



Estimating the economic costs of child marriage in the Arab region

Supplementary material



Shared Prosperity Dignified Life



Economic and Social Commission for Western Asia

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United Nations
Beirut

Table S1. Prevalence of child marriage at the provincial level in Arab countries

S. No.	Egypt (2014)		Somalia (2006)		Yemen (2013)		Iraq (2018)		Sudan (2014)	
	Governorates	CMR (%)	Regions	CMR (%)	Governorates	CMR (%)	Governorates	CMR (%)	States	CMR (%)
1	Alexandria	05.00	Awdal	11.78	Abyan	27.40	Anbar	17.33	Blue Nile	49.63
2	Asyut	22.66	Bakool	30.11	Aden	10.00	Babil	30.62	Central Darfur	56.11
3	Aswan	19.24	Banadir	52.63	Aldhalae	32.60	Baghdad	27.90	East Darfur	46.35
4	Beni Suef	25.94	Bari	28.89	Al-Baidha	36.70	Basrah	33.50	El-Gadarif	47.53
5	Cairo	07.16	Bay	70.13	Al-Hudaydah	30.70	Diala	32.05	Gezira	28.03
6	Dakahlia	20.12	Galguduud	37.64	Al-Jawf	43.50	Duhok	08.14	Kassala	40.63
7	Damietta	13.16	Gedo	47.25	Al-Mhrah	36.80	Erbil	23.96	Khartoum	19.56
8	El-Beheira	17.67	Hiran	45.47	Al-Mhweit	42.60	Karbalah	36.77	North Darfur	39.10
9	Fayoum	27.20	Lower Juba	60.77	Amran	37.40	Kirkuk	18.05	North Kordofan	32.74
10	Gharbia	11.43	Lower Shabelle	70.84	Dhamar	50.50	Misan	43.54	Northern	19.03
11	Giza	25.38	Middle Juba	89.98	Hadramaut	27.80	Muthana	23.21	Red Sea	25.90
12	Ismailia	12.56	Middle Shabelle	56.66	Hajjah	31.20	Nineveh	31.49	River Nile	17.58
13	Kafr El-Sheikh	13.58	Mudug	37.95	Ibb	31.50	Najaf	37.25	Sinnar	33.62
14	Qalyubia	16.49	Nugal	52.88	Lahj	30.00	Qadisyah	25.28	South Darfur	52.33

Table S1. Prevalence of child marriage at the provincial level in Arab countries

S. No.	Egypt (2014)		Somalia (2006)		Yemen (2013)		Iraq (2018)		Sudan (2014)	
	Governorates	CMR (%)	Regions	CMR (%)	Governorates	CMR (%)	Governorates	CMR (%)	States	CMR (%)
15	Luxor	14.19	Sanaag	46.26	Mareb	34.00	Salahaddin	22.68	South Kordofan	43.68
16	Matrouh	21.82	Sool	48.95	Reimah	42.00	Sulaymaniyah	13.49	West Darfur	45.01
17	Menoufia	08.36	Togdhere	39.43	Sadah	32.40	Thiqar	34.83	West Kordofan	31.94
18	Minya	19.30	Woqooyi Galbeed	14.63	Sanaa	37.60	Wasit	28.70	White Nile	36.72
19	New Valley	16.44			Shabwah	29.00				
20	North Sinai	NA			Taiz	26.40				
21	Port Said	05.43								
22	Qena	16.76								
23	Red Sea	12.64								
24	Sharkia	18.23								
25	Sohag	22.38								
26	South Sinai	NA								
27	Suez	04.45								
	Total	17.40	Total	45.27	Total	31.90	Total	27.90	Total	34.20

Table S1. (Cont...)

S. No.	State of Palestine (2018/2019)		Morocco (2003/2004)		Mauritania (2019–2021)		Syrian Arab Republic (2006)		Jordan (2017/2018)	
	Governorates	CMR (%)	Regions	CMR (%)	Governorates	CMR (%)	Governorates	CMR (%)	States	CMR (%)
1	Ariha & Al Aghwar	9.61	Chaouia-Ouardigha	15.90	Adrar	30.44	Aleppo	12.98	Ajloun	4.21
2	Bethlehem	11.81	Doukkala-Abda	19.40	Assaba	46.16	Al-Hasakah	6.96	Amman	9.70
3	Deir Al-Balah	7.26	Fes-Boulemane	15.40	Brakna	34.49	Damascus	11.11	Aqaba	9.62
4	Gaza	20.93	Gharb-Chrarda-Beni Hassen	18.30	Dakhlet Nouadhibou	19.52	Daraa	23.59	Balqa	8.32
5	Hebron	18.19	Grand-Casablanc	7.70	Gorgol	50.25	Deir Ezzor	9.92	Irbid	9.51
6	Jenin	7.92	Guelmim-Es-Smara	23.10	Guidimaka	57.29	Hama	12.31	Jerash	11.99
7	Jerusalem	9.19	Laayoune-Boujdou-Sakia Al Hamra	29.40	Hodh Ech Chargui	49.69	Homs	16.50	Karak	4.37
8	Khan Yunis	10.14	Marrakech-Tensift-Al Haouz	26.40	Hodh Gharbi	43.68	Idlib	16.29	Ma'an	12.76
9	Nablus	9.39	Meknes-Tafilalet	17.10	Nouakchott Nord	23.83	Latakia	4.86	Madaba	8.31
10	North Gaza	22.78	Oriental	11.80	Nouakchott Ouest	16.50	Quneitra	26.09	Mafraq	15.38
11	Qalqilya	12.44	Rabat-Sale-Zemmour-Zaer	14.10	Nouakchott Sud	23.51	Raqqa	9.91	Tafilah	3.24
12	Rafah	11.67	Souss-Massa-Draa	16.10	Tagant	38.17	Rural-Dam	21.74	Zarqa	10.95
13	Ramallah & Al Bireh	8.32	Tadla-Azilal	21.60	Tiris Zemmour Et Inch	25.62	Sweida/As Suwayda	8.42		
14	Salfit	12.06	Tanger-Tetouan	15.30	Trarza	27.47	Tartus	4.72		

Table S1. (Cont...)

S. No.	State of Palestine (2018/2019)		Morocco (2003/2004)		Mauritania (2019–2021)		Syrian Arab Republic (2006)		Jordan (2017/2018)	
	Governorates	CMR (%)	Regions	CMR (%)	Governorates	CMR (%)	Governorates	CMR (%)	States	CMR (%)
15	Tubas & Northern Valley	8.70	Taza-Al Hoceima-Taounate	9.80						
16	Tulkarem	5.31								
	Total	13.43	Total	15.90	Total	36.63	Total	13.27	Total	9.68

Table S1. (Cont...)

S. No.	Algeria (2018/2019)		Qatar (2012)		Tunisia (2018)	
	Provinces	CMR (%)	Municipalities	CMR (%)	Regions	CMR (%)
1	High Plateau Centre	6.16	Al-Daayen	13.36	Centre-Est	0.90
2	High Plateau Est	4.40	Al-Khor	3.97	Centre-Ouest	2.05
3	High Plateau Ouest	5.97	Al-Rayyan	5.16	District Tunis	1.28
4	Nord-Centre	1.75	Al-Shamal	0	Nord-Est	2.47
5	Nord-Est	0.58	Al-Wakra	0	Nord-Ouest	2.66
6	Nord-Ouest	6.44	Doha	3.78	Sud-Est	0.78
7	Sud	5.99	Umm Slal	2.18	Sud-Ouest	0.53
	Total	3.77	Total	4.17	Total	1.49

Source: Authors' estimation using information from DHS and MICS.

Note: CMR = Child marriage rate; NA = Not available.

Table S2. Total number of pregnancies by child marriage, non-child marriage and as usual scenarios (in thousands), 2001–2050

Countries	Scenario	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
Algeria	As usual				1,231	1,203	1,130	1,083	1,093	1,138	1,162	1,148
	CM				2,107	1,940	1,812	1,954	2,529	3,050	3,175	3,195
	Non-CM				726	756	741	682	613	580	558	501
Egypt	As usual				3,560	3,645	3,721	3,921	4,276	4,614	4,849	4,977
	CM				4,823	4,936	5,037	5,383	6,249	7,451	8,472	9,076
	Non-CM				2,665	2,729	2,789	2,905	3,011	2,968	2,868	2,799
Iraq	As usual					1,596	1,751	1,890	2,023	2,143	2,255	2,351
	CM					1,810	1,986	2,143	2,318	2,525	2,752	2,939
	Non-CM					1,418	1,556	1,680	1,783	1,847	1,885	1,921
Jordan	As usual		229	264	386	424	400	396	427	478	541	588
	CM		322	373	461	497	520	570	630	689	736	773
	Non-CM		162	189	233	239	219	199	177	161	152	148
Mauritania	As usual					222	215	202	188	170	141	109
	CM					287	278	263	252	241	207	164
	Non-CM					186	179	167	155	137	111	83
Morocco	As usual		910	943	953	941	909	877	851	832	810	785
	CM		1,559	1,575	1,542	1,774	2,054	2,249	2,415	2,604	2,803	2,966
	Non-CM		799	833	849	839	793	735	683	650	629	607

Countries	Scenario	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
State of Palestine	As usual			159	187	213	236	258	286	319	357	387
	CM			236	277	313	348	409	504	612	722	813
	Non-CM			112	133	151	166	175	175	177	186	195
Qatar	As usual				41	41	43	42	41	41	40	39
	CM				42	43	45	45	44	45	45	45
	Non-CM				40	41	42	41	40	40	39	38
Somalia	As usual		614	686	805	938	1,075	1,220	1,392	1,596	1,812	1,990
	CM		758	859	1,019	1,189	1,402	1,665	1,983	2,341	2,749	3,131
	Non-CM		509	576	691	833	971	1,077	1,164	1,310	1,528	1,731
Sudan	As usual			1,944	2,127	2,367	2,639	2,942	3,271	3,632	4,004	4,333
	CM			2,771	3,121	3,510	3,951	4,706	5,888	7,091	8,175	9,220
	Non-CM			1,168	1,300	1,456	1,625	1,779	1,901	1,972	1,954	1,854
Syrian Arab Republic	As usual		736	816	670	708	828	862	967	1,091	1,193	1,246
	CM		750	835	688	731	860	906	1,028	1,170	1,292	1,362
	Non-CM		721	798	654	691	804	830	924	1,037	1,128	1,173
Tunisia	As usual			292	391	415	381	352	345	360	382	390
	CM			441	632	673	616	613	759	965	1,086	1,112
	Non-CM			190	259	282	265	238	215	199	183	174
Yemen	As usual				1,252	1,388	1,495	1,585	1,675	1,775	1,875	1,948
	CM				1,720	1,867	1,995	2,241	2,605	2,956	3,284	3,566
	Non-CM				1,089	1,224	1,327	1,404	1,449	1,477	1,508	1,537

Table S3. Total number of unintended pregnancies by child marriage, non-child marriage and as usual scenarios (in thousands), 2001–2050

Countries	Scenario	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
Algeria	As usual				863	911	989	1,056	1,104	1,141	1,182	1,235
	CM				911	967	1,049	1,260	1,472	1,659	1,871	2,116
	Non-CM				861	909	987	981	943	901	865	848
Egypt	As usual				3,738	4,089	4,497	5,018	5,516	5,975	6,506	7,004
	CM				3,806	4,162	4,576	5,262	6,177	7,072	8,074	9,027
	Non-CM				3,737	4,088	4,497	4,905	5,109	5,260	5,461	5,656
Iraq	As usual					1,187	1,362	1,557	1,749	1,952	2,168	2,354
	CM					1,491	1,711	1,954	2,227	2,543	2,885	3,181
	Non-CM					918	1,054	1,205	1,338	1,464	1,597	1,709
Jordan	As usual		126	177	203	216	227	247	275	305	332	354
	CM		138	187	235	273	302	345	403	472	549	622
	Non-CM		122	171	222	235	228	226	228	234	234	231
Mauritania	As usual					49	85	129	184	251	323	383
	CM					45	81	125	186	269	364	446
	Non-CM					43	79	123	175	233	294	343
Morocco	As usual		863	924	974	1,014	1,055	1,088	1,105	1,115	1,121	1,129
	CM		895	959	1,011	1,198	1,390	1,570	1,762	2,016	2,332	2,626
	Non-CM		864	925	975	992	1,009	1,019	1,015	1,001	980	961

Countries	Scenario	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
State of Palestine	As usual			96	115	135	156	182	210	240	271	300
	CM			115	138	162	191	243	301	365	438	512
	Non-CM			72	86	102	116	127	139	150	161	170
Qatar	As usual				34	39	47	52	55	58	63	66
	CM				39	44	52	57	60	63	68	72
	Non-CM				34	39	46	52	55	58	62	65
Somalia	As usual		7	9	11	15	18	23	29	37	46	54
	CM		7	9	11	14	19	25	33	43	56	68
	Non-CM		5	7	9	11	14	17	21	27	33	38
Sudan	As usual			165	232	319	428	569	742	953	1,202	1,434
	CM			150	216	297	406	582	808	1,091	1,446	1,816
	Non-CM			138	197	272	358	435	521	618	719	802
Syrian Arab Republic	As usual		439	478	407	471	607	694	761	813	877	948
	CM		467	506	430	496	640	733	805	863	934	1,014
	Non-CM		429	467	398	461	592	675	739	787	846	911
Tunisia	As usual			290	288	294	305	321	348	370	391	410
	CM			414	384	378	392	459	554	638	726	816
	Non-CM			209	211	216	224	219	220	217	216	215
Yemen	As usual				418	517	628	748	882	1,024	1,178	1,316
	CM				425	526	639	803	1,016	1,249	1,512	1,778
	Non-CM				409	506	614	717	821	931	1,049	1,154

Table S4. GDP total in billions (USD) by child marriage, non-child marriage and as usual scenarios, 2001–2050

Countries	Scenario	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
Algeria	As usual				173	152	315	652	1,340	2,737	5,554	9,738
	CM				154	121	231	444	830	1,501	2,691	4,299
	Non-CM				196	191	430	958	2,164	4,992	11,462	22,058
Egypt	As usual				349	387	651	1,131	2,034	3,780	7,262	12,536
	CM				336	344	541	887	1,502	2,588	4,551	7,298
	Non-CM				362	435	782	1,442	2,753	5,520	11,588	21,533
Iraq	As usual					224	411	767	1,457	2,814	5,527	9,602
	CM					219	391	711	1,318	2,481	4,729	7,991
	Non-CM					228	432	828	1,610	3,191	6,461	11,538
Jordan	As usual		13	29	41	46	57	78	116	189	336	567
	CM		12	24	32	33	38	46	63	93	149	233
	Non-CM		15	34	52	64	87	130	213	383	755	1,383
Mauritania	As usual					8	11	15	22	36	65	110
	CM					8	10	13	18	29	49	82
	Non-CM					9	12	17	27	46	85	148
Morocco	As usual		63	95	103	117	241	496	1,016	2,069	4,195	7,358
	CM		57	79	80	85	163	307	573	1,061	1,951	3,163
	Non-CM		70	114	132	159	356	801	1,800	4,036	9,020	17,117

Countries	Scenario	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
State of Palestine	As usual			12	17	19	39	82	169	347	707	1,240
	CM			11	15	15	29	56	105	196	358	578
	Non-CM			12	19	23	53	120	271	616	1,394	2,658
Qatar	As usual				180	161	466	1,264	3,207	7,611	16,869	30,340
	CM				180	160	463	1,252	3,168	7,493	16,545	29,658
	Non-CM				181	162	469	1,276	3,247	7,731	17,200	31,038
Somalia	As usual		3	4	6	7	10	13	21	34	62	105
	CM		3	4	5	6	8	11	16	25	43	71
	Non-CM		3	5	6	9	12	17	27	47	89	156
Sudan	As usual			94	108	34	111	327	890	2,218	5,061	9,179
	CM			92	92	26	77	207	508	1,128	2,284	3,741
	Non-CM			97	126	45	159	517	1,559	4,360	11,216	22,525
Syrian Arab Republic	As usual		154	289	20	42	148	472	1,364	3,551	8,314	15,193
	CM		154	287	20	41	144	459	1,315	3,391	7,861	14,242
	Non-CM		154	291	21	43	151	486	1,415	3,717	8,794	16,209
Tunisia	As usual			48	48	44	73	125	222	409	781	1,346
	CM			48	43	36	54	87	142	233	388	601
	Non-CM			48	53	55	98	180	346	718	1,571	3,016
Yemen	As usual				48	22	38	69	127	241	468	811
	CM				46	19	32	54	95	170	309	508
	Non-CM				51	24	46	86	169	342	710	1,297

Table S5. GDP per capita by child marriage, non-child marriage and as usual scenarios (in thousand USD), 2001–2050

Countries	Scenario	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
Algeria	As usual				4.3	3.5	6.7	13.2	25.8	50.1	97.3	165.5
	CM				4.0	3.0	5.6	10.5	19.3	34.5	61.6	98.9
	Non-CM				4.5	3.8	7.6	15.4	31.1	62.9	127.2	224.0
Egypt	As usual				3.7	3.7	5.6	9.0	14.8	25.2	44.5	71.9
	CM				3.6	3.4	5.1	7.9	12.5	20.5	34.3	53.4
	Non-CM				3.7	3.9	6.1	10.0	17.0	29.9	54.8	91.6
Iraq	As usual					5.5	8.9	14.9	25.4	44.4	79.2	128.1
	CM					5.4	8.7	14.3	24.1	41.4	72.8	116.0
	Non-CM					5.5	9.1	15.4	26.6	47.0	85.1	139.3
Jordan	As usual		2.0	2.2	2.5	3.2	4.4	6.1	8.4	11.7	16.7	22.4
	CM		1.9	2.0	2.2	2.8	3.7	4.9	6.6	8.9	12.4	16.5
	Non-CM		2.1	2.3	2.8	3.8	5.7	8.3	12.1	18.1	27.8	40.1
Mauritania	As usual					1.8	1.9	2.4	3.3	5.0	8.5	14.0
	CM					1.7	1.8	2.2	2.9	4.3	7.1	11.6
	Non-CM					1.8	2.0	2.5	3.5	5.4	9.4	15.6
Morocco	As usual		2.1	2.9	3.0	3.2	6.3	12.4	24.5	48.6	96.1	166.1
	CM		1.9	2.5	2.4	2.5	4.5	8.2	15.0	27.3	49.8	80.4
	Non-CM		2.1	3.0	3.1	3.4	6.7	13.3	26.6	53.3	107.1	187.1

Countries	Scenario	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
State of Palestine	As usual			2.8	3.5	3.3	6.1	11.0	19.9	35.7	64.0	101.7
	CM			2.8	3.2	2.9	5.1	8.8	15.1	25.7	43.4	65.9
	Non-CM			2.8	3.7	3.7	6.9	12.9	24.3	45.6	85.6	141.2
Qatar	As usual				66.3	53.9	144.5	368.6	891.6	2,036.5	4,367.7	7,691.2
	CM				66.2	53.8	143.8	366.0	883.4	2,012.9	4,304.4	7,559.1
	Non-CM				66.3	54.0	144.8	369.5	894.3	2,044.6	4,388.8	7,732.9
Somalia	As usual		0.3	0.3	0.4	0.4	0.5	0.6	0.8	1.1	1.7	2.5
	CM		0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.9	1.3	1.9
	Non-CM		0.3	0.4	0.4	0.5	0.5	0.6	0.8	1.2	1.9	2.8
Sudan	As usual			2.7	2.6	0.7	2.0	5.2	12.2	26.4	52.6	85.7
	CM			2.6	2.5	0.6	1.7	4.2	9.4	19.3	36.4	57.0
	Non-CM			2.7	2.9	0.8	2.5	6.7	16.6	38.0	80.8	139.9
Syrian Arab Republic	As usual		8.0	14.4	1.2	2.1	5.6	15.8	41.5	98.3	209.3	355.6
	CM		8.0	14.3	1.2	2.1	5.5	15.5	40.7	95.8	202.7	342.6
	Non-CM		8.0	14.4	1.2	2.1	5.7	16.0	42.2	100.3	214.4	365.5
Tunisia	As usual			4.5	4.2	3.6	5.5	8.9	15.2	27.0	49.5	82.7
	CM			4.5	3.9	3.1	4.6	7.1	11.5	18.7	31.3	48.8
	Non-CM			4.5	4.3	3.9	6.1	10.2	17.9	32.9	63.0	109.4
Yemen	As usual				1.8	0.7	1.1	1.7	2.9	4.9	8.6	13.7
	CM				1.7	0.6	0.9	1.5	2.3	3.7	6.3	9.7
	Non-CM				1.8	0.7	1.1	1.8	3.1	5.3	9.5	15.5

Demographic and health costs

Child marriage primarily has ramifications on women's educational attainment, autonomy and agency, incidents of gender-based violence, labour force participation and health outcomes (including early pregnancy), as well as the health of their children (UNICEF, 2005; Santhya, Haberland and Singh, 2006; Lloyd and Mensch, 2008; Goli, Rammohan and Singh, 2015; Parsons and others, 2015; UN-Women, 2021). In addition, women married young encounter difficulty accessing abortion care, accounting for nearly one third of all unsafe abortion-related deaths each year globally, with 15 per cent of all unsafe abortions taking place among adolescents aged 15–19 (IPAS, 2019). These young women also cannot negotiate with their partners, such as the ability to refuse sexual intercourse or ask them to use birth control, leading to unwanted pregnancies (Onagoruwa and Wodon, 2017b). The unwanted pregnancies and abortions are the demographic costs, as they alter future growth, survival or reproduction, eventually leading to private and public health-care costs for the government.

Education costs constitute the loss of educational attainment by girls who are married as children due to cultural norms and financial constraints (Field and Ambrus, 2008; McCleary-Sills and others, 2015), and the repercussions in terms of restricted agency in all facets of their lives are the social costs. A girl married off to evade poverty is still likely to remain poor owing to vulnerabilities like immature age and a lack of education. Moreover, child marriage reduces her chances of continuing her education, restricting her skills, earning prospects, mobility and, thereby, her social circle. It further dents her decision-making ability, particularly her reproductive choices, including the timing and number of children, and issues pertaining to the allocation of

household resources on health and education (Nguyen and Wodon, 2017a, 2017b, 2017c). Early pregnancies are also documented to restrict education opportunities for girls and their children, shrinking intergenerational mobility. The literature says that women attain less education, with an opportunity cost of 5.6 per cent literacy per year after marriage, while the children are affected due to less privileged and illiterate mothers (Field and Ambrus, 2008; Mayer and Lopoo, 2004).

Child marriage limits the decision-making power of a girl about her own life – her agency, which includes choices related to the exercise of reproductive rights, family decisions, participation in labour markets and holding positions of power (Hanmer and Klugman, 2016). Predominantly, it restricts a girl's fundamental right to "free and full consent" to marry at "full age", as protected by the Universal Declaration of Human Rights. At the same time, it also puts her in greater danger of gender-based violence, including physical, sexual and emotional violence by husbands and other family members (UNICEF, 2008; Klugman, and others, 2014). Child marriage is in fact recognized as one of the earliest and most prevalent forms of gender-based violence (Coomaraswamy, 1999; UNICEF, 2013). Young girls, due to lack of status and agency within their marriages and households, experience many forms of abuse – domestic abuse if they cannot efficiently deal with the responsibilities of marriage and motherhood, sexual abuse if they refuse sexual intercourse, and psychological abuse when they are isolated from the family and community (UNICEF, 2005; Nour, 2009; Nnadi, 2014). Many country-specific studies focused on South Asia (ICRW, 2005; Oshiro and others, 2011; Nasrullah and others, 2014) and Latin America (UNICEF, 2005) have produced evidence of physical and sexual violence

inflicted on women married as children, specifically below the age of 18. A study by Kidman (2017) investigated 34 countries to report that women married as children were more likely to face more physical and sexual violence than women who married as adults.

Health costs are the private and public costs primarily generated from high fertility rates of women marrying early and eventual health-care expenditure on maternal and childcare health and nutrition. Low age at marriage has health implications via higher maternal morbidity and mortality rates. Besides, it has repercussions on fertility rates, as women married as children have higher lifetime fertility, coupled with low use of contraception. High total fertility combined with low decision-making power not only affects the entire trajectory of the children's life opportunities but also leads to

high population growth, eventually burdening limited public resources (IFPRI, 2003; Mathur, Greene and Malhotra, 2003; Onagoruwa and Wodon, 2017a). Child marriage also has intergenerational health effects on children birthed by young mothers. It can generate health complications for newborns, raising the risk of under-5 mortality rates, the likelihood of lifetime malnutrition and the vicious circle of poverty (Ganchimeg and others, 2014; Wodon, 2017; Onagoruwa and Wodon, 2017c; Raj, Jackson and Dunham, 2018).

Demographic cost estimates are in terms of three indicators: (1) total number of pregnancies; (2) unintended pregnancies; and (3) maternal deaths. Below, we present the cost estimates for all three indicators separately.

Total pregnancies

The percentage of the additional number of pregnancies attributable to child marriage is presented in Table S6. In 2021, the excess number of pregnancies due to child marriage ranged from 22.9 per cent in Mauritania to 0.4 per cent in the Syrian Arab Republic. Besides Mauritania, Algeria also had over 10 per cent of the excess number of pregnancies due to child marriage. There are nine additional countries where the excess number of pregnancies due to child marriage was over 5 per cent. In comparison, Qatar and the Syrian Arab Republic ranked among the lowest excess numbers of pregnancies due to child marriage.

A similar pattern can be noticed in the projected period till 2050. In 2050, Algeria, Morocco and Tunisia will continue to have

around 6 per cent of an excess number of pregnancies attributable to child marriage if the current rate of child marriage continues to prevail.

Demographic cost estimates for the Arab region, which includes a weighted average of the 13 countries included in the study, suggest that the share of excess pregnancies in 2021 was 7.4 per cent, while it will be 3.4 per cent in 2050. In absolute terms, there were 1,058,400 additional pregnancies attributable to child marriage in 2021. If child marriage continues to prevail, the Arab region will endure 695,500 additional pregnancies, notwithstanding the progress in other demographic and socioeconomic indicators.

Table S6. Demographic costs: Percentage of the additional number of pregnancies attributable to child marriage across 13 Arab countries, 2001–2050

Countries	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
Algeria				28.0	10.9	6.8	6.2	7.3	7.5	6.6	6.2
Egypt				30.3	8.6	5.0	3.7	3.4	3.6	3.6	3.5
Iraq					8.2	3.1	1.9	1.5	1.4	1.4	1.4
Jordan		13.9	7.0	3.9	3.0	3.0	3.1	3.0	2.8	2.4	2.2
Mauritania					22.9	6.6	4.0	3.0	2.8	2.5	2.4
Morocco		16.7	7.9	4.8	5.0	5.5	5.8	5.8	5.9	6.0	6.1
State of Palestine			78.2	12.8	6.9	4.8	4.3	4.4	4.4	4.2	4.0
Qatar				1.2	0.6	0.5	0.4	0.4	0.4	0.4	0.4
Somalia			8.3	4.1	2.5	2.0	1.9	2.0	1.8	1.7	1.6
Sudan			82.5	14.3	7.9	5.5	4.7	4.7	4.5	4.3	4.2
Syrian Arab Republic			0.9	0.5	0.4	0.3	0.4	0.4	0.3	0.3	0.3
Tunisia				19.1	9.4	6.2	5.3	6.3	7.1	6.8	6.2
Yemen				16.8	5.8	3.4	2.9	3.0	3.0	2.9	2.8

Unintended pregnancies

The percentage of the additional number of unintended pregnancies attributable to child marriage is presented in Table S7. In 2021, Iraq had the highest (16.1 per cent) and Egypt had the lowest (0.3 per cent) number of unintended pregnancies attributable to child marriage. Apart from Iraq, the State of Palestine and Tunisia had more than 4 per cent of the additional number of unintended pregnancies. Excess unintended pregnancies attributable to child marriage for other Arab countries included in this study stood at less than 3 per cent.

A similar pattern can be observed in the projected years. In 2050, Tunisia will have the highest (3.8 per cent), while Qatar (0.2

per cent) and the Syrian Arab Republic will have the lowest (0.2 per cent) additional number of unintended pregnancies if the current rate of child marriage continues to prevail.

Estimates of unintended pregnancies for the Arab region indicate that the total share of excess unintended pregnancies in 2021 was 2.8 per cent, while it will be 1.9 per cent in 2050. In absolute terms, 267,800 additional unintended pregnancies were attributable to child marriage in 2021. If child marriage continues to prevail, the Arab region will bear 323,600 additional unintended pregnancies, notwithstanding the improvement in other demographic and socioeconomic indicators.

Table S7. Demographic costs: Percentage of the additional number of unintended pregnancies attributable to child marriage across 13 Arab countries, 2001–2050

Countries	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
Algeria				1.4	0.7	0.5	1.4	2.0	2.3	2.5	2.7
Egypt				0.9	0.3	0.1	0.4	0.9	1.1	1.3	1.3
Iraq					16.1	6.0	3.7	2.8	2.4	2.1	2.0
Jordan		2.6	0.9	0.4	0.9	1.3	1.6	1.8	1.9	2.1	2.3
Mauritania					3.0	0.5	0.1	0.3	0.7	0.8	0.9
Morocco		0.7	0.4	0.2	1.0	1.4	1.7	1.9	2.3	2.7	3.0
Qatar				3.7	1.4	0.8	0.6	0.4	0.3	0.3	0.2
Somalia			4.2	2.1	1.4	1.4	1.4	1.4	1.3	1.3	1.3
State of Palestine			44.6	7.4	4.1	3.0	3.0	3.0	2.9	2.8	2.9
Sudan			7.5	1.3	0.7	0.7	1.2	1.5	1.6	1.7	1.8
Syrian Arab Republic		1.6	0.8	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.3
Tunisia				12.0	5.5	3.7	3.7	3.8	3.8	3.7	3.8
Yemen				1.2	0.5	0.3	0.6	1.0	1.1	1.2	1.3

Maternal deaths

Table S8 shows the percentage of the excess number of maternal deaths attributable to child marriage across the Arab region. The findings suggest that in 2021, out of 13 Arab countries, Iraq had the highest (21.3 per cent), and the Syrian Arab Republic had the lowest (0.9 per cent) excess number of maternal deaths attributable to child marriage. About seven countries show more than 5 per cent of the excess number of maternal deaths.

If child marriage is not eliminated, the excess number of maternal deaths attributable to child marriage will continue to prevail in 2050,

but with a change in country-level patterns. If the current rates prevail, countries like Algeria, Morocco and Tunisia will have more than 4 per cent of the excess number of maternal deaths by 2050.

Health costs counted in terms of maternal deaths for the Arab region as a whole reveal that the share of the additional number of maternal deaths attributable to child marriage stood at 7.2 per cent in 2021 and will be 3 per cent in 2050. In absolute terms, child marriage accounted for 653 additional maternal deaths in 2021, while the maternal deaths will be 551 in 2050.

Table S8. Demographic costs: Percentage of the additional number of maternal deaths attributable to child marriage across 13 Arab countries, 2001–2050

Countries	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2050
Algeria				13.3	5.9	3.8	3.9	4.1	4.1	4.1	4.2
Egypt				16.1	4.6	2.7	2.2	2.3	2.3	2.2	2.2
Iraq					21.3	8.0	4.9	3.7	3.1	2.7	2.5
Jordan		11.7	5.4	3.8	3.5	3.4	3.3	3.3	3.3	3.3	3.4
Mauritania					14.9	4.0	2.2	1.8	1.9	1.8	1.8
Morocco		7.7	3.8	2.5	2.8	3.0	3.1	3.2	3.5	3.8	4.1
Qatar				9.4	4.0	2.4	1.7	1.3	1.1	0.9	0.8
Somalia			21.5	10.8	7.2	5.9	5.1	4.5	4.0	3.7	3.5
State of Palestine			48.1	8.0	4.4	3.2	3.2	3.1	3.0	2.9	2.9
Sudan			11.8	2.1	1.2	1.0	1.5	1.7	1.8	1.8	1.9
Syrian Arab Republic			2.8	1.4	0.9	0.7	0.6	0.5	0.4	0.4	0.4
Tunisia				14.3	6.6	4.4	4.3	4.3	4.2	4.1	4.1
Yemen				13.8	5.2	3.2	2.8	2.7	2.5	2.4	2.4

Conclusion: Demographic and health costs

The demographic cost estimates for child marriage and non-child marriage scenarios clearly show a significant difference that specifically indicates a disproportionate burden of pregnancies, the number of unintended pregnancies, and maternal deaths due to child marriage. The study also observes similar differences in terms of GDP in the child marriage and non-child marriage scenarios.

In terms of the excess number of total pregnancies, Algeria and Mauritania are among the countries bearing the greatest burden, while Qatar and the Syrian Arab Republic had the least amount of burden of the excess number of pregnancies attributable to child marriage in 2021. In 2050, Algeria, Morocco and Tunisia are expected to bear the highest costs of the excess number of

total pregnancies due to child marriage if the current rate continues. Regarding the number of unintended pregnancies, Iraq, the State of Palestine and Tunisia bear the highest burden of child marriage, whereas Egypt, the Syrian Arab Republic and Yemen bore the least burden in 2021 estimates. In 2050, Tunisia is projected to endure the highest cost of unintended pregnancies if the current rate of child marriage persists. In terms of the burden of maternal deaths attributable to child marriage, Iraq and Mauritania endured the highest, while the Syrian Arab Republic bore the lowest number of maternal deaths in 2021. In 2050, Algeria, Morocco and Tunisia are projected to bear the greatest number of maternal deaths if the current rate of child marriage continues.

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