children lay solely on women (2); activities of the state, public and international organizations for family planning, aimed to creating the necessary conditions for the preservation and/or improvement of reproductive health, regulating intra-birth of children, and increasing the availability of contraceptives and IUDs (3). These factors affected adversely to the reproductive intentions of the population, and crude birth rates declined significantly in all regions (Fig. 2):

Figure 2. Differences in regional crude birth rates (CBR) in Uzbekistan between 1991-2010, in percentage points
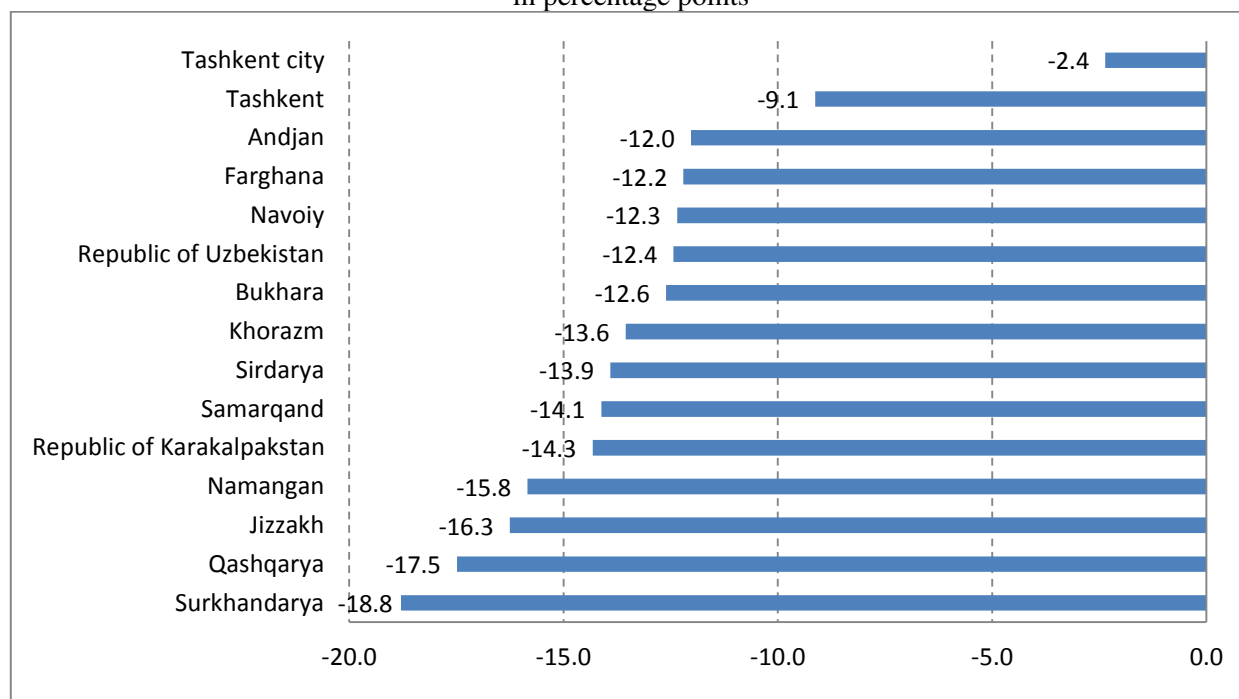
Source: Statistics Committee of the Republic of Uzbekistan

However, there has always been considerable regional variation in all demographic indicators in Uzbekistan: whereas the average value of the Crude Birth Rate (CBR) was equal to 21.8 in 2000, regional CBR ranged from 14.6 in Tashkent city to 26.6 in Qashqadarya region. Nonetheless, these regional differences fell by almost the same pace as did regional CBRs since the early 1990s.

3. Factors of Regional Fertility Differences

In explaining differences in fertility rates among regions one should make distinction between differences in the structure of the population, and differences due to different characteristics of the regions (Duchêne et al., 2004). For example, Hank distinguishes two categories of regional characteristics that affect fertility behavior: economic opportunities and constraints on the one hand, and social structure and culture on the other (Hank, 2001). First, fertility behavior is affected by constraints imposed by the regional living conditions (e.g., the degree of urbanization, the local labor market, the availability of child care, the occupational structure, and regional unemployment, etc.). Second, the social environment affects fertility behavior because of regional differences in attitudes toward the family and children.

Since it is logical to assume that poor economic conditions are discouraging, we expect that high unemployment has a negative impact on fertility. Furthermore, Kravdal (2002) argues that unemployment does not only affect the level of fertility of those currently unemployed but that high local unemployment rates may depress wages generally.

Leibenstein (1957) has proposed that the benefits of having children derive from the utility received from enjoying children as a consumption good (1); the income received from children working in a productive capacity for the family (2); and potential security of receiving support in old age (3). However, these benefits have different effects in urban and rural areas (see Table 1). Besides, the costs incurred in the course of having children are also differentially between these areas: while the cost of housing and feeding a child is marginal in rural areas, it is no longer negligible in urban areas. In addition to direct cost, there are also opportunity costs: if a woman takes off from work for the birth, her income is forgone (though she might receive maternity leave benefits).

Table 1. Benefits received, and costs incurred from having children

Community residence	Type of benefit			Costs	
	Consumption good	Productive asset	Security in old age	Direct (nutrition, clothing, housing, etc.)	Indirect (income loss from women leaving labor force, etc.)
Rural	+	+	+	Low	Low
Urban	+		+	High	High
Source: L. Philips, H. Votey, and D. Maxwell. (1969)*A synthesis of the economic and demographic models of fertility: an econometric test,* The review of economics and statistics, Vol. 51, 3:300.					

Obviously, these patterns of benefits and costs of having children in community residences show that rural population tend to have high birth rates, whereas people living in urban areas prefer lower birth rates.

While economic justification for regional differences in fertility rates are based on the assumption that fertility behavior depends on weighing costs and benefits of having children in different economic environments, cultural explanations emphasize the role of values and norms on having children (Billary and Wilson, 2001). Though the convergence of superficial aspects of culture (e.g., consumption patterns, amusement) is often observed, it does not affect the fundamental values. Therefore, we can expect regional cultural differences within a country to be persistent.

Additionally, it has been suggested that the fall in the CBR may not be related to the transition, but rather to changes in lifestyles and attitudes (Giovanni and Renato, 1995). According to this view, these women have adjusted to the values and behaviors of their Western counterparts who frequently emphasize the importance of work and career, greater individualism and later pregnancies. However, more rapid than average decline in fertility rates among older women and the frequent increases in the share of first births in the total number of births do not support this argument. Instead, insufficient income inadequate housing might be cited as a major barrier to having (another) child.

In case of Uzbekistan, differences in socio-economic development among regions (especially, in rural areas) and the dominance of traditional socio-cultural norms largely influence to women's reproductive

behavior[1]. Particularly, the general attitude expected from girls in underdeveloped rural areas of these regions is their transition from a father-dependent life to a husband dependent life through marriage (Royston and Armstrong, 1989). In these areas, women are dependent on their husbands to a large degree in decision-making (including, in having a child), as they lack social and economic autonomy (Smits and Gündüz-Hosgör, 2003).

Economic autonomy of women through work both elevates their status in society and gives them the right to have more say in the family (Jejeebhoy, 1995; Kravdal, 2002; Basu, 2002).And though the influence of women's participation in the labor force on their reproductive behavior is less strong than that of education, the economic activity type (paid employment) that they are engaged in has a significant role in reproductive preferences (Yüceshahin and Özgür, 2008).

While more paid employment opportunities are available for women in the relatively industrialized regions of Uzbekistan (Navoiy, Qashqadarya, Tashkent and Tashkent city),unpaid family labor (raising agricultural products or stockbreeding owned by the family, besides the childcare) is encouraged in regions with relatively agriculture-based economic structure (Jizzakh, Samarqand, Sirdarya and Surkhandarya).

Besides, since the most of the employed women work in the tertiary sector in Uzbekistan (e.g., government jobs such as education, healthcare, etc.), where they have better career opportunities; contractual arrangements such as paid maternity leave for 18 months provides incentives to combine family and work.

Apart from the factors mentioned above, high Infant Mortality Rate also pushes up the number of births to compensate for the loss (so called '*replacement level*'), regardless of the community residence. Accordingly, we assume that regions where the IMR is above the national average, numbers of births are also high, and vice versa.

Also, we expect per capita income (neglecting its sources) and household size to be positively associated with the level of fertility (Bongaarts, 2001).

For the case of migration, Brockerhoff (1995) identifies the major proximate determinants of fertility decline, which are postponement of marriage, spousal separation and delaying childbearing decision. Moreover, the migrants gradually abandon the ways of behaving characteristics of the culture they migrate from and take over the culture they migrate to (Rose, 1942).

The literature review above let us conclude that a model for explaining regional differences in birth rates should include demographic variables reflecting differences in the structure of the population, socioeconomic variables reflecting differences in opportunities and constraints, and cultural variables that reflect differences in values.

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[1]These norms not only encourage couples to have multiple children, but also keep from using birth control means.

4. Data

As discussed in the previous sections, we use three categories of variables as explanatory ones. They data are obtained from State Statistics Committee of the Republic of Uzbekistan, and the choice of them depended on their availability.

Demographic Variables. Unavailability of TFR, which is not affected by changes in age and structure of the population, for the most of years under study period made us use the Crude Birth Rates (per 1.000 persons) as a proxy. Although this does not affect the descriptive value of the analysis, it clearly limits the scope of the study.

Besides Crude Birth Rates, we employ following important fertility-related variables:

- Net wedding, a difference between the numbers of marriages and divorces;
- Infant Mortality Rate, the number of deaths of children less than a year old per, 1000 live births;
- Net migration, a difference between in- and out-migration;
- Household size, average number of persons living together in a family.

Socioeconomic variables. Although these types of factors typically do not directly affect fertility, they can influence fertility decline through the proximate determinants described earlier. And to reflect this assumption, we use following variables:

- Relatively agriculture-based economic structure: the share of agriculture sector in Gross Regional Product (GRP);
- Level of income: per capita disposable income, measured in the real prices of 2004;
- Female labor force participation rate: the number of women employed as a share of total employment in the economy of a region;
- Poverty rate: due to lack of direct measure for the poverty, we use the percentage of families classified as '*maloobespechennaya semya'* (meaning *families with moderate means*, who consume less than 2.200 kcal a day) through the household surveys done by State Committee of Statistics on annual basis;

Cultural Variables. We assume that a regional cultural difference between regions in Uzbekistan to be persistent over a long period of time and it is very difficult to identify them. Even so, they still have some effect on fertility behavior (e.g., whereas norms have a stronger impact in rural areas as social control, direct social influence plays a more important role in urban areas).Therefore, we assess the impact of cultural influences indirectly by *urbanization rate*, population living in urban areas relative to overall population.

Based on the expected signs of the regression coefficients, we assumed that the birth rates are high in regions where: there are many marriages and a few divorces (1); IMR is high (2); net migration rates are high (3); household size is big (4); there are low percentages of families with moderate means (5); people have relatively higher income (6); urbanization rate is low(7), share of woman employed in total is low (8) and share of agriculture in the GRP is small (9).

Our analysis is based on data for all 14 regions of the Republic of Uzbekistan for the period of 2004 - 10. Appendixes2 and 3 show the summary of the variables used, and their correlation matrix, respectively.

5. Regression Results

In order to estimate the size of effects of sources of variation mentioned above, we employ the standard specification of panel data model.

To investigate the relative importance of variables in regional birth rate variations, 5 different regression analyses were conducted. The correlation matrix of all variables does not indicate any collinearity problem (see appendix 3). These models, with regional Crude Birth Rates as endogenous variable in each case, consist of: Model 1 and 2, which account for demographic factors, Model 3, which includes variables related to cultural variables, and Model 4, which consists of some socio-economic variables (Table 2).

Table 2. Results of the multiple regressions for the dependent variable Crude Birth Rate among regions in Uzbekistan				
	Model 1	Model 2	Model 3	Model 4
Net Wedding	0.218***	0.202***		
	(0.032)	(0.031)		
Net Migration	0.138***	0.148***		
	(0.050)	(0.047)		
Infant mortality rate	0.037	0.021		
	(0.050)	(0.048)		
Household size		1.723***		
		(0.566)		
Female labor force participation rate			-0.132***	
			(0.054)	
Urbanization rate			-0.084***	
			(0.015)	
Share of Agriculture in GRP				-0.120**
				(0.054)
Real Disposable Income				0.003*
				(0.002)
Poverty				-0.106*
				(0.064)
Constant	19.081***	10.622***	33.358***	27.473***
	(0.964)	(2.925)	(2.293)	(1.452)
R-squared	0.440	0.492	0.330	0.337
N	98	98	98	98
*** p<0.1, ** p<0.05, *** p<0.01*				
Notes: Standard errors are given in brackets.				

To a large scale, regression results confirm that almost all parameters have the expected sign and are of a plausible order of magnitude. There is a clear and highly significant positive impact of nuptiality on natality; though infant mortality also has the same impact, it is not supported by its statistical significance. And unexpected sign of migration might be explained by inefficient system of out-migration statistics (Model 1). In

the Model 2, which includes average household size in addition to variables in Model 1, clearly shows that precisely this variable has biggest impact on reproductive behavior of woman.

The cultural variables in the Model 3 confirm our view that compared to the other regions, the regions with relatively larger share of women employed in total, and also with more population living in urban areas relative to total, experience lower CBR.

The impact of socio-economic conditions on CBR was also tested through some variables, namely, per capita disposable income, poverty rate and share of agriculture in GRP (Model 4). And while unpredicted sign of share of agriculture in GRP might be due to exhausted potential of this sector in generating jobs, which lead to higher out-migration of young males in these regions, the small magnitude of disposable income can be explained by preference to traditional socio-cultural norms over opportunity costs of having children.

6. Conclusion and policy recommendations

Since the post-independence period (1991-2010), all of the regions in Uzbekistan witnessed drops in fertility rate; though with large variations from region to region. Therefore, we intended to study the causes of interregional variations in birth rates. And though this article does not contain much that is very new, it clearly shows that not a single, but a mixture of many contributory causes are apparently reducing the number of birth rates in Uzbekistan, which vary significantly at regional levels.

While increased women's participation in the labor force, urbanization rate and out-migration of young males from regions with large share of agriculture in their GRP have all contributed to the fertility decline in all regions of Uzbekistan,
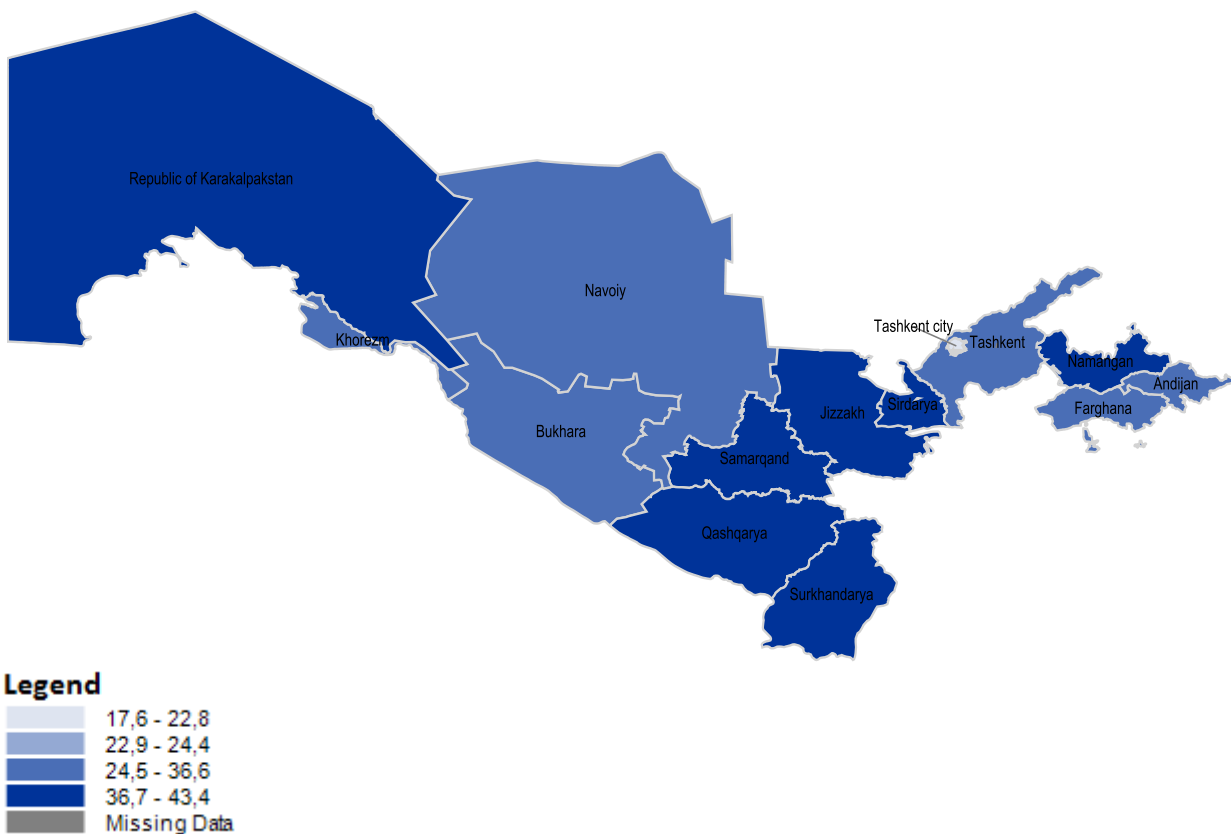
Moreover, real disposable income was not found to have large effect on regional birth rates, which can be explained by preference to traditional socio-cultural norms over opportunity costs of having children. These norms usually encourage fecundity, which can be also confirmed by the average household sizehad the biggest impact on reproductive behavior of women living in these regions.

Furthermore, in our opinion, such a drop in CBR are not the results of shifts toward Western models of marriage or reproductive behavior, as cited frequently on local mass media, but due to negative changes in the economic circumstances of the marriageable population and of the families already formed at first years of independence, and due to growing number of young male out-migration at later periods. In particular, unoptimistic expectations about the future and a greater erosion of public institutions, which are untested in this paper, should have a large influence on the decision to marry and to have a child.
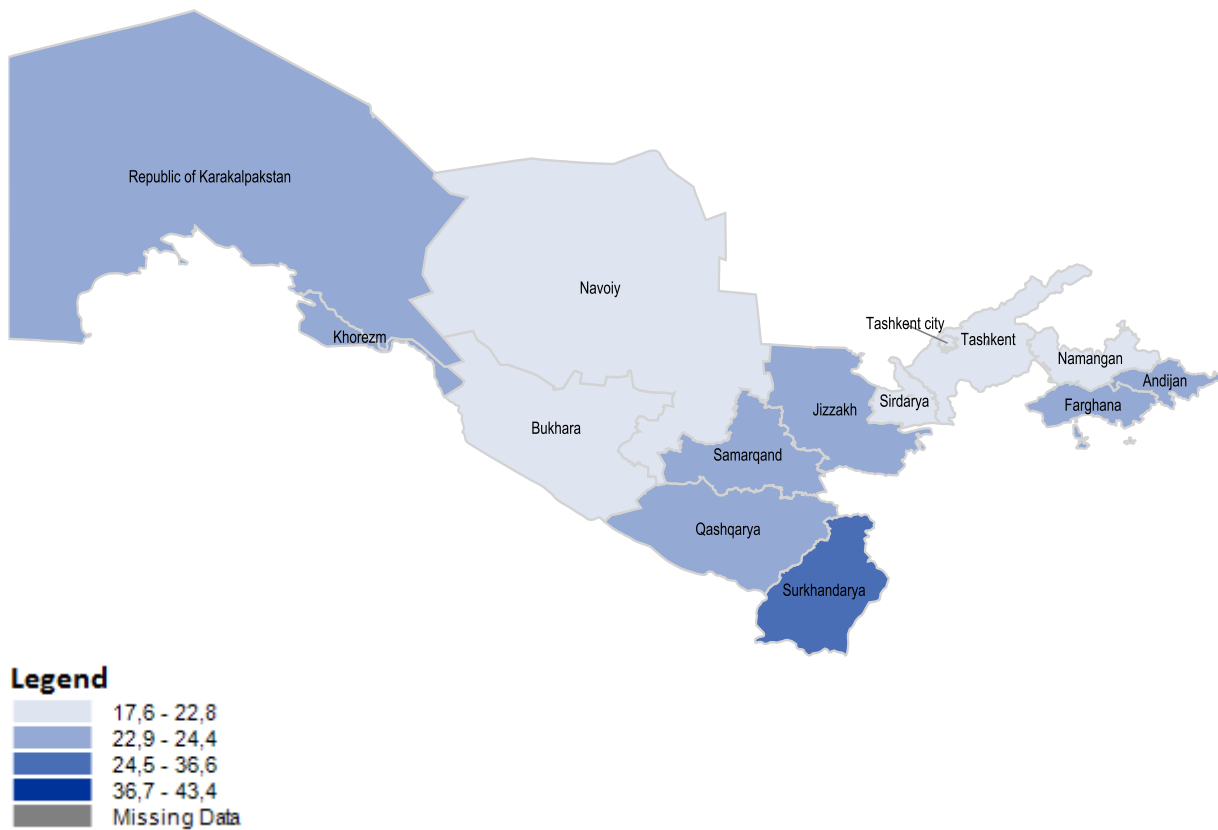
Thus, ongoing process of birth rate decline, though slow, will not improve if the fall in real wages and rise in cost of housing and other goods continue. Moreover, if public policy towards family continues to be

concentrated on narrower issues, such as improvement women's at fertility age or family support measures, the decline in birth rates might continue, with even wider variation among regions.

Regional Crude Birth Rates (number of births per 1.000 people) in Uzbekistan, 1991 and 2010

1991

Legend
- 17,6 - 22,8
- 22,9 - 24,4
- 24,5 - 36,6
- 36,7 - 43,4
- Missing Data

2010

Legend
- 17,6 - 22,8
- 22,9 - 24,4
- 24,5 - 36,6
- 36,7 - 43,4
- Missing Data

Source: Statistics Committee of the Republic of Uzbekistan

Appendix 2

Summary of the variables used

Variable	Measurement	Mean	Standard Deviation	Minimum	Maximum
Crude Birth Rate	number of births per 1.000 persons	22.3	2.1	15.8	26.2
Infant Mortality Rate	number of deaths per 1.000 live births	13.5	3.4	6.1	23.2
Net Wedding	per 1.000 persons	15.3	7.1	3.4	34.4
Net Migration	per 1.000 persons	-4.8	4.5	-21.3	.94
Household size	persons	5.2	0.6	3.5	6.2
Poverty rate	in percentage	4.7	1.4	1.6	9.4
Disposable Income	in constant prices of 2000	343.4	249.7	147.2	1642.7
Female Labor Force Participation rate	in percentage	47.1	2.9	40.9	55.7
Share of Agriculture in GRP	in percentage	29.9	12.9	0	50.9
Density	number of persons per sq. km. of arable land	31.3	92.1	2.3	372.4
Urbanization rate	in percentage	42.2	19.5	19.1	100

Correlation matrix of the variables

	CrudeBirthRate	NetWedding	InfantMortalityRate	HouseholdSize	FLFPR	Urbanization	AgricultureShare	DisposableIncome 2004	Poverty	Density_ArableLand
CrudeBirthRate	1									
NetWedding	0.323^{**}	1								
InfantMortalityRate	-0.342^{***}	-0.109	1							
HouseholdSize	0.636^{***}	0.124	-0.230^{*}	1						
FLFPR	-0.0474	-0.294^{**}	-0.173	0.264^{**}	1					
Urbanization	0.414^{***}	-0.0668	-0.259^{*}	0.617^{***}	0.393^{***}	1				
AgricultureShare	0.299^{**}	-0.171	-0.00526	0.396^{***}	0.261^{**}	0.377^{***}	1			
DisposableIncome2004	-0.526^{***}	0.00699	0.0331	-0.731^{***}	-0.294^{**}	-0.811^{***}	-0.308^{**}	1		
Poverty	0.420^{***}	-0.311^{**}	-0.0307	0.505^{***}	0.228^{*}	0.560^{***}	0.293^{**}	-0.685^{***}	1	
Density_ArableLand	-0.0573	-0.0944	-0.244^{*}	-0.111	-0.0970	-0.136	-0.0576	0.206^{*}	-0.139	1

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

References

Basu A.M. (2002). *Why does education lead to lower fertility? A critical review of some of the possibilities*. World Development 30: 1779–1790

Billari, F., & Wilson, C. (2001). *Convergence towards diversity? Cohort dynamics in the transition to adulthood in contemporary Western Europe*. Working Paper 2001-039, Rostock, Germany: Max Planck Institute for Demographic Research.

Bongaarts J. (2002). *The end of the fertility transition in the developing world. In Completing the Fertility Transition*. United Nations Population Division: New York; 288–307.

Brockerhoff, M. (1995). "Fertility and Family Planning in African Cities: the   Impact of Female Migration." Journal of Biosocial Science **27**: 347-358.

Duchêne, J. et. al. (2004). *Study of low fertility in the regions of the European Union: places, periods and causes*. Working Paper on population and social condition, Luxembourg.

Giovanni, A., Renato, P. (1995). *The transition's population crisis: an econometric investigation of nuptiality, fertility and mortality in severely distressed economies*.
UNICEF ICDC's Innocenti Occasional Paper n.49

Hank, K. (2001). *Regional fertility differences in Western Germany: An overview of the literature and recent descriptive findings*. International Journal of Population Geography, 7, 243–257.

Inagamov Sh. (2012). *Annual Report on 'Prediction of demographic development and the sustainable development of the social sphere in the medium and long perspective in Uzbekistan'*. IFMR: Tashkent.

Jejeebhoy SJ. (1995). *Women's Education, Autonomy and Reproductive Behaviour: Experience from Developing Countries*. Clarendon Press: Oxford.

Kravdal, O. (2002). *The impact of individual and aggregate unemployment on fertility in Norway*. Demographic Research, 10:261–293.

Leibenstein, H. (1957). *Economic Backwardness and Economic Growth.* John Wiley and Sons: New York.

L. Philips, H. Votey, and D. Maxwell. (1969).*A synthesis of the economic and demographic models of fertility: an econometric test,* The review of economics and statistics, Vol. 51, 3: 298-308.

Maksakova L. (2011*) Life quality: socio-demographic aspect*. Innovation and economic technologies,**1:** 1-10.

Rose, A. 1942. *Research Note on the Influence of Immigration on the Birth Rate* American.Journal of Sociology, Vol. 47, 4:614-621.

Royston E, Armstrong S. (1989). *Preventing Maternal Deaths*. World Health Organization: Geneva.

Smits J, Gündüz-Hos¸gör A. (2003). *Linguistic capital: language as a socio-economic resource among Kurdish and Arabic women in Turkey*. Ethnic and Racial Studies 26: 829–853.

Yüces¸ahin MM, Özgür EM. (2006). *Internal displacement of the population in south-eastern Turkey:processes and the spatial pattern*. Turkish Journal of Geographical Sciences. 4:15–35.