The Demographic Dividend and Economic Growth: Empirical Analysis

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Motivation

- *Demographic transition* occurs when a particular country moves from the category of countries with high mortality and fertility rates to the category of countries with low mortality and fertility rates.
- *Demographic dividend* occurs when the proportion of working people in the total population is high because this indicates that more people have the potential to be productive and contribute to growth of the economy.
- The United Nations Population Fund (UNFPA): " *demographic dividend* is the economic growth potential that can result from shifts in a population's age structure, mainly when the share of the working-age population (15 to 64) is larger than the non-working-age share of the population (14 and younger, and 65 and older)".

Motivation

- **1. Labor Supply**
  - The economy is able to take in and productively employ more workers.
  - Women are more likely to take jobs outside the home.

- **2. Savings**
  - Personal savings grow and can serve as a resource for fueling the economy.

- **3. Human Capital**
  - Decreases in fertility rates result in healthier women and fewer economic pressures at home.
  - Parents are able to invest more resources per child, leading to better health and educational outcomes.

Motivation

- Important for policymaking, because neither the least developed countries nor the countries of Africa have yet experienced favorable demographic conditions according to the research by UN population division (UN, 2012).
- Most researchers (Bloom et al (2007), Bloom (2009), De la Croix et al. (2009), Wei and Hao (2010), Yao et al. (2013), Zhang et al. (2015), Cruz and Ahmed (2016), Kumar Das and Kar (2016), Wongboonsin and Phiromswad (2017), have found that increase in working-age population triggers economic growth, whereas increase in the dependency ratio hinders economic expansion.
- This research attempts to contribute to the literature by examining how are the changes in decomposed dependency ratios (youth and old-age dependency ratios) associated with changes in economic growth.

Methodology

The model was implemented by de la Croix et al (2009) and is based on standard growth-accounting framework by Barro (1991) using Lin-Lin equation of the explanatory variable levels.

The model is specified as follows:

- $LnGDP = \beta LnX - \alpha \log(y0) - LnPop - LnDep + LnCap$

Where

- LnGDP is ln of the real GDP,
- X includes the vector of the variables influencing the GDP growth,
- y_0 is the initial value of the GDP, included to capture the convergence effect,
- LnCap is the log of gross capital formation,
- LnPop is the log of total population,
- LnDep is the log of old-age/youth dependency ratio

Methodology

- Demographic structure variables:
  - Youth dependency ratio = population aged 0-15 / Working-age population;
  - Old-age dependency ratio = population aged 65+ / Working-age population;

Data

- Data: Quality of Government Database. Version: “qogstdjan2017”
- The dataset is constructed by the University of Gothenburg: The Quality of Government Institute
- Panel data of 145 countries for the period of 1992-2010

Data and Descriptive statistics

- Descriptive Statistics

Variable	Number of Observations	Mean	Std.Dev	Min	Max
Real GDP growth rate (%)	*2,638*	*2.08*	*5.00*	*-29.81*	*28.44*
Youth dependency ratio	*2,619*	*0.56*	*0.25*	*0.16*	*1.12*
Old-age dependency ratio	*2,619*	*0.11*	*0.07*	*0.01*	*0.36*
Population growth, %	*2,614*	*1.56*	*1.48*	*-6.34*	*15.03*
Capital formation at current PPPs	*2,552*	*20.43*	*9.07*	*0.61*	*88.90*
Landlocked dummy	*2,638*	*0.22*	*0.42*	*0*	*1*
Year	*2,638*	*2000*	*5.32*	*1992*	*2010*
OECD dummy	*2,638*	*0.19*	*0.40*	*0*	*1*

Results – OLS regression

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Dependent variable- LnGDP per capita	Model 1	Model 2
Ln_Youth dependency ratio 0-15	**-0.259*** **	
	(0.02)	
Ln_Old-age dependency ratio 65+		**0.08*** **
		(0.01)
Ln_Initial GDP per capita 1990	0.968***	1.017***
	(0.01)	(0.01)
Ln Capital Stock PPP	0.041**	0.064***
	(0.02)	(0.02)
Ln Population	0.019***	0.023***
	(0.00)	(0.00)
Landlocked	-0.075***	-0.077***
	(0.02)	(0.02)
Year	0.013***	0.016***
	(0.00)	(0.00)
OECD dummy	-0.079***	-0.092***
	(0.02)	(0.02)
Constant	-25.274***	-33.356***
	(2.21)	(2.10)
Observations	1901	1901
R^2	0.963	0.961

IV Regression

- *Reverse causality problem: Instrumental Variables regression*

The causality running from economic growth to dependency ratios can take place if income growth may result in decline in fertility rates, which consequently reduces the youth dependency ratio. For example, rapid economic growth could also lead to higher living standards and better healthcare institutions. This situation, in turn, reduces the mortality rates of the population thereby increasing old-age dependency ratios. Consequently, economic growth can exert impact on overall dependency ratio via channels of *fertility and mortality rates*.

IV Regression

- Chosen instruments:
  - Mortality rate 1992; Fertility rate 1992; Proposed by Bloom (2009), Wei and Hao (2010), Yao et al. (2013), Zhang et al. (2015)

Validity: Correlation between instrument and the instrumented variable

- The correlation between the instruments and the instrumented variables can be explained by the fact that the number of dependent people in a country is highly dependent on the mortality rates and fertility rates of the beginning of the given period.

IV Regression

Validity: Zero correlation between instrument and the dependent variable.

- It is unlikely that base-year fertility and base-year mortality rates are correlated with the economic growth rates in subsequent years, as real GDP growth rates are strongly affected by factors such as investments, education level, government policies and etc.
- Additionally, the validity of instruments was tested by Sargan-Hansen over-identification test.
- First-stage F-test statistics from the first stage regressions are greater than 10 for all models in both estimation equations, which can be ground for rejecting the hypothesis that the applied instruments for the endogenous independent variable are weak (Staiger and Stock, 1997).

Results - IV Regression

Dependent variable – LnGDP per capita	Model 1	Model 2
Ln_Youth dependency ratio 0-15	**-0.656*** **	
	(0.17)	
Ln_Old-age dependency ratio 65+		**0.533*** **
		(0.18)
Ln_Initial GDP per capita 1990	0.852***	0.991***
	(0.07)	(0.06)
Ln Capital Stock PPP	0.061**	0.085***
	(0.03)	(0.03)
Ln Population	-0.053*	-0.018*
	(0.03)	(0.03)
Landlocked	-0.127*	-0.088
	(0.08)	(0.07)
Year	0.009***	0.016***
	(0.00)	(0.00)
OECD dummy	-0.077	-0.404**
	(0.10)	(0.19)
Constant	-14.288**	-32.793***
	(6.98)	(3.53)
Observations	1865	1865
First-stage F value	8633	2213
Sargan-Hansen p-value	0.5681	0.1219

Policy implications

- The empirical analysis shows that the demographic structure exerts a statistically significant effect on the economic growth of a country.
- This prompts that the family planning and healthcare policies in the countries with high mortality and high fertility rates should be refined so that the countries could reach the demographic transition phase and reap the benefits from the demographic dividend.

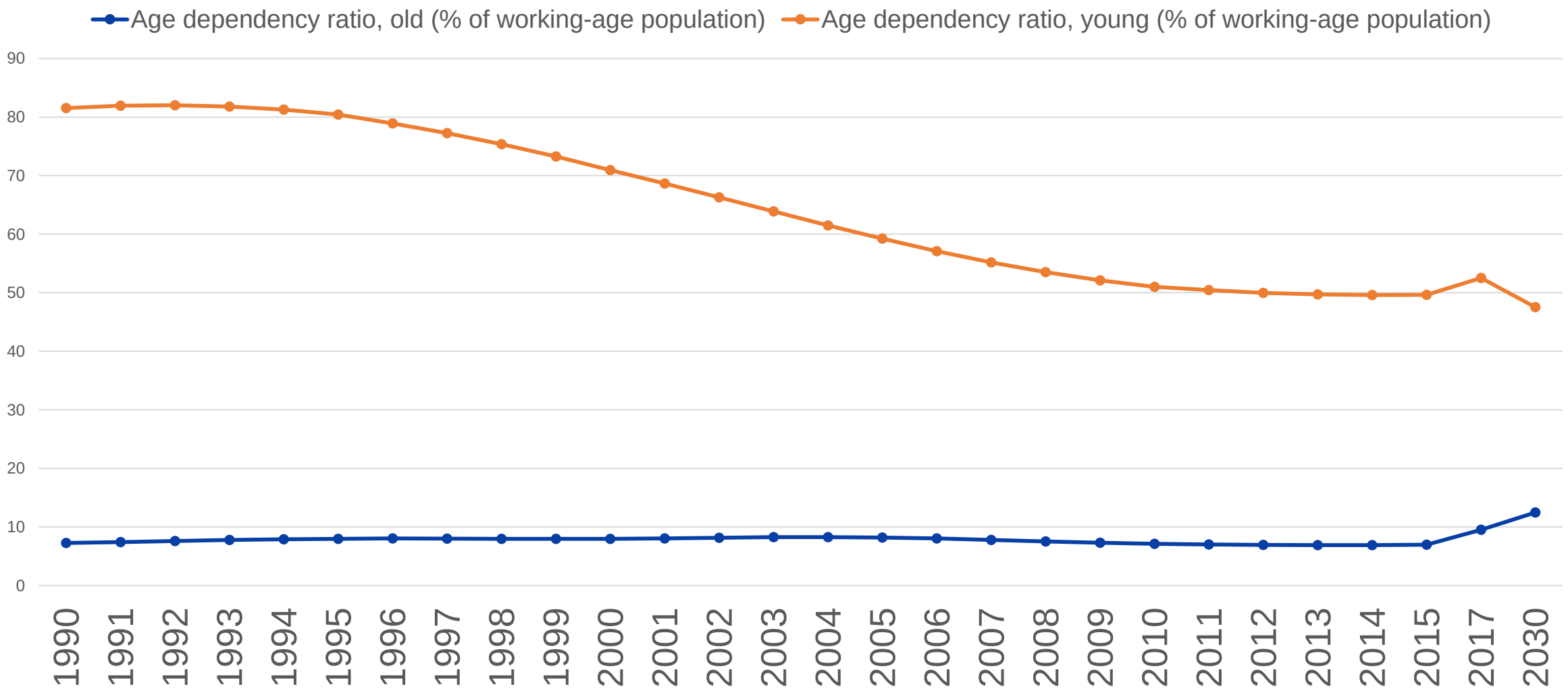

END OF THE PRESENTATION
THANK YOU FOR YOUR ATTENTION

Demographic dividend - Uzbekistan

Population	29,473,614 (July 2016 est.)
Age structure	**0-14 years:** 24.22% (male 3,658,960/female 3,480,659) **15-24 years:** 19.22% (male 2,874,982/female 2,790,128) **25-54 years:** 43.95% (male 6,444,288/female 6,510,741) **55-64 years:** 7.54% (male 1,049,876/female 1,171,369) **65 years and over:** 5.06% (male 637,408/female 855,203) (2016 est.)
Dependency ratios	**total dependency ratio:** 49.7% **youth dependency ratio:** 42.7% **elderly dependency ratio:** 7%
Median age	**total:** 28.1 years **male:** 27.6 years **female:** 28.7 years (2016 est.)
Population growth rate	0.93% (2016 est.)
Birth rate	16.9 births/1,000 population (2016 est.)
Death rate	5.3 deaths/1,000 population (2016 est.)

Data Source: CIA World Factbook: Uzbekistan

Demographic dividend - Uzbekistan



Data Source: World Development Indicators: Uzbekistan