



# Fertility differences across the MENA region

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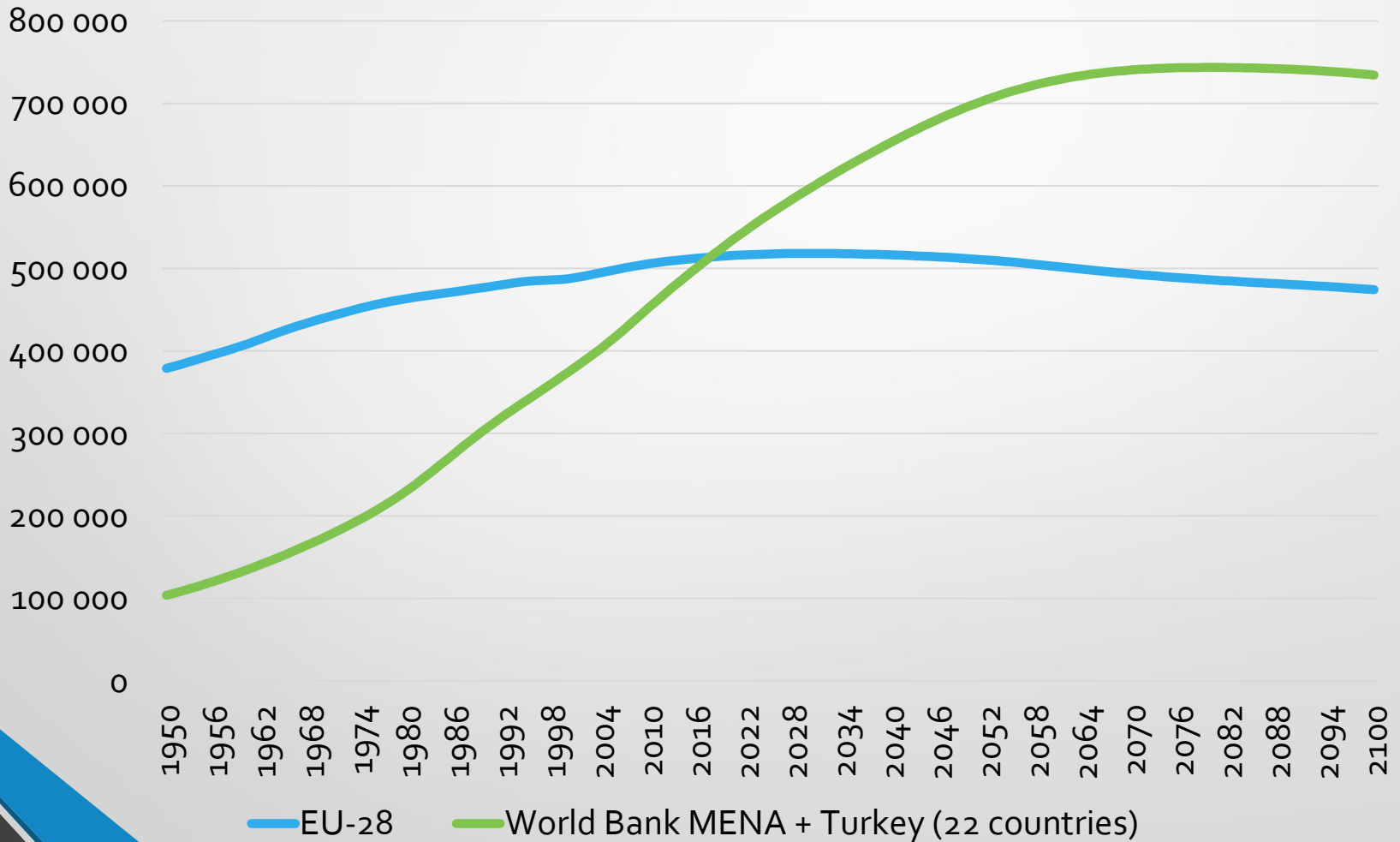
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# Motivation

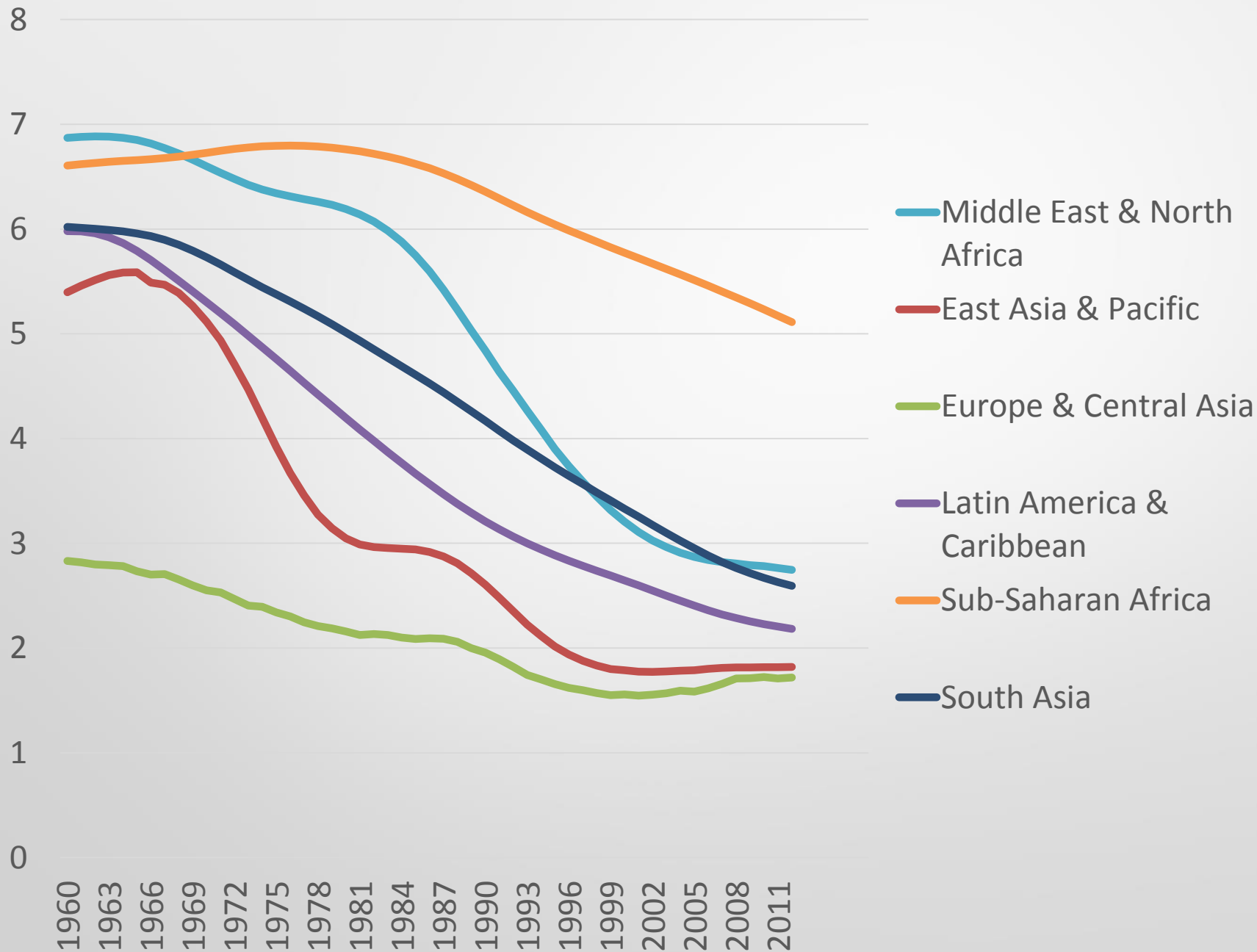
- With exception for Sub-Saharan Africa, MENA countries still have the highest fertility level in the world.
- The greatest fertility decline in the world during last 30 years also happened in MENA (Salehi-Isfahani et al, 2010), but then fertility decline stalled.
- Densely populated and actively growing region, with common religion, influence of Arab culture, but in the same time very diverse in fertility level (Eberstadt and Shah, 2012).

# Motivation

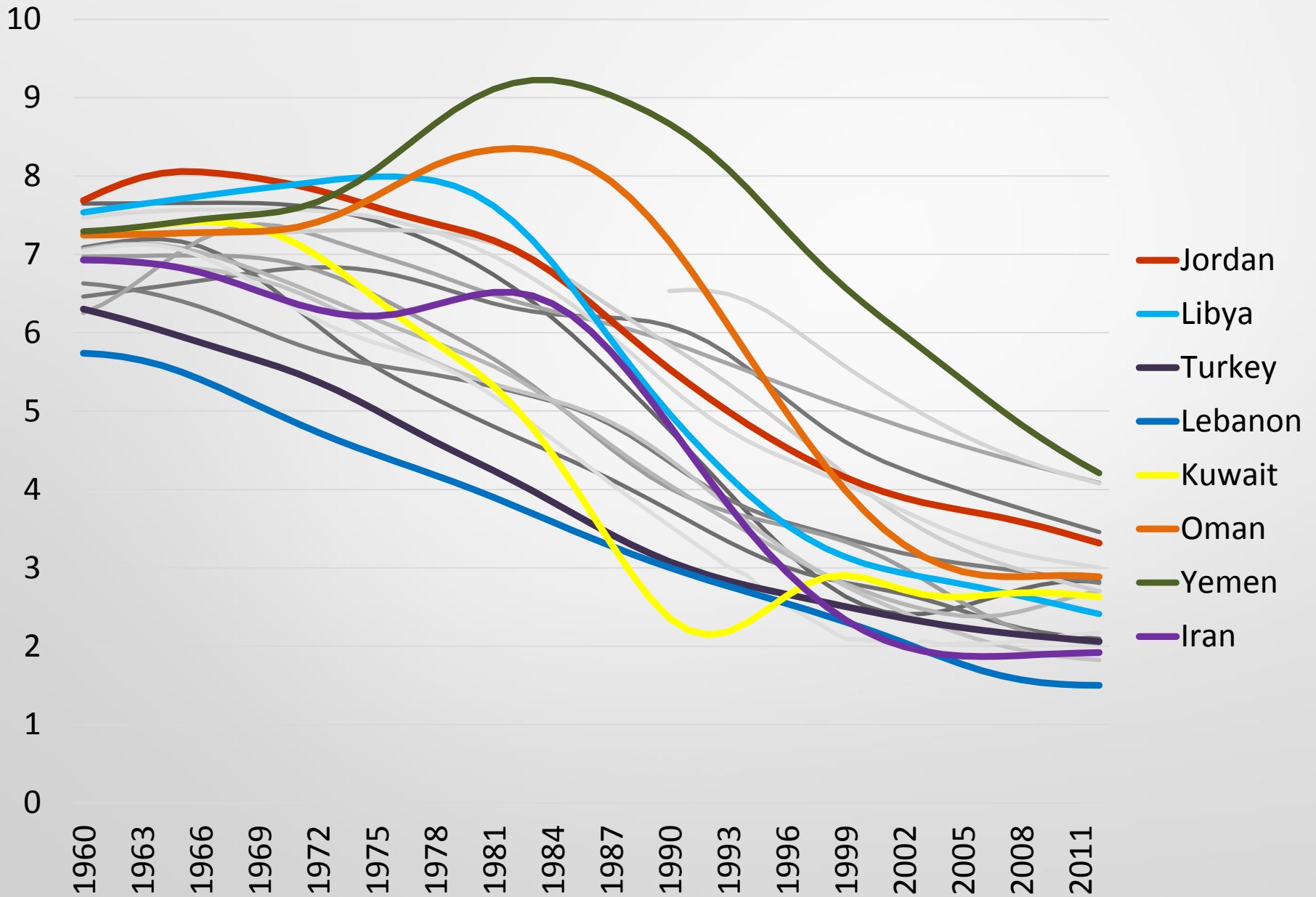
UN population dynamics and projections (medium fertility scenario), thousands of inhabitants



# Total fertility rate in the world, World Bank regions



# Total fertility rate in MENA countries



# The goal

The goal is to explain the differences in fertility patterns in MENA countries through the relationship between socio-economic factors and values

Research question: Why this diversity occurs in countries with similar traditional social norms and common dominating religion?

MENA countries had almost the same fertility level just a half century ago - why then it differs now? And what are the main factors of such diversity nowadays?

# Literature review

- Focused mainly on a single countries (Hosseini-Chavoshi and Abbasi-Shavazi, 2012; Frini and Muller, 2012; Salam, 2013; Dinçer et al., 2014; Loeffler and Friedl, 2014), or the whole region (Eberstadt and Shah, 2012), but without revealing fertility differences among the countries.
- Studies where fertility differences are investigated, mostly focused on comparison of developed and developing countries (Abeynayake et al., 2012; Jain and Ross, 2012), but don't examine fertility differences within the MENA region.

# Literature review – key findings

- Muslim family law hinders fertility decline and preserve patriarchy, but socio-economic development puts heavy pressure on it (Moghadam, 2003, 2004)
- Access to contraception and level of education are factors that contribute the most to fertility decline (Moghadam, 2004; Obermeyer, 1994; Hoodfar, 1996; Roudi-Fahimi & Kent, 2007; Salam, 2013; Loeffler and Friedl, 2014)
- Strong leadership of the government, its' strong intention to provide widely available contraception, healthcare and education (expecially for women), in order to lower fertility level is a key for understanding the trends in some Middle East countries (Caldwell and Sathar, 1996).
- There is no or little connection between fertility level and labor participation of women in MENA countries (İlkkaracan, 2012; Loeffler and Friedl, 2014).



# Conceptual scheme – number of children

## Individual:

- Education
- Income
- Employment
- Gender values
- Freedom of choice

## Country:

- Level of socio-economic development (GDP, unemployment level)
- State-sponsored education and healthcare system (% of GDP)
- Access to contraception
- Government fertility level stance
- Level of freedoms in the country
- Population attitudes and values

# Hypotheses

- H<sub>1</sub>: People with gender egalitarian attitudes are likely to have fewer children.
- H<sub>2</sub>: People with high self-perception of freedom have fewer children.
- H<sub>3</sub>: Employment status affect fertility level. Employed and better going (high income) people are seem to have fewer children than unemployed and inactive as well as low income people.

# Data



Dataset: WVS, 4-6 waves, 16 countries, age limits 35-65,  
Our sample for 16 countries amounts of 22,196 respondents.

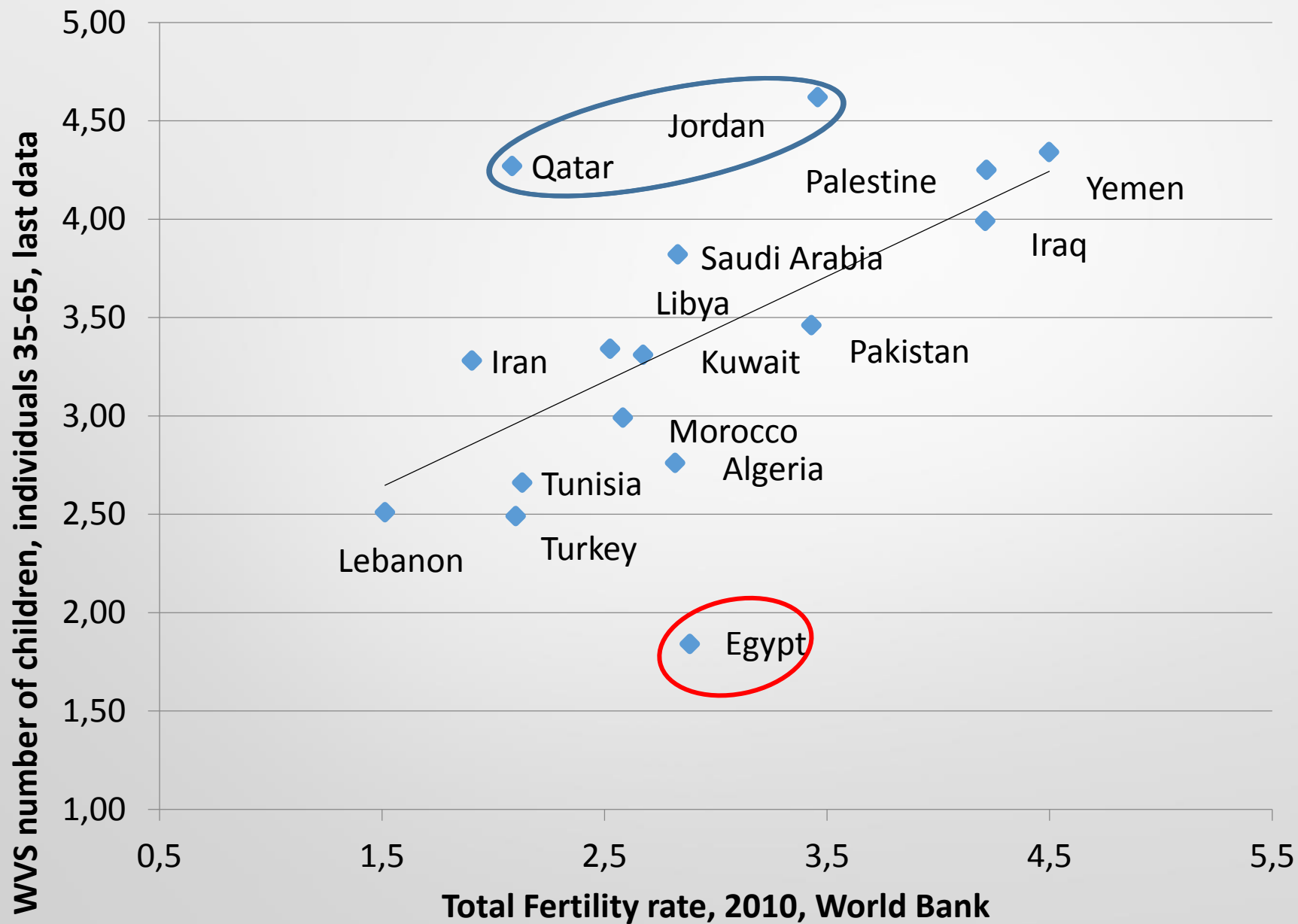
## Methods:

1<sup>st</sup> step –Poisson regression on individual variables for each country, comparison of determinants

2<sup>nd</sup> step – Explaining revealed fertility patterns differences among MENA countries

3<sup>d</sup> step- Poisson regression modeling with clustered standard errors, testing macro level variables

# WVS vs statistics



# Descriptive statistics, sample of 35-65 years old, WVS data

Country	Year of survey	N	Numb er of kids	% wome n	For selected sample, 35- 65						
					High educated ,%	High educated , f. %	High income, %	Employ ed, f. %	Unemplo yed, total %	Lack of freedom, %	Gender egalit.at., index
Jordan	2014	603	4.6	47.3	27.3	28.4	14.3	11.0	12.4	5.2	0.4
Yemen	2014	366	4.3	54.0	14.7	6.3	5.5	8.0	15.0	17.7	0.3
Qatar	2010	579	4.3	55.1	38.2	43.7	31.3	44.9	6.1	4.1	0.4
Palestine	2013	453	4.3	55.3	48.5	47.8	8.7	12.3	12.2	11.4	0.4
Iraq	2012	559	4.0	44.3	22.8	21.2	14.1	11.2	10.6	9.7	0.4
Saudi Arabia	2003	538	3.8	49.9	23.1	19.6	30.5	17.7	8.9	7.8	0.3
Pakistan	2012	528	3.5	53.3	10.2	6.0	19.7	3.0	7.3	6.2	0.3
Libya	2014	1039	3.3	42.4	47.8	53.5	15.8	30.6	9.3	6.8	0.4
Kuwait	2014	469	3.3	35.9	41.2	50.7	22.8	77.9	5.6	6.0	0.4
Iran	2007	870	3.3	51.6	28.0	25.5	10.5	16.2	25.8	6.1	0.3
Morocco	2011	369	3.0	51.0	5.4	5.4	3.4	84.1	7.5	9.1	0.5
Algeria	2013	474	2.8	52.6	32.2	36.0	9.1	22.0	22.6	9.4	0.5
Tunisia	2013	451	2.7	43.7	22.7	24.2	7.9	31.4	21.0	9.3	0.4
Lebanon	2013	570	2.5	48.8	47.3	47.4	21.7	42.9	11.8	5.1	0.6
Turkey	2011	718	2.5	48.7	29.0	25.0	22.0	23.4	8.7	3.4	0.5
Egypt	2013	812	1.8	70.6	22.1	18.4	4.7	9.5	7.5	15.6	0.3

# Tested model: Poisson regression (Nchildren – dependent variable)

## Control variables:

<b>Gender</b>	1 - males, 0 - females
<b>Age groups</b>	'35-44', basic category - '45-54', '55-65'
<b>Marital status</b>	1 - married, 0 – others
<b>Education</b>	1 - higher education, 0 – any other level
<b>Income</b>	low, basic category – medium income, high

## Tested variables:

<b>Employment status</b>	Basic category - employed, unemployed, inactive
<b>Perception of self – freedom (choice and control over life)</b>	Basic category - lack of freedom, medium level freedom, high level freedom
<b>Gender-equality attitudes index</b>	0 - traditional attitudes, 1 - egalitarian attitudes

# Results(I)

*Age groups:* 35-44 have fewer children than 45-54, and 45-54 have fewer children than 55-64, but not in Egypt

Married: strongly positive effect among all countries

*Higher education:* negative effect in all countries, where significant (Algeria, Iran, Jordan, Libya, Qatar, Saudi Arabia, Turkey, Egypt)

*High income:* negative effect in Kuwait, Libya and Turkey, positive – in Saudi Arabia

*Low income :* positive effect in Kuwait and Iraq, negative – Egypt

# Results(II)

*Unemployment: greater number of children in Qatar, Pakistan, Morocco and Kuwait, fewer - in Iran*

*Nonactive (not a part of labor force) to employed: greater number of children in Iraq, Jordan, Lebanon, Libya, Qatar, Saudi Arabia, fewer - in Egypt*

*Medium to high level of freedom: fewer children in Libya, Egypt, Yemen, more children - in Saudi Arabia*

*No freedom: fewer children in Yemen and Saudi Arabia*

*Gender-equality values index: fewer children for persons with more egalitarian values in most countries, except for Egypt*



# Coefficients from Poisson Regression, 35-65 years old, WVS data

Country	35-45	55-65	High educ	Unemplo yed	Non active	Medium freedom	No freedom	GEV	N	Pseudo R2
Algeria	<b>-0.33***</b>	<b>0.24***</b>	<b>-0.26**</b>	0.03	0.04	-0.09	0.17	<b>-0.17**</b>	474	0.1927
Palestine	<b>-0.21***</b>	0.28	-0.05	0.03	-0.02	-0.03	-0.11	<b>-.19**</b>	453	0.0424
Iran	<b>-0.39***</b>	<b>0.28***</b>	<b>-0.23***</b>	<b>-0.13***</b>	0.12	-0.07	-0.05	<b>-0.21***</b>	866	0.0873
Iraq	<b>-0.20***</b>	-0.03	0.03	0.03	<b>0.16***</b>	-0.06	0.01	<b>-0.23***</b>	559	0.0401
Jordan	<b>-0.19***</b>	<b>0.23***</b>	<b>-0.15**</b>	0.06	<b>0.30***</b>	-0.04	0.04	-0.11	603	0.0732
Kuwait	<b>-0.27***</b>	-0.6	0.07	<b>0.20**</b>	0.17	-0.90	-0.14	<b>-0.19***</b>	469	0.1033
Lebanon	<b>-0.30***</b>	<b>0.12***</b>	-0.40	0.17	<b>0.16***</b>	0.4	0.01	<b>-0.24***</b>	570	0.1049
Libya	<b>-0.34***</b>	<b>0.22***</b>	<b>-0.11 **</b>	-0.04	<b>0.23***</b>	<b>-0.65*</b>	-0.09	<b>-0.07***</b>	1028	0.1435
Morocco	<b>-0.36**</b>	<b>0.26***</b>	-0.03	<b>0.81*</b>	0.48	0.05	-0.17	<b>-0.19*</b>	369	0.0948
Pakistan	<b>-0.22***</b>	0.21	0.09	<b>0.13*</b>	-.08	-0.27	0.09	-0.05	528	0.0419
Qatar	<b>-0.13***</b>	<b>0.12**</b>	<b>-0.10***</b>	<b>0.22**</b>	<b>0.16***</b>	-0.06	-0.19	0.07	578	0.0607
S.Arabia	<b>-0.19***</b>	<b>0.07***</b>	<b>-0.13***</b>	-0.28	<b>0.26***</b>	<b>.11***</b>	<b>-0.17***</b>	-0.09	538	0.0836
Tunisia	<b>-0.43***</b>	<b>0.36***</b>	-0.24	-0.22	0.10	-0.07	0.07	-0.11	451	0.1449
Turkey	<b>-0.18**</b>	<b>0.16**</b>	<b>-.34***</b>	0.06	0.12	0.02	0.004	-0.04	718	0.0525
Egypt	<b>0.25***</b>	<b>-0.34***</b>	<b>-0.14*</b>	0.16	<b>-0.16*</b>	<b>-.13***</b>	-0.03	<b>0.16*</b>	812	0.0625
Yemen	<b>-0.68 **</b>	<b>-0.04</b>	0.03	-0.11	.15	<b>-1.18***</b>	<b>-.13***</b>	<b>-0.25***</b>	366	0.0272

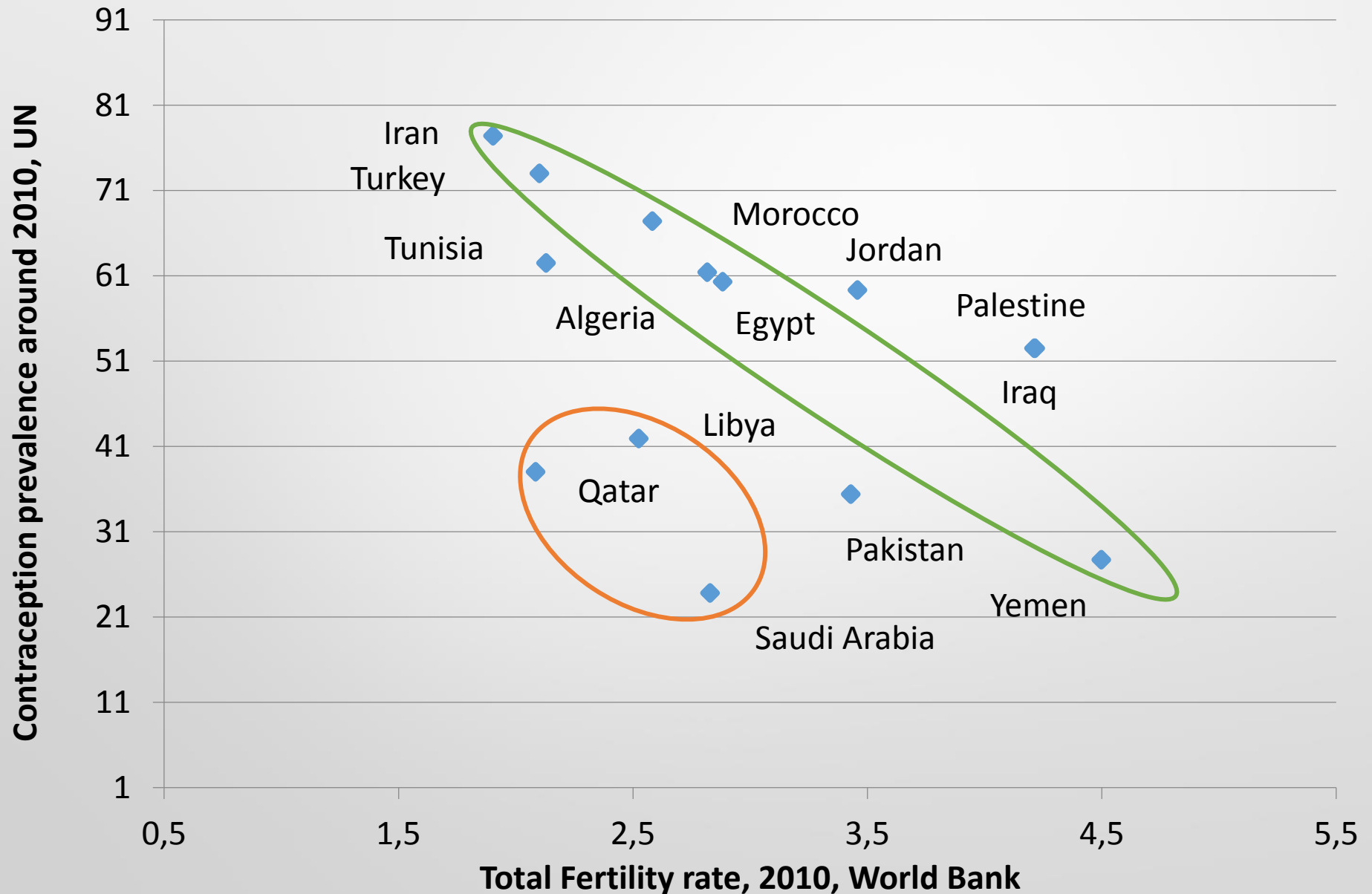
# Country-level data

- Level of socio-economic development and governance: GDP PPP per capita, share of urban population, female labor force participation rate, male unemployment, Gender Inequality Index, ICRG Quality of Government Index.
- State-sponsored education and healthcare system: secondary and tertiary education enrollment rate (females), public education and health expenditures;
- Access to contraception: contraception prevalence;
- Government fertility level stance: policy to raise or lower fertility, family planning support;
- Level of freedoms in the country: Freedom House Civil Liberties level, Number of grounds for abortion, Effective Democracy Index (Freedom Rising)
- Population attitudes and values: Emancipative Values Index, Secular Values Index.

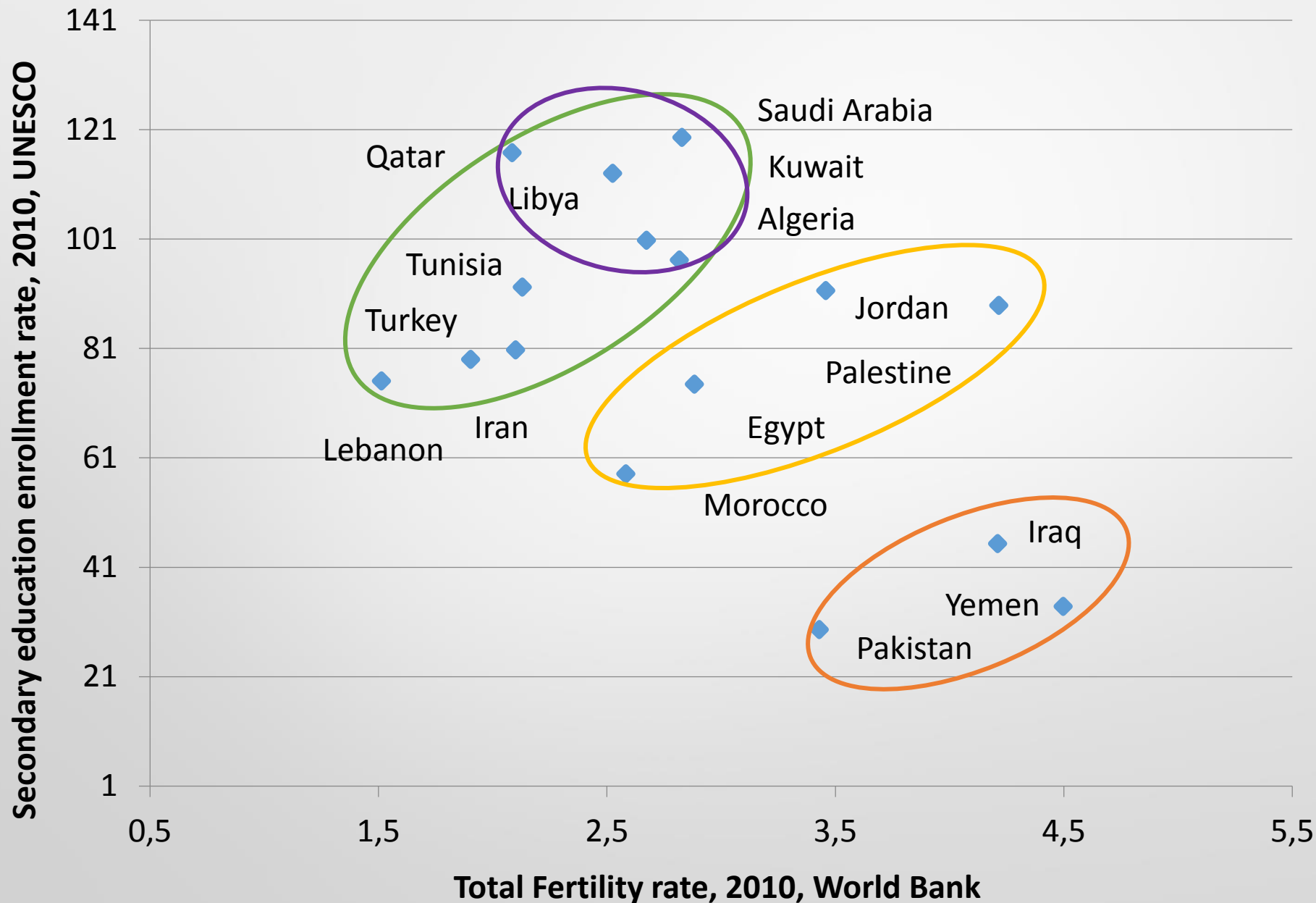
# Country-level data, 2010

	Total Fertility rate, WB	Female labor force participation rate, % (ILO estimate)	Male unemployment % (ILO estimate)	GDP per capita (PPP), \$ Int 2011	Urban population, % (Palestine - 2009)	Tertiary education enrollment rate	Contraception prevalence	Abortion grounds (2011)	Fertility policy (2011) (1 - raise, 2 - maintain, 3 - lower, 4 - no intervention)	Family planning support (2011) (1 - direct, 2 - indirect, 3 - no support, 4 - forbidden)	Civil liberties (higher level - less liberties)	Effective Democracy Index (Welzel)	Quality of government (1 - highest quality)	Health expenditure, % GDP	Education expenditure, % GDP	Gender Inequality Index (2013)	Emancipative Index (Welzel)	Secular Values Index (Welzel)
Yemen	4,5	<b>24,8</b>	9,7	4534,2	31,7	6,6	27,7	1	3	1	5	11,0	0,31	1,3	4,6	0,73	<b>0,22</b>	0,29
Palestine	4,2	<b>14,7</b>	24,6	4162,7	<b>73,9</b>	<b>57,4</b>	<b>52,5</b>	-	-	-	-	-	-	-	-	-	-	-
Iraq	4,2	<b>14,5</b>	13,5	12329,7	69,0	11,9	<b>52,5</b>	1	4	1	6	2,0	0,29	2,7	-	0,54	<b>0,27</b>	<b>0,35</b>
Jordan	3,5	<b>15,6</b>	10,2	11256,1	<b>82,5</b>	<b>42,9</b>	<b>59,3</b>	1,2,3,5	3	1	5	25,0	0,56	<b>5,9</b>	-	0,49	<b>0,23</b>	0,19
Pakistan	3,4	<b>23,9</b>	<b>4</b>	4219,6	36,6	8,0	35,4	1,2,3	3	1	5	8,0	0,47	1,0	2,3	0,56	<b>0,30</b>	0,31
Egypt	2,9	<b>23,3</b>	4,8	10614,6	43,0	31,8	<b>60,3</b>	1	3	1	5	11,0	0,47	1,9	3,8	0,58	<b>0,23</b>	0,20
Saudi Arabia	2,8	<b>17,7</b>	<b>3,5</b>	<b>45597,8</b>	<b>82,1</b>	40,3	23,8	1,2,3	4	3	6	4,0	0,58	2,6	5,1	<b>0,32</b>	-	-
Algeria	2,8	<b>14,6</b>	8,1	12494,1	67,5	34,1	<b>61,4</b>	1,2,3	3	1	5	10,0	0,44	3,3	4,3	0,43	<b>0,32</b>	<b>0,35</b>
Kuwait	2,7	<b>42,8</b>	<b>1,9</b>	<b>75365,5</b>	<b>98,3</b>	41,2	-	1,2,3,5	1	1	5	33,0	0,61	2,2	3,8	<b>0,29</b>	<b>0,32</b>	0,25
Morocco	2,6	<b>25,9</b>	8,9	6465,7	57,7	13,5	<b>67,4</b>	1,2,3	3	1	<b>4</b>	20,0	0,61	2,1	<b>5,4</b>	0,46	<b>0,33</b>	0,21
Libya	2,5	<b>29,8</b>	15,9	<b>30260,7</b>	<b>77,6</b>	-	41,9	1	4	3	7	0,0	0,39	2,1	-	<b>0,22</b>	<b>0,26</b>	0,23
Tunisia	2,1	<b>24,9</b>	12,2	10410,9	65,9	<b>43,4</b>	<b>62,5</b>	1,2,3,4,5,6,7	3	1	5	14,0	0,60	<b>3,8</b>	6,2	<b>0,27</b>	<b>0,28</b>	0,27
Turkey	2,1	<b>27,6</b>	11,5	16674,0	70,7	<b>50,1</b>	<b>73,0</b>	1,2,3,4,5,6,7	2	1	<b>3</b>	34,0	0,52	<b>4,4</b>	2,9	0,36	<b>0,34</b>	0,24
Qatar	2,1	<b>50,5</b>	<b>0,1</b>	<b>127983,8</b>	<b>98,7</b>	26,6	38,0	1,2,3,5	1	3	5	17,0	0,58	1,6	2,4	0,52	<b>0,27</b>	0,13
Iran	1,9	<b>16</b>	11,9	16979,6	<b>70,6</b>	<b>42,9</b>	<b>77,4</b>	1	1	3	6	6,0	0,48	2,8	4,3	0,51	<b>0,33</b>	<b>0,34</b>
Lebanon	1,5	<b>22</b>	<b>4,4</b>	16263,0	<b>87,2</b>	<b>48,6</b>	-	1	4	1	<b>3</b>	16,0	0,49	2,7	1,6	0,41	<b>0,40</b>	0,43

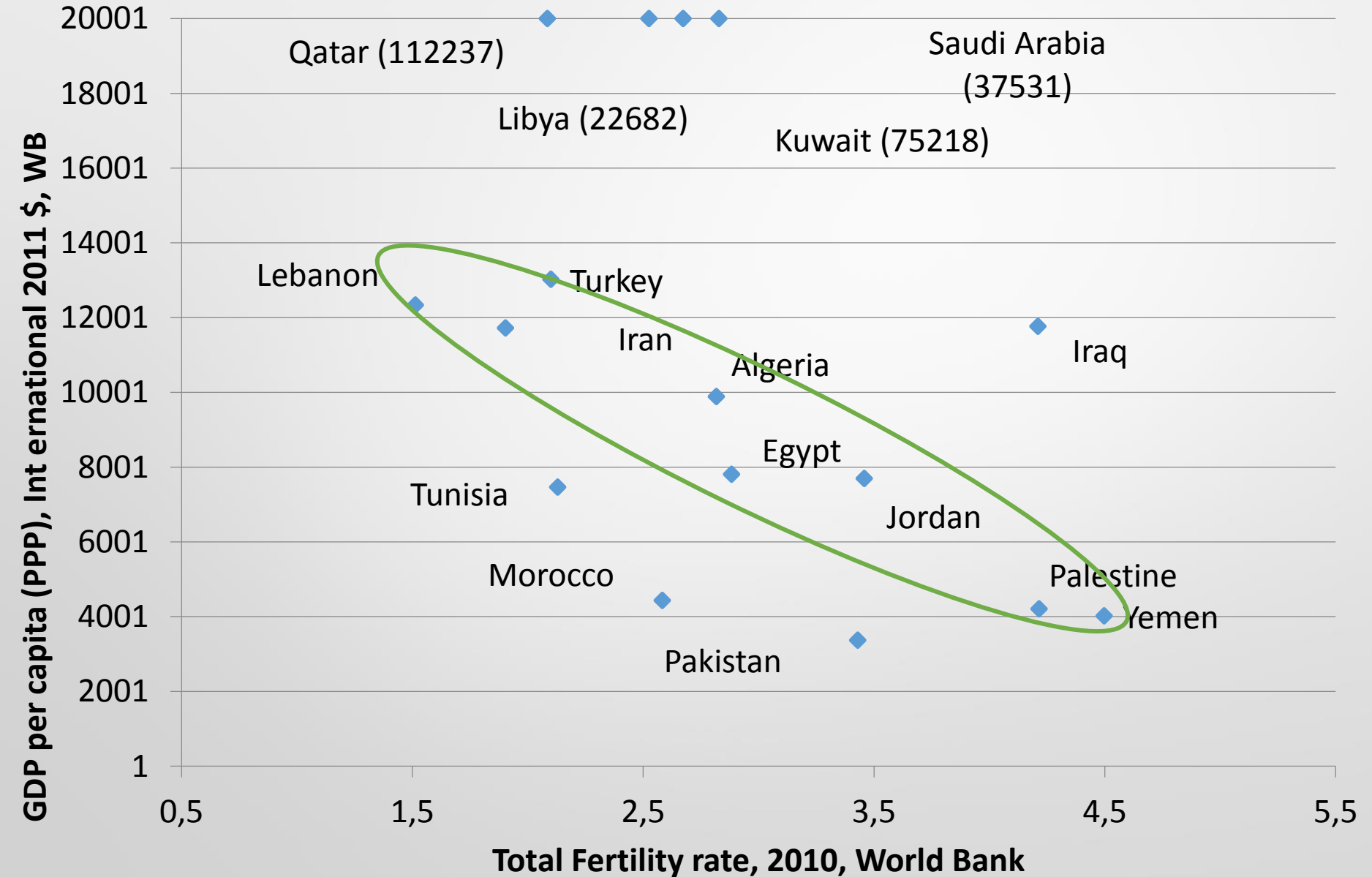
# Contraception use and fertility level in MENA



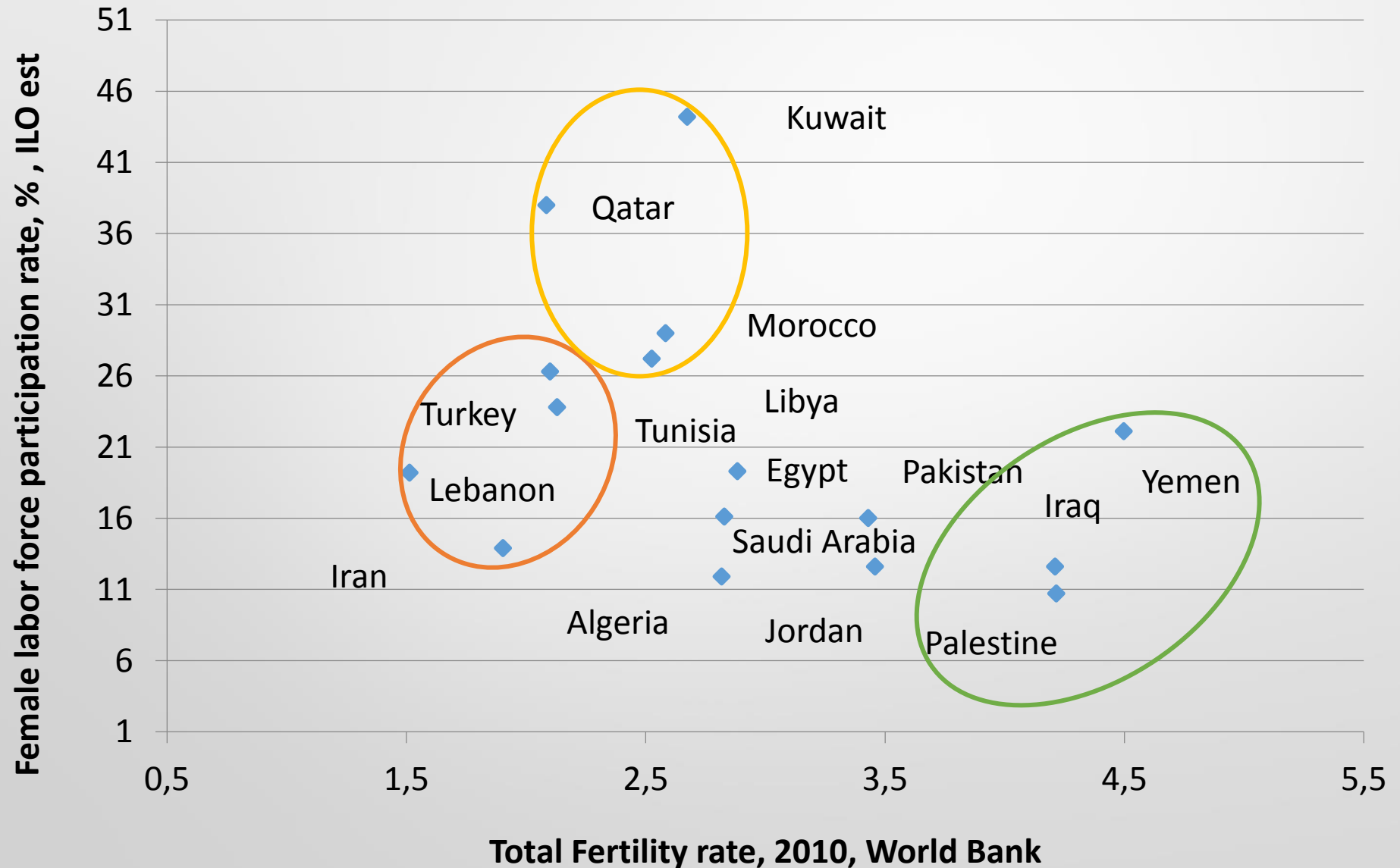
# Education enrollment and fertility level in MENA



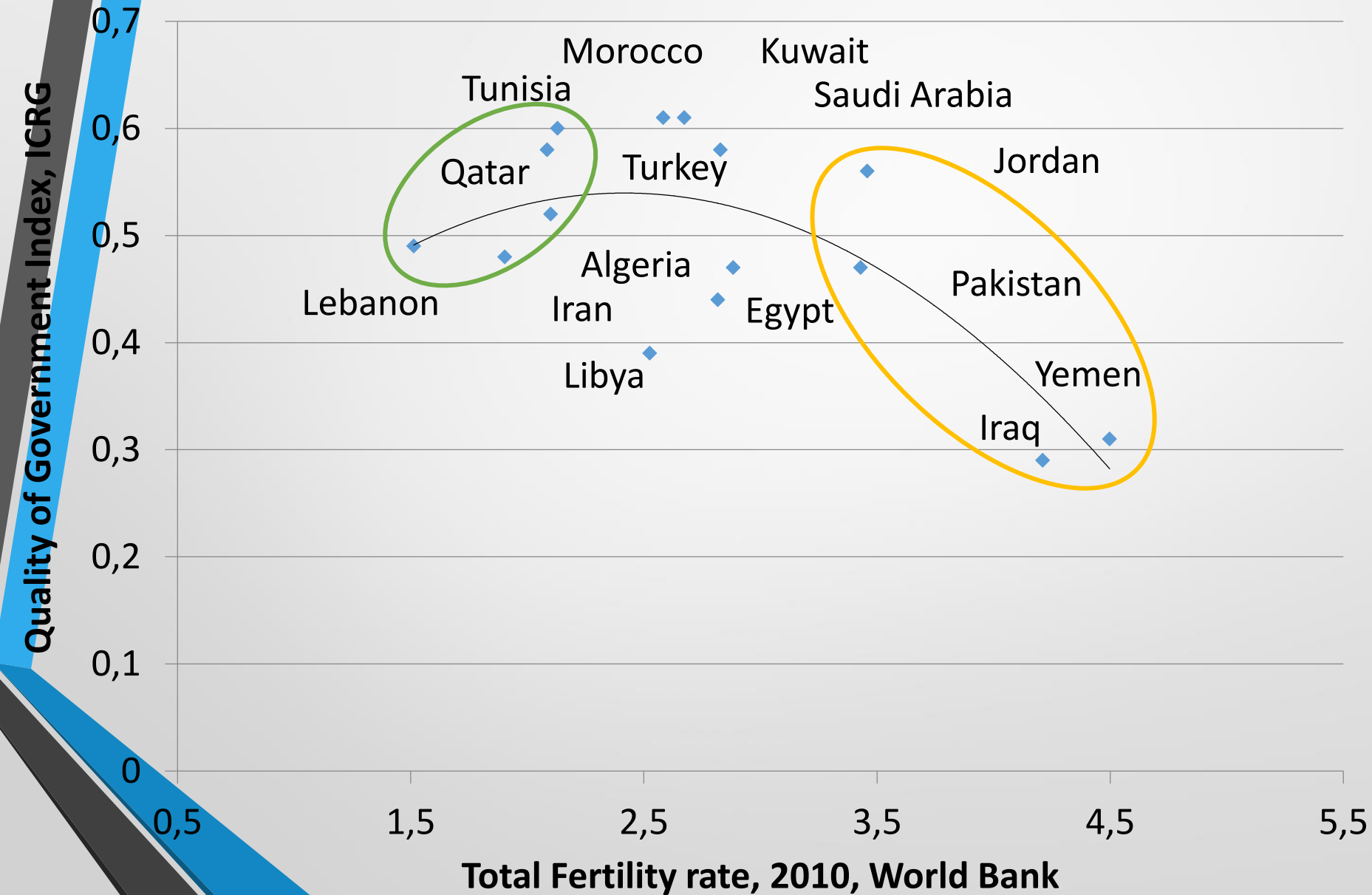
# GDP per capita and TFR in MENA countries



# Labor force participation and TFR in MENA



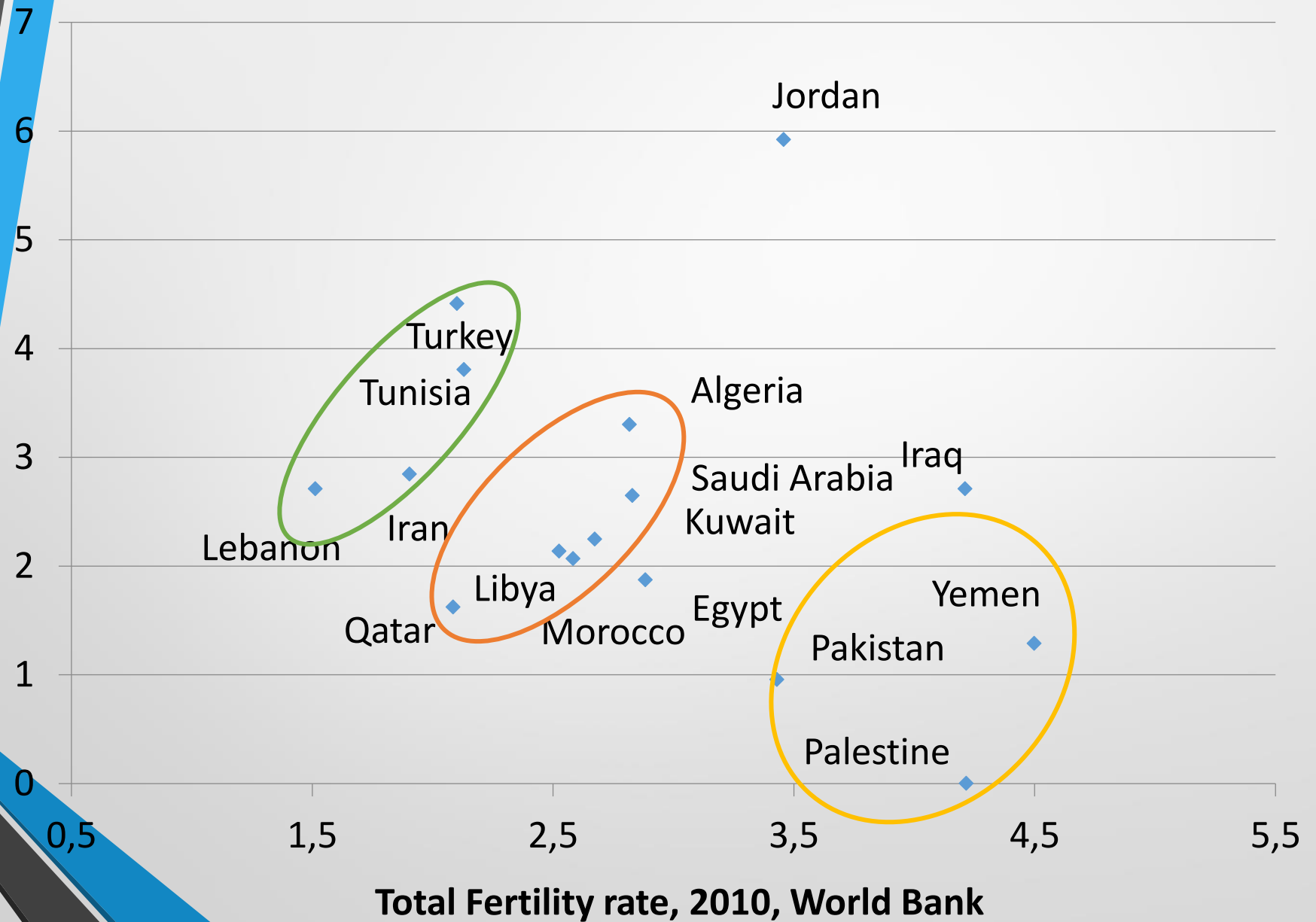
# ICRG Quality of Government





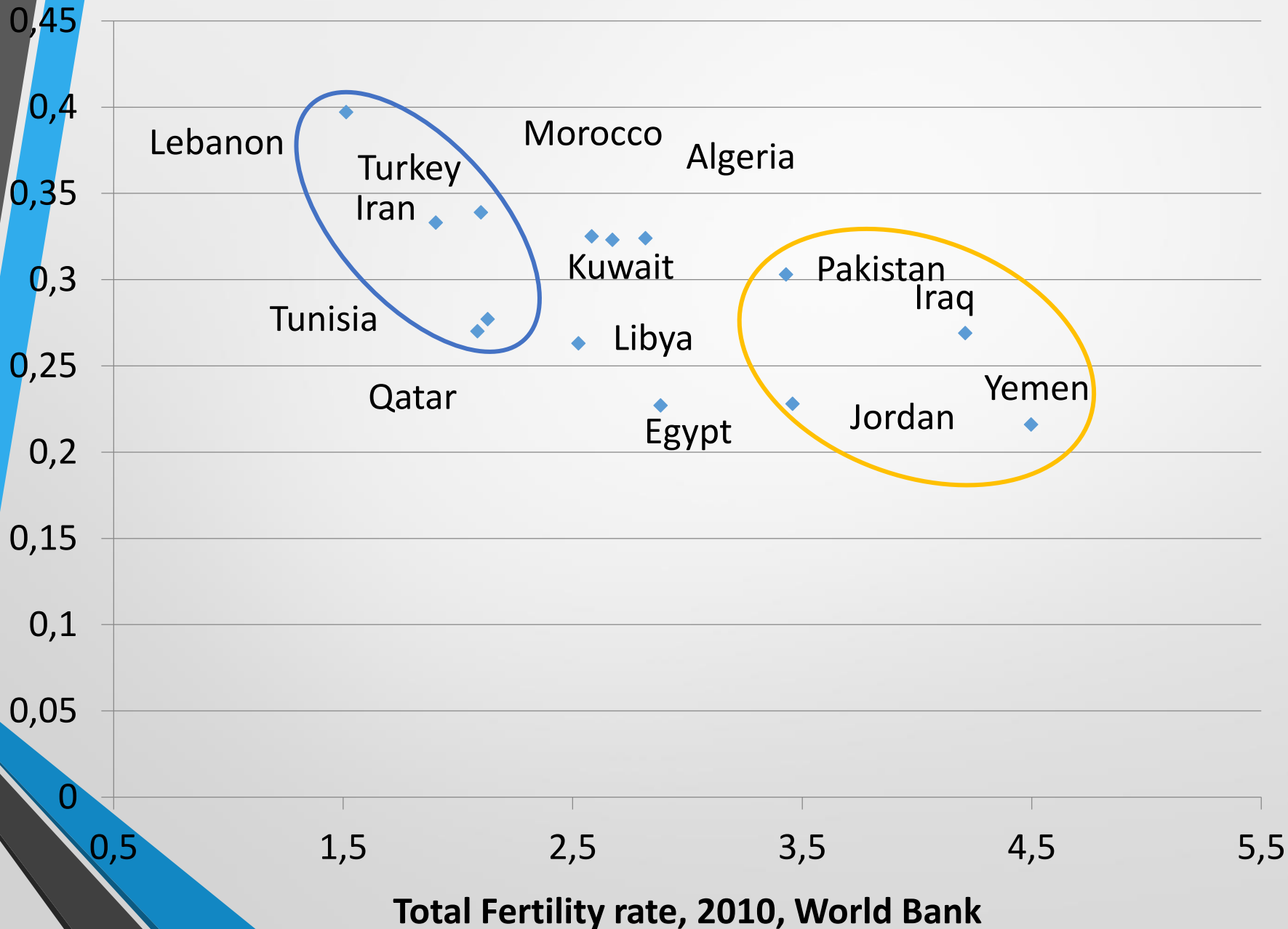
# Health Expenditures in MENA countries

Health expenditures, public, % of GDP, WHO



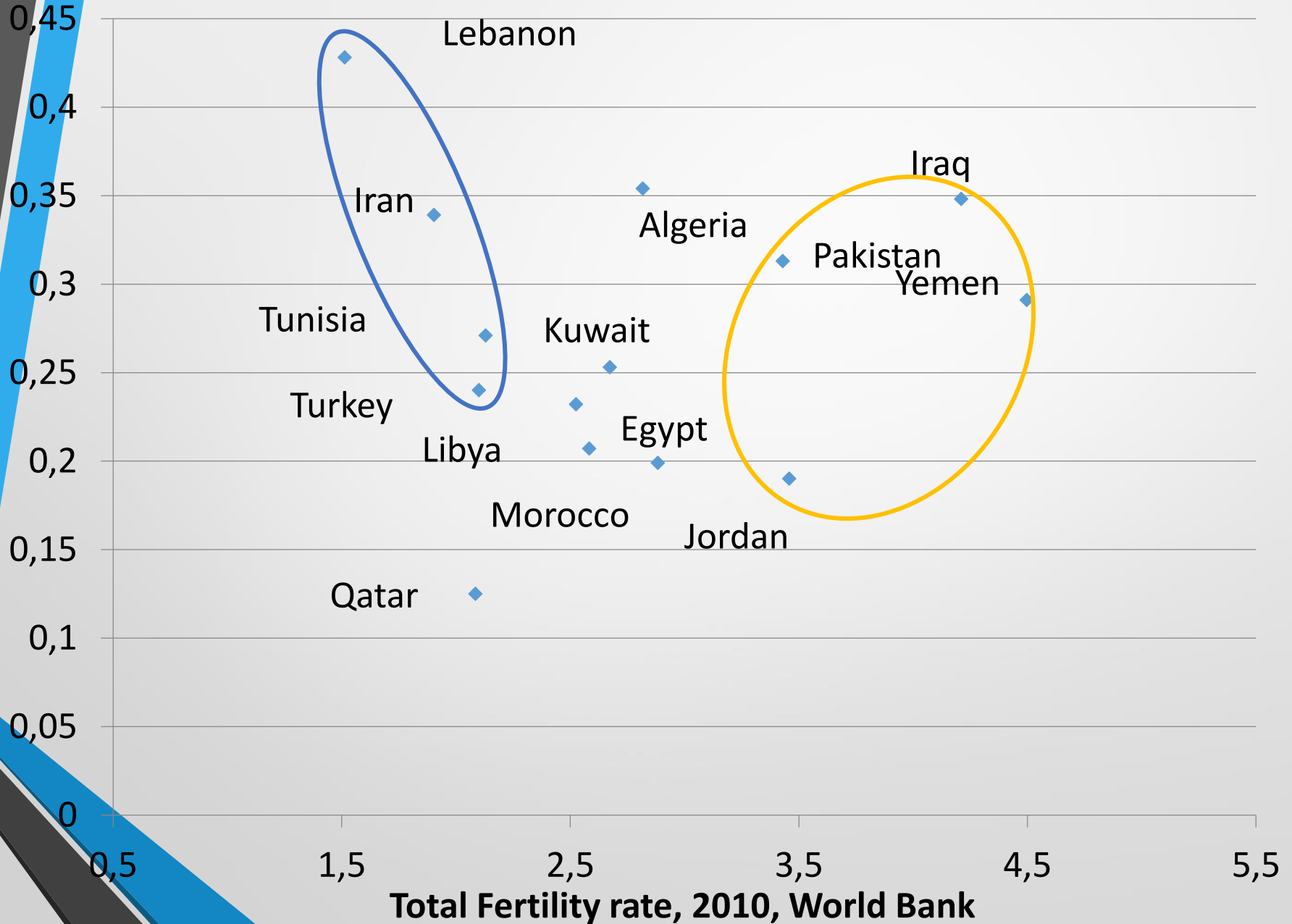
# Emancipative Values in MENA countries

Emancipative values, 2007-2014, Freedom Rising



# Secular Values in MENA countries

Secular values, 2007-2014, Freedom Rising



# Macro-analysis: clusters (I)

- 1) Most developed countries with widespread contraception, high level of education and healthcare system and high level of emancipative values:

Turkey, Tunisia, Iran, Lebanon. TFR=1,5-2,1

- 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 (% GDP) and emancipative values, high level of education, low level of contraception prevalence:

Qatar, Libya, Kuwait, Saudi Arabia, Algeria. TFR=2,1-2,8

# Macro-analysis: clusters (II)

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=2,6-4,2

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=3,4-4,5



Thank you for your attention

This report was presented at the 5th LCSR Summer School “Introduction to Factorial Design and Data Visualization with R”.

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<http://lcsr.hse.ru/en/summer2015>

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<http://lcsr.hse.ru/summer2015>