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**The Determinants of the Fertility: The Case of Armenia**

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**BY**

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## Signature Page

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## **Abstract**

The paper aims to find out the determinants of fertility introducing several of them such as education, migration, wage and GDP, which is highly important as it can help to find the areas needed to concentrate to in order to achieve best possible outcomes.

In the light of the inverse J-shaped relationship between GDP per capita and total fertility rates I try to single out the impact of economic growth on the fertility rate of Armenia.

Finally the paper comes up with conclusions, policy recommendations the fulfilment of which will contribute to the elimination of current drawbacks and will promote the fertility increase going hand in hand with the economic growth in Armenia.

## Introduction

Demographic change is one of the acute challenges which Armenia faces nowadays and which can go worse if sustainable steps are not taken now. For a small country like Armenia which is in troubled peace and should be ready for restarting the “non-ended” war any time, the demographic decline is rather hot issue. The negative demographic decline is seen as an internal security threat and is included in the “National Security Strategy” as an issue of high importance: “The Republic of Armenia sees a low national birthrate, disappointing indexes of health, mortality, life expectancy and the quality of life, unregulated and illegal migration, especially among the educational, scientific and cultural workforce, as demographic threats to national security.”<sup>1</sup> According to this specification Armenian internal security is now in danger as fertility decline, high mortality rate as well as vast number of population flow from the country are the existing causes of the negative demographic change. Hence, the question of increasing the fertility rate to insure full reproduction, as well as decreasing the emigration and the brain-drain should be on the agenda. The importance of population issues has become vital. Improving the demographic situation in the country is one of the important ways to improve the economic situation of it.

I consider this is one of the basic problems, from which hinge the other global problems and also the further life of all the mankind.

Fertility rate has been decreased markedly during the past three to four decades especially in the majority of the developing countries and the same trend is continued in almost everywhere. According to Guengant J.P.<sup>2</sup> study more than 40 percent of the countries’ population lives in such countries where the reproductive rate is lower than 2.1. During the

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<sup>1</sup> Republic of Armenia National Security Strategy (2007)  
[http://www.mfa.am/u\\_files/file/doctrine/Doctrineeng.pdf](http://www.mfa.am/u_files/file/doctrine/Doctrineeng.pdf)

<sup>2</sup> Guengant J.P. (2002). *The Proximate Determinants During the Fertility Transition*.  
<http://www.un.org/esa/population/publications/completingfertility/2RevisedGUENGANTpaper.PDF>

20<sup>th</sup> century the world experienced high economic and social development increase and at the same time high fertility decline and population growth rate. Based on the UNDP reports<sup>3</sup>, more than 50 percent of the population now lives in territory with below reproductive rate. In many developing as well as developed countries this low or lowest low fertility as well as population aging became a huge socioeconomic and policy barrier. Economic and social development are mainly the cause of low fertility, such as increase in income, high education, high level of female workforce participation, gender equality, low mortality as well as high life expectancy, birth control methods, etc.<sup>456</sup> Hence the negative relationship between fertility and economic as well as social development became one of the commonly accepted empirical regulatory.

This paper is organized as follows:

In the first chapter begins with the background information and overview of fertility introducing the definition as well as several fertility calculation methods and what each of them show (crude rate birth (CBR), age specific fertility rate (ASFR), average age at maternity (AAM)). The age structure as well as its possible influence on the country's future development is depicted also in this chapter.

The second chapter of the paper is separated into three parts: three determinants of fertility which I consider being the main and most important and I think is worthy to touch upon in my paper.

1. Education and fertility (how education can affect the fertility rate in the long run)

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<sup>3</sup>( 2012) UNDP, Human Developments Report, Human Development Indicators 2012  
<http://hdr.undp.org/en/statistics/>

<sup>4</sup> Bryant, J (2007) *Theories of Fertility Decline and Evidance from development Indicators*. Population and Development Review.

<sup>5</sup> Morgan S.P and Taylor M.G. (2006). *Low Fertility at the Turn of the 21 Century*. Annual Review of Sociology 32

<sup>6</sup> Bongaarts, J. and Walkins S.C. (1999). *Social Interconnections and Contemporary Fertility Transitions*. Populations and Development Review 22

2. Migration and fertility (highlight the micro and macro-models which can influence on the individual's decision to leave the country)
3. Wage and fertility (how and what kind of impact it can have on the fertility timing decision making process)

The third chapter aims to examine the existence of the J-shaped relationship between fertility and GDP proposed by Myrskylä, A. et.al<sup>7</sup> and on empirical study done in 2010 by Luci and Thevenon<sup>8</sup>: how J-shaped model works in the OECD countries and what impact can economic growth in its different stages have on the fertility rate.

Then I come up with my own findings which reveal how education, migration, as well as wage and GDP affect on the fertility rate in Armenia. I used the inverse J-shaped method on the case of Armenia to see if the economic growth can bring to the fertility rebound. Next, I introduce some policy skims, which can bring both to the fertility increase and economic growth, and sum up my work with the conclusion and recommendations for the future studies.

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<sup>7</sup> Myrskylä, A., Kohler, H.P., Billari, F. (2009). *Advances in Development Reverse Fertility Decline*. Populations Studies Center

<sup>8</sup> Luci, A. and Thevenon, O. (2010) *Does Economic Development Drives Fertility Rebound in OECD Countries*. INED - Institut National d'Etudes Démographiques. France



## Research Questions

RQ1. What factors explain the fertility rate in Armenia from 2002-2010?

RQ2. What are the implications of the J-shaped theory in Armenia?

RQ3. Is there relationship between wages and fertility rate?

RQ4. Is there any relationship between education and fertility?

RQ5. Is there any relationship between migration and fertility rate?

## Literature Review

The importance of population issues has become vital. Improving the demographic situation in the country is one of the important ways to improve the economic situation of it.

The relationship between population growth and income was most famously examined and described by Thomas R Malthus<sup>9</sup>. His model has two important parts:

1. Some factor production existence, such as land, which is in fixed supply, hence implying decreasing return to scale for all other factors.
2. Standard of living has positive effect on the population growth rate.

Thus, this model implies that negative feedback does subside and if no changes in the technology are made or availability of land is created, the population size will be self-stabilized. More significantly, in case of the available resource expansion, per capita income will not be changed in the long run. Hence, better technology or larger land will bring to the larger but not richer population. Thomas Malthus is considered to be the originator of the “population problem” and he was the one to express alarm about quick population growth. According to Thomas Malthus<sup>10</sup> the society cannot be reshaped in a new form which would lead to a better life for all. He argued that that could never happen as there would never be enough food to support an idealistic society. His two initial postulates were that men should eat and will continue to reproduce. As Malthus states, “population when unchecked goes on doubling itself every twenty five years, or increases in a geometrical ratio.”

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<sup>9</sup> Malthus, T. (1798 reprinted 1993). *An essay on the principle of population*. London: Johnson. Reprinted, Oxford: Oxford University Press

<sup>10</sup> Ibid.

According to Michal Kremer<sup>11</sup> the change in technology also indeed led to the population growth during the history, than to the increase in per capita. Looking back and based on estimation from 1 million BC to 1990, Kremer states that until very recent times this interrelation seems to be steadfast with the model, but this model has been changed dramatically, and does not go hand in hand with the Malthusian point of view after the industrialized revolution, hence he goes on with the idea that the population growth and changes in technology is steadfast with the endogenous change of the population involvement models. This model from one hand also is the same with the Malthusian conclusion that available technology limits the population growth; hence the population growth is commensurately connected with the rate of the population growth. Thus, theoretical models of the change in technology foreshadow that the higher the population the higher the technological change.

Galor and Weil<sup>12</sup> suggest that the key element which separates Malthusian and post-Malthusian regimes is the technological progress speed-up, and he points out the Industrial Revolution to be the event dividing the post-Malthusian regime from the Modern growth eras. And he finalizes the idea that those 3 regimes together have reshaped the world that we have at present.

Several scholars in recent years use the inverse J-shaped model in their studies to find a relationship between the economic growth and fertility rate fluctuations. In the study of the Luci and Thevenon<sup>13</sup>, they find that the countries with the medium income level depict below replacement level inert fertility, and vice versa the countries with the highest income level

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<sup>11</sup> Kremer, M. (1993). *Population Growth and Technological Change: One Million B.C. to 1990*. Quarterly Journal of Economics, 108(3),

<sup>12</sup> Galor, O and Weil, D. (1999). *From Malthusian Stagnation to Modern Growth*. Population and Economic Growth, Vol. 89, No 2

<sup>13</sup> Luci, A. and Thevenon, O. (2010) *Does Economic Development Drives Fertility Rebound in OECD Countries*. INED - Institut National d'Etudes Démographiques. France

face fertility rebound. Thus, this asserts the J-shaped pattern of fertility through the economic development process and suggests a convex impact of economic growth on the fertility increase.

Besides the relationship between GDP and fertility, there are many other determinants of fertility such as education, wage and migration.

Education: Martín-Gracia<sup>1415</sup> finds that the education of women is the main determinant of the fertility rate fluctuation and sees it as one of the important factor of fertility postponement or decline of it. From the theoretical point of view fertility and educational enrollment first of all can bring to the time and money obligations, also, the woman should reach to the educational goals before getting married and giving birth to a child<sup>1617</sup>. But some research has pointed out the fact that women enrolled in education more postpone that cancel it at all<sup>1819</sup>.

Migration: Both macro and micro-level factors can affect on the decision to migrate from the country. For example the high unemployment rate as well as the low wages can create the push and pull effect: make the people to leave the country (Haug 2000, cited<sup>20</sup>). The microeconomic models of migration are mainly hinged from the individual choice.

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<sup>14</sup> Martín-García, T. (2006). *Women's Education and Fertility in Spain. The Impact of Educational Attainment and of Educational Choice on First, Second and Third Births*. Madrid: Centro de Estudios Avanzados en Ciencias Sociales.

<sup>15</sup> Martín-García, T. (2008). *A Reassessment of the Role of Women's Education in Existing Fertility Research*. *Genus* LXIV (1-2)

<sup>16</sup> Kravdal, O. (2007). *Effects of Current Education on Second and Third-birth Rates among Norwegian Women and Men Born in 1964: Substantive Interpretations and Methodological Issues*. *Demographic Research* 17 (9)

<sup>17</sup> Hoem, B. (2000). *Entry into Motherhood in Sweden: the Influence of Economic Factors on the Rise and Fall in Fertility, 1986-1997*. *Demographic Research* 2 (4)

<sup>18</sup> Kravdal, O. (2007). *Effects of Current Education on Second and Third-birth Rates among Norwegian Women and Men Born in 1964: Substantive Interpretations and Methodological Issues*. *Demographic Research* 17 (9)

<sup>19</sup> Liefbroer, A.C. and Corijn, M. (1999). *Who, What, Where and When? Specifying the Impact of Educational Attainment and Labor Force Participation on Family Formation*. *European Journal of Population* 15

<sup>20</sup> Weber, L. (2010) *Demographic Change and Economic Growth*. Simulations on Growth Model. Springer-Verlag, Berlin

Mainly cost-benefit analysis makes the individual make a rational decision about migration<sup>21</sup>. Migration is also household involved choice<sup>22</sup> based of which emphasizes that it is a household decision to send migrants in a context where migration is for the appeasing the impact of market imperfection on “ejecting” households. The household model of migration counts on different non-economic factors that can influence on migration decision making process (migration networks, information, social capital, insurance).

Wage: The other strong determinant of fertility is considered to be wage. Based on the Heckman and Walker<sup>23</sup> assumption the wife’s wage is in a negative relationship with the expected number of the children, as the time under the woman’s disposal is divided from the market earnings and spent on child-bearing and child-caring.

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<sup>21</sup> Massey, D. et al. (1993). *Theories of International Migration: A Review and Appraisal* Population and Development Review Vol. 19, No 3

<sup>22</sup> Stark, O. and Bloom, D. (1987). *New Economics of Labor Migration*.  
<http://www.ppge.ufrgs.br/GIACOMO/arquivos/eco02268/stark-bloom-1985.pdf>

<sup>23</sup> Heckman, J. and Walker J. (1990). *The Relationship Between Wages and Income and the Timing and Spacing of Births: Evidence from Swedish longitudinal data*. *Econometrica* 58 (6)

## Chapter 1

### 1.1 General Review of Fertility

There are several paths to measure fertility. First of all there is a need to distinguish fertility from fecundity. Fecundity is the biological ability to have children and fertility is an act of giving life to a baby as a fact. Fertility gives a feedback to the number of children itself. If a child dies the probability to have children rises again. There can be different factors for further having children such as the number of children and the age of the mother. The fertility rate can be changed depending on the economic and political conditions (Muller, 2000 cited in Weber, L. 2010<sup>24</sup>).

The crude birth rate shows the variation in the population changes, though the shortcoming of it is that it totally ignores the risk-concept.

$$\text{CBR} = \frac{\text{number of live births in a year}}{\text{mid - year population}} = \frac{B}{P}$$

As births are connected with the total population instead of the women's fertility age only, it is not possible correctly compare the crude birth rate over time because of the disregarding of the age structure<sup>25</sup>.

The number of children changes based on the age of a woman. It is possible to calculate age-specific fertility rate (ASFR) via calculating the number of births of all women giving a special age to the total number of women in the age-cohort<sup>26</sup>:

$$\text{ASFR}_x = f(x) = \frac{\text{number of births in a year to a women in an age group } x \text{ to } x + n}{\text{mid - year population of women in aged group } x \text{ to } x + n}$$

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<sup>24</sup> Weber, L. (2010). *Demographic Change and Economic Growth: Simulations on Growth Model*. Springer-Verlag Berlin

<sup>25</sup> Rowland, D. T. (2003). *Demographic Methods and Concepts*. Oxford: Oxford University Press.

<sup>26</sup> Ibid

The age specific fertility rate can be changed over time, based on the age change of the potential mother. This ratio can also be changed based on the periphery.

The other important calculation of the fertility is measuring the total fertility rate (TFR). “The total fertility rate is derived from the age specific fertility rate and acts as a measurement for a cumulated fertility rate for a fictive age cohort” (Muller, 2000 cited in Weber, L. 2010<sup>27</sup>). The total fertility rate is a theoretic value. Though, the total fertility rate shows the fertility level correct taken in any fixed year. With the TFR it is also possible to measure whether fertility rate is above or below the replacement level<sup>28</sup>. The exact value of the TFR for getting the replacement population level hangs on the probability of having more girl than boy, and a decreased mortality rate of a woman before the end of the fecundity period.

The other very important factor that needs to be taken into account and is vital for indicating the fertility rate is the average age of maternity (AAM). This indicates the exact period of time a woman decides to have a child (Muller, 2000 cited in Weber, L. 2010<sup>29</sup>). The increase in AAM can cause to the postponement and decline in fertility rate.

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<sup>27</sup> Weber, L. (2010). *Demographic Change and Economic Growth: Simulations on Growth Model*.

<sup>28</sup> Rowland, D. T. (2003). *Demographic Methods and Concepts*.

<sup>29</sup> Weber, L. (2010). *Demographic Change and Economic Growth: Simulations on Growth Model*.

## 1.2 Population Age Structure

A critical issue that should not be underestimated is the population age-structure. This is the mean of population distribution across various age groups, which can be changed highly based on the population size fluctuation.

Population age structure is a robust and powerful predictor of economic growth. Demography is not a destiny, it just creates potential. It is known that age structure can be used to estimate the economic growth in the long run. According to Rowland<sup>30</sup> “Population stock changes through the flows of births, deaths and migration”. Societies can be divided into growing, shrinking, and stable.

The change of age structure can affect on country’s future development.

Ernst Billeter (1954, cited<sup>31</sup>) shared the population into 3 groups

1. Pre-productive (0-14 ages)
2. Productive (15-64)
3. Post-productive (65+)

The countries, which faced baby booms and population high growth, and implemented different kind of policies and programs to reduce high fertility rate and in that way tried to have an economic growth, will have an age-structure change: first, the working-age (productive) group gets larger, and then the country can face another challenge on the way of economic growth, which is the post-productive group period. The countries with advanced transition should look ahead and adopt different policies in order to cope with the aging population. For many of the developing countries the demographic transition is on the

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<sup>30</sup> Rowland, D. T. (2003). *Demographic methods and concepts*. Oxford: Oxford University Press.

<sup>31</sup> Weber, L. (2010). *Demographic Change and Economic Growth: Simulations on Growth Model*. Springer-Verlag Berlin



door<sup>32</sup>. This creates kind of a baby boom echo effect. Both during the pre-productive and post-productive groups are highly dependent. This phenomenon is called population momentum. The population momentum characterizes “the potential for growth which is inherent within the populations’ age structure.”<sup>33</sup> Age structure creates a potential to change. Hence, because of the population momentum, the developing countries’ population will decrease by 40 percent (World Bank 1999).

Fertility, education, migration, age-structure can rather effect on the economic growth. The steps to try to increase the life expectancy, decreasing different kind of diseases which can lead to mortality, also the increase and development of the standard of education can bring to the economic growth.

Especially in the developing countries the change of the dynamics of fertility, education and migrations can definitely bring to the economic growth in the short-, medium- and long-run. The policymakers also should bear in mind the importance of the demographic impact on the economic growth, as polices adopted now can have both good and bad impact not only in the short period of time, but also in the long one.

The stabilization of the population growth in the world is one of the important conditions toward the steadfast economic growth.

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<sup>32</sup> Bloom, D. E. et al. (2001). *Economic Growth and Demographic Transition*. National Bureau of Economic Research working paper 8685

<sup>33</sup> Rowland, D. T. (2003). *Demographic methods and concepts*.

## Chapter 2

### *2.1 The Relationship between Education and Fertility*

It is known that life domains such as education and fertility are very important for a woman, as both of them have essential life-long effect on the woman's occupation. Much has been change during the last several decades in both educational and fertility behavior of a woman. First, educational system has been rather changed especially for women: more women now try to spend much more time on their education in order to be able to create a better professional career path. On the other hand, according to Martin-Gracia<sup>34</sup> women's education is seen as one of the main determinants of the fertility, especially first childbearing, timing and postponement. This interplay has been rather important topic of discussion for rather long time. How can the educational enrolment affect on the woman's fertility. Martin-Gracia<sup>35</sup> also adds that the study field can also crucially affect on the fertility behavior. In addition to all of the above mentioned it is also interesting to mention that not only the education of a female can affect on the number of children, but also childbirth can lead to the educational career changes. Both education and fertility are time-taking processes and many-way interconnected with each other.

Based on the many scholars such as Martin-Gracia<sup>36</sup> as well as Hoem et al<sup>37,38</sup> there exist three dimensions in which education influences on the women's fertility timing and postponement:

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<sup>34</sup> Martín-García, T. (2008). *A Reassessment of the Role of Women's Education in Existing Fertility Research*. *Genus* LXIV (1-2)

<sup>35</sup> Martín-García, T. (2006). *Women's Education and Fertility in Spain. The Impact of Educational Attainment and of Educational Choice on First, Second and Third Births*. Madrid: Centro de Estudios Avanzados en Ciencias Sociales.

<sup>36</sup> Ibid

<sup>37</sup> Hoem, J.M., Neyer, G. and Andersson, G. (2006a). *Education and Childlessness: The Relationship Between Educational Field, Educational Level, and Childlessness among Swedish Women born in 1955-59*. *Demographic Research* 14 (15)

- The effect of educational enrollment
- The educational level
- The field of education

Different theories on social-cultural or cultural changes, as well as economic theories have been provided to explain the relationship between the education and fertility.

According to the social-cultural and cultural theory, the changes in these aspects could be the reason of paying more attention to the education especially for the women. As of the second demographic transition based on the social-cultural changes, the ideas such as postponement of fertility, divorces, marriage postponement have become normal way of life. Based on the van de Kaa<sup>39</sup> assumption social-structural and cultural changes, as well as the technological innovation gave rise to the second demographic transition.

Before the second half of the 19th century education was not widespread. Moreover, the high rate of the enrolment of the children in the labor market could be explained by the fact that parents had much control on division of their offspring's time. Through the time from the stagnation to growth, not only the individuals themselves but also with the help of the parents chose the education field and level. The parents chose the level of the children together with the fertility choices (Matthews, Feinstein and Olding-Smee, 1982 cited from<sup>40</sup>). Looking from the social-structural aspect since 1950 the education has been largely changed: the women being enrolled in the education has become widely spread which from its side brought to the enrollment in the labor market. While the women, especially with high education, go on risk for losing a job, because of the childbearing, decide to postpone their fertility, hence increasing the fertility delay.

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<sup>38</sup> Hoem, J.M., Neyer, G. and Andersson, G. (2006b). *Educational attainment and ultimate fertility among Swedish women born in 1955-59*. Demographic Research 14 (16)

<sup>39</sup> van de Kaa, D. (2002). *The Idea of a Second Demographic Transition in Industrialized Countries*. Sixth Welfare Policy. Tokyo

<sup>40</sup>

The cultural changes are more coincided with the value change of the family formation (diminishing the parental control, as well as the church control (secularization)): process of individualization. According to the Lesthaeghe and Surkyn<sup>41</sup>, education is highlighted as a way of expansion post-materialist values. In addition to this the reemergence of the feminism somehow decreased the traditional gender role, especially within the more educated part of the woman, shedding a light to their own career<sup>42</sup>.

The technological changes made the legal abortion widely spread. According to the Liefbroer<sup>43</sup>, abortion differentiated sex from the reproduction downgrading the meaning of marriage. In addition to that, media also helped promoting the new ideas and the behavioral exemplars.

Based on the dimension of the educational enrollment on the childbearing outcomes, from the theoretical point of view fertility and educational enrollment are rather incongruous, as, first, it can bring to the time and money obligations, and, second, the woman should reach to the educational goals before getting married and giving birth to a child<sup>44</sup><sup>45</sup>. But some researchers have found out that women enrolled in education more postpone than cancel it at all<sup>46</sup><sup>47</sup>. It is even important to highlight that some studies show even a positive correlation between the received educational level especially between the second and third childbirth

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<sup>41</sup> Lesthaeghe, R. and Surkyn, J. (1988). *Cultural Dynamics and Economic Theories of Fertility Change*. Population and Development review 14 (1)

<sup>42</sup> Liefbroer, A.C. (1999). *From Youth to Adulthood: Understanding Changing Patterns of Family Formation from a Life Course Perspective*. Population issues: an interdisciplinary focus. New York et al., Kluwer Academic/Plenum Publishers

<sup>43</sup> Ibid

<sup>44</sup> Kravdal, O. (2007). *Effects of Current Education on Second and Third-birth Rates among Norwegian Women and Men Born in 1964: Substantive Interpretations and Methodological Issues*. Demographic Research 17 (9)

<sup>45</sup> Liefbroer, A.C. and M. Corijn (1999). *Who, What, Where and When? Specifying the Impact of Educational Attainment and Labor Force Participation on Family Formation*. European Journal of Population 15

<sup>46</sup> Kravdal, O. (2007). *Effects of Current Education on Second and Third-birth Rates among Norwegian Women and Men Born in 1964: Substantive Interpretations and Methodological Issues*.

<sup>47</sup> Liefbroer, A.C. and M. Corijn (1999). *Who, What, Where and When? Specifying the Impact of Educational Attainment and Labor Force Participation on Family Formation*.

rate<sup>4849</sup>). Thus, one of the reasons for this positive outcome is a short period of time under the high educated woman's disposal: short time-gaps between each of the newborn child. The other reasoning for that can be the fact that high educated women mostly marry to the man alike, who can afford himself have a large family. According to Kravdal<sup>50</sup>, better educated women are more prone to have a strong relationship and which promoted motherhood. He adds that in this kind of families women are more likely to be able to turn to the medical assistance in case of fecundity problems (more affordable for them). And finally he adds that educational enrollment for some of the women who have not received high educational level can be a reason for having fewer children (enrollment in the educational system for receiving higher degree in the later period of time: upgrade in education).

As it is mentioned in different studies, the resources of the parents and the social class can be good indicator in the future family formation as well as the fertility behavior of the offspring: the marriage age, number of children, educational level. Women brought up in large families are more prone to become mothers in early ages and have many children. In contrast to this, the women raised in highly educated families are more apt to postpone the fertility age (especially during the teenage period), based on the high educational and career expectations that they have for their offspring<sup>5152</sup>.

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<sup>48</sup> Kreyenfeld, M. and D. Konietzka (2008). *Education and Fertility in Germany*. Demographic Change in Germany: the Economic and Fiscal Consequences. Berlin, Springer

<sup>49</sup> Kreyenfeld, M. (2002). *Time-squeeze, Partner Effect or Self-selection? An Investigation into the Positive Effect of Women's Education on Second Birth Risks in West Germany*. Demographic Research 7 (2)

<sup>50</sup> Kravdal, O. (2007). *Effects of Current Education on Second and Third-birth Rates among Norwegian Women and Men Born in 1964: Substantive Interpretations and Methodological Issues*.

<sup>51</sup> Barber, J.S. (2000). *Intergenerational Influences on the Entry into Parenthood: Mothers' Preferences for Family and Nonfamily Behavior*. Social Forces 79 (1)

<sup>52</sup> Dahlberg, J. (2011). *Social background and becoming a parent in Sweden*. Stockholm Research Reports in Demography 2011 (5)

## *2.2 The Relationship between Migration and Fertility*

Migration has very important impact on nation. According to Christopher Delbrück and Brend Raffelhuschen (1993, cited<sup>53</sup>) “Migration is a permanent or semi-permanent change of normal residence, for a person, a family or a household.” There are local, inter-regional, and international migrations.

As E. Ravenstein<sup>54</sup> mentioned, that there exist “laws of migration” such as

- The main motivator of the migration is more economic.
- The majority of migrations are short-distance and they shift from rural to urban areas.
- People migrate to more industrialized areas and these areas get larger and larger after some times
- The percentage of urban migrants is much lower than that of rural ones.
- Singles migrate more than women or families

Migrations are much connected and caused by the geographic factors: demand and supply of labor. The low-capital intense countries have low equilibrium market wage. This causes people to migrate from low to high market wage countries. The high migration forces the wages to decrease up to the zero difference. Hence, as Massey et al<sup>55</sup> proposed:

- Wage difference leads to the international migration
- The labor market increases the flow of labor
- The regulation of the labor market can control the migration flows

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<sup>53</sup> Weber, L. (2010) *Demographic Change and Economic Growth*. Simulations on Growth Model. Springer-Verlag, Berlin

<sup>54</sup> Ravenstein, E. G. 1885. *The Laws of Migration*. Journal of the Royal Statistical Society, 48

<sup>55</sup> Massey, D. et al. (1993). *Theories of International Migration*

There exist push and pull macroeconomic migration model (Haug 2000, cited<sup>56</sup>), where push factor rises the migration flow, because of the high unemployment rates and the low wages in the motherland, and the pull factor makes the appealing stronger. Hence, economy is the major causes of the migration and that the economic motives are the main elements of the migration forces. For the globalization and less developed countries development of the international migration of labor can be one of the main pillars. The migration of the skilled and highly educated people is two-sided; it can play both negative and positive effect on less developed countries

1. On one hand the less developed country loses its “brains”, it loses labor and the human capital in the labor market, which are very important for the developing countries, and are the “fundamental bricks”.
2. On the other hand, the highly skilled and educated people rather easily adjust in the new environment and find jobs, and after a while send remittances back home, which is highly important for economic development and growth. International migrant remittances in many countries are high income share also. These remittances are usually direct productive investments in the host countries, they also ease the poverty.

Hence, for the households with no opportunities, migration can be an opportunity to improve the livelihood because of the remittances received from the migrants. The migration can be rather big advantage for the poor family members who stayed back at home.

The microeconomic models of migration are mainly hinged from the individual choice. Mainly cost-benefit analysis makes the individual make a rational decision about migration. Thus, international migrations become the human capital investment theory: people make a decision to migrate to the most productive country suitable for them, still,

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<sup>56</sup> Ibid

there are several factors that they need to take into account before leaving (the language barriers, and the need to study and overcome them, travelling as well as different psychological ones)<sup>57</sup>. The net present value concept is based on the idea that probability of having a job by discounting the future returns should be compared with the discounted costs. If the Net present value is positive, it will make the individual to move. According to the author the microeconomic factors are even stronger than the macro-economic ones. Hence

- Migration is based on the different wages and employment rates
- Lower transaction costs will increase the likelihood to move
- The amount of the differential NVP is somewhat settles the migration rate
- Migration flow can be controlled mainly through wage policies

From the demographers' point of view, migration has rather strong power. In my model I just separated it from any other stock and just set it exogenously. If we just take time  $t = 50$  (time lag  $t=50$ ), and think that during each year 2% of the population will leave the country ( $p=500$ ), it is obvious that this diminutive number can change the whole structure of generation during one generation course. It is important to note, that I take a working class of the generation as immigrants from the home country. It is obvious that in this case we have not only work-force flow, but also high rate of brain-drain from Armenia, the migration will not only affect the TFR but also the high-skilled population decrease. It is also important that the number of births will decrease due to the declining number of potential mothers. The migration also forces the dependency ratio to increase due to the increasing work-flow.

Hence migration is really a strong factor for such a small country like Armenia, and there is a need to create strong policies to keep the inhabitants of Armenia here in the home country and also encourage the emigrants to returns back Armenia. Based on the microeconomic model, the best way to do is to create good working places and conditions in

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<sup>57</sup> Massey, D. et al. (1993). *Theories of International Migration*



Armenia and increase wages as in case of positive NPV in the home-country, few people will leave it.

### *2.3 The Relationship between Wage and Fertility*

Fertility decision is considered to be a “rational economic response to the household demand”. It is a certain type of good consumption under a budget constrain for the utility maximizing couples. Depending on the couples’ income, the number of children is decided. If child’s “price” is high it can result to the decline of fertility<sup>58</sup>. According to Todaro and Smith

- The rise in household income causes to the rise in the demand for children.
- There is a negative correlation between demand and the price of the children
- The rise in other goods prices causes to the rise in the children demand.
- The rise in the preference of other goods causes to the decrease in the demand of children

Based on the Heckman and Walker<sup>59</sup> assumption, the husband’s income is positively correlated with the expected effect on fertility, as the time under his disposal is not used on the childbearing and child-caring. Though, the wage of a wife is negatively correlated with the expected fertility rate, as the time under her command is cut-off from the market earnings and spent on bearing and caring for the children.

Walker’s model arrives at the idea that there is a “period of a shadow price of giving birth”. Based on this model there are 3 terms that needs to be taken into account while consideration for having a child:

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<sup>58</sup> Todaro, M. P., & Smith, S. C. (2006). *Economic development*. Harlow: Pearson Education. Uzawa, H. (1965). Optimum technical change in an aggregative model of economic growth. *International Economic Review* 1

<sup>59</sup> Heckman, J. and Walker, J. (1990) *Estimating Fecundability from Data on Waiting Times to First Conception*. *Journal of the American Statistical Association*

- The opportunity cost spent away from paid work (unpaid time period)
- The net direct expenditures
- Given up return to human capital investment

Walker justifies that later born children of women face flatter wage profiles with larger wages, than the ones who are borne earlier and comes to the conclusion that it is much inexpensive to have children in later ages: flatter earnings profile brings to the comparatively cheaper the later births<sup>60</sup>.

Unlike Walker, Cigno<sup>61</sup> thinks that higher per capita pay lowers the tempo effect and highlights that steeper wage profiles bring to the slower fertility tempo. Thus, he argues that women with high wages are conduced to have children later: for the women with steeper wage profiles having children in later ages is cheaper. Semi-skilled or in manual occupation women have children earlier than the high-skilled because of not high capital loss. Though, Walker's and Cigno's point of views are controversial, we can conclude that enough income is needed before having a child. Thus, developing a career path can be driving force and motive for postponing the fertility to the later ages. As Gustafsson<sup>62</sup> expostulates in his research, the women's career cost is vital factor for postponing the childbearing time. He divides these costs into two parts:

1. direct wage loss while being withdrawn from the labor force
2. human capital investment loss and investment returns

He points out 5 types of parameters which can effect on the career cost outcomes:

1. the sum of the human capital before maternity

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<sup>60</sup> Walker, J. R. (2002). *A Comment on Ali Tasiran's 'Wage and income effects on the timing and spacing of births in Sweden and in the United States'*. Journal of Population Economics Vol. 15, No 4

<sup>61</sup> Cigno, A. (1991). *Economics of the Family*. Oxford: Oxford University Press

<sup>62</sup> Gustafsson, S. (2001). *Optimal age at motherhood. Theoretical and empirical considerations on postponement of maternity in Europe*. Journal of Population Economics 14(2)

2. human capital depreciation rate because of non use
3. to human capital investment return rate
4. human capital investment profile
5. out of work time length

Hence, he comes into conclusion that in case of favorable conditions created for staying at home for a shorter period of time, will result to the decrease in fertility decline, as this will decrease the period of shadow price of giving birth. He also states that the women with steeper earning occupation in case of having children have higher life-time losses, than in case of the ones with flatter earning occupations.

As Easterline<sup>63</sup> indicates, parents usually try to decrease the family size during the bad time (try to have smaller family size: have fewer children) as they try to have twice better standard of living than they had during their own childhood.

As, usually, becoming a mother is perceived highly incompatible with the high paid work; it is postponed to the later ages as this decreases life time income loss. Though, the cost of the child can be neutralized by the high earnings of the husband.

It is known that fertility rate has vastly decreased in most developing as well as developed countries, and is below the replacement level, the reason for that can likely be the active participation in the labor force. There was a sharp fertility decline especially during the 60s and 70s. But stabilization is seen in a fertility rate from 1990 on and even increase up to the population replacement level in most of the OECD countries. The high fertility decline rate Adsera (2004<sup>64</sup>) explains with the high unemployment rate and not stable employment

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<sup>63</sup> Easterlin, R. A. (1987) *Population and Economic Change in Developing Countries*. University of Chicago Press

<sup>64</sup> Adsera, A. (2004). *Changing Fertility Rates in Developed Countries. The Impact of Labor Market Institution*. *Population Economics* 17

contractual bases, which brought to the increase in income and uncertainty to the future, which was actual for both men and women labor force.

Thus, countries with flexible employment settings, where women could be sure about fact that work position is kept while being on the maternity leave, mainly encouraged the women not to postpone the childbearing time.

Last, but not least, is the well prepared and circumstantially created incentive: influential and encouraging on the childbearing decision making process.

The second fact which encouraged mother to have more children and not to postpone is the right policies being implemented after the sharp decline of the fertility rate.

An interesting fact is that the fertility started to increase in most of the countries where women are heavily exposed in labor force (USA, New Zealand, Norway), and unlike that, the countries where women labor force is comparably low, the fertility rate is going on declining reaching up to the unity level<sup>65</sup>.

Hence the author marks the importance of the role of labor market institutional variation and the conformable employment uncertainty altitude. The exit from the labor market during the childbirth period implies from itself temporarily income drop which varies from the age of the mother as well as hangs on several factors.<sup>66</sup>

- the forgone earning losses during the maternity leave period
- only incremental or no growth in wage because of the forgone experience
- risk to become unemployed

Finally he points out that the wage and employment variability are shaped by the labor market, hence the women fertility depends on the way in which the labor markets affect on their spouses' and their own expected income.

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<sup>65</sup> Ibid

<sup>66</sup> Ibid

Hence, a strong and flexible labor market and right policy implementations as well as the detailed created incentives for maternity plan can influence on not only to halt the decline in the fertility rate, but also to have a stable increase in it up to the replacement level, or even more.

## Chapter 3

### *Inverse J-Shaped Model*

Much attention has been put at the relationship between economic growth and fertility rate. The pioneer in this was Thomas Malthus<sup>67</sup> (see p. 9) who argued that there is a negative relationship between fertility increase and economic growth (pro-cyclical evolution of fertility). In the same way, Doepke<sup>68</sup> asserts that there is a negative relationship between economic growth and fertility rate in the long run. He says that the increase in GDP per capita in the long run results to the decrease in the childbirth rate. Many empirical studies were devoted to find the relationship between these two variables.

Myrskylä, Kohler and Billari<sup>69</sup>, in their research first documented an inverse negative relationship between the fertility rate and economic growth from the end of the 20<sup>th</sup> and beginning of the 21<sup>st</sup> centuries. They highlight that though there is evident declining level of fertility rate during the low and medium level of HDI (Human development index), the advanced development can bring to the inverse declining trend during more developed levels of it. Thus the negative fertility-development relationship hence becomes J-shaped<sup>70</sup>: HDI positively associated with the high developed countries. The authors come to the conclusion that the increases in fertility rate hand in hand with the economic and social growth have potential to positively impact on the aging of the population; improve the social and economic shortcomings which was connected with the low childbearing rates. They highlight that, meanwhile the development pushes forward the fertility decline at HDI's low and medium levels, at advanced level it may change the fertility change dramatically. Thus

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<sup>67</sup> Malthus, T. (1798 reprinted 1993). *An essay on the principle of population*. London: Johnson. Reprinted, Oxford: Oxford University Press

<sup>68</sup> Doepke, M. (2003). Accounting for Fertility Decline During the Transition to Growth.

<sup>69</sup> Myrskylä, A., Kohler, H.P., Billari, F. (2009). *Advances in Development Reverse Fertility Decline*. Populations Studies Center

<sup>70</sup> *J-Shaped theory is based on the demographic transition model which predicts ever decreasing fertility rates during the transition period though beyond a certain level of development fertility rates increase again*

the negative relationship between fertility and HDI becomes J-shaped, which means that HDI becomes positively associated with fertility rate in developed countries.

Continuing Mirskilla's<sup>71</sup> idea Luci and Thevenon<sup>72</sup> went further and tried to find a relationship between economic growth (taken mainly GDP per capita) and fertility. They offer the hypothesis of the convex impact of GDP per capita on the fertility mainly. They use the fertility inverse J-shaped pattern through the process of economic development testing the hypothesis empirically on the OECD countries taking a time-lag from 1960 to 2007. The results of the study are as follows: Change qualitatively the economic growth influences on fertility rates. The change took place because of the two-way relationship of the fertility and economic development. On one hand, first of all, fertility variation based population composition affect on the number of women in the labor force. Second, population composition influences on the investments in education level, as well as innovation and technology increase and change which makes productivity. Hence with these means fertility affects on the long term economic growth.

On the other hand, economic growth has a positive impact on fertility rate. Thus, the positive or negative impact of the economic growth on the fertility rate depends on the developed stage of the country. Therefore, the fertility rate can be highly fluctuated affected by the economic development of the country.

So, finding suggests that the change in the impact of economic development on fertility reflects new patterns of fertility behavior, in which childbearing goes together with female labor market participation": existence of the inverse J-shaped pattern between economic growth and fertility rate.

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<sup>71</sup> Myrskylä, A., Kohler, H.P., Billari, F. (2009). *Advances in Development Reverse Fertility Decline*

<sup>72</sup> Luci, A. and Thevenon, O. (2010) *Does Economic Development Drives Fertility Rebound in OECD Countries*. INED - Institut National d'Etudes Démographiques. France

## Chapter 4

### *The Case of Armenia*

Armenia is now facing demographic challenges such as low fertility, aging population, migration. Comparing censuses done in 2001<sup>73</sup> and 2011<sup>74</sup> the de facto population of Armenia decreased for about 130.000 people. If this trend continues, till the end of this century there will be a little bit more than 1.5 million people living in Armenia. As of the results of 2011 preliminary operational indicator of 2011 population census of Armenia the de facto population of Armenia is 2,871,509 and de jure population is 3,285, 767<sup>75</sup>.

According UNFPA report, simple reproduction is insured when the fertility rate is at least 2.1<sup>76</sup>. As of the UN Population Division in Armenia the reproduction indicator in Armenia is about 1.74<sup>77</sup>, which is even higher if we compare with the results of the Armenian National Statistical service indicator, which is only 1.4<sup>78</sup>, while according to the 2010 Demographic and Health Survey the total fertility rate is 1.7<sup>79</sup>. According to the survey done 2009 during the upcoming three years 68 percent of the respondents who have families are not going to have babies, and 16 percent are not sure. The letter's income is enough only for food and communal expenditures<sup>80</sup>.

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<sup>73</sup> (2001)Population Census. National Statistical service of the republic of Armenia.

<http://docs.armstat.am/census/engcontent.php>

<sup>74</sup> (2011)Population Census. National Statistical service of the republic of Armenia.

<http://armstat.am/file/doc/99469163.pdf>

<sup>75</sup> ibid

<sup>76</sup> (2010)UNFPA Armenia. Fertility. <http://www.unfpa.am/en/fertility>

<sup>77</sup> (2010) World Population Prospects. UN Population Division. [http://esa.un.org/unpd/wpp/Sorting-Tables/tab-sorting\\_fertility.htm](http://esa.un.org/unpd/wpp/Sorting-Tables/tab-sorting_fertility.htm)

<sup>78</sup> (2010)UNFPA Armenia. Fertility.

<sup>79</sup> (2010)Armenian Demographic and Health Survey. National Statistical Service of the Republic of Armenia. <http://www.unfpa.am/sites/default/files/PR5.pdf>

<sup>80</sup> (2009) Sample Survey on Fertility Preferences of Armenian Population

<http://www.unfpa.am/en/publications-fertility-survey-2009>



In addition to the above mentioned it is worthy to add also that there is high infertility problem in Armenia<sup>81</sup>. According to the accoucheur and gynecologist E. Hambardzumyan, 18% of the Armenian population from 18 to 40 years old have infertility problem, which is a result of stress (war, earthquake, cold and dark years). As the doctor warns, this can bring to the decline of the population rate up to 50 percent till 2050<sup>82</sup>

The nation is considered aging if the rate of the population of 65 years old or above is 7%. According to the UN 2010 Population Revision this rate in Armenia is about 11.1%<sup>83</sup>. If we take also into consideration the age structure of Armenia and the “baby-boom” during the 1950s, the above mentioned rate is up to increase in the near future as the rate of population from 60 to 65 is 14.6%<sup>84</sup>. It is worthy to mention that according to the UN estimates the rate of the 60 and above aged population will reach to 20 percent till 2024<sup>85</sup>.

As of the UNSFPA data during 2011 the people exiting Armenia exceeded the arrivals by 43.8 thousand people<sup>86</sup>. According to the survey about the labor migrants from Armenia from 2002-2005, 48.3% of the labor migrants have high education (secondary special, incomplete high, higher, post-graduate)<sup>87</sup>. These people are the important assets of Armenia, and this migration can be seen nothing else but brain-drain.

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<sup>81</sup> (2012) Հարցազրույց մանկաբարձ-գինեկոլոգ Էդուարդ Համբարձումյանի հետ:  
<http://www.doctors.am/am/announcements>

<sup>82</sup> ibid

<sup>83</sup> (2010) World Population Prospects. UN Population Revision.  
[http://esa.un.org/unpd/wpp/Sorting-Tables/tab-sorting\\_fertility.htm](http://esa.un.org/unpd/wpp/Sorting-Tables/tab-sorting_fertility.htm)

<sup>84</sup> United Nations (2011). Roadmap for Mainstreaming Aging Armenia. New York and Geneva.  
[http://www.unece.org/fileadmin/DAM/pau/\\_docs/age/2011/Road-Map-Armenia/Chapter-1.pdf](http://www.unece.org/fileadmin/DAM/pau/_docs/age/2011/Road-Map-Armenia/Chapter-1.pdf)

<sup>85</sup> UNFPA Armenia. Population Aging. <http://unfpa.am/en/aging>

<sup>86</sup> UNFPA Armenia. Migration. <http://www.unfpa.am/en/migration>

<sup>87</sup> (2006) Labor Migration from Armenia in 2002-2005: A Sociological Survey of Households.  
<http://www.osce.org/hy/yerevan/18226>

## Methodology

To see if there is a postponement in the average age of maternity first of all I used descriptive, including dynamics of age specific fertility rates, growth decomposition of age specific fertility rates. For that reason I divided 6 age-specific fertility groups during the time-lag from 2002 to 2010 (under 20, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49) (see annex 1).

The next step was the correlation analysis in order to see how different determinants affected on the fertility rate in Armenia. First I tried to correlate the yearly average wage with the fertility, to see if there is a correlation between wage and fertility. For that reason I correlated the average rate of the fertility with the average wage per person during the period from 2003 to 2011 (see annex 2).

To see if there is a correlation between GDP per capita and fertility, I did a correlation analysis with the GDP and the total fertility rate again taking the time-lag from 2003 to 2011 (see annex 3).

Then I decided to run a correlation analysis between the migration and fertility, in order to see how net migration affects on the fertility rate. For this reason I took the net migrants from the country again with the fertility rate, with the above mentioned time-leg again (see annex 4).

Last, but not least, I ran correlation with the education and fertility rate, in order to see if education somehow correlated with the fertility rate, like it is in many developing and developed countries. The time lag was the same as with the previous threes (see annex 5).

As correlation did not reflect causality, I turned to regression model. I did cluster analysis in order to control the age specific cluster I introduced the dummy variables (FE-fixed effects estimation model) (see annex 6). This fixed effect model performs regression in

deviations from the means. This implies an elimination of unobserved specific variables that are constant over time and have an impact of fertility. The fixed effects estimator also captures norms and attitudes over time which does not change much over time, such as gender roles. Then, I came across with the problem: the dummy variables explained all variations in fertility.

In order to get rid of the age specific variations, I was to normalize the age specific data.

$$NAS = (Value - Average) / Standard Deviation$$

Hence I had 50 observations without data and could run the same regression without fixed effects (see annex 7).

Finally I tried to see whether the inverse J-shaped model works in Armenia by introducing the squared GDP per capita (see annex 8) and also ran regression statistics (see annex 9).

Linear regression equation

$$F_i = \beta_0 + \beta_1 GDP_i + \beta_2 EDUC_i + \beta_3 MIG_i + \beta_4 FE_i$$

$$i = 1, 2, \dots, n$$

$\beta$  – is a p-dimensional parameter vector

The test of the J-shaped model in Armenia gives an opportunity to propose correct policy recommendation in order to overcome the hinging on us fertility problem.

## **Limitations**

The major limitations to which I came across during my study were:

- Short time period under discussion
- Not enough data
- Financial crisis

## **Findings**

1. First of all I tried to do a growth decomposition of age specific fertility rate based on the statistics data to see if there accrued any changes in the age specific fertility during the past 8 years, and the major finding that I have is that there is a postponement in fertility for about 2 years, which can be a direct link to a decline of it. The interesting phenomenon that was depicted was the sharp increase in fertility starting from 2002 which reached its peak in 2003 and had a decline from that year on. From 2001 up to 2010 the fertility rate was the highest in 2003. It is interesting to mention that there was about no fertility in the age groups of 35 to 39 as well as there was rather low fertility in the age group of 30 to 34. The large part of the women who had a baby during those 3 years period were the women of 20 to 24 age group as well as from 25 to 29. The fertility in the age group of under-20 years old women was also visibly popular. The second interesting finding while doing age decomposition was the fact that the fertility rebounds were felt from time to time, which was along with the increase in the ASFR (Age Specific Fertility Rate). After experiencing a sharp decline in fertility in all of the age groups during 2 years (mid 2004 up to mid 2005), there was an increase of it again starting from the second part of 2005 the large part of it was consisted of the age groups 25 to 29, 30 to 34 as well as there was an existence of the childbirth in the age group 20 to 24. Even if we compare those 2 time period fertility rebounds (2002-2003 and mid 2006- 2008) it is easily seen that the women age groups who have childbirths has been changed. In the second case there is about no fertility indicated in the under 20 years old women, the rate of which was rather high in the first time period. The fertility rate climbed sharply from 2006 and reached the peak in 2007 and right after that leveled off up to 2008. This interesting phenomenon can have several explanations, the most important of which can be the financial crisis the start of which is considered to be the August, 2007. According to

many data collected and provided by WFP (2008<sup>88</sup>) and PFA (2010<sup>89</sup>), the crises started to be felt in Armenia from 2008, which could bring to the uncertainty and decrease of fertility. The decreasing trend started to go up again reaching to the highest point in 2009 and fell significantly again to the 0 level in 2010. It is important to highlight the fact that during those 2 years period there was an increasing trend of the fertility rate in the age group 35 to 39 which was insignificant at all before. It is also important to indicate that the fertility rate was the highest in the age groups above 24. Thus, just doing calculation it can be seen that the AFR has been increased for about two years starting from 2006.

The changes in age specific fertility can have several explanations. First of all, it can be the reason of the *education*.

- Now more and more people give high importance to the education and the degree, as it is considered a clue to the good occupation with high salary. It is known that in order to earn a degree young women need to undergo education. Unlike the Soviet period, when there were many factories where even an uneducated person could find a job and receive an average payment, now if one wants to find a job, it is needed to have a degree (mainly). In general it takes time to get the desired degree, thus: more educated women spend more time on education than the less educated ones, and on average they are older when they leave the educational system. Hence, the highly educated women mostly are older at first birth.
- The second reason can be the fact that women who get high education want to turn the knowledge into practice before shifting to the motherhood stage. Usually, if the woman gets experienced professional before getting pregnant, the depreciation of the

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<sup>88</sup> (2008). *Implications of the World's Financial Crisis for Armenia's Economy*. Policy Forum Armenia.

<sup>89</sup> (2010). *Effects of the financial Crisis on the Vulnerable Households: Follow-up Study Armenia*. World Food Program

received education will be less felt on the women's future career path. Thus getting a job and trying to be professionalized in it can be the second reason for the fertility postponements, which changes the ASFR.

- The third reason can be the wage. A person with high education wants to find a highly paid job. As I agree with the idea of Cigno and Ermisch (1989<sup>90</sup>), I also think that women with high wages are more prone to postpone the childbearing and child-caring time-period. And as Gustafson (2001<sup>91</sup>) highlights women's career cost is rather strong indicator in fertility postponement.
2. The second thing that I tried to do, was finding correlations between wage, GDP, Education, Migration and Fertility one by one. And I found out positive correlation between Wage and fertility, but found negative relationship with all the others. And as the correlations did not cause causality I decided to do a cluster analysis introducing the dummy variable in order to control the age specific clusters. The problem that I had during the cluster analysis was that the fixed effects explained all the variations in fertility. Thus, I decided to normalize age-specific data in order to get rid of age specific variations. And now I had 50 observations without clusters and could run the same regression without fixed effects and came up with the results that Wage, GDP and Migration are negatively connected with the fertility.

The finding that Wage, Migration, GDP and Fertility are negatively correlated with the fertility was rather predictable. As was explained in the Chapter 2, all of these factors are negatively correlated with fertility in general, which was also true in Armenia. Not existence of solid P-Values in the regression can be explained by the fact that there was

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<sup>90</sup> Cigno, A. and J. Ermisch (1989). *A Microeconomic Analysis of the Timing of Births*. European Economic Review 33 (4)

<sup>91</sup> Gustafsson, S. (2001). *Optimal Age at Motherhood. Theoretical and Empirical Considerations on Postponement of Maternity in Europe*. Journal of Population Economics 14

data limitation. Another explanation of it is the position in the J-shaped model Armenia is.

3. In order to find the relationship between the GDP and fertility, and to see if the negative relationship can turn into positive one in the near future after the end of the transition period, I decided to go further and try the inverse J-shaped theory in my model, through introducing the squared GDP, which was rejected.

So, what was the reason for trying especially the J-shaped theory? This could explain many things, such as

- If the GDP growth could bring to the fertility increase in the final stage, than there should be a need to introduce some policies on the field of investments mainly in Armenia which could bring to the economic growth. Nevertheless, as the J-shaped model was rejected in Armenia, there is a need to introduce some policies which are directly linked to the fertility growth.

## **Policy Recommendations**



To overcome all these demographic challenges concerning fertility, emigration and age structure concrete and sustainable steps need to be taken. There is a need for Armenia to catalyze demographic transition, adopt and review the existing compatible policies in the areas such as

1. Health
2. Education
3. Labor market
4. Trade
5. Governance

Demography can matter for a pace of economic development.

1. As the increasing fertility rate is vital for Armenia and is a security issue also, there is a need to pay more attention on it and create favorable conditions for it, in order not to postpone the fertility into later period. The experience of other nations may offer useful lessons and serve as an example that could help shape workable policies in Armenia. I advise to use the Sweden Family Policy System scheme in Armenia. It is considered to be the best in all of the Nordic countries, which influences on the fertility rate increase as well as helps to decrease the number of poor children. The reason for advising to implement especially this policy scheme is that it has been implemented in Sweden in 1974 and many post-launch analyses have been done to see the fruitfulness of it. The logic of the policy is rather interesting and important. It is based on the dual-earner family model and the same rights and obligations exist concerning the family and labor market work both for men and women. This kind of policy will not only increase the fertility rate in Armenia, but also increase the women labor force which is also very

important especially for the small country like Armenia. The main and important feature of the Swedish family policy system is that it shifts from one-earner family to the dual-earner ones. It highlights the importance of the shared responsibility both for the economy and the children. This is related to children's rights to access to both parents. It is also related to gender equality in that fathers' leave facilitates women's return to and involvement in labor market work. Hence, this leave policy has several goals

- increasing employment levels
- gender equality
- children's rights

16 months parental leave is provided to both of the parents, which means that each of the parents can take 8 months leave, and be also paid for about 80 to 90 percent of the average income that they used to have. It is important to mention that only 2 months from each of the parent's share cannot be transferred to the other parent, i.e. wife can transfer 6 months of her parental leave to the husband. The other interesting fact is that the parents can use their parental leave any time during 8 years: can do a distribution of the leave in order to be with the child during different periods of the childhood. The leave period can be also used part time, which means that you extend your leave period. Also, if a parent agrees to get lower than 80 percent monetary replacement, the leave can be considerably prolonged. The division of leave in turn seems to have effects on the continued career of women and men and it is also associated with continued childbearing.

Two very interesting facts that can affect on the parental leave use development are:

- Gender equality bonus: based on financial reasons wives usually takes longer parental leave than the husbands, as most often men get higher salary than women and the risk to lose money because of leave is higher. Thus, the gender equality bonus helps to make the difference even in the families.
- Child home care allowance: the parents can stay at home with the child of 1 to 3 years old and be paid for that instead of taking the child to publicly financed day care centers because of some reasons. This also a great help to the poorly paid of unemployed women (Family Policy Sweden, 2008<sup>92</sup>, Earles, K., 2011<sup>93</sup>, Gilman R and D, 1989<sup>94</sup>, Ferranini T., Duvander A., 2009<sup>95</sup>)

The parental policy system, which has been practiced in Sweden for several decades and foregone important changes, can be definitely used in Armenia, which can have multiple good impacts on our county. First of all, it will foster gender equality and shared child responsibility which from its side emboldens the family ties and discourages divorces. Second, it is a good solution of combining work and family and decline postponement of the childbirth to the later stages of life, because of the fear of education or experience depreciation. Third, it guarantees good economic conditions for all the children. Fourth, it can

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<sup>92</sup> (2008) *Family Policy in Swden 2008. Social Insurance Report 2008:15*. Försäkringskassan [http://www.forsakringskassan.se/wps/wcm/connect/6e389bcd-7166-4475-b037-2ca81d37f6da/socialforsakringsrapport\\_2008\\_15.pdf?MOD=AJPERES](http://www.forsakringskassan.se/wps/wcm/connect/6e389bcd-7166-4475-b037-2ca81d37f6da/socialforsakringsrapport_2008_15.pdf?MOD=AJPERES)

<sup>93</sup> Earles, K (2011). *Swedish Family Policy – Continuity and Change in the Nordic Welfare State Model*. Social Policy & Administration, Vol 45. Blackwel Publishing

<sup>94</sup> Gilman R., Gilman, D. (1989). *Swedish Family Policy*. Caring for Families #21. Context Institution. <http://www.context.org/iclib/ic21/gstaffsn/>

<sup>95</sup> Terrarini, F., Duvander, A.Z. (2009). *Swedish Family Policy: Controversial Reform of a Success Story*. Fridrich Ebert Stiftung. Stockholm

provide individual economic independence. Hence, doing a research in many parental leave systems of many countries I came to the conclusion that the Sweden's one is rather good and flexible scheme which can be used in Armenia with minor changes only if needed in order to be fitted to our nation properly.

2. The important policy which will be compulsory from 2012 for the state bodies and employees of state organization in the sphere of education, culture and social protection is the “Compulsory State Health Insurance” (law N1923n,2011)<sup>96</sup>. The next step can be enlargement of this policy, from which not only the employees of state institutions can benefit, but also the self-employed and unemployed part of the population.
3. Combining work and childbearing: as the conflict between female employment and family formation may also be reduced in that case if sufficient support is provided to working parents: In order to increase the fertility rate in Armenia, there is a need to implement special incentive plan for the mothers who have 2 or more children, i.e. high maternity salary, special benefits and conditions at work during the 1.5 years after the maternity leave, for example: during the six months of work after the maternity leave, the women can have an opportunity to work part time, but be paid for the full-time. And after that 6 month have extra 1hour break, except the 1 hour lunch break (total 2 hour break), in order to be able to go home feed the baby and return back. This incentive plan will definitely increase the fertility rate in Armenia, which has strategic importance for Armenia.
4. The other policy for increasing the fertility rate can be the reduction of the taxes from the families with three or more children. This can be an incentive for the families to somehow deduct the costs of the children, as it is known that the “the

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<sup>96</sup> (2011)ՀՀ Կառավարության որոշում N 1923-Ն <http://www.arlis.am/DocumentView.aspx?docID=73526>

cost of the child” is counted before having one. If the parents know that some of the taxes will be deducted in case of having three or more child, they will consider the third child a beneficial decision and not a “trouble”.

5. As migration rate is also rather high in Armenia, there is a need to create special conditions for the foreign and Armenian investors abroad, to come and invest their money here: *low taxes or no taxes at all during the first two years of the business settlement*. This kind of policy, on one hand, will promote SMLE creations in Armenia which in the long run can affect to the steadfast economic growth. On the other hand it will be a good way of creating job opportunities, and keeping Armenian workforce in Armenia. Finally, this type of policy can be beneficial also from the demographic point of view, as those investors can get married, settle down in Armenia and change decreasing demographic situation.
6. It is also important to mention that there is a scarce in the policies concerning to the international migration. It is known that the international migration is one of the fundamental layers of the Armenian economy. It might be very good to adopt several policies, which can help the people to invest the remittances received from the Diaspora in Armenia which can lead to the economic growth.

Hence, the right policies at the right time can be the central pillar for the fertility increase as well as economic growth. There is a need to forecast the future of the country before adopting this or that law.

## **Conclusion and Recommendation for Future Research**

Fertility, mortality, migration, age-structure can rather effect on the economic growth. The steps to try to increase the life expectancy, decreasing different kind of diseases which can

lead to mortality, also the increase and development of the standard of education can bring to the economic growth. Especially in the developing countries the change of the dynamics of fertility, mortality and migrations can definitely bring to the economic growth in the short-, medium- and long-run. The policymakers also should bear in mind the importance of the demographic impact on the economic growth, as policies adopted now can have both good and bad impact not only in the short period of time, but also in the long one. Armenia also should learn the lessons of the developing or already developed countries, pay much more attention on the demographic impact on the economic growth, and do everything to gather good data on demography, analyze them, and try to take and adopt every possible measures, steps and policies to use the demography as a tool toward the economic growth, which will in its turn provide welfare to the population.

The stabilization of the population growth in the world is one of the important conditions toward the steadfast economic growth.

For the future research I highly recommend to do a decomposition of the GDP per capita into a number of more specific variables and estimate their impact on fertility one by one: mainly divide the GDP per capita into 3 variable and see how each of them impacts into fertility rate fluctuation: labor productivity, average working hours per worker and the employment ration (this also can be divided into employment rate and the ratio of active population). This can help to capture the impact of employment variable on fertility and see which of the variables has positive/negative and significant coefficient on fertility. To be more precise in findings I also suggest decomposing the working age population also into female and male parts. This will give an opportunity to see whether the employment of the women part of the population mainly works for the fertility rebound or the family income is the main factor of it. Hence, is the high employment rate of women is the direct cause on the

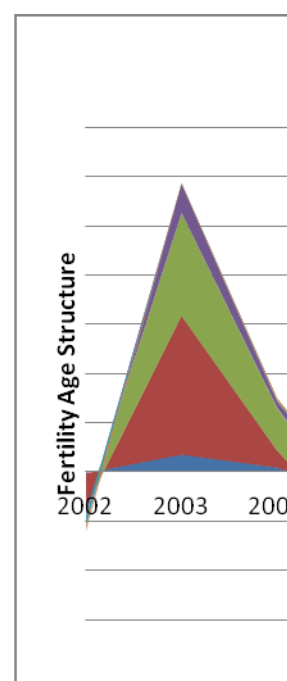
fertility rate. If it is true: what institutional context mainly impacts on this, and if it is not: what should be changed to achieve such results.

## **Annexes**

### *Annex 1*

#### **Growth Decomposition**

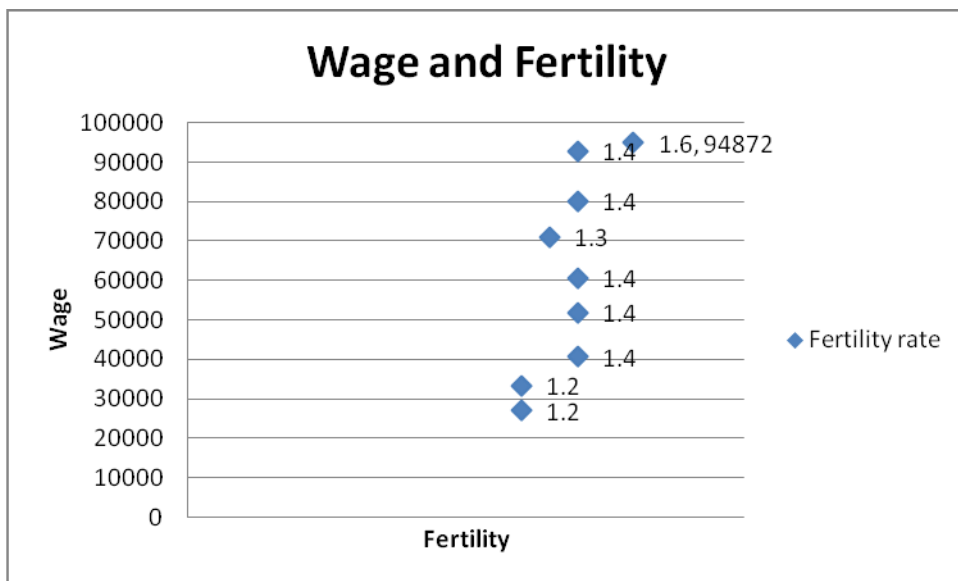
	<b>Under 20</b>	<b>20-24</b>	<b>25-29</b>	<b>30-34</b>	<b>35-39</b>	<b>40-44</b>	<b>45-49</b>
<b>2002</b>	-0.0004	-0.01332	-0.00161	-0.00242	-0.0037	-0.00202	-0.0004
<b>2003</b>	0.007039	0.056315	0.041822	0.012008	0.000292	-0.00041	0
<b>2004</b>	0.001853	0.007042	0.01705	0.002965	0.001042	-0.00111	-0.00037
<b>2005</b>	-0.01081	-0.02233	0.007925	0.006124	0.001512	0.00072	0
<b>2006</b>	-0.00513	-0.01318	0.005492	0.002563	0	-0.00146	0
<b>2007</b>	0.000371	0.01482	0.019637	0.013338	0.000505	0.000741	0.000371
<b>2008</b>	0.000706	-0.00565	0.011291	0.005999	0.003822	0.000706	0
<b>2009</b>	0.006581	0.01628	0.024593	0.017319	0.005341	0.001039	0
<b>2010</b>	0.002258	-0.00806	0.004194	0.006774	-0.00107	0	0



## Annex 2

### Wage and Fertility Correlation

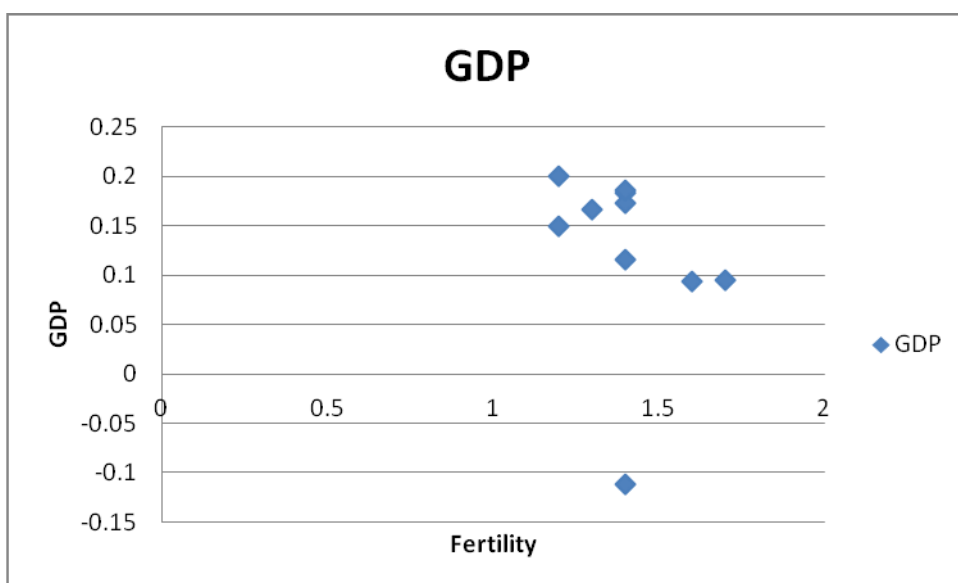




Year	FR	WAGE
2002	1,2	27027
2003	1,2	33222
2004	1,4	40603
2005	1,4	51750
2006	1,4	60538
2007	1,3	71099
2008	1,4	80189
2009	1,4	92862
2010	1,6	94872
2011	1,7	107197

### Annex 3

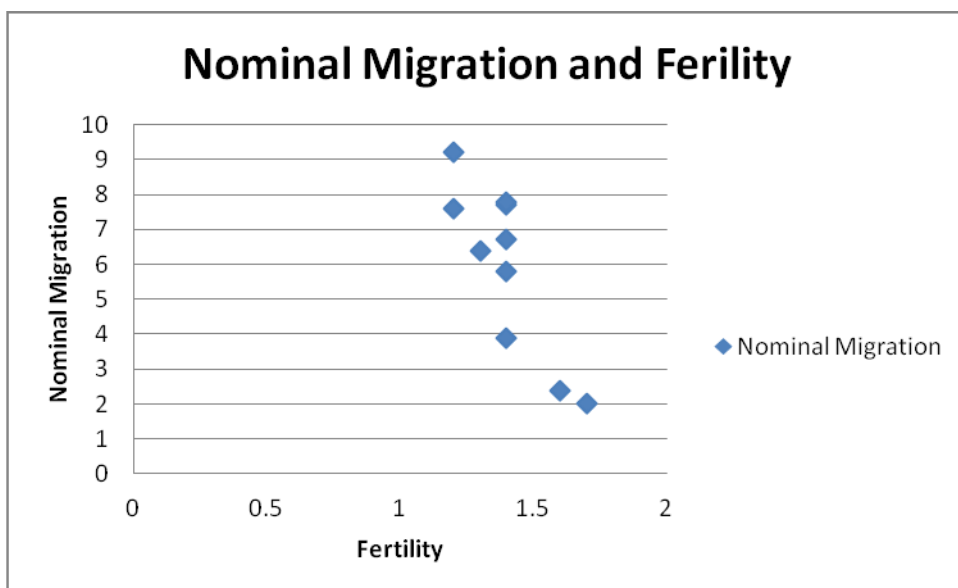
#### GDP and Fertility Correlation



Year	FR	GDP
2002	1,2	0,15
2003	1,2	0,20018
2004	1,4	0,183571
2005	1,4	0,172734
2006	1,4	0,185741
2007	1,3	0,165772
2008	1,4	0,116175
2009	1,4	-0,11187
2010	1,6	0,093261
2011	1,7	0,095449

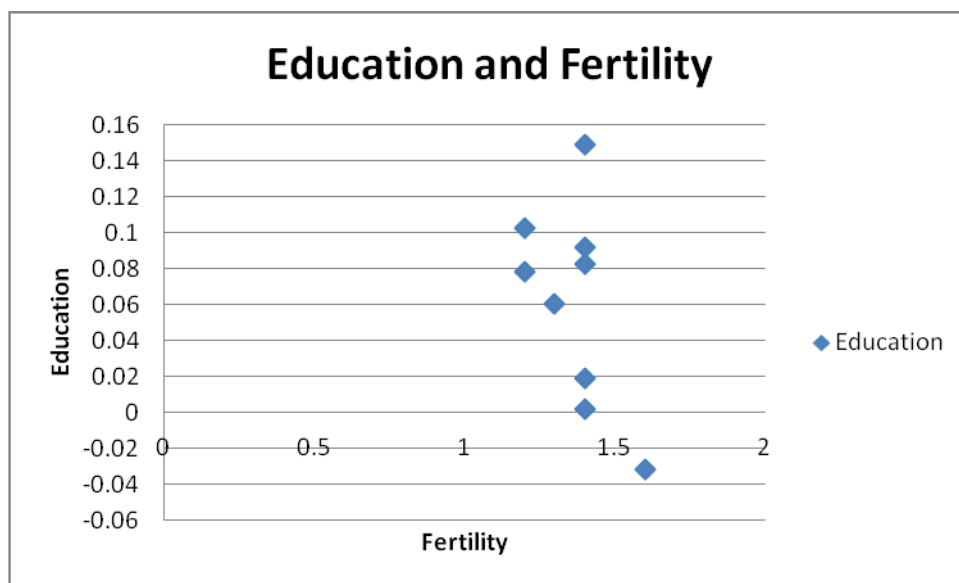
#### Annex 4

#### Nominal Migration and Fertility Correlation



<b>Year</b>	<b>FR</b>	<b>NM</b>
<b>2002</b>	1,2	9,2
<b>2003</b>	1,2	7,6
<b>2004</b>	1,4	7,7
<b>2005</b>	1,4	7,8
<b>2006</b>	1,4	6,7
<b>2007</b>	1,3	6,4
<b>2008</b>	1,4	5,8
<b>2009</b>	1,4	3,9
<b>2010</b>	1,6	2,4
<b>2011</b>	1,7	2

## Education and Fertility Correlation



Year	FR	EDUC
2002	1,2	0,102715
2003	1,2	0,078317
2004	1,4	0,091925
2005	1,4	0,148703
2006	1,4	0,082494
2007	1,3	0,060607
2008	1,4	0,019199
2009	1,4	0,002011
2010	1,6	-0,03163

## Introduction of Dummy Variables

	GDP	Fertility	WAGE	NM	EDUC	FE1	FE2	FE3	FE4	Fe5	FE6	FE7
Under												
20	0.20018	29.3	33222	7.6	0.078317	1	0	0	0	0	0	0
	0.183571	29.8	40603	7.7	0.091925	1	0	0	0	0	0	0
	0.172734	26.8	51750	7.8	0.148703	1	0	0	0	0	0	0
	0.185741	25.4	60538	6.7	0.082494	1	0	0	0	0	0	0
	0.165772	25.5	71099	6.4	0.060607	1	0	0	0	0	0	0
	0.116175	25.7	80189	5.8	0.019199	1	0	0	0	0	0	0
	0.093261	28.3	92862	3.9	0.002011	1	0	0	0	0	0	0
20-24	0.20018	126.6	33222	7.6	0.078317	0	1	0	0	0	0	0
	0.183571	128.5	40603	7.7	0.091925	0	1	0	0	0	0	0
	0.172734	122.3	51750	7.8	0.148703	0	1	0	0	0	0	0
	0.185741	118.7	60538	6.7	0.082494	0	1	0	0	0	0	0
	0.165772	122.7	71099	6.4	0.060607	0	1	0	0	0	0	0
	0.116175	121.1	80189	5.8	0.019199	0	1	0	0	0	0	0
	0.093261	123.3	92862	3.9	0.002011	0	1	0	0	0	0	0
25-29	0.20018	71.5	33222	7.6	0.078317	0	0	1	0	0	0	0
	0.183571	76.1	40603	7.7	0.091925	0	0	1	0	0	0	0
	0.172734	78.3	51750	7.8	0.148703	0	0	1	0	0	0	0
	0.185741	79.8	60538	6.7	0.082494	0	0	1	0	0	0	0
	0.165772	85.1	71099	6.4	0.060607	0	0	1	0	0	0	0
	0.116175	88.3	80189	5.8	0.019199	0	0	1	0	0	0	0
	0.093261	96.7	92862	3.9	0.002011	0	0	1	0	0	0	0
30-34	0.20018	29.6	33222	7.6	0.078317	0	0	0	1	0	0	0
	0.183571	30.4	40603	7.7	0.091925	0	0	0	1	0	0	0
	0.172734	32.1	51750	7.8	0.148703	0	0	0	1	0	0	0
	0.185741	32.8	60538	6.7	0.082494	0	0	0	1	0	0	0
	0.165772	36.4	71099	6.4	0.060607	0	0	0	1	0	0	0
	0.116175	38.1	80189	5.8	0.019199	0	0	0	1	0	0	0
	0.093261	45.2	92862	3.9	0.002011	0	0	0	1	0	0	0
35-39	0.20018	10.2	33222	7.6	0.078317	0	0	0	0	1	0	0
	0.183571	10.6	40603	7.7	0.091925	0	0	0	0	1	0	0
	0.172734	11.2	51750	7.8	0.148703	0	0	0	0	1	0	0
	0.185741	11.2	60538	6.7	0.082494	0	0	0	0	1	0	0
	0.165772	11.4	71099	6.4	0.060607	0	0	0	0	1	0	0
	0.116175	13	80189	5.8	0.019199	0	0	0	0	1	0	0
	0.093261	14.8	92862	3.9	0.002011	0	0	0	0	1	0	0
40-44	0.20018	2.4	33222	7.6	0.078317	0	0	0	0	0	1	0
	0.183571	2.1	40603	7.7	0.091925	0	0	0	0	0	1	0
	0.172734	2.3	51750	7.8	0.148703	0	0	0	0	0	1	0
	0.185741	1.9	60538	6.7	0.082494	0	0	0	0	0	1	0
	0.165772	2.1	71099	6.4	0.060607	0	0	0	0	0	1	0
	0.116175	2.3	80189	5.8	0.019199	0	0	0	0	0	1	0

	0.093261	2.6	92862	3.9	0.002011	0	0	0	0	0	1	0
45	0.20018	0.2	33222	7.6	0.078317	0	0	0	0	0	0	1
	0.183571	0.1	40603	7.7	0.091925	0	0	0	0	0	0	1
	0.172734	0.1	51750	7.8	0.148703	0	0	0	0	0	0	1
	0.185741	0.1	60538	6.7	0.082494	0	0	0	0	0	0	1
	0.165772	0.2	71099	6.4	0.060607	0	0	0	0	0	0	1
	0.116175	0.2	80189	5.8	0.019199	0	0	0	0	0	0	1
	0.093261	0.2	92862	3.9	0.002011	0	0	0	0	0	0	1

*Annex 7*

**Regression statistics without fixed effects**

<i>Regression Statistics</i>	
Multiple R	0.997002
R Square	0.994012
Adjusted R Square	0.992437
Standard Error	3.7612
Observations	49

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	10	89241.75	8924.175	630.8342	5.07E-39
Residual	38	537.5718	14.14663		
Total	48	89779.33			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	17.1486	14.33199	1.196526	0.238904	-11.865	46.16219	-11.865	46.16219
gdp	-38.5951	38.68072	-0.99779	0.324694	-116.9	39.70989	-116.9	39.70989
WAGE	-4.8E-05	8.25E-05	-0.58409	0.562612	-0.00022	0.000119	-0.00022	0.000119
NM	-1.26074	1.572169	-0.80191	0.427591	-4.44343	1.921951	-4.44343	1.921951
EDUC	5.780529	25.70246	0.224902	0.823261	-46.2514	57.81245	-46.2514	57.81245
FE1	27.1	2.010446	13.4796	4.67E-16	23.03006	31.16994	23.03006	31.16994
FE2	123.1571	2.010446	61.25862	1.35E-39	119.0872	127.2271	119.0872	127.2271
FE3	82.1	2.010446	40.83671	5.3E-33	78.03006	86.16994	78.03006	86.16994
FE4	34.78571	2.010446	17.30249	1.3E-19	30.71578	38.85565	30.71578	38.85565
Fe5	11.61429	2.010446	5.77697	1.15E-06	7.54435	15.68422	7.54435	15.68422
FE6	2.085714	2.010446	1.037439	0.306088	-1.98422	6.15565	-1.98422	6.15565

## Annex 8

### Squared GDP

	GDP	Fertility	GDP	Wage	Migration	Education	GDP_Squared
Under20	0.20018	1.094637	0.20018	33222	7.6	0.078317	0.040072
	0.183571	1.362555	0.183571	40603	7.7	0.091925	0.033698
	0.172734	-0.24495	0.172734	51750	7.8	0.148703	0.029837
	0.185741	-0.99512	0.185741	60538	6.7	0.082494	0.0345
	0.165772	-0.94154	0.165772	71099	6.4	0.060607	0.02748
	0.116175	-0.83437	0.116175	80189	5.8	0.019199	0.013497
	0.093261	0.558801	0.093261	92862	3.9	0.002011	0.008698
20-24	0.20018	0.996063	0.20018	33222	7.6	0.078317	0.040072
	0.183571	1.572047	0.183571	40603	7.7	0.091925	0.033698
	0.172734	-0.30748	0.172734	51750	7.8	0.148703	0.029837
	0.185741	-1.39882	0.185741	60538	6.7	0.082494	0.0345
	0.165772	-0.18622	0.165772	71099	6.4	0.060607	0.02748
	0.116175	-0.67126	0.116175	80189	5.8	0.019199	0.013497
	0.093261	-0.00433	0.093261	92862	3.9	0.002011	0.008698
25-29	0.20018	-1.27288	0.20018	33222	7.6	0.078317	0.040072
	0.183571	-0.72857	0.183571	40603	7.7	0.091925	0.033698
	0.172734	-0.46825	0.172734	51750	7.8	0.148703	0.029837
	0.185741	-0.29075	0.185741	60538	6.7	0.082494	0.0345
	0.165772	0.336393	0.165772	71099	6.4	0.060607	0.02748
	0.116175	0.715046	0.116175	80189	5.8	0.019199	0.013497
	0.093261	1.70901	0.093261	92862	3.9	0.002011	0.008698
30-34	0.20018	-0.97776	0.20018	33222	7.6	0.078317	0.040072
	0.183571	-0.83136	0.183571	40603	7.7	0.091925	0.033698
	0.172734	-0.52025	0.172734	51750	7.8	0.148703	0.029837
	0.185741	-0.39215	0.185741	60538	6.7	0.082494	0.0345
	0.165772	0.266662	0.165772	71099	6.4	0.060607	0.02748
	0.116175	0.577767	0.116175	80189	5.8	0.019199	0.013497
	0.093261	1.877089	0.093261	92862	3.9	0.002011	0.008698
35-39	0.20018	-0.98361	0.20018	33222	7.6	0.078317	0.040072
	0.183571	-0.73323	0.183571	40603	7.7	0.091925	0.033698
	0.172734	-0.35768	0.172734	51750	7.8	0.148703	0.029837
	0.185741	-0.35768	0.185741	60538	6.7	0.082494	0.0345
	0.165772	-0.23249	0.165772	71099	6.4	0.060607	0.02748
	0.116175	0.769002	0.116175	80189	5.8	0.019199	0.013497
	0.093261	1.89568	0.093261	92862	3.9	0.002011	0.008698
40-44	0.20018	0.683507	0.20018	33222	7.6	0.078317	0.040072
	0.183571	-0.62137	0.183571	40603	7.7	0.091925	0.033698
	0.172734	0.248548	0.172734	51750	7.8	0.148703	0.029837
	0.185741	-1.49129	0.185741	60538	6.7	0.082494	0.0345
	0.165772	-0.62137	0.165772	71099	6.4	0.060607	0.02748
	0.116175	0.248548	0.116175	80189	5.8	0.019199	0.013497
	0.093261	1.553424	0.093261	92862	3.9	0.002011	0.008698
45	0.20018	0.801784	0.20018	33222	7.6	0.078317	0.040072



	0.183571	-1.06904	0.183571	40603	7.7	0.091925	0.033698
	0.172734	-1.06904	0.172734	51750	7.8	0.148703	0.029837
	0.185741	-1.06904	0.185741	60538	6.7	0.082494	0.0345
	0.165772	0.801784	0.165772	71099	6.4	0.060607	0.02748
	0.116175	0.801784	0.116175	80189	5.8	0.019199	0.013497
	0.093261	0.801784	0.093261	92862	3.9	0.002011	0.008698

## *Annex 9*

### **J-Shaped theory test: regression statistics**

<i>Regression Statistics</i>	
Multiple R	0.604614
R Square	0.365558
Adjusted R Square	0.291786
Standard Error	0.787202
Observations	49

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	15.35345	3.070691	4.955227	0.00114
Residual	43	26.64655	0.619687		
Total	48	42			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	8.51851	2.986964	2.851896	0.006653	2.494724	14.5423	2.494724	14.5423
GDP	112.159	143.2011	0.783227	0.437786	-176.633	400.9515	-176.633	400.9515
Wage	-9.3E-05	5.95E-05	-1.56961	0.123836	-0.00021	2.66E-05	-0.00021	2.66E-05
Migration	-1.33678	1.007669	-1.3266	0.191642	-3.36894	0.69538	-3.36894	0.69538
Education	2.078469	5.928096	0.350613	0.72759	-9.87668	14.03361	-9.87668	14.03361
GDP_Squared	-449.62	493.5591	-0.91097	0.367387	-1444.98	545.7369	-1444.98	545.7369

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