DRAFT VERSION, WILL BE UPDATED SOON

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Do Value Changes explain Fertility Differences across the MENA Region?

Middle East and Northern Africa is a rapidly growing and world-shaking region of the world, with unique cultural-religious situation and following its own path of modernization with diverse fertility transition. Its' population these days is approximately equal to that of European Union and is 5 times bigger than it was 60 years ago. Its' fertility level is second high in the world after Sub-Saharan Africa, but in the same time it experienced the greatest fertility decline in the world over the past 30 years. Some MENA countries like Turkey, Tunisia, Lebanon and Iran have fertility level close to 2 children per women or even lower, while women in other MENA countries – Oman, Yemen, Iraq, Jordan – still give birth to 3 or even 4 children on average. Countries of the MENA region have a lot of common in their past: Arab and Muslim culture, geographic conditions. For centuries, they were moving at very similar path, but now they happened to have rather diverse state of modernization, state of fertility level. Why did their paths diverge and what are the factors explaining this differences at individual and country level?

The paper focuses on MENA region fertility patterns and tries to explain the diversity between countries with similar traditional values and common dominating religion. Based on WVS data for the two last waves the authors pick up 16 MENA countries and do the regression analysis on the total number of children in the families. The results reveal that persons in MENA countries who have higher number of children tend to have less egalitarian gender values, but the actual impact of various factors may significantly vary from country to country[4].

Key words: fertility, MENA, Middle East, diversity of fertility level, values

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[4] Which also raises the question about the quality of WVS data in MENA countries.

Introduction

The world, as we know it today, is a highly dynamic place. We live in a world undergoing tremendous transformations, which have never ever been seen before. In 1950 every fifth person in the world was living in Europe, asserting its power around the globe. In the year 2015 it's now every tenth and this share will steadily decrease for at least next 100 years - whereas countries of neighboring MENA region – one of the most rapidly growing among world regions – have already increased their population more than fourfold: from 100 mln in 1950 to 450 mln in 2013, nearly equaling European Union, and are expected to rise up to 750 mln by 2080 (Appendix 1 & 2, UN WPP 2012 rev.). A new world pole – Middle East – promptly emerges on our increasingly multipolarizing planet. A region that already attracts worldwide attention to its events and problems, a region that challenges existing world order in different ways and will do this even more actively in future – due to its rapidly increasing mass. And a region with a highly unique cultural-religious situation that moves it in a special way from the typical modernization we see in other world regions (Appendix 3, World Bank data).

Fig.1 MENA as defined by World Bank and used in this paper
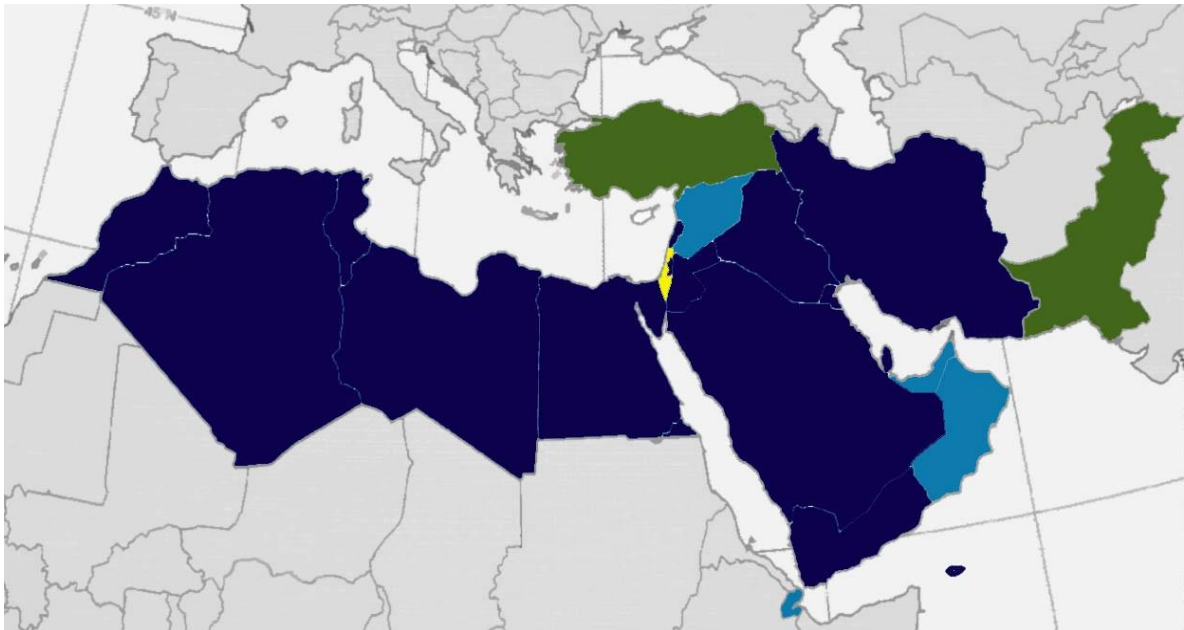
Legend:

Blue, dark blue and **yellow** – MENA according to World Bank definition;

Yellow – Israel (excluded as non-muslim country);

Dark blue and **green** – countries in which World Values Survey was conducted;

Blue – countries of the MENA region, where WVS was not conducted;

Green – countries not defined as part of MENA region by World Bank, but included in this study as Muslim countries historically and culturally close to that of MENA region, also with WVS conducted.

Ongoing changes, of which MENA (unique) emergence is, perhaps, the most spectacular case[5], are world-shaking and are driven mostly by fertility[6] that shapes current development trends and will be the main factor, shaping not only MENA, but whole world's situation in foreseeable future. Considering crucial role fertility plays in development and future of MENA countries, we target it as our main phenomenon designated for studying and understanding.

Different regions of the world have different history of fertility transition, every pattern eventually resulting in fertility decline. Countries of the MENA region, however, have a quite distinctive way of fertility transition: for decades their level of fertility was consistently high and was one of the highest in the world, but then they experienced a tremendous decline[7], which was then followed by a sudden halt on a level which is again highest in the world with the exception of Sub-Saharan Africa. Muslim societies seem to undergo the same demographic transition, as Western societies do – but with significant variation from country to country and with, probably, some MENA-unique obstacles that slow it down (Appendix 4, World Bank data).

Previous studies devoted to understand fertility transition in MENA countries mainly focused on the factors of demographic transition either in single countries (Hosseini-Chavoshi and Abbasi-Shavazi, 2012; Frini and Muller, 2012; Salam, 2013; Dinçer et al., 2014), or in the whole region (Eberstadt and Shah, 2012), with no regard to fertility differences among MENA countries. Studies that investigated fertility differentials on the cross-national level mostly focused on the fertility differences across developing or developed countries, or on the comparison between

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[5] which is why this region was chosen in this paper for deeper investigation.

[6] mortality already declined enough to have a little impact on population reproduction.

[7] six of the ten largest fertility declines has taken place in Muslim-majority countries, four of which are part of the MENA region, which population is predominantly Arab (Eberstadt and Shah, 2012).

these two broad categories (Abeynayake et al., 2012; Jain and Ross, 2012). There are no studies examining the nature of fertility differences per se across the MENA region. Thus, many questions remain unanswered. This paper aims to fill this gap and answer the following questions: Why this diversity occurs in countries with seemingly similar traditional values and common dominating religion? MENA countries had almost the same fertility level just a half century ago - why then it differs now? If, as highlighted above, Islam and the level of religiosity cannot solely account for fertility levels in the MENA region, what are the main factors of such diversity nowadays?

Literature review

Historically, for all statistically observable period MENA region was an area with the highest fertility level in the world (except for Sub-Saharan Africa) – and still retains this status. During the latest few decades, fertility in most MENA countries has undergone significant decline - on average, it more than halved: from 7 children per woman around 1960 to about 3 children in 2012. The total fertility rate (average number of births per woman) is now less than 3 in more than a half of the countries of the region, but is still more than 4 in Iraq, Palestine, and Yemen (UN WPP 2012 rev.). There have been impressive fertility declines in Oman, Algeria, Libya, Iran and Saudi Arabia since the 1980s, but only a slight decline in Iraq, Palestine, Djibouti and Jordan, and from 2000s very weak or almost no decline in Jordan, Oman, Iraq, Syria, Libya, Palestine, Egypt and Kuwait, while even rise in Algeria and Morocco, each having TFR of 2,7-2,8 as of 2012 (ibid).

Varieties of factors that affect fertility in MENA region are being studied in sociological and demographic papers for decades. Some emphasize effects on country-level, while other go deeply into individual scale of interactions. Sometimes these effects and factors flow seamlessly into each other and are hard to separate. It seems logical to explore the studies in a certain order – for example, starting with basic country-level characteristics and then proceeding to individual ones.

Speaking of country-level development, it is important to refer to Moghadam (2003, 2004). He reveals several controversial developments in the region: «(1) the expansion of industrialization, urbanization, proletarianization, and state-sponsored education, which undermines tribes, the extended family unit and patriarchal family authority; (2) the retention of Muslim family law, which legitimates the prerogatives of male family members over female family members; and (3) women's demands for greater civil, political, and social rights on the basis of global discourses and international conventions» (Moghadam, 2004). Thereby, in his work Moghadam raises many issues of modernization in MENA region: intensifying economic and social development on one hand, as national policy and current

state of affairs, and active resistance from religious legislative traditions on other hand. The author discloses the key characters of Middle East culture, explaining the persistence of patriarchy through policies and laws within instrumental approach toward women and gender that strengthen the position of the state. Thus, Muslim family law is an institutional base for low position of women in society, which brings us to a necessity of testing state-level indicators of economic and social development along with individual level of religiosity.

However, the usage of religious institutions can be entirely different in different circumstances. Islamic republic of Iran is an exceptional case of how Islamic religion can be successfully used to lower fertility (Moghadam, 2004; Obermeyer, 1994; Hoodfar, 1996; Loeffler and Friedl, 2014). Generally, religious states tend to suppress any modernization in social sphere and to preserve fertility behavior as traditional as possible. They usually forbid any kinds of family planning. Surprisingly, Iran managed to do the reverse. Islamist conservatives came to power in Iran in 1979 during Islamic Revolution and soon dismantled any liberal reforms, introduced by formerly reigning Shah, but a decade later – faced with huge population growth[8] causing rapid impoverishment of the population – were forced to not simply allow contraception and fertility control, but to urgently push fertility control methods to the population to stop reduction in living standards, rising of which was their political goal. This is an example of conservative political elites using religiously approved and even promoted family planning to stay in power and to have a political support from women for this aim. Moreover, education system was also expanded, as well as healthcare system with contraception made widely available – everything for fertility decline – to achieve political goal of wellbeing. The society was still significantly religious and was still retaining traditional norms and values with women still highly excluded from labor market, and the government was also preserving this Status Quo too – yet focused state-level policies have led it to a most rapid fertility decline among the whole Muslim world. Contraception, education, healthcare and state perception of the situation – are the key features in this case.

Many papers are devoted to the explaining of the effect of education upon the fertility rate (Caldwell and Ruzicka, 1987; McDonald, 1985). Modernization and fertility transition in MENA countries were encouraged by economic growth and urbanization: countries become richer, more industrialized and urbanized. Modernization in developing countries, having induced sharp mortality decline, has quickly led to the noticeable social changes: the total fertility rate declined from 7.7 to 6.3 children per woman between 1966 and 1976, the mean age at marriage increased from 18.4 to 19.7 years, and modest rises occurred in education and employment levels for women (Aghajanian, 1990). Two decades

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[8] As fertility transition stalled and family planning program was abandoned, fertility level was remaining at about 6,5 children per woman, which meant about 3% of average annual population growth and per capita GDP to decrease rapidly.

later, by 1996 there were only a few countries in the world outside Sub-Saharan Africa, where the fertility rate was still over 5 children per woman: Afghanistan, Laos, Cambodia, Nepal and Pakistan, Palestine, Yemen, Oman, Iraq, Syria, Jordan and Saudi Arabia (Caldwell and Sathar, 1996). Many studies have explored two key indices of fertility transition among developing countries: child mortality level, or child survival, and schooling levels. Decrease of child mortality rate and rising at schooling levels lead to the priority for the child quality instead child quantity (Becker 1974). Therefore, it also makes sense to test how government efforts and progress in school education enrollment and in mortality reduction are connected with fertility level. One can expect – and it can be hypothetically taken – that the more state invest in education system and the higher are government expenditures on education and health, the lower is average fertility level.

Frini and Muller (2012) used time series data over 45 years to provide empirical evidence of demographic transition, education and economic growth correlation in the context of Tunisia. The key explanatory variables in their Tunisia model are real GDP per capita, infant mortality, contraceptive use ratio, and education. Long-term triangular relationship was shown in the paper: education has relatively fostered economic growth and has affected fertility, but then fertility transition has produced a feedback effect on both education and economic growth (Frini, Muller 2012), which means a loop between education, fertility and economic growth. The fertility decline, caused by education improvement, has in turn promoted economic growth, which then again affected fertility and education. The conclusion is that education and economic growth have very strong and long-term connection with fertility, and this connection works in both directions.

Another interesting example of how changed institutions can influence fertility behavior is the work of B.S.Okun (1996). He studied Jews of MENA origin who were newcomers to Israel in 1950s and 1960s and who were almost no different to the original MENA population: low status of women, low levels of economic development and educational attainment (half of women were illiterate), preference for sons, very high number of children. Not Muslim, but basically the same traditional values and religiosity. Author shows how in just slightly more than a decade fertility level of these immigrant groups has dropped sharply: being exposed to industrial society they had now to look for a job instead of continuing farming, furthermore – big number of children (now surviving) became very costly as education was compulsory in Israeli education system. Over time, Jews of MENA origin from marriage cohorts just one generation apart reduced their number of children from 6 to 3, rapidly convergencing to the rest of the population. In general, this paper stresses the importance of external factors that push people from a highly traditional societies to reduce their fertility: education, the need to adapt to changed economic conditions, children survival and costs.

Population policy – is one of the most important factors influencing fertility level. MENA countries have experience of promoting a variety of population policies. "Population policy" is understood as a set of legislatively fixed governmental interventions aiming to alter demographic trends in the desired direction. In 1990s Iran and Egypt faced the goals of improving health facilities on the one hand, reducing child mortality, and of decreasing the birthrate on the other hand (Moghadam, 2004). Other countries, like Israel and Saudi Arabia aimed to improve state of health, but not to decrease fertility rate. For the countries like Iran, Lebanon, Tunisia, and Turkey joined effects of socio-economic development, women's educational attainment, and state-sponsored family planning programs have produced the lowest fertility rates of the region (Roudi-Fahimi & Kent, 2007). Indeed, the average of about 2.5 children per woman in these MENA countries is even lower than fertility rate of many Latin American countries (Moghadam, 2004). As was shown, MENA countries noticeably differ in terms of population policy goals and fertility levels. Data on contraception prevalence, one of the key indicators of family planning program and one of the factors that affect fertility the most, only proves aforementioned findings (Appendix 5, World Bank data).

The only cases of similarly fast fertility transition regulated by the state are family planning programs in East Asia, whose main feature is political and moral leadership provided by elites – where different means of family planning[9] are introduced by elites realizing the importance of fertility decrease and having no moral opposition from the church or other traditional institutions (Caldwell and Sathar, 1996). Authors compare fertility transition in Pakistan, Sri Lanka and Bangladesh, and draw attention to the fact that despite higher level of GDP per capita in Pakistan, wise education and family planning policies in Sri Lanka and Bangladesh, initially poorer countries, made fertility transition in this countries much faster and more successful than in Pakistan.

Loeffler and Friedl (2014) compare different socio-demographic indicators in Iran with its unusually rapid fertility transition and TFR reaching 1.6 in last years and in neighboring countries of the region. Phenomenal fact that simultaneously with the lowest TFR Iran also retains one of the lowest female labor participation rate in the region. In the same time Iran has a very high[10] level of secondary and tertiary education enrollment, and it definitely contributes to its low TFR, but this level of female education yet has no positive influence on the labor market participation of the women in Iran. As result, authors report, that about 75% of all suicides in Iran are done by women because of family and marital problems. This brings us to the importance of taking into account level of individual freedom.

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[9] Mainly contraception made widely available.
[10] For a MENA country: 90,5% of female gross primary and secondary enrollment and 49.5% of female tertiary enrollment.

Alam, Ahmed and Butt (2003) studied factors of total fertility rate in Pakistan in 1965-1998 and used time-series model containing following factors: infant mortality rate, female labor force participation rate, real GDP and sterilization as indicator of contraceptive prevalence. Comprehensive modelling with sophisticated techniques, used by authors to reveal causality, shows that these factors have different impact on fertility in the short-run (2-year horizon) and long-run (10- and 15-year horizons): in the short-run main factors are contraceptive prevalence and female education – they explain 40% variance of fertility alone, but in the long-run 80% of variance is explained by infant mortality rate and contraceptive use. The authors conclude that key conditions for fertility decline in the country with such a low level of socio-economic development as in Pakistan are "client-oriented affordable but persuasive 'planned' family-planning programme, coupled with few years of schooling, particularly female, firmly supported by the political and social elite at all levels of that society, and also adapted to the sociocultural realities of the vast masses of the people of that country." This doesn't require significant socio-economic structural changes, but in the long-run these changes turns out to be necessary for further and long-term changes in fertility.

Salam (2013) draws attention to the fertility in Saudi Arabia – one if not the most conservative and religious country in MENA region, with active pronatalist policy, Sharia law and heavily restricted contraception and abortion. According to the author, despite all the government efforts for promotion of high fertility without any birth control, total fertility rate in Saudi Arabia declined from 7 children per woman in 1985 to 4.5 children in 1999 – this was primarily a result of "expansion in females' education and recent encouragement to wider participation of women in labor force" with contraception being still largely restricted. This again emphasizes the importance of female education along with labor participation and general modernization processes: it can be assumed that contrary to traditionalist state fertility policy in Saudi Arabia its' huge economic capital, accumulated by mid-1980s then[11] caused society to inevitably modernize as more citizens could afford education and in the same time government was investing in education and urbanization as well, reducing infant mortality rate (Appendix 6, World Bank data). The effect of economic capital overcame the effect of traditionalist policy and restrictions.

Socioeconomic development, gender, class, and the state policy – all influence fertility level as well. The position of women in society determines her access to education and employment[12]. Other studies in Egypt, Jordan, Morocco, Tunisia, Turkey, and Yemen

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[11] In the 1980s falling oil prices reduced GDP per capita in Saudi Arabia more than twice for about 20 years until in 2000s oil prices again started to rise.

[12] Except for Saudi Arabia, where elite women do get private Western education, but do not seek for a job due to conservative social norms and state policy combining forcing preservation of traditional values with high economic profits allowing many people to economically realize traditional gender roles.

(Roudi-Fahimi & Kent, 2007; Groth & Sousa-Poza, 2012), along with many other developing countries have shown the same results: rural-urban residence, education, and socioeconomic status, health of the mother and child determined the number of children to a large extent. In general, lowering fertility and rising age of first marriage and childbirth in MENA countries seem to be persistent demographic tendencies.

Speaking of individual characteristics, it worth noting that level of religiosity has something special to Islam. According to Beck (1957), Islam in fact has some distinctive features that can slow down modernization. Petty, but amazing fact about medical care in MENA countries: according to traditional Muslim regulations, no other man can see the wife of a man. This eventually creates serious problems in providing medical care (especially during child delivery) to women who have religious husbands: the doctor is often a man, but many of these husbands would rather let their wives die than intimately expose them to the eye of another man. In the villages a lowly midwife is the usual attendant, but their qualification is obviously incomparable to that of a doctor. We can see here how some specifics of Islam, in fact, indeed affects (maternal) mortality reduction – however, the driving force in this case is the degree of religiosity, and it can be tested on individual level.

İlkkaracan (2012) studied participation of the Turkish women in the labor market. Only 26% percent of the adult women in Turkey participated in the labor market in 2009[13] – a tiny 4-percentage point increase compared to the data of 1988, where 22% of adult women participated in labor market. Despite large structural changes and shifts in the country economy over the last 20 years, still majority of women do not perceive job as opportunity to increase their say in the family. However, many of women see labor participation as potential means to increased autonomy – but current lack of skills and education combined with lack of institutional support[14] makes any attempts of looking for a job meaningless, thus leading to a conservation of traditional gender roles. Author points out that low education of many Turkish women leads to a lesser desire for labor participation and in the same time leads to a much fewer job opportunities and preservation of traditional gender roles.

N. Eberstadt and A. Shah made a comprehensive analysis of fertility transition in the Muslim countries in their book chapter (Groth & Sousa-Poza, 2012). Authors refer to Lant Pritchett who used variable of desired fertility level[15] as predictor for actual fertility in developing countries. He found that this single variable has a 90% association with actual fertility level in 56 developing countries, which challenges the view of contraception as the key factor in fertility decline. Author points out that contraception helps to prevent only

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[13] Compared with 71% of men.

[14] Low wages and poor workplace conditions without any real public assistance.

[15] hypothetical measure of what the total fertility rate would be if only "wanted" births occurred, tested by the author using data of Demographic and Health Surveys (DHS).

undesired births, while total majority of births in developing countries are desired[16] and therefore various factors primarily reduce desired number of children, which then results in decline in actual fertility. This eventually leads to the importance of understanding factors, which form actual fertility preferences: individual norms and values that encourage women to want higher number of children. This idea is then supported by Eberstadt and Shah: "Socioeconomic factors, to be sure, may well affect the desired family sizes that women of childbearing age report in these DHS surveys - in fact they surely do. But the critical determinant of actual fertility levels in Muslim and non-Muslim societies alike at the end of the day would appear to be attitudinal and volitional, rather than material and mechanistic." This is our primary interest in the present study.

Summing up all mentioned above, nowadays MENA region is passing considerable social changes in many fertility and family formation aspects. Globalization processes, urbanization, integration into world economics, adoption of new technologies and foreign experience, new ideas and means of communication – all these transformations, growing from year to year like a snowball and drawing in more and more spheres of existence, bring incredible changes in the very nature of fertility behavior. On average, it is not always visible, but these changes of fertility and family formation, which eventually happen in MENA countries these days, have already pulled their societies out from everlasting stasis and thrown them into a storming ocean of ever-changing modern world. Breaking away from traditional world, but still clinging to it with their familiality and religious authorities, they see the inevitability of changes and they do change, but in the same time they oppose themselves to the avant-garde of these changes – the West – very often not agreeing to the direction of occuring changes and trying to find alternative ways of social modernization, culturally acceptable and fitting the paradigm of Islam. Moving to rapidly growing cities and being proletarized, they have to change their family and fertility behavior, which challenges existing governing systems accustomed to entirely traditional agrarian society. Fertility is typically associated with marriage, but other important factors include socio-economic development, state policies, individual gender values and social class. Women's empowerment tends to result in fertility decline in developing countries as high fertility becomes meaningless and even burdensome. Despite these persistent and widespread patterns countries still do differ in terms of family planning programs, legislation, gender equity defined the position of women on the state. Besides, each country has different economic opportunities and different structure of social spending which affects a lot starting conditions for any policy implementation and social development. So in the end it can be summarized that fertility level in MENA countries is formed by various actors on two levels: macro-scale or country level, where different "external" factors are applied to the individual,

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[16] According to DHS surveys.

and micro-scale or individual level, where lots of individual characteristics (among which marital status, education and employment are most important) determine resulting number of children. All the factors observed in many studies above also guide us to the selection of specific data variables to examine jointly in this paper.

And countries themselves do matter as well: more "liberal" ones with lower fertility level and European-like family legislation include Turkey, Tunisia, Lebanon and Morocco, and can be grouped into one cluster; very rich and in the same time very conservative countries with strong Muslim traditions – like Saudi Arabia or Kuwait\Qatar – another one; some countries, that try different ways of "Islamic modernization", combining Muslim traditions with some modern advances - like Iran, Libya and Algeria – can be assigned to a third cluster; and conservative and poor MENA countries like Iraq, Syria, Palestine, Jordan, Pakistan, Yemen and Egypt would respectively constitute the fourth cluster.

Data and sample

Fourth, fifth and sixth waves of World Values Survey were used as database for this research. Fourth wave was conducted between 1999-2004, fifth wave was conducted between 2005-2009 and sixth wave of the survey was conducted between 2010-2014. Data on most countries was used from wave six; except for Iran and Pakistan – missing in sixth wave, they had to be used from fifth wave, while Saudi Arabia - even from wave four. The WVS maintains nationally representative samples in each country. Information is collected in standardized face-to-face interviews.

Among 21 countries that belong to MENA region according to the World Bank definition (and plus Turkey and Pakistan as a countries with also strong Muslim culture and traditions and integration into MENA region) 16 participated in WVS at least once in last three waves, 13 of them – in most recent wave in 2010-2014. Total list of MENA countries with available individual data consists of 16 countries: Algeria, Palestine, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Pakistan, Qatar, Saudi Arabia, Tunisia, Turkey, Egypt and Yemen. Total population of these countries in 2013 was 538 mln., which is 7,5% of world population and was already bigger than population of EU (507 mln. in 2013). Total GDP (PPP) of the region is $8 bln., which is 8% of world GDP and about 50% of EU GDP.

To acquire values and attitudes data on these countries, we use national random samples, provided by WVS and totaling 22,196 respondents, aged 35-64. Our target (dependent) variable is *number of children.* The main research method is multilevel Poisson regression modelling. First, we test model only with control individual variables. Second, we add individual-level characteristics of employment, perception of self-freedom and gender egalitarian attitudes.

Variables

The dependent variable is measured as X011 "How many children do you have?" Independent variables are listed in the table (fig. 1.).

On the individual level we control for the following characteristics:

Sex. Sex is recorded as "1" for males and "0" for females.

Age. We narrow age intervals to 35-64. The reason for such reduction is to take into analysis only respondents whose fertility is mostly complete. Age is then divided into 3 categories: 35-44, 45-54 and 55-64.

Marital status is recorded into dummy variable, where "1" – status of being married, and "0" – any other marital status.

Education. Education is measured through X025 "What is the highest educational level you have attained?" We recode this variable into dichotomous one, where "1" stands for higher education and "0" for any other education.

Income is measured through the question X047 "On this card is an income scale on which 1 indicates the lowest income group and 10 the highest income group in your country. We would like to know in what group your household is. Please, specify the appropriate number, counting all wages, salaries, pensions and other incomes." We have recoded this variable into 3 categories: 1-3 as "Low income", 4-7 as "Middle income" and 8-10 as "High income".

Tested individual level variables:

Employment status is measured by current status in the labor market, where "0" stands for employed persons, "1" – for unemployed ones, and "2" – for non-active (retired, students, housewives, etc.);

Perception of self-freedom is measured through the following question "Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "no choice at all" and 10 means "a great deal of choice" to indicate how much freedom of choice and control you feel you have over the way your life turns out". We have recorded this variable into variable with 3 levels: 1 – "Low level of freedom of choice and control", 2 – "Middle level of freedom", and 3 – "Full freedom".

Gender egalitarian attitudes variable is constructed as index, equally combining degree of agreement with the following statements:

v45: "When jobs are scarce, men should have more right to a job than women";

v52: "A university education is more important for a boy than for a girl";

v51: "On the whole, men make better political leaders than women do".

The resulting index variable varies from 0 – "traditional gender attitudes" to 1 – "egalitarian gender attitudes".

We also supplement our Poisson regression analysis of individual data with descriptive analysis of country-level data, used to form consistent clusters of MENA countries having similar socio-demographic characteristics and pursuing similar policies.

Fig 1. Conceptual framework

Fertility level (number of children)

Individual factors:	**Country-level factors (supplementary):**
Control variables:	Contraception prevalence
Education level	Secondary education enrollment rate
Income level	GDP per capita
Marital status	Health expenditures
	Emancipative Values Index
Examined variables:	
Gender-egalitarian values	
Subjective freedom of choice Employment status	

Preliminary results

Table 1. Key and most important country-level statistics, around 2010 or nearest available

	Total Fertility rate	Contraception prevalence	Secondary education enrollment rate, females	Tertiary education enrollment rate	Female labor force participation rate, %, estimate	GDP per capita (PPP), Int 2011 $	Health expenditures, public, % GDP	Education expenditures, gov-t, %GDP	Urban population, % (nat, est.)	Quality of government index (1 - highest quality)	Gender Inequality Index	Emacipative Values Index
Source:	World Bank	UN	UNESCO	World Bank	ILO	World Bank	WHO	UNESCO	United Nations	ICRG	UN	Welzel, 2013
Top-Developed												
Tunisia	2,1	62,5	92,2	43,4	24,9	10410	3,8	6,2	65,9	0,6	0,27	0,28
Turkey	2,1	73	80,7	50,1	27,6	16674	4,4	2,9	70,7	0,52	0,36	0,34
Lebanon	1,5	58	75,0	48,6	22	16263	2,7	1,6	87,2	0,49	0,41	0,4
Iran	1,9	77,4	79,0	42,9	16	16979	2,8	4,3	70,6	0,48	0,51	0,33
Algeria	2,8	61,4	81,5	34,1	14,6	12494	3,3	4,3	67,5	0,44	0,43	0,32
Oil-Rich												
Qatar	2,1	38	116,7	26,6	50,5	127983	1,6	2,4	98,7	0,58	0,52	0,27
Saudi Arabia	2,8	23,8	119,5	40,3	17,7	45597	2,6	5,1	82,1	0,58	0,32	0,32
Libya	2,5	41,9	113,0	63,8	29,8	30260	2,1	2,7	77,6	0,39	0,22	0,26
Kuwait	2,7	52	100,7	41,2	42,8	75365	2,2	3,8	98,3	0,61	0,29	0,32
Less developed												
Egypt	2,9	60,3	74,4	31,8	23,3	10614	1,9	3,8	43	0,47	0,58	0,23
Morocco	2,6	67,4	58,0	13,5	25,9	6465	2,1	5,4	57,7	0,61	0,46	0,33
Jordan	3,5	59,3	91,5	42,9	15,6	11256	5,9	4,9	82,5	0,56	0,49	0,23
Palestine	4,2	52,5	88,8	57,4	14,7	4162	-	-	73,9	-	-	-
Least Developed												
Iraq	4,2	52,5	45,3	11,9	14,5	12329	2,7	-	69	0,29	0,54	0,27
Pakistan	3,4	35,4	29,6	8	23,9	4219	1	2,3	36,6	0,47	0,56	0,3
Yemen	4,5	27,7	33,8	6,6	24,8	4534	1,3	4,6	31,7	0,31	0,73	0,22

Table 2. Individual-level Statistics by country, selected sample 35-65

For selected sample, 35- 64

Country	Year of survey	N	Number of children	% females	Highly educated,%	Highly educated,% women	High income,%	Employed, females%	Unemployed, total %	Low level of freedom,%	Gender egalitarian attitudes, average index
Algeria	2013	468	2,76	52.6	32.2	36.0	9.1	22.0	22.6	9.4	,28
Palestine	2013	446	4,25	55.3	48.5	47.8	8.7	12.3	12.2	11.4	,29
Iran	2007	855	3,28	51.6	28.0	25.5	10.5	16.2	25.8	6.1	,27
Iraq	2012	554	3,99	44.3	22.8	21.2	14.1	11.2	10.6	9.7	,29
Jordan	2014	590	4,62	47.3	27.3	28.4	14.3	11.0	12.4	5.2	,26
Kuwait	2014	464	3,31	35.9	41.2	50.7	22.8	77.9	5.6	6.0	,27
Lebanon	2013	564	2,51	48.8	47.3	47.4	21.7	42.9	11.8	5.1	,38
Libya	2014	1014	3,34	42.4	47.8	53.5	15.8	30.6	9.3	6.8	,27
Morocco	2011	362	2,99	51.0	5.4	5.4	3.4	84.1	7.5	9.1	,34
Pakistan	2012	520	3,46	53.3	10.2	6.0	19.7	3.0	7.3	6.2	,25
Qatar	2010	567	4,27	55.1	38.2	43.7	31.3	44.9	6.1	4.1	,26
Saudi Arabia	2003	536	3,82	49.9	23.1	19.6	30.5	17.7	8.9	7.8	,21
Tunisia	2013	435	2,66	43.7	22.7	24.2	7.9	31.4	21.0	9.3	,30
Turkey	2011	706	2,49	48.7	29.0	25.0	22.0	23.4	8.7	3.4	,32
Egypt	2013	783	1,84	70.6	22.1	18.4	4.7	9.5	7.5	15.6	,24
Yemen	2014	362	4,34	54.0	14.7	6.3	5.5	8.0	15.0	17.7	,23

Table 3. Poisson regression models of the number of children in MENA countries

	Tunisia	Turkey	Lebanon	Iran	Qatar	Saudi Arabia	Libya	Algeria	Kuwait
Female	Basic category								
Male	-0.206**	0.0183	0.0570	0.0893	-0.0801	-0.0762	-0.236***	-0.0706	-0.0367
35-44	Basic category								
45-54	0.431***	0.181***	0.303***	0.396***	0.132***	0.194***	0.346***	0.325***	0.275***
55-64	0.767***	0.353***	0.410***	0.657***	0.248***	0.235**	0.562***	0.571***	0.243***
Any other marital status	Basic category								
Married	0.768***	0.564***	0.915***	0.336***	0.765***	0.799***	1.157***	1.362***	0.743***
Not higher education	Basic category								
Higher education	-0.211	-0.324***	-0.0571	-0.227***	-0.0958**	-0.146***	-0.0970**	-0.269***	0.0839*
Low family income	Basic category								
Middle Income	-0.0452	-0.114*	0.0641	-0.0948**	-0.0880	-0.0384	-0.0727	-0.0369	-0.220***
High Income	-0.0995	-0.317***	0.0364	-0.165*	-0.0853	0.150**	-0.127**	0.0201	-0.365***
Employed	Basic category								
Unemployed	-0.275***	0.0526	0.165**	-0.0893	0.208***	-0.259	-0.0446	0.0423	0.185**
Non-Active	0.0849	0.136	0.137**	0.218***	0.163***	0.256***	0.218***	0.0466	0.182
Low level of freedom of choice and control	Basic category								
Middle level of Freedom	-0.137	0.0279	-0.0457	0.0441	0.0651	-0.0668	0.0334	-0.264**	0.0558
Full Freedom	-0.0551	-0.00338	-0.0671	0.0510	0.124	-0.169**	0.0904	-0.153	0.139
Gender Equality Values index (0->1)	-0.307	-0.0149	-0.334**	-0.506***	0.137	-0.111	-0.144	-0.255*	-0.363***
Constant	0.257	0.273*	-0.0261	0.694***	0.626***	0.611***	0.109	-0.0755	0.598***
Observations	435	706	564	855	567	536	1,014	468	464
Pseudo R-squared	0,14	0,05	0,11	0,08	0,06	0,09	0,14	0,20	0,11

*** p<0.01, ** p<0.05, * p<0.1

Table 3. Poisson regression models of the number of children in MENA countries (cont.)

	Egypt	Morocco	Jordan	Palestine	Iraq	Pakistan	Yemen
Female	Basic category						
Male	-0.136	-0.159***	0.139	-0.122*	0.0664	-0.0372	-0.0361
35-44	Basic category						
45-54	-0.249***	0.371***	0.190***	0.211***	0.197***	0.215***	0.0712
55-64	-0.605***	0.619***	0.414***	0.227***	0.253***	0.414***	0.0992
Any other marital status	Basic category						
Married	0.571***	0.695***	0.727***	0.653***	0.548***	0.874***	0.312**
Not higher education	Basic category						
Higher education	-0.155*	0.0400	-0.139***	-0.0570	0.0262	0.110	0.0220
Low family income	Basic category						
Middle Income	0.173***	-0.0451	-0.0648	-0.100*	0.000823	-0.0420	-0.0743
High Income	0.184	-0.285*	0.0333	-0.0896	-0.142	-0.136*	-0.341
Employed	Basic category						
Unemployed	0.168	0.0644	0.0639	0.0274	0.0527	0.153**	-0.117
Non-Active	-0.158*	0.0254	0.300***	-0.0151	0.169	0.0634	0.158
Low level of freedom of choice and control	Basic category						
Middle level of Freedom	-0.107	-0.0845	-0.0866	0.0598	-0.0630	0.116	0.101
Full Freedom	0.0138	-0.157	-0.0374	0.105	-0.00873	0.124	0.293***
Gender Equality Values index (0->1)	0.326*	-0.352**	-0.174	-0.280*	-0.374**	-0.233	-0.354*
Constant	0.398**	0.496***	0.635***	0.897***	0.814***	0.243	1.079***
Observations	783	362	590	446	554	520	362
Pseudo R-squared	0,06	0,10	0,07	0,04	0,04	0,05	0,03

*** p<0.01, ** p<0.05, * p<0.1

Country-level analysis

Basic descriptive analysis of country-level data has shown that in terms of number of children and factors that affect it the most, countries of the MENA region can be divided into four following groups (clusters):

1. Most developed countries with widespread contraception, high level of education and healthcare system and high level of emancipative values: Turkey, Tunisia, Iran, Lebanon. Total Fertility rate for these countries is the lowest and varies from 1,5 to 2,1

2. Oil-exporting economies, that decreased fertility level primarily by vast education investments and astronomical level of GDP per capita but who attempt to restrict contraception and family planning programs. Moderate level of social expenditures (% of GDP) and emancipative values, high level of education, low level of contraception prevalence: Qatar, Libya, Kuwait, Saudi Arabia, Algeria. TFR varies from 2,1 to 2,8.

3. Moderately developed countries without large reserves of natural resources. Moderate level of contraception prevalence, moderate level of social expenditures and education system, moderate level of emancipative values: Egypt, Morocco, Jordan, Palestine. TFR varies from 2,6 to 4,2.

4. Less developed MENA countries with low level of socio-economic development. Low level of contraception prevalence, social expenditures, education system, emancipative values: Iraq, Pakistan, Yemen. TFR is the highest in these countries and varies from 3,4 to 4,5.

The produced basic analysis of country-level data allows us to conclude that education enrollment level and contraception level are the most predictive factors of the number of children. An important role is also played by healthcare expenditures, as a proxy for social expenditures in general. Having descriptively analyzed whole list of country-level variables, we came to the conclusion, that following 5 variables need to be taken into resulting multilevel model: aforementioned education enrollment rate, contraception prevalence level and healthcare expenditures – along with GDP PPP per capita (basic indicator of economic condition) and Emancipative Values index (Welzel's indicator of human empowerment). The same set of variables we also examine on our clusters' level.

Table 4. Key Country-level variables, clusters

	Cluster 1 (Top developed)	Cluster 2 (Oil-Rich)	Cluster 3 (Less developed)	Cluster 4 (Least developed)
Country-level (not population-weighed)				
Total Fertility rate (2010)	1,92	2,60	3,22	4,02
Contraception prevalence	70,2	42,6	60,2	39,2
GDP per capita (PPP), Int 2011 $	15591,9	53061,5	8449,1	7174,5
Secondary education enrollment rate	81	110	78	36
Health expenditures, public, % GDP	3,4	2,4	3,2	1,7
Emacipative Values Index (Welzel)	0,34	0,30	0,26	0,27

Individual-level analysis

The analysis of individual-level data suggests the following conclusions:

- As expected, marriage is still heavily tied to marital behavior. But there is also significant variation that suggests this effect to be significantly different in different countries.

- Higher education effect is significant only in countries where notably lower number of children is reported in survey: Algeria, Iran, Libya, Qatar, Saudi Arabia, Turkey and Egypt. The only country with high level of fertility where this effect is significant is Jordan. The lack of significance in other countries allows us to guess that the connection between education and number of children in this countries may be non-linear: it is possible, that women with the highest level of education have more opportunities for work or they come from richer families, which gives them more opportunities to realize their fertility intentions, but does not change their values a lot. Or there is a too little variation, which means that societies in these countries are still highly homogeneous in terms of values.

- Persons with lower level of income have higher number of children only in Iraq and Kuwait, and fewer children – in Egypt. Persons who have higher level of household income have less children in Kuwait, Libya and Turkey, but more – in Saudi Arabia. This corresponds with the findings from literature: in Saudi Arabia the government aims to preserve traditional gender roles by any means and its vast profits from oil exports create opportunities for people with traditional gender values to realize their traditional ideals, while the government of pre-war Libya was investing its oil profits into social policies, therefore modernizing gender values and not preserving them. Regarding Egypt, it is worth noting that average number of children in Egypt in survey is much smaller than that according to statistics, and a reason for such a difference could be in the quality of WVS sample for Egypt: Egyptian women tend to have more liberal values, higher education and less children than they should, building on the statistical country-level data. Probably, some part of women, living in rural settlements, was not included in the sample.

- Effect of employment is also significant only in a number of countries: unemployed persons have more children in Kuwait, Morocco, Pakistan and Qatar, but less in Iran. Iran's exceptionalism in this case can be easily explained using existing studies and statistical data: its advanced state of contraception revolution and female higher

education enrollment gives rise to a big proportion of women who are well educated and are in power to control their lives, but still face heavy pressure from traditional muslim norms that restrict their opportunities of employment and self-fulfillment. Non-active persons (primarily, housewives) have higher number of children in Iraq, Jordan, Libya, Lebanon, Qatar and Saudi Arabia.

- Effect of life control is only significant in four countries: Libya, Saudi Arabia, Egypt and Yemen. Generally, persons with fewer children in these countries estimate that they have also less control over their life. It is hard to identify the direction of causal relationship (if it does exist), but it may be assumed that women who don't feel themselves free enough give birth to lower number of children or that persons assess their level of personal freedom by number of children they have.

- And the last examined variable – gender-egalitarian values. Significant in most countries, it has negative effect on the number of children. This completely confirms the hypothesis derived from the theory of R. Inglehart – more emacipated women with more gender-egalitarian values have fewer children.

Having conducted this primary individual-level analysis, it seems hard to distinguish any definite dependencies in country effects. As proposed above, we conduct multilevel analysis, where we examine both – constructed clusters effects and basic country-level variables effects separately. The results of multilevel Poisson regression are presented in the table 7.

Table 5. Multilevel Poisson regression models and separate Poisson models for clusters

|	Multilevel poisson regression models			Single-level poisson regression models			
	Model 1 (Basic)	Model 2 (with clusters)	Model 3 (with macro-variables)	Cluster 1 (top-developed)	Cluster 2 (oil-rich)	Cluster 3 (less developed)	Cluster 4 (least developed)
Basic – Female							
Male	-0.0643***	-0.0645***	-0.0637***	0.00819	-0.143***	0.101**	-0.0309
Basic - 35-44							
45-54	0.232***	0.232***	0.234***	0.332***	0.252***	0.0733**	0.182***
55-64	0.371***	0.371***	0.380***	0.515***	0.372***	0.129***	0.272***
Basic - Any other marital status							
Married	0.797***	0.798***	0.804***	0.661***	1.025***	0.778***	0.510***
Basic - Not higher education							
Higher education	-0.0967***	-0.0965***	-0.102***	-0.139***	-0.0289	-0.0354	0.100**
Basic - Low family income							
Middle Income	-0.0468***	-0.0468***	-0.0418***	-0.113***	-0.0337	0.0467	-0.0917***
High Income	-0.0637***	-0.0640***	-0.0627***	-0.237***	0.0140	0.0988*	-0.274***
Basic – employed							
Unemployed	0.0439**	0.0440**	0.0449**	-0.0632*	0.106***	0.265***	0.0261
Non-Active	0.131***	0.131***	0.137***	0.154***	0.191***	0.190***	0.112
Basic - Low level of freedom of choice and control							
Middle level of Freedom	-0.0319	-0.0316	-0.0415*	-0.000707	-0.0495	0.00918	0.0148
Full Freedom	0.00852	0.00882	-0.00239	0.00154	0.0247	0.0724	0.0783
Gender Equality Values index (0->1)	-0.193***	-0.193***	-0.185***	-0.441***	-0.162***	0.112	-0.331***
Cluster: Basic - Top-developed							
Cluster: Oil-rich		0.342***					
Cluster: less developed		0.187					
Cluster: least developed		0.369**					
Country: Contraception prevalence			-0.0111***				
Country: Education Enrollment			-0.00590*				
Country: Health expenditures			0.0959**				
Country: Emancipation values			-0.595				
Country GDP PPP per capita (log)			0.201**				
Constant	0.429***	0.136	-0.565	0.384***	0.301***	0.198**	0.869***
Observations	9,226	9,226	8,780	2,560	3,049	2,181	1,436
AIC	36983.14	36984.91	35077.25				
BIC	37082.96	37120.38	35211.77				
Number of groups	16	16	15				
Pseudo R-squared				0,08	0,11	0,05	0,03

*** p<0.01, ** p<0.05, * p<0.1

Multi-level analysis: results

Conclusion

The goal of this study was to explain the differences in fertility patterns in MENA countries through the relationship between socio-economic factors and values. Why this diversity occurs in countries with similar traditional values and common dominating religion? Data and literature analysis revealed several clusters among MENA countries, that differs in their state of modernization, their approach to social policies and in the resources they posess. On average, MENA countries tend to have stricter gender norms with significantly more rigid and asymmetrical division of gender and family duties: men do work and bread-win, while women do children and breast-feed. But as the modernization comes and spreads into life of everyone by many ways, such a millennial order becomes no more feasible. And a great diversity comes along with it. While some MENA countries have TFR at level of 2 children per woman, other still have it at 3 or 4 children. In some countries – like Turkey, Tunisia or Iran – women with education give birth to a lower number of children at the cost of high and widespread access to contraception, while in other – Saudi Arabia or Qatar, to name a few – they do this even with much lower access to contraception, using sophisticated marital and cultural mechanisms yet requiring further investigation. And some countries – like Iraq, Yemen and Pakistan – are just still lacking any kind of capital that can push forward fertility transition. Low level of education enrollment, as well as low level of public social investments, contraception access and female labor force participation. Speaking from the other point, some oil-rich MENA countries have exceptionally high level of female labor force participation rate , but other – like Saudi Arabia or Algeria – have the reverse, even lower than average MENA level. In many MENA countries, even of different level of well-being, average level of female labor force participation is in narrow range of 22-27%, with a few, both poor and rich ones in range of 14-17%.

Individual data analysis supports theoretical findings but is significant only in a number of countries.

Appendix 1. UN historical and projected population estimates for European Union and MENA region, 1950-2100
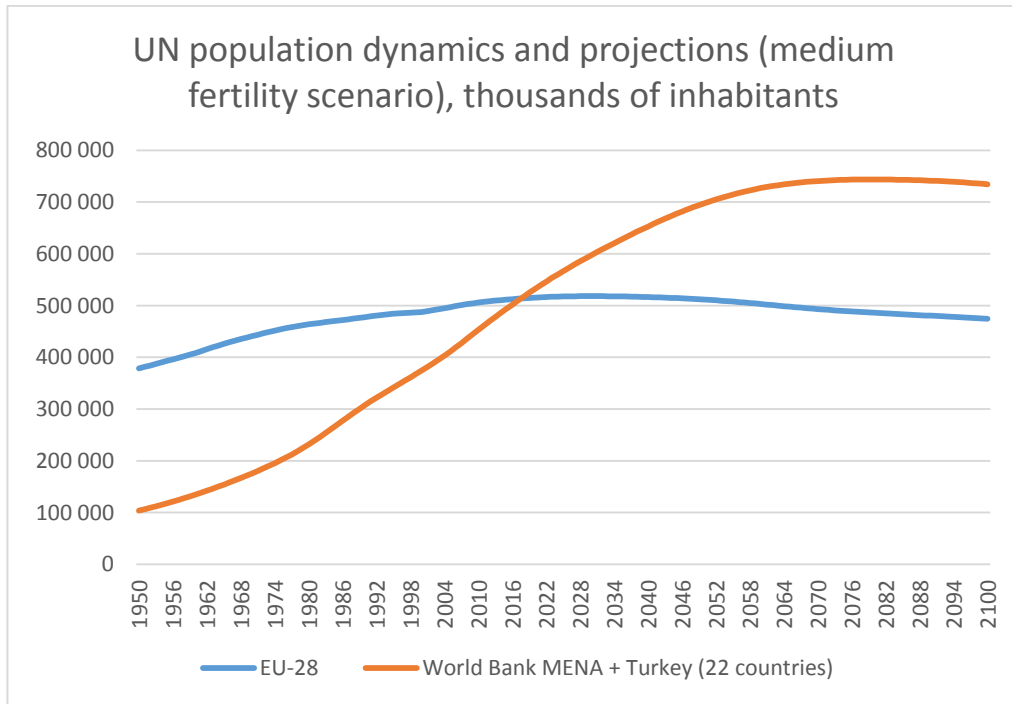
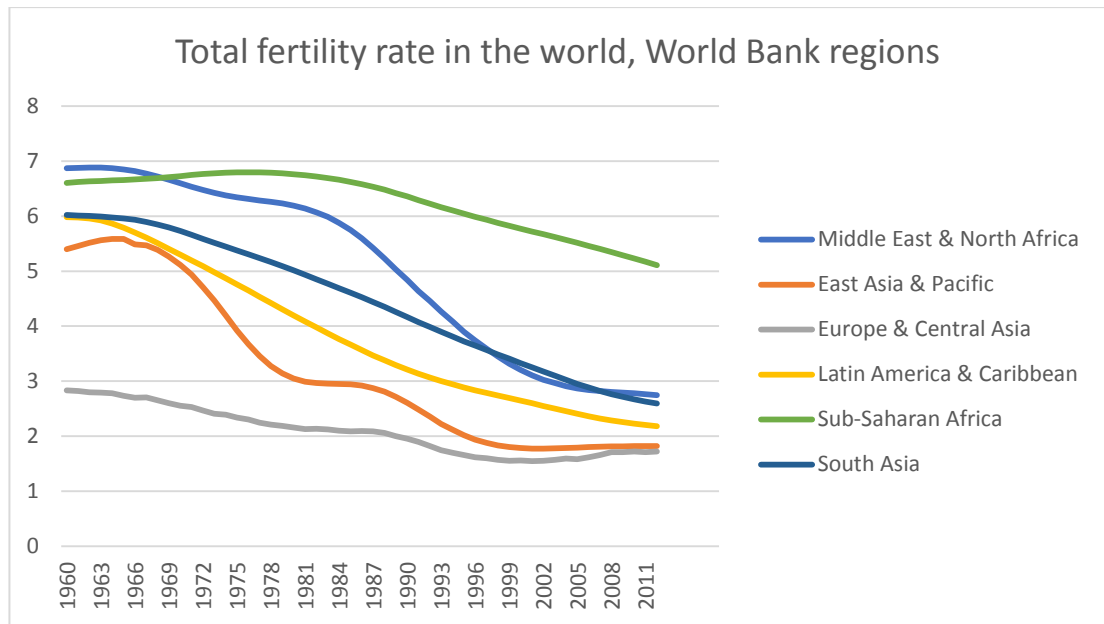Source: UN World Population Prospects, 2012 revision.

Appendix 2. UN historical and projected population estimates for countries of MENA region (World Bank definition, Turkey added), 1950-2100
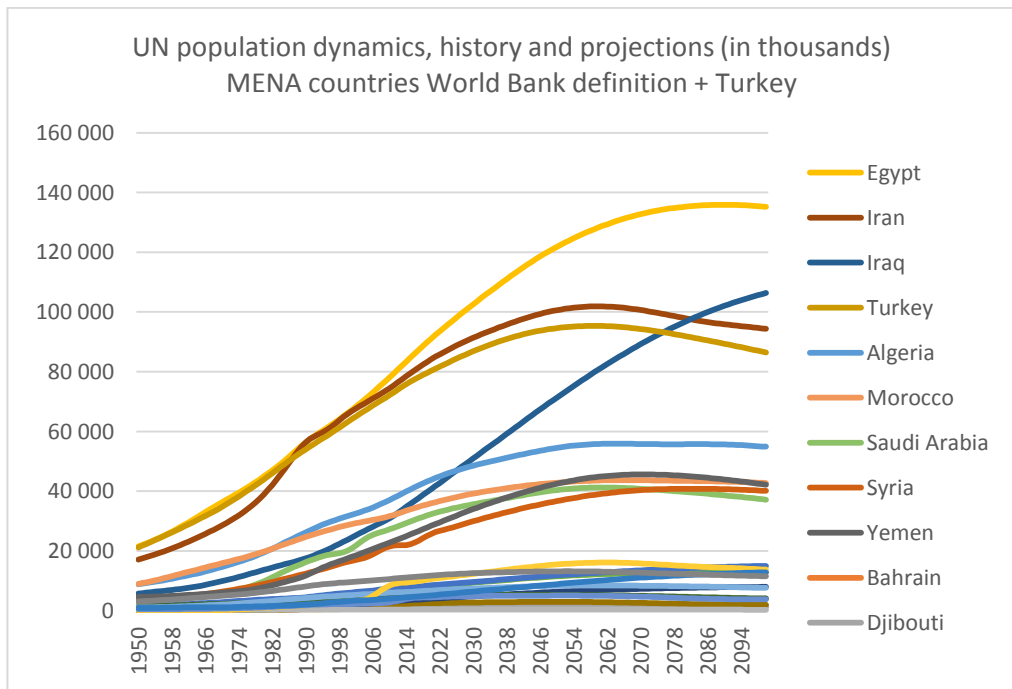
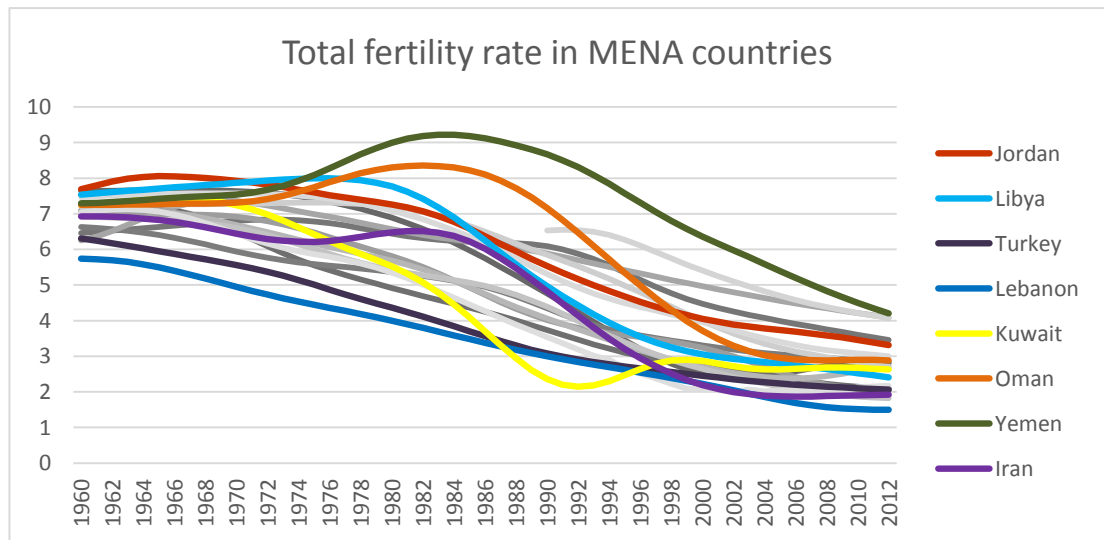

Source: UN World Population Prospects, 2012 revision.

Appendix 3. Total fertility rate across world regions, 1960-2012

Total fertility rate in the world, World Bank regions

Appendix 4. Different paths of fertility transition across MENA region, 1960-2012

Total fertility rate in MENA countries

Note: Turkey added and Israel and Malta excluded as non-muslim countries.

Appendix 5. Contraceptive prevalence in MENA countries (% of women ages 15-49), 1971-2013
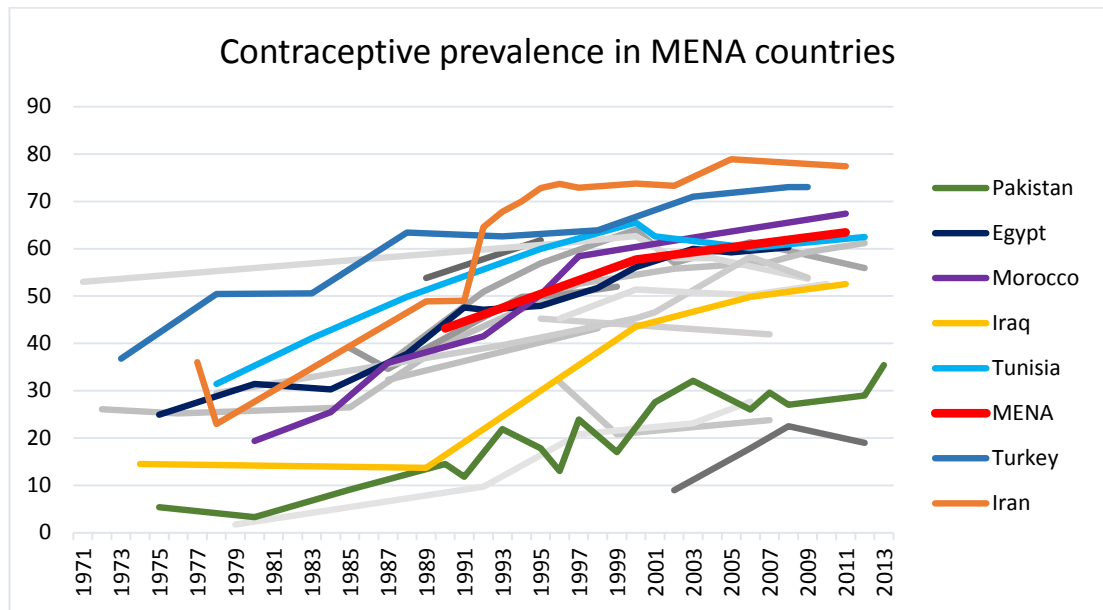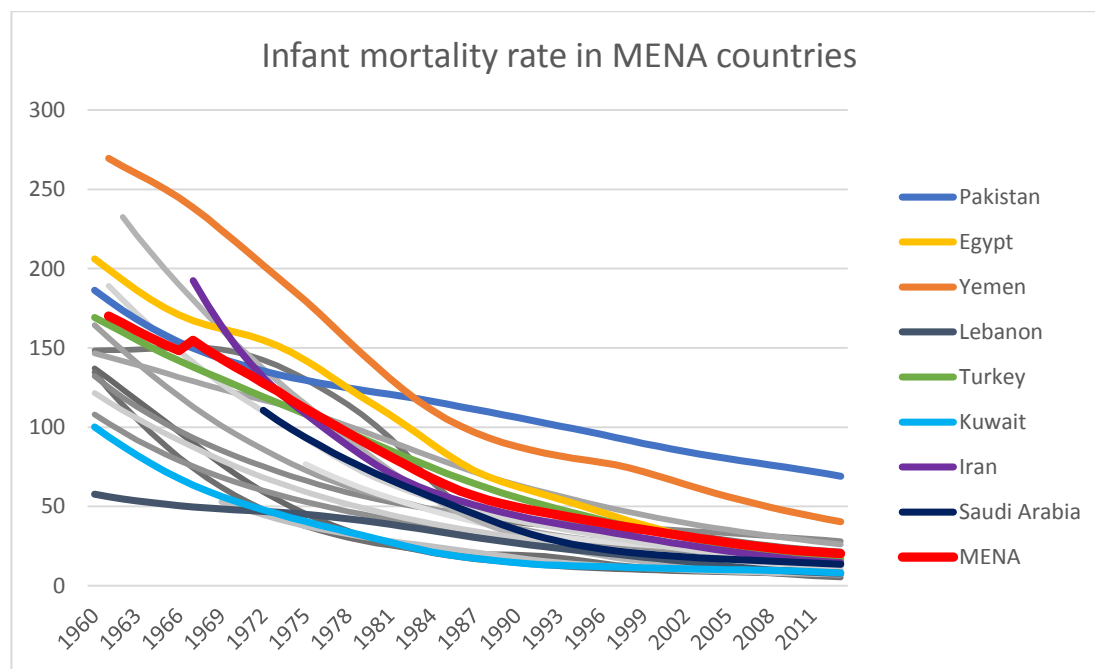

Note: Turkey and Pakistan added as muslim countries geographically close to to be a part of the MENA region.

Source: World Bank online database, Contraceptive prevalence (% of women ages 15-49) (different sources)

http://data.worldbank.org/indicator/SP.DYN.CONU.ZS

Appendix 6. Infant mortality rate in MENA countries (per 1000 live births), 1960-2013

Note: Turkey and Pakistan added as muslim countries geographically close to to be a part of the MENA region.

Source: World Bank online database, Mortality rate, infant (per 1,000 live births) (different sources)

http://data.worldbank.org/indicator/SP.DYN.IMRT.IN

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